Moolarben Coal Operations UG4 LW401, LW402, LW403 – End of Panel Report

1.0 INTRODUCTION

The Moolarben Coal Complex is an open cut and underground coal mining operation located approximately 40 kilometres north of Mudgee in the Western Coalfield of New South Wales (NSW) (**Figure 1**).

Moolarben Coal Operations Pty Ltd (MCO) is the operator of the Moolarben Coal Complex on behalf of the Moolarben Joint Venture (Moolarben Coal Mines Pty Ltd [MCM], Yancoal Moolarben [YM] Pty Ltd and a consortium of Korean power companies). MCO, MCM and YM are wholly owned subsidiaries of Yancoal Australia Limited.

The Moolarben Coal Complex comprises four approved open cut mining areas (OC1 to OC4), three approved underground mining areas (UG1, UG2 and UG4) and other mining related infrastructure (including coal processing and transport facilities) (**Figure 2**). Since the commencement of coal mining operations in 2010, mining activities have occurred within OC1, OC2, OC3, OC4, and UG1 and UG4 (**Figure 2**).

The UG4 Underground Mine (UG4) is a component of the Moolarben Coal Project Stage 1 Approval (05_0117) (**Figure 2**). First workings for UG4 North Mains commenced in October 2020 (**Figure 3**). Secondary extraction in UG4 of the first Longwall LW401 commenced in July 2022.

Mining operations at the Moolarben Coal Complex are currently approved until 31 December 2038 in accordance with Project Approval (05_0117) (Moolarben Coal Project Stage 1) (as modified) and Project Approval (08_0135) (Moolarben Coal Project Stage 2) (as modified), granted under the NSW *Environmental Planning and Assessment Act, 1979* (EP&A Act).

This report has been prepared to satisfy the additional management and monitoring measures committed by MCO in response to the Independent Advisory Panel for Underground Mining (IAPUM).

1.1 Background

MCO undertakes secondary extraction in accordance with the UG4 Longwalls 401 to 408 Extraction Plan (2022) (the UG4 Extraction Plan). The UG4 Extraction Plan and associated sub-plans were prepared with input from experienced and qualified experts to satisfy Condition 77(a), Schedule 3 of PA 05_0117. This end of panel report covers the secondary extraction undertaken in Longwall LW401, LW402, and LW403.

The study area on **Figure 3**, surrounding Longwalls 401-408, shows the surface extent of the 26.5° angle of draw and 20 mm predicted subsidence contour. Longwall extraction occurs from the east to the west. The longwall layout includes approximately 260 m panel widths (void) with 35 m width pillars (solid). The extraction schedule for Longwalls LW401, LW402, and LW403 is provided in **Table 1**.

Table 1 Extraction Schedule

Longwall	Start Date	Completion Date
LW401	July 2022	November 2022
LW402	February 2023	July 2023
LW403	July 2023	December 2023

Figure 1: Regional Location

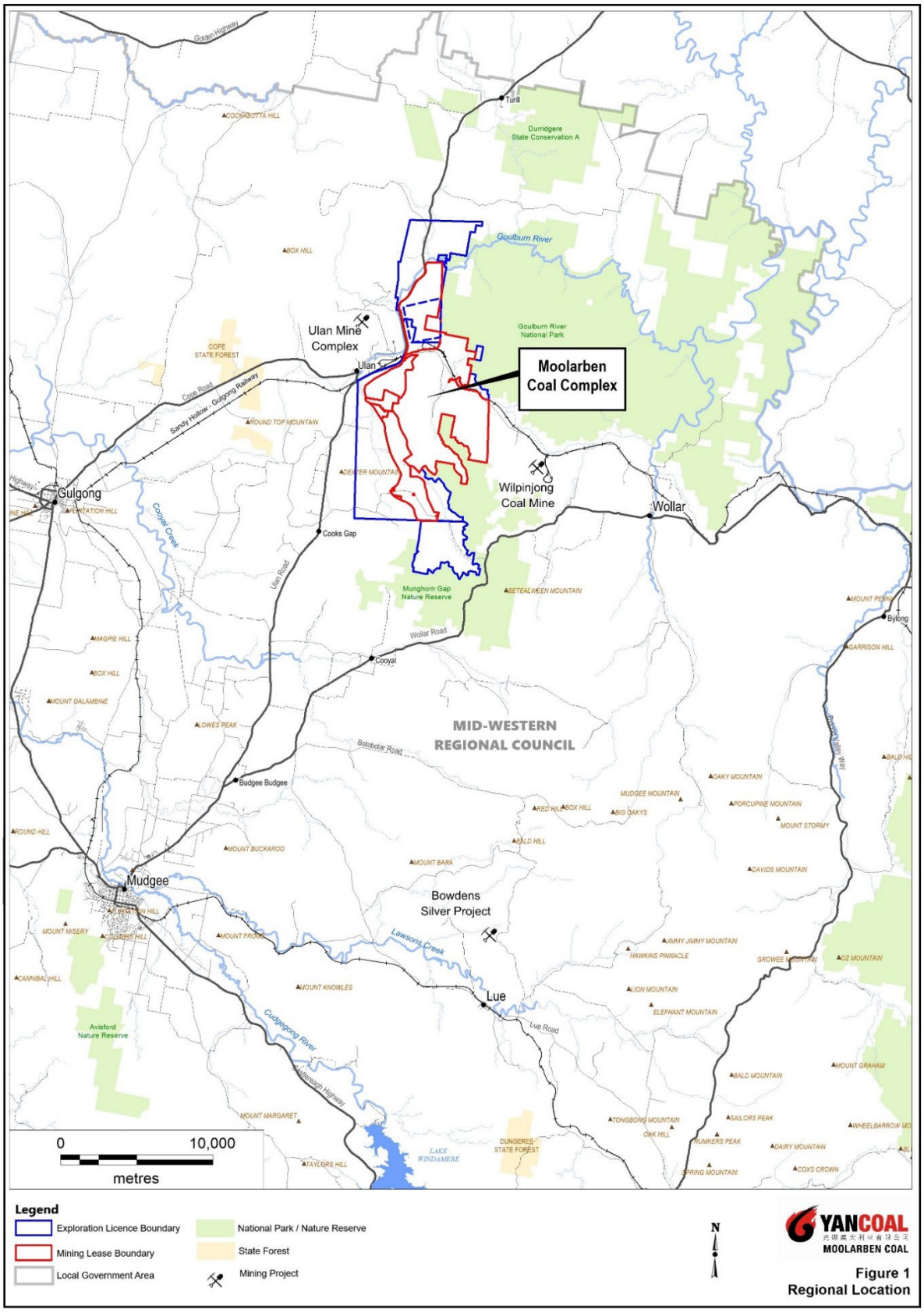


Figure 2: Moolarben Coal Complex Layout

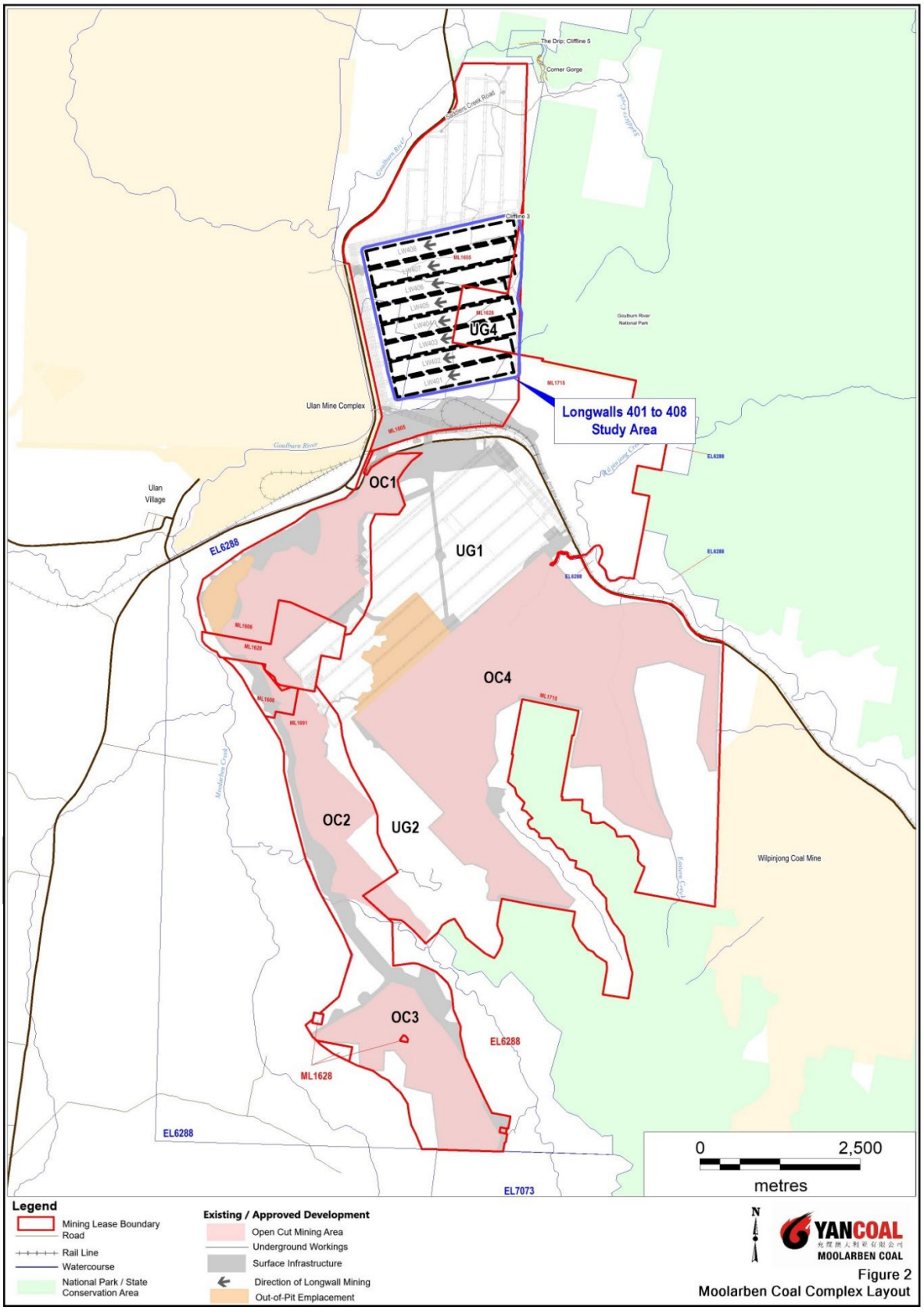
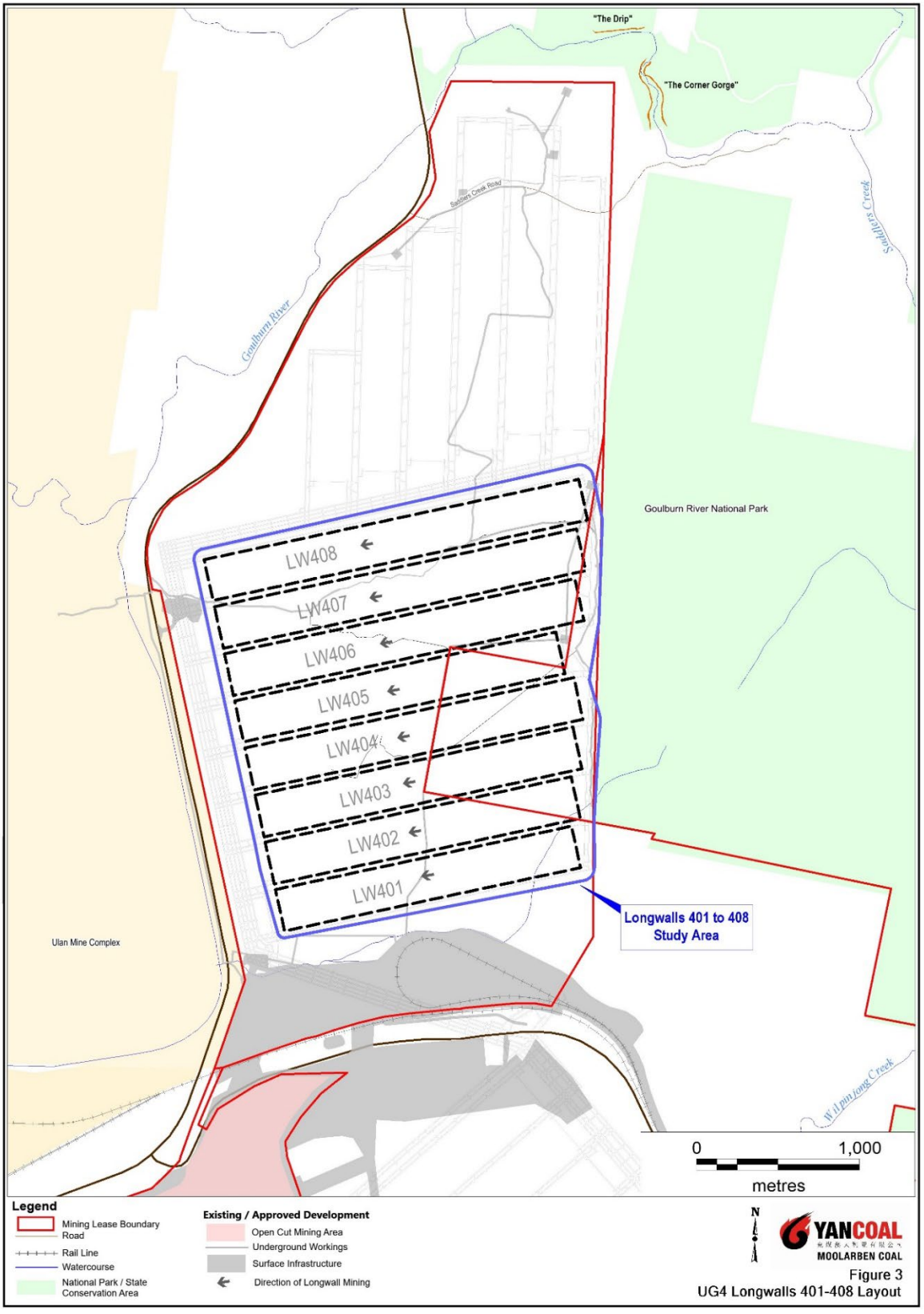


Figure 3: Underground 4 Longwalls 401 to 408 Layout



2.0 GROUNDWATER MONITORING

MCO monitors a network of piezometers in accordance with the UG4 Longwalls 401 to 408 Water Management Plan (LW401-408 WMP). The monitoring program includes monthly monitoring of standing water level in standpipes, and daily pressure readings for vibrating wire piezometers (VWPs) which are downloaded each month. Trigger values have been established that, when exceeded, determine the need for investigation and possible response actions for potential impacts to groundwater levels in the alluvial and Triassic aquifers. Groundwater Investigation Trigger levels will be established for new monitoring bores once 12 months of baseline data is collected. The Permian strata do not include triggers as they are already extensively affected by past mining, are predicted to undergo further impact from ongoing mining, and contain groundwater of generally poor quality.

The Environmental Assessments of the Moolarben Coal Mine predict impacts to groundwater due to MCO's operations. Response triggers for groundwater levels within Quaternary Alluvium and Triassic Sandstone aquifers take account of the minimal impact considerations in the Aquifer Interference Policy (DPI, 2012). Monitoring frequency and response triggers have been implemented to allow for early identification of potential risks associated with private bores being impacted above the Aquifer Interference Policy considerations (i.e. greater than 2 m drawdown).

Groundwater monitoring is undertaken at MCC in accordance with the approved Groundwater Management Plan. Key existing MCC groundwater monitoring sites in the vicinity of UG4 are shown on **Figure 4** and summarised in **Table 2**.

Table 2 UG4 Groundwater Monitoring Network

Piezometer	Type	Lithology Screened	Screened Interval (mbgl)	Ground Elevation (mAHD)
PZ101B*	Standpipe	Permian OB	54 – 60	403.28
PZ101C	Standpipe	Lower Triassic	24 – 30	403.00
PZ102C	Vibrating Wire Piezometer	Triassic	28	380.65
		Permian	64	344.65
PZ103C	Standpipe	Lower Triassic	24 – 30	425.00
PZ103D	Vibrating Wire Piezometer	Permian	31	394.26
		Permian	55	370.26
		Permian	85	340.26
PZ105A	Vibrating Wire Piezometer	Permian OB	28	388.93
		Permian OB	80	
		Ulan Seam	118	
PZ105C	Standpipe	Lower Triassic	20 – 28	389.00
PZ128	Vibrating Wire Piezometer	Triassic	20	409.52
		Permian OB	36	
		Permian OB	55	
PZ129		Triassic	35	417.95

Piezometer	Type	Lithology Screened	Screened Interval (mbgl)	Ground Elevation (mAHD)
	Vibrating Wire Piezometer	Permian OB	53	
		Permian OB	74	
PZ191*	Standpipe	Ulan seam	60 – 72	417.69
PZ192	Vibrating Wire Piezometer	Triassic	68	453.70
		Ulan seam roof	166	
		Ulan seam base	178	
PZ193	Vibrating Wire Piezometer	Permian OB	80	461.40
		Ulan seam roof	162	
		Ulan seam base	184	
PZ194	Vibrating Wire Piezometer	Triassic	78	429.19
		Ulan seam roof	173	
		Ulan seam base	196	
PZ194B	Standpipe	Triassic	82-88	493.00
PZ194C	Standpipe	Permian	97-109	493.00
PZ195	Vibrating Wire Piezometer	Top Permian	72	471.40
		Ulan seam roof	162	
		Ulan seam base	175	
PZ195B	Standpipe	Triassic	61-66	471.43
PZ195C	Standpipe	Permian	79-91	486.7
PZ229	Vibrating Wire Piezometer	Jurassic	84	492.64
		Triassic	140	
		Triassic	198	
		Permian	253	
		Permian	316	
PZ232	Vibrating Wire Piezometer	Triassic	45	484.62
		Triassic	75	
		Permian OB	96	
		Permian OB	132	
PZ235C	Standpipe	Triassic	46-49	434.43
PZ235B	Vibrating Wire Piezometer	Permian OB	68	434.86
		Permian OB	96	
		Ulan seam	147	
PZ236A	Standpipe	Triassic	54-60	436.70
PZ236B	Vibrating Wire Piezometer	Permian OB	85	436.72
		Permian OB	110	
		Ulan seam	157	

mAHD = metres Australian Height Datum, mbgl = metres below ground level.
* To be decommissioned prior to extraction for safety of underground operations or where impacted by subsidence. Will continue to be monitored until decommissioned.
Note: PZ102A and PZ103A have been replaced by Vibrating Wire Piezometers.

2.1.1 LW401 Groundwater Levels

Triassic Sandstone

The Triassic aged sandstones overlay the Permian coal measures. Consistent with modelled groundwater trends, observed groundwater levels remained relatively stable within the Triassic monitoring bores located above LW409-LW414 outside the Study Area. Groundwater levels within the Triassic monitoring bores located above UG4 LW401-LW408 have reduced as a result of mining within the area.

During extraction of LW401 a reduction of 7.7m has been observed within PZ195B which is located approximately 80 m from the starting end of LW402. PZ194 VWP 78m also reduced by 4.2m. Consistent with climatic trends several bores remained generally static, albeit with minor rises of between 0.2 m and 0.5 m recorded at PZ101C, PZ103C and PZ105C (**Figure 5**). No Triassic sandstone groundwater level investigations were triggered during extraction of LW401.

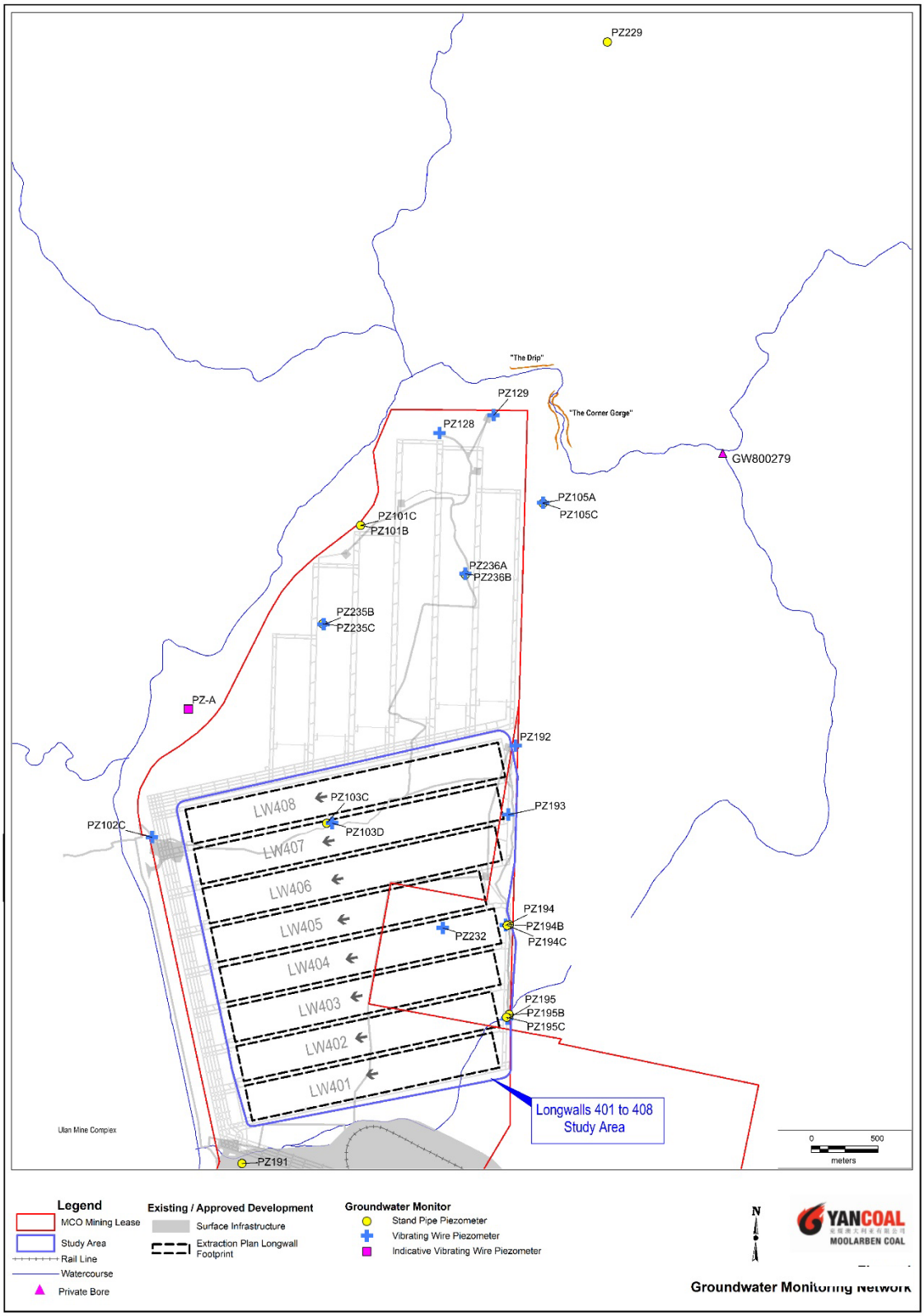
Permian Illawarra Coal Measures

The Permian strata overlying the Ulan Seam comprise interbedded claystones, siltstones, sandstones and coal seams. Groundwater levels in the Permian exhibited a range of responses during the extraction of LW401 and are highly influenced by their proximity to mining, strata interval monitored and general geographic location. Drawdown of the Permian generally continued due to proximal mining operations. This trend is most prominently observed in VWP PZ195 72m and PZ195C due to their location, approximately 80m from the starting end of LW402, with drawdown of 5.1m and 14m observed. A more gradual drawdown of groundwater levels within the Permian monitoring bores is observed as they move further away from LW401 (**Figure 6**).

Ulan Seam

Groundwater levels in the Ulan coal seam are extensively depressurised by past mining and are predicted to be further impacted from mining at Moolarben and neighbouring operations. During the extraction of LW401, the greatest groundwater drawdowns observed were in proximity to the underground, including development of the UG4 mains on the western side of UG4, and backroads on the eastern side. Drawdowns of between 0.1m to 5.5m were observed within the monitoring sites located above UG4 (**Figure 7**). Monitoring sites located further away from LW401 recorded less drawdown. Groundwater drawdown is expected to continue to propagate radially from UG operations within the Ulan seam.

Figure 4 Groundwater Monitoring Locations Relevant to Longwalls 401 to 408



2.1.2 LW402 Groundwater Levels

Triassic Sandstone

During extraction of LW402 drawdown continued to be observed within the Triassic Sandstone aquifer. Consistent with extraction of LW401, observations of drawdown reduced with distance from mining operations. Drawdowns were observed in PZ232 75 m of 3.7m, however PZ232-45m remained relatively stable. PZ194 78m and PZ193 80m observed drawdown of 2.3m and 2.1m. Monitoring sites located further north remained generally consistent with historical monitoring (**Figure 5**). No Triassic sandstone groundwater level investigations were triggered during extraction of LW402.

Permian Illawarra Coal Measures

Groundwater levels in the Permian continued to exhibit a range of responses during the extraction of LW402. Drawdown of the Permian continued due to proximal mining operations. Drawdown ranged from 3.6m to 16.8m, drawdown was most prominently observed in VWP PZ195 72m and PZ195C which are located approximately 80 m from the starting end of Longwall 402. A more gradual drawdown of groundwater levels within the Permian monitoring bores is observed at greater distances from LW402 (**Figure 6**).

Ulan Seam

During the extraction of LW402, the Ulan Seam groundwater levels continued to be influenced by MCO mining operations and neighbouring operations. VWP PZ195 162 m and 175 m located at the commencing end of LW402 reduced by 25.5 m and 10.8 m respectively during the extraction of LW402. Monitoring bores located further away from the LW402 observed reduced groundwater drawdown generally consistent with predictions ranging from 0.1 m to 4.7 m (**Figure 7**). Groundwater drawdown is expected to continue to radially from UG operations within the Ulan seam.

2.1.3 LW403 Groundwater Levels

Triassic Sandstone

During extraction of LW403 drawdown continued to be observed within the Triassic Sandstone aquifer. Consistent with extraction of LW402, observations of drawdown reduced with distance from mining operations. Drawdowns continued to be observed in PZ232 75 m (2.4m), PZ232-45m remained relatively stable. PZ194 78m and PZ193 80m observed drawdown of 5.3m and 3.5m. Monitoring sites located further north remained generally consistent with historical monitoring (**Figure 5**). No Triassic sandstone groundwater level investigations were triggered during extraction of LW403.

Permian Illawarra Coal Measures

Drawdown of the Permian Illawarra Coal Measures continued to be observed proximal mining operations. Drawdown ranged from 0.1m to 7.9m; drawdown was most prominently observed in VWP PZ232 96m and PZ194C, both monitoring bores being in close proximity to LW403. A more gradual drawdown of groundwater levels within the Permian monitoring bores is observed at greater distances from LW403 (**Figure 6**). Observed drawdown in the Permian monitoring bores has generally been consistent with predictions.

Ulan Seam

During the extraction of LW403, the Ulan Seam groundwater levels continued to be influenced by MCO mining operations and neighbouring operations. VWP PZ193 162 m located at the commencing end of LW407 reduced by 12.1 m during the extraction of LW403. Monitoring bores located further away from the LW403 observed reduced groundwater drawdown generally consistent with predictions ranging from 0.9 m to 1.9 m (**Figure 7**.

2.1.4 Groundwater Inflows

Estimating mine inflows onsite is a complex process. Unlike measuring groundwater levels or pressures, measuring groundwater inflows to opencut pits and underground operations is complicated by many factors. Evaporation, rainfall runoff, dewatering for other uses, seepage losses from storages, introduction of other water sources; all of these factors introduce uncertainty into accurately estimating the amount of groundwater inflow to the mining operations (AGE, 2023).

During the Extraction of LW401, LW402, and LW403 the average daily dewatering of underground mining operations (UG1 and UG4 combined) ranged from approximately 120L/s to 310L/s, including water supply, inflows, and recirculation.

Groundwater inflows estimated during extraction of LW401, LW402, and LW403 were generally greater than modelled during the extraction of LW401 and LW402, as a result of above average rainfall observed during 2022 and increased volumes of water stored in open cut voids adjacent to UG mining operations during this time period. Inflows into UG mining operations continued to reduce during 2023 as rainfall eased and open cut voids were dewatered. Observed inflows during extraction of LW403 were only marginally above predictions (AGE, 2023).

2.1.5 Groundwater Quality

Groundwater quality monitoring is undertaken at standpipe piezometers in accordance with the LW401-408 WMP. The monitoring network covers the major hydrogeological units and bores are broadly distributed across the project area. Parameters include physical parameters, major cations and anions, dissolved metals and nutrients. Site specific triggers for acidity (pH) and electrical conductivity (EC) have been developed for alluvial and Triassic aquifers across the Moolarben Coal Complex. No groundwater quality investigations were triggered during extraction of LW401, LW402, and LW403.

Water quality results from relevant piezometers are provided in **Table 3**.

2.1.6 Private Groundwater Users

MCO had negligible impact on private groundwater users during the reporting period. No compensatory water supply was required or supplied during the period.

2.1.7 Potential Impacts to the Drip

The Drip is located over 3.5 km from current MCO mining operations. There is no evidence indicating that The Drip is being impacted by MCC operations. This is evident on **Figure 5** from the stable groundwater levels in the Triassic bores closest to The Drip (PZ128 and PZ129).

Figure 5 UG4 Triassic Sandstone Hydrograph

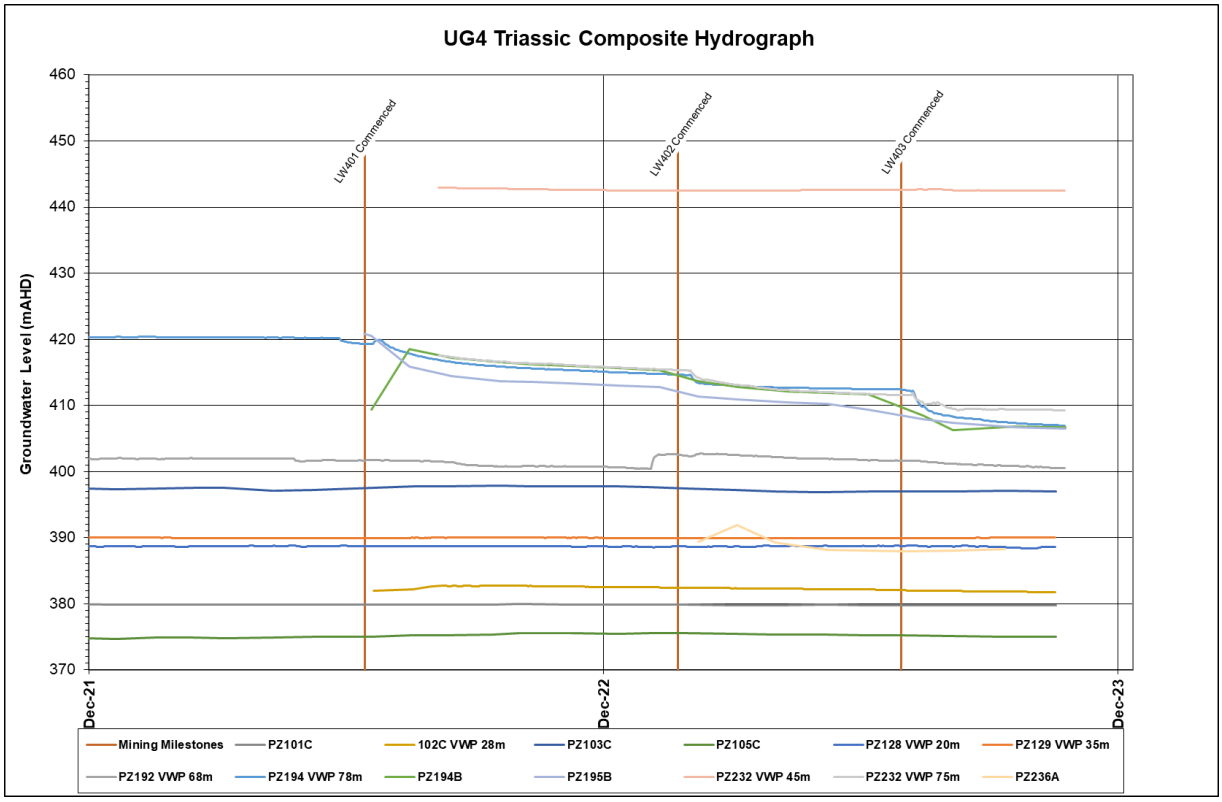


Figure 6 UG4 Permian Overburden Composite Hydrograph

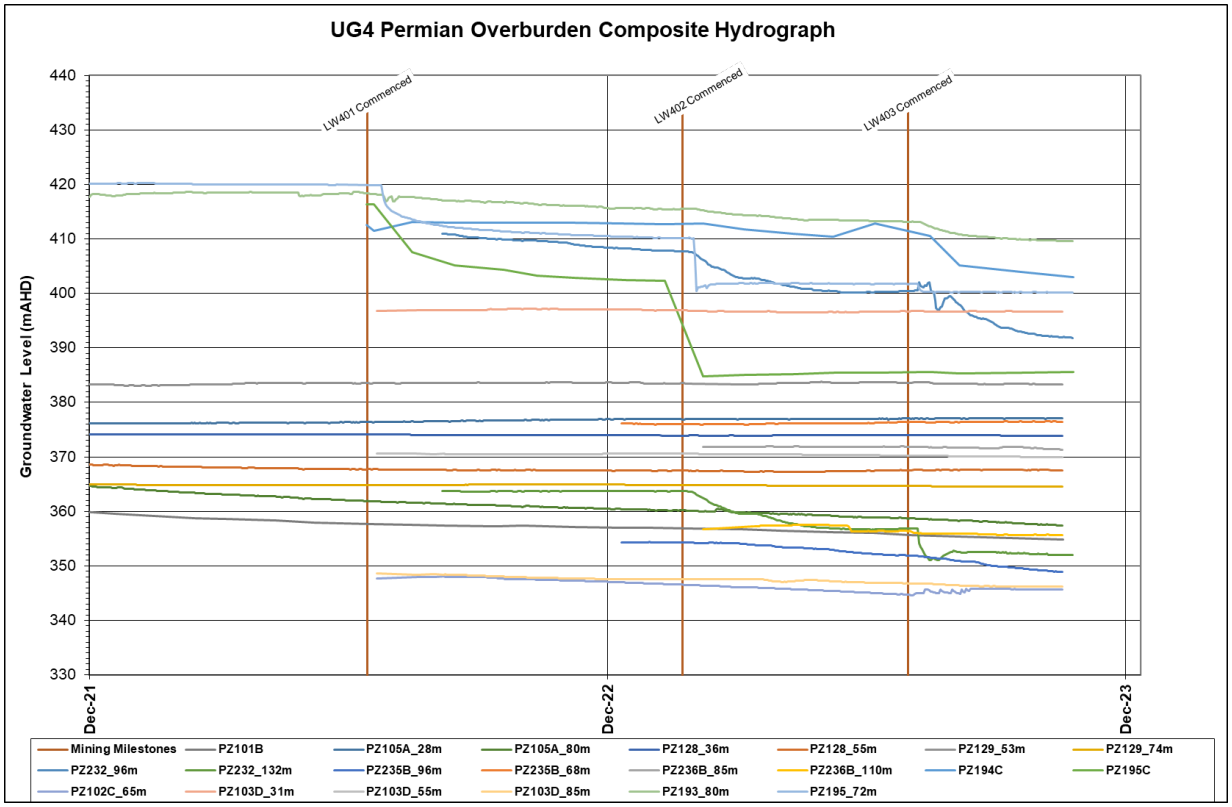


Figure 7 UG4 Ulan Seam Composite Hydrograph

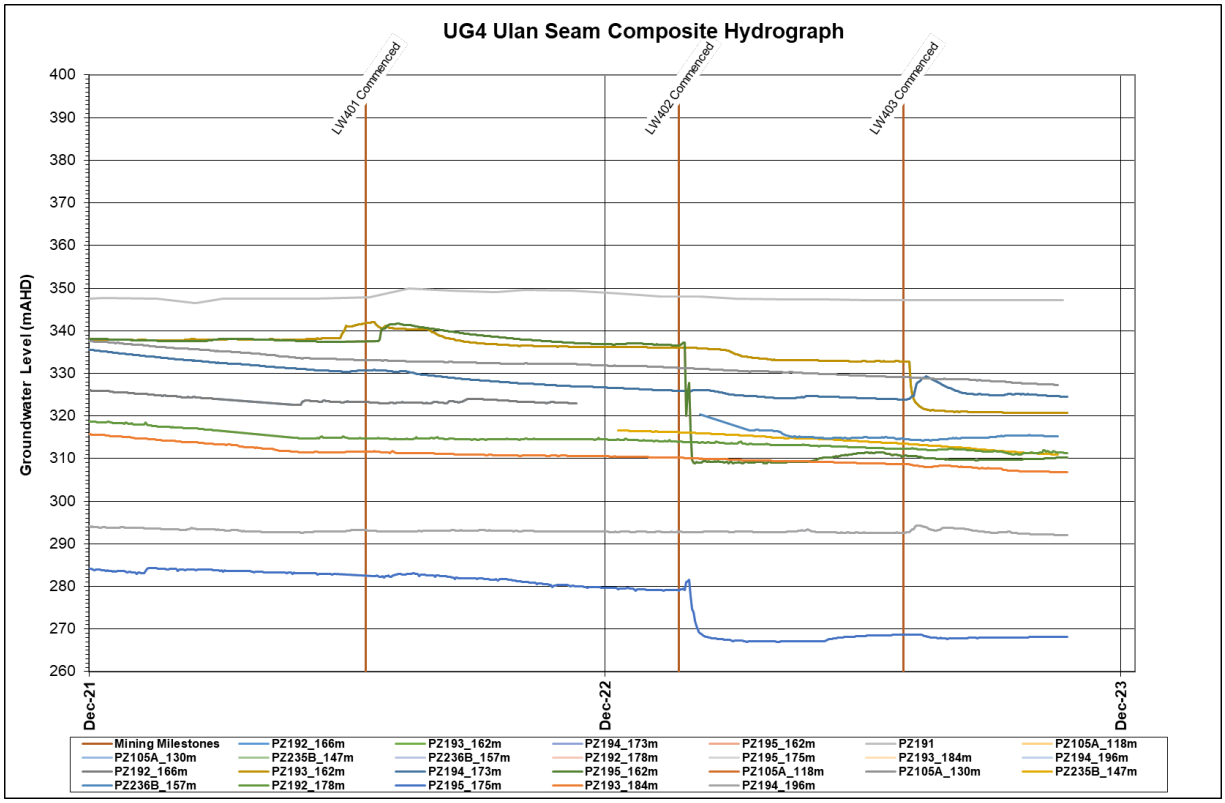


Table 3 UG4 Groundwater Quality Results

Site	Sample Point	Date	Electrical Conductivity - Field (µS/cm)	Electrical Conductivity - Lab (µS/cm)	Total Dissolved Solids (mg/L)	Total Suspended Solids (mg/L)	pH (Field) (Unit)	pH Lab (Unit)	Calcium - Dissolved (mg/L)	Magnesium - Dissolved (mg/L)	Sodium - Dissolved (mg/L)	Potassium - Dissolved (mg/L)	Alkalinity Carbonate (mg/L)	Alkalinity Bicarbonate (mg/L)	Chloride (mg/L)	Sulphate - Turbidimetric (mg/L)	Aluminium - Dissolved (mg/L)	Arsenic - Dissolved (mg/L)	Boron - Dissolved (mg/L)	Cobalt - Dissolved (mg/L)	Cadmium - Dissolved (mg/L)	Chromium - Dissolved (mg/L)	Copper - Dissolved (mg/L)	Iron - Dissolved (mg/L)	Lead - Dissolved (mg/L)	Manganese - Dissolved (mg/L)	Mercury - Dissolved (mg/L)	Nickel - Dissolved (mg/L)	Selenium - Dissolved (mg/L)	Silver - Dissolved (mg/L)	Zinc Dissolved (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Phosphorus - Total (mg/L)	Reactive Phosphorus - Total (mg/L)	Fluoride (mg/L)
MCO Water	Piezometer PZ101B	13/10/2022 11:00	788	784	512	19	7.46	8.04	54	19	75	18	<1	315	56	<1	<0.01	0.004	<0.05	<0.001	<0.0001	<0.001	<0.001	0.91	<0.001	0.155	<0.0001	0.001	<0.01	<0.001	0.01	0.37	0.1	0.21	<0.01	1.2
MCO Water	Piezometer PZ101B	5/04/2023 10:10	724	780	433	68	7.47	7.4	54	21	80	18	<1	371	52	2	<0.01	0.005	<0.05	<0.001	<0.0001	<0.001	<0.001	1.49	<0.001	0.183	<0.0001	0.002	<0.01	<0.001	<0.005	0.56	0.02	0.29	<0.01	1.2
MCO Water	Piezometer PZ101B	12/10/2023 11:20	844	792	429	36	7.29	7.4	51	18	76	16	<1	143	52	<1	<0.01	0.006	<0.05	<0.001	<0.0001	<0.001	<0.001	2.01	<0.001	0.184	<0.0001	0.001	<0.01	<0.001	<0.005	0.76	0.03	0.25	<0.01	0.8
MCO Water	Piezometer PZ101C	13/10/2022 11:15	565	620	433	45	6.91	7.68	32	16	59	10	<1	205	69	2	<0.01	0.001	<0.05	0.002	<0.0001	<0.001	<0.001	0.64	<0.001	0.499	<0.0001	0.007	<0.01	<0.001	0.076	0.3	0.46	0.2	<0.01	0.5
MCO Water	Piezometer PZ101C	5/04/2023 10:20	593	629	328	53	6.9	6.9	34	18	64	10	<1	244	60	3	<0.01	0.002	<0.05	0.002	<0.0001	<0.001	<0.001	0.86	<0.001	0.617	<0.0001	<0.001	<0.01	<0.001	<0.005	0.21	0.03	0.12	<0.01	0.5
MCO Water	Piezometer PZ101C	12/10/2023 11:10	659.1	636	356	235	6.78	6.9	32	17	63	10	<1	232	61	3	<0.01	0.002	<0.05	0.002	<0.0001	<0.001	<0.001	0.83	<0.001	0.554	<0.0001	0.001	<0.01	<0.001	0.009	0.23	0.11	0.14	<0.01	0.6
MCO Water	Piezometer PZ103C	19/10/2022 12:30	297	297	153	659	5.9	5.8	4	7	30	6	<1	44	50	12	<0.01	0.011	<0.05	0.018	<0.0001	<0.001	<0.001	6.76	<0.001	0.457	<0.0001	0.095	<0.01	<0.001	0.11	0.02	<0.01	0.35	<0.01	<0.1
MCO Water	Piezometer PZ103C	4/04/2023 10:34	287	291	226	1570	5.82	5.6	5	9	32	7	<1	42	53	14	<0.01	0.007	<0.05	0.012	<0.0001	<0.001	<0.001	8.35	<0.001	0.412	<0.0001	0.073	<0.01	<0.001	0.036	0.03	0.01	0.89	<0.01	<0.1
MCO Water	Piezometer PZ103C	12/10/2023 14:30	330.1	310	174	1720	5.67	5.6	5	8	32	7	<1	38	58	12	<0.01	0.004	<0.05	0.016	<0.0001	<0.001	<0.001	6.91	<0.001	0.502	<0.0001	0.098	<0.01	<0.001	0.047	0.05	0.02	0.29	<0.01	<0.1
MCO Water	Piezometer PZ105C	13/10/2022 10:20	215.3	219	136	27	6.02	7.07	5	4	27	3	<1	28	52	2	0.01	0.002	<0.05	0.015	<0.0001	<0.001	<0.001	2.54	<0.001	0.782	<0.0001	0.057	<0.01	<0.001	0.016	<0.01	0.02	0.02	<0.01	<0.1
MCO Water	Piezometer PZ105C	5/04/2023 12:00	207.1	219	110	57	7.37	5.9	6	4	28	3	<1	26	52	3	<0.01	<0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.012	<0.0001	0.018	<0.01	<0.001	0.027	<0.01	0.17	0.05	<0.01	<0.1
MCO Water	Piezometer PZ105C	12/10/2023 12:40	230.1	223	156	26	6.28	6	5	4	26	3	<1	30	48	3	<0.01	<0.001	<0.05	0.013	<0.0001	<0.001	<0.001	<0.05	<0.001	0.621	<0.0001	0.048	<0.01	<0.001	0.032	0.03	0.07	<0.01	<0.01	<0.1
MCO Water	Piezometer PZ191	14/10/2022 13:30	1785	1560	1030	908	6.18	6.97	28	106	262	17	<1	120	117	536	0.15	<0.001	<0.05	0.055	0.0058	<0.001	0.009	2.07	<0.001	4.24	<0.0001	0.205	<0.01	<0.001	2.13	0.49	0.05	0.7	<0.01	0.4
MCO Water	Piezometer PZ191	3/04/2023 12:50	1679	2170	997	3200	6.31	6.2	31	58	225	13	<1	173	106	500	0.06	<0.001	<0.05	0.023	0.002	<0.001	<0.001	8.93	<0.001	2.21	<0.0001	0.098	<0.01	<0.001	0.571	0.67	0.02	3.06	<0.01	0.6
MCO Water	Piezometer PZ191	19/10/2023 11:50	1897	1780	1330	5150	6.68	7	44	56	256	17	<1	243	107	551	0.07	0.001	<0.05	0.014	<0.0001	<0.001	<0.001	10.9	<0.001	1.73	<0.0001	0.051	<0.01	<0.001	0.106	0.4	0.03	6.46	<0.01	0.6
MCO Water	Piezometer PZ194B	19/10/2022 11:10	518	543	316	180	6.88	7	58	11	40	23	<1	182	51	31	0.01	<0.001	<0.05	0.004	<0.0001	0.003	<0.001	<0.05	<0.001	0.739	<0.0001	0.03	<0.01	<0.001	0.02	<0.01	<0.01	0.06	<0.01	0.1
MCO Water	Piezometer PZ194B	6/04/2023 10:40	524	532	329	208	7.09	7.2	51	10	45	28	<1	216	47	33	0.14	<0.001	<0.05	0.003	0.0001	<0.001	0.002	0.1	<0.001	0.194	<0.0001	0.021	<0.01	<0.001	0.029	0.01	0.08	0.05	<0.01	0.2
MCO Water	Piezometer PZ194B	19/10/2023 10:30	602.7	548	301	149	6.81	7	49	10	38	19	<1	188	53	30	<0.01	<0.001	<0.05	0.002	<0.0001	<0.001	<0.001	<0.05	<0.001	0.269	<0.0001	0.047	<0.01	<0.001	0.051	0.08	0.1	0.06	<0.01	0.1
MCO Water	Piezometer PZ194C	19/10/2022 11:20	862	892	507	304	7.9	8	48	23	70	49	<1	370	45	29	0.03	0.001	<0.05	<0.001	<0.0001	<0.001	<0.001	0.21	<0.001	0.166	<0.0001	0.001	<0.01	<0.001	<0.005	0.13	<0.01	0.09	<0.01	0.4
MCO Water	Piezometer PZ194C	6/04/2023 10:20	861	878	544	143	7.94	7.9	46	24	82	55	<1	403	42	38	0.08	0.001	<0.05	0.001	<0.0001	<0.001	<0.001	0.39	<0.001	0.132	<0.0001	0.002	<0.01	<0.001	0.009	0.19	0.05	0.07	<0.01	0.4
MCO Water	Piezometer PZ194C	19/10/2023 10:40	982.4	891	514	113	7.47	7.4	44	24	85	61	<1	407	32	38	0.01	0.002	<0.05	0.001	<0.0001	<0.001	<0.001	0.07	<0.001	0.085	<0.0001	0.01	<0.01	<0.001	<0.005	0.12	0.02	0.17	<0.01	0.4
MCO Water	Piezometer PZ195B	19/07/2022 12:30	1040	1080	697	370	7.3	8.6	39	11	131	36	<1	128	104	262	0.12	0.008	<0.05	<0.001	<0.0001	0.07	<0.001	<0.05	<0.001	0.008	<0.0001	0.012	<0.01	<0.001	<0.005	0.03	0.02	0.11	<0.01	0.2
MCO Water	Piezometer PZ195B	19/10/2022 11:50	1078	1190	602	411	10.87	11	4	2	147	77	210	13	62	132	0.04	0.004	<0.05	<0.001	<0.0001	<0.001	<0.001	<0.05	<0.001	0.001	<0.0001	0.004	<0.01	<0.001	<0.005	0.02	<0.01	0.02	<0.01	0.3
MCO Water	Piezometer PZ195B	6/04/2023 11:20	982	589	408	600	11.56	8	1	<1	120	49	339	63	45	29	0.12	0.008	<0.05	0.002	0.0001	<0.001	0.002	0.09	<0.001	0.005	<0.0001	0.002	<0.01	<0.001	0.01	0.13	0.02	0.16	<0.01	0.4
MCO Water	Piezometer PZ195B	19/10/2023 11:00	550.3	547	317	475	7.18	7.5	65	8	32	9	<1	178	43	78	<0.01	0.008	<0.05	0.005	<0.0001	<0.001	<0.001	2.3	<0.001	0.694	<0.0001	0.051	<0.01	<0.001	<0.005	0.23	0.04	0.18	<0.01	0.2
MCO Water	Piezometer PZ195C	19/07/2022 12:10	1085	1020	562	16	9.09	7.3	77	30	70	26	<1	336	142	9	<0.01	<0.001	<0.05	<0.001	<0.0001	0.009	<0.001	<0.05	<0.001	0.042	<0.0001	<0.001	<0.01	<0.001	0.015	0.38	<0.01	0.01	<0.01	0.5
MCO Water	Piezometer PZ195C	19/10/2022 12:00	998	1030	578	414	9.23	8.8	12	19	120	75	96	222	120	15	0.02	0.001	<0.05	0.003	<0.0001	<0.001	<0.001	0.05	<0.001	0.003	<0.0001	0.01	<0.01	<0.001	<0.005	0.56	<0.01	<0.02	<0.01	0.5
MCO Water	Piezometer PZ195C	6/04/2023 11:00	872	896	534	44	7.22	7.2	68	29	88	20	<1	444	35	53	0.18	0.004	<0.05	0.007	0.0003	<0.001	0.023	1.19	<0.001	0.084	<0.0001	0.002	<0.01	<0.001	0.047	0.39	0.02	0.05	<0.01	0.7
MCO Water	Piezometer PZ195C	19/10/2023 11:20	1360	1400	1120	87	7.17	7.3	102	35	245	22	<1	481	106	324	<0.01	0.002	<0.05	<0.001	<0.0001	<0.001	<0.001	0.72	0.004	0.067	<0.0001	0.001	<0.01	<0.001	0.009	0.35	0.13	0.24	0.03	0.7
MCO Water	Piezometer PZ235C	12/10/2023 12:10	775	768	462	219	6.68	6.9	79	19	42	10	<1	267	48	79	0.05	0.009	<0.05	0.054	<0.0001	<0.001	<0.001	3.5	<0.001	1.89	<0.0001	0.311	<0.01	<0.001	0.054	0.04	0.01	<0.01	0.01	0.1
MCO Water	Piezometer PZ236A	5/04/2023 10:50	289	319	174	146	8.62	8.5	32	5	22	2	35	50	42	13	<0.01	<0.001	<0.05	<0.001	<0.0001	0.019	<0.001	<0.05	<0.001	0.006	<0.0001	0.007	<0.01	<0.001	<0.005	0.07	0.2	0.04	<0.01	0.1
MCO Water	Piezometer PZ236A	12/10/2023 11:50	1077	1110	345	632	11.58	11.6	90	<1	23	4	217	84	45	16	0.2	0.002	<0.05	<0.001	<0.0001	0.033	<0.001	<0.05	<0.001	<0.001	<0.0001	<0.001	<0.01	<0.001	<0.005	0.14	0.22	<0.01	<0.01	0.2

3.0 REFERENCES

Australasian Groundwater and Environmental Consultants Pty Ltd (2023). *UG4 LW401 to LW408 Extraction Plan Revised Groundwater Technical Report for Moolarben.* Dated August 2023.