UWIR 2021-2024

Greater Kenmore & Bodalla Area

Bridgeport (Cooper Basin) Pty Ltd
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This UWIR Report (Version 01) for PL 31, 32 & 47, the Greater Kenmore and Bodalla Area is issued by authority of Bridgeport Energy Pty Ltd, under the authority of the Bridgeport Chief Technical Officer.

3rd December 2021

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Barry Smith, Chief Technical Officer

Bridgeport Energy Limited

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Acronym	Definition
ANZECC	Australia New Zealand Environment and Conservation Council
ALARP	May be As Low as Reasonably Possible
ALS	Australian Laboratory Services
AS/NZS	Australia New Zealand Standard
BTEX	Benzene, Toluene, Ethyl-benzene and Xylene
DEHP	*DES, previously known as* Department of Environment & Heritage Protection
DES	Department of Environment and Science
DNRM	Department of Natural Resources and Mines
DOR	Department of Resources
EA	Environmental Authority
ESA	Environmentally Sensitive Area
EPM	Equivalent Porous Medium
GAB	Great Artesian Basin
GDE	Groundwater Dependent Ecosystem
IAA	Immediately Affected Area
ML	Mega litres
NATA	National Association of Testing Authorities
LTAA	Long-Term Affected Area
NATA	National Association of Testing Authorities
OWC	Oil Water Contact
OWK	Oilwells Inc. Of Kentucky
PL	Petroleum Lease
STB	Stock Tank Barrel
SET	Senior Executive Team
SWL	Connate water saturation
TDS	Total Dissolved Solids
UWIR	Underground Water Impact Report

Executive Summary

This report outlines potential impacts of petroleum related extraction on groundwater and other associated ecological and social values relating to the State's water resources.

An analytical model used historic and predicted future water production volumes to assess the maximum water level drawdown below GKBA fields. Using the previous model, but with updated water extraction volumes, results showed water level drawdown is absent in the upper, unconfined layers of the Cooper and Eromanga Basins. Water drawdown is minimal in subsequent lower layers and limited to the petroleum related target aquifer. No formation experienced an increase in maximum drawdown under current extraction, and no increase in water drawdown is predicted using future water production estimates.

Local landholder bores are extremely shallow and target the unconfined Winton Formation with extremely shallow operational depths. Considering the depths at which water is extracted for petroleum and the geology of the Cooper and Eromanga Basins, as well as the analytical model results, Bridgeport conclude there is no direct impact to landholders.

Bridgeport used a standardised risk assessment to determine the likelihood of impacts from water extraction. The risk assessment determined no direct impact to groundwater, groundwater users, groundwater dependent ecosystems, environmental values or other water related criteria.

Bridgeport will continue to monitor and evaluate the risk of water extraction to landholders and the surrounding ecosystems using a monitoring plan put forward in this UWIR, and results will be reported annually.

Statement of Compliance

Since the approval of the Beach Energy UWIR in 2014 and submission by Bridgeport in 2018, from analysis of the data collected there has been limited material change in the information, predictions or impacts made in the UWIR report. The limited material change will involve an updated analytical model, which indicates a significant decline in the maximum groundwater drawdown contours surrounding Greater Kenmore and Bodalla Area.

Legislation

The following legislation was used to determine and prepare the contents of this UWIR include:

- Water Act (2000) [reprint current from 1st December 2020 to date, accessed 2021).
- Underground Water Impact Reports and Final Reports – ESR/2016/2000 Version 3.02 Effective 05 JUL 2007 (formerly EM1089) [https://environment.des.qld.gov.au/management/activities/non-mining/water/groundwater#underground_water_impact_report; accessed 2021 https://environment.des.qld.gov.au/__data/assets/pdf_file/0036/88398/rs-gl-uwir-final-report.pdf]

As per the instructions in the DES (2017), "*An UWIR must contain the information that has been outlined in each of the following parts of this guideline*", including;

- Part A: Information about underground water extractions resulting from the exercise of underground water rights
- Part B: Information about aquifers affected, or likely to be affected
- Part C: Maps showing the area of the affected aquifer(s) where underground water levels are expected to decline
- Part D: An assessment of the impacts of the environmental values from the exercise of underground water rights
- Part E: A water monitoring strategy
- Part F: A spring impact management strategy

- Part G (a): For a CMA, assignment of responsibilities to resource tenure holders (N/A)
- Part G (b): Final reports

To make sure Bridgeport have complied with the above requirements, we have chosen to itemise the Parts and include the relevant requirements (as sections) of the relevant legislation as they have been laid out in DES (2017).

Project Setting

Bridgeport Energy operates several conventional oilfields in the Eromanga Basin, approximately 280 km west of the township of Charleville. The two main oilfields are Kenmore and Bodalla, with 16 and 11 wells respectively (Table 1). The main fields support numerous satellite fields, including Blackstump, Marcoola, Bargie Byrock, Coolum and Glenvale. These satellite fields contain far fewer wells (Table 1). All of these fields extend throughout the arid to semi-arid Channel Country in south-eastern Queensland.

Table 1: Bridgeport Energy Oilfields in the Greater Kenmore & Bodalla Area

Oil Field Name	Oil Field Type	PL Number	Number of Wells currently producing (as of September 2021)
Kenmore	Main field, Conventional Oil Field	PL 32	19
Bodalla	Main field, Conventional Oil Field	PL 31	13
Blackstump	Conventional Oil Field	PL 47	2
Marcoola	Conventional Oil Field	PL 482	1
Bargie	Conventional Oil Field	PL 256	1
Byrock	Conventional Oil Field	PL 484	1
Coolum	Conventional Oil Field	PL 483	1
Glenvale	Conventional Oil Field	PL 483	1

The oil fields of Kenmore (26°39'1.47"S, 143°26'11.47"E), Bodalla (26°27'23.59"S, 143°25'36.59"E) and Blackstump (26°37'36.40"S, 143°18'37.81"E), generally referred to as the Greater Kenmore and Bodalla Area (GKBA) are located approximately 280 km west of Charleville, the largest regional town in the immediate area. The closest township is Eromanga, 16 kilometres to the west of the Kenmore production facility.

The Kenmore production facility consists of a small (up to 20 man) camp, production facility, storage tanks, loadout facility, chemical storage area and evaporation ponds. The Bodalla production facility has a similar design, with similar facilities, however it is designed to operate with a single operator. Blackstump oil field is an un-maned satellite field, consisting of two beam pumps, flow lines to the vertical separators, a skimmer and the evaporation ponds. Marcoola, Bargie, Coolum, Glenvale and Byrock are similar to Blackstump, in that they only have one beam pump, and facilities for fuel storage, flow lines, vertical separators, a skimmer and evaporation ponds.

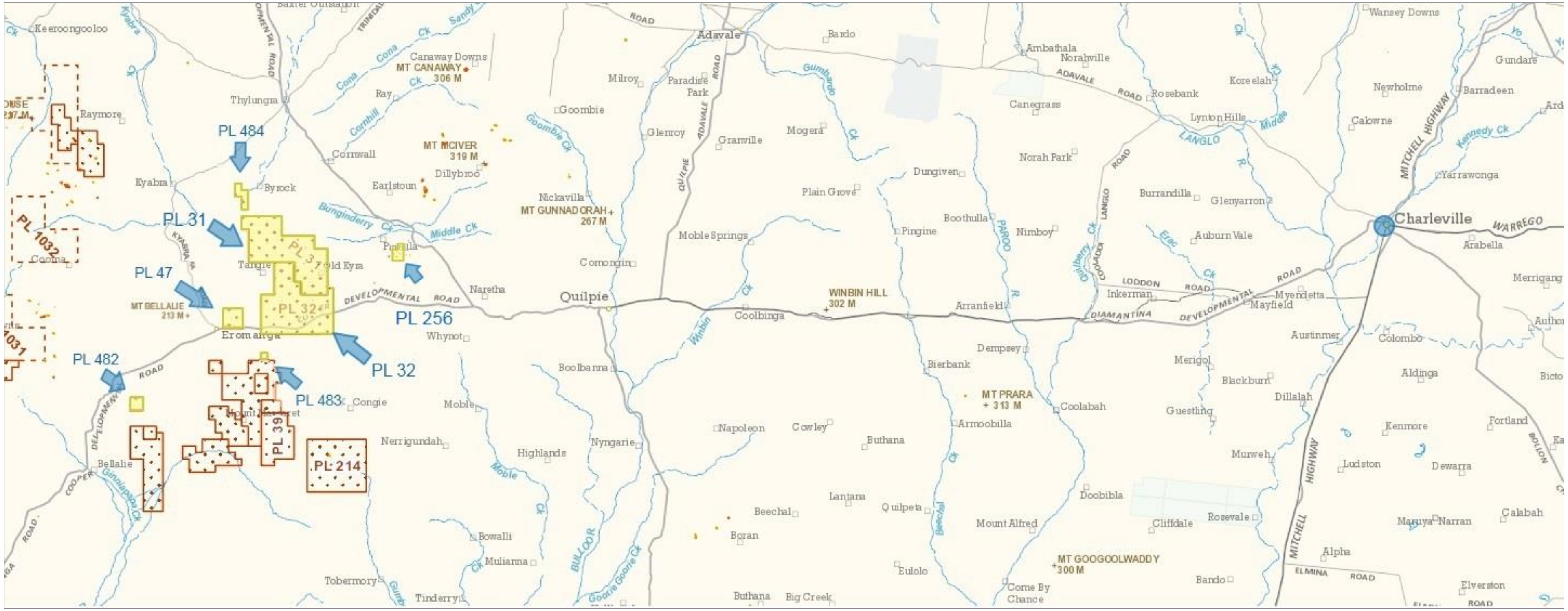


Figure 1: The location of PL 31, 32 & 47 (GKBA), PL 482 (Marcoola), PL 483 (Coolum and Glenvale), PL 484 (Byrock) and PL256 (Bargie), 285 km west of Charleville.

Part A*: Underground water extractions

Requirements under section 376(a) of the Water Act
To meet the requirements under section 376(a) of the Water Act, an UWIR must include the following: **1. The quantity of underground water produced or taken from the area because of the exercise of underground water rights; and** **2. An estimate of the quantity of water to be produced or taken because of the exercise of underground water rights for a three-year period starting on the consultation day of the report.**

*Part A refers to Section 5.1.1 (page 12) of the guideline (DES 2017).

Bridgeport Energy has developed a monitoring strategy that meets the requirements of Section 376(a)(1) of the Water Act. This section provides specific details of how water related parameters are collected, including water produced or taken as part of exercising underground water rights.

Bridgeport Energy's monitoring strategy is based on three primary parameters:

- Formation water production
- Reservoir oil/water level depth
- Water quality

The volumetric measurements of oil and produced water are required from an operational point-of-view, to aid in the process of facility optimisation. This includes tracking productivity so that separation processes are optimised (and therefore appropriate volumes of chemicals are used in the separation process where applicable, and therefore less oil is discharged into the post-separation treatment process), processing capacity is increased, and oil production is maximised.

Since April 2017, Bridgeport has measured oil and water production, which can be used to calculate the volume of water extracted per well and standardised to beam pump operating time. In the field, each well is flow tested into an isolated test tank at different intervals. After a settlement period, the contents of the tank are volumetrically measured by means of a dipstick and water-indicating paste. Volumes of both produced oil and water are obtained from this measurement.

Volumetric oil and water calculations are recorded to calculate production rates for oil and water over time.

Daily water and oil production rates (total fluid rates) are also correlated to the beam pump operation time daily, to provide a more accurate water/oil production per unit operation time across the field/s.

As a result, historical water production statistics are available for the field and on a per-well basis (Appendix 2). Consequently, Bridgeport has a detailed understanding of extraction rates throughout its ownership history.

Methods for measuring underground water level

Bridgeport monitors the depth of underground water levels. Since a significant portion of the requirements under S376 of the Water Act pertain directly to the relationship between water extraction and underground water level depth, Bridgeport has adopted two methods of evaluating water depth.

The first is through analysis of current wells and their production status. Underground water levels tend to rise as oil is depleted. Consequently, when an existing well “waters out” (ceases to produce oil and only produces water), it is inferred that in the immediate localised area, the underground water level has risen to the depth of the well’s perforations. For the wells drilled in GKBA, this some 1400m from surface.

The second of these is through identification of the oil/water contact (OWC) via petrophysical analysis as new wells are drilled. When new wells are drilled; the oil-water contact at the time of drilling is identified by log analysis through independent third-party contractors. Since the depth of the oil/water contact is defined as the top of the aquifer, identification infers aquifer water level. Maintaining records of these parameters helps define the original reservoir water level as well as how water level depth might change over the production life of the field, as water displaces oil. The geological attributes of the targeted Hutton or other formations does not allow the consistent determination of the OWC however and is discussed in detail below.

Cumulative assessment of water extracted

From November 2014 to August 2021, a total of 11,978.49 ML of water was extracted. Bridgeport took ownership of the majority of the GKBA producing assets in March 2017. Total water extraction has remained relatively constant annually, from 1,763.95 ML in 2015, 1,807.41 ML in 2016, 1,869.63 ML in 2017 to 1,447.88 ML in 2018. In the last three years, 1,880.37 ML in 2019, 1,528.96 ML in 2020 and 1,678.79 ML in 2021 (Table 2).

Kenmore is the largest water producing field across the GKBA tenements. In the last three years, Kenmore has produced 3,904.52 ML (or 76.72% of the 5,089.61 ML total). Bodalla is the second largest producing field, producing 2,414.40 ML of the three-year total (or 20.93% of the total), for a combined contribution of 97.65%. The next biggest producer is Black Stump, which produced an average of 2.20% (or 111.82 ML of the total). All other fields are extremely minor contributors to the three-year production figures. They include 0.70 ML (0.01%) at Coolum, 2.38 ML (0.05%) at Glenvale, 4.72 ML (0.09%) at Marcoola and 0.09 (0.002%) ML at Bargie (Table 2).

Table 2: Annual water extracted from the GKBA fields between November 2016 and October 2021.

Year	Bodalla	Kenmore	Blackstump	Marcoola	Glenvale	Coolum	Bargie	Byrock	Total water extracted (ML)
2015	372.30	1,379.21	9.62	1.66	0.35	0.81	0.00	0.000003	**1,763.95**
2016	336.24	1,469.76	0.00	0.90	0.26	0.25	0.00	0.000000	**1,807.41**
2017	353.32	1,492.07	23.72	0.19	0.28	0.06	0.00	0.000000	**1,869.63**
2018	287.16	1,117.47	40.67	1.34	0.96	0.29	0.01	0.000000	**1,447.88**
2019	343.27	1,499.14	35.40	1.57	0.70	0.22	0.06	0.000000	**1,880.37**
2020	331.59	1,164.97	31.34	1.55	0.76	0.22	0.03	0.000000	**1,528.96**
2021	390.53	1,240.31	45.07	1.60	0.91	0.26	0.01	0.000000	**1,678.79**
Total	**2,414.40**	**9,363.02**	**185.82**	**8.81**	**4.23**	**2.10**	**0.11**	**0.000003**	**11,978.49**

Cumulative water production per well (in ML) between November 1st 2014 and October 31st 2021 in GKBA oilfield is quantified in Table 3. Wells vary across and within fields, but if we break down the two largest fields into a per well basis, major contributions come from only a small minority of wells (6 at Kenmore and 5 at Bodalla). The 6 largest contributions to total water production at Kenmore are Kenmore 39, which contributes 23.01% of the total water from all Kenmore wells. This is followed by Kenmore 30 (15.42%), Kenmore 27 (10.69%), Kenmore 8 (10.43%), Kenmore 10 (9.13%) and Kenmore 28 (7.79%). All other Kenmore wells contribute rather minor amounts compared to the total (Table 3). The largest contributions at Bodalla include Bodalla 17 (24.05%), Bodalla 14 (19.22%), Bodalla 09 (15.66%), Bodalla 05 (15.62%) and Bodalla 6 (6.94%) (Table 3).

A "year's" data is reported from November 1st the previous year, through to the 31st of October that year, to allow reporting (e.g. 2015 data includes 1st November 2014 through to 31st October 2015).

Table 3: Cumulative water (ML) extracted from each well in GKBA between 2015 and 2021.

Well	Cumulative water (ML)		Well	Cumulative water (ML)
Kenmore 1	127.67		**Kenmore 37**	315.94
Kenmore 2	89.35		**Kenmore 39**	2,154.62
Kenmore 3	195.47		**Kenmore 41**	5.78
Kenmore 8	976.47		**Bodalla 5**	377.14
Kenmore 9	37.47		**Bodalla 6**	167.47
Kenmore 10	855.30		**Bodalla 9**	378.09
Kenmore 11	191.84		**Bodalla 10**	33.97
Kenmore 13	45.83		**Bodalla 13**	155.26
Kenmore 15	460.87		**Bodalla 14**	463.93
Kenmore 16	35.08		**Bodalla 15**	132.39
Kenmore 17	72.76		**Bodalla 16**	12.07
Kenmore 18	55.33		**Bodalla 17**	580.74
Kenmore 20	296.21		**Bodalla 19**	0.27
Kenmore 22	70.63		**Bodalla 20**	7.73
Kenmore 24	23.94		**Bodalla 21**	91.74
Kenmore 26	2.07		**Bargie 01**	0.06
Kenmore 27	1,001.23		**Bargie 05**	0.04

Kenmore 28	729.25		**Blackstump 01**	165.01
Kenmore 30	1,443.32		**Blackstump 04**	19.31
Kenmore 31	0.46		**Blackstump 06**	1.50
Kenmore 32	3.00		**Marcoola 01**	8.81
Kenmore 33	133.82		**Coolum 01**	2.10
Kenmore 34	6.35		**Glenvale 01**	4.23
Kenmore 35	32.95		**Byrock 02**	0.00

Annual water production (ML) histograms across key wells in the Kenmore and Bodalla oil fields (and satellite fields) are presented in Figure 2. Extraction quantities vary on a per well basis over time. The easiest method to compare temporal variation is Figure 2 and Figure 3.

Kenmore has seen some wells increase in production in 2021 (e.g. Kenmore 27, 28 and 30), whilst some have decreased (e.g. Kenmore 8, 16, and 39). Some have ceased or are temporarily shut in (e.g. Kenmore 22, 35 etc.). Trends in production per well remain variable across the field, and there are no specific patterns.

At Bodalla, production per well is more consistent. Bodalla 5 and 6 have remained relatively consistent, whilst water production from Bodalla 15 has decreased annually over the last several years. Bodalla saw a marketed increase in water production. Bodalla 9 has had a consistent increase in produced water volumes since 2015, with annual production remaining consistent over the last three years. By far the largest annual contribution to total water production in the past was from Bodalla 17. This has substantially decreased however, from a total of 221.27 ML in 2015, 20.19 ML in 2018 to 2.54 ML in 2021. Figure 3 also demonstrates the overall small proportional contribution satellite fields make to total water extraction. Blackstump 1 has increased production from 9.61 ML in 2015 to 35.84 ML in 2018. Blackstump is contributing a relatively low but consistent amount of water extraction per year over time. The other satellite fields, such as Bargie, Byrock, Coolum, Glenvale and Marcoola are barely featured due to extremely low volumes.

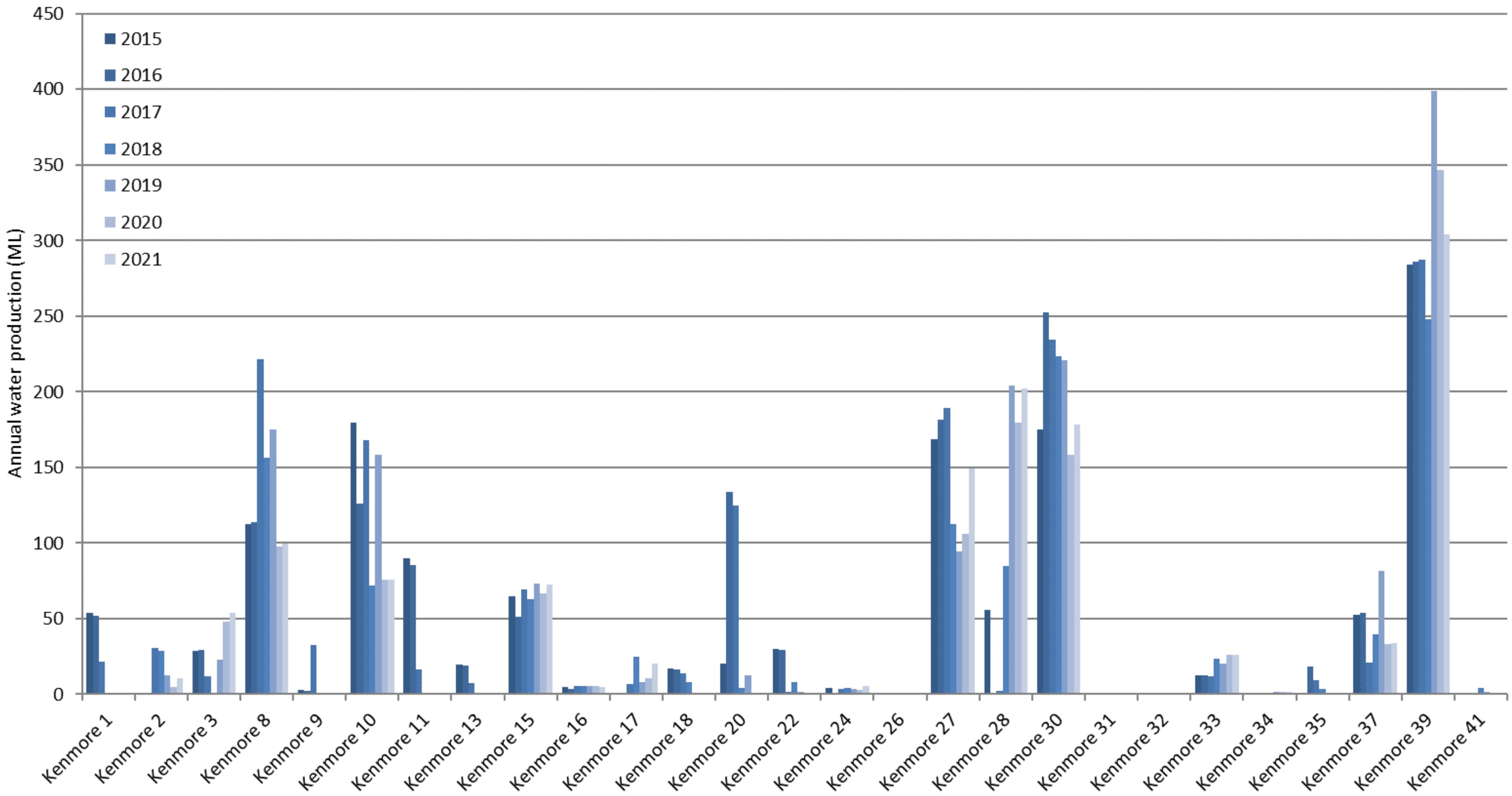


Figure 2: Annual water (ML) production per well at Kenmore, from 2015 to 2021.

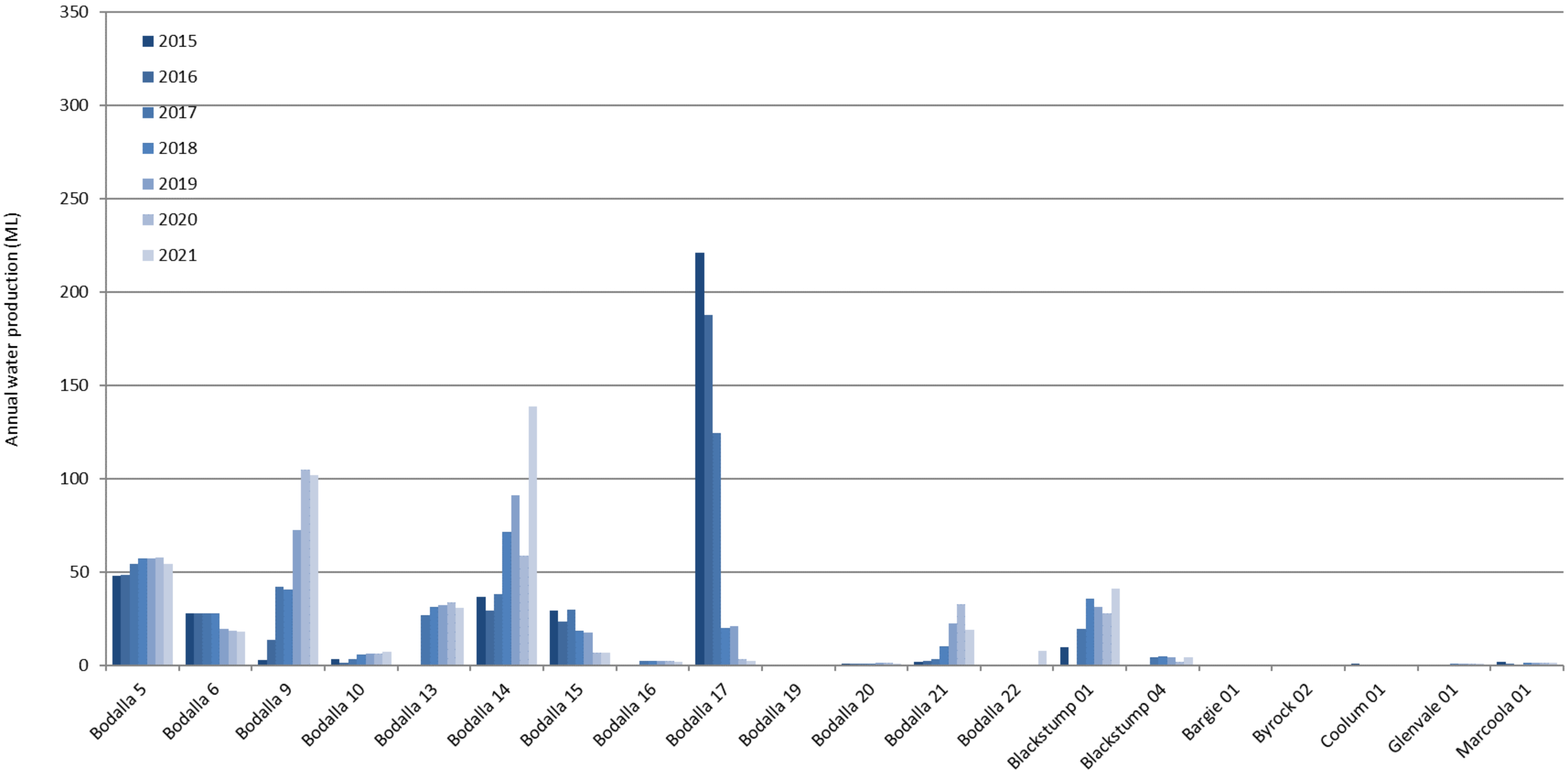


Figure 3: Annual water (ML) production per well at Bodalla and the satellite fields from 2015 to 2021.

Previous Production Estimates

In the previous UWIR (Bridgeport 2018), Bridgeport provided a prediction of three future years of production based on extrapolation by an appropriately qualified Senior Reservoir Operations Engineer. In 2019, Bridgeport produced 1,880.37 ML of water across the tenements, a 23.1% (or 389.94 ML) increase against the predicted 1,490.43 ML. In 2020, Bridgeport produced 1,528.96 ML compared to the predicted 1,493.13 ML, an increase of 37.33 ML (or 2.5%). In the final year of this reporting period, 2021, Bridgeport produced 1,678.79 ML compared to the predicted 1,495.22 ML, a difference of 11.56%.

Table 4 summarises the results of the period between 2019 and 2021, inclusive.

Table 4: A comparison between the predicted water production from each year from the Bridgeport UWIR (2018-2021)

Type	Year	Bodalla	Kenmore	Blackstump	Marcoola	Glenvale	Coolum	Bargie	Byrock	Total (ML)
Predicted	**2019**	289.24	1,152.48	44.61	2.14	1.04	0.38	0.0000	0.2200	**1,490.43**
Actual	**2019**	343.27	1,499.14	35.40	1.57	0.70	0.22	0.0600	0.0000	**1,880.37**
Predicted	**2020**	290.39	1,153.58	44.68	2.32	1.10	0.41	0.0000	0.2900	**1,493.13**
Actual	**2020**	331.59	1,164.97	31.34	1.55	0.76	0.22	0.0300	0.0000	**1,528.96**
Predicted	**2021**	291.23	1,154.52	44.75	2.41	1.16	0.44	0.0000	0.3400	**1,495.22**
Actual	**2021**	390.53	1,240.40	45.07	1.60	0.91	0.26	0.0100	0.0000	**1,678.79**

Future Production Estimates

Section 376(1)(ii) requires an estimate of the quantity of water to be produced or taken because of the exercise of the relevant underground water rights.

Where there was sufficient and consistent production history, the method of decline curve analysis (DCA) was applied in ValNav software, which is an industry-based reservoir engineering platform. As most of the wells have been producing for many years, DCA was undertaken on a well-by-well basis for each of Bridgeport's producing fields. Varity of methods includes DCA of historical oil production, total liquid production and water cut/WOR trends.

Bridgeport Energy predicts the annual water production will average 1,805.20 ML from combined GKBA assets between 2022 and 2024 (

Table 5). Bridgeport predict 1,773.07 ML in 2022, 1,834.08 ML in 2023 and 1,808.44 ML in 2024.

Bridgeport acknowledges depleting oilfields produce an increased volume of water as a percentage cut from all fluids extracted. There are a number of options which can oil flow from production from wells, including;

- Re-perforating other oil producing formations
- Increased pumping and other well optimisations
- Enhanced Oil Recovery techniques

Bridgeport predicts total water extraction will remain relatively constant in the next three years, as there are no significant plans to change production at the wells (

Table 5).

Table 5: Actual and predicted water extraction (ML) from the GKBA group from 2016 to 2024.

Year	Bodalla	Kenmore	Blackstump	Marcoola	Glenvale	Coolum	Bargie	Byrock	Total extracted (ML)
2016	331.68	1479.56	0.00	0.67	0.25	0.12	0.00	0.00	1812.28
2017	353.76	1445.29	31.44	0.24	0.41	0.10	0.00	0.00	1831.24
2018	298.95	1165.03	40.30	1.50	0.91	0.29	0.01	0.00	1506.98
2019	332.95	1427.03	37.88	1.59	0.60	0.17	0.06	0.00	1800.27
2020	344.38	1167.10	28.06	1.53	0.91	0.26	0.03	0.00	1542.28
2021	324.20	1036.81	38.52	1.35	0.76	0.22	0.01	0.00	1401.87
2022	405.25	1,322.36	42.01	1.36	1.60	0.26	0.20	0.03	**1,773.07**
2023	414.76	1,374.05	40.92	1.24	2.46	0.26	0.36	0.03	**1,834.08**
2024	407.79	1,354.56	39.97	1.13	4.42	0.26	0.28	0.02	**1,808.44**
Combined Total	**3,213.72**	**11,771.80**	**299.10**	**10.60**	**12.31**	**1.94**	**0.95**	**0.08**	**15,310.50**

The total water production from the last three years (2019, 2020 and 2021) has been compared to the future modelled predictions below (Figure 4).

Kenmore observed a decline after 2019, and a gradual increase in extraction over the two following years. Production is predicted to continue to rise on a similar path until 2024, when extraction should level out (Figure 4, A). Bodalla was very consistent and has been since 2016. Extraction is predicted to increase by a small margin from 2021 levels, but remain consistent (Figure 4, B). Satellite fields (Figure 4, C) are similar, in that although they are expected to increase in extraction rates, they are marginal increases remaining consistent in the next three years.

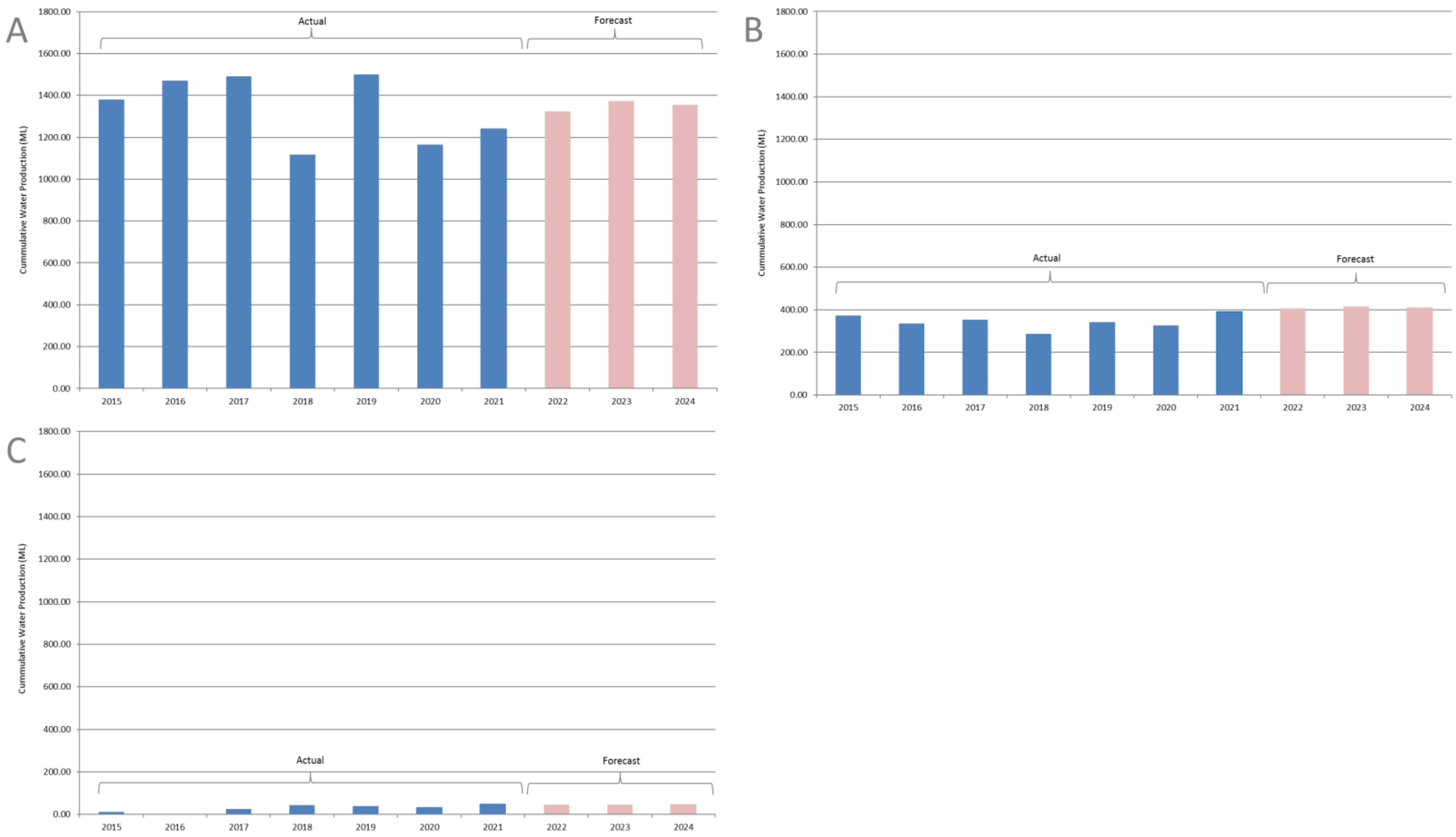


Figure 4: Cumulative water production (ML) per field at (A) Kenmore, (B) Bodalla,(C) Satellite fields including forecasts 2024.

Part B*: Aquifer information and underground water flow

Requirement under sections 376(b)(i) to 376 (b)(iii) of the Water Act
For each aquifer affected, or likely affected, by the exercise of the relevant underground water rights, an UWIR must include: **1. A description of the aquifer;** **2. An analysis of the movement of underground water to and from the aquifer, including how the aquifer interacts with other aquifers; and** **3. An analysis of the trends in water level change for the aquifer because of the exercise of underground water rights.**

*Part B refers to Section 5.1.2 (page 13) of the guideline (DES 2017).

Hydrogeological/aquifer descriptions for each field is mentioned per field in individual selections below.

PL 31, 32 & 47 Kenmore, Bodalla and Blackstump

Location

The Eromanga and Cooper Basins are multi-layered hydro stratigraphic basins within the Great Artesian Basin (GAB). The basin areas extend over one million square kilometres across Queensland, New South Wales, South Australia, and the south-east of the Northern Territory and are one of the largest artesian basins in the world. At surface there is a wide diversity of land and ecosystem values that are defined by geological, geomorphological and hydrological influences.

Geological setting

The Eromanga Basin is overlain by the Lake Eyre Basin, a succession of Tertiary and Quaternary age sediments occurring extensively throughout central Australia. In the north east of South Australia, the Lake Eyre, Eromanga Basin sediments were deposited during the Jurassic-Cretaceous period and reach a maximum thickness between 1200 m and 2700 m. These sediments were deposited under fluvial, lacustrine and (later) shallow-marine conditions, and are broadly continuous across the basin. These sediments are gently folded in some areas and contain a succession of aerially extensive sandstone formations that serve as oil reservoirs and regional aquifers. The Eromanga Basin is the largest basin within the Great Artesian Basin (GAB). The Eromanga Basin lies within South Australia, with other components in Queensland and New South Wales. Production from the GKBA is predominantly from this basin.

Beneath the Eromanga Basin, and entirely covered by an unconformity, the Cooper Basin is limited in its distribution by bounding faults and pinch-out edges. The tectonic history of the Cooper and Eromanga basins is complex and has been characterised by several periods of rift-related subsidence and compressional uplift and erosion. This history has resulted in the Cooper Basin being subdivided into a number of large scale sub-troughs separated by fault-bounded ridges (Figure 5). The GKBA has potential exploration potential, but except for the Byrock field in PL484, exploration has been limited in the Cooper Basin.

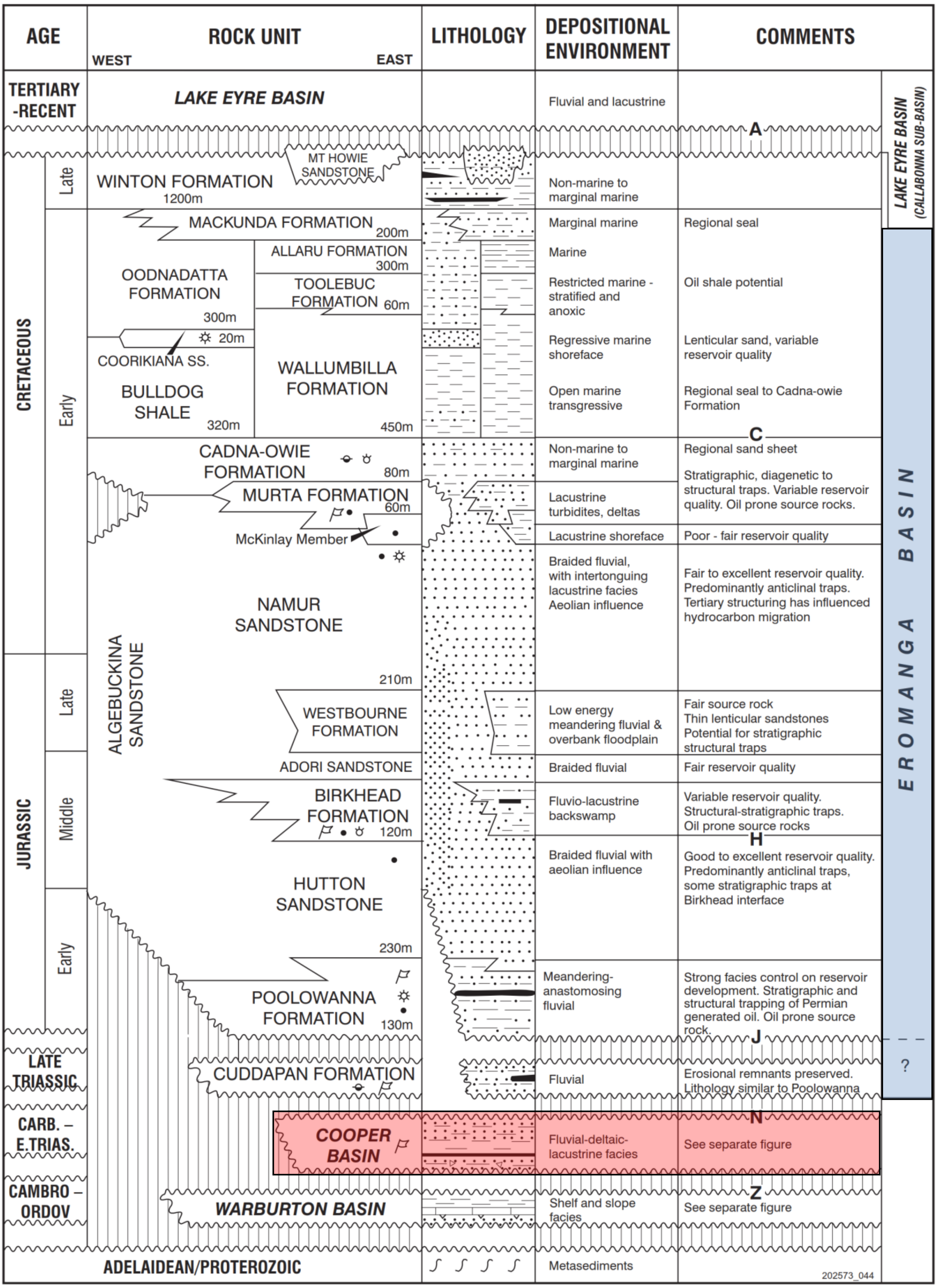


Figure 5: Stratigraphic column of the Eromanga Basin (blue) and Cooper Basin (red)

Hydrogeological setting

The targeted formations of the Kenmore oil field consist of the Birkhead Formation, the Hutton Sandstone and the Poolowanna Formation (also known as Basal Jurassic) in the Eromanga Basin. These targets are >1,400 m below surface.

In the Kenmore oil field, the Birkhead Formation consists of interbedded shales, silt stones and sandstones and is approximately 70 m thick. The Hutton Sandstone consists of highly porous sandstone, approximately 115 to 120 thick. The Poolowanna Formation consists of interbedded carbonaceous shale and sandstone, approximately 40 m thick.

Much the same as Kenmore, the Bodalla oil field targets the Birkhead Formation, Hutton Sandstone and Poolowanna Formation. The Birkhead Formation consists of fine to medium grained well sorted sandstones, interbedded with mud rocks. The Hutton Sandstone comprises two units, a course lower bed of sandstone and an upper unit of finer grained sandstones. The Poolowanna Formation comprises fine to coarse grained sandstones with minor coals and mud rocks.

There are two wells at Blackstump that target the Poolowanna Formation. The formation consists of multiple sandstone intervals, the highest of which including lacustrine sand bodies, each with multiple permeability ranging from 2.8×10^{-4} m/day to 1.59 m/day.

The formations which Bridgeport target for extraction are sealed by impervious strata both above and below, with properties that do not allow the migration of fluid. Some strata also have extremely low permeability and porosity, both features which concentrates oil within a particular formation.

Figure 6 shows the amount of shale and sand through geological formations at key wells across key fields, from Byrock to Utopia (a separate field Bridgeport operates) in the region. This figure uses gamma ray logs correlated with depth. The section from the Mackunda down to the top Candna-Owie is a series of primarily marine shales approximately 600 metres thick, which form an effective aquiclude trapping hydrocarbons below and separating the target oil bearing sands below the Cadna-Owie from the shallow groundwater aquifers above the Mackunda, which are used by landowners and water users regionally.

Each well is drilled to international standards, including casing and cementing, that are designed to separate production volumes from accessing the overlying strata.

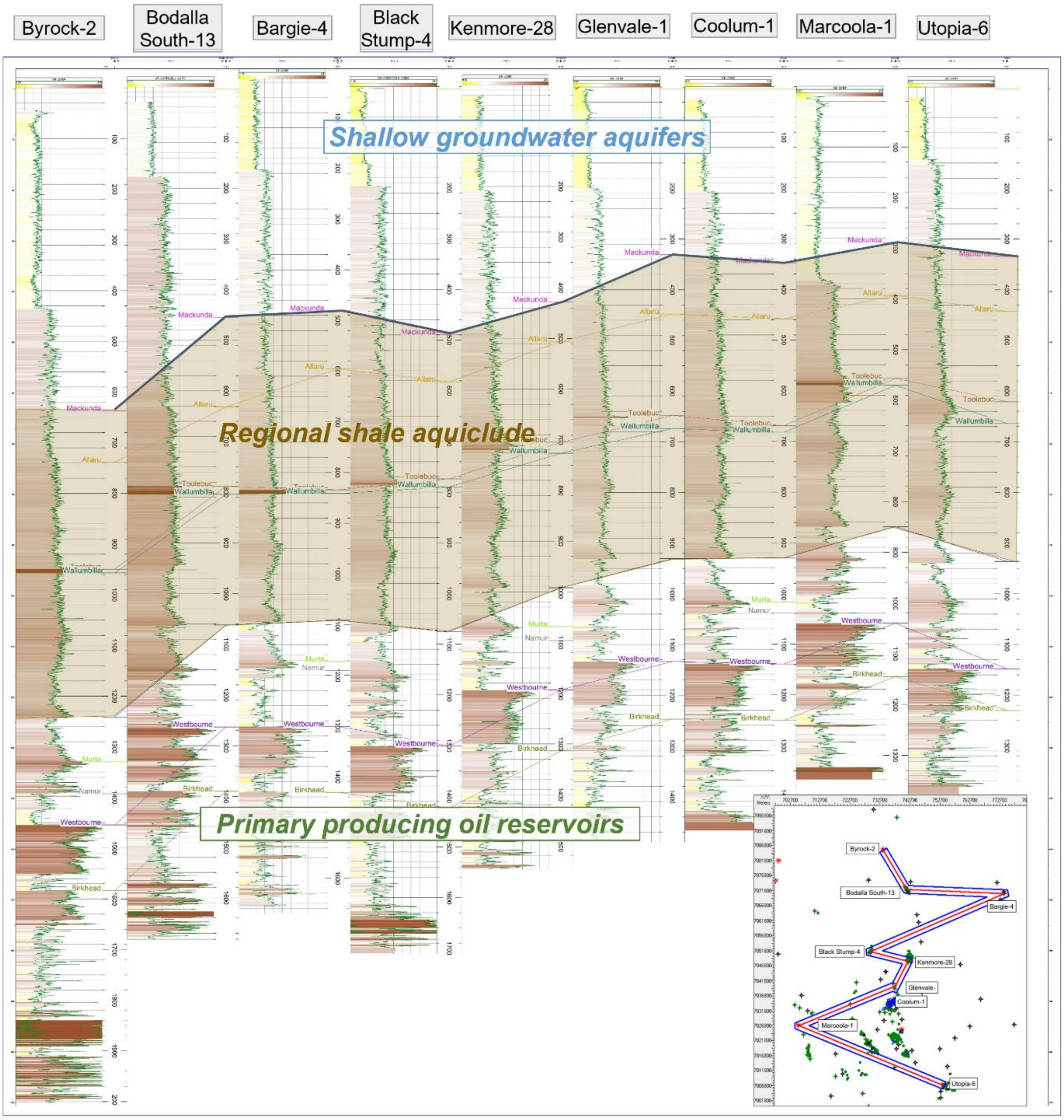


Figure 6: Gamma ray log cross section, correlated with depth from Byrock-2 to Utopia-6, showing the amount of shale and sand through the geological formations.

Any significant faults that intersect aquifer

Extensive shales separate major sand bodies, acting as a vertical barrier to hydrocarbon migration throughout the Kenmore and other nearby fields.

Well histories

The table below does not cover the entire history of each well prior to Bridgeport ownership, as documentation is difficult to find in some instances. Accurate recent history (<4 years) is displayed (Table 6).

Table 6: Individual well histories at Kenmore, Bodalla and Blackstump from 2017 to 2024.

Well	Status	Formation	History
Kenmore 1	Producing	Basal Jurassic	
Kenmore 2	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests. Pulled and replaced tubing, June 2021.
Kenmore 3	Producing	Hutton	
Kenmore 4	Suspended	Hutton	Currently suspended
Kenmore 5	Suspended		
Kenmore 6	Producing	Hutton	
Kenmore 7	Producing	Hutton	
Kenmore 8	Producing	Hutton	
Kenmore 9	Producing	Hutton	
Kenmore 10	Producing	Hutton	
Kenmore 11	Producing	Hutton	
Kenmore 13	Producing	Hutton	
Kenmore 14	Suspended	Hutton	
Kenmore 15	Producing	Hutton	
Kenmore 16	Producing		
Kenmore 17	Producing	Basal Jurassic	May 2017 - Pulled out rods and replaced with new downhole pump and rods. Pulled rods and ran in rod string and pump, 2021.
Kenmore 18	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests.

Well	Status	Formation	History
Kenmore 19	Producing	Hutton	
Kenmore 20	Suspended	Hutton	
Kenmore 21	Suspended	Hutton	
Kenmore 22	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests. October 2017 Run in downhole pump and rods, installed artificial lift to bring well online.
Kenmore 23	Producing	Hutton	
Kenmore 24	Producing	Hutton	January 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. Pulled and replaced pump and rod string, 2021.
Kenmore 26	Producing	Basal Jurassic	Re-ran pump and rod string, June 2021.
Kenmore 27	Producing	Hutton	
Kenmore 28	Producing	Hutton	June 2017 - Slick line work to conduct flow and build up tests. October 2017 - Pulled tubing and jet pump and ran with new tubing and jet pump.
Kenmore 29	Suspended	Hutton	
Kenmore 30	Producing	Hutton	
Kenmore 31	Suspended	Hutton	
Kenmore 32	Producing	Hutton	January 2017 - Pulled out rods and replaced with new downhole pump and rods.
Kenmore 33	Producing	Hutton	Replaced parted rod string and downhole pump in November 2019.
Kenmore 34	Producing	Hutton	April 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods
Kenmore 35	Producing	Adori & Westbourne	
Kenmore 36	Suspended	Hutton	Perforated Birkhead over 1391-1396m and put on hydraulic pump.
Kenmore 37	Producing	Hutton	
Kenmore 39	Producing	Hutton	
Kenmore 41	Producing	Hutton	
Bodalla 1	Suspended	Hutton	

Well	Status	Formation	History
Bodalla 2	Suspended	Hutton	
Bodalla 3	Suspended	Hutton	
Bodalla 4	Suspended	Hutton	
Bodalla 5	Free flow	Basal Jurassic	
Bodalla 6	Free flow	Basal Jurassic	
Bodalla 8	Suspended	Hutton	
Bodalla 9	Producing	Hutton	
Bodalla 10	Producing	Birkhead	Rod change in March 2020.
Bodalla 11	Suspended	Hutton	
Bodalla 12	Suspended	Hutton	
Bodalla 13	Producing	Hutton	
Bodalla 14	Producing	Hutton	
Bodalla 15	Producing	Hutton	
Bodalla 16	Producing	Hutton	
Bodalla 17	Producing	Hutton	
Bodalla 18	Suspended	Hutton	
Bodalla 19	Producing	Birkhead	July 2017 - Installed artificial lift to bring well online.
Bodalla 20	Producing	Basal Jurassic	June 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. Rod repair in March 2020.
Bodalla 21	Producing	Basal Jurassic	
Blackstump 1	Producing	Basal Jurassic	March 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. September 2019 upgraded downhole pump. April 2020 replaced and upgraded downhole pump.
Blackstump 4	Producing	Basal Jurassic	March 2017 - Pulled out rods and tubing and replaced with new tubing, downhole pump and rods. Pull completed, re-run rods and pump, March 2021.
Blackstump 6			

PL 256 Bargie

Location

The satellite oil field of Bargie (26°28’22.85”S, 143°44’17.64”E) is located 255 km directly west of Charleville, and 55 km west, north-west of Quilpie (Figure 7). The currently producing Bargie 1 well was drilled on the 1st of January 1994 to a total depth of 1732.0 m. Note, an application to renew PL 256 is currently pending with the Department of Resources, and will result in a name change to PL 1064 in the future.

Figure 7: The location of PL 256 Bargie, 55km to the west north-west of Quilpie. The tenement is approximately 15 km^2, with 0.23 km^2 of oil field.

Geological setting

The geological setting of Bargie is considered the same as that described for the GKBA described in Figure 5 above.

Hydrogeological setting

The Basal Jurassic or Poolowanna Formation in the Eromanga Basin is the targeted formation in the Bargie tenement. The formation consists of multiple sandstone intervals, the highest of which including lacustrine sand bodies, each with multiple permeability ranging from 2.8×10^{-4} m/day to 1.59 m/day. The structure is also sealed by strata above, which concentrates oil within this zone. Bargie 1 well is perforated into this formation at 1609.7 to 1614.0 m.

Any significant faults that intersect aquifer

The Poolowanna Formation at the Bargie field is defined by a four-way closure on a north south plunging anticline.

Well histories

The table below does not cover the entire history of each well prior to Bridgeport ownership, as documentation is difficult to find in some instances. Accurate recent history (<4 years) is displayed (Table 7).

Table 7: Individual well history at Bargie from 2017 to 2021. Does not cover the entire history of each well. Accurate recent history (<4 years) is displayed.

Well	Status	Formation	History
Bargie 1	Producing	Basal Jurassic	Drilled January 1994
Bargie 2	Plugged & Abandoned		Spudded April 1995
Bargie 3	Plugged & Abandoned		Spudded May 1995
Bargie 4	Plugged & Abandoned		Spudded October 2003

PL 482 Marcoola

Location

The satellite oil field of Marcoola (26°51’54.50”S, 143°4’10.73”E) is located approximately 321 km west south west of Charleville and 30 km south-west of the smaller township of Eromanga (Figure 8). The tenement covers approximately 12 km^2. The area of disturbance is less than 0.01 km^2, considering only one well and interceptor pond is present. The well was originally drilled in 2007 into the Hutton Sandstone. No well completion report is available for the drilling in 2007. Note, an application to renew and amalgamate PL 482, 483 and 484 is currently pending with the Department of Resources and will result in a name change to PL 1063 in the future.

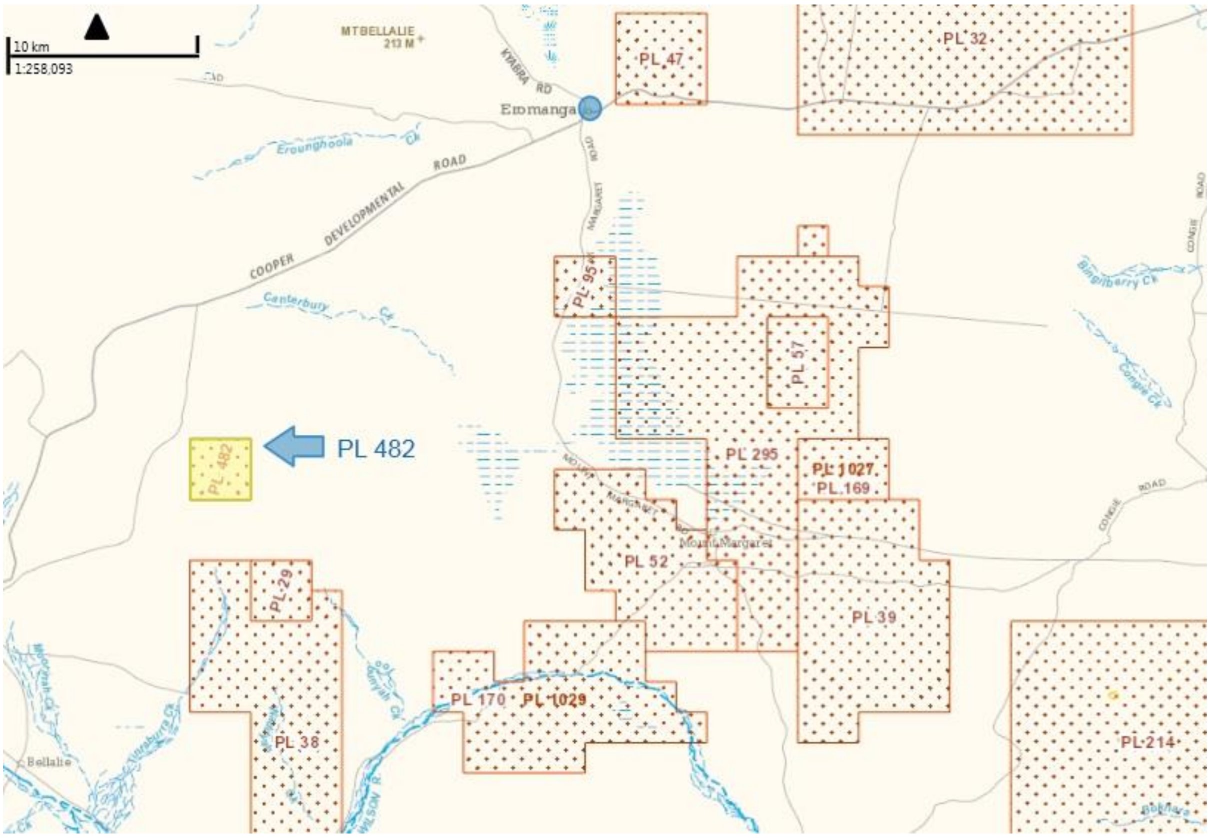


Figure 8: The location of PL 482 Marcoola, 30 km south west or Eromanga. The tenement is 12 km^2, with >0.01 km^2 of oil field.

Geological setting

The geological setting of Marcoola is considered the same as that for the general GKBA, described in Figure 5.

Hydrogeological setting

The target formation for the Marcoola field is the Hutton Sandstone. The Hutton Sandstone can be separated into two distinct portions in the Marcoola oil field, the upper, consisting of fine to medium grained sandstone, well sorted, sub rounded and with white clay matrix, with excellent inferred porosity. The lower portion is defined by rare siltstone. The well at Marcoola is a co-mingled production well, with new perforations occurring at 916.5 – 923.2 m RDT in the Murta Formation (M2 Sandstone), with legacy perforations in the Hutton. Due to the co-mingled production, a determination of specific volumes of total oil and water produced from either formation cannot be accurately determined (Appendix 1).

Any significant faults that intersect aquifer

Near Marcoola oil field there is an anticlinal structure known as Harkaway Anticline, running in a southeast to northwest direction. The structure is also sealed by strata above, which concentrates oil within this zone.

Well histories

The table below does not cover the entire history of each well prior to Bridgeport ownership, as documentation is difficult to find in some instances. Accurate recent history (<4 years) is displayed (Table 8).

Table 8: Individual well history at Marcoola from 2017 to 2021.

Well	Status	Formation	History
Marcoola 1	Producing	Hutton	Parted rod string replacement August 2014. Re-perforated into Murta reservoir December 2017.

PL 483 Coolum & Glenvale

Location

The satellite oil field of Coolum and Glenvale (26°44’33.32”S, 143°23’45.09”E) is situated 280 km to the west of Charleville and 15 km south east of Eromanga (Figure 9). Two wells were drilled in this tenement, Coolum 1 and Glenvale 1. They are both still actively producing. Coolum 1 was drilled to a depth of 1468 m and Glenvale 1 was drilled to a depth of 1487 m. Note, an application to renew and amalgamate PL 482, 483 and 484 is currently pending with the Department of Resources, and will result in a name change to PL 1063 in the future.

Figure 9: The location of PL483 Coolum & Glenvale, 15 km to the south-east of Eromanga. The tenement is 3 km², with<0.08 km² of oil field.

Geological setting

The geological setting of Marcoola is considered the same as that described for the general GKBA described in Figure 5 above.

Hydrogeological setting

The target formation of the two wells in Coolum and Glenvale is the Westbourne Formation of the Late Jurassic in the Eromanga Basin. The Westbourne Formation is generally considered to be a confining bed of homogeneous characteristics. The formation comprises interbedded siltstone and sandstone units of poor to fair porosity, and oil is trapped from vertical migration by shales above.

Any significant faults that intersect aquifer

There are no significant faults in the aquifer targeted within the Coolum and Glenvale tenements. There is a dome shaped four-way hydrocarbon dip trap in the Glenvale field, comprising of sandstones.

Well histories

The table below does not cover the entire history of each well prior to Bridgeport ownership, as documentation is difficult to find in some instances. Accurate recent history (<4 years) is displayed (Table 9).

Table 9: Individual well history at Coolum and Glenvale from 2017 to 2021.

Well	Status	Formation	History
Coolum 1	Producing	Westbourne	Spudded January 2005
Glenvale 1	Producing	Westbourne	Spudded September 1985

PL 484 Byrock

Location

The satellite field of Byrock (26°19’58.67”S, 143°20’30.36”E) is situated approximately 290 km west from Charleville and 38 km to the north east of Eromanga (Figure 10). Note, an application to renew and amalgamate PL 482, 483 and 484 is currently pending with the Department of Resources (DOR) and will result in a name change to PL 1063 in the future.

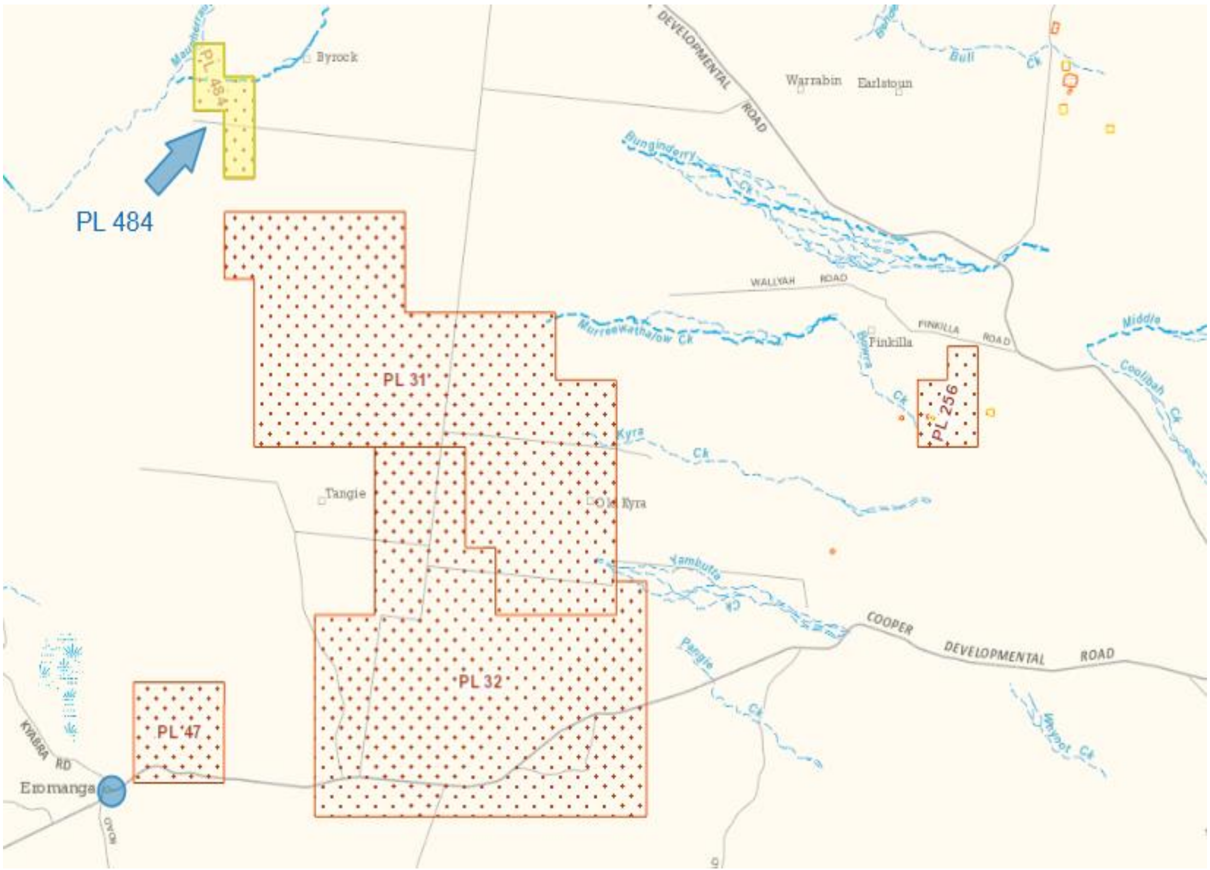


Figure 10: The location of PL 484 Byrock, 38 km to the north east of Eromanga. The tenement is 15.5 km^2, with <0.03 km^2 of oil field.

Geological setting

The geological setting of Marcoola is considered the same as that described for the general GKBA described in Figure 5 above.

Hydrogeological setting

The target of the Byrock 2 well is the Toolachee Formation of Carboniferous Age in the Cooper Basin, defined by thick seams of hydrocarbon rich coal with sandstone and conglomerate present, with a low gross permeability.

Any significant faults that intersect aquifer

A hydrocarbon trap is located in the Byrock oilfield, forming a northwest to southwest anticline closure. The structure is sealed by overlying shale strata, which concentrates oil within this zone.

Well histories

The table below does not cover the entire history of each well prior to Bridgeport ownership, as documentation is difficult to find in some instances. Accurate recent history (<4 years) is displayed (Table 10).

Table 10: Individual well history at Coolum and Glenvale from 2017 to 2021.

Well	Status	Formation	History
Byrock 1	Plugged & Abandoned		
Byrock 2	Producing	Toolachee	Spudded February 1986

An analysis of the movement of underground water to and from the aquifer, including how the aquifer interacts with other aquifers;

Bridgeport does not collect quantitative data on the movement of underground water into and from other aquifers. Bridgeport focusses on the volumes of crude oil and water extracted, as well as reservoir pressure of hydrocarbon producing reservoirs. All these measurements are used to help model impacts in the targeted aquifers. Bridgeport does not have wells or resources that target or isolate other aquifers that are not associated with petroleum, and therefore monitoring capability is limited.

Information to inform this section has been sourced from the Ecological and Bioregional Assessment Program, compiled by Department of the Environment and Energy, Bureau of Meteorology, CSIRO and Geoscience Australia (Evans et al. 2020). The program was designed to provide independent geological and environmental scientific advice on bioregions, one of which includes the Cooper Basin (and covers Greater Kenmore and Bodalla Area). The assessment of hydrogeology was informed using data from petroleum related activities. Bridgeport has attempted to summarise key points from Evans et al. 2020 (access at; https://www.bioregionalassessments.gov.au/sites/default/files/gba-coo-stage2-appendix_hydrogeology_final.pdf; as of November 2021) that highlight movement to and from targeted aquifers.

The Cooper Basin report also covers the entire Eromanga Basin (that comprises a portion of the Great Artesian Basin (GAB)). Evans et al. (2020) state “From bottom to top these include the artesian GAB aquifers (e.g. Hutton Sandstone and Cadna-owie–Hooray aquifer), the Rolling Downs aquitard and the Winton–Mackunda partial aquifer”. Both the Rolling Downs aquitard and the Westbourne aquitard separate artesian GAB aquifers from shallow aquifers. In the deeper artesian GAB aquifers, hydraulic gradients and therefore flow rates are likely near stagnant.

The primary source of groundwater (for landholder bores) occurs from the Winton-Mackunda aquifer, which is topographically controlled. There are a lower number of bores that target depths below the Winton-Mackunda aquifer. Those that do, would typically target resources such as gas, coal and oil. Petroleum fields likely contribute to localised depressurization (especially on the western flank of the Cooper Basin) leading to variable hydraulic head levels. Other attributes may also influence hydraulic head, including progress of petroleum production over time, reservoir compartmentalisation, permeability and re-charge. Evans et al. (2020) goes on to conclude that pressure and salinity suggests there is some degree of connectivity between artesian aquifers of the Eromanga and Cooper Basins, and that hydrochemistry and dissolved gas concentrations may indicate some connectivity between deep and shallow system components. However, the “uncoupled nature of both deep fault sets, and polygonal fault systems is one impediment for direct connectivity pathways to the near-surface unconfined aquifers”.

Evans et al. (2020) are conscious of the lack of data and assumptions made from both limited temporal and spatial sample points, and conclusions drawn from data from wells that only target specific uses (e.g. petroleum). A feature throughout Evans et al. (2020) is the acknowledgement of a lack of considerable data and knowledge gaps. One of the considerations was the lack of data from points other than petroleum wells targeting hydrocarbons. Petroleum wells have unique caveats, considering they target only specific top zones or peaks of a specific aquifer. The knowledge gap also extends to the shallower Winton-Mackunda aquifer, as few are regularly tested, nor are the perforation or open producing depths known.

Bridgeport acknowledge that the key focus of petroleum operations limits the ability to infer the movement to and from other aquifers. Hydrocarbon traps, are by their nature, capped by impermeable geological layers, which limit the movement of both hydrocarbons and water. These structures are deliberately targeted for resource extraction. Conclusions about lateral or vertical movement would be dependent on pressure gradients, which in turn may be influenced by historic and ongoing production. A lack of wells and a lack of perforations in alternate reservoirs limits the conclusions Bridgeport can make about reservoir interactions. Bridgeport is of the view that the best summary of groundwater interactions between aquifers in the Cooper Basin can be found in a report that encompasses a more complete data set and provides independent research, such as that by Evans et al. (2020). This report is likely the most recent and comprehensive analysis of groundwater movement in the region. The report can be found here; https://www.bioregionalassessments.gov.au/sites/default/files/gba-coo-stage2-appendix_hydrogeology_final.pdf (as of 2021).

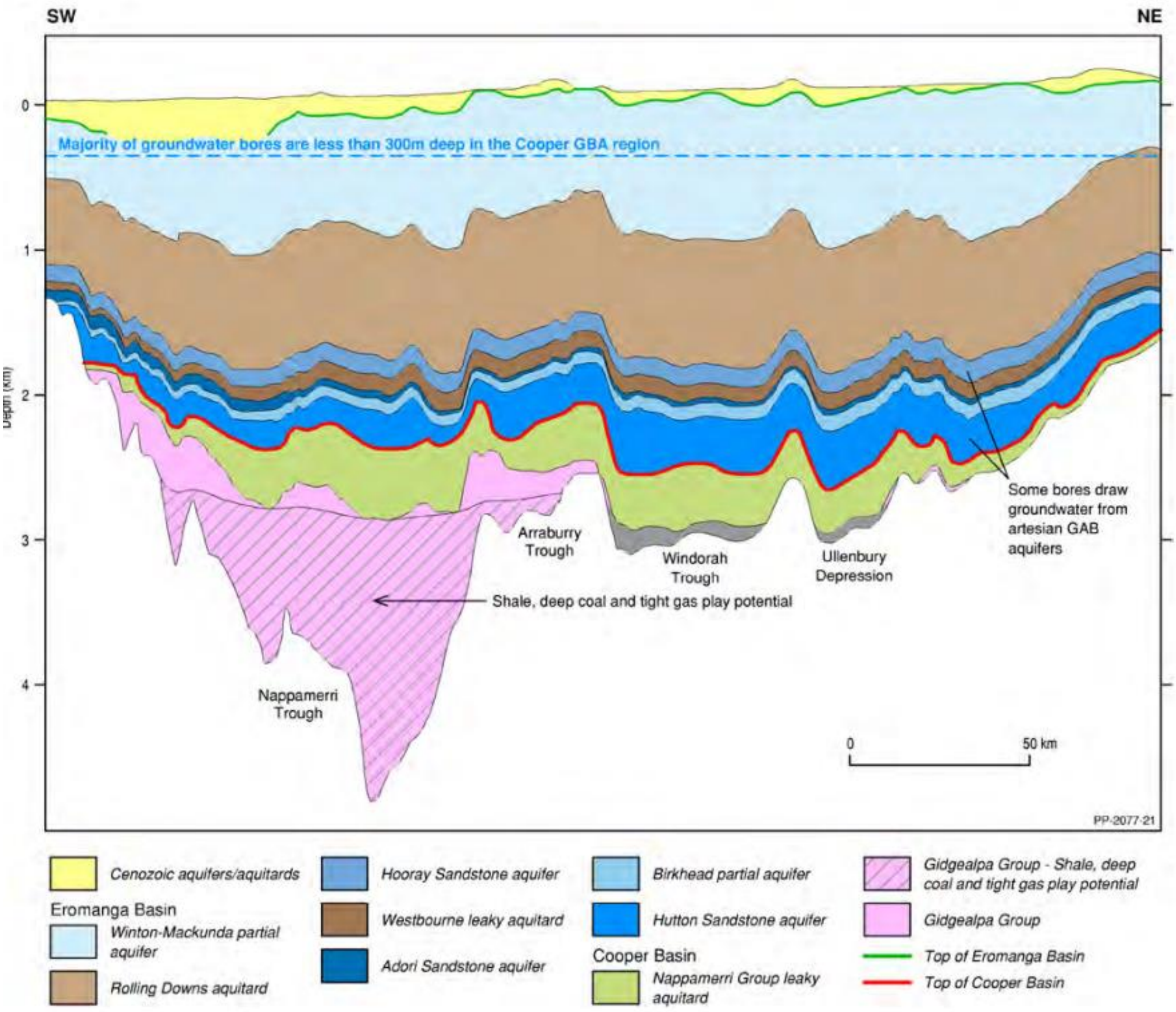


Figure 11: An example figure from Evans et al. (2020), including Cooper GBA cross section. Significant aquitards present.

An analysis of the trends in water level change for the aquifer because of the exercise of underground water rights.

This is covered in the following section.

Part C*: Predicted water level declines for affected aquifers

Requirements under sections 376(b)(iv) to 376(e) of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following: 1. **Maps showing the IAA and the LTAA (sections 376(b)(iv) and 376(b)(v) of the Water Act** 2. **A description of the methods used to produce these maps (section 376(c) of the Water Act)** 3. **Information about all water bores in the IAA (including the number of bores in the area, maps showing the location of these bores and the authorised use of each bore) (section 376(d) of the Water Act); and** 4. **A program for conducting an annual review of the accuracy of maps produced and giving the chief executive a summary of the outcome of each review, including a statement of whether there has been a material change in the information of predictions used to prepare the maps (section 376(e) of the Water Act).**

*Part C refers to Section 5.1.3 (page 15) of the guideline (DES 2017).

Maps showing the IAA and the LTAA (sections 376(b)(iv) and 376(b)(v) of the Water Act

This data and text has been provided based on previous modelling. The model and methods have not been changed; only new extraction data has changed to draw conclusions on pressure draw down.

A description of the methods used to produce these maps (section 376(c) of the Water Act)

Model development and testing

Golder Associates originally developed a model for water extraction for Beach Energy and their Eromanga oil fields in August 2014 (Beach Energy 2014). The model is suitable, and Bridgeport contracted Golder Associates to re-run the same analytical model with updated production data in 2018 and again in 2021.

The analytical model was re-run under identical conditions and a comparison of the results reflect an accurate representation of water levels over time, under different extraction conditions, and therefore suit the purposes of the UWIR. The method used to develop the IAA and LTAA maps and model are described below.

The model has been developed to provide indicative potential drawdown levels of the targeted aquifers, using all relevant and accurate data. Some of the relevant modelling data includes quantitative details on geological mapping and formation details, tenure locations, groundwater levels and historical and predicted water and oil production.

Bridgeport outlines the model, its calibration, assumptions and all other details below. The following sections heavily references the description of the model from the Beach Energy (2014) UWIR, which was written by Golder Associates in 2014.

AnAqSIM Software

The groundwater impact assessment estimation was conducted using an analytical software program called AnAqSim (version 2011-2). AnAqSim is analytical software capable of superimposing multiple analytical calculations (using flow equation calculations) to yield a composite solution consisting of equations for head and discharge as a function of location and time. Whilst the analytical equations are written in two-dimensions, three-dimensional flow may be simulated using simple planar multiple levels. In multi-level calculations, the resistance to vertical flow is accounted for in the vertical leakage between levels.

AnAqSim is not a high complexity numerical modelling software, such as MODFLOW or FeFlow. It is indicative in its level of complexity and output. However, AnAqSim is significantly better than many traditional analytical methods, and appropriate for the use in a UWIR and the determination of an IAA and LTAA.

It was necessary to simplify the conceptual hydrogeological model to comply with the capabilities of the analytical calculations (equations). Whilst this did not permit the analysis of basin structure and geometry, it did provide a representative vertical distribution of strata ('layers') and representative levels.

Up to five planar layers with corresponding initial groundwater levels are permitted in the software. To evaluate the potential impact in each basin, analysis was divided into two separate calculation exercises:

1) Eromanga Basin: including tertiary and quaternary sediments overlying Cretaceous to early Jurassic strata, namely the GAB aquifers: and

2) Cooper Basin: containing the deeply confined Permian and Triassic strata, namely the older pre-GAB aquifers (note that only one well in the GKBA produces from the Cooper Basin GAB).

The separate calculations are show in Table 12 and Table 13 respectively.

The division into two separate domains permitted the allocation of five layers in the Eromanga Basin, as a separate hydraulic system, excluding the underlying Cooper Basin strata. It was anticipated that the impact from extraction in the Cooper Basin would not impact beyond the top of the Tinchoo Formation (i.e. the top of the Cooper Basin) due to the thickness of the low permeability layers and the small abstraction rate (one well).

If no impact was predicted by the analysis at the top of the Cooper Basin, then it was considered reasonable to omit this from the overlying Eromanga Basin calculations.

Assumptions and Limitations

The following assumptions and limitations are inherent to the analytical modelling process:

Calculations for both basins were undertaken in steady state conditions (i.e. not time varying) to investigate the worst-case scenario for groundwater impact estimation. This is considered a worst-case scenario as there is no time varying or limiting extraction from the strata. A steady state solution effectively calculates the response to continued extraction until there is no further (i.e. greater) drawdown effect from extraction. On this basis, two scenarios were investigated in the calculations as it is considered most suited for a steady state calculation of this resolution:

- Immediate Effected Area: was considered to be the average historical annual rate of water plus oil production: and
- Long-term Effected Area: was considered to be the immediate Effected Area rates plus the average predicted annual rate for the next three years of water plus oil production.

Other extractors (e.g. non-Bridgeport wells, for example in the Tintaburra field) were not considered in the calculation, as they are outside of the scope of this study, and no data is available.

Layering in the analysis was maximised when replicating the strata, either to represent all the units in the strata or until the maximum permitted number of layers was reached in the software. Combining adjacent strata in a model is referred to as equivalent porous medium (EPM) modelling. EPM modelling assigns a single value for each hydraulic parameter of the grouped adjacent strata such that the bulk behaviour is represented in the analysis. This was considered reasonable simplification given the availability of hydraulic parameter data, particularly at increasing depths in both areas.

The top layer for each model was assigned as a dummy layer in order to set up the observed heads. This zone was then replicated below (layer 2 in each model) as confined to represent the actual aquifer conditions present. Where no groundwater level data was available in the vicinity of the site, inferred values were used, typical for this kind of deeply confined basin.

The necessary combination of layers (considering these are in reality interbedded high and low permeability layered strata) as a single equivalent porous medium layer results in a worst-case scenario as the bulk hydraulic connectivity of the model layer may not capture some of the lower permeability aquitards present in the basin.

AnAqSim provides the calculated drawdown for the top of each layer (no results are available for each subdivision). The model calculates the drawdown as water head pressure. Where the formations are artesian, the calculated drawdown corresponds to a water pressure decline (unless the extent of the pressure decline is such that the bore reaches sub-artesian conditions). In non-artesian formations (as in the upper formations targeted for water supply by the community), the drawdown corresponds to a decrease of water level. The model is therefore designed to provide indicative worst-case scenario results.

Methodology for measurement and calculation of oil and water extraction volumes

Measurement

Oil and water extracted from each formation is measured via a total fluid test. The desired well is tested for a period, with all formation fluids collected in a dedicated test tank. The formation fluid is allowed to settle out to facilitate the separation process. A water finding chemical (paste stick) is used to find the water-oil contact point and volumes of water and oil are determined from the tank dipstick and measured total volume in the tank as per API procedures. The water oil rates are then converted to a 24-hour test rate, and this test rate is then used on a day to day basis for determining the quantity of oil and water extracted from each formation. These well tests are repeated to confirm results and periodically (generally quarterly) re-tested to update the extraction rates throughout the months and years and can be adjusted for any potential mechanical downtime.

The above method is used at Kenmore. Bodalla uses a combination of the above method and utilises a pressure vessel to separate the oil and water with rates being recorded via a water meter. The oil rate is determined via the amount recovered in the production tank during the test period. The remaining oil fields are mainly single well fields and oil water rates are updated whenever the site is attended to check stocks.

The quantity of water and oil for each well in each formation has been predicted by assuming the most recent oil water rates and applying these for the next three years. The oil rate will decrease over this period due to natural decline; however, the water rate will increase slightly to account for this natural decline in oil rate. As the formations are naturally recharged, the formation pressure is not expected to decrease greatly meaning that the formation fluid extraction rate should be approximately stable for the next three years.

Calculation for Model

Monthly oil and monthly water production volumes in megalitres (ML) was provided by Bridgeport to Golder Associates, split per tenement and per well. The data was provided for all wells that are currently and have historically extracted either groundwater and/or oil at any period in the previous three years.

A monthly average for each well for oil, water and oil + water over the operation of the well was then calculated and converted to m^3/month. These values were then divided by 30 days to produce the rate used by the model (m^3/day) (see Average Extraction Rates for Modelling).

In the model, each well that has currently and historically extracted water and/or oil has, therefore, been modelled with its own individual extraction rate. The value used in the modelling is the average rate for oil plus water as removal of any liquid, specifically oil at the beginning of a wells production life, may result in a depressurisation of the aquifer and possible leakage of groundwater from overlying aquifers used by the community.

Future production rates were supplied by Bridgeport for each well which is planned to continue production over the coming 3 years. No material increase to production is planned. In order to produce a material change, significant infrastructure would be required, which is unrealistic and unplanned.

This approach enabled the worst-case scenario to be modelled for both the historic production and predicted future production as it does not take into account wells that may have only been in production for a few years, i.e. only pulling the piezometric surface down minimally in their short duration, but instead applies a constant rate of extraction, calculating maximum drawdown that would occur at that pumping rate over an infinite amount of time. An example of this is Kenmore 4 which was only in production during the 1980's allowing the piezometric surface to re-equilibrate.

Assumptions of the calibration process for the sensitivity analysis

Calibration was used to refine the hydraulic parameters used in the model, particularly where there was a paucity of observed results from field or laboratory testing (e.g. the cap rock).

The section “Observed groundwater levels and calibration targets” discusses the calibration process of fitting modelled groundwater head to a representative groundwater head in each model layer. Calibration was achieved by altering the hydraulic parameters and groundwater flux rates in unpumped conditions, to produce the calibrated model.

All parameters were varied within likely ranges, as determined from available site investigation data, published values and reasonable representative values for each type of strata, as outlined in Section “Rationale for selection of hydraulic parameters”.

Throughout calibration, statistical analysis was undertaken on the results to assess the “goodness of fit” of the models results compared to the calibration targets. This process anecdotally informed the subsequent sensitivity analysis in that changes to the vertical hydraulic conductivity had the greatest impact on the distribution of head pressures throughout the model.

Assumptions relating to sensitivity analysis that were derived from the calibration process included demonstrating that the necessary grouping of strata was reasonable, as discussed in Section “Justification for the layering in AnAqSim”. This was corroborated though achieving a reasonable fit between modelled and observed groundwater head distribution using reasonable hydraulic parameter values for each layer. Grouping similar hydro stratigraphical units in this way is a common technique to simplify the actual strata present where similar hydraulic parameters are expected for the strata within the grouping.

It was important to establish the accuracy of this assumption during calibration, for example, the single layer in the models used to represent the cap rock actually represented multiple layers of strata present in the Basins. Without reasonable calibration being achieved, this assumption may not have been considered valid and the layering in the model may have required revision. However, as a reasonable vertical head distribution was obtained using reasonable parameters, this was not considered necessary.

Changing the vertical hydraulic conductivity of the cap rock by an order of magnitude during sensitivity analysis was considered reasonable as an upper bound of the range of likely values, as partly derived from calibration modelling.

As the model was run in steady state, there was no requirement to investigate the storage coefficient of the strata.

Groundwater impact calculation input parameters

This section discusses the input parameters necessary for the groundwater impact calculation.

The simplified geological layering used in the calculation for the Eromanga Basin and Cooper Basin is shown in Table 12 and Table 13 respectively. This simplified layering grouped similar adjacent stratum together where appropriate, to reduce the observed stratigraphy into no more than five layers.

Rationale for selection of hydraulic parameters

The following section outlines how the hydraulic parameters in Table 12 and Table 13 that were inferred or derived from supporting information, along with a discussion on the assumptions associated with these parameters.

Thickness of aquifer

The thickness of the aquifer was determined from the details provided on 'Well formation Well Cards' supplied by Beach Energy in 2014. The well cards provided the top and bottom elevations for each formation encountered, for each well drilled in all relevant tenements. Geological cross sections were drawn from a combination of the data off Beach Energy well cards. Data obtained from (the then) Department for Environment and Heritage Protection (DEHP) suggested that the elevations from the two different sources strongly agree with one another, providing a high degree of confidence. For the purposes of modelling, the average elevation of the top and base of each formation was used.

Table 11: Hydraulic Parameters

Basin	Formation	Hydraulic Classification	Hydraulic Conductivity (m/d)		Porosity (fraction)
			Min.	Max.	
Eromanga Basin	Quaternary and Tertiary Alluvium	Aquifer	-	-	-
	Winton Formation	Major Aquifer	-	-	-
	Mackunda Formation Allaru Mudstone Toolebuc Formation Wallumbilla Formation	Aquifer with confining bed	-	-	-
	Cana-Owie Formation	Aquifer and Aquitard (part)	-	-	-
	Hooray Sandstone	Major Aquifer	$4.3x10^{-4}$	1.96[4]	0.19[3]
	Westbourne Formation Adori Sandstone and Birkhead Formation	Confining bed/Reservoir Aquifer Water bearing/Reservoir	$8.0x10^{-7}$ [2] $2.8x10^{-5}$[3]	$2.5x10^{-4}$ [2] $2.3x10^{1}$[3]	0.2 [2] 0.05 to 0.23[3]
	Hutton Sandstone	Major Aquifer/ Reservoir	$3.5x10^{-1}$ $5.7x10^{-5}$[3]	$9.8x10^{-3}$ $2.3x10^{1}$[3]	[3] 0.01 to 0.24
	Poolowanna Formation	Major Aquifer/Reservoir	$1x10^{-7}$ [2] $2.8x10^{-4}$[3]	$3.7x10^{-3}$ [2] 1.59[3]	0.18 [2] 0.11 to 0.19[3]
Cooper Basin	Tinchoo / Arrabury Formations	Primarily confining beds	-	-	-
	Toolachee Formation	Major Aquifer/Reservoir	$2.0x10^{-3}$ [1]	$4.3x10^{-3}$	0.15 0.1 to 0.15[3]

Sources include (1) Government of South Australia Primary Industries and Resources, SA. Petroleum and Geothermal in South Australia – Cooper Basin, 2009. (2) Alexander, E.M, Reservoirs and Seals of the Eromanga Basin (undated) (3) historical information provided by Beach and (4) DEHP pumping data

Table 12: Eromanga Basin Analytical Calculation Parameters

Layer	Top Elevation (mAHD)	Bottom Elevation (mAHD)	Average Head (mAHD)	Horizontal Hydraulic Conductivity (m/d)	Vertical Hydraulic Conductivity (m/d)	Average Abstraction per Well (m^3/d)	Number of Beach Energy Wells	Hydraulic Properties
TOP OF MODEL – ground level								
1: UPPER: Tertiary and Quaternary strata, Winton Formation and Mackunda Formation (UNCONFINED)	160 (Ground level) [1&2]	-120 [1&2]	154 [1&2]	$5.0x10^{-2}$ [3]	$5.0x10^{-4}$ [3]	0 [2]	0	Aquifer
2: LOWER: Tertiary and Quaternary strata, Winton Formation and Mackunda Formation (CONFINED)	-120 [1&2]	-400 [1&2]	154 [1&2]	$5.0x10^{-2}$ [3]	$5.0x10^{-4}$ [3]	0 [2]	0	Aquifer
3: Allaru, Toolebuc and Wallumbilla Formations	-400 [1&2]	-870 [1&2]	162 [1]	$1.0x10^{-2}$ [3]	$1.0x10^{-4}$ [3]	0 [2]	0	Aquitard
4: Cadna-owie Formation and Hooray Sandstone	-870 [1&2]	-1080 [1&2]	255 [1]	$1.0x10^{-3}$ [4]	$1.0x10^{-5}$ [4]	0 [2]	0	Aquifer and Aquitard (part)
5: Westbourne, Adori and Birkhead Formations and Hutton Sandstone and Poolowanna Formation	-1080 [1&2]	-1390 [1&2]	480 [2]	$1.2 x10^{-1}$ [2]	$1.0x10^{-4}$ [4]	126.8 (See Appendix F for individual well abstraction rates) [2] *	65	Aquifer
BASE OF MODEL – major unconformity at base of Eromanga Basin								

Table 13: Cooper Basin Analytical Calculation Parameters

Layer	Top Elevation (mAHD)	Bottom Elevation (mAHD)	Average Head (mAHD)	Horizontal Hydraulic Conductivity (m/d)	Vertical Hydraulic Conductivity (m/d)	Average Abstraction per well (m^3/d)	Number of Beach Energy wells	Hydraulic Properties
TOP OF MODEL – major unconformity at top of Cooper Basin								
1: UPPER: Tinchoo and Arrabury Formations (UNCONFINED)	-1470 [1&2]	-1500 [1&2]	315 [3]	$1.0x10^{-4}$ [3]	$1.0x10^{-5}$ [3]	0 [2]	0	Aquitard
2: LOWER Tinchoo and Arrabury Formations	-1500 [1&2]	-1535 [1&2]	315 [3]	$1.0x10^{-4}$ [3]	$1.0x10^{-5}$ [3]	0 [2]	0	Aquitard
3: Toolachee Formation	-1535 [1&2]^	-1560 [1&2]	622 [2]	$3.9x10^{-3}$ [4]	$3.9x10^{-4}$ [4]	1.55 (See Appendix F for individual well abstraction rates) [2] *	1	Aquifer
BASE OF MODEL – Daralingie Formation aquitard / confining layer								

Sources include (1) DEHP database (2) Beach Reports/Beach DST/ Beach groundwater monitoring and extraction data (3) inferred value (4) literature value *total extraction from all strata was grouped into a single model layer in both basins (Eromanga Basin extraction was from Layer 5 and Cooper Basin extraction was from Layer 3) Section "Justification for the layering in AnAqSim" and Section "Assigning abstraction in the calculation" discussed the justification for the selected layering.

^The bottom elevation of the model is based on the depth of the extraction well and not the base of the Toolachee formation. Model assumes horizontal flow only in the reservoir.

Average Head

The average head for all formations in the Eromanga basin, up to and including the Hooray Sandstone were primarily calculated from historical data in the (previously known as) DEHP database. This historical data in considered applicable as the purpose of this UWIR assessment is to assess the total impacts to groundwater from Bridgeport's' current extraction operations, and therefore provides a baseline to the assessment.

Sufficient data existed for the head in Layer 1 and Layer 2 with 237 water level measurements available across the study area (Golder Associates, 2014, Appendix D, Groundwater Elevation Data – Shallow Units), primarily from the DEHP database. Of these 237 measurements, 4 measurements were included from Beach Energy's gauging of surrounding bores in April 2011. These more recent water level measurements tie in well with those supplied by DEHP for this layer. Although there is significantly less coverage available for Layer 3 (10 data points) and Layer 4 (4 data points), the data that is available for each layer is generally within the same range of one another and fits well with the anticipated conceptual model i.e. with increasing depth there is an increase in the elevation of groundwater, attributed to the increase in overburden pressure and the confined nature of the aquifers/reservoirs.

No data was available in the (previously known as) DEHP database for Layer 5 (the target formations of Beach Energy's operations), likely due to the depth of the formations. Head data for this layer was, however, available from DSTs undertaken by Beach Energy (or previous operators) during drilling and installation of the wells (Appendix D, DST and Groundwater Elevation Data). A total of 87 measurements were used to calculate the average head of Layer 5. Again, the measurements obtained from the DSTs are generally within the same range of one another and fit well with the anticipated conceptual model, providing a high degree of certainty in the measurements.

Limited data was available within the study area from both the DEHP database and Beach Energy's records on the groundwater elevations in the deeper Cooper Basin. No data was available for Layer 1 and Layer 2. The average head was therefore inferred, and as a result, there is a high degree of uncertainty associated with these numbers.

Only 2 DST results were available for the Toolachee Formation (Layer 3), with a difference of 206 m AHD between them. There is, therefore, also a high degree of uncertainty associated with these numbers.

Horizontal hydraulic conductivity

No hydraulic conductivity data was available through literature review, the DEHP database or Beach Energy's data for Layer 1 and Layer 2 of the Eromanga Basin model. The values were therefore inferred based on the lithology. A value of 5 x 10^{-2} m/day was used for Layer 1 and Layer 2, composed primarily of sandstone, siltstone and shale, which is typical of a mid-range value for a sandstone (Freeze and Cherry, 1979). There is uncertainty associated with this value due to the lack of site-specific data.

In addition, no data was available for Layer 3. A value of 1 x 10^{-2} m/day was inferred for the Allaru Mudstone, Toolebuc Formation and Wallumbilla Formation, which comprise predominantly mudstones, siltstones, and fine-grained sandstones. Again, this value is typical of a mid-range hydraulic conductivity for a sandstone. This value was inferred as the sandstone units present within Layer 3 are thought to be where the majority of groundwater flow would occur. There is uncertainty associated with this value due to the lack of site-specific data.

No data from Beach Energy was available for specific hydraulic conductivity results in Layer 4. A range of literature values along with pumping test data from DEHP was, however, available for the Hooray Sandstone, presented in Table 11. These range from 4.3 x 10^{-4} to 1.96 m/day. A value in the lower end of the literature range was chosen to consider the less permeable Cadna-owie Formation contained within the layer (1 x 10^{-3} m/day). There is less uncertainty associated with these values in comparison to those used for Layer 1 to Layer 3.

Both literature values and site-specific values for units within Layer 5 were available. The literature values range from 8 x 10^{-7} to 2.5 x 10^{-4} m/day, however, do not include values for the Poolowanna Formation. The site-specific values, obtained from intrinsic permeability data, flow test data, tenement specific reports and measurements on core plugs (all supplied by Beach Energy) were available for all units in Layer 5. The site-specific values ranged from

2.8×10^{-5} to 22.7 m/day (Golder Associates, 2014, Appendix D). A geometric mean based on the site-specific data of all 5 layers was used for the purposes of modelling (0.12 m/day). This value is within the higher end of permeabilities for a sandstone unit, which is as expected as Layer 5 comprises the sandstone oil reservoirs targeted by Bridgeport. As all geological units have been used from site-specific values, there is greater certainty associated with the values of hydraulic conductivity assigned to this layer.

No literature or site-specific values for hydraulic conductivity were available for the Tinchoo and Arrabury Formations in the Cooper Basin. Limited drilling has been undertaken by Beach Energy or other operators in the Cooper Basin, with only one production well currently and historically installed in the Cooper Basin. Values for the Tinchoo and Arrabury Formations (Layer 1 and Layer 2) have therefore been inferred. There is uncertainty associated with this value due to the lack of site-specific data.

No site-specific values are available for the Toolachee Formation. Literature values are presented in Table 11 and range from 2×10^{-3} to 4.3×10^{-3} m/day. A mid-range value of these literature values has been used (3.9×10^{-3} m/day). This value is considered appropriate in the absence of site-specific data and falls with the mid-range of hydraulic conductivities of a sandstone unit.

Vertical hydraulic conductivity

In the absence of published site investigation values, the vertical hydraulic conductivity of the units was generally assumed to be 1% of the horizontal hydraulic conductivity. Due to the interbedded nature of the sandstone bodies in the study area and the presence of vertical barriers to hydrocarbon migration (and therefore groundwater) in the form of laterally extensive siltstone, shale and mudstone units, as previously described, it is considered that vertical groundwater flow is negligible. A value of 1% is therefore considered conservative. Although no site-specific data is available, the presence of hydrocarbon seals in itself indicates the resistance to vertical groundwater movement.

Additional anisotropy was introduced for Layer 5 (Westbourne, Adori and Birkhead Formations and Hutton Sandstone and Poolowanna Formation) of 0.1%. This was considered representative of the likely anisotropy of this stratum.

Cooper Basin anisotropy was assumed to be 10% throughout the model. This value was considered conservative for stratum at this depth and was adopted in-light of the limited hydraulic data available in this basin.

Average abstraction per well

The average abstraction rate per well was calculated based on historical volumes measured by previous operators, including Beach Energy and now Bridgeport, for individual wells on a monthly basis, along with monthly predicted volumes for the next three years of operation. A detailed methodology as to how the volumes were calculated is provided above. As extraction volumes are provided per well, per month, per geological unit over the life of the well there is minimal uncertainty associated with the extraction rates assigned in the model.

More uncertainty is associated with the three-year predicted future rates as the volumes are predictions only.

Number of abstraction wells

The number of abstraction wells was based on the number of current and historic abstraction wells since operations began, and as supplied by both Beach Energy and Bridgeport.

The role of Departmental (registered) monitoring Bores

As discussed in the previous section, information obtained on bores from the (previously known as) DEHP database, along with those supplied by Beach Energy (and subsequently Bridgeport) were used to produce geological cross sections across the study area. Elevations of the tops of each unit were taken from both the DEHP data and well data supplied by Beach Energy. This enabled the validation of elevations obtained from Beach Energy well card information to calculate the aquifer thicknesses.

Data obtained from DEHP was relied upon for the calculation of average head data, specifically for the more shallow units included in Layer 1, Layer 2 and Layer 3 in the Eromanga

Basin model (as previously discussed in Section "Rationale for selection of hydraulic parameters" above), due to the lack of availability of data from Beach Energy on the more shallow units. However, no DEHP data was available for the deeper target formations, whereby, data from Beach Energy was used.

Pumping test data (transmissivity values) were available for limited geological units from DEHP. These values were predominantly for the Hooray Sandstone, but also the Etonvale Formation and the Adavale Group Equivalent, the latter two being in the Adavale Basin, below the Cooper Basin, and therefore irrelevant to this assessment. The values obtained from DEHP pumping test data for the Hooray Sandstone were used in Table 11.

The role of departmental bores in model calibration and review is covered in Section "Sensitivity Analysis", but primarily involves the use of observed groundwater SWLs obtained for the more-shallow units.

Extent of calculation and boundary conditions

The extent of the Cooper Basin and Bridgeport Energy tenements was used in conjunction with the distribution of the relevant extraction wells to form the extent of the calculation domain. This included a buffer to ensure the boundary conditions did not influence the results.

Boundary conditions were set as lines of zero flux (i.e., no flow boundaries) and located at sufficient distance from the area of interest to be far field boundaries.

The upper and lower extents of the model were assigned as head dependant flux and flux conditions respectively. This permitted the increasing groundwater level with depth conditions by creating the head elevation at the top of the model and a small flux at the base.

In the Eromanga Basin, the value assigned to the head dependant flux was 154 m AHD at the top of the model (to represent the approximated observed water table in the upper layer). The flux at the base of the model was calibrated at 2.5×10^{-5} m/d (equivalent to 9.1 mm/year recharge to the base of the model). This was necessary to simulate the observed or likely increasing hydraulic pressure with depth in both basins.

For the Cooper Basin, the upper model boundary had a head dependant flux set at 315 m AHD, to replicate inferred heads, and a flux at the base of $2x10^{-5}$ m/d (equivalent to 7.3 mm/year recharge to the base of the model). The value for the flux at the base of the model was achieved through the calibration process that matched modelled groundwater levels to the approximated observed and inferred groundwater levels.

The extent of the Eromanga Basin calculation can be seen in Beach (2014) and the extent of the Cooper Basin calculation domain can be seen Beach (2014).

No recharge was applied to any model due to the use of the head dependant flux on the upper surface of the model.

Water Production volumes used for the calculation

The water extraction rates for the model were defined as follows:

- The average historical observed water (plus oil) extraction rate represents the Immediate Effected Area; and
- The average historical observed water (plus oil) extraction rates plus the average predicted annual rate for the next three years was used to represent the Long-term Effected Area.

A summary of the extraction rates used in the original modelling is as follows:

Eromanga Basin

- For the Eromanga Basin immediately affected area an average extraction rate (equivalent to the observed historical average extraction) of 120.2 m^3/day was adopted for the wells (with a range of 1.2 m^3/d to 594.2 m^3/d);
- For the Eromanga Basin long term affected area an extraction rate (equivalent to the long-term average extraction) of 124.9 m^3/day was adopted over the 42 wells (with a range of 1.0 m^3/d to 673.3 m^3/d).

- Although the maximum and average extraction is slightly higher in the long term affected area, the total extraction is less because there are fewer wells.

Cooper Basin

- For the Cooper Basin immediately affected area an extraction rate (equivalent to the observed historical average extraction) of 1.2 m^3/day was adopted for the single well used in the model;
- For the Cooper Basin predictive model long term affected area an extraction rate (equivalent to the long-term average extraction) of 1.6 m^3/day was adopted for the single well used in the model.
- The values for historical and predicted extraction were similar for both basins.

Justification for the layering in AnAqSim

The Eromanga Basin was grouped into five EPM layers according to the hydraulic properties of the strata, combining adjacent strata with broadly similar hydraulic properties as well as combining the observed target stratum for oil and gas extraction. Combining target extraction layers was necessary to maintain numerical stability in the analysis.

Layer 1: The shallowest major aquifers in the study area (i.e., those aquifers most heavily developed for water supply, including the unconfined shallow Quaternary, Tertiary, Winton and Mackunda Formation aquifers) were grouped as a single hydro stratigraphic unit, with the entire unit then split into an upper and lower layer in the model (Layer 1 comprising the upper layer). No abstraction was assigned to this upper layer in the model as this upper portion contained the head dependant flux boundary.

Layer 2: consisted of the lower half of the Quaternary, Tertiary and Winton and Mackunda Formation. These have been split into the upper two layers in order to investigate the potential impact of the deeper oil and gas extraction.

Layer 3: consisted of the underlying Allaru, Toolebuc and Wallumbilla Formations. These formations are generally considered to collectively act as an aquitard with very little groundwater abstraction and no oil or gas extraction in the Eromanga Basin.

Layer 4: combined the Cadna-owie Formation and Hooray Sandstone. Oil and gas wells are often screened in both these formations, and they exhibit similar geological characteristics, both being generally thinly interbedded sandstone and siltstone with occasional coarse grained, brecciaed or pebble beds.

Layer 5: consisted of the Westbourne, Adori and Birkhead Formation aquifers and aquitards as well as the underlying Hutton Sandstone and Poolowanna Formation. Oil and gas extraction wells are often screened over a combination of these strata generally comprising interbedded siltstone, shale, fine sandstone and occasional coal seams. The Hutton Sandstone and Poolowanna Formation were considered to be more permeable and accounted for the highest extraction rate by Beach Energy (and subsequently Bridgeport) operations by an order of magnitude. The Hutton Sandstone and Poolowanna Formation are therefore the main targets for oil extraction.

The Base of the model was formed by the base of the Eromanga Basin, which is marked by a major unconformity. Underlying the Eromanga Basin are the aquitards of the Tinchoo and Arrabury Formations. It was considered suitable to separate the Cooper Basin into a separate model due to the hydraulic separation of the two basins as well as the low average extraction from the underlying Cooper Basin.

The Cooper Basin was grouped into three layers, with the upper layer being split into two layers with identical properties. This was to permit the response of pumping to be observed in the Tinchoo and Arrabury Formations. The layers were configured as follows:

Layer 1: the upper portion of the Tinchoo and Arrabury Formations comprise Layer 1. This had the head dependant flux boundary condition applied to the top in order to replicate the inferred groundwater levels. Layer 1 was assigned identical hydraulic properties to the underlying Layer 2 Tinchoo and Arrabury Formations.

Layer 2: represented the lower half of the Tinchoo and Arrabury Formation aquitards. No oil or gas extraction was identified to target these strata. These are generally interbedded siltstone and fine sandstone with low permeabilities.

Layer 3: represented the Toolacheee Formation at the base of the Cooper Basin. This was not utilised for water supply and only a single Beach Energy (and now Bridgeport) extraction well extracts from these strata.

Note that although AnAqSim allows the division of a layer in two sections, the calculated results are provided for the full layer (no results available for each subdivision).

Assigning abstraction in the calculation

Abstraction was assigned to a single layer in each basin model. This was considered a reasonable simplification to represent the behaviour, given the EPM model approach adopted in this analysis. Extraction well details were interrogated to give a single extraction target in each basin. In the Eromanga Basin model, the Westbourne, Adori and Birkhead Formations, Hutton Sandstone and Poolowanna Formation were grouped together as the bottom layer of the model and therefore also combined the abstraction from these strata into the single layer.

In the Cooper Basin, as the single extraction was considered to be at a low rate, it was considered sufficient to investigate this in a separate model and investigate the potential impact at the top of the Cooper Basin.

To simulate an immediately impacted area and a long term impacted area in steady state analysis, average historical and average predicted abstraction rates were analysed respectively, using observed and predicted oil and water extraction data provided by Beach Energy (and subsequently Bridgeport) (refer to Section "Water production volumes for the calculations").

The grouping of the strata in the software (Table 12) and treating adjacent grouped strata as an EPM removed the necessity to establish the target formation beyond the defined layers within the software. This is because abstraction can only be assigned to defined software layers and not specific target depths or strata within an individual layer. This allowed a much coarser definition of assigning the extraction target formation. Golder considered that this was an acceptable assumption as the software does not allow for further refinement; the

EPM approach already provided a bulk representative behaviour of the adjacent grouped strata. As the focus of impact is the strata generally overlying the extraction targets, this was deemed to be a suitable methodology.

Observed groundwater levels and calibration targets

Groundwater levels in the shallow aquifers and those that are utilised for groundwater abstraction or monitored by DEHP (now DES) were generally obtained from the DEHP (now DES) groundwater database.

Hydrostatic pressure data was available for strata targeted for oil extraction. This was obtained from Beach Energy, with representative groundwater levels presented in Table 12 and Table 13, where available. The selected value for groundwater level is derived from numerous spatially distributed wells and from a range of elevations and depths across the basins (relevant to the layer). As the calculation required the layers to be horizontal and planar, the groundwater levels were also set at simplified representative levels.

Where no groundwater level data was available (Tinchoo and Arrabury in the Cooper Basin), it was necessary to use a representative value derived from likely groundwater pressure extrapolated from adjacent layers.

Calibration was undertaken on both calculations using observed/inferred groundwater levels verses calculated groundwater levels in unpumped conditions. The bottom flux and hydraulic conductivity values were altered until a satisfactory fit was achieved. A plot of modelled verses observed groundwater level for the Eromanga Basin is given in Figure 12.

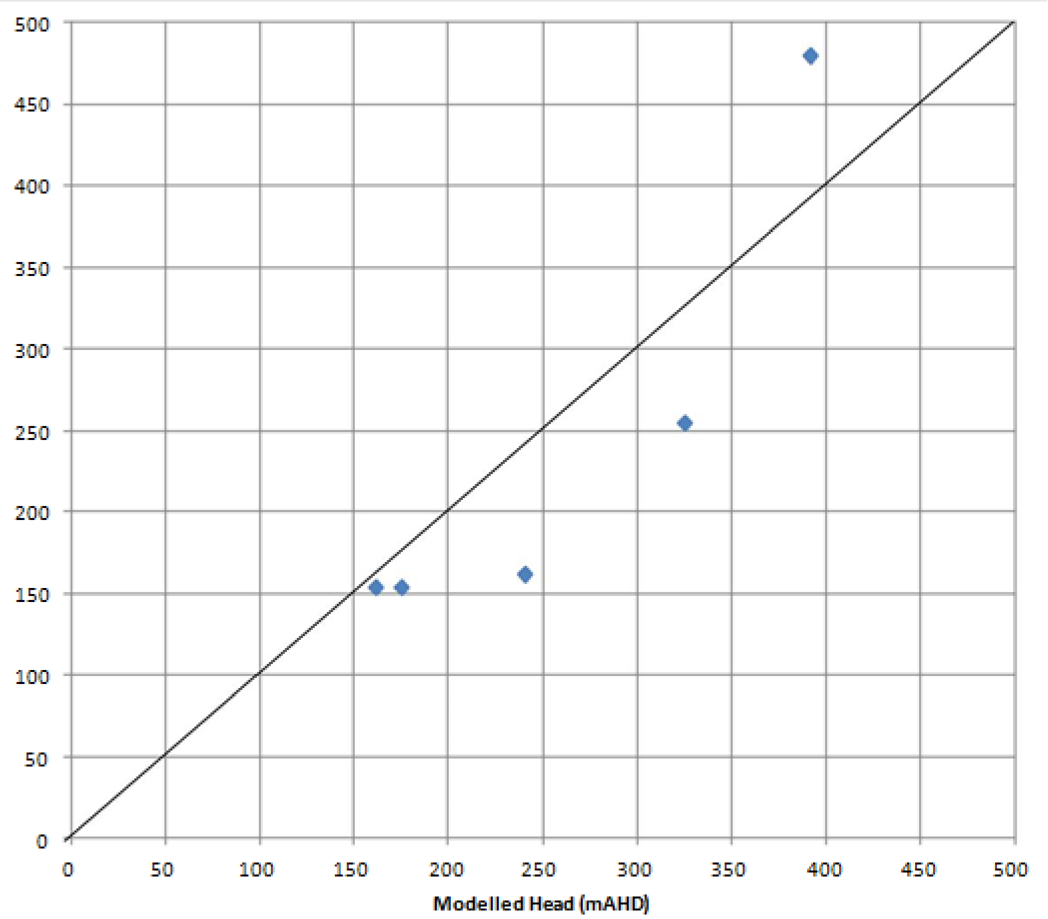


Figure 12: Eromanga Basin: Observed versus modelled groundwater level

A reasonable fit between modelled and observed groundwater head was achieved in using the parameters given in Table 14.

Table 14: Cooper Basin: Tabulated Observed versus modelled groundwater level

Calibration Target	Observed Groundwater Level (mAHD)	Modelled Groundwater Level (mAHD)	Residual (m)
OBH Layer 1	Not known	345	n/a
OBH Layer 2	Not known	410	n/a
OBH Layer 3	622	446	176

Both models were considered to contain representative head values sufficient for the purposes of the impact assessment, and able to demonstrate the potential impact of pumping. This is because the likely groundwater gradient was achieved and the resultant drawdown is the important factor in this analysis, this is not impacted by the initial pressure head.

Modelling extent is demonstrated in Figure 13.

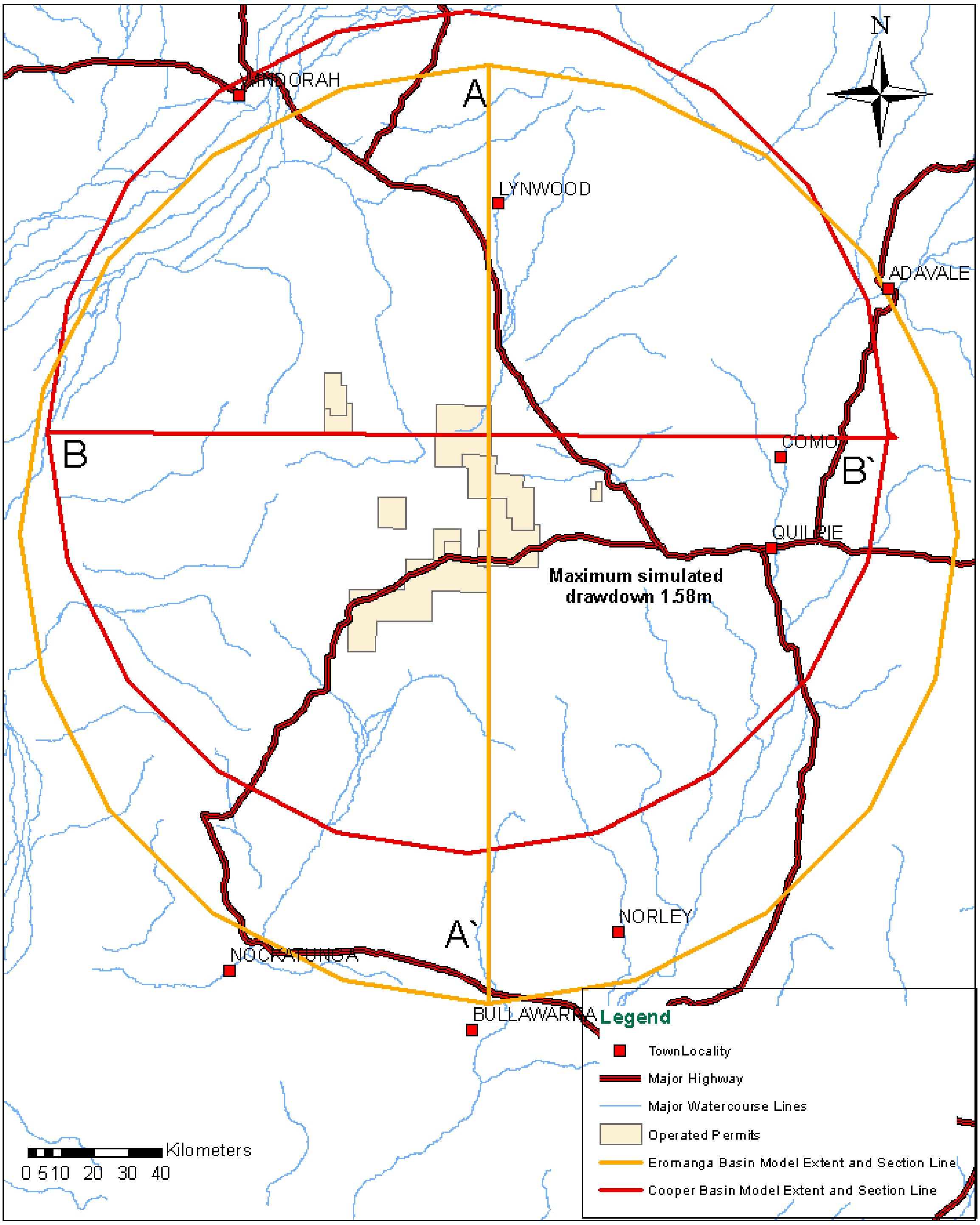


Figure 13: Extent of the Eromanga (orange) and Cooper (red) Basin models, including locations for the hydraulic head calculations.

Results

Sensitivity Analysis

Calibration modelling and sensitivity analysis were undertaken on both the Cooper Basin and Eromanga Basin models, taking into consideration the MDBC (2000) guidelines and the more up to date Australian Groundwater Modelling Guidelines (Barnett et. al. 2012). Hydraulic Parameter sensitivity analysis involved increasing the vertical hydraulic conductivity of the cap rock (overlying aquitard layer above of the extraction targets) by an order to magnitude. All other input parameters in the model remained the same as the calculated impact scenarios described above.

Sensitivity analysis was undertaken in a targeted manner for a number of reasons. The rationale for the selection of the cap rock as well as the vertical hydraulic conductivity as the key parameters to be investigated during sensitivity analysis can be summarised for both models, as follows:

Calibration modelling anecdotally corroborated Golder's hydrogeological assessment that the key calibration parameter was the vertical hydraulic conductivity of the cap rock.

Horizontal hydraulic conductivity was not considered likely to have a significant impact on the results as it is the potential for vertical propagation of groundwater depressurisation through the model layers that would result in a modelled impact on the features of interest (i.e. private bores, springs and groundwater dependant ecosystems). This is because the vertical distance between the target formations for oil extraction and the potentially impacted features is considered to be large. It is the vertical hydraulic conductivity and depth of the target formations that were considered to have a greater influence on the vertical propagation of hydraulic depressurisation, rather than horizontal hydraulic conductivity.

Sensitivity analysis on the cap rock was deemed appropriate as there was a paucity of hydraulic data for these strata. This is likely to be a result of this layer not being a target formation for groundwater, oil or gas in this area of the Eromanga Basin, as discussed in Section "Assumptions for calibration process for the sensitivity analysis". Hydraulic parameter values were obtained for most other strata within the model domain; therefore, the cap rock was considered the least well constrained in terms of its hydraulic characteristics and should therefore be evaluated using sensitivity analysis.

The presence of oil in the Eromanga Oil Fields demonstrated that the cap rock was an effective aquitard, as without it, oil would have migrated towards the surface over geological time. It is this layer that was therefore the key driving force in the flow dynamics of the system, and it is this layer that should determine the rate and scale of the propagation a depressurisation effect through the model. Increasing the hydraulic conductivity of model layers overlying the cap rock would not significantly influence the result as the limiting factor in the propagation of potential impacts would still be from the low permeability cap rock.

Altering the hydraulic parameters of the target formation (i.e. below the cap rock) was not considered to be beneficial to achieving a greater impact in the model as it would likely have impacts. These impacts included;

Increasing the hydraulic conductivity of the target formation should reduce the maximum depressurisation in the vicinity of the extraction wells while increasing the radius of influence of the depressurisation. Acting on the base of the low permeability cap rock, this would likely result in a reduced impact above the cap rock. This is because the magnitude of depressurisation would be reduced, therefore reducing the potential propagation of the depressurisation through the cap rock. Given that there are no identified features of interest in close proximity to the trigger level drawdown zone, this was not considered to be significant.

Decreasing the hydraulic conductivity of the target formation may result in unrealistically low hydraulic conductivity values such that the observed yield would not be obtained from the modelled wells. Reducing the hydraulic conductivity of the target formation was therefore considered unrealistic as site observation of the yield of the wells, some extracting since 1984, constrained a lower limit for the target formations and any significant decrease through sensitivity analysis was considered unrealistic.

Hydraulic sensitivity analysis

Analysis of the sensitivity of the groundwater impact estimation scenario result to changes in the vertical hydraulic conductivity of the cap rock was undertaken. To provide a conservative approach to sensitivity analysis, the vertical hydraulic conductivity was increased by an order of magnitude, as follows:

SA1: Hydraulic Parameter Sensitivity Analysis on the Cooper Basin: Layer 1 and Layer 2 (upper and lower portions of the Tinchoo and Arraburry Formation) vertical hydraulic conductivity increased to $1x10^{-4}$ m/d; and

SA2: Hydraulic Parameter Sensitivity Analysis on the Eromanga Basin: Layer 3 (the grouped layer consisting of the early to late Cretaceous Allura Mudstone, Toolebuc Formation and Wallumbilla Formation) vertical hydraulic conductivity increased to $1x10^{-3}$ m/d.

Sensitivity analysis steady state calibration

The sensitivity analysis models (SA1 and SA2) were calibrated in the same manner as the groundwater impact estimation scenario. Results from the final calibrated steady state calculations for all sensitivity scenarios are tabulated in Table 15.

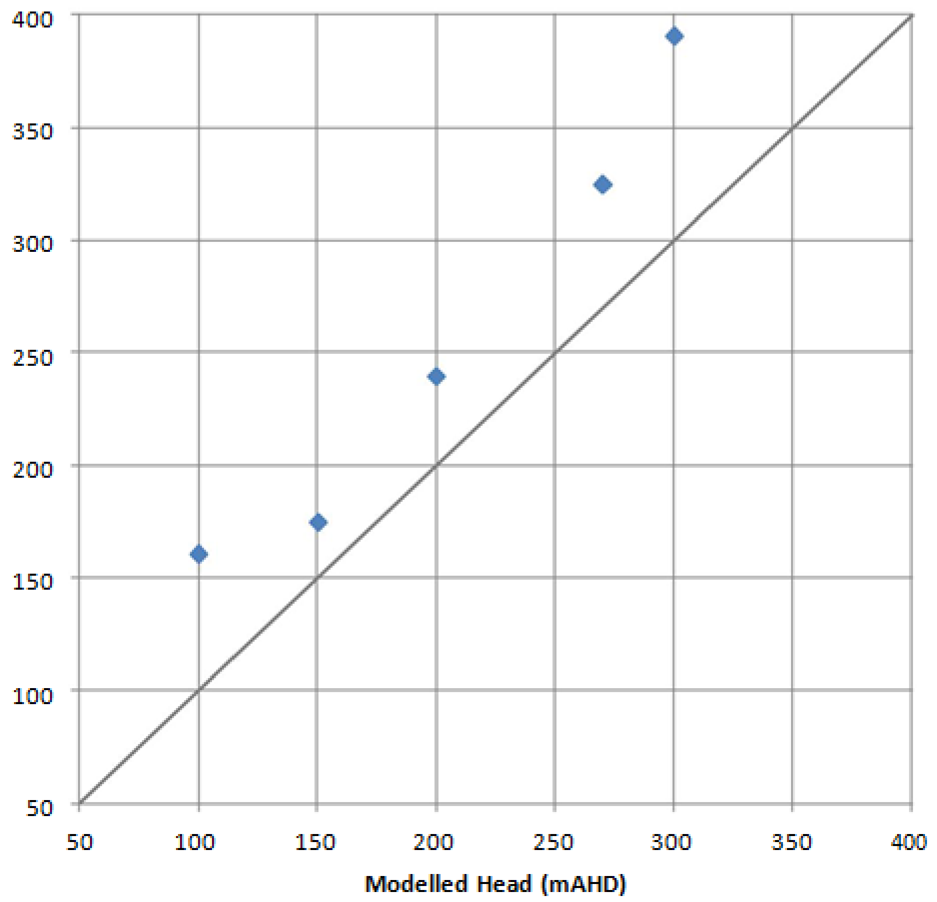


Figure 14: Eromanga Basin SA2: Observed versus modelled groundwater level

The Cooper Basin SA2 calibration results are shown in tabulated form in Table 15 along with the SA1 calibration results, where possible.

Table 15: Sensitivity analysis calibration

Model Layer (and modelled groundwater level [mAHD])		Observed Groundwater Level (mAHD)		Sensitivity Analysis versus Observed Groundwater Level Residual (m)	
SA1 Cooper Basin	SA2 Eromanga Basin	Cooper Basin	Eromanga Basin	SA1 Cooper Basin	SA2 Eromanga Basin
Layer 1: 618	Layer 1: 161	Not known	100	n/a	61
Layer 2: 624	Layer 2: 175	Not known	150	n/a	25
Layer 3: 624	Layer 3: 240	622	200	2	40
-	Layer 4: 325	-	270		55
-	Layer 5: 391	-	300		91

These calibration results were considered suitable to conduct the sensitivity analysis modelling.

Results of sensitivity analysis modelling

The calibrated models were run using the long-term scenarios and in steady state to give a conservative, worst case scenario. There were Figures in the original research (not included here), which were graphically represented sensitivity analysis. They included the following;

Cooper Basin:

- a drawdown of less than 5 m is predicted in all layers by the sensitivity analysis

Eromanga Basin:

- Modelled Groundwater Drawdown Contours in Layer 2
- Modelled Groundwater Drawdown Contours in Layer 3
- Modelled Groundwater Drawdown Contours in Layer 4
- Modelled Groundwater Drawdown Contours in Layer 5

Note: all contours shown are one metre contours.

Information about all water bores in the IAA (including the number of bores in the area, maps showing the location of these bores and the authorised use of each bore) (section 376(d) of the Water Act); and Bridgeport Energy has used the Registered water bores (DNRM and private) data, held within the Groundwater and Inland Waters layer of the Queensland Governments Queensland Globe GIS website to identify groundwater bores near GKBA tenements. This information was accessed 2018 (Bridgeport 2018), and again in 2021. No changes were observed to data within Bridgeport tenements.

The extent of the search was within a 20km radius from the centre of the facility, which is a significantly larger area compared with the IAA and LTAA.

A majority of nearby (<25km) wells accessed the Winton Formation. The majority of these wells (Table 18) are drilled to a depth not exceeding 100m. In general, groundwater take within this management area is relatively limited, as these are not actively pumped. Some wells in Table 18 have also been abandoned and decommissioned since drilling.

It is highly unlikely the extraction of water from Bridgeport targeted formations (>1400 m below ground) would influence shallower formations <100m deep due to geological barrier to free flow factors limiting the movement of water between such depths. Bridgeport also protects shallower aquifers and reservoirs by installing cemented steel casing in our production wells, and testing and validating the integrity of the boreholes using wireline logging assessment. There is an also extremely restrictive geological boundaries between the lower targeted formations and higher freshwater targeted aquifers. The total water and oil production are also greatly reduced, on overall decline compared to historical extraction figures, with less total volume coming from less wells in each field.

Many individual bores are located around the small township of Eromanga, to the west of Kenmore. Because all bores within Eromanga are a similar distance from the main field of Kenmore, instead of measuring everyone bore separately, a generic distance for 19.08 km was given for each.

Modelling Results

Golder Associates were provided the previous three years production (2018 through 2021) and the future predicted (2021 to 2024) production. The models were run with this new data.

The main model results can be summarised as follows;

- Compared to Beach Energy and previous Bridgeport historical production rates, the impacted area has declined due to falling production over 2019-2021.
- The largest maximum drawdown was calculated to occur in layer 5.
- All modelled layers have a decreased drawdown due to lower production.

Layer 2 (the unconfined aquifer layer which landholder bores access within the region), has a maximum modelled drawdown of 1.67 m over the 2018 – 2021 period, and a modelled drawdown of 1.52 m between 2021 and 2024 (Figure 15).

Layer 3 has a maximum modelled drawdown of 7.76 m over the 2018 – 2021 period, and a modelled drawdown of 7.04 m between 2021 and 2024 (Figure 16).

Layer 4 has a maximum modelled drawdown of 17.52 m over the 2018 – 2021 period, and a modelled drawdown of 15.82 m between 2021 and 2024 (Figure 17).

Layer 5 (the confined target aquifer for petroleum extraction) has a maximum modelled drawdown of 60.93 m over the 2018 – 2021 period, and a modelled drawdown of 53.30 m between 2021 and 2024 (Figure 18).

To contextualise the layer depths of the model and the drawdown pressures together, Figure 19 and Figure 20 were developed. These represent the main model layers (left hand y axis, and the associated model drawdown (right hand y axis).

No water drawdown models were produced for the Cooper Basin, as no impact/drawdown was detected by the model calculations.

The maximum modelled drawdown in each Eromanga Basin model layer are tubulised in Table 16, and graphically represented as follows;

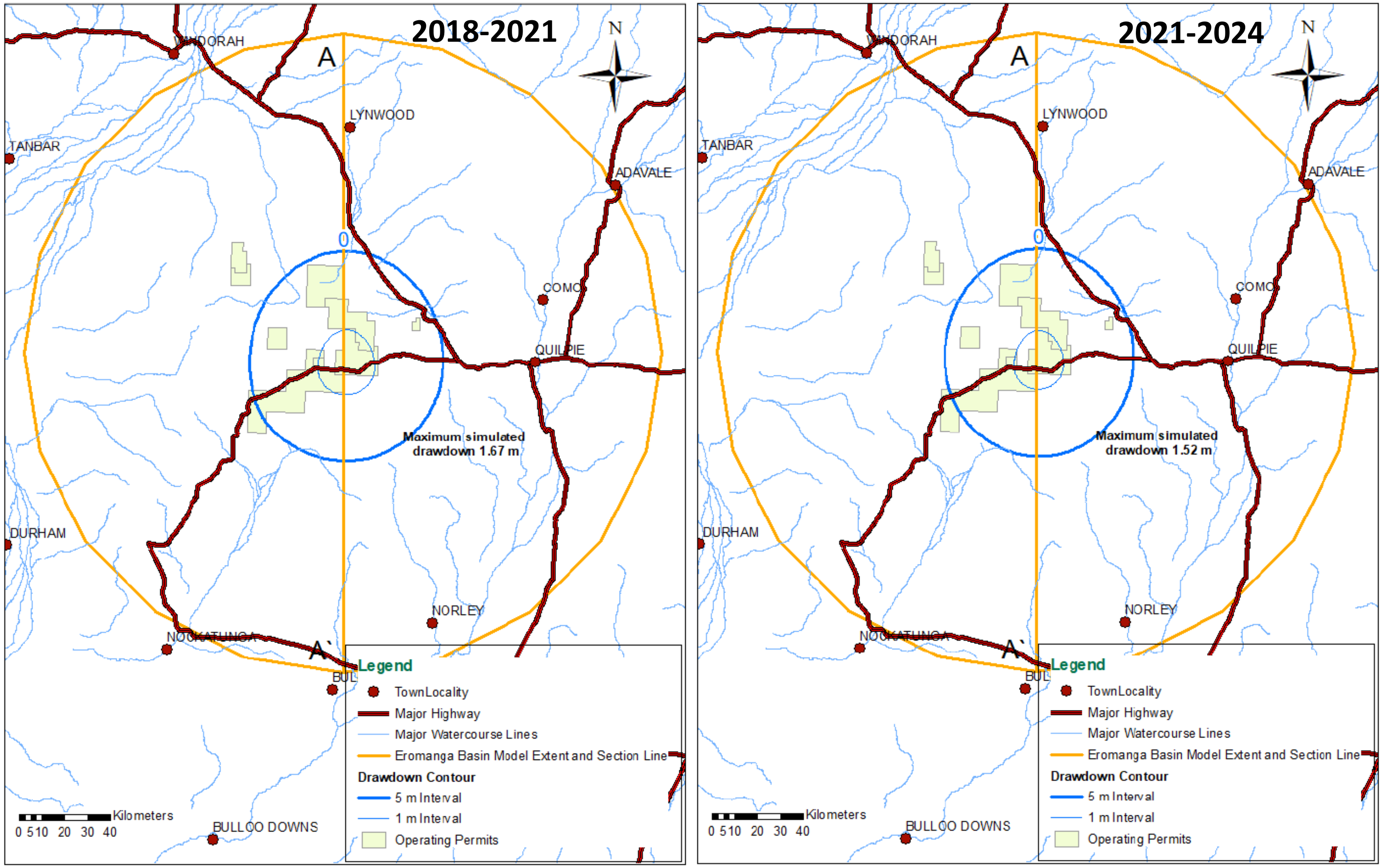


Figure 15: Calculated drawdown in Layer 2, Eromanga Basin from 2018 – 2021 production in the left panel, and 2021 to 2024 predicted production on the right panel. Contours are shown in one metre intervals.

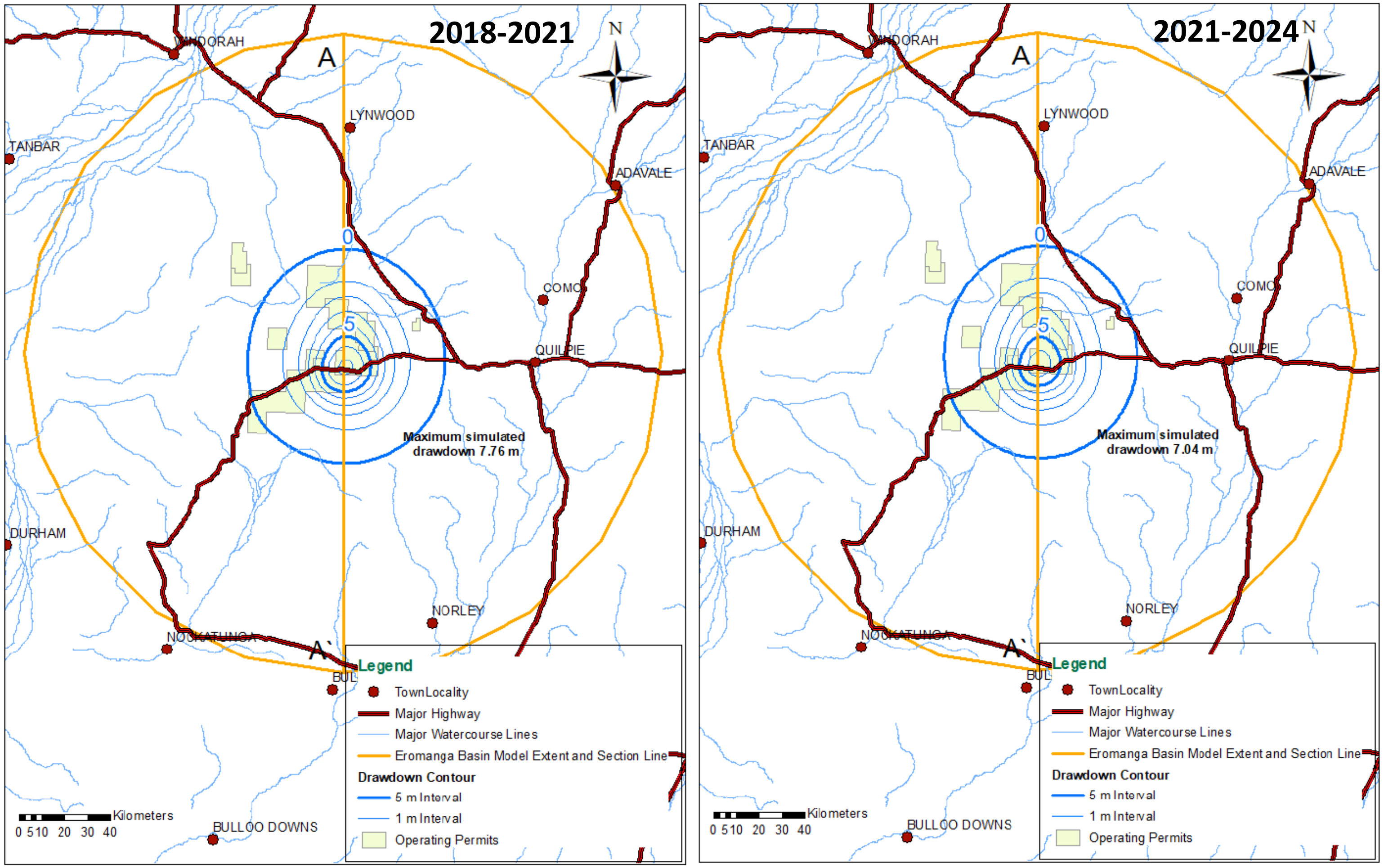


Figure 16: Calculated drawdown in Layer 3, Eromanga Basin from 2018 – 2021 production in the left panel, and 2021 to 2024 predicted production on the right panel. Contours are shown in one metre intervals.

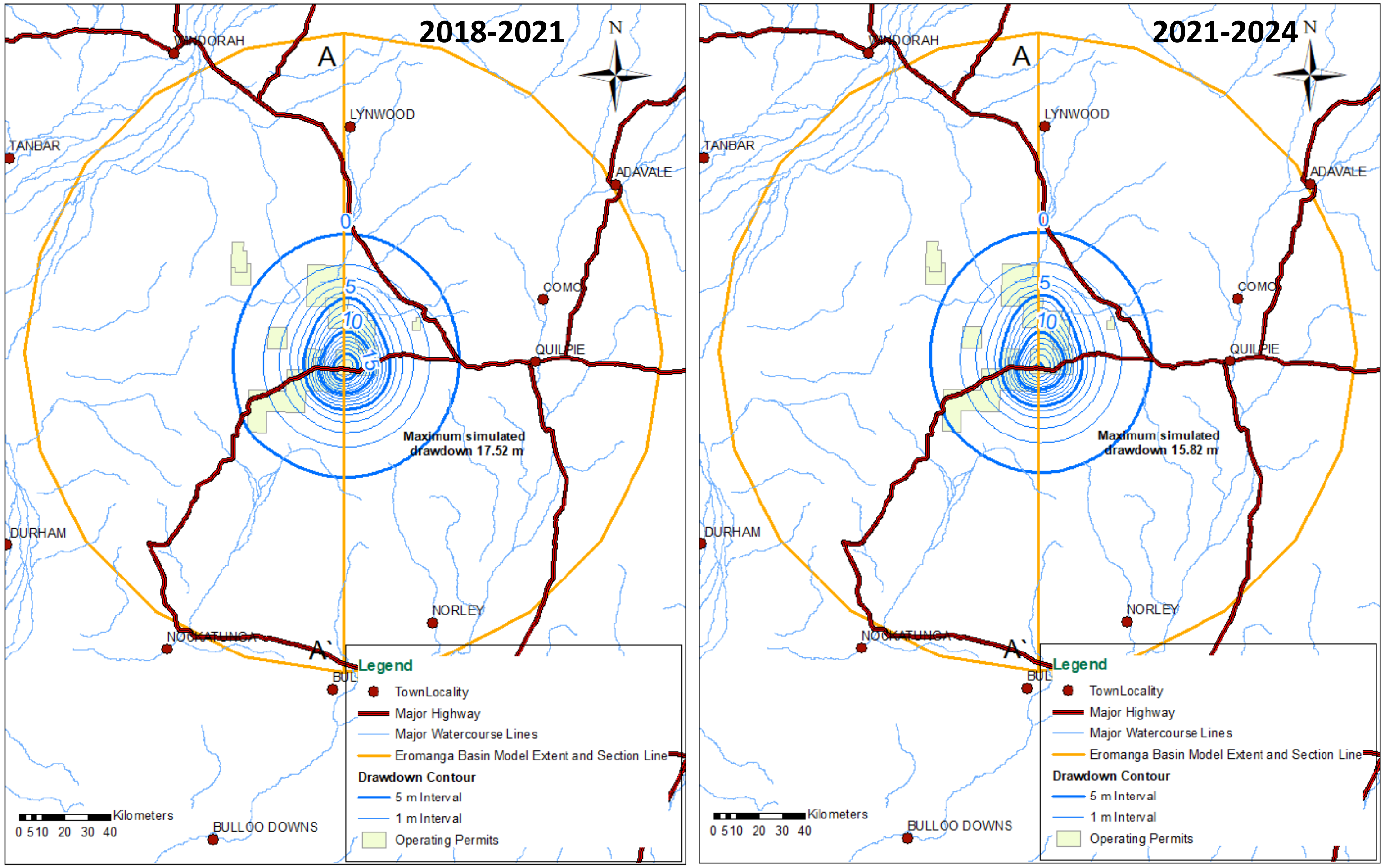


Figure 17: Calculated drawdown in Layer 4, Eromanga Basin from 2018 – 2021 production in the left panel, and 2021 to 2024 predicted production on the right panel. Contours are shown in one metre intervals.

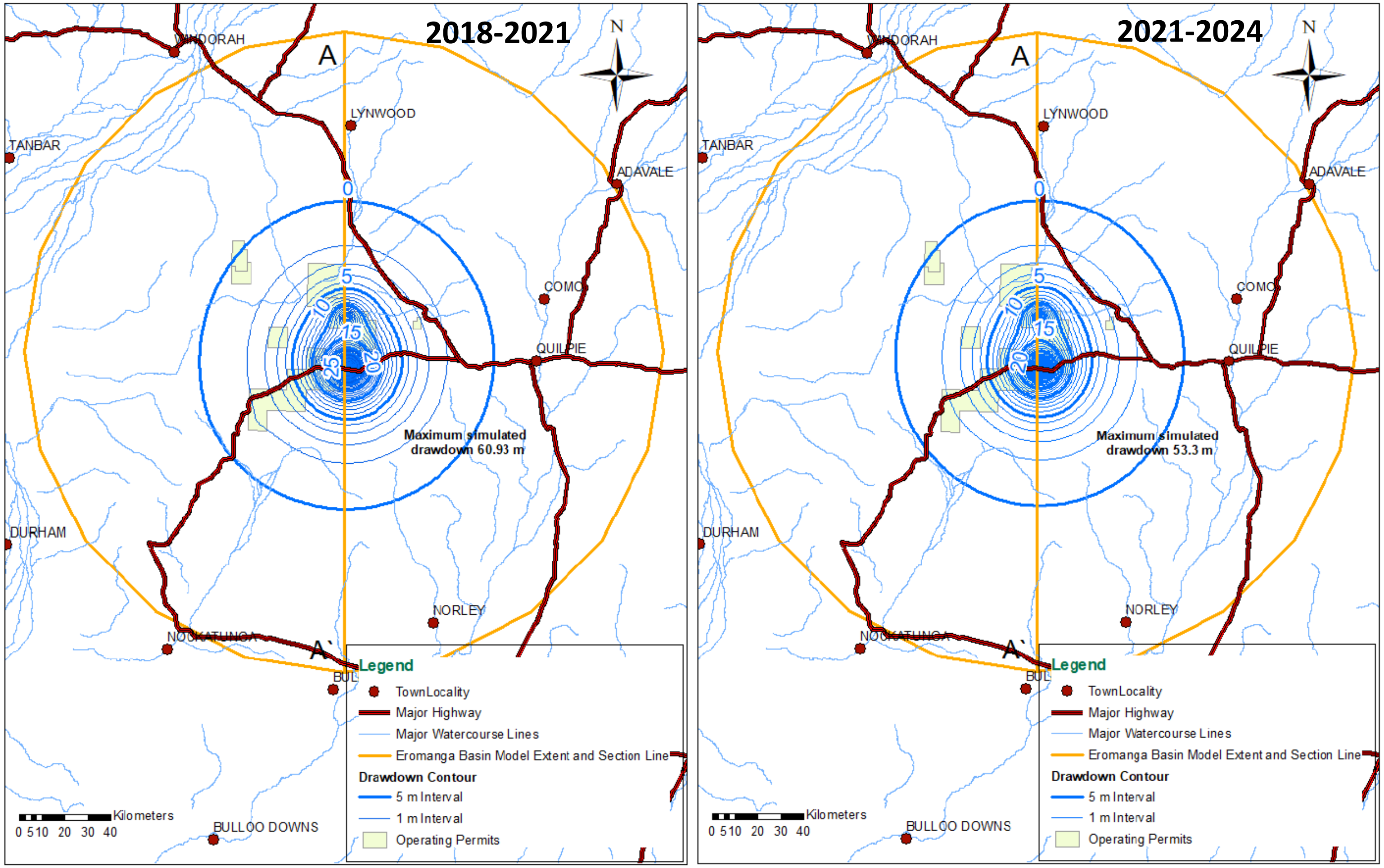


Figure 18: Calculated drawdown in Layer 5, Eromanga Basin from 2018 – 2021 production in the left panel, and 2021 to 2024 predicted production on the right panel. Contours are shown in one metre intervals.

Table 16: Comparison of model drawdowns in Basin and Layers between the 2018 and 2021 UWIR

Basin	Formation	Model Layer	1984-2014 UWIR Model drawdown (m)	2014-2018 drawdown (m) (during)	2018-2021 drawdown (m) (forecast)	2018-2021 UWIR Model drawdown (m) (during)	2021-2024 UWIR Model drawdown (m) (forecast)
Eromanga	Winton & MacKunda	2	2.8 m	1.58	1.34	1.67	1.52
Eromanga	Allaru, Toolebuc & Wallumbilla	3	13.2 m	7.53	6.40	7.76	7.04
Eromanga	Cadna-Owie and Hooray Sandstone	4	29.8 m	17.55	14.99	17.52	15.82
Eromanga	Westbourne, Adori & Birkhead	5	98.1 m	66.12	53.73	60.93	53.3
Cooper	Tinchoo and Arrabury (Upper)	1	-	-	-	-	--
Cooper	Tinchoo and Arrabury (Lower)	2	0.1	-	-	-	-
Cooper	Toolachee to Patchawarra	3	5.5	1.27	2.1	-	-

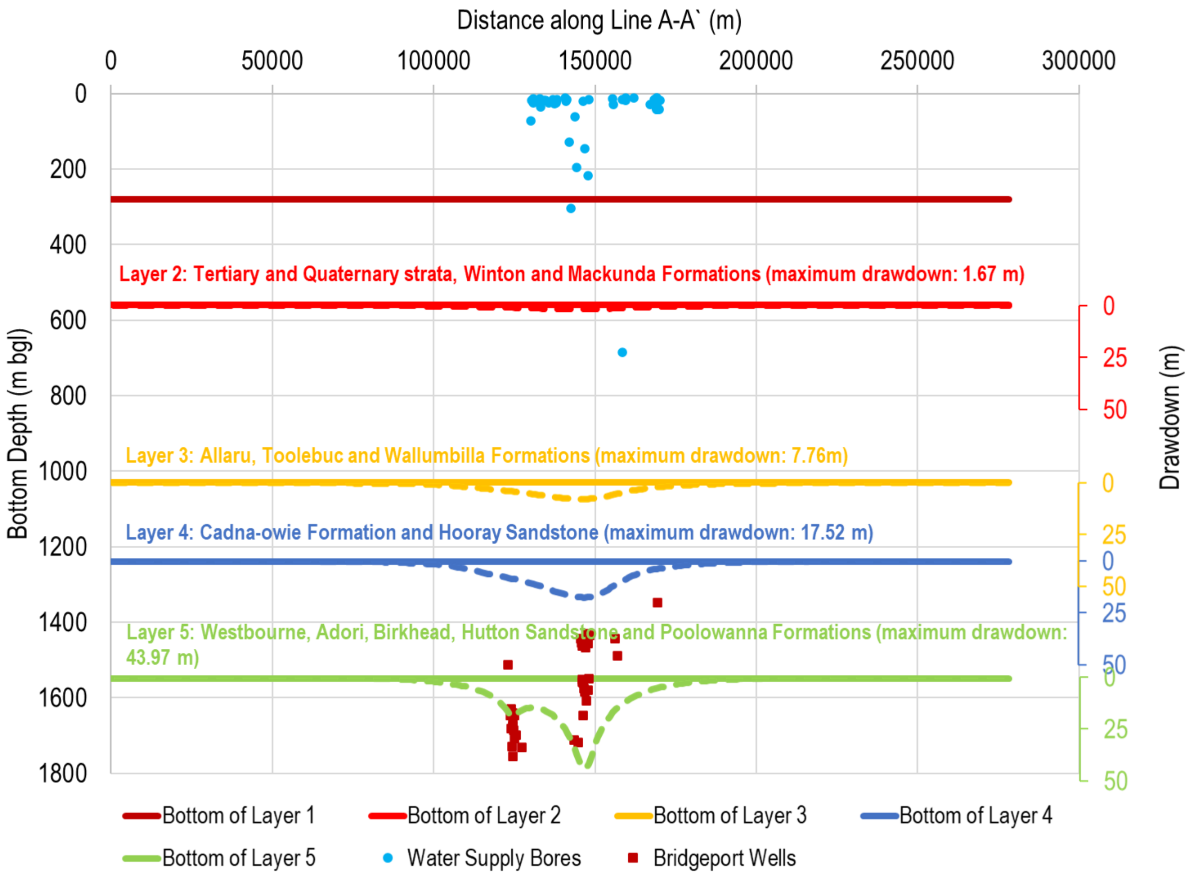


Figure 19: Calculated groundwater level drawdowns along Section A-A`, Eromanga Basin (2018-2021). Separate Y axis shows depth the drawdown in meters, with well total depths.

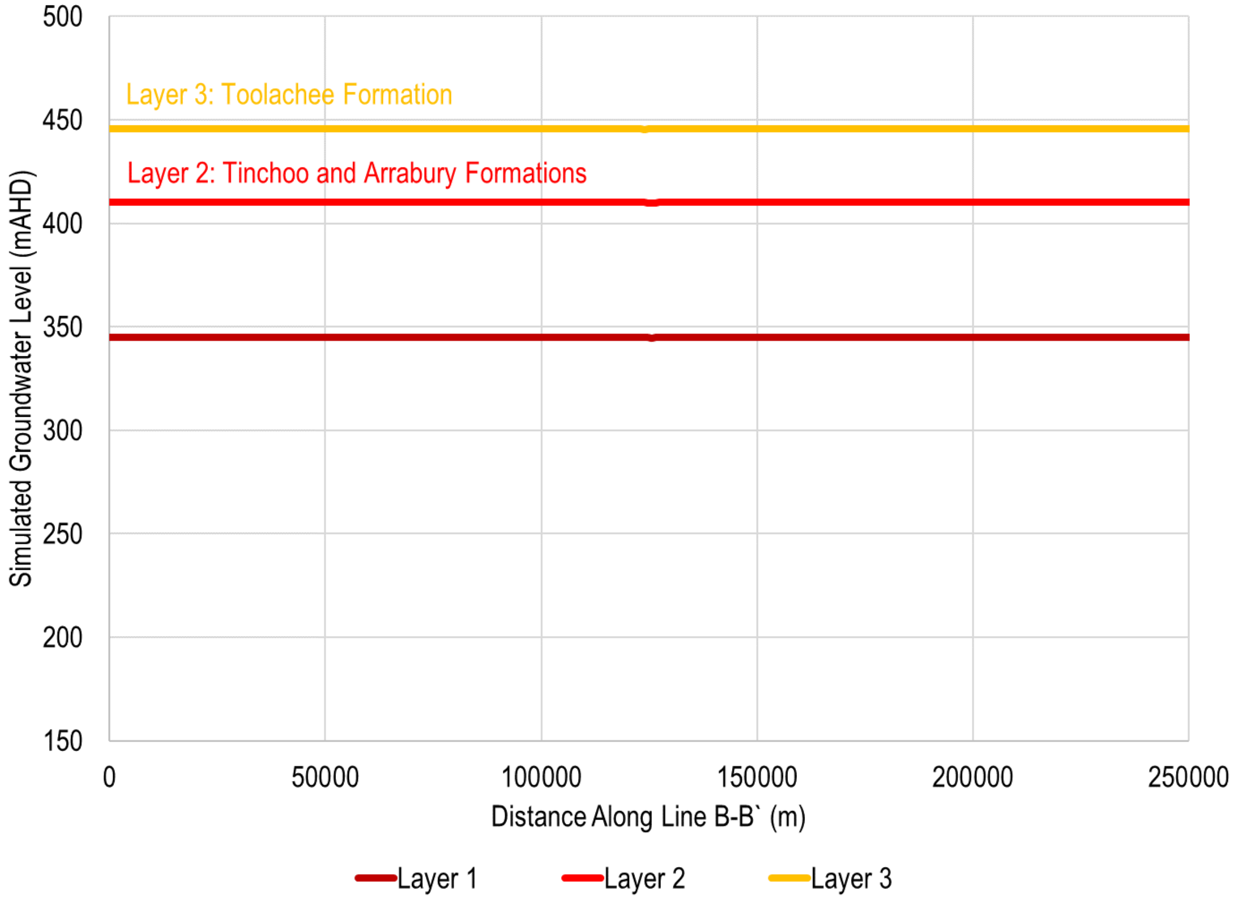


Figure 20: Calculated groundwater level drawdowns along Section A-A`, Cooper Basin (2018-2021). Separate Y axis shows depth the drawdown in meters.

Information about all water bores in the IAA (including the number of bores in the area, maps showing the location of these bores and the authorised use of each bore) (section 376(d) of the Water Act)

The bore trigger threshold is defined in DES (2017) as a decline in water level of 5m in bores of a consolidated aquifer, and a 2m water level decline in bores in an unconsolidated aquifer. All Bridgeport targeted aquifers are confined, and the surface aquifer targeted by landholders are unconfined.

Considering the layers of the model, and where landholder bores target, there are no layers below Layer 2 that are relevant to a drawing down of bore water levels. In Layer 2 (which contains the Winton Formation), the model predicted (in both historic and future predicted production) a minor decline (<1.67m) in water level. This layer represents numerous geological layers that are deeper than the average target depths of landholder bores (commonly ~50m). Therefore, there are no bores that are within any Layer, and specifically Layer 2, that have a water level drawn down by more than the bore trigger thresholds.

To contextualise for the Department, the number of bores within the region (again, none of which are inside an IAA/LTAA), a 20km radius was used from the centre of each Kenmore, Bodalla and Blackstump. The Queensland Governments database for quantitative data on each bore was used to determine the average total depth of each well. To create an accurate representation, plugged and abandoned wells and petroleum wells were removed from the average calculation (Table 17).

Table 17: Average depth of bores within a 20km radius from the centre of each main field, after removing all hydrocarbon targeting wells and Abandoned and Destroyed wells.

Site	Average Bore Depth (m)
Kenmore	50.77 m
Bodalla	61.07 m
Blackstump	69.29 m
Coolum & Glenvale	160.71 m
Byrock	37.49 m
Bargie	245.1 m
Marcoola	284.68 m

The average depths of landholder bores into their intended target (Winton Formation), means there are limited pressure declines as calculated by the model. The only bores impacted by predicted pressure decline due to extraction are bores with the specific use of extracting petroleum. Therefore, there are no identified bores within an IAA/LTAA.

Figure 21: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Kenmore (yellow dots).

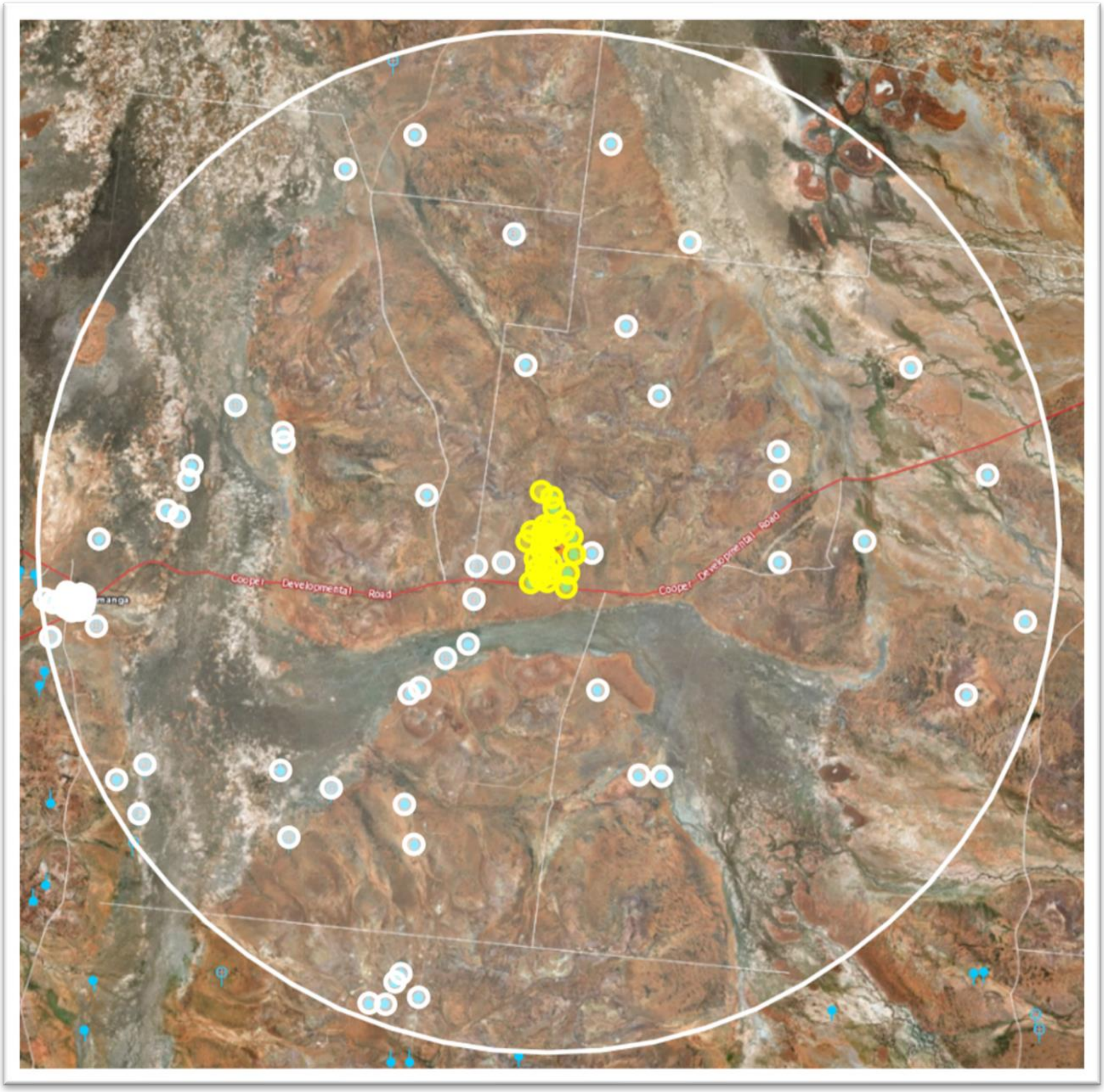


Table 18: Identified water bores occurring within 20 km from the centre of Kenmore. This list does not include the currently producing Bridgeport wells. Average distance to the centre of the Kenmore field is 15.14 km.

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
357	-26.67708059, 143.27703486	30/06/1925	Winton Formation	25.91 m	19.18 km	Eromanga No 1 Bore	Abandoned and Destroyed	Water bore
358	-26.66938894, 143.2727374	03/03/1909	Hooray Sandstone	1303 m	19.02 km	Eromanga No 2 Bore	Existing	Petroleum
5236	-26.6804104, 143.26092402		Winton Formation	15.02 m	19.18 km		Abandoned and Destroyed	Water bore
6162	-26.65707926, 143.42036617	01/08/1938	Winton Formation	218.24 m	2.20 km		Abandoned and Destroyed	Water bore
6197	-26.55374579, 143.42425447		Winton Formation	26.02 m	12.65 km		Abandoned and Destroyed	Water bore
6198	-26.55624519, 143.48592025	01/01/1926	Winton Formation	22.80 m	13.01 km	Old Kyra Bore	Existing	Water bore
6200	-26.59568889, 143.56397503		Winton Formation	18.30 m	15.30 km	Hartleys Well	Existing	Water bore
6201	-26.62957762, 143.59091931		Winton Formation	36.60 m	16.83 km	Homestead Bore	Existing	Water bore
6402	-26.52263493, 143.38925467	12/09/1988	Winton Formation	14.60 m	17.09 km	Tangie Well	Existing	Water bore
6433	-26.61624651, 143.34286691		Winton Formation	24.40 m	12.00 km	Honolulu Bore	Existing	Water bore
6435	-26.6076355, 143.32592253		Winton Formation	24.40 m	14.21 km		Abandoned and Destroyed	Water bore
6454	-26.65041139, 143.54758672	01/01/1916	Winton Formation	17.10 m	11.78 km	House Well	Existing	Water bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
6455	-26.69874454, 143.58341992	01/01/1910	Winton Formation	18.30 m	16.90 km	Shearing Shed Well	Existing	Water bore
7013	-26.58263426, 143.46369849		Winton Formation	21.30 m	9.02 km	Allston Well	Existing	Water bore
7014	-26.63152273, 143.5178648		Winton Formation	15.20 m	8.87 km	Shed Well	Existing	Water bore
7015	-26.65402341, 143.45175462		Winton Formation	16.80 m	1.79 km	Handleys Well	Existing	Water bore
7016	-26.62235604, 143.51730913		Winton Formation	11.60 m	9.31 km	House Well	Existing	Water bore
11305	-26.66874607, 143.40981082	01/09/1948	Winton Formation	20.73 m	3.74 km		Abandoned and Destroyed	Water bore
12733	-26.81263492, 143.4259233	29/09/1954	Winton Formation	71.93 m	20.02 km	Panjee No 1	Existing	Water bore
12860	-26.59485678, 143.42814342	13/08/1955	Winton Formation	303.90 m	7.48 km	Nobles Creek Bore	Existing	Water bore
12949	-26.72819103, 143.35981207		Winton Formation	16.80 m	13.17 km	Kennedy's Paddock	Abandoned and Destroyed	Water bore
12950	-26.74374672, 143.34481245		Winton Formation	18.30 m	15.78 km		Abandoned and Destroyed	Water bore
12952	-26.73624715, 143.29175754		Winton Formation	18.00 m	19.71 km	Glenvale House Bore	Abandoned and Destroyed	Water bore
12953	-26.72069159, 143.29397955	01/12/1954	Winton Formation	20.42 m	18.74 km	White Gate Glenvale	Abandoned and Destroyed	Water bore
12968	-26.69707909, 143.45369941	12/01/1955	Winton Formation	195.70 m	5.69 km	Cranstoun No 3 Bore	Existing	Water bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
15120	-26.69652412, 143.39092243	12/05/1962	Winton Formation	128.00 m	7.88 km	Stony Hill Bore	Existing	Water bore
15497	-26.65819046, 143.4109218	31/071963	Winton Formation	145.40 m	3.12 km		Abandoned and Destroyed	Water bore
23111	-26.67568872, 143.6039751	16/02/1962	Artesian – Controlled Flow	3004.00 m	18.15 km	HOA Eromanga 1	Existing	Oil & Gas
23417	-26.52541208, 143.4581426	21/09/1984	Artesian – Controlled Flow	1523.70 m	16.18 km	HOA KYRA 1	Existing	Oil & Gas
23517	-26.60457859, 143.4753652	30/07/1985	Artesian – Condition Unknown	1703.00 m	2.08 km	LEA Greymount 1	Existing	Oil & Gas
23519	-26.74596855, 143.3889786	23/09/1985	Adavale Group	1487.00 m	13.18 km	LEA Glenvale 1	Existing	Oil & Gas
23522	-26.6268024, 143.3107325	18/03/1986	Artesian – Condition Unknown	2060 m	15.18 km	LEA Black stump 1	Existing	Oil & Gas
23553	-26.64069139, 143.3017565	02/04/1986	Adavale Group	1733.50	15.61 km	LEA Black stump 2	Existing	Oil & Gas
23654	-26.72263564, 143.3417567	08/12/1989	Basal Jurassic	1543.00 m	14.22 km	LEA Erounghoola 1	Existing	Oil & Gas
23816	-26.64263581, 143.3062009	08/12/1988	Toolachee Formation	1666.20 m	15.17 km	LEA Black stump 3	Existing	Oil & Gas
23869	-26.78930196, 143.3823125	12/10/1989	Artesian – Condition Unknown	1530.50 m	18.28 km	AMP Endeavour 1	Existing	Oil & Gas
23920	-26.73319081, 143.3856451	05/12/1990	Evergreen Formation	1240.50	11.89 km	LEA Glenvale North 1	Existing	Oil & Gas

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
23923	-26.79402412, 143.3906457		Artesian – Condition Unknown	1564.30 m	18.48 km	AMP supply 1	Existing	Oil & Gas
23927	-26.7962876, 143.3787309	13/06/1990	Artesian – Condition Unknown	1562.40 m	19.18 km	AMP Endeavour 2	Existing	Oil & Gas
23991	-26.79596872, 143.3728683	21/10/1991	Artesian – Condition Unknown	1567.50 m	19.32 km	AMP Endeavour 2	Existing	Oil & Gas
26187	-26.68735734, 143.40008893	ND	Winton Formation	61.00 m	6.31 km	Arabic Bore	Abandoned and Destroyed	Water Bore
50106	-26.68263503, 143.40814428	01/01/1900	Winton Formation	13.10 m	5.31 km	Arabic Well	Existing	Water Bore
50107	-26.67180285, 143.2709238	01/01/1943	Winton Formation	18.90 m	19.08 km*	Post Office Bore	Existing	Water Bore
50108	-26.66930285, 143.27064598	01/01/1890	Winton Formation	12.50 m	19.08 km*	Eromanga Police Well	Existing	Water Bore
50109	-26.67235843, 143.26842384		Winton Formation	12.20 m	19.08 km*	Unknown	Existing	Water Bore
50110	-26.7240234, 143.46814392		Winton Formation	18.30 m	9.36 km	Cranstoun No 1 Bore	Existing	Water Bore
50111	-26.7243011, 143.47592162	01/01/1945	Winton Formation	12.20 m	9.48 km	Cranstoun No 2 Bore	Existing	Water Bore
50182	-26.65707836, 143.5178717	01/01/1954	Winton Formation	15.42 m	8.38 km	Dillon Well Job 2464	Existing	Water Bore
50393	-26.66985844, 143.2664794		Unknown	Unknown	19.08 km*	Unknown	Abandoned and Destroyed	Unknown

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
50394	-26.67069172, 143.2723127	20/01/1882	Winton Formation	15.00 m	19.08 km*	The Grove Bore	Abandoned and Destroyed	Water Bore
50409	-26.64985832, 143.277868	31/05/1982	Winton Formation	16.50 m	18.35 km	Brankos Well	Existing	Water Bore
50411	-26.66846961, 143.25870174	31/07/1982	Winton Formation	18.29 m	20.18 km	Eroungholoa House	Existing	Water Bore
50480	-26.6676362, 143.268146		Winton Formation	Unknown	19.08 km*	Unknown	Abandoned and Destroyed	Unknown
50481	-26.67208062, 143.27175719	30/06/1985	Winton Formation	21.00 m	19.08 km*	Berella	Existing	Water Bore
50497	-26.67208064, 143.26925722		Winton Formation	43.00 m	19.08 km*	Unknown	Existing	Water Bore
50511	-26.63596832, 143.39342188		Winton Formation	30.00 m	5.68 km	Unknown	Existing	Water Bore
50526	-26.67069174, 143.27092379	20/11/1984	Winton Formation	16.45 m	19.08 km*	Eromanga Police Bore	Existing	Water Bore
50527	-26.67124732, 143.26759054	16/11/1984	Winton Formation	18.89 m	19.08 km*	NO 1	Existing	Water Bore
50528	-26.67013621, 143.268146	14/11/1984	Winton Formation	22.86 m	19.08 km*	NO 2 House Bore	Abandoned and Destroyed	Water Bore
50529	-26.66727914, 143.26717741	12/11/1984	Winton Formation	18.89 m	19.08 km*	NO 3	Abandoned and Destroyed	Water Bore
50530	-26.6665251, 143.26675721	4/06/1985	Winton Formation	19.50 m	19.08 km*	Refinery Bore	Existing	Water Bore
50566	-26.61930207, 143.34314462		Winton Formation	12.20 m	11.92 km	Nobbs Creek Bore	Existing	Water Bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
50586	-26.67124733, 143.26620166	14/10/1986	Winton Formation	32.00 m	19.08 km*	Unknown	Existing	Water Bore
50590	-26.67124731, 143.2689794	28/08/1987	Winton Formation	24.00 m	19.08 km*	MRD Camp Bore	Abandoned and Destroyed	Water Bore
50594	-26.66930288, 143.26647944	10/11/1987	Winton Formation	42.00 m	19.08 km*		Existing	Water Bore
50633	-26.63124684, 143.30953399	20/10/1988	Unknown	Unknown	15.04 km	Ponchos Bore	Existing	Unknown
50637	-26.72541389, 143.2839797	30/08/1988	Winton Formation	41.10 m	19.94 km	Glenvale House Bore	Existing	Water Bore
50670	-26.69846585, 143.3873114	12/02/1989	Winton Formation	685.80 m	8.47 km	Stonie Bore No 2	Existing	Water Bore
50671	-26.53319073, 143.3645328	13/02/1989	Winton Formation	29.00 m	17.13 km	Honolulu Redrill	Existing	Water Bore
50675	-26.66895198, 143.2682593	24/02/1989	Winton Formation	32.50 m	19.08 km*	B Pegler (DO) Eromanga	Existing	Water Bore
50677	-26.66930291, 143.262035	15/03/1989	Winton Formation	37.50 m	19.08 km*	G Snow Eromanga	Existing	Water Bore
50678	-26.66985848, 143.2617573	10/02/1989	Winton Formation	28.40 m	19.08 km*	Eromanga Town Hall	Existing	Water Bore
100170	-26.78680194, 143.38425692	19/09/1994	Artesian – Condition Unknown	Unknown	17.88 km	SSL Endeavour 4	Existing	Unknown
116026	-26.66791, 143.2684078	14/09/2001	Winton Formation	37.00 m	19.08 km*	House Bore	Existing	Water Bore
116128	-26.667361, 143.2695863	20/03/2009	Winton Formation	25.00 m	19.08 km*	NO 8 Neal St	Existing	Water Bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Kenmore Field	Original Name	Remarks	Likely Use
116267	26.66905089, 143.2714141	23/03/2009	Winton Formation	38.00 m	19.08 km	Public Hall	Existing	Water Bore
116329	-26.66793671, 143.2724951	29/06/2013	Winton Formation	24.00 m	19.08 km*	PUMPING BORE #2	Existing	Water Bore
116330	-26.66724197, 143.2715618	27/07/2013	Winton Formation	41.00 m	19.08 km*	PUMPING BORE #1	Existing	Water Bore
160556	-26.667222, 143.2716667	02/08/2013	Winton Formation	40.00 m	19.08 km*	TBH7	Abandoned and Destroyed	Water Bore
160557	-26.668333, 143.2725	30/07/2013	Winton Formation	24.00 m	19.08 km*	Monitoring Bore No 3	Existing	Water Bore
160558	-26.66805556, 143.2725	31/07/2013	Winton Formation	24.00 m	19.08 km*	Monitoring Bore No 2	Existing	Water Bore
160560	-26.667777, 143.2713889	28/07/2013	Winton Formation	30.00 m	19.08 km*	Monitoring Bore 1	Existing	Water Bore
160561	-26.6675, 143.2727778	03/08/2013	Winton Formation	33.00 m	19.08 km*	CBH 2	Abandoned and Destroyed	Water Bore

Figure 22: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Bodalla (yellow dots).

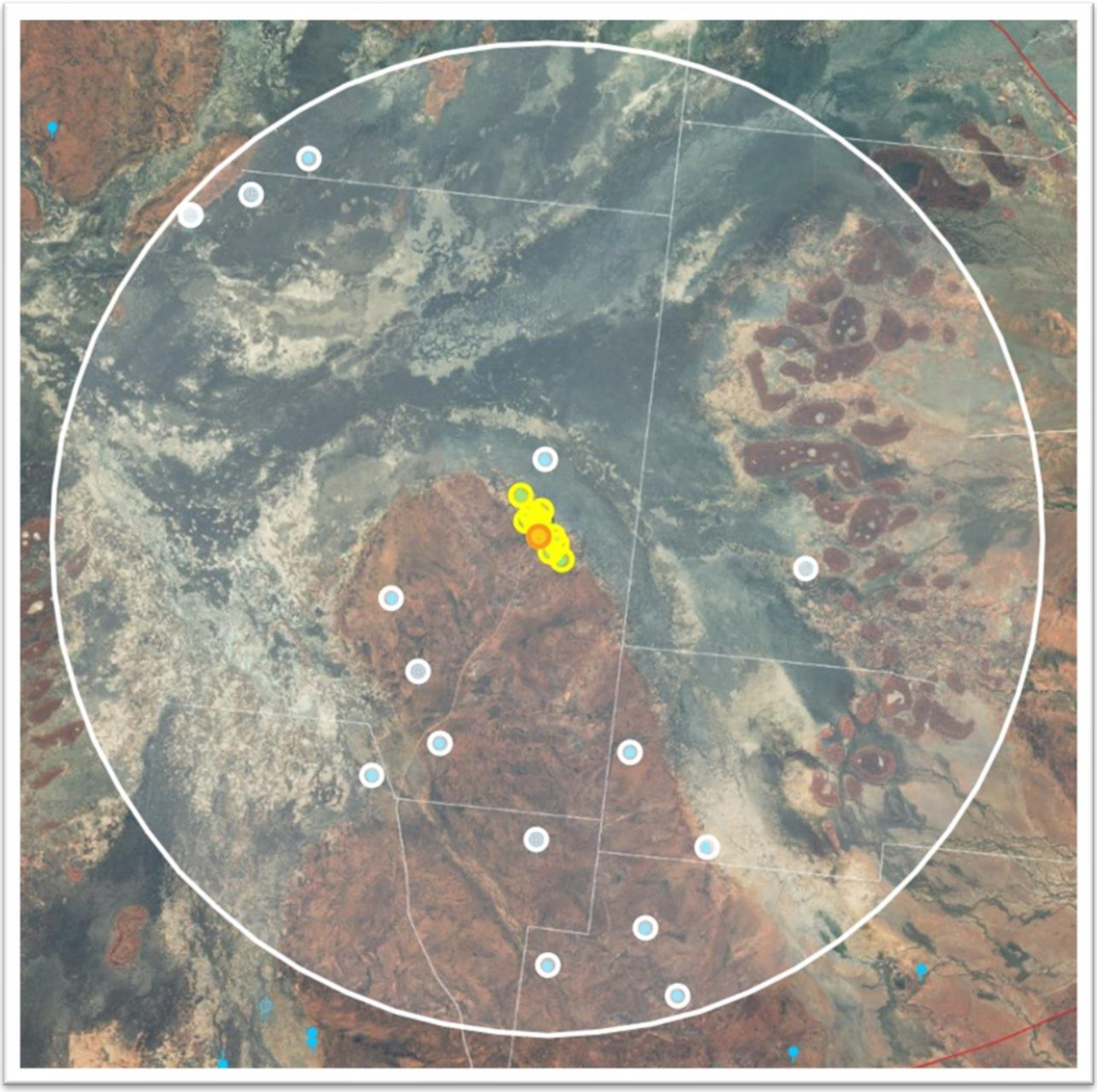


Table 19: Identified water bores occurring within 20 km from the centre of Bodalla. This list does not include the currently producing Bridgeport wells. Average distance to the centre of the Bodalla field is 13.24 km.

Bore Identification #	Location	Drilled Date	Formations/Targets	Indicated Depth on GW database	Distance from Bodalla Field	Original Name	Remarks	Likely Use
5223	-26.3512465, 143.298977		Winton Formation	21.90 m	18.95 km	Gibber Hill No 1	Abandoned and Destroyed	Water bore
5224	-26.3512465, 143.298977		Winton Formation	21.90 m	18.95 km	Gibber Hill No 2		Water bore
6197	-26.55374579, 143.42425447, 143.42425447		Winton Formation	26.20 m	12.28 km		Abandoned and Destroyed	Water bore
6198	-26.55624519, 143.48592025	01/01/1926	Winton Formation	22.80 m	14.12 km	Old Kyra Bore	Existing	Water bore
6402	-26.52263493, 143.38925467		Winton Formation	14.60 m	9.38 km	Tangie Well	Existing	Water bore
7013	-26.58263426, 143.46369849		Winton Formation	21.30 m	16.30 km	Allston Well	Existing	Water bore
7311	-26.46591238, 143.5220002	01/01/1924	Mackunda Formation	786.40 m	10.84 km		Abandoned and Destroyed	Water bore
7460	-26.47569053, 143.3715457	08/07/1938	Winton Formation	14.00 m	6.63 km	Corowa Downs Well	Existing	Water bore
9037	-26.34457961, 143.32092105		Winton Formation	17.37 m	17.97 km	Unknown	Abandoned and Destroyed	Water bore
12860	-26.59485678, 143.42814342	13/08/1955	Winton Formation	303.90 m	17.39 km	Nobles Creek Bore	Existing	Water bore
22604	-26.43068993, 143.42730906	06/11/1967	Lissoy Sandstone	2572.00 m	3.08 km	BPD Bodalla 1	Existing	Oil & Gas

Bore Identification #	Location	Drilled Date	Formations/Targets	Indicated Depth on GW database	Distance from Bodalla Field	Original Name	Remarks	Likely Use
23417	-26.52541208, 143.4581426	21/09/1984	Murta Sandstone	1213.10 m	9.47 km	Hoa Kyra 1	Existing	Oil & Gas
23517	-26.60457859, 143.4753652	30/07/1985	Adavale Group	1703.00 m	19.32 km	Lea Greymount 1	Existing	Oil & Gas
23521	-26.33291272, 143.3417541	12/02/1986	Hooray Sandstone	1454.50 m	18.00 km	Lea Byrock 1	Existing	Oil & Gas
50525	-26.49930159, 143.38147678		Unknown	Unknown	7.28 km	Lasmo	Abandoned and Destroyed	Unknown
50671	-26.53319073, 143.3645328	13/02/1989	Winton Formation	29.00 m	11.82 km	Honolulu Redrill	Existing	Water bore

Figure 23: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Blackstump (yellow dots).

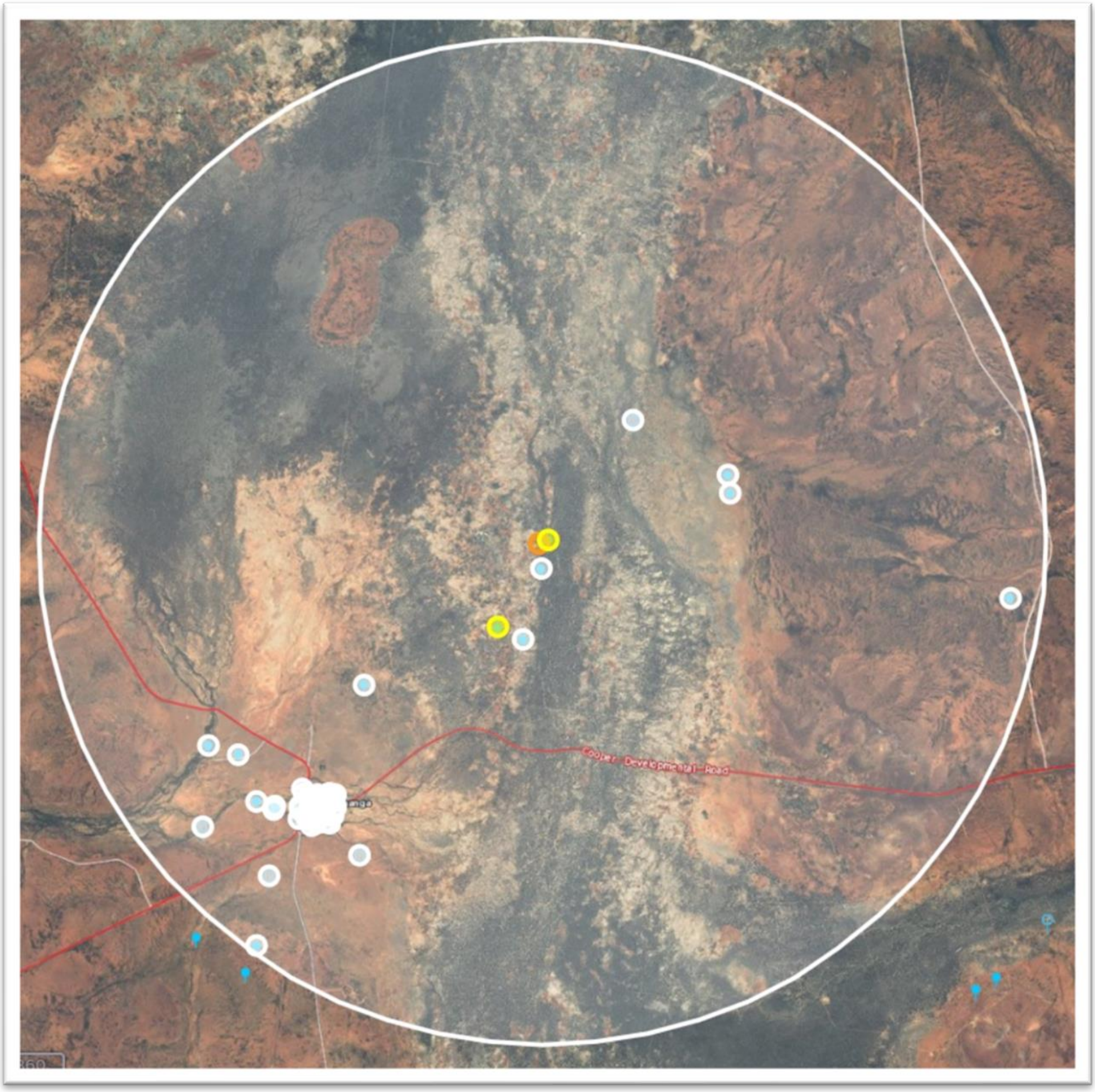


Table 20: Identified water bores occurring within 20 km from the centre of Blackstump. list does not include the currently producing Bridgeport wells. Average distance to the centre of the Black Stump field is 6.90 km.

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Blackstump Field	Original Name	Remarks	Likely use
357	-26.67708059, 143.27703486	30/06/1925	Winton Formation	25.91 m	8.57 km	Eromanga No 1 Bore	Abandoned and Destroyed	Water bore
358	-26.66938894, 143.2727374	03/03/1909	Hooray Sandstone	1303 m	7.00 km	Eromanga No 2 Bore	Existing	Oil & Gas
5235	-26.67263636, 143.24897971		Winton Formation	18.30 m	8.86 km	Erounghoola Well	Abandoned and Destroyed	Water bore
5236	-26.6804104, 143.26092402		Winton Formation	15.02 m	8.56 km		Abandoned and Destroyed	Water bore
6435	-26.6076355, 143.32592253		Winton Formation	24.40 m	3.08 km		Abandoned and Destroyed	Water bore
6433	-26.61624651, 143.34286691		Winton Formation	24.40 m	4.00 km	Honolulu Bore	Existing	Water bore
23816	-26.64263581, 143.3062009	08/12/1988	Toolachee Formation	1666.20 m	2.08 km	LEA Black stump 3	Existing	Oil & Gas
50107	-26.67180285, 143.2709238	01/01/1943	Winton Formation	18.90 m	7.00 km	Post Office Bore	Existing	Water bore
50108	-26.66930285, 143.27064598	01/01/1890	Winton Formation	12.50 m	7.00 km	Eromanga Police Well	Existing	Water bore
50109	-26.67235843, 143.26842384		Winton Formation	12.20 m	7.00 km	Unknown	Existing	Water bore
50393	-26.66985844, 143.2664794		Unknown	Unknown	7.00 km	Unknown	Abandoned and Destroyed	Unknown
50394	-26.67069172, 143.2723127	20/01/1882	Winton Formation	15.00 m	7.00 km	The Grove Bore	Abandoned and Destroyed	Water bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Blackstump Field	Original Name	Remarks	Likely use
50409	-26.64985832, 143.277868	31/05/1982	Winton Formation	16.50 m	4.55 km	Brankos Well	Existing	Water bore
50410	-26.65958079, 143.25009067	30/06/1982	Winton Formation	18.30 m	7.80 km	One Mile Bore	Existing	Water bore
50411	-26.66846961, 143.25870174	31/07/1982	Winton Formation	18.29 m	7.70 km	Eroungholla House	Existing	Water bore
50480	-26.6676362, 143.268146		Winton Formation	Unknown	7.00 km	Unknown	Abandoned and Destroyed	Unknown
50481	-26.67208062, 143.27175719	30/06/1985	Winton Formation	21.00 m	7.00 km	Berella	Existing	Water bore
50497	-26.67208064, 143.26925722		Winton Formation	43.00 m	7.00 km	Unknown	Existing	Water bore
50511	-26.63596832, 143.39342188		Winton Formation	30.00 m	9.36 km	Unknown	Existing	Water bore
50526	-26.67069174, 143.27092379	20/11/1984	Winton Formation	16.45 m	7.00 km	Eromanga Police Bore	Existing	Water bore
50527	-26.67124732, 143.26759054	16/11/1984	Winton Formation	18.89 m	7.00 km	NO 1	Existing	Water bore
50528	-26.67013621, 143.268146	14/11/1984	Winton Formation	22.86 m	7.00 km	NO 2 House Bore	Abandoned and Destroyed	Water bore
50529	-26.66727914, 143.26717741	12/11/1984	Winton Formation	18.89 m	7.00 km	NO 3	Abandoned and Destroyed	Water bore
50530	-26.6665251, 143.26675721	4/06/1985	Winton Formation	19.50 m	7.00 km	Refinery Bore	Existing	Water bore
50566	-26.61930207, 143.34314462		Winton Formation	12.20 m	3.89 km	Nobbs Creek Bore	Existing	Water bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Blackstump Field	Original Name	Remarks	Likely use
50586	-26.67124733, 143.26620166	14/10/1986	Winton Formation	32.00 m	7.00 km	Unknown	Existing	Water bore
50590	-26.67124731, 143.2689794	28/08/1987	Winton Formation	24.00 m	7.00 km	MRD Camp Bore	Abandoned and Destroyed	Water bore
50594	-26.66930288, 143.26647944	10/11/1987	Winton Formation	42.00 m	7.00 km		Existing	Water bore
50633	-26.63124684, 143.30953399	20/10/1988	Unknown	Unknown	7.00 km	Ponchos Bore	Existing	Unknown
50661	-26.69152518, 143.258702	08/02/1989	Winton Formation	36.00 m	9.82 km			Water bore
50675	-26.66895198, 143.2682593	24/02/1989	Winton Formation	32.50 m	7.00 km	B Pegler (DO) Eromanga	Existing	Water bore
50676	-26.66096963, 143.2553684	09/02/1989	Winton Formation	42.19 m	7.39 km	R&C Castles Eromanga	Existing	Water bore
50677	-26.66930291, 143.262035	15/03/1989	Winton Formation	37.50 m	7.48 km	G Snow Eromanga	Existing	Water bore
50678	-26.66985848, 143.2617573	10/02/1989	Winton Formation	28.40 m	7.48 km	Eromanga Town Hall	Existing	Water bore
116026	-26.66791, 143.2684078	14/09/2001	Winton Formation	37.00 m	7.00 km	House Bore	Existing	Water bore
116128	-26.667361, 143.2695863	20/03/2009	Winton Formation	25.00 m	7.00 km	NO 8 Neal St	Existing	Water bore
116267	26.66905089, 143.2714141	23/03/2009	Winton Formation	38.00 m	7.00 km	Public Hall	Existing	Water bore
116329	-26.66793671, 143.2724951	29/06/2013	Winton Formation	24.00 m	7.00 km	PUMPING BORE #2	Existing	Water bore

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Blackstump Field	Original Name	Remarks	Likely use
116330	-26.66724197, 143.2715618	27/07/2013	Winton Formation	41.00 m	7.00 km	PUMPING BORE #1	Existing	Water bore
160556	-26.667222, 143.2716667	02/08/2013	Winton Formation	40.00 m	7.00 km	TBH7	Abandoned and Destroyed	Water bore
160557	-26.668333, 143.2725	30/07/2013	Winton Formation	24.00 m	7.00 km	Monitoring Bore No 3	Existing	Water bore
160558	-26.66805556, 143.2725	31/07/2013	Winton Formation	24.00 m	7.00 km	Monitoring Bore No 2	Existing	Water bore
160560	-26.667777, 143.2713889	28/07/2013	Winton Formation	30.00 m	7.00 km	Monitoring Bore 1	Existing	Water bore
160561	-26.6675, 143.2727778	03/08/2013	Winton Formation	33.00 m	7.00 km	CBH 2	Abandoned and Destroyed	Water bore

Figure 24: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Bargie (yellow dots).

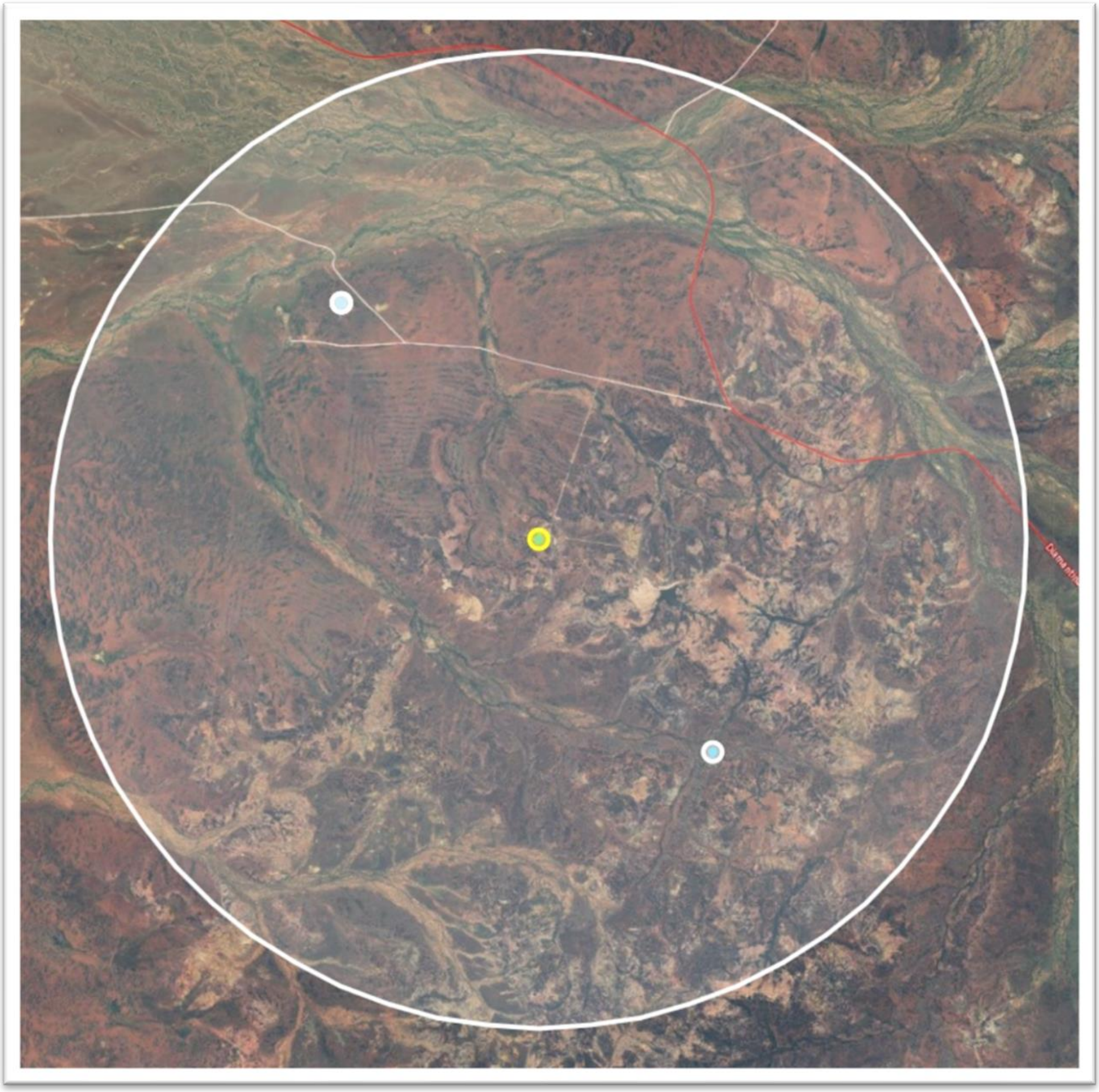


Table 21: Identified water bores occurring within 20 km from the centre of Bargie. This list does not include the currently producing Bridgeport wells. Average distance to the centre of the Bargie field is 6.26 km.

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Bargie Field	Original Name	Remarks	Likely use
6450	-26.43429839, 143.7017498		Winton Formation	304.80 m	6.73 km		Abandoned and Destroyed	Water bore
6452	-26.5081867, 143.7700828	01/01/1931	Mackunda Formation	441.40 m	5.33 km	Opal Creek Bore	Existing	Water bore
50370	-26.43429839, 143.70174989		Winton Formation	48.80 m	6.73 km	Tongalderry Bore	Existing	Water bore

Figure 25: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Marcoola (yellow dots).

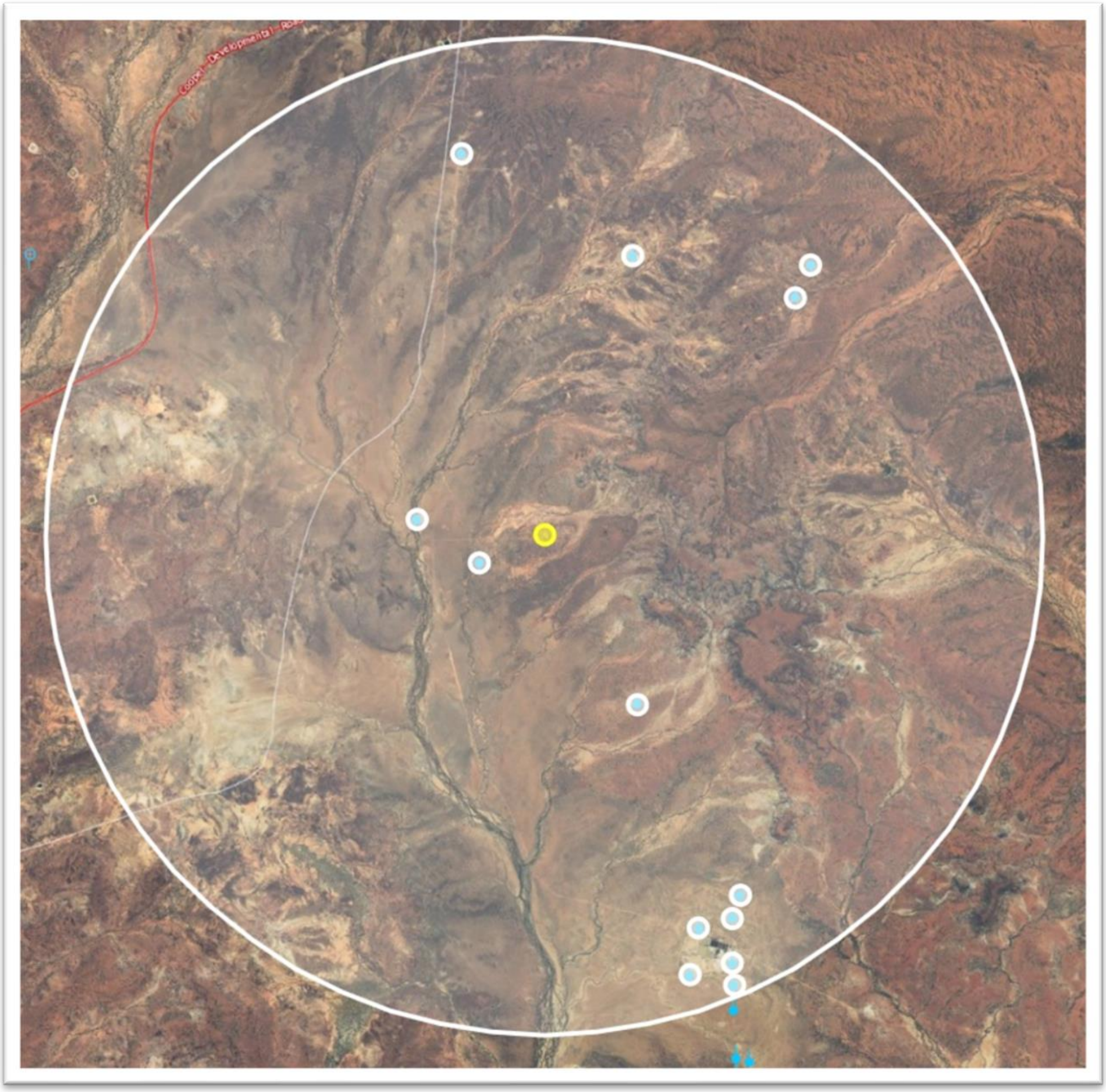


Table 22: Identified water bores occurring within 20 km from the centre of Marcoola. This list does not include the currently producing Bridgeport wells. Average distance to the centre of the Marcoola field is 6.90 km.

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth	Distance from Marcoola	Original Name	Remarks	Likely use
6370	-26.82180419, 14311759402	01/01/1914	Winton Formation	220.67 m	7.55 km	Dead Finish Bore 2	Existing	Water bore
6371	-26.86263813, 143.0468427	04/05/1916	Winton Formation	348.69 m	2.58 km	Gumbla Bore	Existing	Water bore
22090	-26.86958248, 143.0578731	21/10/1959	Wallumbilla Formation	ND	1.46 km	LHS SC 3 (GUMBLA	Existing	ND
23236	-26.93597108, 143.0956511	04/12/1984	Basal Jurassic	1234.20 m	9.26 km	HEP TINTABURRA 5	Existing	Oil & Gas
23332	-26.92847106, 143.0973177	11/01/1984	Basal Jurassic	1211.60	8.47 km	HEP TINTABURRA 1	Existing	Oil & Gas
23447	-26.92680434, 143.1034287	10/09/1984	Basal Jurassic	1219.20 m	8.58 km	HEP TINTABURRA 2	Existing	Oil & Gas
23448	- 26.93402658, 143.1034287	26/09/1984	ND	ND	9.35 km	HEP TINTABURRA 3	Existing	ND
23449	-26. 93763769, 143.1037066	17/11/1984	Basal Jurassic	1207.00 m	9.78 km	HEP TINTABURRA 4	Existing	Oil & Gas
23451	-26.92319322, 143.1048175	19/05/1985	Basal Jurassic	1223.80 m	8.18 km	HEP TINTABURRA 7	Existing	Oil & Gas
23585	-26.82708199, 143.1148163	12/05/1988	Metasediments	1527.00 m	6.92 km	LEA Gumla 1	Existing	Oil & Gas
23793	-26.89236003, 143.0862063	27/08/1988	Hutton Sandstone	1319.50	3.88 km	HEP Sirius 1	Existing	Oil & Gas
23940	-26.8040291, 143.0545391	24/11/1990	ND	ND	7.90 km	LEA Thunbunnee 1	Existing	ND

100190	-2.8204156, 143.0853723	009/12/1992	ND	ND	5.79 km	OCA Gumia 1	Existing	ND

Figure 26: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Byrock (yellow dots).

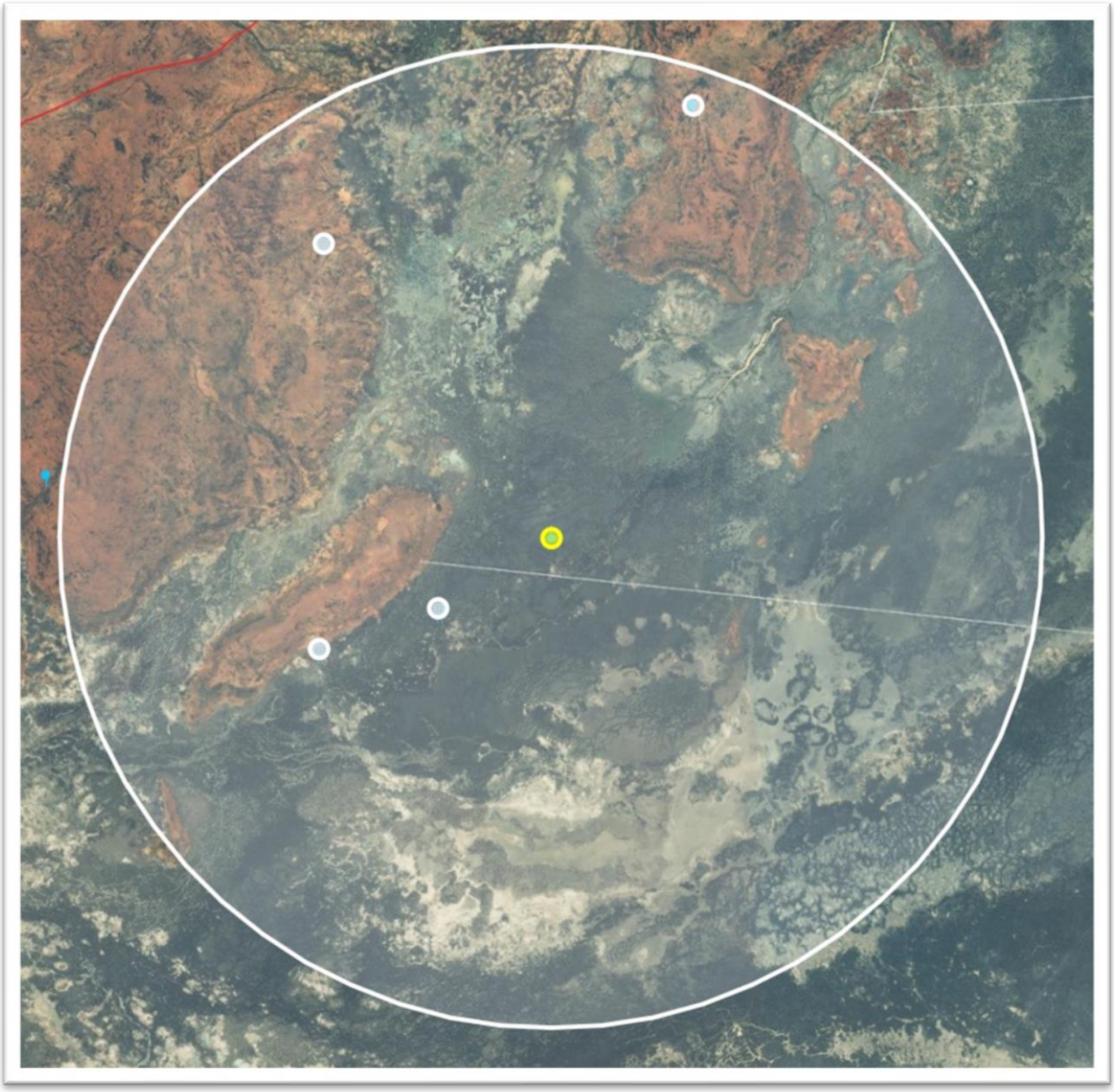


Table 23: Identified water bores occurring within 20 km from the centre of Byrock. list does not include the currently producing Bridgeport wells. Average distance to the centre of the Byrock field is 6.23 km.

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth	Distance from Byrock	Original Name	Remarks	Likely use
5215	-26.28457971, 143.29980987		Winton Formation	510.80 m	7.62 km		Abandoned and Destroyed	Water well
5224	-26.3512465, 143.298977		Winton Formation	21.90 m	5.30 km	Gibber Hill No 2	Abandoned and Destroyed	Water well
9037	-26.34457961, 143.32092105		Winton Formation	17.37 m	2.73 km		Abandoned and Destroyed	Water well
50573	-26.261880123, 143.3675866	11/11/19986	Winton Formation	37.49 m	9.30 km	Byrock Bore	Existing	Water well

Figure 27: "Queensland Globe" Inland Waters Groundwater "Registered water bores (DNRM and private)" layer, overlaid the Coolum & Glenvale (yellow dots).

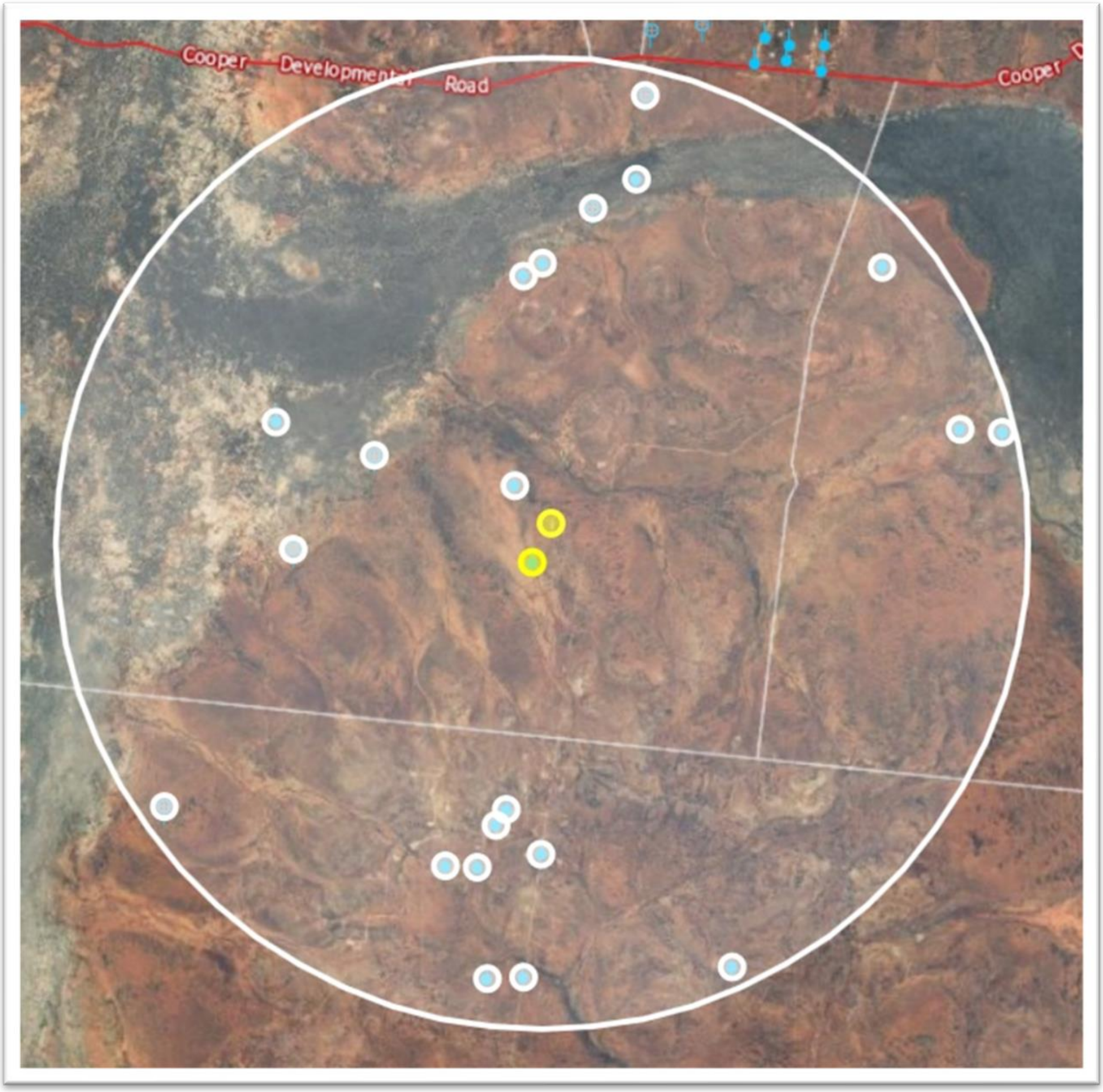


Table 24: Identified water bores occurring within 20 km from the centre of Coolum & Glenvale. This list does not include the currently producing Bridgeport wells. Average distance to the centre of the Coolum & Glenvale field is 7.02 km.

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Glenvale & Coolum Field	Original Name	Remarks	Likely use
5406	-26.78624692, 143.32092429		Winton Formation	17.10 m	9.49 km	Salty Bore	Abandoned and Destroyed	Water well
11305	-26.66874607, 143.40981082	01/09/1948	Winton Formation	20.73 m	9.50 km		Abandoned and Destroyed	Water well
12733	-26.81263492, 143.4259233	29/09/1954	Winton Formation	71.90 m	9.50 km	Panjee No 1	Existing	Water well
12949	-26.72819103, 143.35981207		Winton Formation	16.80 m	3.71 km	Kennedy's Paddock	Abandoned and Destroyed	Water well
12950	-26.74374672, 143.34481245		Winton Formation	18.30 m	4.98 km		Abandoned and Destroyed	Water well
12968	-26.69707909, 143.45369941	12/01/1955	Winton Formation	195.70 m	9.04 km	Cranstoun No 3 Bore	Existing	Water well
15120	-26.69652412, 143.39092243	12/05/1962	Winton Formation	128.00 m	5.67 km	Stony Hill Bore	Existing	Water well
23654	-26.72263564, 143.3417567	08/12/1989	Basal Jurassic	1543.00 m	5.97 km	LEA Eroungoola 1	Existing	Oil & Gas
23715	-26.81430193, 143.3873127	05/11/1987	Adavale Group	1566.70 m	9.00 km	HEP Cranstoun 1	Existing	Oil & Gas
23869	-26.78930196, 143.3823125	12/10/1989	Basal Jurassic	1530.50 m	5.99 km	AMP Endeavour 1	Existing	Oil & Gas
23907	-26.81457977, 143.3806461	10/07/1990	Basal Jurassic	1520.00 m	9.06 km	AMP Cranstoun 2	Existing	Oil & Gas
23920	-26.73319081, 143.3856451	05/12/1990	Evergreen Formation	1240.50	1.30 km	LEA Glenvale North 1	Existing	Oil & Gas

Bore Identification #	Location	Drilled Date	Formations/Target	Indicated Depth on GW database	Distance from Glenvale & Coolum Field	Original Name	Remarks	Likely use
23991	-26.79596872, 143.3728683	21/10/1991	Basal Jurassic	1567.50 m	6.98 km	AMP Endeavour 3	Existing	Oil & Gas
23923	-26.76402412, 143.3906457		Basal Jurassic	1564.30 m	6.45 km	AMP Supply 1	Existing	Oil & Gas
23927	-26.7962876, 143.3787309	13/06/1990	Basal Jurassic	1562.40 m	6.82 km	AMP Endeavour 2	Existing	Oil & Gas
26187	-26.68735734, 143.40008893	ND	Winton Formation	61.00 m	6.94 km	Arabic Bore	Abandoned and Destroyed	Water well
50106	-26.68263503, 143.40814428	01/01/1900	Winton Formation	13.10 m	7.46 km	Arabic Well	Existing	Water well
50110	-26.7240234, 143.46814392		Winton Formation	18.30 m	8.94 km	Cranstoun No 1 Bore	Existing	Water well
50111	-26.7243011, 143.47592162	01/01/1945	Winton Formation	12.20 m	9.74 km	Cranstoun No 2 Bore	Existing	Water well
50670	-26.69846585, 143.3873114	12/02/1989	Winton Formation	685.80 m	5.46 km	Stonie Bore No 2	Existing	Water well
100170	-26.78680194, 143.38425692	19/09/1994	ND	ND	5.59 km	SSL Endeavour 4	Existing	ND

A program for conducting an annual review of the accuracy of maps produced and giving the chief executive a summary of the outcome of each review, including a statement of whether there has been a material change in the information of predictions used to prepare the maps (section 376(e) of the Water Act).

Bridgeport provides the following detail to form the basis of a groundwater monitoring strategy (same as below) which includes parameters, locations and frequency to help define and inform the program. This program will be used to monitor against historic conditions, and data will inform assumptions made by this UWIR (e.g. the IAA and LTAA) for each subsequent yearly period that data is collected. Considering the on-going consistency of field production, field life, the predicted modelled drawdowns and physical factors relating to the reservoir and those above it, little material change to the modelled mapping is predicted. This however will be monitored and submitted to the chief executive annually, with appropriate data, interpretation and statements.

The monitoring will be as follows;

Shallow Groundwater Monitoring (~0-15m TD)

Bridgeport continue to sample and expand shallow groundwater sampling bores across PL 31 (Bodalla) and PL 32 (Kenmore). This data will inform shallow groundwater monitoring around the largest of Bridgeport evaporation ponds and any potential impacts related to shallow groundwater.

Regional Groundwater Monitoring (~all well target depth TD)

The requirement to develop op a monitoring strategy (s378) is detailed in the following section. The plan considers and matches the historic monitoring plans put forth by Beach Energy, to keep consistency with best practice and historic brown fields operations.

Shut-in wellhead pressure will be monitored in across the fields in a series of wells. Shut-in tubing head pressure (SITHP) is taken and extrapolated to determine reservoir pressure (and therefore water level).

Well selection is based on position within the field, as well as target formation. There are four wells perforated in the Hutton which will be tested at Kenmore and three at Bodalla. One well, Kenmore 28 has been brought back online, so Kenmore 29 will be monitored in its place. The Basal Jurassic will be monitored at Bodalla by monitoring two wells (Table 37).

Table 25: Shut-in wells in the Hutton (Kenmore and Bodalla) and Basal Jurassic (Bodalla) that will be monitored for shut-in well head pressure.

Kenmore (Hutton)	Bodalla (Hutton)	Bodalla (Basal Jurassic)
K-5	B-4	B-5
K-22	B-8	B-6
K-29	B-18	B-22
K-31		

Frequency of Measurements

Shut-in tubing head pressure will be monitored quarterly. Any influence on the groundwater system is extremely slow acting, which supports this monitoring schedule.

Significant changes in the reservoir pressure can infer changes in well bore conditions or reservoir conditions. The SITHP will be assessed against the previous monitoring figures every quarter, to be reported in the annual updates.

Each annual update and three yearly report will include;

- A summary of the previous (12 or 36 months) monitoring data
- Assessment of monitoring program (applicability, improvements)
- Results review

Rationale for Strategy

Bridgeport took over the already mature GKBA oil fields from Beach Energy. Bridgeport recognises the most sensible approach would be to continue monitoring in a similar method and technique, which accomplishes the same goals and allows consistent comparisons over time.

The Cooper-Eromanga Basin is extremely large, extremely slow acting hydrogeological groundwater basin. The overall extraction from the GKBA fields has been deemed to be low, with little to no influence on groundwater dependent ecosystems or regional groundwater users. The following parameters and frequency are deemed appropriate for the scale of monitoring and have been justified through the previous UWIRs.

Changes in predictions

Any material change in predictions would equate to a significant increase in current and predicted production. There is no material limit to the extraction of oil and water from a petroleum tenement. If any significant change was to occur, it would require a significant and material change to the physical infrastructure at the facility (which is not planned). Bridgeport would include any increased production and extraction into the subsequent reporting, modelling and water drawdown predictions, but no physical change would occur to day to day operations. This is considered appropriate, as the current levels of production do not exceed extraction from the previous operators, nor impact local or regional ecosystems or landholders.

Summary

Matching the previous operators monitoring strategy will allow for accurate and best-practice data to determine potential impacts, with little to no material change expected.

Notification of Commencement

The submission of this UWIR, and this sentence, seeks to notify OGIA that the Water Monitoring Strategy has been commenced. The Water Monitoring Strategy will be summarised, reviewed, and adjusted during the annual and three yearly reporting periods as required.

Part D*: Impacts on environmental values

Requirements under sections 376(da) and 376 (db) of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following; **1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);** **2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act)-** **i. For a three-year period starting on the consultation day for the report; &** **ii. Over the projected life of the resource tenure.**

*Part D refers to Section 5.1.4 (page 17) of the guideline (DES 2017).

To better describe the Bridgeport potential impacts on Environmental Values (EVs), an analysis tool was developed using templates from Work Health and Safety & Environment templates used in other Bridgeport areas (such as Production). The use of matrices provides a better understanding and classification of the potential risk to EVs and provides the Department of Environment and Science (DES) clarity on how Bridgeport has come to conclusions around impacts. The following table represents Bridgeport's EV risk allocation framework. The use of the framework is simply to define the Likelihood and Consequence, to determine the Level of Risk (Table 27).

Table 26: Bridgeport Energy Risk Allocation Framework applied to Environmental Values

EV Risk Allocation Framework						
Likelihood		**Consequence**				
		Insignificant	**Minor**	**Moderate**	**High**	**Catastrophic**
A	**Almost certain**	Medium	High	Extreme	Extreme	Extreme
B	**Likely**	Medium	High	High	Extreme	Extreme
C	**Possible**	Low	Medium	High	Extreme	Extreme
D	**Unlikely**	Low	Low	Medium	High	Extreme
E	**Rare**	Low	Low	Low	Medium	High
F	**Incapable of occurring**	No risk	No risk	No risk	No risk	No risk

Consequence Rating		
Level	**Description**	**Definition**
Insignificant	**Almost Certain**	No unauthorised adverse impact on environment values
Minor	**Likely**	Temporary and minor unauthorised effect on environmental values – non reportable environmental harm
Moderate	**Possible**	Serious temporary or minor permanent unauthorised damage to environmental values – reportable incident with local attention
High	**Unlikely**	Significant unauthorised harm to environmental values - reportable incident with adverse national publicity
Catastrophic	**Rare**	Major unauthorised event causing significant unauthorised harm to environmental values, loss of company credibility with stakeholders and likely prosecution

Likelihood Rating		
Level	**Description**	**Definition**
A	**Almost Certain**	(1) Reasonably expected to occur within a month (2) Will likely occur in most circumstances
B	**Likely**	(1) Likely to occur within the next year (2) Probably occur in the near future
C	**Possible**	(1) Likely to occur over ten years (2) Might occur at some time
D	**Unlikely**	(1) Not specifically expected to occur but may occur sometime (2) May occur in exceptional circumstances
E	**Rare**	(1) Foreseeable but not normally expected to occur (2) May occur in exceptional circumstances
F	**Incapable of occurring**	(1) Incapable of occurring regardless of time (2) Impossible to occur physically
**Please note this table is a guide to determining the likelihood rating. The frequency may change depending on the risk type and the context in which it occurs.		

Environmental Risks		
Level of Risk	**Authority to approve the risk**	**Action Required**
Extreme	Senior Executive Team (SET) Board of Director must be made aware	Unacceptable Risk – STOP or DO NOT START the action until controls are established to reduce the risk to an acceptable level. Establish permanent control measures and review for effectiveness. The highest level of management must be made aware.
High	Operations Manager sign off Board of Director must be made aware	Activity may only proceed if: likelihood is tolerable; personnel are competent; risks are adequately assessed; legal and mandatory requirements are met;
Medium	SSM to sign off Manager must be made aware	Acceptable – apply adequate safeguards and review for effectiveness. Monitor for changes which may cause escalation of risk level.
Low	No approval but must document risk in the UWIR	Acceptable – apply safeguards as considered necessary. Monitor for changes which may cause escalation of risk level.
No risk	No approval but must document risk in the UWIR	Acceptable – apply safeguards as considered necessary. Monitor for changes which may cause escalation of risk level.

Bridgeport used the definition of environmental values (EVs) as provided by legislation and other Government policies, procedures or departments as outlined below.

Environment Protection Act (1994) define EVs as;

> (a) a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety;
>
> (b) another quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

The Environmental Protection (Water) Policy (2009) also has an EV definition,

> *"those qualities of the waterway that make it suitable to support particular aquatic ecosystems or human use".*

The Department of Environment and Science (2019) also have an apt definition;

> *"EVs for water are the qualities that make it suitable for supporting aquatic ecosystems and human water uses."*

Environmental values are scheduled into the Environment Protection (EPP) (Water and Wetland Biodiversity) Policy 2019 through a legislative process. These EVs are described in Schedule 1 of the EPP (Water and Wetland Biodiversity Policy 2019.

In Queensland, all tidal and non-tidal waters, including wetlands, lakes and groundwater have EVs, as described in the Environmental values and water quality objectives under the Environmental Protection (Water and Wetland Biodiversity) Policy document (DES, 2019).

A short list of Environmental Values includes;

- Aquatic Ecosystem Health
- Agricultural uses (e.g. stock watering and irrigation)
- Recreational uses (e.g. swimming, wading, boating, fishing and aesthetics)
- Drinking water (raw water supply)
- Industrial uses (e.g. mining, mineral refining and processing) and

- Cultural and spiritual values.

Using the Department of Environment and Sciences' website, a basic map of the EPP (Water and Wetland Biodiversity) scheduled data [https://environment.des.qld.gov.au/__data/assets/image/0021/214590/qld-basin-map.jpg] was accessed. The interactive map [https://apps.des.qld.gov.au/protection-policy-water/] was also accessed. Further, the Environmental Protection (Water and Wetland Biodiversity) Policy 2019 Schedule 1 was accessed [https://www.legislation.qld.gov.au/view/html/inforce/current/sl-2019-0156#sch.1], to summarise the type and presence of EVs.

The two mapping resources (above) reveal the absence of spatial data for EVs over the Bridgeport GKBA assets which are the focus of this UWIR. The GKBA fields are within a project area classified in these mapping resources as "future programs", which implies a current lack of development of spatial layers relating to EVs, which are likely to be added at a later date, if applicable. Likewise, the live spatial data services reveal an absence of layers over the project area, focussing heavily on the eastern coast. The actual Schedule also does not include definitions relating to the GKBA project area. The closest EPP (Water and Wetland Biodiversity) Overview Map region relating to the GKBA area is the Queensland Murray-Darling and Bulloo Basins map. The GKBA assets would likely be classified in the "Lake Eyre" region of the EPP (Water) mapping, which has been described for the Queensland Water Quality Guidelines (Department of Environment and Science 2018).

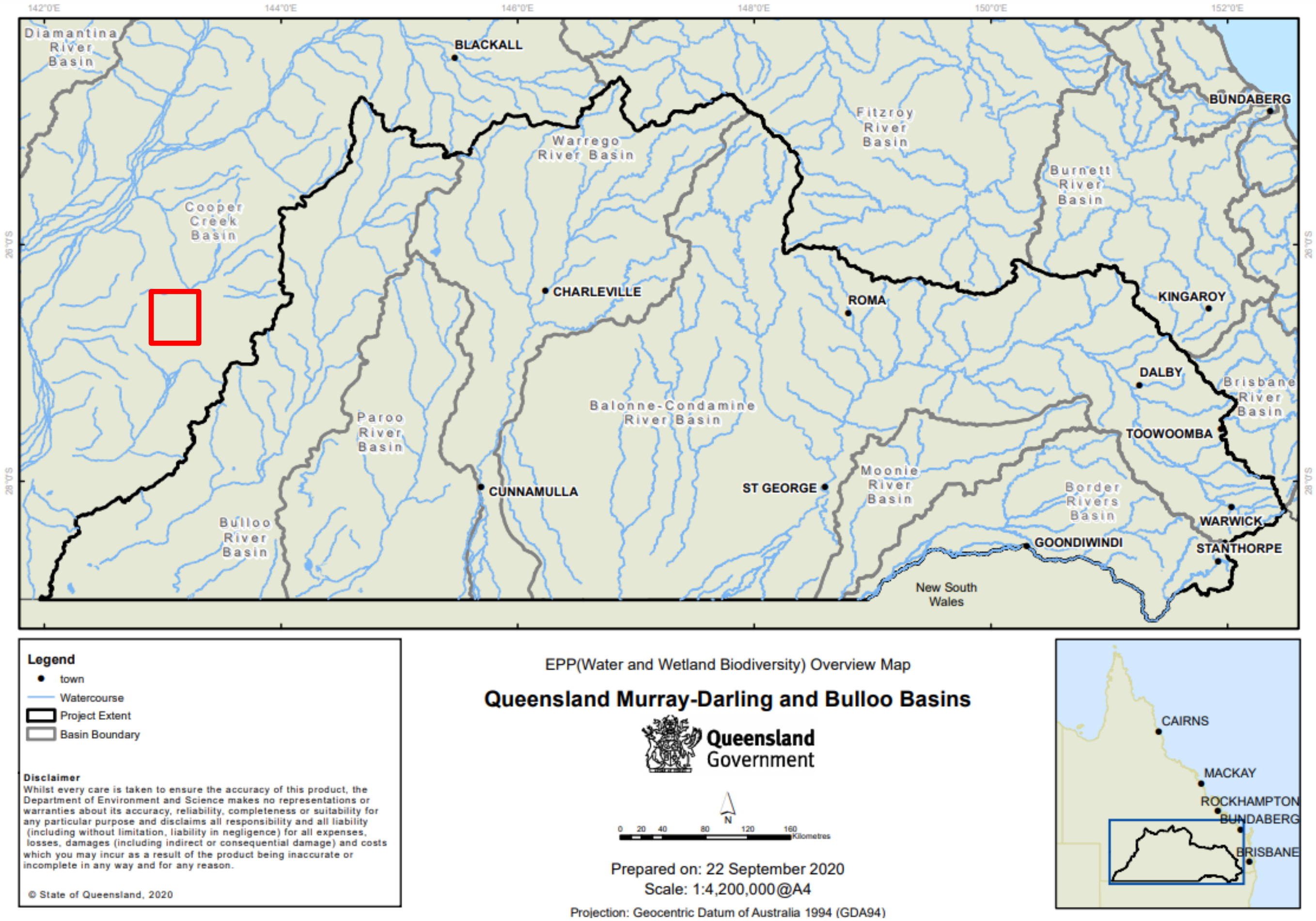


Figure 28: The EPP (Water and Wetland Biodiversity) Overview Map region that is closest to GKBA (red square). The dark line represents the Queensland Murray-Darling and Bulloo Basin. GKBA would likely occur within a "Lake Eyre" region.

Regardless, the absence of spatial data and the mapping classification within the EPP (Water and Wetland Biodiversity) Guideline for the specific region relating to GKBA was merely highlighted above to demonstrate our attempt to use specific Queensland Government resources, and why they do not feature further in this process.

Bridgeport summarises and describes EVs relevant to the exercise of water rights associated with GKBA assets in Table 27. Subsequently, Bridgeport assesses the EVs as per the Risk Allocation Framework in Table 26 in reference to UWIR requirements and physical conditions around GKBA.

Table 27: Environmental Values as described in Healthy waters for Queensland: Environmental values, management goals and water quality objectives—frequently asked questions (by the DES), as well as in the EPP (Water and Wetland Biodiversity) Schedule 2.

Section	Environmental Value	Definition
D.1	**Aquatic ecosystem**	'A community of organisms living within or adjacent to water, including riparian or foreshore area'. (EPP (Water and Wetland Biodiversity), schedule 2). The intrinsic value of aquatic ecosystems, habitat and wildlife in waterways and riparian areas, for example, biodiversity, ecological interactions, plants, animals, key species (such as turtles, platypus, seagrass and dugongs) and their habitat, food and drinking water. Waterways include perennial and intermittent surface waters, groundwaters, tidal and non-tidal waters, lakes, storages, reservoirs,

		dams, wetlands, swamps, marshes, lagoons, canals, natural and artificial channels and the bed and banks of waterways. (This EV incorporates the 'wildlife habitat' EV used in the South East Queensland Regional Water Quality Management Strategy (SEQRWQMS)).
D.2	**High ecological/conservation value waters**	'Waters in which the biological integrity of the water is effectively unmodified or highly valued.'
D.3	**Slightly disturbed waters**	'Waters that have the biological integrity of high ecological value waters with slightly modified physical or chemical indicators but effectively unmodified biological indicators'.
D.4	**Moderately disturbed waters**	'Waters in which the biological integrity of the water is adversely affected by human activity to a relatively small but measurable degree.'
D.5	**Highly disturbed waters**	'Waters that are significantly degraded by human activity and have lower ecological value than high ecological value waters or slightly or moderately disturbed waters.'
D.6	**Irrigation**	Suitability of water supply for irrigation, for example, irrigation of crops, pastures, parks, gardens and recreational areas.
D.7	**Farm water supply/use**	Suitability of domestic farm water supply, other than drinking water. For example, water used for laundry and produce preparation.

D.8	**Stock watering**	Suitability of water supply for production of healthy livestock.
D.9	**Human consumers of aquatic foods**	The suitability of the water for producing aquatic foods for human consumption such as fish, crustaceans and shellfish from natural waterways.
D.10	**Primary recreation**	Means a use that involves the following types of contact with the water—full body contact, frequent immersion by the face and trunk, frequent contact with spray by the face where it is likely some water will be swallowed or inhaled, or come into contact with ears, nasal passages, mucous membranes or cuts in the skin e.g. diving, swimming, surfing.
D.11	**Secondary recreation**	Means a use that involves the following types of contact with the water—contact in which only the limbs are regularly wet, and other contact, including the swallowing of water, is unusual (examples—boating, fishing, wading) or occasional inadvertent immersion resulting from slipping or being swept into the water by a wave.
D.12	**Visual recreation**	Means a use that does not ordinarily involve any contact with the water—for example angling from the shore, sunbathing near water.
D.13	**Drinking water supply**	Suitability of the water for supply as drinking water having regard to the level of treatment of the water.
D.14	**Industrial use**	Suitability of water supply for industrial purposes, for example, food, beverage, paper, petroleum and power industries, mining and minerals refining/processing. Industries usually treat water supplies to meet their needs.

D.15	**Cultural and spiritual values**	Means scientific, social or other significance to the present generation or past or future generations, including Aboriginal People or Torres Strait Islanders. This includes custodial, spiritual, cultural and traditional heritage, hunting, gathering and ritual responsibilities, symbols, landmarks and icons (such as waterways, turtles and frogs). • lifestyles (such as agriculture and fishing).
D.16	**Environmentally Sensitive Areas**	ESAs are areas of habitat, described as important for key ecological functions in legislation (e.g. Nature Conservation Act 1994, Marine Parks Act 2004, etc.). ESAs are split into two categories, Category A and Category B, and the appropriate formal definition can be found in the Environment Protection Regulation (2019).

D.1 Aquatic ecosystem

Definition: 'A community of organisms living within or adjacent to water, including riparian or foreshore areas'. (EPP (Water and Wetland Biodiversity), schedule 2).

The intrinsic value of aquatic ecosystems, habitat and wildlife in waterways and riparian areas, for example, biodiversity, ecological interactions, plants, animals, key species (such as turtles, platypus, seagrass and dugongs) and their habitat, food and drinking water. Waterways include perennial and intermittent surface waters, groundwaters, tidal and non-tidal waters, lakes, storages, reservoirs, dams, wetlands, swamps, marshes, lagoons, canals, natural and artificial channels and the bed and banks of waterways.

(This EV incorporates the 'wildlife habitat' EV used in the South East Queensland Regional Water Quality Management Strategy (SEQRWQMS)).

UWIR requirements

D.1.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.1.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act) -

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

To determine the extent of watercourse, wetlands, springs (including other relevant environmental values and layers) or river improvement trust asset areas on PL 31, 32 & 47, PL 256, PL 482, PL 483 and PL 484, the following layers, including water course areas, pondage, major water course lines, groundwater dependent ecosystems (areas, watercourses and springs), water plans (waterholes and lakes), pondage, active springs, directory of important wetlands, groundwater dependent ecosystems – springs, high ecological significance wetlands, water course identification map (watercourses), MSES (high ecological significance wetlands) and the River Improvement Trust Areas. All shapefiles were downloaded from the Queensland Governments resources and overlaid on the boundaries of each petroleum tenement.

There is a very small (500 m) portion of a major water course line in upper north-east boundary of PL 31 Bodalla. It is the beginning of a larger ephemeral water course, and begins 9 km from the main production facility, and 8.5 km from the nearest production well. There are no other watercourses, wetlands, GDEs or springs within the boundary of PL 31, 32 & 47. There is pondage in PL 31, 32 & 47, otherwise known as low-hazard category dams licenced as environmentally relevant activities (ERA) for the evaporation of produced water. These ponds are accounted for in the disturbed surface area calculations and in PL 31, 32 & 47 ERC calculations. The water course that features within PL 31 is not relevant to areas of significant disturbance from petroleum or on-going plans to extract more petroleum.

There are no significant watercourses, wetlands, groundwater dependent ecosystems or springs located within PL 256, although there is a major water course line in northern most portion of the tenement. PL 256 is a single well, which is a very low producer. There are no significant watercourses, wetlands, groundwater dependent ecosystems or springs located within Marcoola (PL 482) and Coolum & Glenvale (PL 483). In Byrock (PL 484), there is a major water course line which overlays the northern section of the tenement. The crude oil facility and authorised activities are located 1.8 km south of the major water course line and is not expected to interfere or have any impact on the water course, especially considering the very small portion of water extracted at Byrock (which also cycles (turning on and off at different times)).

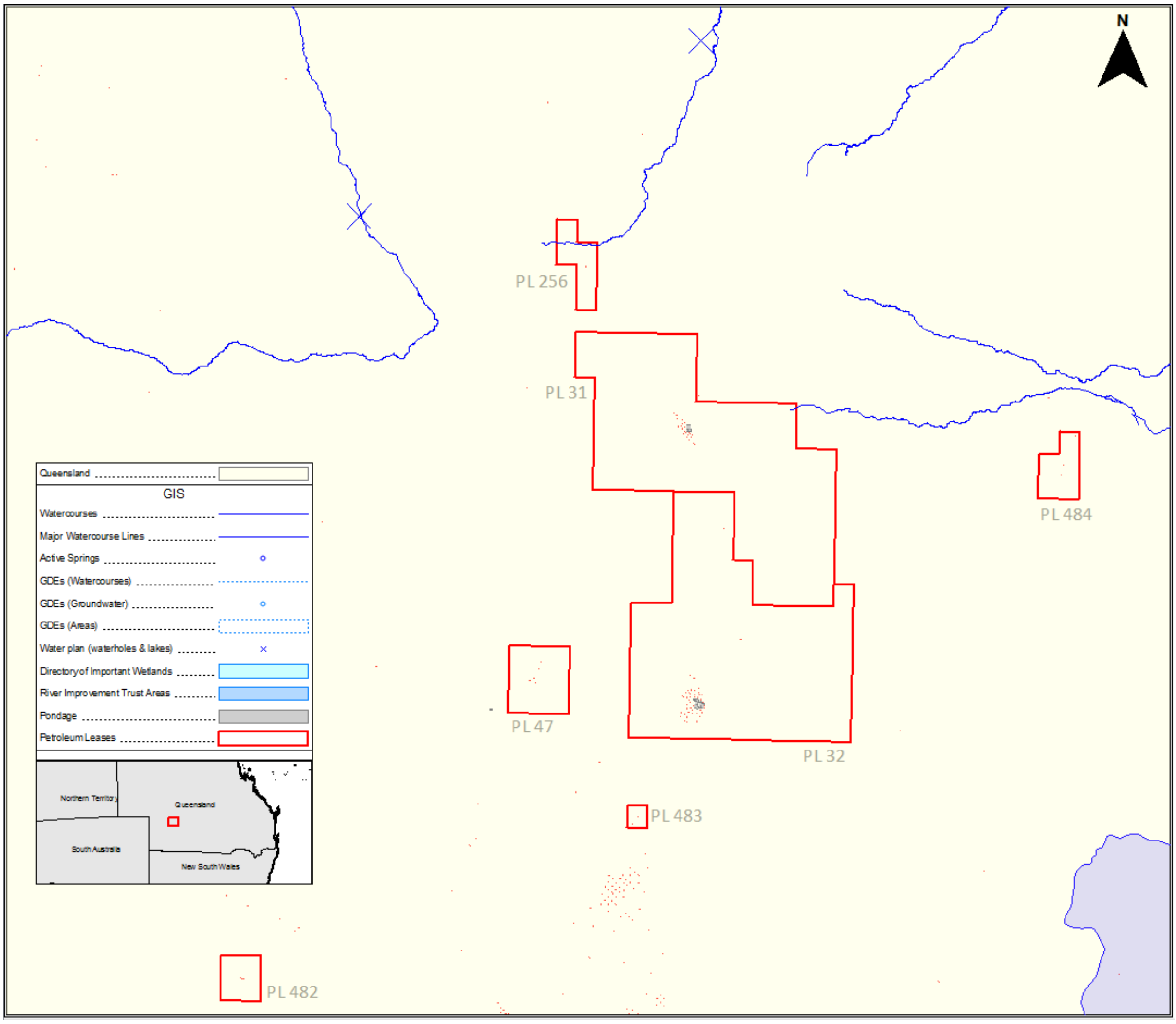


Figure 29: Aquatic shapefiles and layers applied to the appropriate GKBA UWIR tenements.

The aquatic features around the tenement areas are in a generally degraded state. They are characterised by little to no riparian vegetation, with mature trees only. Mature trees are tall enough to withstand constant grazing. Young, new recruitment find it difficult once climatic conditions reduce groundcover and animals forage on alternate, unprotected new trees and shrubs. Waters are open to livestock (both domestic and feral), including cattle, sheep, kangaroos, goats, pigs and horses) with vegetation constantly grazed to a literal bare soil condition for large portions of the year.

The aquatic features near tenements like Kenmore are ephemeral, in that they only contain water when the region receives large rainfall. There are no ecosystems which rely on groundwater, and the region (known as Channel Country) is known for the large influx of rainfall, quick flooding and quick retreat of surface waters.

Any potential impacts from operations would likely include small impacts from localised spills of hydrocarbon or chemicals and impacts from produced water discharge (which will be covered in a Section D.8).

These features/descriptions do not preclude Bridgeport's' right to take water from having an impact on aquatic EVs but is provided with the aim to set a realistic context to the land in which we operate.

Note, this information will be relevant to subsequent EVs, but will not be repeated in each section. A reference back to this section will be provided.

Bridgeport Risk Allocation

D.1.1. Bridgeport have assessed the likelihood of aquatic ecosystem environmental values being impacted by the previous exercise of underground water rights as a Likelihood of D, or Unlikely, with the explanation being (1) Not specifically expected to occur but may occur sometime. The consequence of impact is Minor, leading to a Low consequence level of risk. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are limited aquatic ecosystems within or in proximity to, Bridgeport petroleum production that would be influenced by the exercise of underground water rights for the remaining life of the project.

D.1.2.i. Bridgeport have assessed the likelihood of aquatic ecosystem environmental values being impacted by the exercise of underground water rights for the next three years as a Likelihood of D, or Unlikely, with the explanation being (1) Not specifically expected to occur but may occur sometime. The consequence of impact is Minor, leading to a Low consequence level of risk. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are limited aquatic ecosystems within or in proximity to, Bridgeport petroleum production that would be influenced by the exercise of underground water rights for the remaining life of the project.

D.1.2.ii. Bridgeport have assessed the likelihood of aquatic ecosystem environmental values being impacted by the exercise of underground water rights for the remainder of the project life as a Likelihood of D, or Unlikely, with the explanation being (1) Not specifically expected to occur but may occur sometime. The consequence of impact is Minor, leading to a Low consequence level of risk. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are limited aquatic ecosystems within or in proximity to, Bridgeport petroleum production that would be influenced by the exercise of underground water rights for the remaining life of the project.

D.2 High ecological/conservation value waters

> **Definition:** 'Waters in which the biological integrity of the water is effectively unmodified or highly valued.'

UWIR requirements

D.2.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.2.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no waters of high ecological values or conservation value waters within or nearby to Bridgeport tenements relating to GKBA. All environmental values related to highly disturbed waters.

See section D.1 Aquatic ecosystem above, for a comprehensive summary of the ecological/conservation waters values.

Bridgeport Risk Allocation

D.2.1. Bridgeport have assessed the likelihood of high ecological/conservation water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no high ecological or conserved ecosystems within or in proximity to Bridgeport petroleum production that would be influenced by previous exercise of underground water rights.

D.2.2.i. Bridgeport have assessed the likelihood of high ecological/conservation water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no high ecological or conserved ecosystems within or in proximity to Bridgeport petroleum production that will occur in the next three-year period.

D.2.2.ii. Bridgeport have assessed the likelihood of high ecological/conservation water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no high ecological or conserved ecosystems within or in proximity to Bridgeport petroleum production that will occur over the life of the project.

D.3 Slightly disturbed waters

Definition: 'Waters that have the biological integrity of high ecological value waters with slightly modified physical or chemical indicators but effectively unmodified biological indicators'.

UWIR requirements

D.3.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.3.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no slightly disturbed ecological water values within or nearby to Bridgeport tenements relating to GKBA. All environmental values related to highly disturbed waters.

See section D.1 Aquatic ecosystem above, for a comprehensive summary of the ecological/conservation waters values.

Bridgeport Risk Allocation

D.3.1. Bridgeport have assessed the likelihood of slightly disturbed water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no high ecological or conserved ecosystems within or in proximity to Bridgeport petroleum production that would be influenced by previous exercise of underground water rights.

D.3.2.i. Bridgeport have assessed the likelihood of slightly disturbed water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no high ecological or conserved ecosystems within or in proximity to Bridgeport petroleum production that will occur in the next three-year period.

D.3.2.ii. Bridgeport have assessed the likelihood of slightly disturbed water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no high ecological or conserved ecosystems within or in proximity to Bridgeport petroleum production that will occur over the life of the project.

D.4 Moderately disturbed waters

Definition: 'Waters in which the biological integrity of the water is adversely affected by human activity to a relatively small but measurable degree.'

UWIR requirements

D.4.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.4.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no moderately disturbed waters within or nearby to Bridgeport tenements relating to GKBA. All environmental values related to highly disturbed waters.

See section D.1 Aquatic ecosystem above, for a comprehensive summary of the ecological/conservation waters values.

Bridgeport Risk Allocation

D.4.1. Bridgeport have assessed the likelihood of moderately disturbed water values being impacted by the previous exercise of underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no moderately disturbed waters within or in proximity to Bridgeport petroleum production that would be influenced by previous exercise of underground water rights.

D.4.2.i. Bridgeport have assessed the likelihood of moderately disturbed water values being impacted by the preceding three years of exercising underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no moderately disturbed waters within or in proximity to Bridgeport petroleum production that would be influenced by the exercise of underground water rights for the next three years.

D.4.2.ii. Bridgeport have assessed the likelihood of moderately disturbed water values being impacted by the preceding life if the project exercising underground water rights as a Likelihood of F, or incapable of occurring, with the explanation being impacts are (2) Impossible to occur. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are no moderately disturbed waters within or in proximity to Bridgeport petroleum production that would be influenced by the exercising of underground water rights for the remainder of the project’s life.

D.5 Highly disturbed waters

Definition: 'Waters that are significantly degraded by human activity and have lower ecological value than high ecological value waters or slightly or moderately disturbed waters.'

UWIR requirements

D.5.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.5.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

The water values within or nearby Bridgeport tenements meet the definition of highly disturbed waters. The lack of environmental values within or near the majority of tenements precludes a lot of direct impacts. The most common possible impacts would be from incidental spilling of chemicals or petroleum related products, as well as the release of water for stock use (see D.8 below). The limited environmental features mapped as occurring within or near Bridgeport tenements are far removed from actual petroleum assets. For example, the small water course in the eastern side of PL 31 is ~9km kilometres from any physical activity related to petroleum production, and the water course crossing PL 256 is 1.8 km from any activity related to petroleum production. It is highly unlikely there would be any physical impact from petroleum related activities. The depth from which Bridgeport extract water, the modelling which demonstrates a lack of pressure decline in surface reservoirs, and highly disturbed water values not reliant on subsurface water reservoirs, would preclude impacts to surface waters from extraction.

Bridgeport Risk Allocation

D.5.1. Bridgeport have assessed the likelihood of highly disturbed water values being impacted by the previous exercise of underground water rights as a Likelihood of D or Unlikely, with the explanation being impacts are (2) May occur in exceptional circumstances. The consequence of impact is Minor, leading to a Low consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are very few highly disturbed waters within or in proximity to Bridgeport petroleum production. And what highly disturbed water features there are, are not reliant on water reservoirs related to or impacted by water extracted in the process of producing petroleum by previous exercise of underground water rights.

D.5.2.i. Bridgeport have assessed the likelihood of highly disturbed water values being impacted by the future three-year exercise of underground water rights as a Likelihood of D or Unlikely, with the explanation being impacts are (2) May occur in exceptional circumstances. The consequence of impact is Minor, leading to a Low consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are very few highly disturbed waters within or in proximity to Bridgeport petroleum production. And what highly disturbed water features there are, are not reliant on water reservoirs related to or impacted by water extracted in the process of producing petroleum over the next three-year period of exercising underground water rights.

D.5.2.ii Bridgeport have assessed the likelihood of highly disturbed water values being impacted by the future exercise of underground water rights over the life of the project as a

Likelihood of D or Unlikely, with the explanation being impacts are (2) May occur in exceptional circumstances. The consequence of impact is Minor, leading to a Low consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. continued monitoring) and escalate risk level if appropriate.

The risk and consequence levels determined by Bridgeport are based on the fact there are very few highly disturbed waters within or in proximity to Bridgeport petroleum production. And what highly disturbed water features there are, are not reliant on water reservoirs related to or impacted by water extracted in the process of producing petroleum over the remaining project of exercising underground water rights.

D.6 Irrigation

Definition: Suitability of water supply for irrigation, for example, irrigation of crops, pastures, parks, gardens and recreational areas.

UWIR requirements

D.6.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.6.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

The predominant land use during and after petroleum operations will be broad acre marginal/extensive sheep and cattle grazing of remnant native vegetation. There will be no pasture or cropping. The irrigation program run at Kenmore (PL 32) is to support rehabilitation and revegetation whilst vegetation establishes. No gardens, parks, pasture or recreational areas and their irrigation is affected by the exercise of groundwater extraction.

Bridgeport Risk Allocation

D.6.1. Bridgeport have assessed the likelihood of irrigation environmental values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no irrigation programs whose water quality values that would be impacted by previous operators exercising underground water rights. The physical environment, habitat types, landforms, soil type, current and future land use precludes irrigation.

D.6.2.i. Bridgeport have assessed the likelihood of irrigation environmental values being impacted by the exercise of underground water rights for the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no irrigation programs whose water quality values would be impacted by exercising underground water rights over the next three years. The physical environment, habitat types, landforms, soil type, current and future land use precludes irrigation.

D.6.2.ii. Bridgeport have assessed the likelihood of irrigation environmental values being impacted by the exercise of underground water rights for the life of the project as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no irrigation programs whose water quality values would be impacted by exercising underground water rights over the life of the project. The physical environment, habitat types, landforms, soil type, current and future land use precludes irrigation.

D.7 Farm water supply/use

Definition: Suitability of domestic farm water supply, other than drinking water. For example, water used for laundry and produce preparation.

UWIR requirements

D.7.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.7.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no domestic farm facilities that consume water from Bridgeport operations, or affected by the exercise of water extraction within Bridgeport tenements. Modelling shows no drawdown in the unconfined aquifer (Layer 1 & 2 of the model above) such as the Winton Formation, that all local landholder bores target. This means there are no identified IAA/LTAA that influence local landholder bores.

Bridgeport Risk Allocation

D.7.1. Bridgeport have assessed the likelihood of farm water supply/use values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no farms that are dependent on water supply or water quality values that would be impacted by previous exercise of underground water rights.

D.7.2.i. Bridgeport have assessed the likelihood of farm water supply/use values being impacted by the following three years of exercising of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no farms that are dependent on water supply or water quality values that would be impacted by future exercise of underground water rights for three years.

D.7.2.ii. Bridgeport have assessed the likelihood of farm water supply/use values being impacted by the exercising of underground water rights for the remainder of the project life as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no farms that are dependent on water supply or water quality values that would be impacted by future exercise of underground water rights for remainder of the project’s life.

D.8 Stock watering

Definition: Suitability of water supply for production of healthy livestock.

UWIR requirements

D.8.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.8.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

A majority of wells that are installed to provide livestock watering access the Winton Formation. The majority of these wells (Table 18) are drilled to a depth not exceeding 100m. In general, groundwater take within this management area is relatively limited and marginal, as these are not actively pumped. Some wells in Table 18 have also been abandoned and decommissioned since drilling.

It is highly unlikely the extraction of water from Bridgeport targeted formations (>1400 m below ground) would influence shallower formations <100m deep due to geological barriers to free flow factors limiting the movement of water between such depths. Bridgeport also protects shallower aquifers and reservoirs by installing cemented steel casing in our production wells, and testing and validating the integrity of the boreholes using wireline logging assessment/sono-log recordings. There is an also extremely restrictive geological boundaries between the lower targeted formations and higher freshwater targeted aquifers.

Bridgeport Risk Allocation

D.8.1. Bridgeport have assessed the likelihood of livestock water supply/use values being impacted by the previous exercise of underground water rights as a Likelihood of E, or Rare, with the explanation being (1) Foreseeable but not normally expected to occur. The consequence of impact is Minor, leading to a Low risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no impacts to livestock from previous exercise of underground water rights, barriers both natural (geological) and engineered (concrete and steel casing) preventing resource extraction from impacting the much higher and distinct targeted aquifers of landholders. Modelling by Golder Associates has confirmed these conclusions.

D.8.2.i. Bridgeport have assessed the likelihood of livestock water supply/use values being impacted by the future three years of exercising underground water rights as a Likelihood of E, or Rare, with the explanation being (1) Foreseeable but not normally expected to occur. The consequence of impact is Minor, leading to a Low risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no impacts to livestock from previous exercise of underground water rights (no change to the proposed activities which previously occurred either), barriers both natural (geological) and engineered (concrete and steel casing) preventing resource extraction from impacting the much higher and distinct targeted aquifers of landholders. Modelling by Golder Associates has confirmed these conclusions.

D.8.2.ii. Bridgeport have assessed the likelihood of livestock water supply/use values being impacted over the remaining life of the project, and its exercising underground water rights as a Likelihood of E, or Rare, with the explanation being (1) Foreseeable but not normally expected to occur. The consequence of impact is Minor, leading to a Low risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no impacts to livestock from previous exercise of underground water rights (no change to the proposed activities which previously occurred either), barriers both natural (geological) and engineered (concrete and steel casing) preventing resource extraction from impacting the much higher and distinct targeted aquifers of landholders. Modelling by Golder Associates has confirmed these conclusions.

D.9 Human consumers of aquatic foods

Definition: The suitability of the water for producing aquatic foods for human consumption such as fish, crustaceans and shellfish from natural waterways.

UWIR requirements

D.9.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.9.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

The predominant land use during and after petroleum operations will be broad acre marginal/extensive sheep and cattle grazing of remnant native vegetation. There is no aquaculture, mariculture, or freshwater fisheries within or in proximity to, Bridgeport tenements.

Bridgeport Risk Allocation

D.9.1. Bridgeport have assessed the likelihood of irrigation aquatic food values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no aquaculture programs whose water quality values would be impacted by previous operators exercising underground water rights.

D.9.2.i. Bridgeport have assessed the likelihood of aquatic food values being impacted by the exercise of underground water rights for the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no aquaculture programs whose water quality values would be impacted by exercising underground water rights over the next three years.

D.9.2.ii. Bridgeport have assessed the likelihood of aquatic food values being impacted by the exercise of underground water rights for the life of the project as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no aquaculture programs whose water quality values would be impacted by exercising underground water rights over the life of the project.

D.10 Primary recreation

Definition: Means a use that involves the following types of contact with the water—full body contact, frequent immersion by the face and trunk, frequent contact with spray by the face where it is likely some water will be swallowed or inhaled, or come into contact with ears, nasal passages, mucous membranes or cuts in the skin e.g. diving, swimming, surfing.

UWIR requirements

D.10.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.10.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no primary recreation activities that take place within or near the Bridgeport GKBA petroleum leases. There is no immersive swimming, frequent bodily contact, inhalation or contact with products related to or impacted by, the exercise of underground water rights.

Bridgeport Risk Allocation

D.10.1. Bridgeport have assessed the likelihood of primary recreation values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no primary recreational areas in any proximity to areas impacted by previous operators exercising underground water rights.

D.10.2.i. Bridgeport have assessed the likelihood of primary recreation values being impacted by the following three-year period exercising of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there will be no primary recreational areas in any proximity to areas impacted by operators exercising underground water rights over the next three years.

D.10.2.ii. Bridgeport have assessed the likelihood of primary recreation values being impacted by exercising of underground water rights for the life of the project as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there will be no primary recreational areas in any proximity to areas impacted by operators exercising underground water rights, at any time during the life of the project.

D.11 Secondary recreation

Definition: Means a use that involves the following types of contact with the water—contact in which only the limbs are regularly wet, and other contact, including the swallowing of water, is unusual (examples—boating, fishing, wading) or occasional inadvertent immersion resulting from slipping or being swept into the water by a wave.

UWIR requirements

D.11.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.11.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no secondary recreation activities that take place within or near the Bridgeport GKBA petroleum leases. There is no boating, fishing or wading commonly occurring, nor occasional incidental contact with products related to or impacted by, the exercise of underground water rights.

Bridgeport Risk Allocation

D.11.1. Bridgeport have assessed the likelihood of secondary recreation values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no secondary recreational areas in any proximity to areas impacted by previous operators exercising underground water rights.

D.11.2.i. Bridgeport have assessed the likelihood of secondary recreation values being impacted by the following three-year period exercising of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there will be no secondary recreational areas in any proximity to areas impacted by operators exercising underground water rights over the next three years.

D.11.2.ii. Bridgeport have assessed the likelihood of secondary recreation values being impacted by exercising of underground water rights for the life of the project as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there will be no secondary recreational areas in any proximity to areas impacted by operators exercising underground water rights, at any time during the life of the project.

D.12 Visual recreation

Definition: Means a use that does not ordinarily involve any contact with the water—for example angling from the shore, sunbathing near water.

UWIR requirements

D.12.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.12.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no visual recreation activities that take place within or near the Bridgeport GKBA petroleum leases. There is no recreational activities or amenities near these tenements, especially none that are related to or impacted by, the exercise of underground water rights. The only instance of visual recreation at these fields is likely incidental tourism whereby tourists take pictures near a specifically constructed "tourist appropriate" beam pump designed and installed for that purpose.

Bridgeport Risk Allocation

D.12.1. Bridgeport have assessed the likelihood of visual values being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no visual recreational areas in any proximity to areas impacted by previous operators exercising underground water rights.

D.12.2.i. Bridgeport have assessed the likelihood of visual recreation values being impacted by the following three-year period exercising of underground water rights as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there will be no visual recreational areas in any proximity to areas impacted by operators exercising underground water rights over the next three years.

D.12.2.ii. Bridgeport have assessed the likelihood of visual recreation values being impacted by exercising of underground water rights for the life of the project as a Likelihood of F, or Incapable of Occurring, with the Explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there will be no visual recreational areas in any proximity to areas impacted by operators exercising underground water rights, at any time during the life of the project.

D.13 Drinking water supply

Definition: Suitability of the water for supply as drinking water having regard to the level of treatment of the water.

UWIR requirements

D.13.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.13.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

Having regard for the treatment of water, no water is sourced from or near the GKBA tenements for drinking water supply. The ongoing extraction of water from around GKBA would not negatively affect the water treatment required at the nearest township of Eromanga, approximately 16km to the west of the Kenmore (PL 32) field. Any local landholder bores are extremely shallow, and access water from bores less than 50m deep, far removed from the great than 1,300m+ petroleum wells (as detailed in appropriate sections earlier in this document).

Bridgeport Risk Allocation

D.13.1. Bridgeport have assessed the likelihood of drinking water being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate.

This conclusion is appropriate because there are currently no drinking water or treatment facilities whose water quality values that would be impacted by previous operators exercising underground water rights. Modelling shows no drawdown in the unconfined aquifer (Layer 1 & 2 of the model above) such as the Winton Formation, that all local landholder bores target. This means there are no identified IAA/LTAA that influence local landholder bores.

D.13.2.i. Bridgeport have assessed the likelihood of drinking water being impacted in the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no drinking water or treatment facilities whose water quality values that would be impacted by exercising underground water rights for a further three years. Modelling shows no drawdown in the unconfined aquifer (Layer 1 & 2 of the model above) such as the Winton Formation, that all local landholder bores target. This means there are no identified IAA/LTAA that influence local landholder bores.

D.13.2.ii. Bridgeport have assessed the likelihood of drinking water being impacted over the remaining life of the project as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no drinking water or treatment facilities whose water quality values that would be impacted by exercising underground water rights for the remaining years of the project. Modelling shows no drawdown in the unconfined aquifer (Layer 1 & 2 of the model above) such as the Winton Formation, that all local landholder bores target. This means there are no identified IAA/LTAA that influence local landholder bores.

D.14 Industrial use

Definition: Suitability of water supply for industrial purposes, for example, food, beverage, paper, petroleum and power industries, mining and minerals refining/processing. Industries usually treat water supplies to meet their needs.

UWIR requirements

D.14.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.14.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

There are no alternate industries in or near the Bridgeport tenements that relate to this UWIR. There are no food or beverage manufacturers, no power producers, light or commercial industrial groups. The predominant land use during and after petroleum operations will be broad acre marginal/extensive sheep and cattle grazing of remnant native vegetation. There will be no pasture, cropping or (very likely) any other commercial activities. There are small scale opal mining operations at the Bargie field (PL 256), but these re surface mines (<15m deep), and as such, are not affected by the ongoing or future exercise of water rights.

Bridgeport Risk Allocation

D.14.1. Bridgeport have assessed the likelihood of industrial uses being impacted by the previous exercise of underground water rights as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no industrial uses or programs whose water quality values would be impacted by previous operators exercising underground water rights.

D.14.2.i. Bridgeport have assessed the likelihood of irrigation industrial uses being impacted by the exercise of underground water rights for the next three years as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no industrial uses or programs whose water quality values would be impacted by exercising underground water rights over the next three years.

D.14.2.ii. Bridgeport have assessed the likelihood of industrial use values being impacted by the exercise of underground water rights for the life of the project as a Likelihood of F, or Incapable of Occurring, with the explanation being (2) Impossible to occur physically. The consequence of impact is Insignificant, leading to a No risk consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring) and escalate risk level if appropriate. This conclusion is appropriate because there are currently no there are currently no industrial uses or programs whose water quality values would be impacted by exercising underground water rights over the life of the project.

D.15 Cultural and spiritual values

Definition: Means scientific, social or other significance to the present generation or past or future generations, including Aboriginal people or Torres Strait Islanders.

- custodial, spiritual, cultural and traditional heritage, hunting, gathering and ritual responsibilities
- symbols, landmarks and icons (such as waterways, turtles and frogs)
- lifestyles (such as agriculture and fishing).

UWIR requirements

D.15.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.15.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

Bridgeport Energy tenements overlay numerous Native Title claims. Bridgeport GKBA tenements overlay the Native Title Claim of the Boonthamurra People. Their claim is represented by several classifications by the Aboriginal and Torres Strait Islander Partnerships including the Tribunal Number (QCD2015/008) and QUD reference number (QUD435/2006). The Native Title claims are represented graphically over the GKBA Bridgeport tenements in Figure 30.

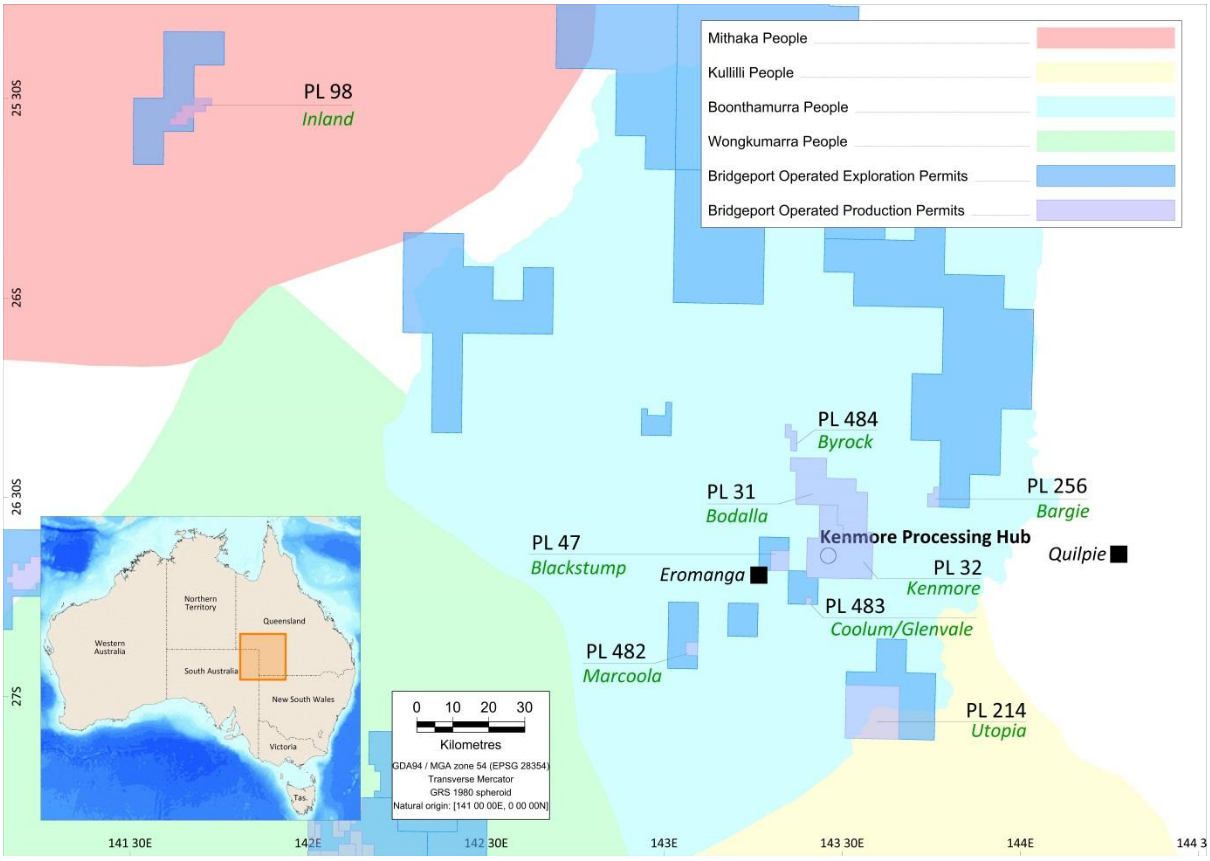


Figure 30: Native Title claims relevant to the GKBA tenements (PL31, PL 32, PL 47, PL 256, PL 482, PL 483 and PL 484.

Bridgeport Energy have a Native Title Policy that guides staff and contractors on their awareness and treatment of Aboriginal culture heritage, as well as a Cultural Heritage Management Plan with the Boonthamurra that guide our working relationship and decisions on key areas of interest to both parties.

Regardless of these technical/legal agreements, Bridgeport are aware of the potential for cultural heritage points and areas to reside within the area of our lease, and potentially outside the direct leases and into areas potentially impacted by our water extraction. Bridgeport are actively engaged with protecting this cultural heritage wherever possible.

The potential impacts to cultural heritage as a result of exercising underground water rights, in the past and into the future, would primarily be the physical disturbance to surface cultural heritage, including physical objects/features (e.g. artefacts). This physical disturbance is avoided by applying industry best-practice and the processes agreed to by the Boonthamurra, for cultural clearance prior to any disturbance to undisturbed/previously uncleared areas.

These impacts could potentially occur any time physical disturbance occurs on Bridgeport tenements, which includes during the three-year period and the projected life of the resource tenure.

To describe some of the registered physical cultural heritage recorded on the GKBA assets, a group tenement search was requested and provided by the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register. All tenement searches were requested with a 5 km radius buffer around the tenement boundary.

Table 28: Tenement Search by Queensland Government Department of Aboriginal and Torres Strait Islander Partnerships

Tenement	A&TSI Cultural Heritage Site Points	A&TSI Cultural Heritage Polygons	Figure Reference
PL 31	No	No	Figure 31
PL 32	Yes	No	Figure 32
PL 47	No	No	Figure 33
PL 256	Yes	No	Figure 34
PL 482	No	No	Figure 35
PL 483	Yes	No	Figure 36
PL 484	Yes	No	Figure 37

There were no cultural heritage bodies, no cultural heritage management plans, no Designated Landscape Areas (DLA) and no Registered Cultural Heritage Study Areas recorded in these search areas.

Bridgeport are aware of other significant Aboriginal cultural heritage features within the boundary of Bridgeport tenements. Water extraction does not nor will affect these directly or indirectly, for either the three-year period or for the life of the tenure. No physical harm comes to these features as a result of the current petroleum activities or the associated water extraction and have been left in place untouched as they were.

A Register of National Estate (RNE) was a register of places throughout Australia, including Commonwealth heritage places of local and state significance. Sections within the *Environment Protection and Biodiversity Conservation Act* (1999) and the *Australian Heritage Council Act 2003* referring to the RNE have since been repealed and the register closed. Within the closed register (which is still searchable) there are references to cultural heritage areas surrounding Eromanga. One of these places would likely include the Cunnavalla Creek Area, 72 km to the west of PL 32 Kenmore. This cultural heritage feature is to the east of the Eromanga township, and would not be influenced by water extraction in the next three years, or in the expected life of these fields.

The following cultural heritage points have been registered and are provided by the Aboriginal and Torres Strait Islander Cultural Heritage Database and Register.

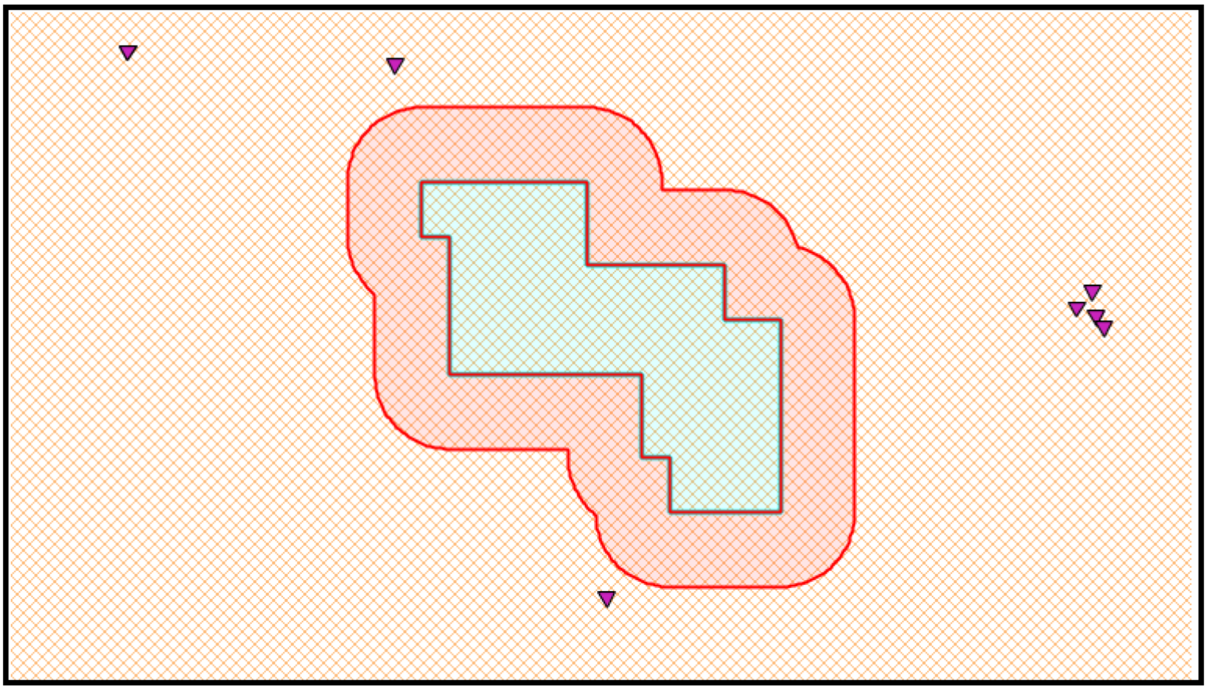


Figure 31: Cultural heritage points around the PL 31 boundary, 5km buffer zone.

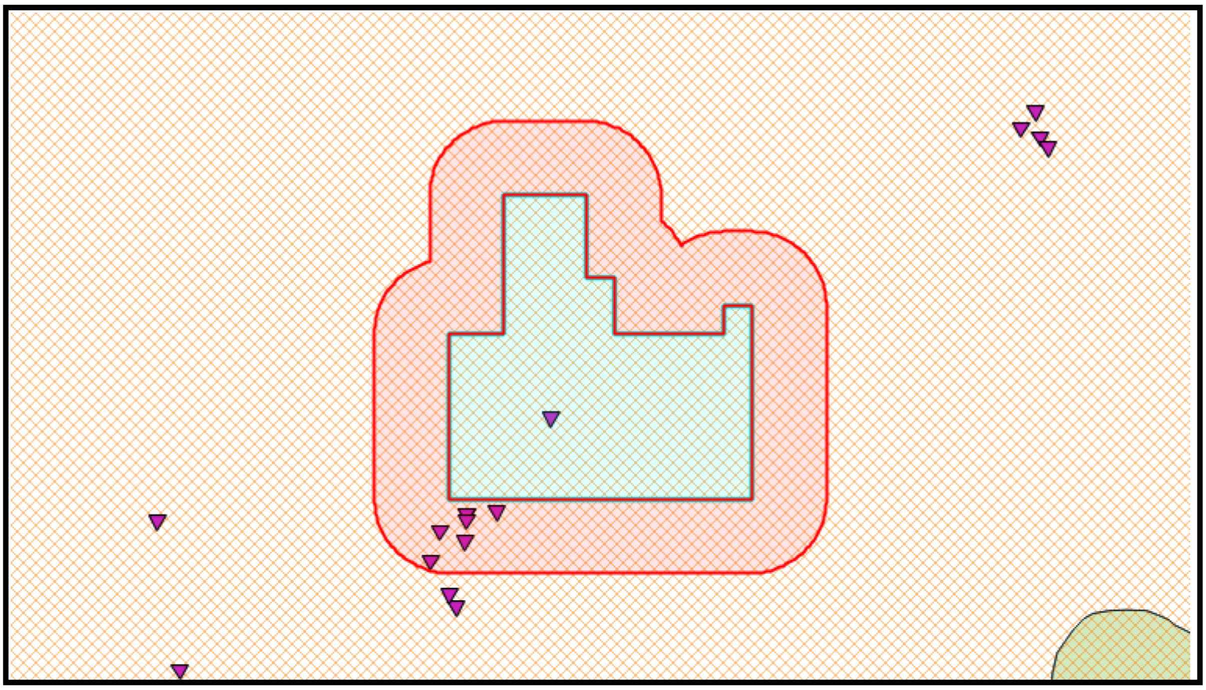


Figure 32: Cultural heritage points around the PL 32 boundary, 5km buffer zone.

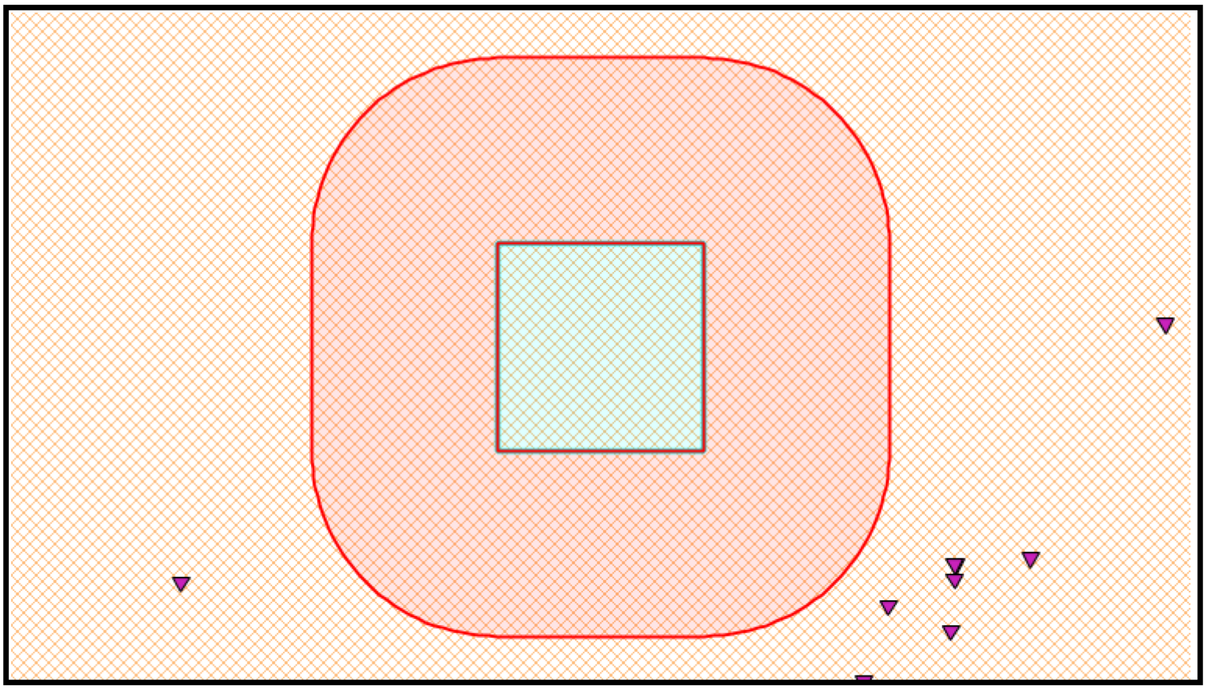


Figure 33: Cultural heritage points around the PL 47 boundary, 5km buffer zone.

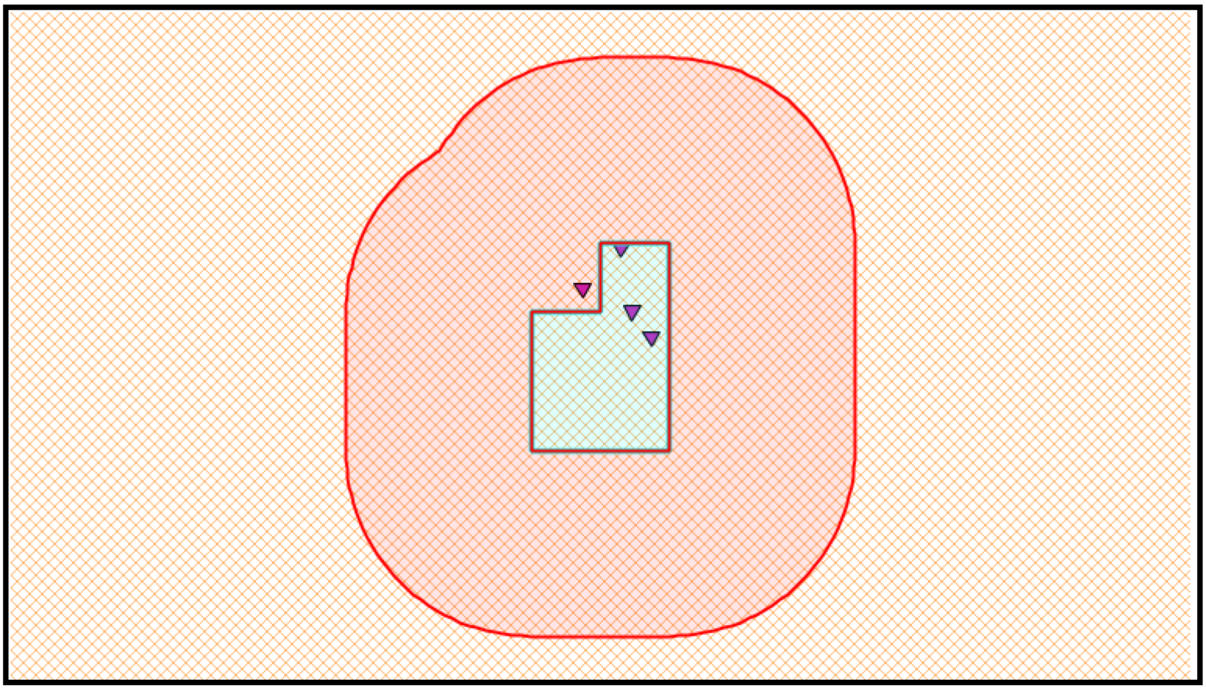


Figure 34: Cultural heritage points around the PL 256 boundary, 5km buffer zone.

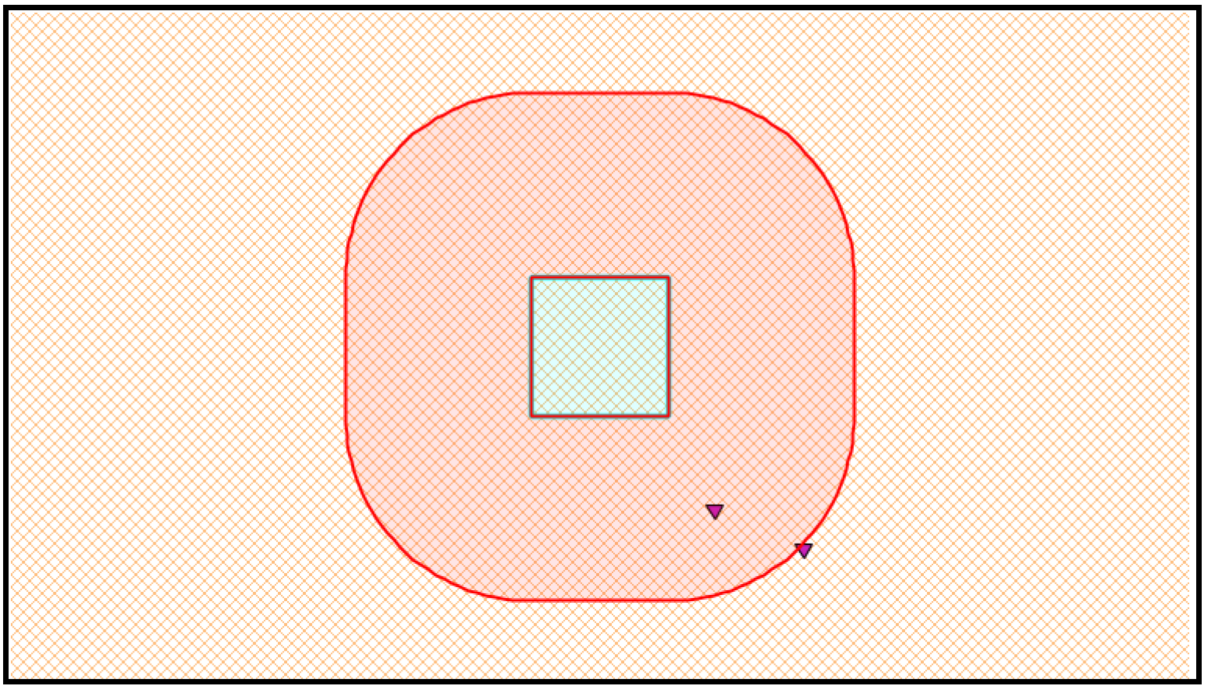


Figure 35: Cultural heritage points around the PL 482 boundary, 5km buffer zone.

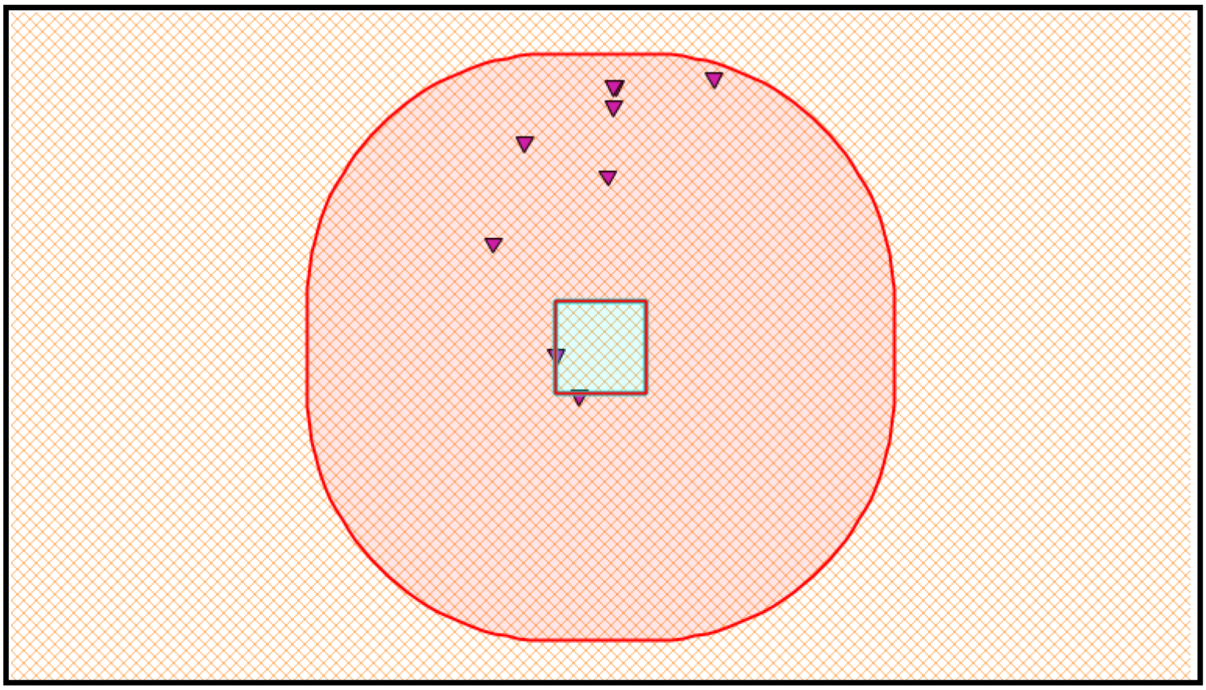


Figure 36: Cultural heritage points around the PL 483 boundary, 5km buffer zone.

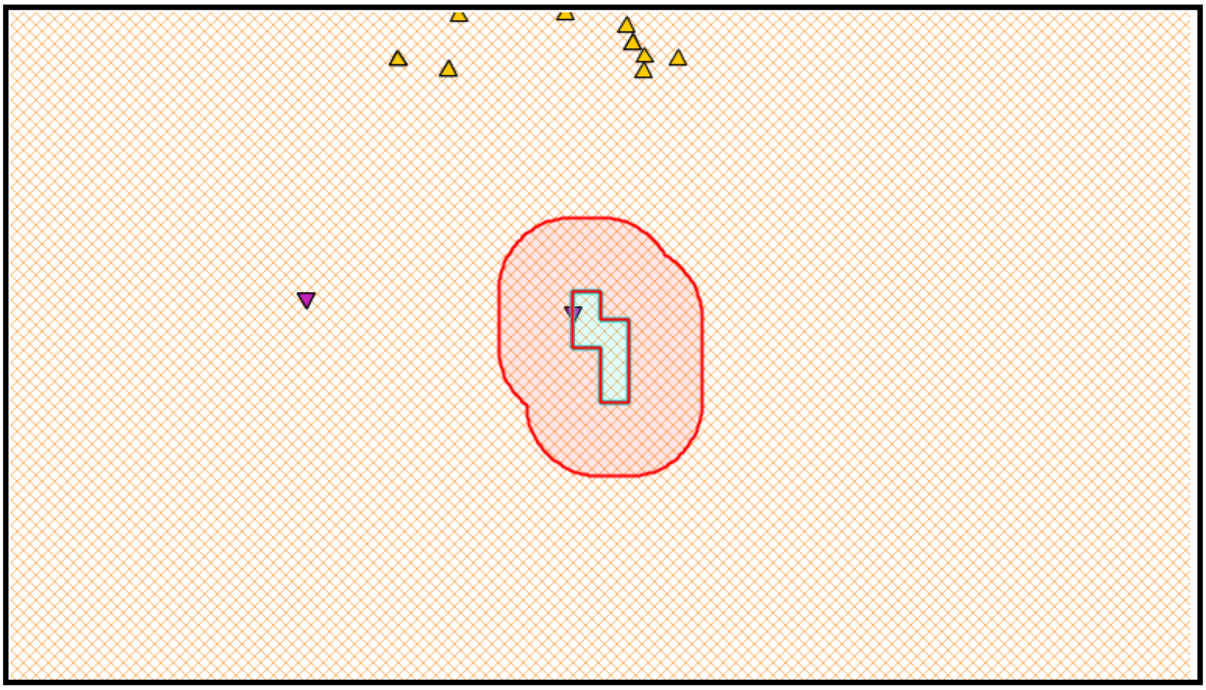


Figure 37: Cultural heritage points around the PL 484 boundary, 5km buffer zone.

The above description of physical places of cultural significance indicate there are areas of cultural importance/value in relation to the surface area of these tenements and surrounding areas.

The impact to these cultural values has been and will be reduced by appropriate Aboriginal Cultural Heritage clearance and management procedures prior to physical disturbance.

Bridgeport Risk Allocation

D.15.1. Bridgeport have assessed the likelihood of Cultural and spiritual values being impacted by the previous exercise of underground water rights as a Likelihood of E, or Rare, with the explanation being (1) Foreseeable but not normally expected to occur. The consequence of impact is High, leading to a Medium consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring), review for effectiveness and escalate risk level if appropriate. This conclusion is appropriate because there have been appropriate safeguards in place to review cultural and spiritual values prior to any physical activity taking place (e.g. cultural heritage clearance by appropriate Native Title groups).

D.15.2.i. Bridgeport have assessed the likelihood of Cultural and spiritual values being impacted by the exercise of underground water rights for the following three years as a Likelihood of E, or Rare, with the explanation being (1) Foreseeable but not normally expected to occur. The consequence of impact is High, leading to a Medium consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring), review for effectiveness and escalate risk level if appropriate. This conclusion is appropriate because there has and always will be appropriate safeguards in place to review cultural and spiritual values prior to any additional physical activity taking place (e.g. cultural heritage clearance by appropriate Native Title groups).

D.15.2.ii. Bridgeport have assessed the likelihood of Cultural and spiritual values being impacted by the exercise of underground water rights for the life of the project as a Likelihood of E, or Rare, with the explanation being (1) Foreseeable but not normally expected to occur. The consequence of impact is High, leading to a Medium consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring), review for effectiveness and escalate risk level if appropriate. This conclusion is appropriate because there has and always will be appropriate safeguards in place to review cultural and spiritual values prior to any additional physical activity taking place (e.g. cultural heritage clearance by appropriate Native Title groups) for the remainder of the project life.

D.16 Environmental Sensitive Areas (ESAs)

Definition: ESAs are areas of habitat, described as important for key ecological functions in legislation (e.g. Nature Conservation Act 1994, Marine Parks Act 2004, etc.). ESAs are split into two categories, Category A and Category B, and the appropriate formal definition can be found in the Environment Protection Regulation (2019).

UWIR requirements

D.16.1. A description of the impacts of environmental values that have occurred, or are likely to occur, because of any previous exercise of underground water rights (section 376(da) of the Water Act);

D.16.2. An assessment of the likely impacts on environmental values that will occur, or are likely to occur, because of the exercise of underground water rights (section 376(db) of the Water Act);

i. For a three-year period starting on the consultation day for the report; &

ii. Over the projected life of the resource tenure.

Description

Bridgeport used the Queensland Governments' Department of Environment and Sciences' website, to update the geographic extent of all tenement boundaries in relation to environmentally sensitive areas (ESAs). This includes PL 31 Bodalla (Figure 38), PL 32 Kenmore (Figure 39), PL 47 Blackstump (Figure 40), PL 256 Bargie (Figure 41), PL 482 Marcoola (Figure 42), PL 483 Coolum & Glenvale (Figure 43) and PL 484 Byrock (Figure 44).

1: Environmentally Sensitive Areas (ESAs) – non-mining resource activities

Environmentally sensitive areas (ESAs) are defined in the *Environmental Protection Regulation (2019)* (Schedule 19, Part 1, Section 2), and can be related to EVs. There are multiple Categories of ESA, category A and B. The most applicable ESAs relating to the Bridgeport tenements in GKBA include;

(a) any of the following areas under the Nature Conservation Act (1992)

i. a coordinated conservation area (e.g. conservation park, national park, marine park etc.);

ii. an area of critical habitat or major interest identified under a conservation plan;

iii. an area subject to an interim conservation order;

(b) an area subject to the following conventions to which Australia is a signatory

i. the 'Convention on the Conservation of Migratory Species of Wild Animals' (Bonn, 23 June 1979);

ii. the 'Convention on Wetlands of International Importance, especially as Waterfowl Habitat' (Ramsar, Iran, 2 February 1971);

iii. the 'Convention Concerning the Protection of the World Cultural and Natural Heritage' (Paris, 23 November 1972);

(e) the following under the Queensland Heritage Act 1992

i. a place of cultural heritage significance;

ii. a Queensland heritage place, unless there is an exemption certificate issued under that Act;

(f) an area recorded in the Aboriginal Cultural Heritage Register established under the Aboriginal Cultural Heritage Act 2003, section 46, other than the area known as the 'Stanbroke Pastoral Development Holding', leased under the Land Act 1994 by lease number PH 13/5398;

(g) a feature protection area, State forest park or scientific area under the Forestry Act 1959;

(h) a declared fish habitat area under the Fisheries Act 1994;

(j) an endangered regional ecosystem identified in the database known as the 'Regional ecosystem description database' published on the department's website.

The Queensland Government Department of Environment and Sciences' Maps of environmentally sensitive areas webpage has a feature where maps can be downloaded with ESAs, relevant to specific resource authority boundaries (in this instance, petroleum leases). Bridgeport downloaded Petroleum lease maps [https://environment.des.qld.gov.au/management/maps-of-environmentally-sensitive-areas] 2021.

These maps have a single ESA category within the boundaries of all GKBA tenements. That is the Of Concern Regional Ecosystems (remnant biodiversity status) layer, which is categorised as Category C. A regional ecosystem is classified as category C under the Environment Protection Act (1994) if remnant vegetation is 10-30% of its pre-clearing extent across the bioregion. This Category C mapping is considered indicative only.

The largest contributor to the general ecosystems, biology and vegetation remaining across these tenements is climate, rainfall and existing land use. The low general rainfall, extremely dry and extreme climate reduce the abundance and diversity of the species and habitats that can survive across the region. Further restricting the ecosystems that are present, their health and abundance is heavily impacted by the surrounding and predominant land use, broad acre grazing. Broad acre grazing is where large, unrestricted acreage is freely opened to extreme numbers of domestic hard-hooved animals such as cattle and sheep. The un-controlled and vast nature of the land, as well as the readily accessible watering points for domestic animals, allows introduced species such as horses, goats and pigs to thrive, who also heavily impact the surrounding ecosystems negatively, by over grazing, destructive grazing and habitat destruction.

As evidenced by these maps, no category A (e.g. National or Conservation Parks) or Category B (e.g. heritage, special habitat) areas occur within or in proximity to the GKBA tenements.

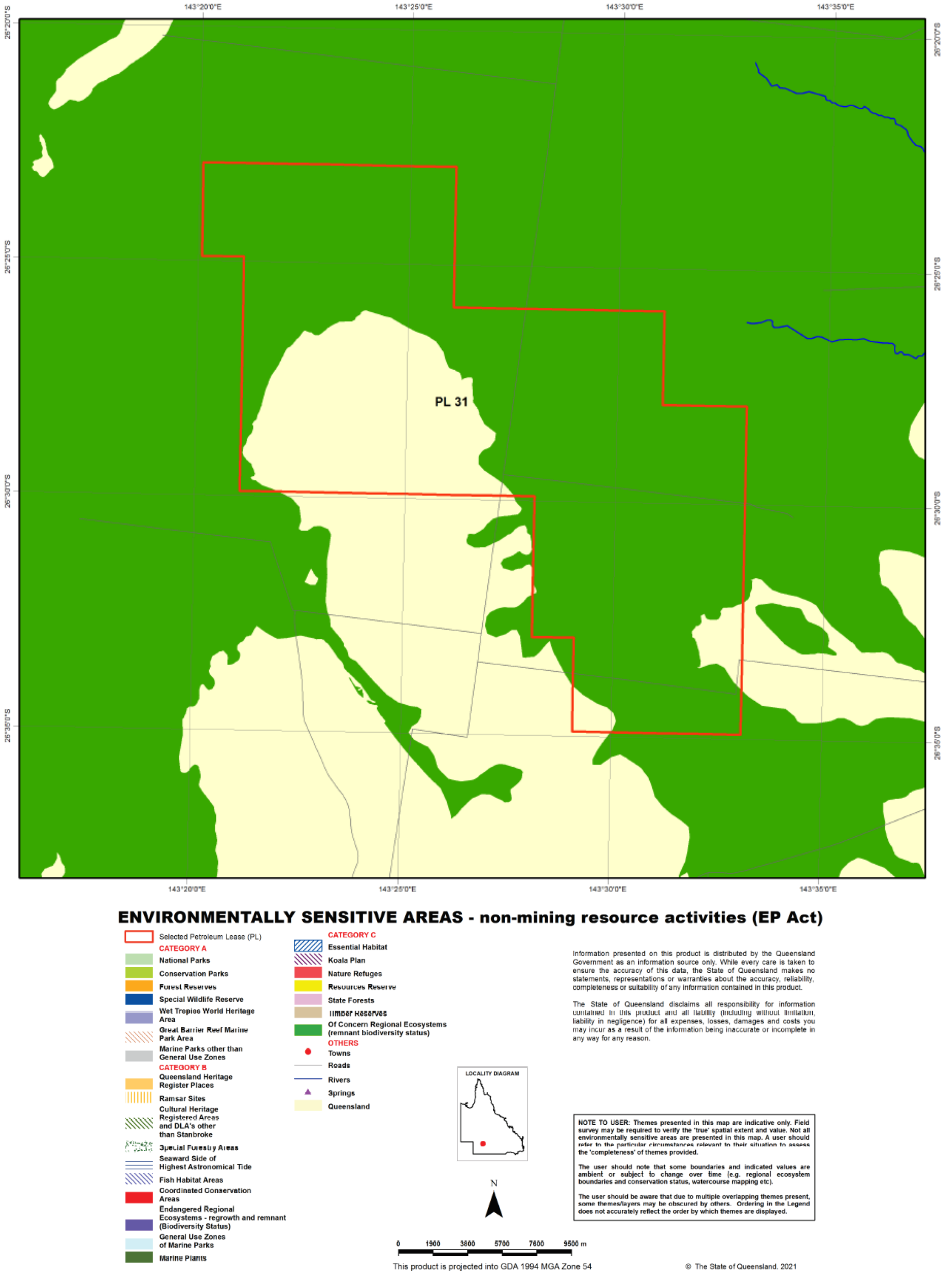


Figure 38: Environmentally sensitive areas around the petroleum lease PL 31 Bodalla.

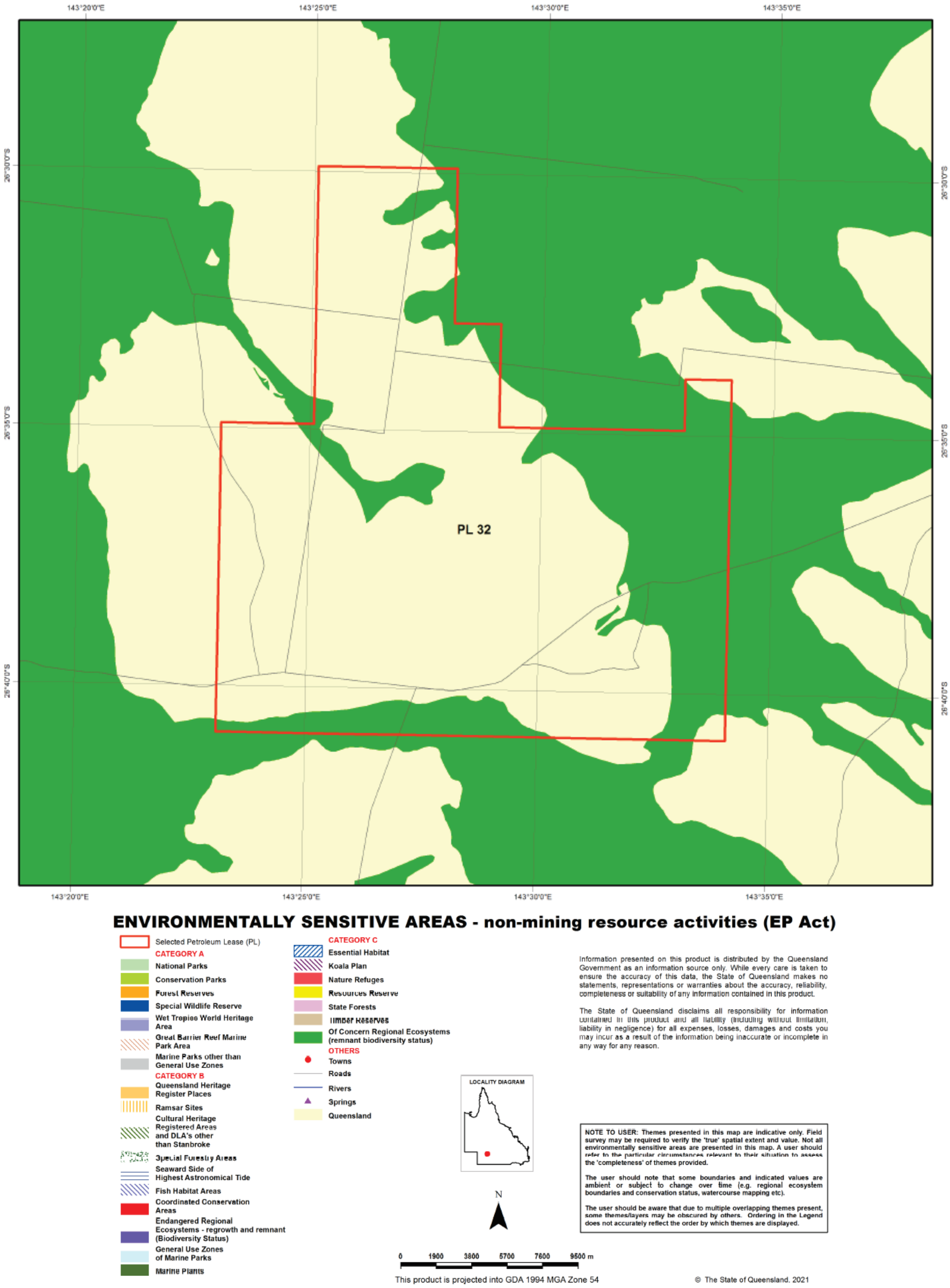


Figure 39: Environmentally sensitive areas around the petroleum lease PL 32 Kenmore.

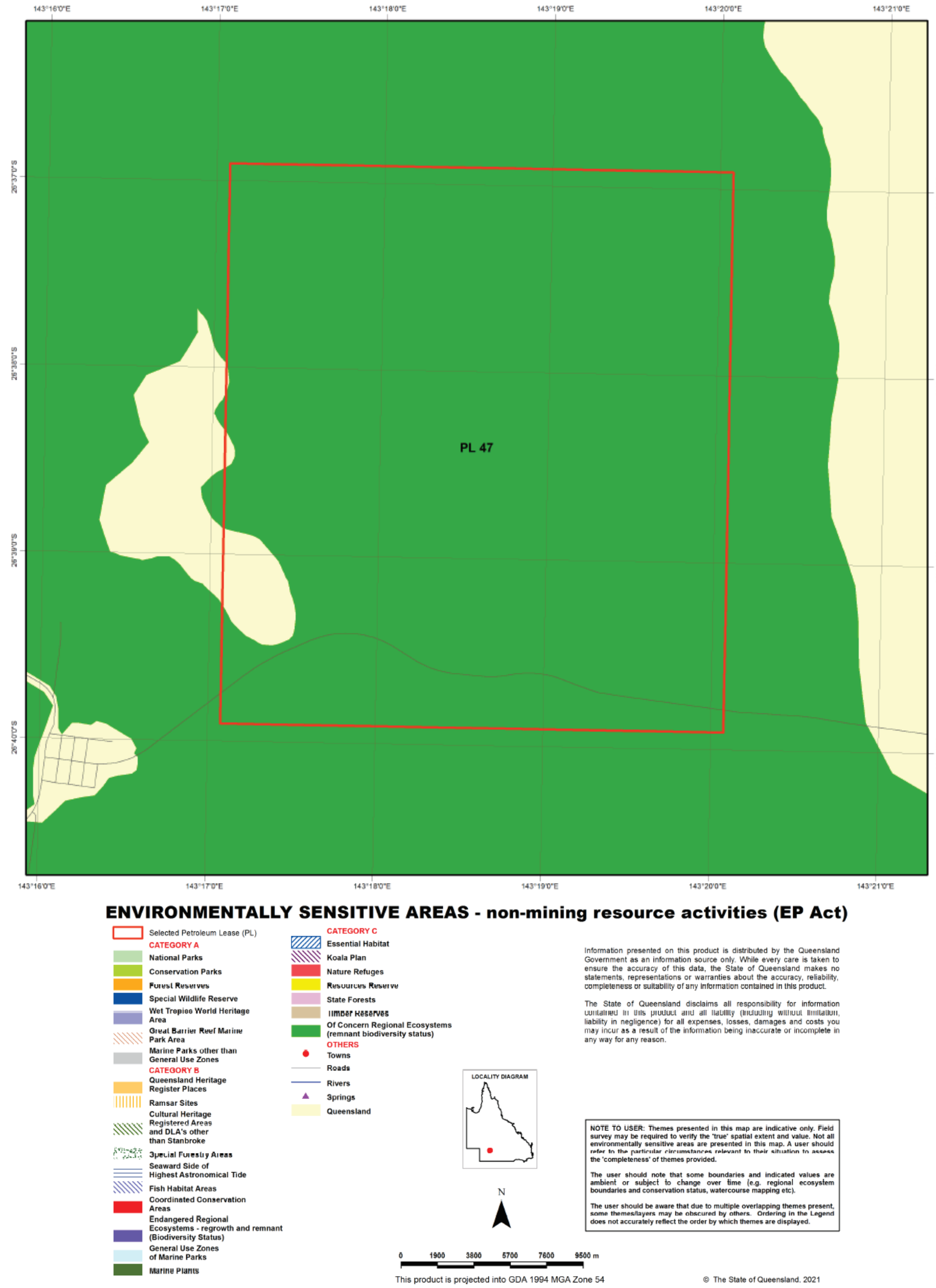


Figure 40: Environmentally sensitive areas around the petroleum lease PL 47 Blackstump.

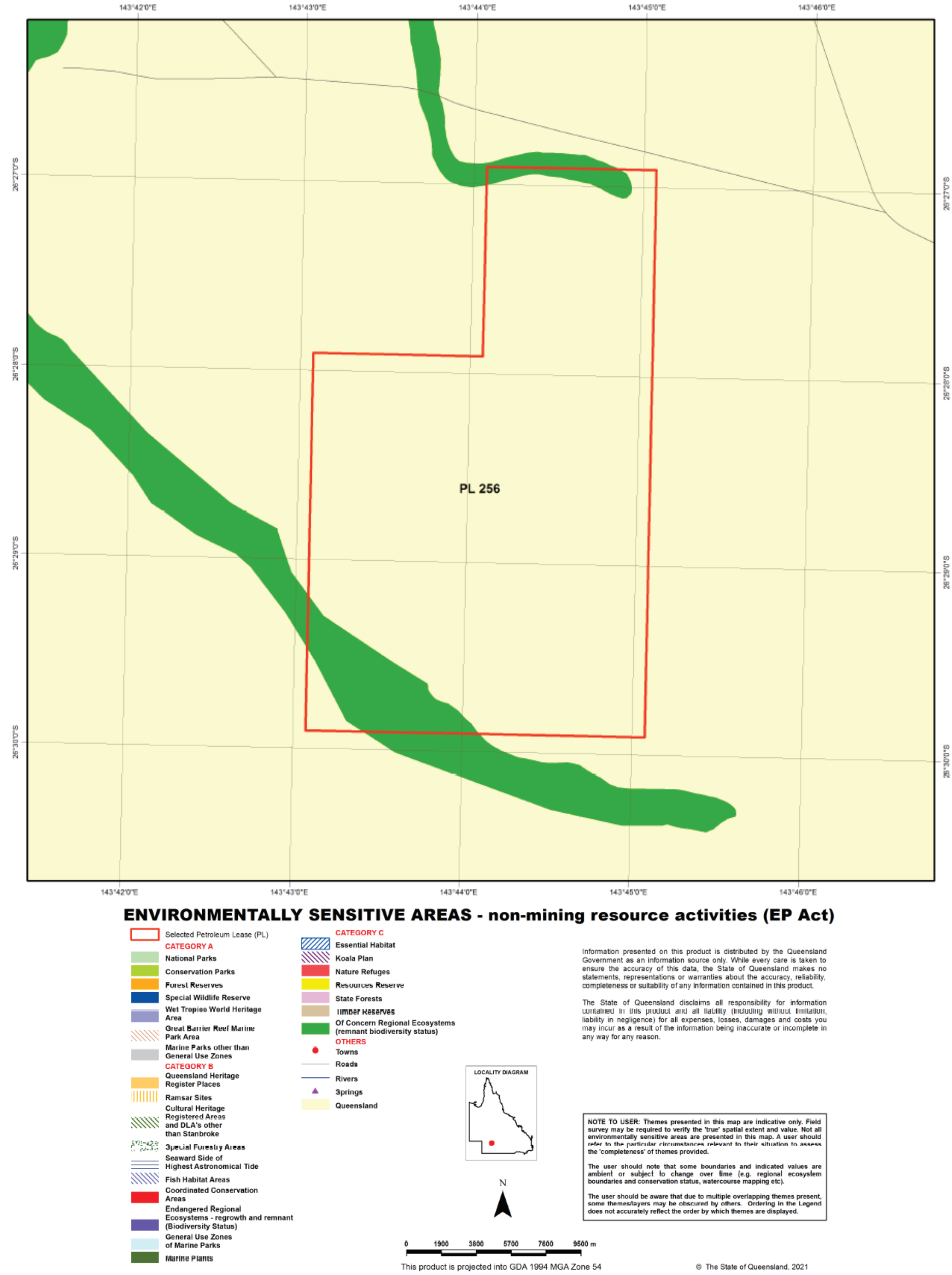


Figure 41: Environmentally sensitive areas around the petroleum lease PL 256 Bargie.

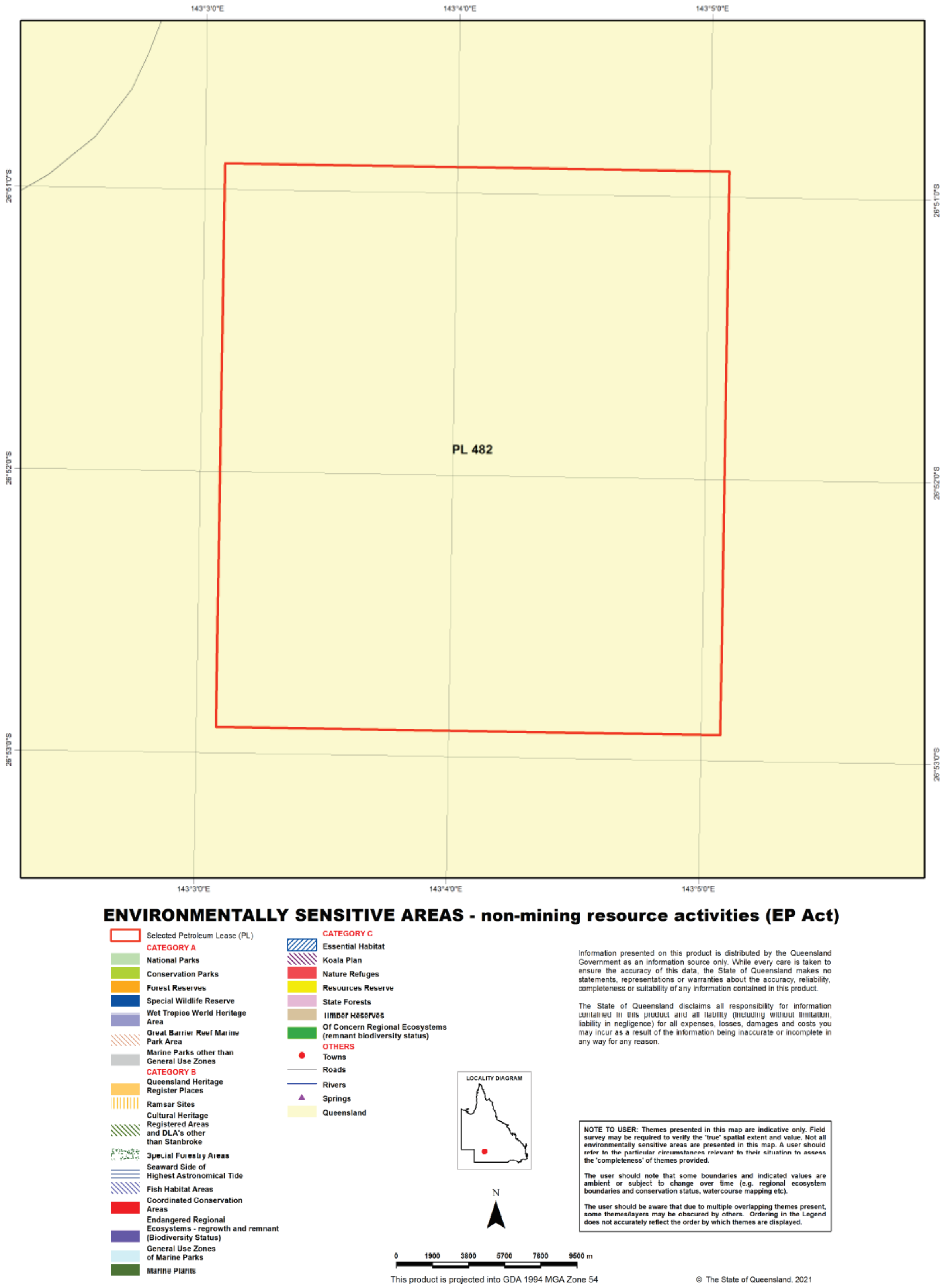


Figure 42: Environmentally sensitive areas around the petroleum lease PL 482 Marcoola.

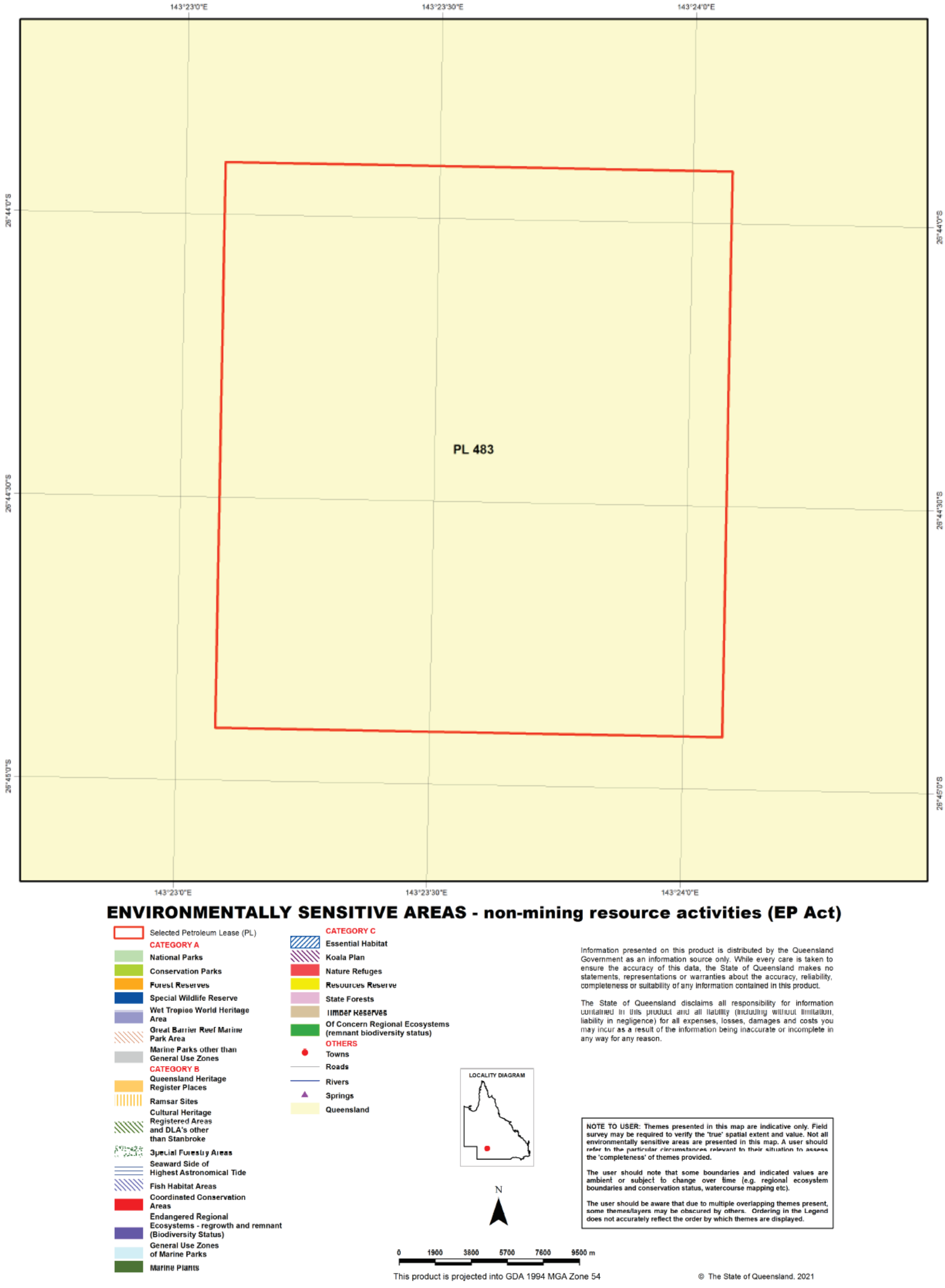


Figure 43: Environmentally sensitive areas around the petroleum lease PL 483 Coolum & Glenvale.

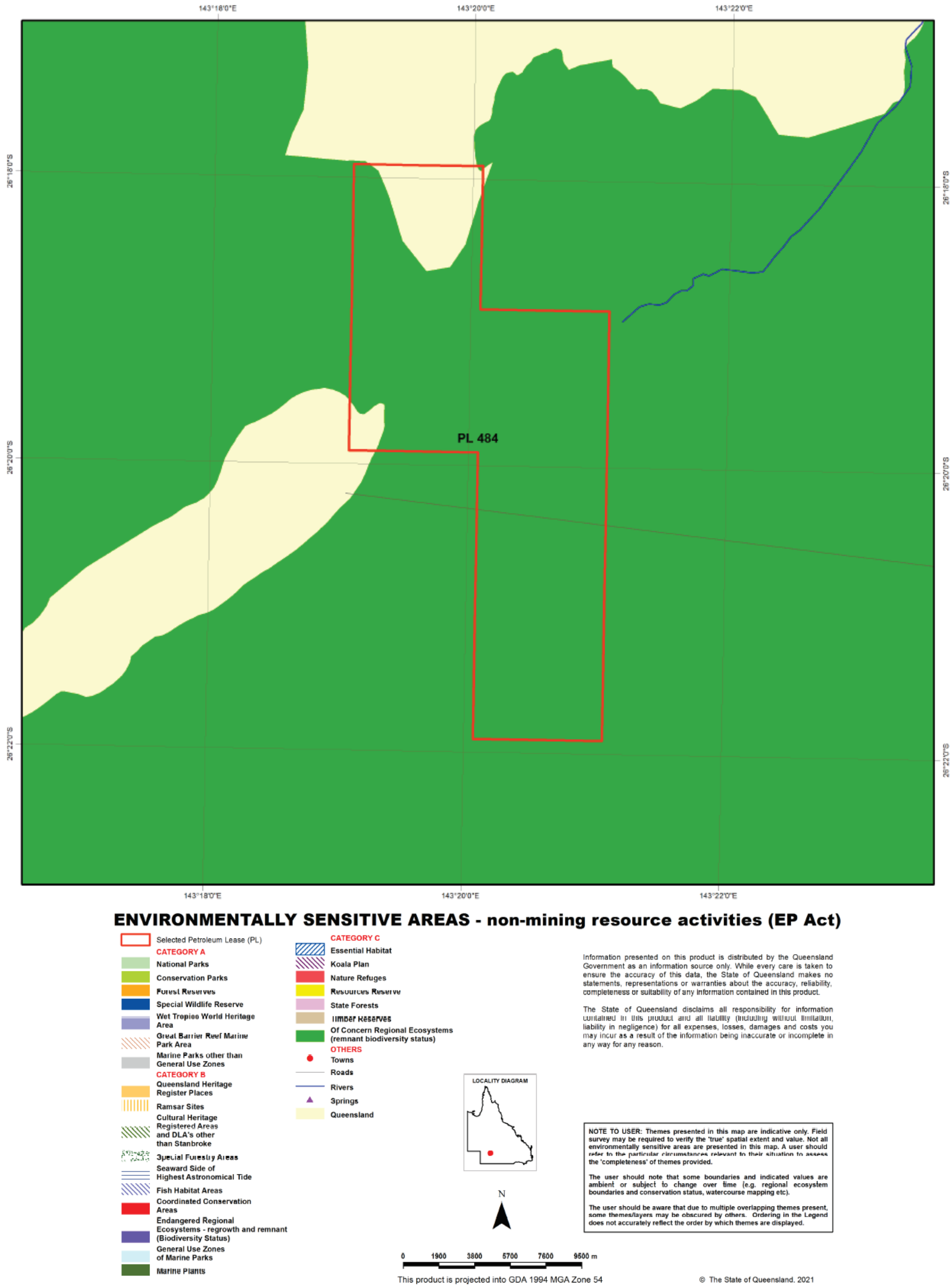


Figure 44: Environmentally sensitive areas around the petroleum lease PL 484 Byrock.

In order to provide the Department an indication of the much broader context in which water extraction and petroleum related activities occur, several of the most relevant ESA's were explored using shapefiles downloaded from Queensland Government's QSpatial webpage [http://qldspatial.information.qld.gov.au/catalogue/custom/index.page] and added to a graphic below. The following layers were downloaded and compared in context against all the GKBA tenements (Figure 45) for this UWIR

Shapefiles include:

- Coordinated conservation areas – Queensland
- Special wildlife reserves
- Nature refuges – Queensland
- Protected areas of Queensland
- Ramsar sites
- Fish habitat areas

None of these layers overlap with Bridgeport GKBA tenements (Figure 45). There is over 100 km between GKBA asset boundary and these ESAs. None of the shallow unconfined aquifers such as the Winton Formation (Layer 1 in the Golder model as above), were not affected or potentially affected by the water extraction within Bridgeport tenements.

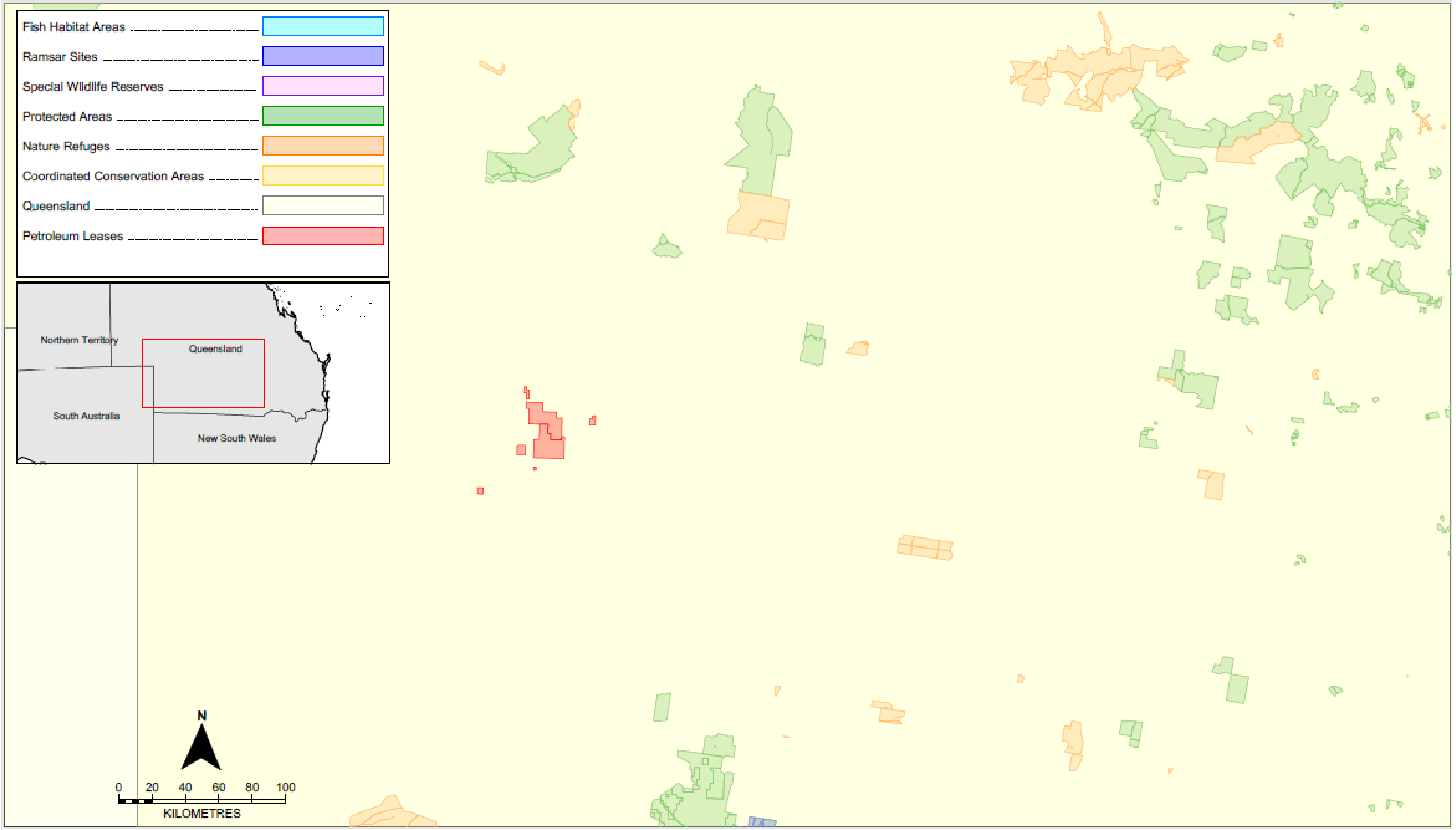


Figure 45: The most relevant conservation layers of ESAs compared to Bridgeport GKBA assets.

Additional descriptions of environmentally relevant activities and or layers have been extracted for Bridgeport GKBA tenements from the Queensland Government.

2: Environmentally Sensitive Areas (Category A, B & C Vegetation) under the Environmental Protection Regulation (2008)

To explore the extent of Category A environmentally sensitive areas (categorised under the Environmental Protection Regulation 2008), including areas other than dwellings, educational or medical institutions, commercial activity or public amenities, a layer was sourced from the Queensland Spatial Catalogue, called Vegetation_management_regional_ecosystem_map.

The closest ESA to Bridgeport GKBA tenements is a regional ecosystem known as “remnant vegetation”. Remnant vegetation is defined by being 10-30% of its pre-clearing extent across the bioregion or more than 30% of its pre-clearing extent remains and the remnant extent is less than 100 km^2. In addition to the “remnant vegetation” category, under the EP Act (1994), the category can be deemed Of Concern if 10-30% of its pre-clearing extent remains unaffected by moderate degradation and/or biodiversity loss. The only remnant regional ecosystem mapped near or within Bridgeport Energy tenements is listed as Of Concern. Remnant vegetation has been mapped using the Queensland Spatial Catalogue overlaid on the boundaries of PL 31, 32 & 47 (Figure 39).

The largest fields, PL 31 (Bodalla) and 32 (Kenmore), are classified as non-remnant areas, considering they are areas of cleared land for other purposes, such as oilfield development. Land immediately surrounding each facility is of no-concern. Blackstump (PL 47) is within a remnant Of Concern area, but the facility has a small footprint, using existing roads where possible. Bargie (PL 256) is dominated by No Concern habitat (Figure 47), whilst Marcoola (PL 482) and Coolum & Glenvale(Figure 48) is all No Concern area. The exception to this is Byrock (PL 484) with a majority of the area defined as Of Concern regional habitat (Figure 50).

This geospatial information was accessed and retrieved from the Queensland Spatial Catalogue [http://qldspatial.information.qld.gov.au/catalogue] and edited in available software to further clarify the location of our physical assets.

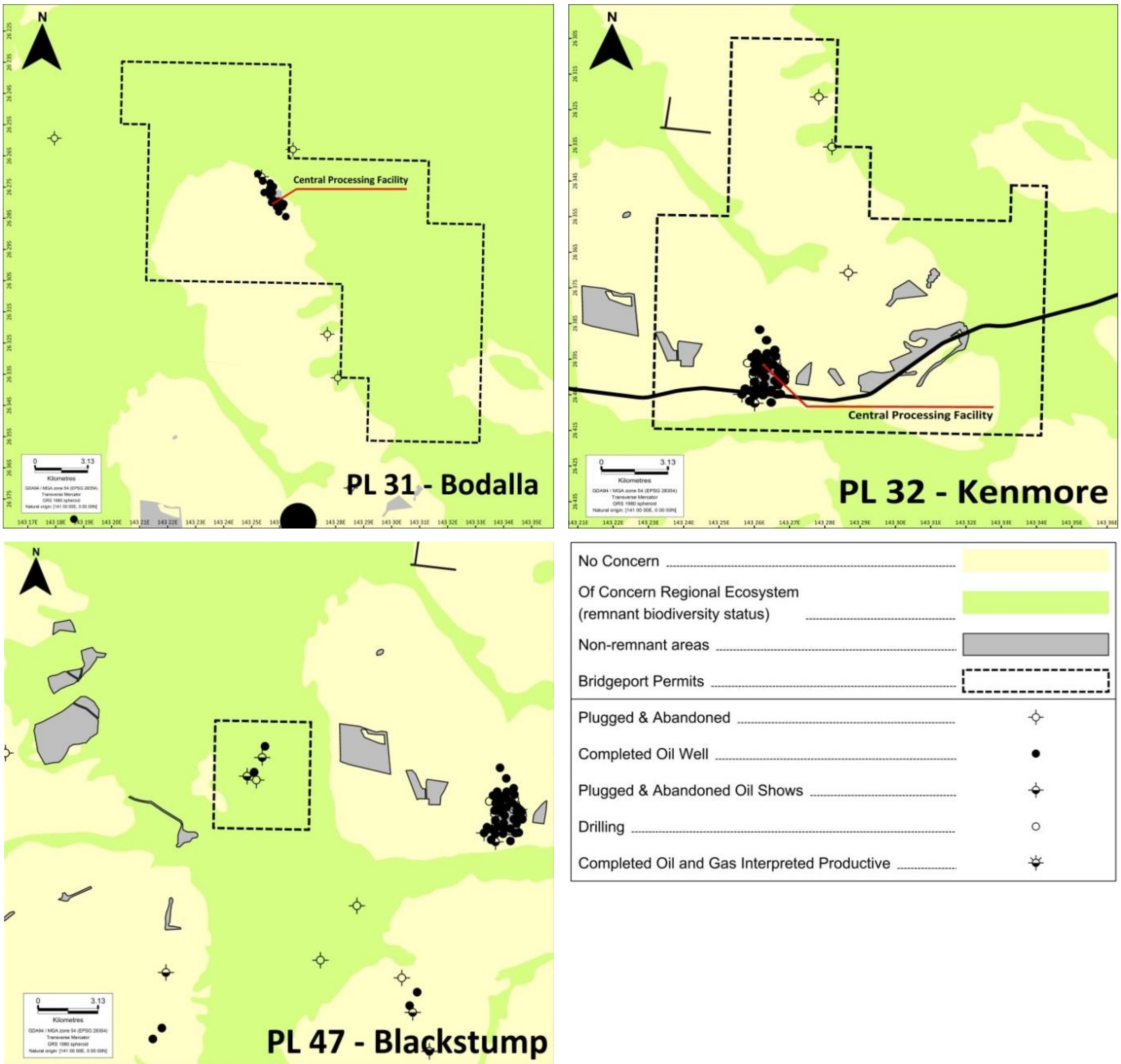


Figure 46: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 31, 32 and 47.

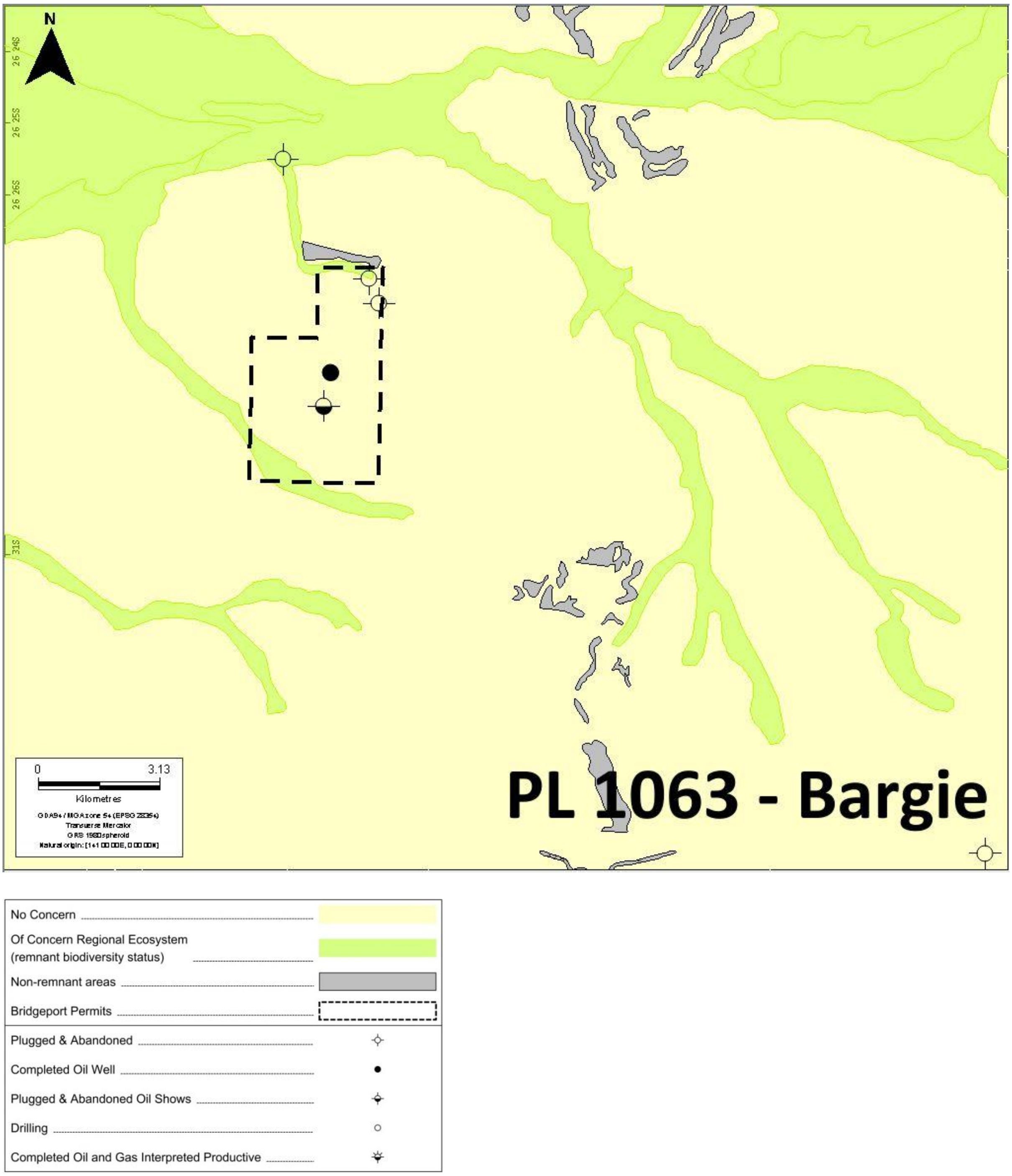


Figure 47: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 256 (PL 1063).

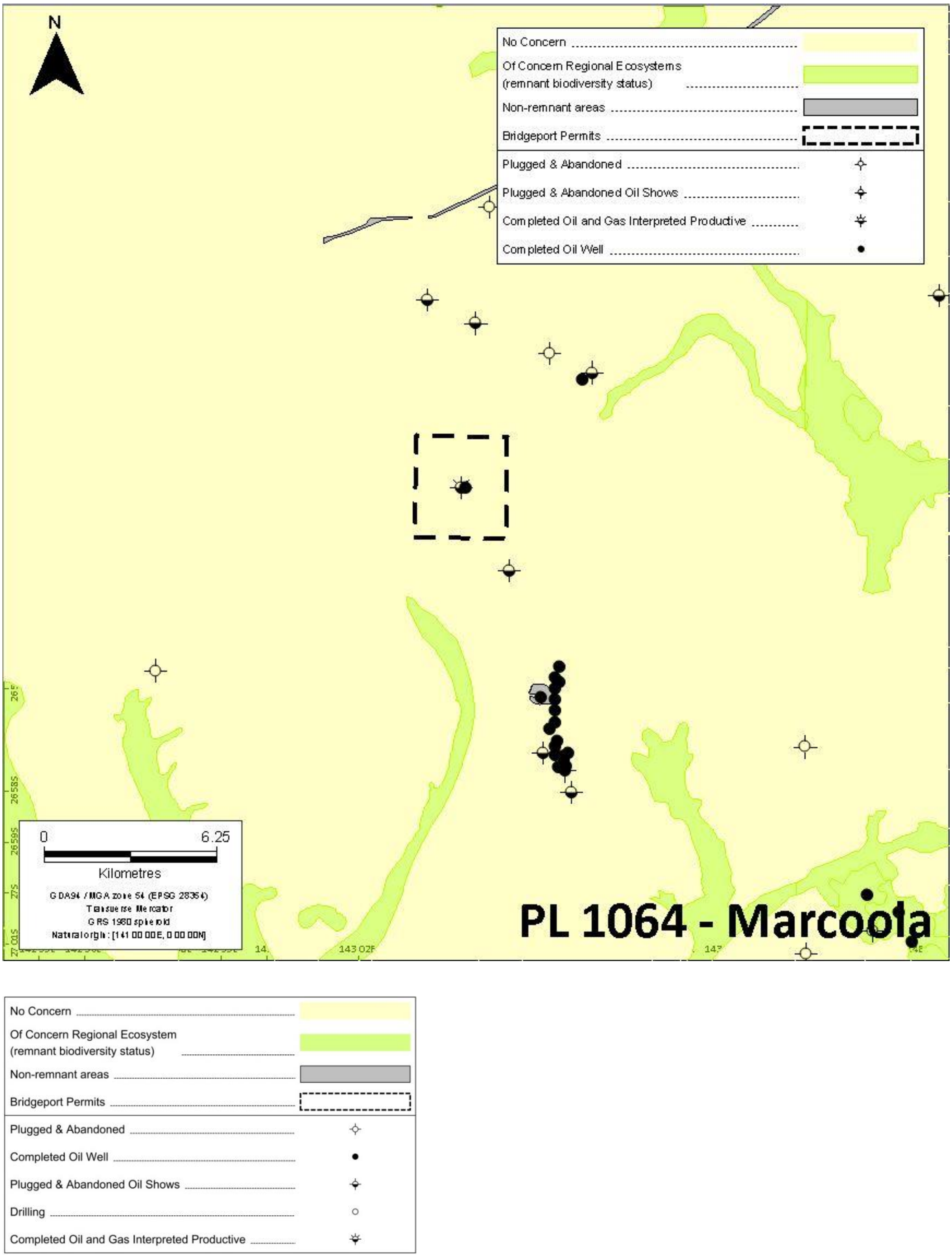


Figure 48: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 482 (Marcoola).

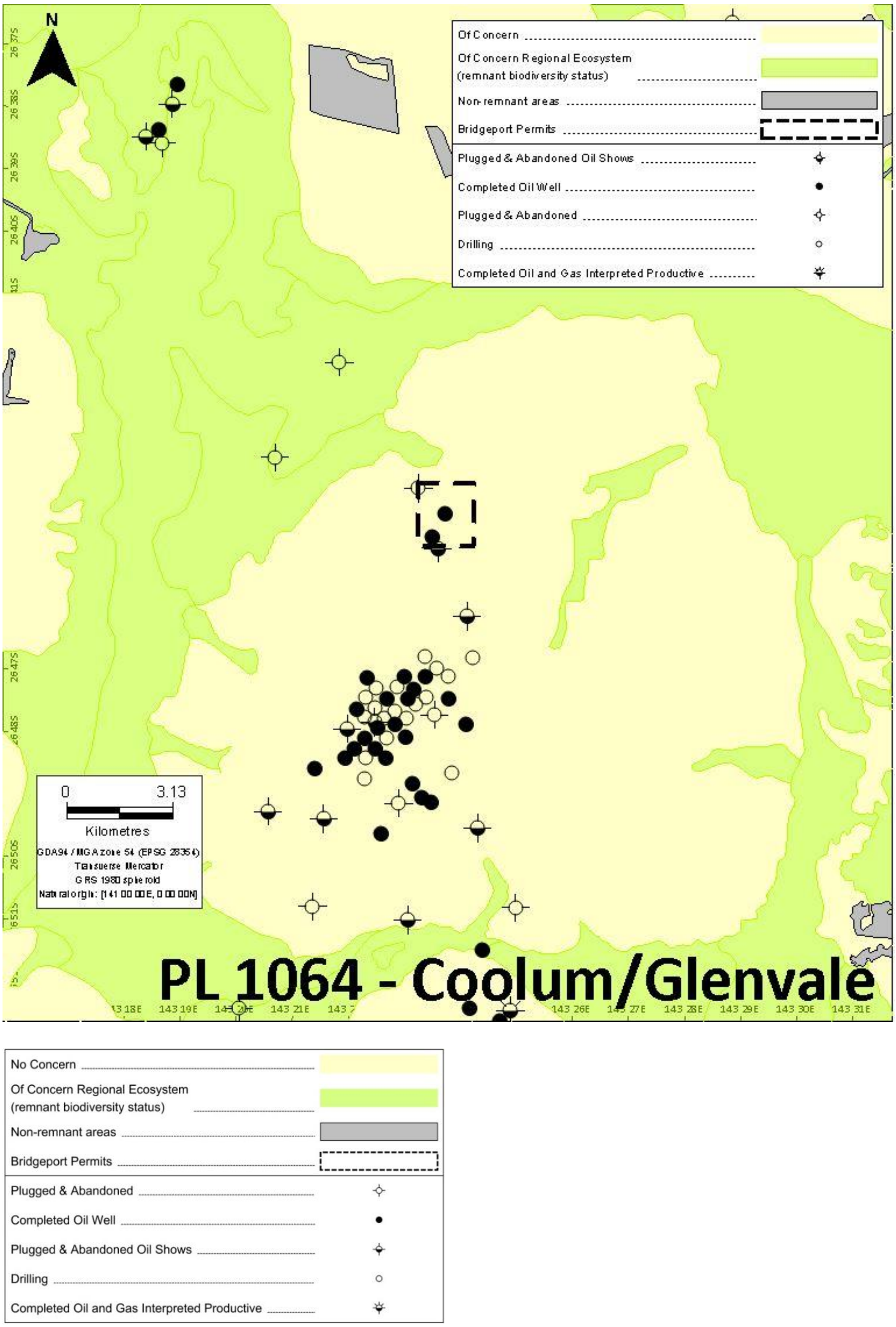
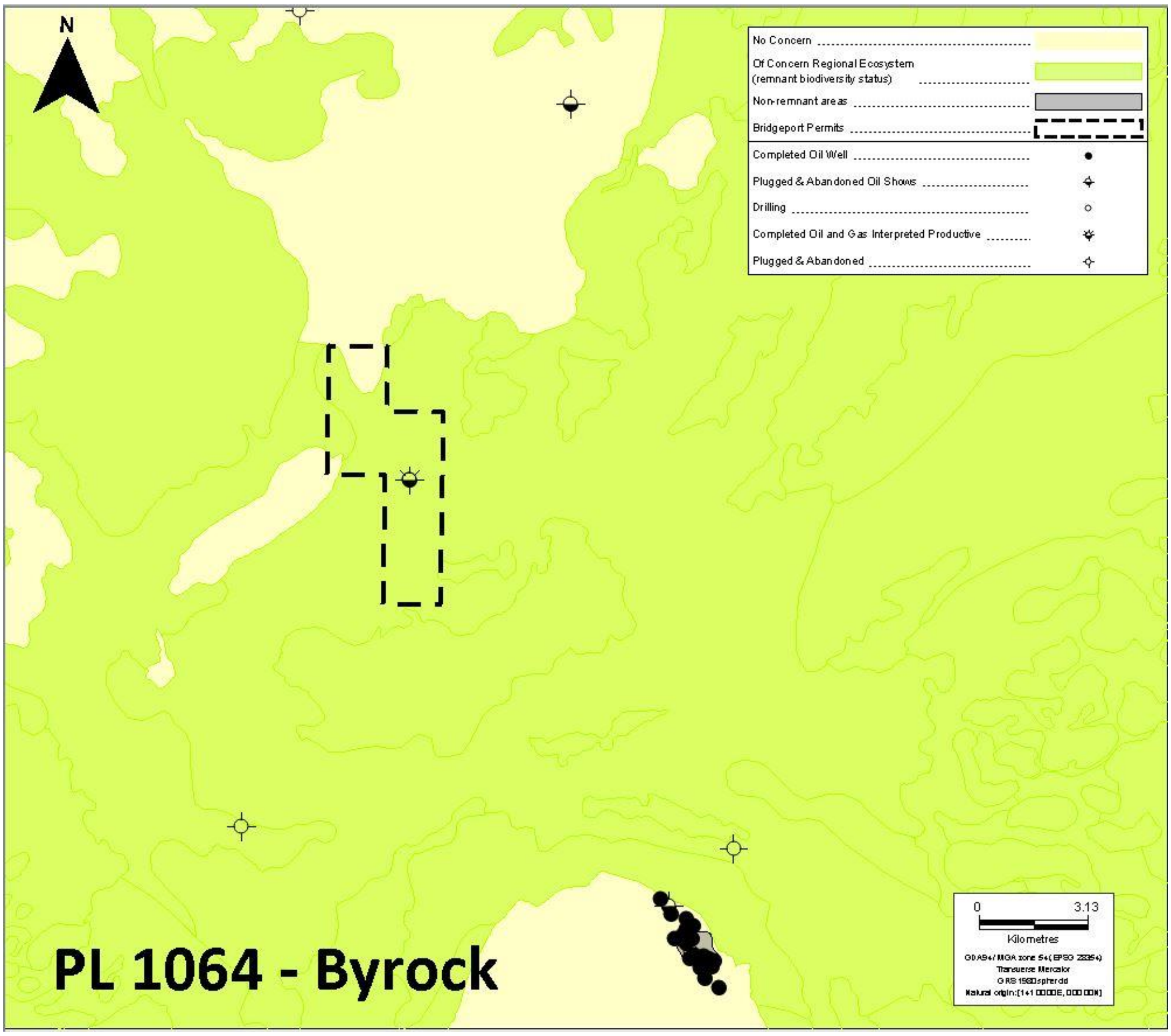


Figure 49: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 483 (Coolum & Glenvale).



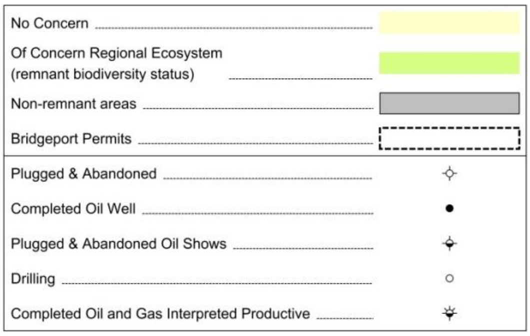


Figure 50: Environmentally sensitive areas – non-mining resource activities (EP Act) layer on the boundary of PL 484 (Byrock).

Bridgeport tenements occur over a limited range of regional ecosystems. To provide a description of the land and ecosystems on which our petroleum activities occur, we use data from the State of Queensland. The State has mapped broad regional ecosystems, defined by particular vegetation communities that are consistently associated with a particular combination of geology, landform and soil type. Within these regional ecosystems, there can be numerous vegetation types. The broad regional ecosystem types are mapped for each tenement in this section. The individual vegetation types associated with each broad regional ecosystem is listed in the table below and also mapped. The majority Of Concern habitat types found within the boundaries of Bridgeport Energy tenements are related to floodplain/riverine fringing vegetation or Tussock and Forblands. The latter is the most dominant Of Concern habitat type across our tenements, although the impact from petroleum" activities is limited, as most of this habitat occurs outside main facilities/oil fields.

The majority of the surface area within Bridgeport Energy tenements is dominated by the Least Concern/No concern *Acacia* dominated woodlands/shrublands, *Eucalypt* forest and Mulga Forest.

The broad ecosystems within the boundaries of PL 31 (Bodalla) are dominated by two types; other *Acacia* dominated open forests, woodlands and shrublands and tussock grassland and forblands (Figure 51). Smaller portions of Eucalypt open forests and woodlands on floodplains and *Acacia aneura* (Mulga) dominated open forests, woodland and shrublands also occur (Figure 51).

The most abundant broad regional ecosystems within the boundary of PL 32 (Kenmore) is Other *Acacia* dominated open forests, woodlands and shrublands. There are *Eucalypt* open forests and woodlands on floodplains, *Acacia aneura* (Mulga) dominated open forests, woodland and shrublands, and tussock grassland and forblands (Figure 51) as well. There are more non-remnant areas within PL 32, where cleared commercial/industrial surfaces, such as the petroleum facilities, are represented. These primarily occur in Mulga forest. There are no field facilities occurring in areas of Of Concern habitat type in PL 32.

There are two broad ecosystems within the boundaries of PL 47 (Blackstump), *Eucalypt* open forests and woodlands on floodplains and other *Acacia* dominated open forests, woodlands and shrublands (Figure 51). There is a small area in the tenements southern boundary which contains tussock grassland and forblands, the only area of Of Concern regional ecosystem present in the tenement. It is on the southern edge of the tenement and is not affected by petroleum operations.

The types of vegetation which categorises the habitat within Bargie (PL 256) is illustrated in Figure 52 over page, and include *Acacia aneura* (Mulga) dominated open forests, woodland and shrublands and other *Acacia* dominated open forests, woodlands and shrublands

At Marcoola (PL 482) the main types of vegetation include Acacia aneura (mulga) dominated open forests and Acacia aneura (mulga) woodlands and shrublands (Figure 53).

At Coolum & Glenvale (PL 483) the main type of vegetation is *Acacia aneura* (mulga) dominated open forests, woodlands and shrublands (Figure 54).

At Byrock (PL 484), the main type of vegetation groups are *Acacia cambagei* low woodland, *Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland, and Floodplain (other than floodplain wetlands) (Figure 55).

A detailed summary of the regional ecosystems present within each tenement are graphically presented below, as well as a detailed table of each regional ecosystem present within each project boundary (Table 29, Table 30, Table 31, Table 32 and Table 33).

To determine category B (and C) environmentally sensitive areas (ESA) under the Environmental Protection Regulation 2008, two layers, Category B and C endangered or Of Concern regulated vegetation layers were overlayed with Bridgeport tenements, and no protected areas occur within any GKBA tenement.

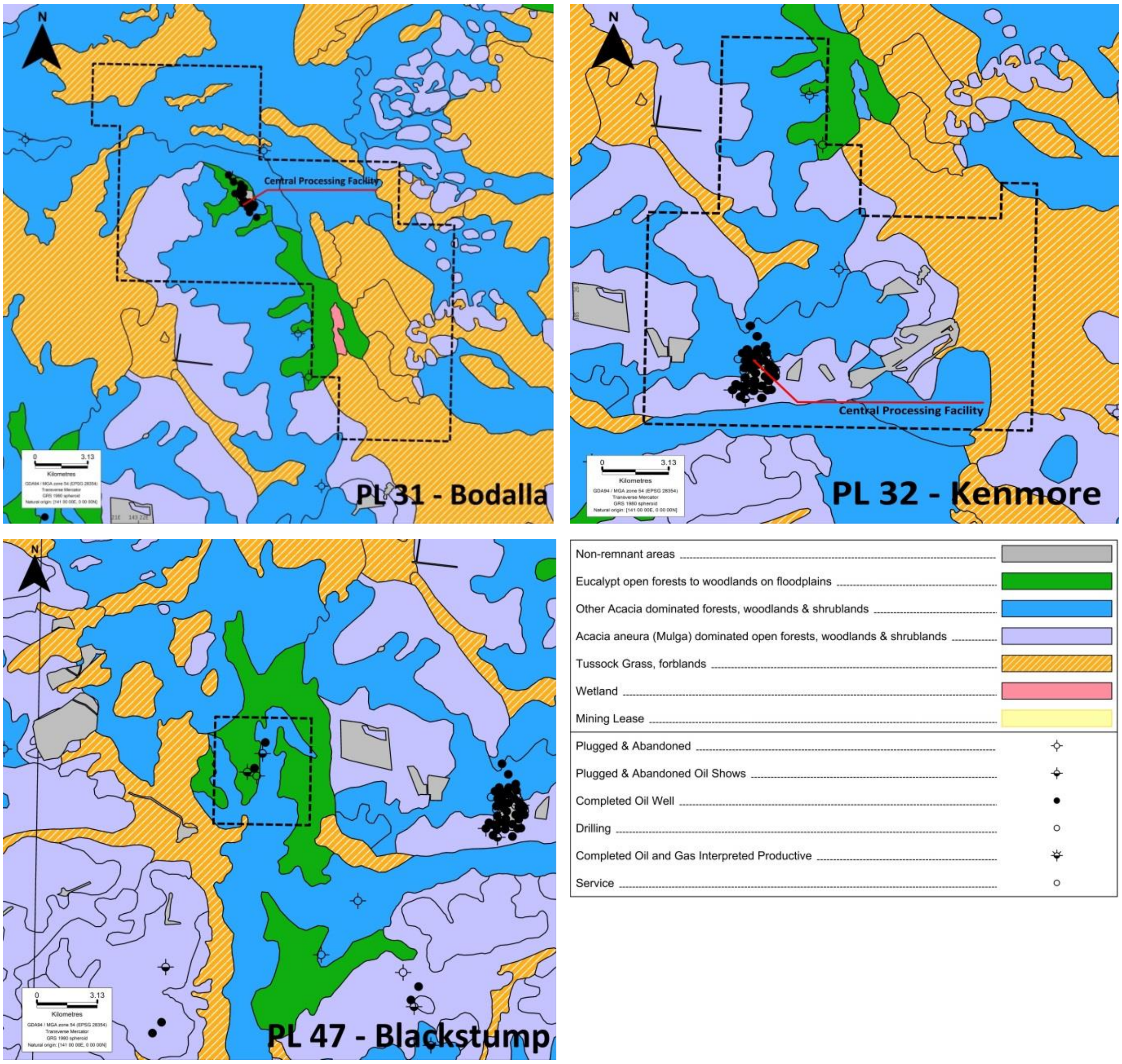


Figure 51: The remnant regional ecosystems inside the boundary of the PL 31 (Bodalla), PL 32 (Kenmore) and PL 47 (Blackstump) tenements, coloured by broad vegetation groups.

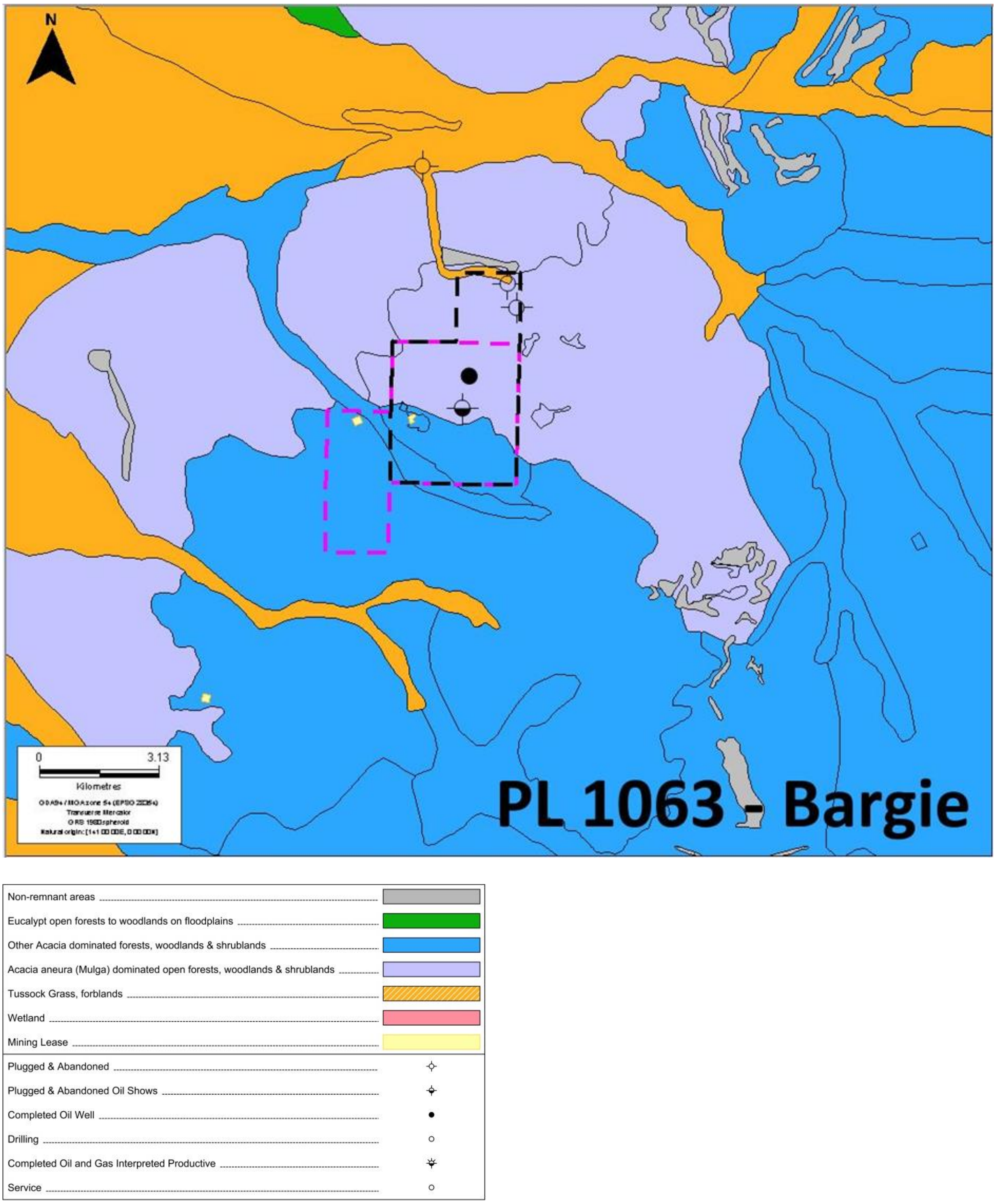


Figure 52: The remnant regional ecosystems inside the boundary of the PL 1063 (Bargie) tenement, coloured by broad vegetation groups.

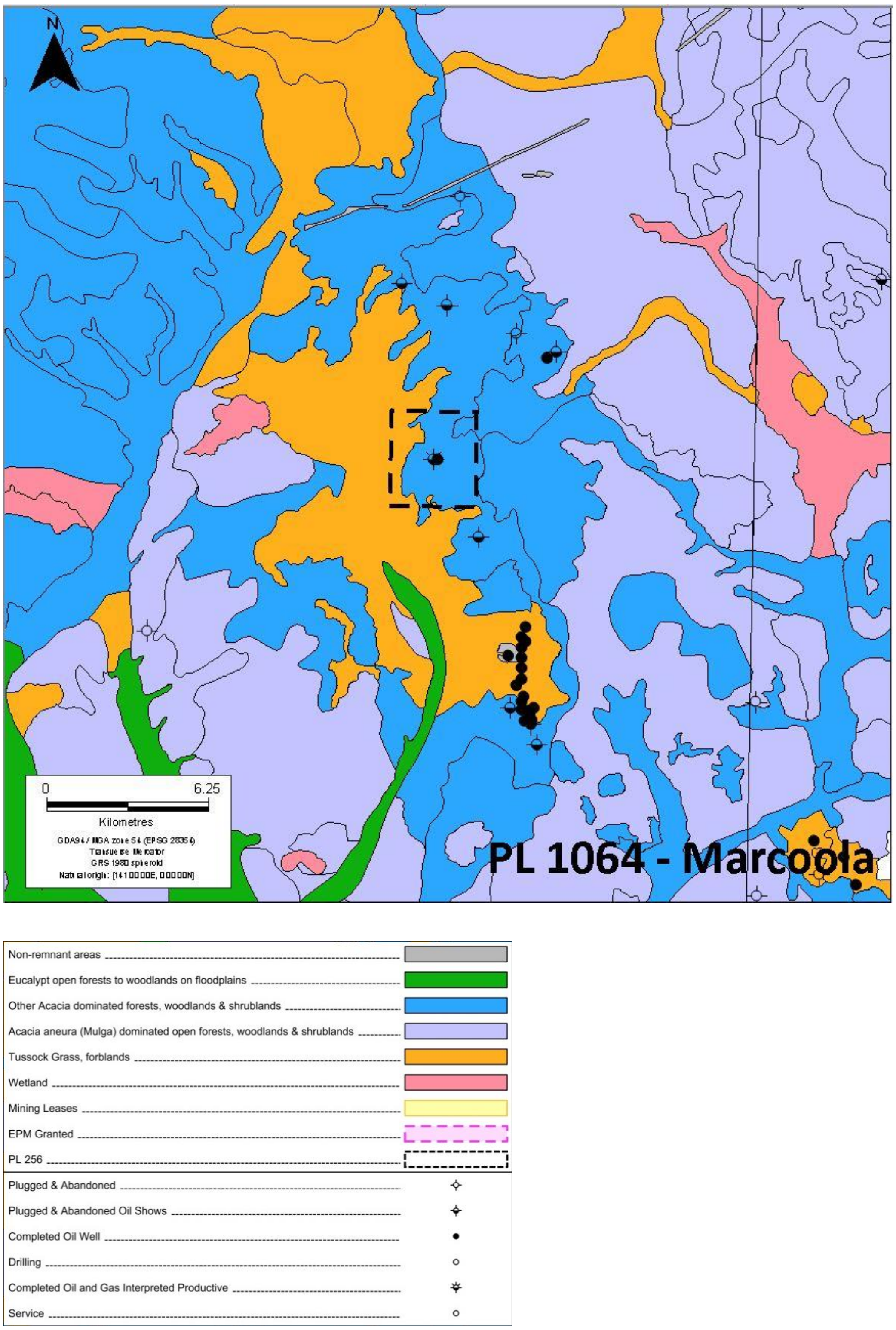


Figure 53: The remnant regional ecosystems inside the boundary of the Marcoola (PL 1064 (ex PL 482) tenement coloured by broad vegetation groups.

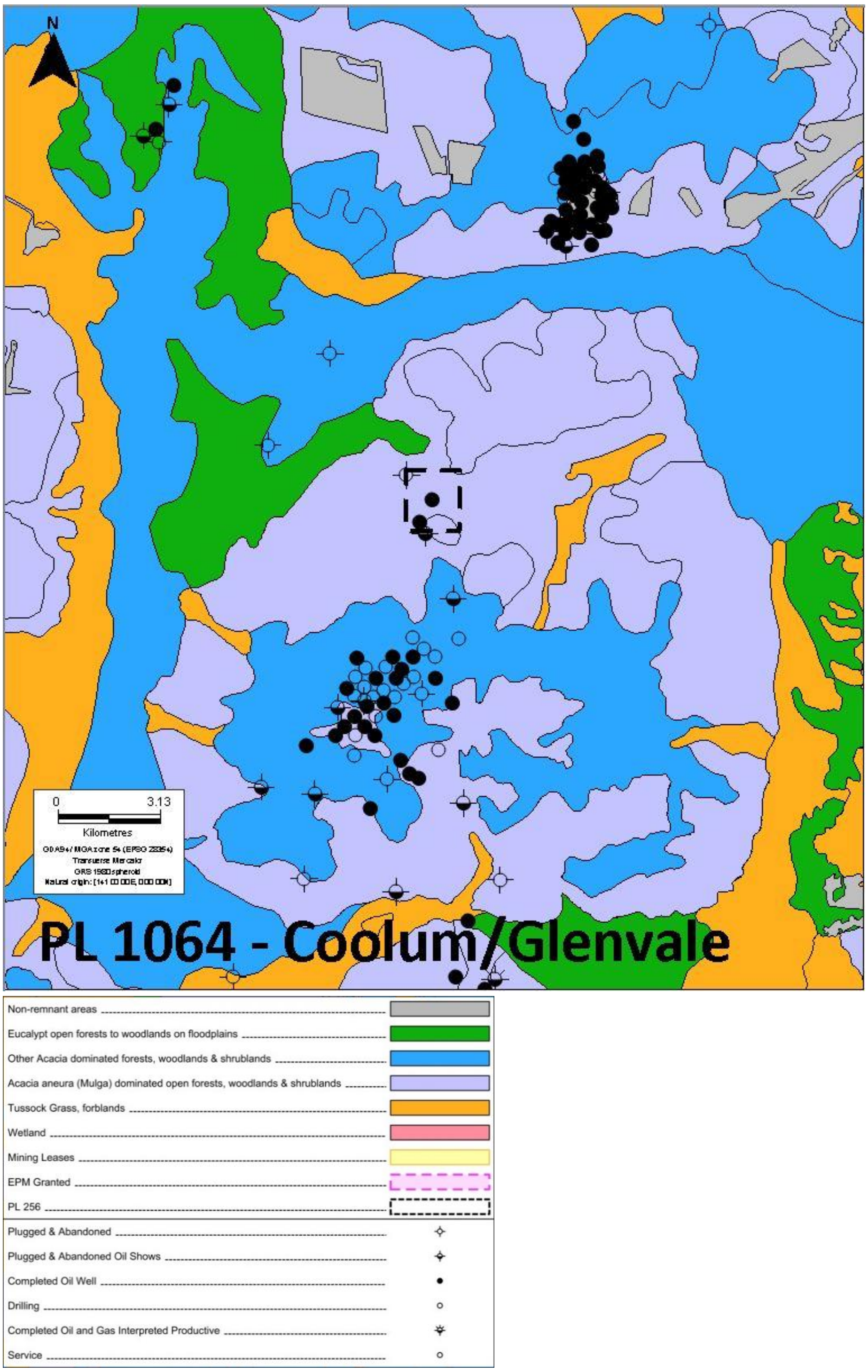


Figure 54: The remnant regional ecosystems inside the boundary of the Coolum & Glenvale (PL 1064 (ex PL 483) tenement coloured by broad vegetation groups.

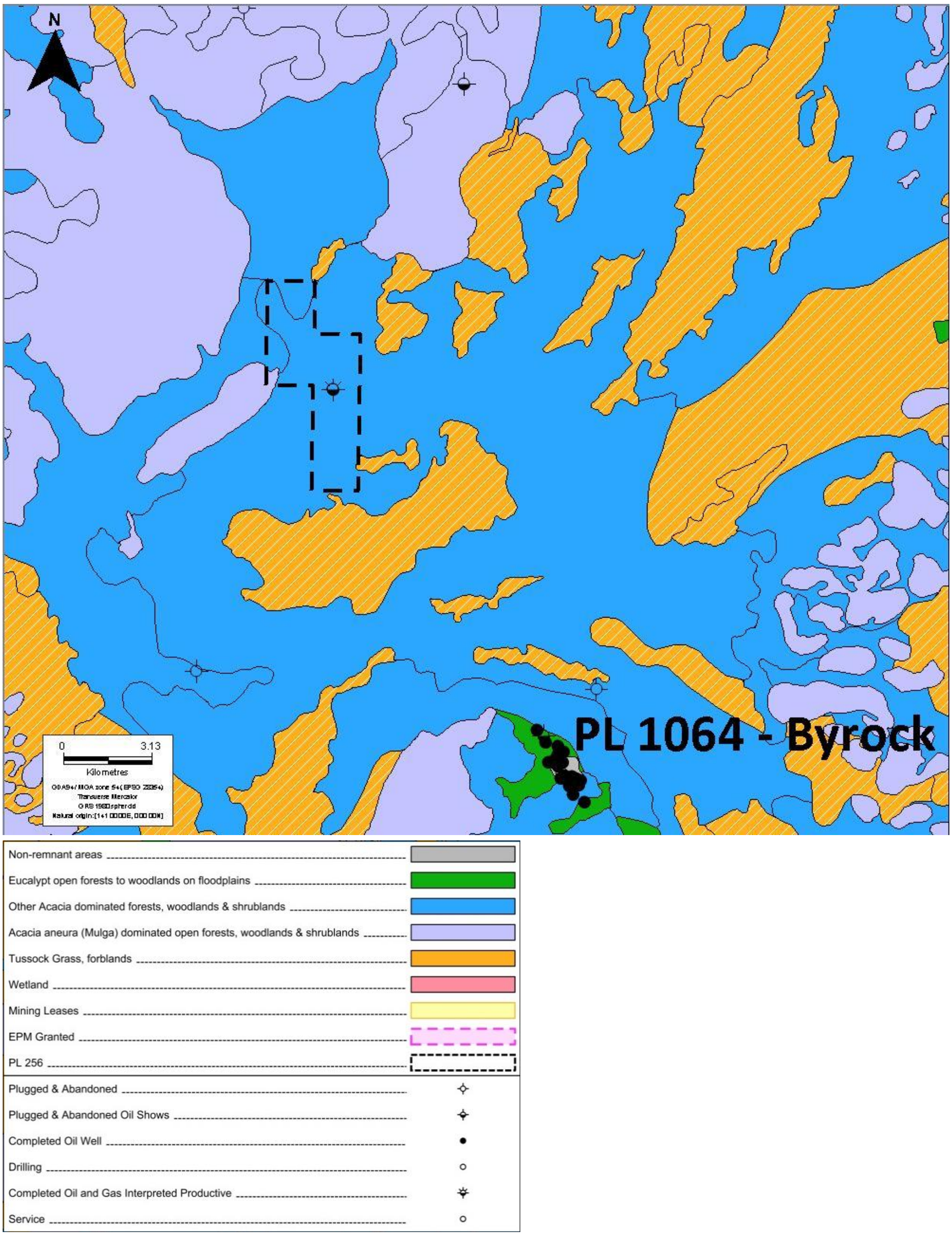


Figure 55: The remnant regional ecosystems inside the boundary of the Byrock (PL 1064 (ex PL 484) tenement coloured by broad vegetation groups.

Table 29: A detailed summary of each regional ecosystem in PL 31 (Bodalla)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.3.2	*Eucalyptus camaldulensis*, *E. coolabah*, *Acacia cambagei* woodland on major drainage lines/rivers		Of Concern
6.3.2a	Riverine wetland or fringing riverine wetland. *E. coolabah* predominates, with scattered tall shrubs and low trees occurring beneath it. *Lysiphyllum gilvum* is a conspicuous tall shrub. The seasonally variable ground layer is open to dense, and usually dominated by perennial grasses or in favourable seasons by ephemeral herbs. Occurs fringing braided channels along narrow drainage lines.		Of Concern
6.3.5	*Eucalyptus ochrophloia*, *Acacia cambagei*, *E. coolabah* woodland on alluvium	Least concern	No concern at present
6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
6.3.11	*Eleocharis pallens*, short grasses, *Eragrostis australasica* open-herbland on clays, associated with ephemeral lakes, billabongs and permanent waterholes		Of Concern
6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern
6.3.13a	Floodplain (other than floodplain wetlands). Forbs, frequently *Atriplex* spp. and *Sclerolaena* spp., predominate with short grasses present, becoming co-dominant or dominant in some situations. Scattered shrubs such as *Chenopodium auricomum* and *Eremophila polyclada*. Associated with depressions on frequently flooded alluvial plains.	Not mentioned	Not mentioned
6.5.8	*Acacia aneura*, *Eucalyptus populnea*, *Eremophila gilesii* low woodland	Least concern	No concern at present
6.5.16	*Acacia aneura* groved with *Corymbia terminalis* or *C. blakei* tall open shrubland on Quaternary sediments	Least concern	No concern at present
6.6.1	*Atalaya hemiglauca*, *Acacia aneura*, *Acacia* spp., *Corymbia terminalis* tall open-shrubland on low dunes over alluvium	Least concern	Of Concern
6.6.1b	Open forbland usually with scattered low shrubs. Common forb species include *Crotalaria eremaea*, *Salsola kali*, *Tribulus terrestris* and *Chamaesyce myrtoides*. Grasses such as *Eriachne aristidea* and *Eragrostis basedowii* are common. Shrub species include *Atalaya hemiglauca*, *Acacia aneura*, *Hakea chordophylla* and *Owenia acidula* occur as scattered individuals and sometimes form an open-shrubland to 4.5 meters tall. Occurs on isolated low dunes and sand mounds, and sometimes rounded mobile crests and often occurring in groups. Occurs in the northern parts of the bioregion (subregion 10) formed from Quaternary windblown sands overlying alluvia. Soils are red to yellow siliceous sands on dunes with sandy surface texture contrast soils on flanks.		Of Concern

6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present

Table 30: A detailed summary of each regional ecosystem in PL 32 (Kenmore)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.3.5	*Eucalyptus ochrophloia*, *Acacia cambagei*, *E. coolabah* woodland on alluvium	Least concern	No concern at present
6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern
6.3.13a	Floodplain (other than floodplain wetlands). Forbs, frequently *Atriplex* spp. and *Sclerolaena* spp., predominate with short grasses present, becoming co-dominant or dominant in some situations. Scattered shrubs such as *Chenopodium auricomum* and *Eremophila polyclada*. Associated with depressions on frequently flooded alluvial plains.	Not mentioned	Not mentioned
6.5.8	*Acacia aneura*, *Eucalyptus populnea*, *Eremophila gilesii* low woodland	Least concern	No concern at present
6.5.16	*Acacia aneura* groved with *Corymbia terminalis* or *C. blakei* tall open shrubland on Quaternary sediments	Least concern	No concern at present
6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present

Table 31: A detailed summary of each regional ecosystem in PL 47 (Blackstump)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.3.5	*Eucalyptus ochrophloia*, *Acacia cambagei*, *E. coolabah* woodland on alluvium	Least concern	No concern at present
6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern

Table 32: A detailed summary of each regional ecosystem in PL 1063 (Bargie)

Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
6.7.7	*Acacia catenulate*, *Eucalyptus thozetiana* and/or *A. ensifolia* low open woodland with *Triodia spp.* and/or *A. petraea*, *A. aneura* on scarps and plateaus	Least concern	No concern at present
6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present
6.9.4	*Acacia cambagei, Senna spp., Sida platycalyx* tall open shrubland on undulating mantled pediments and scarp retreat zones	Least concern	No concern at present

Table 33: A summary of each regional ecosystem in Marcoola (ex PL 482), Coolum & Glenvale (ex PL 483) and Byrock (ex PL 484)

Tenement	Regional Ecosystem	Short Description	Vegetation Management Act Class	Biodiversity Status
Marcoola (ex PL 482)	5.5.2	*Acacia aneura* low open woodland, *Acacia sibirica* & *Eremophila latrobei* on Quaternary deposits	Least concern	No concern at present
	5.6.2	*Acacia georginae* and/or *Acacia cambagei* low open woodland, *Eremophila spp.* on interdune areas and clay plains at interface with dune fields	Least concern	No concern at present
Coolum & Glenvale (ex PL 483)	6.5.16	*Acacia aneura* groved with *Corymbia terminalis* or *C. blakei* tall open shrubland on Quaternary sediments	Least concern	No concern at present
	6.7.9	*Acacia aneura*, *A. stowardii*, *Eremophila latrobei,* tall open shrubland on residuals	Least concern	No concern at present
	6.7.14	*Acacia* spp., *Eucalyptus* spp. open shrubland on crests and tops of residuals	Least concern	No concern at present
	6.7.17	*Eriachne mucronata* open grassland wooded with *Acacia aneura* and/or *Corymbia terminalis* on plains or flat tops of residuals	Least concern	No concern at present
Byrock (ex PL 484)	6.3.6	*Acacia cambagei* low woodland on braided channels or alluvial plains	Least concern	No concern at present
	6.3.13	*Atriplex* spp., *Sclerolaena* spp., species of *Asteraceae* and/or short grasses open herbland on alluvial plains	Least concern	Of Concern

	6.3.13a	Floodplain (other than floodplain wetlands). Forbs, frequently *Atriplex* spp. and *Sclerolaena* spp., predominate with short grasses present, becoming co-dominant or dominant in some situations. Scattered shrubs such as *Chenopodium auricomum* and *Eremophila polyclada*. Associated with depressions on frequently flooded alluvial plains.	Not mentioned	Not mentioned

3: Matters of Environmental Significance (MNES) under the *Environmental Protection and Biodiversity Conservation Act* (1999)

To determine Matters of Environmental Significance (MNES) under the Environmental Protection and Biodiversity Conservation Act (1999), the Australian Federal Governments Protected Matters Interactive Search Tool (the tool) was used. A radius was extended from a central coordinate within the tenements to cover all boundary edges that formed the search areas. The search areas were the project boundaries of each tenement, and extended beyond. The tool provides information and details of all matters of national environmental significance overlapping the user defined search area. This includes threatened species, and those listed under the Environmental Protection and Biodiversity Conservation Act (1999). The tool lists all matters which "may occur in, or may relate to" the search area, so this resource is an indicative tool only. Regarding threatened species, the tool compares the search area to known distribution ranges for each species, categorised as "Species or species habitat likely to occur" and "Species or species habitat may occur" within the search area. The species listed below may or may not occur within Bridgeport tenements, and local knowledge should be applied with the information from the tool. To Bridgeport's knowledge, there has been no record of a threatened species on PL 31, 32 & 47, PL 256, PL 482, PL 483 or PL 484. Threatened species and their status under the Environment Protection and Biodiversity Conservation Act (1999)) are detailed in Table 34.

There are ten species whose distribution is mapped as potentially occurring over Bridgeport Energy tenements. Of these twelve, eight have ranges potentially occurring over PL 31, 32 & 47, including five bird species, one mammal, one plant and one fish (Table 34). There are seven species whose distribution is mapped as occurring over PL 256, five bird species, one mammal and one plant (Table 34). Nine species, including five bird species, one mammal and two plants and a fish have a range that potentially covers either Marcoola (PL 482), Coolum & Glenvale (PL 483) and Byrock (PL 484).

None of these species has been physically recorded or sighted on Bridgeport tenements. These are indicative ranges only and should be considered with local knowledge.

This geospatial/distribution information was accessed from the Australian Governments Department of Environment and Energy's Protected Matters Search Tool website [http://www.environment.gov.au/webgis-framework/apps/pmst/pmst-coordinate.jsf].

Table 34: A list of Threatened species whose distribution as recorded by the Australian Governments Protected Matters Search Tool, overlapping Bridgeport tenements.

Species	Listing Status*	PL 31	PL 32	PL 47	PL 256	PL 482	PL 483	PL 484
Birds								
Calidris ferruginea (Curlew Sandpiper)	Critically Endangered	√	√	√	√	√	√	√
Grantiella picta (Painted Honeyeater)	Vulnerable	√	√	√	√	√	√	
Pedionomus torquatus (Plains-wanderer)	Critically Endangered	√	√	√	√	√	√	
Pezoporus occidentalis (Night Parrot)	Endangered	√	√	√	√	√		
Rostratila australis (Australian Painted Snipe)	Endangered	√	√	√	√	√	√	
Mammals								
Petrogale xanthopus celeris (Yellow-footed Rock Wallaby)	Vulnerable	√	√	√	√			
Macrotis lagotis (Greater Bilby)	Vulnerable							
Vegetation								
Sclerolaena walker (Copperburrs)	Vulnerable	√	√	√	√	√	√	
Frankenia plicata (Frankenia)	Endangered					√		
Fish								
Maccullochella peelii (Murray Cod)	Vulnerable			√				√

*Environment Protection and Biodiversity Conservation Act 1999

4: Matters of State Environmental Significance (MNES) under the Environmental Offsets Regulation (2014)

There are no areas that trigger an Offset requirement (Spatial Catalogue layer: MSES_Legally_secured_offset_area_vegetation_offsets.shp) in either PL 31, 32 & 47, PL 256, PL 482, PL 483 or PL 484.

5: Areas of regional interest under the Regional Planning Interest Act 2014

To determine areas of regional interest under the Regional Planning Interest Act 2014, three layers were used, including Queensland Regional planning interests' Priority living areas, Priority agricultural areas and Strategic Environmental Areas shape files.

None of these layers overlap PL 31, 32 & 47, PL 256, PL 482, PL 483 and PL 484.

6: Endangered, vulnerable, rare or near threatened wildlife species under the Nature Conservation Act 1992

To determine areas potentially impacted by the exercise of water rights on endangered, vulnerable, rare or near threatened wildlife species under the Nature Conservation Act 1992, layers from the Queensland Spatial Catalogue, including protected areas of Queensland, Nature Refuges Queensland and Nature Conservation Act Protected Plant Species were overlayed on Bridgeport tenements.

No endangered, vulnerable, rare or near threatened species under the Nature Conservation Act (1992) were present within or near the PL 31, 32 & 47, PL 256, PL 482, PL 483 and PL 484 tenements.

7: Watercourse, wetlands, springs (including relevant environmental values) or river improvement trust asset areas

Watercourses, wetlands and springs are discussed in appropriate Sections above.

Table 35: Summary of the important environmental features of the land, and spatial layers from DES.

Category	Relevant					GIS data used to determine relevance*
	PL 31, 32 & 47	PL 256	PL 482	PL 483	PL 484	
1: Environmentally Sensitive Areas (ESAs) – non-mining resource activities	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Queensland Government Department of Environment and Sciences' Maps of environmentally sensitive areas webpage
2: Category A environmentally sensitive areas (ESA) under the Environmental Protection Regulation (2008)	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Vegetation_management_regional_ecosystem_map_(Restricted to GKBA)
2: Category B & C environmentally sensitive areas (ESA) under the Environmental Protection Regulation 2008	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	MSES___Regulated_vegetation___category_B_endangered_or_of_concern.shp) MSES___Regulated_vegetation___category_C_endangered_or_of_concern.shp)
3: Matters of Environmental Significance (MNES) under the *Environmental Protection and Biodiversity Conservation Act* (1999)	☐ No ☑ Yes	☐ No ☑ Yes	☐ No ☑ Yes	☐ No ☑ Yes	☐ No ☑ Yes	Australian Federal Governments Protected Matters Interactive Search Tool, that provides indicative ranges.
4: Matters of State Environmental Significance (MNES) under the Environmental Offsets Regulation (2014)	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Matters of state environmental significance - Legally secured offset area - offset register – Queensland.
5: Areas of regional interest under the *Regional Planning Interest Act* 2014	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Regional_planning_interests_Priority_living_area Regional_planning_interests_Priority_agricultural_area Regional_planning_interests_Strategic_environmental_area
6: Endangered, vulnerable, rare or near threatened wildlife species under the *Nature Conservation Act* 1992	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	Protected_areas (estate) Protected_areas (nature refuges) Nature Conservation Act Protected Plant Species
7: Watercourse, wetlands, springs (including relevant environmental values) or river improvement trust asset areas	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☑ No ☐ Yes	☐ No ☑ Yes	Watercourse areas Major watercourse lines Groundwater Dependent Ecosystems (Watercourses) Pondage Water plan (waterholes and lakes) Active Springs Directory of important wetlands Groundwater Dependent Ecosystems (Springs) MSES (high ecological significance wetlands) Watercourse identification map (watercourses) River Improvement Trust Areas (Queensland)

Bridgeport Risk Allocation

D.16.1 Bridgeport have assessed the likelihood of environmentally sensitive areas being impacted by the previous exercise of underground water rights as a Likelihood of E, or Rare, with the explanation being (2) May occur in exceptional circumstances. The consequence of impact is Moderate, leading to a Low consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring), review for effectiveness and escalate risk level if appropriate. This conclusion is appropriate because there are no environmentally sensitive areas that would be impacted on or near Bridgeport tenements, and there has been appropriate safeguards in place to review environmentally sensitive areas prior to any physical activity taking place.

D.16.2.i. Bridgeport have assessed the likelihood of environmentally sensitive areas being impacted by the exercise of underground water rights for the following three years as a Likelihood of E, or Rare, with the explanation being (2) May occur in exceptional circumstances. The consequence of impact is Moderate, leading to a Low consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring), review for effectiveness and escalate risk level if appropriate. This conclusion is appropriate because there are no environmentally sensitive areas that would be impacted on or near Bridgeport tenements, and there has been appropriate safeguards in place to review environmentally sensitive areas prior to any physical activity taking place, and these are not likely to change in the coming three years.

D.16.2.ii. Bridgeport have assessed the likelihood of environmentally sensitive areas being impacted by the exercise of underground water rights for the remaining project period as a Likelihood of E, or Rare, with the explanation being (2) May occur in exceptional circumstances. The consequence of impact is Moderate, leading to a Low consequence level. Actions required from this risk allocation include applying relevant safeguards (e.g. monitoring), review for effectiveness and escalate risk level if appropriate. This conclusion is appropriate because there are no environmentally sensitive areas that would be impacted on or near Bridgeport tenements, and there will likely be no significant change to ESAs in the future of the project.

Conclusion: Summary of the Assessment of Environmental Values

The tenements relating to this UWIR occur in a rugged and remote part of south-western Queensland. The land has been heavily influenced by broad scale extensive stock grazing for decades, and as a result, in conjunction with a tough climate, has limited environmental values across a broad area, and in proximity to petroleum production assets. Where there are environmental features and values, these features do not rely on groundwater i.e. are not groundwater dependent ecosystems. Considering the licenced extraction of water occurs from an isolated region >1,400 m below the surface, it is geologically and deliberately isolated from the primary water target in the Winton formation (sub 100m). Modelling also confirms there is no direct impact at the surface from water extraction at our target aquifers. As a result, the likelihood of environmental values being impacted are rare, unlikely or incapable of occurring.

Table 36: Summary of the important environmental sensitive areas and the associated likelihood, consequence and therefore associated environmental risk to the tenements.

Section	Environmental Value	UWIR Requirement	Likelihood	Consequence	Environmental Risk
D.1	**Aquatic ecosystem**	**D.1.1**	Unlikely	Minor	Low
		D.1.2.i	Unlikely	Minor	Low
		D.1.2.ii	Unlikely	Minor	Low
D.2	**High ecological/conservation value waters**	**D.2.1**	Incapable of occurring	Insignificant	No Risk
		D.2.2.i	Incapable of occurring	Insignificant	No Risk
		D.2.2.ii	Incapable of occurring	Insignificant	No Risk
D.3	**Slightly disturbed waters**	**D.3.1**	Incapable of occurring	Insignificant	No Risk
		D.3.2.i	Incapable of occurring	Insignificant	No Risk
		D.3.2.ii	Incapable of occurring	Insignificant	No Risk
D.4	**Moderately disturbed waters**	**D.4.1**	Incapable of occurring	Insignificant	No Risk
		D.4.2.i	Incapable of occurring	Insignificant	No Risk
		D.4.2.ii	Incapable of occurring	Insignificant	No Risk
D.5	**Highly disturbed waters**	**D.5.1**	Unlikely	Minor	Low
		D.5.2.i	Unlikely	Minor	Low
		D.5.2.ii	Unlikely	Minor	Low
D.6	**Irrigation**	**D.6.1**	Incapable of occurring	Insignificant	No Risk
		D.6.2.i	Incapable of occurring	Insignificant	No Risk
		D.6.2.ii	Incapable of occurring	Insignificant	No Risk
D.7	**Farm water supply/use**	**D.7.1**	Incapable of occurring	Insignificant	No Risk

		D.7.2.i	Incapable of occurring	Insignificant	No Risk
		D.7.2.ii	Incapable of occurring	Insignificant	No Risk
D.8	**Stock watering**	**D.8.1**	Rare	Minor	Low
		D.8.2.i	Rare	Minor	Low
		D.8.2.ii	Rare	Minor	Low
D.9	**Human consumers of aquatic foods**	**D.9.1**	Incapable of occurring	Insignificant	No Risk
		D.9.2.i	Incapable of occurring	Insignificant	No Risk
		D.9.2.ii	Incapable of occurring	Insignificant	No Risk
D.10	**Primary recreation**	**D.10.1**	Incapable of occurring	Insignificant	No Risk
		D.10.2.i	Incapable of occurring	Insignificant	No Risk
		D.10.2.ii	Incapable of occurring	Insignificant	No Risk
D.11	**Secondary recreation**	**D.11.1**	Incapable of occurring	Insignificant	No Risk
		D.11.2.i	Incapable of occurring	Insignificant	No Risk
		D.11.2.ii	Incapable of occurring	Insignificant	No Risk
D.12	**Visual recreation**	**D.12.1**	Incapable of occurring	Insignificant	No Risk
		D.12.2.i	Incapable of occurring	Insignificant	No Risk
		D.12.2.ii	Incapable of occurring	Insignificant	No Risk
D.13	**Drinking water supply**	**D.13.1**	Incapable of occurring	Insignificant	No Risk
		D.13.2.i	Incapable of occurring	Insignificant	No Risk
		D.13.2.ii	Incapable of occurring	Insignificant	No Risk
D.14	**Industrial use**	**D.14.1**	Incapable of occurring	Insignificant	No Risk

		D.14.2.i	Incapable of occurring	Insignificant	No Risk
		D.14.2.ii	Incapable of occurring	Insignificant	No Risk
D.15	**Cultural and spiritual values**	**D.15.1**	Rare	High	Medium
		D.15.2.i	Rare	High	Medium
		D.15.2.ii	Rare	High	Medium
D.16	**Environmentally Sensitive Areas**	**D.16.1**	Rare	Moderate	Low
		D.16.2.i	Rare	Moderate	Low
		D.16.2.ii	Rare	Moderate	Low

Part E*: Water monitoring strategy

Requirements under section 378 of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following; 1. A rationale for the strategy 2. A timetable for strategy 3. The parameters to be measured 4. The locations for taking measurements 5. The frequency of the measurements 6. A program for the responsible tenure holder or holders to undertake a baseline assessment for each water bore that is outside the area of a resource tenure, but within the predicted LTAA; and 7. A program for reporting to the OGIA about the implementation of the monitoring strategy.

*Part E refers to Section 5.1.5 (page 22) of the guideline (DES 2017).

Bridgeport provides the following detail to form the basis of a groundwater monitoring strategy, which includes parameters, locations and frequency to help define and inform the program.

Shallow Groundwater Monitoring (~0-15m TD)

Bridgeport continue to sample and expand shallow groundwater sampling bores across PL 31 (Bodalla) and PL 32 (Kenmore). This data will inform shallow groundwater monitoring around the largest of Bridgeport evaporation ponds and any potential impacts related to shallow groundwater.

Regional Groundwater Monitoring (~all well target depth TD)

The requirement to develop a monitoring strategy (s378) is detailed in the following section. The plan considers and matches the historic monitoring plans put forth by Beach Energy, to keep consistency with best practice and historic brown fields operations.

Shut-in wellhead pressure will be monitored in across the fields in a series of wells. Shut-in tubing head pressure (SITHP) is taken and extrapolated to determine reservoir pressure (and therefore water level).

Well selection is based on position within the field, as well as target formation. There are four wells perforated in the Hutton which will be tested at Kenmore and three at Bodalla. One well, Kenmore 28 has been brought back online, so Kenmore 29 will be monitored in its place. The Basal Jurassic will be monitored at Bodalla by monitoring two wells (Table 37).

Table 37: Shut-in wells in the Hutton (Kenmore and Bodalla) and Basal Jurassic (Bodalla) that will be monitored for shut-in well head pressure.

Kenmore (Hutton)	Bodalla (Hutton)	Bodalla (Basal Jurassic)
K-5	B-4	B-5
K-22	B-8	B-6
K-29	B-18	
K-31	Shallow Bore (BKGRND 1)	
Shallow Bore (SP3-P)	Shallow Bore (BKGRND 2)	
Shallow Bore (SPU-P)		

Production volume monitoring strategy

Production monitoring occurs regularly through the production separator and testig facilities. Production from a single well is isolated into a test tank, where a volumetric measure is recorded over a period of time (usually 24 hours). Once this measure is taken, production per hour can be calculated, and applied to the well for all uptime hours over any given period. Wells are regularly tested on an ad-hoc or as needs basis. This data can then be compiled over any required timeframe.

Frequency of Measurements

Shut-in tubing head pressure will be monitored quarterly. Any influence to the groundwater system is extremely slow acting, which supports this monitoring schedule.

Significant changes in the reservoir pressure can infer changes in well bore conditions or reservoir conditions. The SITHP will be assessed against the previous monitoring figures every quarter, to be reported in the annual updates.

Each annual update and three yearly report will include;

- A summary of the previous (12 or 36 months) monitoring data
- Assessment of monitoring program (applicability, improvements)
- Results review

Rationale for Strategy

Bridgeport took over the already mature GKBA oil fields from Beach Energy. Bridgeport recognises the most sensible approach would be to continue monitoring in a similar method and technique, which accomplishes the same goals and allows consistent comparisons over time.

The Cooper-Eromanga Basin is extremely large, extremely slow acting hydrogeological groundwater basin. The overall extraction from the GKBA fields has been deemed to be low, with little to no influence on groundwater dependent ecosystems or regional groundwater users. The following parameters and frequency are deemed appropriate for the scale of monitoring and have been justified through the previous UWIRs.

Summary

Rationale: Matching previous Operators Monitoring Strategy will allow for accurate and best-practice monitoring to determine potential impacts. Considering there are no shallow layers predicted to be impacted by water extraction (as per modelling above), the scale of water extraction, the monitoring target depths and time frames are appropriate.

Part F*: Spring impact management strategy

Requirements under section 379 of the Water Act
To meet the requirements of the Water Act, an UWIR must include the following: 1. **The details of the spring, including its location;** 2. **An assessment of the connectivity between the spring and the aquifer(s) over which the spring is located:** 3. **The predicted risk to, and likely impact on, the ecosystem and cultural and spiritual values of the spring because of the decline in water level of the aquifer over which the spring is located;** 4. **A strategy for preventing or mitigating the predicted impacts outlined above; or if a strategy for preventing or mitigating the predicted impacts is not included, the reason for not including the strategy;** 5. **A timetable for implementing the strategy; and** 6. **A program for reporting to OGIA about the implementation of the strategy.**

*Part F refers to Section 5.1.6 (page 23) of the guideline (DES 2017).

There are no Great Artesian Basin (GAB) Springs within the boundaries of the GKBA tenements. There are no GAB Springs in the LTAA/IAA area. The nearest GAB Spring is located 200 km to the south-west of GKBA. Considering the volumes extracted, distance to spring, it is considered there is no connectivity between this spring and the aquifers which are potentially impacted by Bridgeport and its extraction.

No other Groundwater Dependent Ecosystem (GDE) has been identified within the boundaries of GKBA, or within the LTAA/IAA areas.

The predicted risk and impact to springs is therefore zero, given their complete absence from areas related to resource extraction, including within or near the tenement boundaries of GKBA or the LTAA/IAA.

Part G (a)*: For a CMA assign responsibility to resource tenure holders

Requirements under section 365, 369, 374 *et. al.* of the Water Act
If OGIA is responsible for preparing the UWIR or final report, the UWIR must: **1. Propose a responsible tenure holder for each report obligation; and** **2. For each IAA, propose a responsible tenure holder who must comply with any make good obligations for water bores within the IAA.** **Report obligations may include obligations relating to Part E and F of the UWIR.**

*Part G refers to Section 5.1.7 (page 27) of the guideline (DES 2017).

Under the Water Act, a Cumulative Management Area (CMA) can be declared where there are multiple resource tenures operating, who may have a cumulative impact on groundwater resulting from their resource extraction.

The Queensland Chief Executive has declared the Surat Cumulative Management Area under the Water Act (2000). The GKBA tenures (PL 31, 32 & 47, PL 256, PL 482, PL 483 and PL 484) included within this UWIR are not within this declared Cumulative Management Area, or any other declared CMA. The Surat Cumulative Management Area is the only CMA in Queensland. Therefore, OGIA is not responsible for preparing a UWIR or final report.

Part G (b): Final Reports

Requirements under section 377 of the Water Act
In addition, a final report must include the following additional information to meet the requirements of the Water Act: **1. A summary about underground water bores in the LTAA (including the number of bores and the location and authorised use or purpose of each bore)** **2. A summary about how the make good obligations of the responsible tenure holder for each water bore to which the final report relates have been compiled with by the holder over the term of the tenure;** **3. A summary of the make good obligation of the responsible tenure holder for each water bore that have not yet been compiled with by the holder and a plan about how these obligations will be complied with; and** **4. Statements about any matters outlined in previous strategies that have not yet been complied with, along with a timetable of planned actions to address these outstanding matters.**

*Part G refers to Section 6.1 (page 28) of the guideline (DES 2017).

A summary about underground water bores in the LTAA (including the number of bores and the location and authorised use or purpose of each bore)

Modelling by Golder Associates (results in sections above) calculated no wells in unconfined aquifers that will be affected by an IAA or LTAA.

A summary about how the make good obligations of the responsible tenure holder for each water bore to which the final report relates have been compiled with by the holder over the term of the tenure;

There are no make good obligations that the responsible tenure holder has identified to be complied with, as no bores sit within an IAA or LTAA.

A summary of the make good obligation of the responsible tenure holder for each water bore that have not yet been compiled with by the holder and a plan about how these obligations will be complied with;

There are no make good obligations that the responsible tenure holder has not yet complied with.

Statements about any matters outlined in previous strategies that have not yet been complied with, along with a timetable of planned actions to address these outstanding matters.

There were no matters outlined in previous strategies that have not yet been complied with. There is therefore no timetable or planned actions to address any outstanding matters.

Part H*: Additional Information, including public consultation

Requirements under section 382(3) of the Water Act
To meet the requirements under section 382(3) of the Water Act, a public notice must state the following; - A description of the area to which the report relates; - That copies of the report may be obtained from the responsible entity; - How the copies may be obtained; - That written submissions on the report may be given; - That submissions must be given to the responsible entity: - That a copy of the submission must be given to the Chief Executive - A day that is at least 20 business days after the notice is published by which submissions may be made; and - Where the submissions may be given.

*Part H refers to Section 4.5 (page 11) of the guideline (DES 2017).

Bridgeport undertook public consultation following the requirements of the Underground water impact reports and final reports Guideline (DES 2017).

A description of the area to which the report relates;

The public consultation notice included a brief description of the area to which the report relates;

> *e.g. "…Bridgeport Energy Pty Ltd has developed an underground water impact report (UWIR) for its operations within PL 31, 32 & 47, PL 256, PL 482, PL 483, PL 484 located in the Eromanga Basin, in an area around 280km west of Charleville"*

A map of the region, including main roads, main town names, highlighted tenements and rivers (a feature many people use in the region) to also graphically represent the area to which the report relates.

That copies of the report may be obtained from the responsible entity;

The public consultation notice included a statement on where the report may be obtained;

> *"You have the opportunity to review and comment on this UWIR. From October 2021 you can access the UWIR by visiting Bridgeport Energy Pty Ltd at: www.bridgeport.net.au. You can also phone (02) 8960 8403 to arrange for hard copy to be posted to you"*

How the copies may be obtained;

The public consultation notice included a statement on how the copies could be obtained;

> *"…you can access the UWIR by visiting Bridgeport Energy Pty Ltd at: www.bridgeport.net.au. You can also phone (02) 8960 8403 to arrange for hard copy to be posted to you"*

That written submissions on the report may be given;

The public consultation notice included a statement on written submissions;

> *"Written submissions on any of the UWIR may be made to Bridgeport Energy Pty Ltd and mailed to: Attn: Ben Hamilton, Bridgeport Energy, Level 7, 111 Pacific Highway Sydney, NSW, 2060"*

That submissions must be given to the responsible entity;

The public consultation notice included a statement on how submissions must be given to the responsible entity;

> *"Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to: Attn: Ben Hamilton, Bridgeport Energy, Level 7, 111 Pacific Highway Sydney, NSW, 2060"*

That a copy of the submission must be given to the Chief Executive;

The public consultation notice included a statement on how all submissions must be given to the chief executive;

> *"Please note that as required by Section 382(3)(d) of the Water Act (2000), copies of all received submissions must be provided to the chief executive. These submissions will be considered as part of the assessment process for the UWIR*".

A day that is at least 20 business days after the notice is published by which submissions may be made;

The public consultation notice include a statement on a date, which was at least 20 business days after the publication notice, by which submissions could be made;

> *"Your submission must be: -In writing, and -Received by COB Friday 19thof November 2021"*

Where the submissions may be given;

The public consultation notice will include a statement on where the submission may be given;

> *"Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to: Attn: Ben Hamilton, Bridgeport Energy, Level 7, 111 Pacific Highway Sydney, NSW, 2060"*

The public advertisement (18cm x 13cm full colour ad) will occur across multiple issues of the South West Newspaper Co, a regional newspaper circulated in south-west Queensland. The newspaper succeeds the Warrego Watchman. Shires in which the South West Newspaper Co is circulated include Bulloo, Balonee, Murweh, Paroo and Quilpie. Relevant towns to Bridgeport operations in which the publication is distributed include Quilpie, Charleville and Eromanga. The publication is currently run weekly.

A close-up copy of the exact notice will be included below.

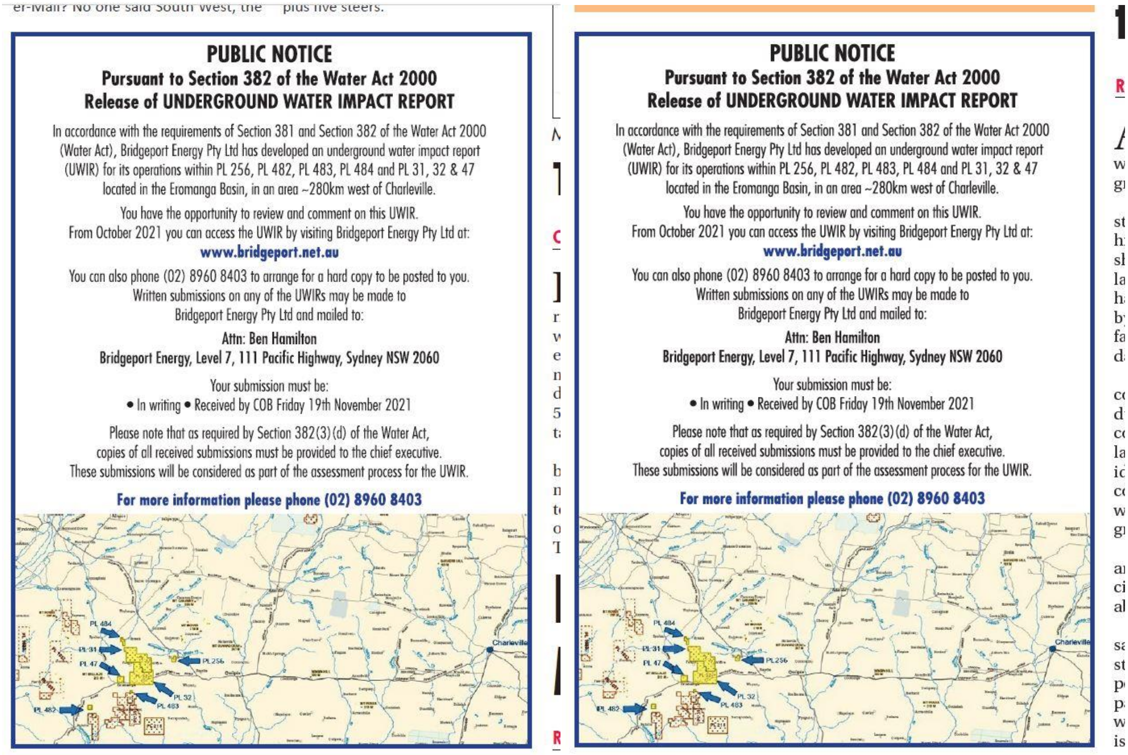
The total number of Business days the public consultation ad has been featured in The South West Newspaper Co was 25 business days.

A draft UWIR was available online [http://bridgeport.net.au] from 20/10/2021 up to the 25/11/2021, after the end of the public notices in the South West Newspaper Co.

Bridgeport considers the publication of the Public Notice in the South West Newspaper Co as appropriate. The South West Newspaper Co was considered a relevant newspaper, appropriately distributed in the relevant areas, and is one of the only remaining printed distribution methods remaining. Going forward, DES might consider the fact paper printed media is terminally declining, especially in many relevant regional areas (Warrego Watchman now defunct), and section 382 (3) may need to change to reflect this reality.

Bridgeport used the standard template provided DES for the public advertisement.

No public submissions were received on the Underground Water Impact Report.



PUBLIC NOTICE
Pursuant to Section 382 of the Water Act 2000
Release of UNDERGROUND WATER IMPACT REPORT

In accordance with the requirements of Section 381 and Section 382 of the Water Act 2000 (Water Act), Bridgeport Energy Pty Ltd has developed an underground water impact report (UWIR) for its operations within PL 256, PL 482, PL 483, PL 484 and PL 31, 32 & 47 located in the Eromanga Basin, in an area ~280km west of Charleville.

You have the opportunity to review and comment on this UWIR.
From October 2021 you can access the UWIR by visiting Bridgeport Energy Pty Ltd at:
www.bridgeport.net.au

You can also phone (02) 8960 8403 to arrange for a hard copy to be posted to you.
Written submissions on any of the UWIRs may be made to Bridgeport Energy Pty Ltd and mailed to:

Attn: Ben Hamilton
Bridgeport Energy, Level 7, 111 Pacific Highway, Sydney NSW 2060

Your submission must be:
• In writing • Received by COB Friday 19th November 2021

Please note that as required by Section 382(3)(d) of the Water Act, copies of all received submissions must be provided to the chief executive. These submissions will be considered as part of the assessment process for the UWIR.

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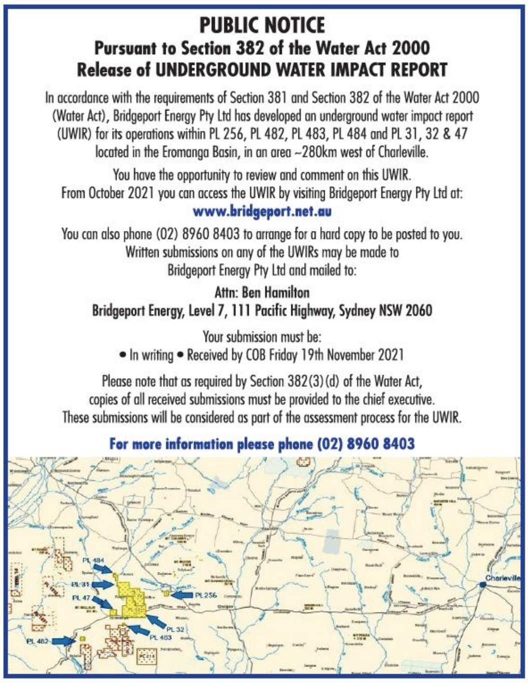

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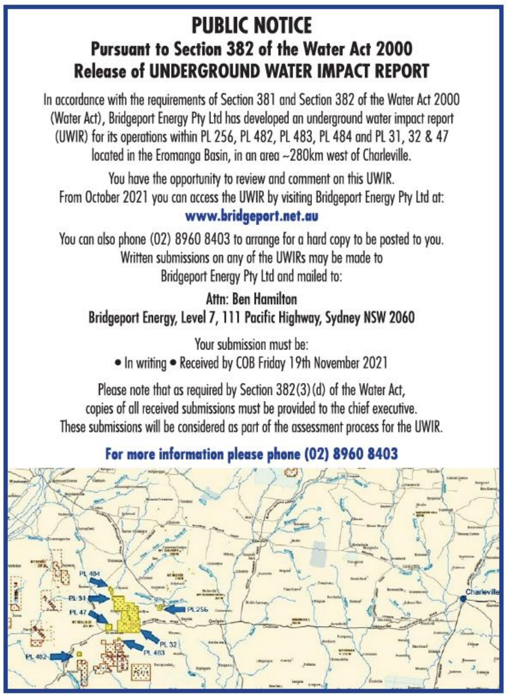

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These submissions will be considered as part of the assessment process for the UWIR.

For more information please phone (02) 8960 8403

Figure 56: The actual scanned image of four Public Consultation Public Notice (of which there were four), which was a Department of Environment and Science template, published in the South West Newspaper Co.

References

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Golder Associates (2014) Underground water impact report for Beach energy oilfields, Eromanga area, SWQ, pp. 1 – 341, South Australia

Golder Associates (2018) Technical Memorandum: Update of groundwater impact assessment for the Eromanga area, SWQ, report prepared for Bridgeport Energy Pty Ltd

Golder Associates (2021) Technical Memorandum: Update of groundwater impact assessment for the Eromanga area, SWQ, report prepared for Bridgeport Energy Pty Ltd

Legislation

Environmental Protection Act 1994 (Reprint current from 1st January 2018) (Queensland)

Environmental Protection (Water) Policy 2009 (Reprint current from 6th December 2016) under the Environmental Protection Act 1994 (Queensland)

Environment Protection (Water and Wetland Biodiversity) Policy 2019, Reprint current from 2 October 2020 to date (accessed 2021)

Environment Protection Regulation (2019)

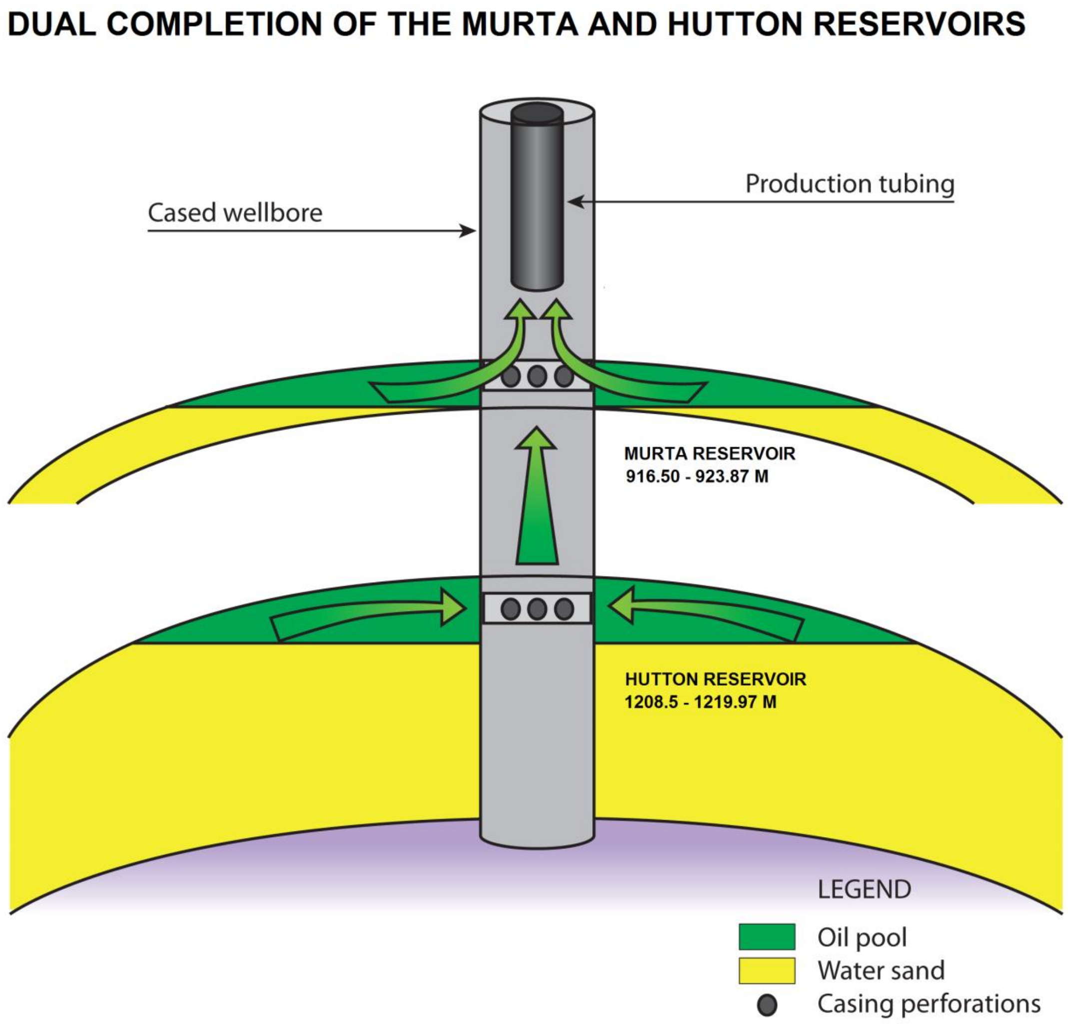
Nature Conservation Act 1994

Marine Parks Act 2004

Petroleum and Gas (Production and Safety) Act 2004 (2021) (Queensland)

Water Act 2000 (Reprint current from 2nd July 2018) (Queensland)

Appendix 1: Dual-Completion Well



Appendix 2: Data

		November	December	January	February	March	April	May	June	July	August	September	October	
	Well Name	**2014**	**2014**	**2015**	**2015**	**2015**	**2015**	**2015**	**2015**	**2015**	**2015**	**2015**	**2015**	**Annual (ML)**
	Kenmore #1	3.48	3.59	3.50	4.49	5.38	4.44	5.35	4.49	4.84	4.65	4.57	4.76	**53.55**
	Kenmore #2	0.09	0.10	0.09	0.09	0.09	0.08	0.09	0.08	0.09	0.09	0.09	0.10	**1.09**
	Kenmore #3	1.24	1.28	1.61	2.86	3.13	2.58	3.11	2.61	2.96	2.37	2.54	2.65	**28.94**
	Kenmore #8	9.02	9.74	9.62	8.93	9.78	9.15	9.72	8.17	9.72	9.63	9.47	9.91	**112.86**
	Kenmore #9	0.22	0.23	0.23	0.20	0.23	0.22	0.23	0.22	0.23	0.23	0.21	0.22	**2.65**
	Kenmore #10	14.74	16.10	15.86	14.26	15.18	15.23	15.02	15.02	14.95	14.21	14.22	15.10	**179.88**
	Kenmore #11	7.62	7.84	7.64	7.09	7.77	6.41	7.72	7.32	7.71	7.58	7.50	7.77	**89.96**
	Kenmore #13	1.67	1.72	1.68	1.56	1.70	1.41	1.69	1.47	1.69	1.66	1.64	1.71	**19.58**
	Kenmore #15	4.71	5.39	5.58	5.10	5.63	5.46	5.39	4.49	5.90	5.83	5.67	5.74	**64.88**
	Kenmore #16	0.35	0.41	0.42	0.39	0.43	0.41	0.41	0.34	0.44	0.44	0.43	0.43	**4.90**
	Kenmore #17	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	**1.00**
	Kenmore #18	1.10	1.13	1.11	1.42	1.70	1.40	1.67	1.42	1.55	1.47	1.44	1.50	**16.92**
	Kenmore #20	0.00	0.00	0.00	0.00	0.00	1.20	1.06	1.59	0.00	0.00	6.17	10.46	**20.47**
	Kenmore #22	0.00	0.00	0.00	0.00	0.00	1.26	4.88	4.73	4.89	4.89	4.73	4.89	**30.26**
	Kenmore #24	0.30	0.31	0.31	0.29	0.36	0.34	0.35	0.35	0.35	0.37	0.38	0.39	**4.10**
	Kenmore #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	**0.00**
	Kenmore #27	12.43	13.42	13.23	11.88	12.63	12.69	12.53	13.45	16.98	16.02	16.04	17.05	**168.35**
	Kenmore #28	6.60	7.38	7.80	6.66	8.11	8.17	8.20	3.10	0.00	0.00	0.00	0.00	**56.02**
	Kenmore #30	17.60	18.98	20.06	17.12	20.86	21.00	19.85	8.15	0.00	0.00	11.60	19.67	**174.89**
	Kenmore #31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Kenmore #32	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.03**
2015	Kenmore #33	0.98	1.01	0.99	0.92	1.12	1.02	1.12	1.07	1.15	1.13	1.06	1.10	**12.67**
	Kenmore #34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Kenmore #35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Kenmore #37	4.38	4.51	4.39	4.06	4.42	3.98	4.39	4.17	4.48	4.41	4.45	4.65	**52.30**
	Kenmore #39	23.85	24.54	23.91	22.20	24.32	21.72	23.92	22.74	24.43	24.02	23.63	24.62	**283.91**
	Kenmore #41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bodalla #5	3.53	4.09	4.11	3.71	4.06	3.97	4.11	3.97	4.11	4.11	3.97	4.10	**47.82**
	Bodalla #6	2.04	2.37	2.38	2.15	2.38	2.30	2.38	2.30	2.38	2.38	2.30	2.37	**27.70**
	Bodalla #9	0.22	0.23	0.23	0.20	0.23	0.22	0.23	0.22	0.23	0.23	0.21	0.22	**2.65**
	Bodalla #10	0.26	0.30	0.29	0.26	0.29	0.28	0.29	0.27	0.28	0.31	0.29	0.30	**3.40**
	Bodalla #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	**0.00**
	Bodalla #14	2.67	3.14	3.07	2.87	3.07	3.07	3.16	3.02	3.12	3.13	3.04	3.15	**36.50**
	Bodalla #15	2.16	2.54	2.48	2.32	2.48	2.48	2.56	2.44	2.53	2.53	2.46	2.55	**29.52**
	Bodalla #16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.12	0.01	0.01	**0.38**
	Bodalla #17	16.20	19.02	18.59	17.37	18.59	18.61	19.16	18.32	18.94	18.95	18.43	19.10	**221.27**
	Bodalla #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	**0.00**
	Bodalla #19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	**0.01**
	Bodalla #20	0.10	0.12	0.11	0.10	0.09	0.08	0.08	0.05	0.08	0.09	0.08	0.09	**1.08**
	Bodalla #21	0.01	0.12	0.14	0.05	0.01	0.02	0.25	0.27	0.28	0.26	0.27	0.28	**1.96**
	Bodalla #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	**0.00**
	Bargie 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Blackstump 01	2.11	1.51	1.51	1.36	1.51	1.46	0.14	0.00	0.00	0.00	0.00	0.00	**9.62**
	Blackstump 04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Marcoola 01	0.14	0.13	0.10	0.13	0.14	0.14	0.16	0.13	0.15	0.16	0.14	0.15	**1.66**
	Coolum 01	0.07	0.07	0.07	0.06	0.07	0.07	0.07	0.07	0.06	0.07	0.07	0.07	**0.81**
	Glenvale 01	0.08	0.02	0.03	0.02	0.02	0.03	0.02	0.03	0.03	0.02	0.03	0.02	**0.35**
	Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total	**140.04**	**151.41**	**151.20**	**140.19**	**155.85**	**151.02**	**159.39**	**136.13**	**134.88**	**131.42**	**147.22**	**165.20**	**1763.95**

		November	December	January	February	March	April	May	June	July	August	September	October	
	Well Name	**2015**	**2015**	**2016**	**2016**	**2016**	**2016**	**2016**	**2016**	**2016**	**2016**	**2016**	**2016**	**Annual (ML)**
2016	Kenmore #1	4.53	4.41	3.88	4.01	4.72	4.54	4.71	3.78	3.47	4.69	4.58	4.75	**52.07**
	Kenmore #2	0.09	0.09	0.08	0.08	0.10	0.09	0.10	0.08	0.07	0.09	0.09	0.10	**1.06**
	Kenmore #3	2.52	2.45	2.16	2.23	2.63	2.52	2.62	2.10	2.03	2.61	2.54	2.64	**29.04**
	Kenmore #8	9.33	9.53	9.31	8.69	9.79	9.41	9.75	9.40	9.51	9.72	9.48	9.84	**113.76**
	Kenmore #9	0.21	0.22	0.22	0.21	0.22	0.21	0.22	0.21	0.22	0.12	0.00	0.00	**2.08**
	Kenmore #10	13.74	15.06	14.85	14.22	14.59	8.30	0.00	0.00	13.76	15.26	5.89	10.28	**125.94**
	Kenmore #11	7.38	7.61	7.33	6.84	7.70	3.44	7.67	7.40	7.49	7.65	7.46	7.75	**85.72**
	Kenmore #13	1.62	1.58	1.39	1.44	1.69	1.63	1.68	1.35	1.32	1.68	1.64	1.70	**18.72**
	Kenmore #15	5.48	5.85	5.90	5.56	5.70	5.74	5.78	5.75	5.31	0.00	0.00	0.00	**51.08**
	Kenmore #16	0.42	0.44	0.44	0.42	0.43	0.43	0.43	0.43	0.40	0.00	0.00	0.00	**3.85**
	Kenmore #17	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.04	0.00	**0.87**
	Kenmore #18	1.43	1.39	1.42	1.26	1.49	1.43	1.48	1.19	1.17	1.48	1.44	1.50	**16.69**
	Kenmore #20	11.09	12.14	11.58	9.08	8.04	11.56	12.08	11.66	11.66	12.01	11.53	11.69	**134.11**
	Kenmore #22	4.73	4.89	4.89	4.57	4.41	4.73	0.95	0.00	0.00	0.00	0.00	0.00	**29.16**
	Kenmore #24	0.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.21**
	Kenmore #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	**0.00**
	Kenmore #27	15.49	16.98	16.75	16.03	16.45	16.54	16.20	16.18	15.52	17.21	6.64	11.59	**181.59**
	Kenmore #28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.19	**0.19**
	Kenmore #30	20.86	22.84	22.16	17.07	15.12	21.74	22.71	21.92	21.92	22.59	21.69	21.99	**252.60**
	Kenmore #31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	**0.02**
	Kenmore #32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Kenmore #33	1.05	1.06	1.04	0.97	1.09	1.05	1.08	1.03	1.05	1.07	1.04	1.08	**12.61**
	Kenmore #34	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.00	0.00	0.00	**0.04**
	Kenmore #35	0.00	0.00	0.00	0.00	0.00	10.40	4.09	0.78	0.80	0.80	0.78	0.80	**18.45**
	Kenmore #37	4.42	4.49	4.38	4.09	4.61	4.43	4.59	4.43	4.48	4.57	4.46	4.63	**53.59**
	Kenmore #39	23.41	23.79	23.23	21.67	24.42	23.47	24.77	24.11	24.40	24.92	22.85	25.24	**286.30**
	Kenmore #41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bodalla #5	3.97	4.11	4.11	3.84	4.11	3.97	4.11	3.88	4.11	4.06	3.97	4.11	**48.33**
	Bodalla #6	2.30	2.38	2.38	2.22	2.38	2.30	2.38	2.25	2.38	2.35	2.30	2.38	**27.97**
	Bodalla #9	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	3.27	3.54	3.36	3.54	**13.71**
	Bodalla #10	0.30	0.36	0.36	0.33	0.24	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.59**
	Bodalla #13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.49	**0.49**
	Bodalla #14	2.79	0.00	0.00	1.52	3.13	3.05	3.14	2.99	3.12	3.20	3.06	3.22	**29.22**
	Bodalla #15	2.26	0.00	0.00	1.23	2.53	2.47	2.54	2.42	2.52	2.54	2.41	2.54	**23.46**
	Bodalla #16	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.00	**0.13**
	Bodalla #17	17.98	19.09	19.34	17.92	18.99	18.52	19.07	17.11	10.75	9.74	9.54	9.86	**187.91**
	Bodalla #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	**0.00**
	Bodalla #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	**0.00**
	Bodalla #20	0.09	0.09	0.09	0.06	0.09	0.09	0.09	0.09	0.09	0.08	0.08	0.09	**1.03**
	Bodalla #21	0.17	0.27	0.24	0.09	0.24	0.26	0.27	0.21	0.27	0.26	0.08	0.03	**2.39**
	Bodalla #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	**0.00**
	Bargie 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Blackstump 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Blackstump 04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Marcoola 01	0.14	0.13	0.09	0.13	0.09	0.12	0.13	0.02	0.02	0.01	0.01	0.01	**0.90**
	Coolum 01	0.07	0.07	0.01	0.00	0.00	0.07	0.01	0.01	0.00	0.00	0.00	0.00	**0.25**
	Glenvale 01	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.26**
	Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total	**158.20**	**161.42**	**157.74**	**145.87**	**155.12**	**162.67**	**152.77**	**140.92**	**151.25**	**152.36**	**127.01**	**142.08**	**1807.41**

		November	December	January	February	March	April	May	June	July	August	September	October	
	Well Name	**2016**	**2016**	**2017**	**2017**	**2017**	**2017**	**2017**	**2017**	**2017**	**2017**	**2017**	**2017**	**Annual (ML)**
2017	Kenmore #1	4.50	4.65	4.70	4.30	2.11	0.00	1.46	0.00	0.00	0.00	0.00	0.00	**21.71**
	Kenmore #2	0.09	0.91	5.03	4.60	2.57	2.49	2.56	2.37	2.55	2.59	2.50	2.57	**30.83**
	Kenmore #3	2.50	2.58	2.49	2.28	1.12	0.00	0.77	0.00	0.00	0.00	0.00	0.00	**11.74**
	Kenmore #8	9.31	19.33	19.54	17.94	19.74	19.20	19.68	18.24	19.62	19.91	19.26	19.80	**221.56**
	Kenmore #9	3.50	3.59	3.57	3.26	3.61	3.48	3.57	3.42	3.27	1.46	0.00	0.00	**32.74**
	Kenmore #10	14.44	14.97	14.73	13.09	14.71	14.24	14.56	14.09	14.16	14.58	12.50	11.64	**167.71**
	Kenmore #11	7.33	3.49	0.00	0.00	3.03	0.00	2.32	0.00	0.00	0.00	0.00	0.00	**16.16**
	Kenmore #13	1.61	1.67	1.68	1.54	1.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**7.53**
	Kenmore #15	5.47	5.80	5.90	5.32	5.93	5.75	5.95	5.74	5.92	5.96	5.66	5.92	**69.32**
	Kenmore #16	0.41	0.44	0.44	0.40	0.45	0.43	0.45	0.43	0.45	0.45	0.43	0.45	**5.22**
	Kenmore #17	0.00	0.00	0.00	0.00	0.00	0.00	0.32	1.38	1.43	1.43	1.02	1.42	**7.01**
	Kenmore #18	1.42	1.47	1.48	1.36	0.67	0.00	0.46	0.81	1.48	1.50	1.46	1.50	**13.61**
	Kenmore #20	11.80	11.98	8.38	8.27	10.19	11.12	11.95	11.69	11.11	12.20	6.04	9.79	**124.54**
	Kenmore #22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.79	**1.79**
	Kenmore #24	0.00	0.00	0.00	0.27	0.39	0.44	0.46	0.43	0.46	0.46	0.42	0.46	**3.79**
	Kenmore #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	**0.00**
	Kenmore #27	16.29	17.00	16.61	14.76	16.58	16.06	16.41	15.89	15.97	16.44	14.09	13.11	**189.22**
	Kenmore #28	0.00	0.19	0.19	0.18	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	**2.09**
	Kenmore #30	22.20	22.53	15.76	15.56	19.17	20.92	22.48	21.99	20.90	22.94	11.36	18.51	**234.32**
	Kenmore #31	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.29**
	Kenmore #32	0.00	0.00	0.00	0.01	0.01	0.03	0.09	0.08	0.08	0.05	0.04	0.04	**0.42**
	Kenmore #33	1.02	1.06	1.07	0.98	1.08	0.96	0.98	0.91	0.98	0.99	0.96	0.98	**11.96**
	Kenmore #34	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.04	0.04	0.04	0.04	0.04	**0.25**
	Kenmore #35	0.77	0.80	0.80	0.73	0.80	0.78	0.80	0.78	0.80	0.80	0.78	0.80	**9.45**
	Kenmore #37	4.39	4.54	4.58	4.19	2.06	0.00	1.42	0.00	0.00	0.00	0.00	0.00	**21.18**
	Kenmore #39	23.98	24.72	24.96	22.85	25.14	23.40	23.99	22.23	23.92	24.26	23.48	24.13	**287.06**
	Kenmore #41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24	0.33	**0.57**
	Bodalla #5	3.97	4.11	4.21	4.30	4.76	4.61	4.76	4.61	4.76	4.76	4.61	4.76	**54.22**
	Bodalla #6	2.30	2.38	2.38	2.15	2.38	2.30	2.38	2.30	2.38	2.38	2.30	2.38	**27.97**
	Bodalla #9	3.50	3.59	3.57	3.26	3.61	3.48	3.57	3.42	3.27	3.53	3.50	3.61	**41.91**
	Bodalla #10	0.00	0.25	0.00	0.23	0.28	0.25	0.26	0.24	0.25	0.50	0.49	0.50	**3.26**
	Bodalla #13	0.00	0.00	2.69	2.47	2.81	2.71	2.83	2.61	2.67	2.79	2.70	2.74	**27.02**
	Bodalla #14	3.18	3.27	3.25	2.96	3.28	3.17	3.24	3.11	2.97	3.21	3.18	3.16	**37.97**
	Bodalla #15	2.51	2.58	2.56	2.33	2.59	2.50	2.56	2.45	2.35	2.53	2.51	2.50	**29.96**
	Bodalla #16	0.01	0.14	0.29	0.25	0.27	0.11	0.22	0.21	0.22	0.22	0.17	0.19	**2.32**
	Bodalla #17	9.54	9.83	9.82	9.24	10.89	10.54	10.89	10.54	10.89	10.89	10.54	10.89	**124.53**
	Bodalla #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	**0.00**
	Bodalla #19	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.03	**0.05**
	Bodalla #20	0.08	0.10	0.11	0.07	0.08	0.07	0.00	0.05	0.03	0.11	0.07	0.08	**0.87**
	Bodalla #21	0.06	0.22	0.27	0.24	0.30	0.26	0.31	0.29	0.32	0.33	0.32	0.33	**3.25**
	Bodalla #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	**0.00**
	Bargie 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Blackstump 01	0.00	0.00	0.00	0.00	0.13	1.37	1.51	2.53	3.57	3.57	3.46	3.33	**19.47**
	Blackstump 04	0.00	0.00	0.00	0.00	0.00	0.62	0.67	0.62	0.67	0.56	0.45	0.66	**4.25**
	Marcoola 01	0.02	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.02	0.02	0.01	0.01	**0.19**
	Coolum 01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.00	**0.06**
	Glenvale 01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.07	**0.28**
	Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total	**156.26**	**168.23**	**161.14**	**149.42**	**162.03**	**151.55**	**164.16**	**153.77**	**157.75**	**161.74**	**134.83**	**148.75**	**1869.63**

2018

	November	December	January	February	March	April	May	June	July	August	September	October	
Well Name	**2017**	**2017**	**2018**	**2018**	**2018**	**2018**	**2018**	**2018**	**2018**	**2018**	**2018**	**2018**	**Annual (ML)**
Kenmore #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	**0.00**
Kenmore #2	2.44	2.58	2.48	2.34	2.55	2.43	2.57	2.50	2.49	2.34	1.68	2.30	**28.70**
Kenmore #3	0.00	0.00	0.00	0.00	0.00	0.57	0.00	0.00	0.00	0.00	0.00	0.00	**0.57**
Kenmore #8	18.81	19.82	19.10	17.97	19.64	7.83	9.81	9.55	9.50	8.93	6.41	8.79	**156.17**
Kenmore #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	**0.00**
Kenmore #10	14.14	14.48	5.92	4.00	4.31	4.24	3.37	4.27	4.44	4.36	4.31	4.34	**72.18**
Kenmore #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	**0.00**
Kenmore #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	**0.00**
Kenmore #15	5.21	0.00	5.89	5.36	5.94	5.77	5.65	5.55	5.92	5.87	5.77	5.91	**62.84**
Kenmore #16	0.39	0.44	0.44	0.40	0.45	0.43	0.43	0.42	0.45	0.44	0.43	0.44	**5.17**
Kenmore #17	1.38	1.43	1.43	1.29	1.43	1.38	2.83	2.74	2.83	2.83	2.74	2.79	**25.11**
Kenmore #18	1.42	1.50	1.44	1.36	1.48	0.90	0.00	0.00	0.00	0.00	0.00	0.00	**8.11**
Kenmore #20	4.23	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.23**
Kenmore #22	4.80	3.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**7.98**
Kenmore #24	0.45	0.46	0.35	0.30	0.31	0.30	0.34	0.32	0.33	0.34	0.33	0.33	**4.16**
Kenmore #26	0.00	0.00	0.00	0.00	0.87	0.32	0.00	0.00	0.00	0.00	0.00	0.00	**1.18**
Kenmore #27	15.94	16.32	9.43	7.52	8.11	7.98	6.34	8.03	8.36	8.20	8.10	8.17	**112.50**
Kenmore #28	0.18	0.19	0.18	0.17	10.48	6.13	11.12	11.14	11.51	11.26	11.20	11.43	**85.00**
Kenmore #30	21.82	22.94	21.85	20.05	16.98	9.92	18.02	18.04	18.64	18.25	18.15	18.51	**223.17**
Kenmore #31	0.02	0.02	0.02	0.02	0.02	0.02	0.00	0.00	0.00	0.00	0.00	0.00	**0.14**
Kenmore #32	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.04	0.03	0.04	0.04	**0.46**
Kenmore #33	0.94	0.99	0.57	0.08	2.57	2.63	2.72	2.57	2.72	2.72	2.63	2.69	**23.83**
Kenmore #34	0.04	0.03	0.00	0.00	0.03	0.07	0.09	0.08	0.09	0.09	0.08	0.09	**0.68**
Kenmore #35	0.78	0.80	0.80	0.73	0.34	0.07	0.00	0.00	0.00	0.00	0.00	0.00	**3.52**
Kenmore #37	0.00	0.00	1.79	4.20	4.59	4.38	4.62	4.50	4.47	4.16	3.02	4.14	**39.86**
Kenmore #39	22.93	24.17	23.28	21.90	6.08	16.13	24.78	24.12	23.99	22.28	16.18	22.20	**248.04**
Kenmore #41	0.32	0.33	0.33	0.30	0.33	0.32	0.33	0.32	0.33	0.33	0.30	0.33	**3.86**
Bodalla #5	4.61	4.87	4.86	4.41	4.88	4.72	4.88	4.64	4.88	4.88	4.72	4.88	**57.24**
Bodalla #6	2.30	2.38	2.37	2.15	2.38	2.30	2.38	2.26	2.38	2.38	2.30	2.38	**27.92**
Bodalla #9	3.10	1.11	2.21	3.26	3.59	3.45	4.02	3.69	4.03	4.06	3.91	3.98	**40.41**
Bodalla #10	0.50	0.51	0.52	0.47	0.50	0.48	0.50	0.48	0.46	0.49	0.50	0.51	**5.93**
Bodalla #13	2.58	2.56	2.71	2.43	2.71	2.60	2.66	2.55	2.50	2.72	2.63	2.59	**31.22**
Bodalla #14	2.92	2.99	3.03	2.76	3.04	3.40	4.65	3.70	11.55	11.63	11.20	10.85	**71.74**
Bodalla #15	2.27	2.43	0.87	0.00	0.00	0.32	0.69	2.26	2.47	2.49	2.39	2.41	**18.62**
Bodalla #16	0.20	0.20	0.23	0.23	0.24	0.23	0.23	0.20	0.21	0.21	0.21	0.21	**2.60**
Bodalla #17	10.37	5.31	0.94	0.48	0.53	0.44	0.36	0.33	0.36	0.36	0.35	0.35	**20.19**
Bodalla #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	**0.00**
Bodalla #19	0.03	0.03	0.03	0.02	0.00	0.00	0.00	0.01	0.02	0.00	0.00	0.00	**0.14**
Bodalla #20	0.09	0.08	0.07	0.05	0.07	0.07	0.09	0.08	0.09	0.09	0.09	0.09	**0.96**
Bodalla #21	0.31	0.32	0.25	0.74	0.92	1.01	1.15	0.94	1.11	1.18	1.14	1.12	**10.19**
Bodalla #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	**0.00**
Bargie 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Blackstump 01	3.10	3.35	3.35	2.78	3.24	3.24	3.29	2.83	3.35	3.23	0.75	3.35	**35.85**
Blackstump 04	0.61	0.67	0.37	0.34	0.37	0.36	0.36	0.31	0.33	0.36	0.36	0.37	**4.82**
Marcoola 01	0.01	0.08	0.08	0.07	0.07	0.09	0.15	0.18	0.16	0.16	0.16	0.12	**1.34**
Coolum 01	0.03	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.29**
Glenvale 01	0.08	0.08	0.08	0.06	0.08	0.08	0.08	0.08	0.08	0.08	0.08	0.08	**0.96**
Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Total	**149.38**	**136.71**	**117.34**	**108.31**	**109.21**	**94.68**	**118.58**	**118.77**	**130.11**	**126.78**	**112.18**	**125.83**	**1447.88**

		November	December	January	February	March	April	May	June	July	August	September	October	
	Well Name	**2018**	**2018**	**2019**	**2019**	**2019**	**2019**	**2019**	**2019**	**2019**	**2019**	**2019**	**2019**	**Annual (ML)**
2019	Kenmore #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	**0.00**
	Kenmore #2	2.44	4.62	5.11	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**12.55**
	Kenmore #3	0.00	0.00	0.00	2.99	2.64	2.62	2.67	2.59	2.56	2.69	4.35	0.00	**23.11**
	Kenmore #8	9.32	20.06	19.56	18.27	19.32	19.08	19.41	18.88	9.11	9.56	8.23	4.55	**175.36**
	Kenmore #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	**0.00**
	Kenmore #10	4.24	32.05	33.02	28.18	6.38	6.33	6.39	6.34	11.55	10.92	6.36	6.28	**158.03**
	Kenmore #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	**0.00**
	Kenmore #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	**0.00**
	Kenmore #15	5.73	6.71	6.67	6.05	5.87	5.99	6.04	6.01	6.13	6.07	6.01	5.94	**73.21**
	Kenmore #16	0.43	0.45	0.45	0.40	0.44	0.45	0.46	0.45	0.46	0.46	0.45	0.45	**5.35**
	Kenmore #17	2.74	2.82	2.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**8.31**
	Kenmore #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	**0.00**
	Kenmore #20	0.00	0.00	12.45	0.41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**12.86**
	Kenmore #22	0.00	0.00	0.00	0.00	0.04	0.84	0.56	0.00	0.00	0.00	0.00	0.00	**1.44**
	Kenmore #24	0.33	0.34	0.34	0.29	0.34	0.30	0.26	0.26	0.25	0.26	0.26	0.27	**3.48**
	Kenmore #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	**0.00**
	Kenmore #27	7.97	7.94	8.18	6.98	8.09	8.02	8.11	8.03	7.80	7.52	8.00	7.90	**94.54**
	Kenmore #28	11.14	23.33	21.77	12.18	17.51	16.60	17.67	17.01	16.83	17.29	16.36	16.37	**204.07**
	Kenmore #30	18.04	35.31	31.40	16.67	15.45	14.64	15.59	15.01	14.85	15.26	14.43	14.44	**221.10**
	Kenmore #31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Kenmore #32	0.04	0.06	0.05	0.06	0.05	0.05	0.04	0.04	0.04	0.04	0.06	0.06	**0.58**
	Kenmore #33	2.63	2.72	2.72	2.45	1.44	1.40	1.44	1.40	1.41	1.44	1.37	0.08	**20.50**
	Kenmore #34	0.08	0.09	0.09	0.08	0.16	0.16	0.16	0.15	0.16	0.16	0.16	0.16	**1.61**
	Kenmore #35	0.00	0.00	0.00	0.00	0.16	0.40	0.25	0.04	0.16	0.02	0.15	0.09	**1.28**
	Kenmore #37	4.51	7.96	8.00	7.24	7.53	7.74	7.87	7.66	7.57	7.94	4.54	2.88	**81.45**
	Kenmore #39	24.17	34.68	34.92	31.59	34.57	34.15	34.73	33.79	33.41	35.06	33.17	34.74	**398.97**
	Kenmore #41	0.32	0.33	0.32	0.28	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**1.34**
	Bodalla #5	4.72	4.88	4.88	4.39	4.88	4.72	4.88	4.72	4.88	4.88	4.72	4.88	**57.44**
	Bodalla #6	2.30	1.57	1.57	1.42	1.57	1.52	1.57	1.52	1.57	1.57	1.52	1.57	**19.30**
	Bodalla #9	3.74	9.28	9.08	5.45	3.04	0.00	0.00	6.03	9.12	8.99	8.74	9.10	**72.58**
	Bodalla #10	0.49	0.52	0.51	0.47	0.52	0.51	0.54	0.51	0.54	0.52	0.53	0.58	**6.23**
	Bodalla #13	2.55	2.71	2.67	2.50	2.79	2.69	2.68	2.58	2.69	2.68	2.66	2.86	**32.06**
	Bodalla #14	10.70	8.46	8.27	7.50	8.29	8.15	8.35	7.96	8.31	5.11	4.97	5.17	**91.22**
	Bodalla #15	2.29	2.49	2.43	2.05	2.44	2.40	2.45	0.99	0.00	0.00	0.00	0.00	**17.53**
	Bodalla #16	0.21	0.21	0.21	0.19	0.21	0.20	0.19	0.19	0.20	0.20	0.20	0.22	**2.43**
	Bodalla #17	0.34	3.81	3.73	3.38	3.74	3.68	0.36	0.34	0.36	0.35	0.34	0.36	**20.79**
	Bodalla #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	**0.00**
	Bodalla #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	**0.00**
	Bodalla #20	0.09	0.09	0.09	0.08	0.09	0.11	0.14	0.14	0.14	0.17	0.13	0.13	**1.38**
	Bodalla #21	1.14	1.27	1.48	1.41	1.53	2.43	2.50	1.94	2.39	2.75	0.73	2.71	**22.28**
	Bodalla #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	**0.00**
	Bargie 01	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	**0.06**
	Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Blackstump 01	3.24	3.39	0.00	0.00	3.39	3.28	2.74	2.86	3.39	0.93	3.23	4.65	**31.10**
	Blackstump 04	0.36	0.37	0.35	0.34	0.37	0.36	0.37	0.34	0.36	0.37	0.33	0.37	**4.30**
	Marcoola 01	0.11	0.14	0.14	0.13	0.14	0.11	0.12	0.13	0.14	0.13	0.13	0.14	**1.57**
	Coolum 01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.03	0.00	0.00	0.00	**0.22**
	Glenvale 01	0.08	0.03	0.08	0.08	0.08	0.08	0.08	0.10	0.10	0.00	0.00	0.00	**0.70**
	Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total	**126.49**	**218.70**	**223.34**	**163.89**	**153.21**	**149.05**	**148.64**	**148.06**	**146.49**	**143.38**	**132.13**	**126.98**	**1880.37**

2020

Well Name	November 2019	December 2019	January 2020	February 2020	March 2020	April 2020	May 2020	June 2020	July 2020	August 2020	September 2020	October 2020	Annual (ML)
Kenmore #1	0.15	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.20**
Kenmore #2	0.00	0.00	0.00	0.00	4.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**4.67**
Kenmore #3	4.18	4.27	4.65	4.38	0.00	4.48	4.64	3.63	4.16	4.62	4.53	4.62	**48.17**
Kenmore #8	7.70	7.88	8.58	8.07	8.61	8.26	8.56	6.69	7.66	8.51	8.35	8.52	**97.39**
Kenmore #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	**0.00**
Kenmore #10	6.19	6.50	6.08	6.08	6.47	6.37	6.62	6.21	5.81	6.62	6.36	6.56	**75.86**
Kenmore #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	**0.00**
Kenmore #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	**0.00**
Kenmore #15	5.97	6.23	6.01	5.81	6.23	6.01	6.22	5.98	6.02	6.17	6.04	0.00	**66.69**
Kenmore #16	0.45	0.47	0.45	0.44	0.47	0.45	0.47	0.45	0.45	0.46	0.45	0.46	**5.48**
Kenmore #17	0.00	0.00	0.00	0.00	0.00	1.76	2.37	2.29	2.37	0.85	0.00	0.83	**10.46**
Kenmore #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	**0.00**
Kenmore #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	**0.00**
Kenmore #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	**0.00**
Kenmore #24	0.26	0.27	0.26	0.25	0.27	0.25	0.26	0.26	0.26	0.27	0.19	0.09	**2.88**
Kenmore #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	**0.00**
Kenmore #27	7.79	8.18	7.65	7.65	8.14	8.01	8.33	7.79	7.29	9.71	12.51	12.90	**105.96**
Kenmore #28	15.80	17.22	16.41	15.27	17.53	9.92	2.31	16.02	17.09	17.55	16.96	17.59	**179.66**
Kenmore #30	13.94	15.20	14.48	13.47	15.46	8.75	2.04	14.15	15.09	15.50	14.98	15.54	**158.61**
Kenmore #31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Kenmore #32	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	**0.75**
Kenmore #33	0.97	1.45	2.47	2.32	2.42	2.31	2.42	2.34	2.42	2.42	2.34	2.38	**26.26**
Kenmore #34	0.16	0.16	0.16	0.15	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.15	**1.90**
Kenmore #35	0.16	0.01	0.05	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.24**
Kenmore #37	2.64	2.70	2.95	2.77	2.96	2.84	2.94	2.30	2.63	2.92	2.87	2.93	**33.44**
Kenmore #39	31.85	32.59	35.49	33.41	35.61	34.20	35.42	27.69	31.70	25.10	9.33	13.96	**346.36**
Kenmore #41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Bodalla #5	4.72	4.88	4.87	4.57	4.87	4.72	4.86	4.72	4.88	4.88	4.72	4.88	**57.58**
Bodalla #6	1.51	1.56	1.55	1.46	1.55	1.51	1.55	1.51	1.56	1.56	1.51	1.56	**18.36**
Bodalla #9	8.79	8.51	8.95	8.19	8.69	8.39	9.18	8.77	8.21	9.13	8.93	9.27	**105.01**
Bodalla #10	0.56	0.59	0.59	0.21	0.28	0.57	0.58	0.56	0.58	0.61	0.58	0.59	**6.31**
Bodalla #13	2.65	2.87	2.87	2.69	2.88	2.78	2.87	2.78	2.88	2.88	2.79	2.64	**33.56**
Bodalla #14	5.00	4.84	5.09	4.65	4.94	4.56	5.22	4.98	0.19	0.00	6.79	12.40	**58.65**
Bodalla #15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.15	2.44	1.82	1.23	**6.65**
Bodalla #16	0.21	0.13	0.16	0.21	0.22	0.21	0.18	0.17	0.18	0.18	0.18	0.17	**2.19**
Bodalla #17	0.35	0.33	0.35	0.32	0.34	0.33	0.36	0.35	0.19	0.00	0.16	0.42	**3.51**
Bodalla #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	**0.00**
Bodalla #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	**0.00**
Bodalla #20	0.13	0.13	0.06	0.00	0.09	0.13	0.13	0.13	0.13	0.13	0.13	0.10	**1.29**
Bodalla #21	2.71	3.07	3.10	2.85	3.11	2.82	2.68	2.58	2.69	2.67	2.15	2.21	**32.63**
Bodalla #22	0.00	0.00	0.00	0.00	0.00	0.47	0.45	2.06	1.00	0.99	0.00	0.89	**5.85**
Bargie 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.03**
Blackstump 01	4.72	4.40	2.28	0.00	0.00	0.00	2.17	4.55	3.50	3.00	3.39	0.08	**28.10**
Blackstump 04	0.36	0.35	0.38	0.35	0.00	0.00	0.15	0.06	0.09	0.00	0.00	0.00	**1.75**
Marcoola 01	0.13	0.14	0.14	0.11	0.13	0.06	0.14	0.13	0.14	0.14	0.13	0.13	**1.55**
Coolum 01	0.00	0.00	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.22**
Glenvale 01	0.00	0.00	0.08	0.06	0.08	0.08	0.08	0.08	0.07	0.08	0.08	0.08	**0.76**
Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
Total	**130.09**	**135.02**	**136.26**	**125.85**	**136.25**	**120.49**	**113.45**	**129.48**	**130.65**	**129.64**	**118.50**	**123.28**	**1528.96**

	Well Name	November 2020	December 2020	January 2021	February 2021	March 2021	April 2021	May 2021	June 2021	July 2021	August 2021	September 2021	October 2021	Annual (ML)
	Kenmore #1	0.01	0.01	0.01	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01	**0.15**
	Kenmore #2	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.02	2.66	2.84	2.92	**10.46**
	Kenmore #3	4.25	4.58	4.60	4.09	4.64	4.47	4.63	4.48	4.59	4.54	4.41	4.63	**53.91**
	Kenmore #8	7.84	8.44	8.48	7.54	8.56	8.25	8.53	8.26	8.46	8.37	8.13	8.53	**99.37**
	Kenmore #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	**0.00**
	Kenmore #10	5.92	6.26	6.62	5.86	6.61	6.35	6.44	6.06	6.48	6.45	6.08	6.56	**75.69**
	Kenmore #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	**0.00**
	Kenmore #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	**0.00**
	Kenmore #15	5.92	6.20	6.23	5.56	6.08	5.99	6.18	5.87	6.22	6.13	6.16	6.33	**72.85**
	Kenmore #16	0.45	0.47	0.47	0.42	0.46	0.45	0.47	0.44	0.22	0.36	0.45	0.46	**5.11**
	Kenmore #17	2.28	2.37	2.28	2.12	1.99	2.20	2.36	2.27	1.98	0.00	0.00	0.15	**20.00**
	Kenmore #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	**0.00**
	Kenmore #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	**0.00**
	Kenmore #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	**0.00**
	Kenmore #24	0.45	0.53	0.55	0.49	0.54	0.53	0.53	0.33	0.34	0.34	0.33	0.34	**5.31**
	Kenmore #26	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.20	0.17	0.16	0.17	**0.89**
	Kenmore #27	11.66	12.32	13.02	11.67	13.01	12.49	12.68	11.92	12.75	12.70	11.96	12.90	**149.08**
	Kenmore #28	15.89	17.62	17.69	14.30	17.46	16.28	17.62	15.70	17.58	17.47	17.12	17.48	**202.22**
	Kenmore #30	14.04	15.57	15.63	12.63	15.42	14.38	15.57	13.87	15.52	15.44	15.12	15.44	**178.62**
	Kenmore #31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
2021	Kenmore #32	0.06	0.06	0.06	0.04	0.03	0.03	0.08	0.07	0.08	0.08	0.08	0.08	**0.76**
	Kenmore #33	2.19	2.42	2.42	2.17	2.14	2.07	2.12	2.05	2.12	2.12	2.05	2.12	**26.00**
	Kenmore #34	0.15	0.15	0.16	0.14	0.16	0.16	0.16	0.15	0.16	0.16	0.16	0.16	**1.87**
	Kenmore #35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.02**
	Kenmore #37	2.69	2.90	2.91	2.59	2.94	2.83	2.93	2.84	2.90	2.87	2.79	2.93	**34.12**
	Kenmore #39	24.03	25.88	26.00	23.12	26.25	25.29	26.15	25.34	25.17	25.67	24.94	26.15	**303.98**
	Kenmore #41	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bodalla #5	4.66	4.81	4.85	2.52	4.03	4.70	4.86	4.72	4.88	4.87	4.72	4.88	**54.50**
	Bodalla #6	1.49	1.53	1.55	1.41	1.56	1.50	1.55	1.51	1.56	1.55	1.50	1.56	**18.25**
	Bodalla #9	8.53	8.47	8.20	7.83	7.25	8.79	8.99	8.55	8.74	8.85	8.70	8.92	**101.81**
	Bodalla #10	0.59	0.61	0.61	0.57	0.61	0.61	0.62	0.61	0.62	0.62	0.54	0.64	**7.25**
	Bodalla #13	2.52	2.54	2.60	2.67	2.95	2.74	2.93	0.28	2.94	2.95	2.84	2.95	**30.90**
	Bodalla #14	11.41	11.55	10.97	10.48	11.76	11.89	12.03	11.44	11.69	11.84	11.64	11.93	**138.63**
	Bodalla #15	1.13	1.12	1.05	0.65	0.97	1.18	0.33	0.21	0.00	0.00	0.00	0.00	**6.65**
	Bodalla #16	0.16	0.15	0.15	0.14	0.19	0.18	0.19	0.18	0.19	0.19	0.17	0.13	**2.01**
	Bodalla #17	0.39	0.39	0.35	0.35	0.39	0.41	0.19	0.07	0.00	0.00	0.00	0.00	**2.54**
	Bodalla #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	**0.00**
	Bodalla #19	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.01	0.01	0.01	0.01	0.01	**0.07**
	Bodalla #20	0.09	0.10	0.09	0.09	0.10	0.09	0.10	0.09	0.10	0.09	0.09	0.09	**1.11**
	Bodalla #21	1.92	2.15	2.11	1.60	1.64	1.65	1.75	1.32	1.22	1.26	1.20	1.24	**19.05**
	Bodalla #22	0.00	0.00	0.00	0.30	0.86	0.90	0.97	0.91	0.96	0.96	0.93	0.96	**7.75**
	Bargie 01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Bargie 05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.01**
	Blackstump 01	3.04	3.52	3.52	3.18	3.52	3.41	3.52	3.41	3.47	3.50	3.38	3.42	**40.88**
	Blackstump 04	0.00	0.00	0.00	0.00	0.20	0.48	0.58	0.44	0.63	0.66	0.57	0.64	**4.20**
	Marcoola 01	0.13	0.12	0.14	0.13	0.13	0.13	0.14	0.13	0.14	0.13	0.13	0.14	**1.60**
	Coolum 01	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	0.02	**0.26**
	Glenvale 01	0.08	0.08	0.07	0.07	0.08	0.07	0.08	0.08	0.08	0.07	0.08	0.08	**0.91**
	Byrock 02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**
	Total	**133.98**	**142.94**	**143.41**	**124.73**	**142.56**	**140.54**	**145.31**	**133.86**	**144.04**	**143.11**	**139.32**	**144.97**	**1678.79**