



Cudgen Lakes Sand Quarry

Environmental Monitoring - Groundwater

Project Approval (PA):	05_0103B
Environmental Protection Licence (EPL):	12385
Licensee:	Gales-Kingscliff Pty Limited
Licensee Address:	20 Ginahgulla Road Bellevue Hill, NSW 2023
Premises:	Cudgen Lakes Altona Drive Cudgen, NSW 2487
Licensee Website:	http://www.galeskingscliff.com.au/
Licensee Website - Monitoring Results:	https://www.galeskingscliff.com.au/reports
EPA Public Register:	https://www.epa.nsw.gov.au/licensing-and-regulation/public-registers
Monitoring Month:	Sep-25
Report prepared on:	7/11/2025
Originator:	R.W. Corkery & Co. Pty Limited

Monitoring Requirements - Groundwater

EPL 12385 Requirements

Monitoring Points - Water and Land

EPL Condition	EPA Identification Number	Site ID	Type of Monitoring Point	Location Description*
P1.2	4	MB15	Groundwater Monitoring - MB15	Groundwater monitoring bore. Defined as MB15 in Gales-Kingscliff Pty Ltd, Soil and Water Management Plan for the Cudgen Lakes Sand Quarry, May 2017 (GKSWMP). Location described in Section 5.2.2 Figure 5.1.
	5	MB10	Groundwater Monitoring - MB10	Groundwater monitoring bore. Defined as MB10 in Gales-Kingscliff Pty Ltd, Soil and Water Management Plan for the Cudgen Lakes Sand Quarry, May 2017 (GKSWMP). Location described in Section 5.2.2 Figure 5.1.
	6	MB11	Groundwater Monitoring - MB11	Groundwater monitoring bore. Defined as MB11 in Gales-Kingscliff Pty Ltd, Soil and Water Management Plan for the Cudgen Lakes Sand Quarry, May 2017 (GKSWMP). Location described in Section 5.2.2 Figure 5.1.

* See 'Monitoring Map' tab.

Monitoring Conditions

EPL Condition	EPA Identification Number	Site ID	Pollutant	Units of Measure	Monitoring Frequency	Sampling Method
M2.2	4, 5 & 6	MB 15, MB10 & MB11	Ammonia	milligrams per litre (mg/L)	Yearly	Grab Sample
			Chloride	milligrams per litre (mg/L)	Yearly	Grab Sample
			Electrical Conductivity	milligrams per litre (mg/L)	Yearly	Grab Sample
			Oil and Grease	milligrams per litre (mg/L)	Yearly	Grab Sample
			pH	pH	Yearly	Grab Sample
			Standing Water Level	metres (Australian Height Datum)	Yearly	No method specified
			Sulfate	milligrams per litre (mg/L)	Yearly	Grab Sample
			Total Suspended Solids	milligrams per litre (mg/L)	Yearly	Grab Sample

Management Plan Requirements - Soil and Water Management Plan

Version: May-21

Note: The Soil and Water Management Plan (SWMP) fulfils the requirement for a Groundwater Monitoring Program under Condition 22 of Schedule 3 of PA 05_0103.

Groundwater Levels

Groundwater drawdowns are not to exceed 1.75m in any of the bores / piezometers over a 6-month (or shorter) period. Any decrease greater than 1.75 over a 6-month (or shorter) period is considered a 'significant decrease'.

Groundwater Quality Objectives

Parameters	Units of Measure	All Bores*	MB2**	MB10**	MB13**	GW62045**	GW300856**
pH	pH	6.5 - 8.5	5.2 - 6.5	-	-	5.5 - 6.8	6.1 - 7.0
Electrical Conductivity (EC)	microSiemens per centimeter (µS/cm)	<3000	-	37344	36384	-	-
Sodium (Na)	milligrams per litre (mg/L)	<500	-	7204	6884	-	-
Magnesium (Mg)	milligrams per litre (mg/L)	<100	-	1082	1146	-	-
Potassium (K)	milligrams per litre (mg/L)	<40	-	249	215	-	-
Chloride (Cl)	milligrams per litre (mg/L)	<1000	-	12811	12600	-	-
Sulfate (SO4)	milligrams per litre (mg/L)	<800	-	1878	2276	-	-
Bicarbonate (HCO3)	milligrams per litre (mg/L)	<400	-	1130	545	-	-
Aluminium (Al)	milligrams per litre (mg/L)	<0.5	1.67	-	-	-	0.72
Filterable Iron (Fe)	milligrams per litre (mg/L)	<20	20.92	-	-	-	-
Ammonia (NH3)	milligrams per litre (mg/L)	<20	-	150	-	-	-

*Unless value is otherwise specified in this table.

*** Objectives based on 80th percentile of all previous data (to July 2019) except pH which is presented as the 20th to 80th percentile range.*

Monitoring Points - Parameters, Locations & Frequency

Occurrence	Frequency	Parameters	Units of Measure	Measurement Type	Sampling Method	Location ID
Operational Periods ¹	Continuous	Standing Water Level	m (AHD)	Logger (Downloaded Quarterly)	Logger	MB1, MB2, MB10, MB14, CSP1, MB11, MB15
		Temperature	degrees Celsius (°C)			
		Electrical Conductivity (EC)	micro Siemens per centimetre (µS/cm)			MB11, MB15
	Monthly	Standing Water Level	m (AHD)	Field	Probe	MB1, MB2, MB10, MB11, MB12, MB13, MB14, MB15, CSP1, CSP3, GW300856, GW062045
		Temperature	degrees Celsius (°C)			
		pH	pH			
		Electrical Conductivity (EC)	micro Siemens per centimetre (µS/cm)			
		Oxygen Reduction Potential (ORP)	millivolts (mV)	Laboratory	Grab Sample	
		Major Cations*	milligrams per litre (mg/L)			
		Major Anions**	milligrams per litre (mg/L)			
		Filterable Iron	milligrams per litre (mg/L)			
		Aluminium	milligrams per litre (mg/L)			
	Arsenic	milligrams per litre (mg/L)				
	Quarterly	Total Phosphorous (P)	milligrams per litre (mg/L)	Laboratory	Grab Sample	MB1, MB2, MB10, MB11, MB12, MB13, MB14, MB15, CSP1, CSP3, GW300856, GW062045
Ammonia Nitrogen		milligrams per litre (mg/L)				
NOx Nitrogen		milligrams per litre (mg/L)				
During Use of Makeup Water from Spear Point Extraction System	During Operation - Frequency Unspecified	Standing Water Level	m (AHD)	Field	Probe	At the end of each line of spear points & a spear point within 10m of each end. At the centre of each line of spear points & a spear point within 10m either side of the centre.
		Temperature	degrees Celsius (°C)			
		pH	pH			
		Electrical Conductivity (EC)	micro Siemens per centimetre (µS/cm)			
		Oxygen Reduction Potential (ORP)	millivolts (mV)			
Non-Operational Periods ²	Continuous	Standing Water Level	m (AHD)	Logger (Downloaded Quarterly)	Logger	MB1, MB2, MB10, MB14, CSP1, MB11, MB15
		Temperature	degrees Celsius (°C)			
		Electrical Conductivity (EC)	micro Siemens per centimetre (µS/cm)			MB11, MB15
	Quarterly	Temperature	degrees Celsius (°C)	Field	Probe	MB1, MB2, MB10, MB11, MB12, MB13, MB14, MB15, CSP1, CSP3, GW300856, GW062045
		pH	pH			
		Electrical Conductivity (EC)	micro Siemens per centimetre (µS/cm)			
		Oxygen Reduction Potential (ORP)	millivolts (mV)			
	6-Monthly	Standing Water Level	m (AHD)	Laboratory	Grab Sample	MB1, MB2, MB10, MB11, MB12, MB13, MB14, MB15, CSP1, CSP3, GW300856, GW062045
		Major Cations*	milligrams per litre (mg/L)			
		Major Anions**	milligrams per litre (mg/L)			
		Filterable Iron	milligrams per litre (mg/L)			
		Aluminium	milligrams per litre (mg/L)			
		Arsenic	milligrams per litre (mg/L)			
		Total Phosphorous (P)	milligrams per litre (mg/L)			
Ammonia Nitrogen	milligrams per litre (mg/L)					
NOx Nitrogen	milligrams per litre (mg/L)					

¹ Operational Periods = periods during which extraction and/or processing of material, and/or the placement of fines and/or VENM material, is occurring at the Quarry.

² Non-Operational Periods = periods during which no extraction, processing, fines placement or VENM placement activities are occurring. Note: for groundwater monitoring purposes, non-operational periods also include periods during which transportation activities alone occur.

*Major Cations = Sodium, Calcium, Magnesium & Potassium

**Major Anions = Chloride, Sulfate & Bicarbonate

Monitoring Location Map - Groundwater

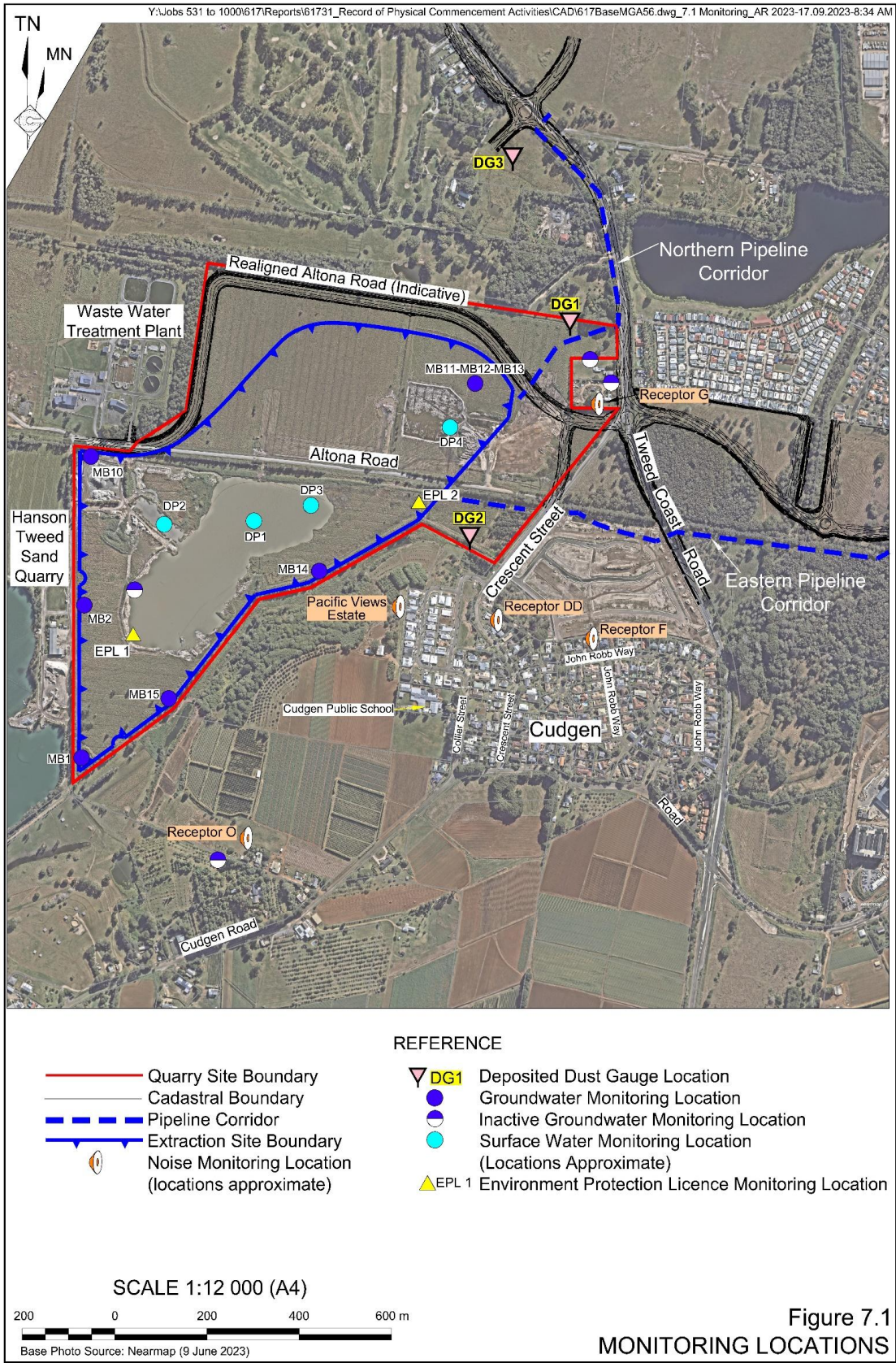


Figure 7.1
MONITORING LOCATIONS

Groundwater Monitoring Bore Location Descriptions

MB1: located at the southwestern boundary between the extraction area and the neighbouring (Hanson Tweed Sand Quarry) sand dredge pond.

MB2: located at the central western boundary between the extraction area and the neighbouring (Hanson Tweed Sand Quarry) sand dredge pond.

MB10: located at the north western boundary between the extraction area and the adjoining Waste Water Treatment Plant.

CSP1-CSP2-CSP3: nested monitoring bore located west of the initial dredge pond and south of the existing Altona Road. This bore has since been removed. This bore has been removed as part of the planned expansion of the dredge pond and the SWMP updated accordingly.

MB11-MB12-MB13: Nested monitoring location within the north-eastern part of the extraction area, north of the existing Altona Road. Noble Lake is located approximately 1km to the northeast.

MB14 and MB15: Replacement bores for MB8A, MB8, MB9 and MB6A, MB6, MB7 which have been damaged over time. Located on the southern boundary of the extraction area; these locations are closest to the two dams and spear points Julius West and Julius East located within the adjoining property owned by R. Julius to the southeast of the Quarry.

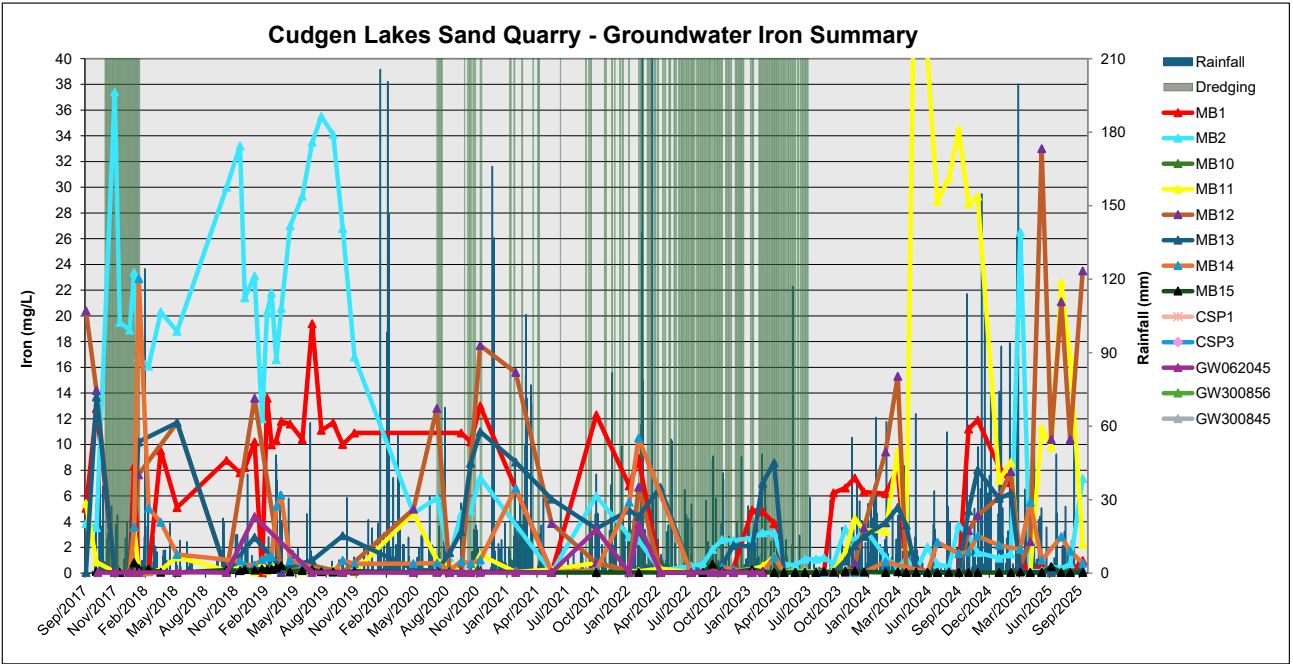
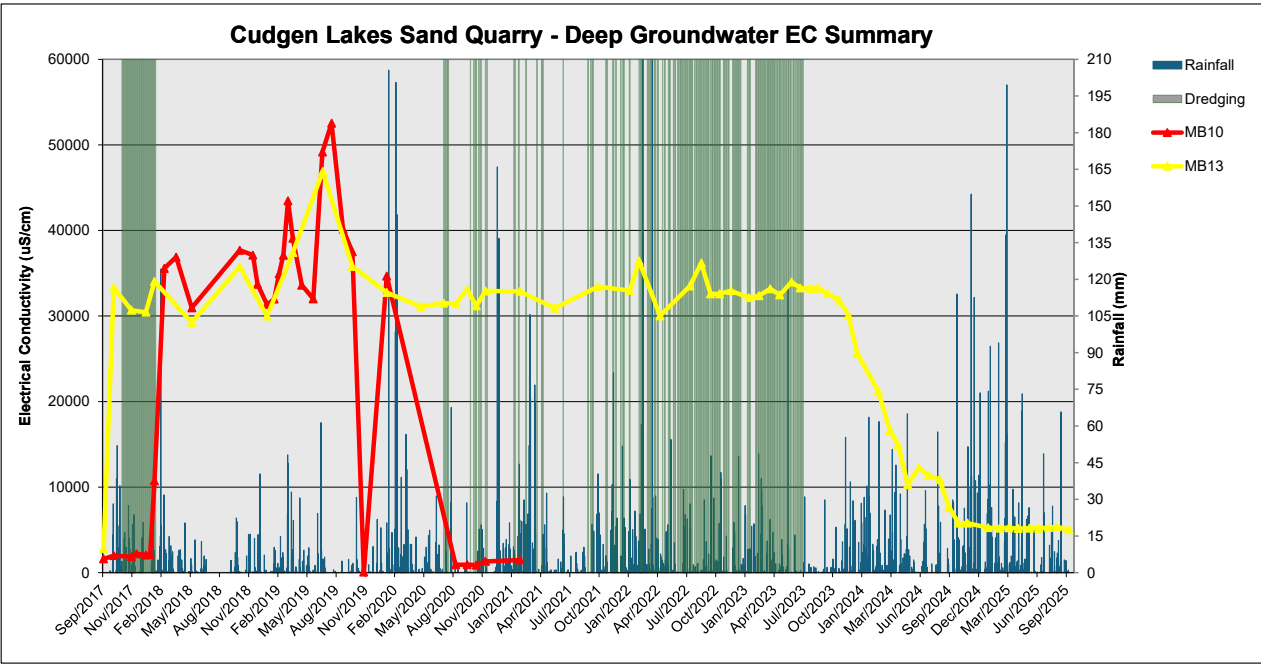
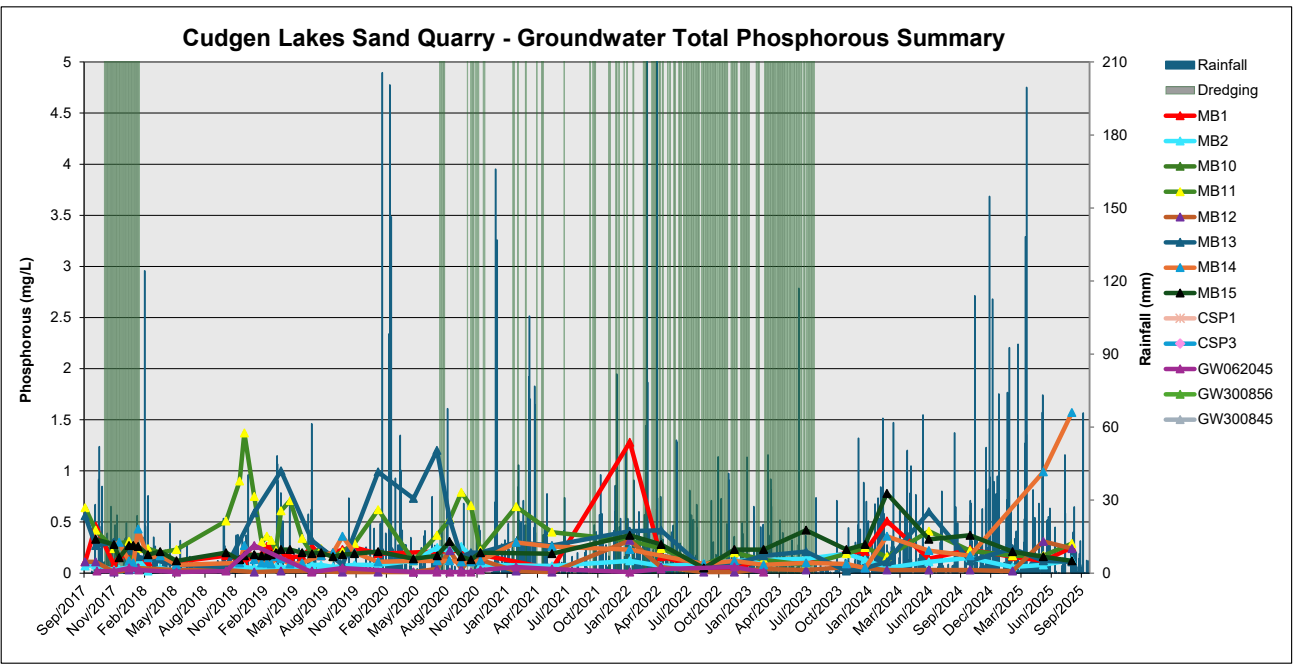
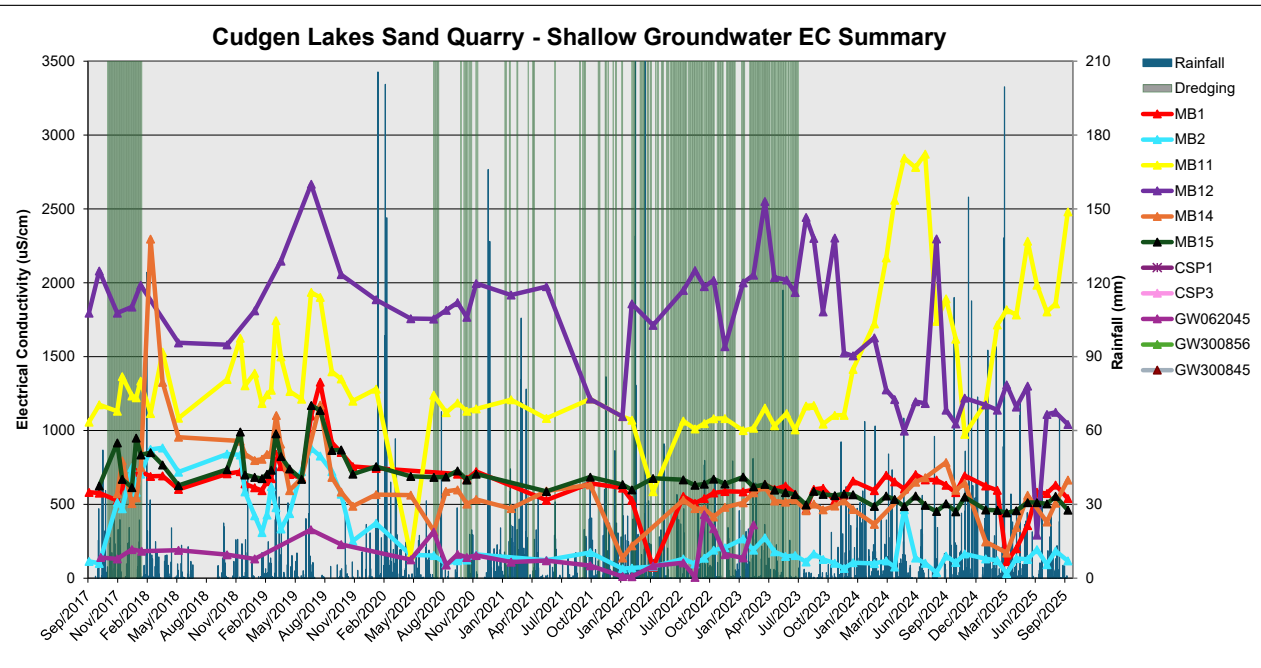
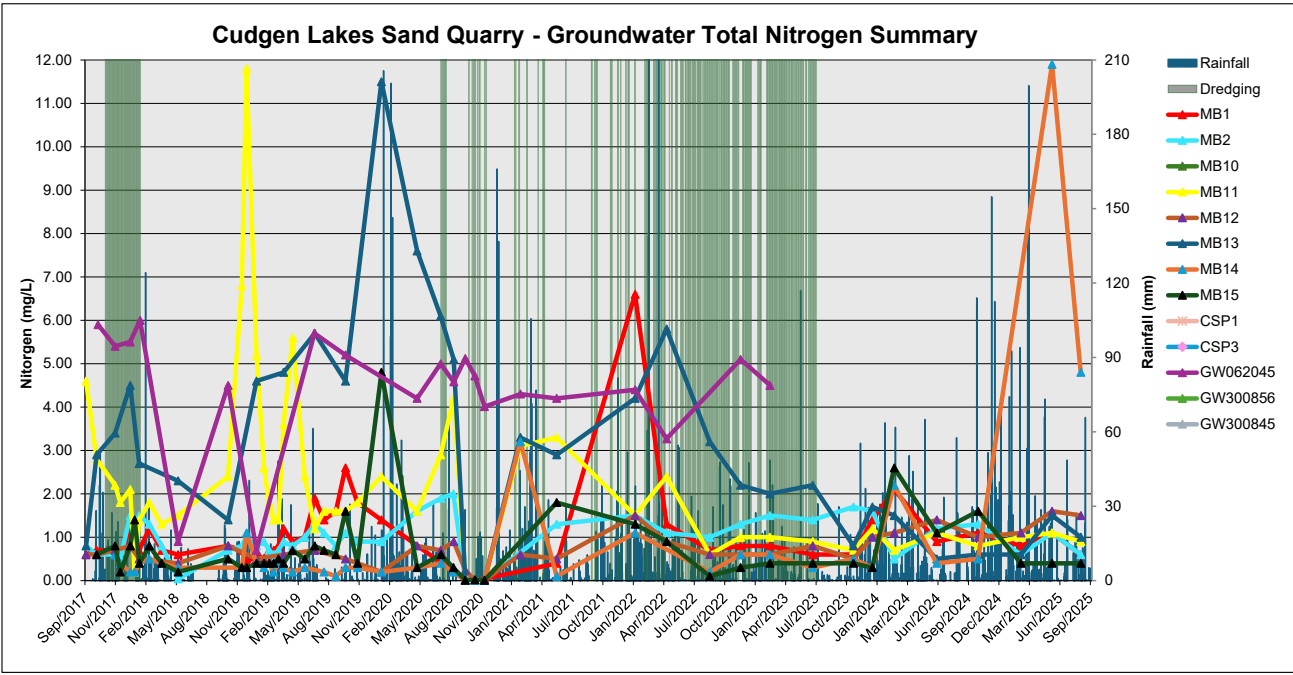
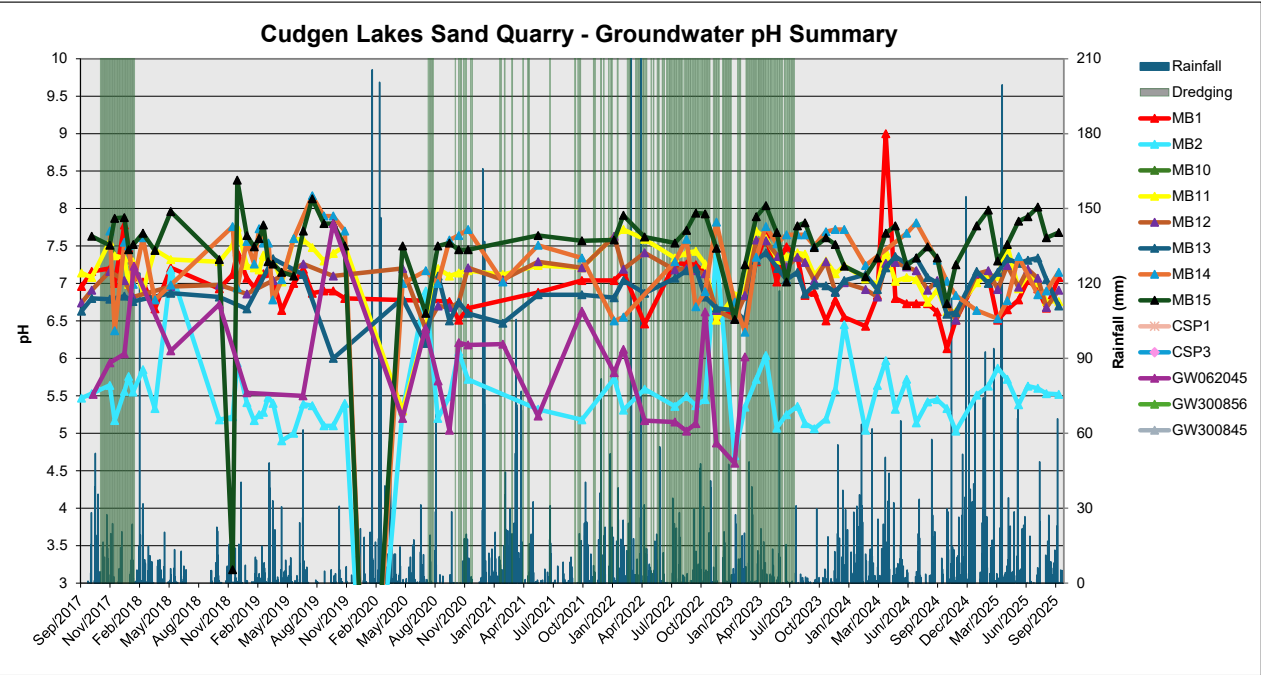
GW062045 and GW300856: Registered groundwater bores located south and east of the Quarry Site.

Spearpoint Monitoring Location Descriptions

The additional monitoring points would be spear points located:

- at the end of each row / line of spear points and a further spear within 10 metres of each end; and
- at the centre of the row / line of spear points and a further spear on either side within 10 metres of the line.

617 - CUDGEN LAKES SAND QUARRY
Groundwater Quality Monitoring Summary



617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB1

Site: MB1		Physical										Major Cations & Anions								Metals			Nutrients										
Sample Date		Comments	Water Level Top of Casing	Water Level m AHD	Temp °C	pH	ElectricalConductivity uS/cm	Dissolved Oxygen mol/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L			
			Objective	-	-	6.5-8.5	<3000	-	-	-	-	<10	<500	-	<100	<40	<1000	<800	<400	<0.5	<0.42	<20	-	-	-	-	-	-	<20	-			
Pre-Extraction	2/07/2002					6.98	1516										108	492		0.01		1.09											
	18/07/2002					6.59	1854	0.91																									
	19/07/2002																53	437		0.01		7.15											
	28/08/2002					6.85	1364										35	425		0.01		15.7											
	1/10/2002					6.84	1272	0.64																									
	23/10/2002					6.54	1372	0.91																									
	24/10/2002																55	227		0.09		3.14											
	28/11/2002					6.66	1215	1.07																									
	13/12/2002					7.32	1463	1.28																									
	16/12/2002																	59	271		0.01		0.69										
	20/01/2003					7.31	1587											58	287		0.01		3.61										
	24/06/2003					7.01		4.98	23				58	193	36		103	375	230	0.01		3.95											
	22/07/2003					7.11		7.66																									
	28/08/2003					6.79		2.03																									
	29/09/2003					6.76		0.9																									
	24/10/2003					6.96		3.53																									
	30/11/2004					7	1536																										
	16/12/2004					7.24	1087																										
	13/01/2005					7	978																										
	2/02/2005					6.9		0.14																									
	8/03/2005					6.85	872	0.05	-85				40	139	25	5	55	216	153	0.04		18											
	10/05/2005					6.85	880												143														
	19/07/2005					7.07	1109	0.54					44	178	25	5	80	246	165	0.12		19											
	5/08/2005					7.48	1066	0.68																									
	10/11/2005					7.21	985	0.27					31	121	20	5	75	173	142	0.11		13											
	12/01/2006					7.12	1214	0.29					36	136	22	5	63		170	0.11		14											
	7/04/2006					7.18	1036	0.20																									
	3/05/2006					7.12	1005	0.18											161														
	10/05/2006					7.01	1002	0.20	-155				38	135	21	5	42	186	218	0.01		5.51											
	19/05/2006					6.88	1008	0.66																									
	26/05/2006					6.43	905	0.42																									
	1/06/2006					6.92	948	0.48																									
	8/06/2006					6.84	1016	0.36																									
	15/06/2006					7.08	1029	0.21					37	176	25	5	124	191	110	0.14		12											
	23/06/2006					6.71	1100	0.38	-113																								
	29/06/2006					6.43	1006	0.20																									
	6/07/2006					7.76	935	0.21	-168																								
	13/07/2006																		183														
	14/07/2006					7.05	978	0.35																									
	8/02/2007					6.87	979	0.32	-102				45	143	20	5	80	171		0.04		22											
	4/03/2007																																
	29/08/2007					7.1	1026	0.31	-1398				33	113	15	5	40	103	160	0.01		6.51											
	26/10/2007					7.02	733	0.20					32	100	16	5	52	102	181	0.01		0.24											
	14/11/2007					6.74	828	0.26					37	105	17	5	38	96	180	0.01		11											
	2/09/2008					7.4	840																										
	4/09/2017		0.86	0.34	19.8	6.96	581	0.2	-81		1.4	5	43	81	15	4	48	12	292	0.02	0.001	5.04	0.11	0.010	0.60	0.01	0.01	0.6	0.39	0.01			
	5/10/2017		0.97	0.23	21.8	7.16	576	1.77	-18.1																								

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB1

2019/2020	4/07/2019		0.81	0.39	21.65	7.19	1098	0.18	-62.2	51	7.8	5	29	132	8	5	24	6	378	0.01	0.001	19.4	0.26	0.001	1.9	0.01	0.01	1.9	0.91	0.01
	31/07/2019	Ants and eggs	0.9	0.3	20.4	6.87	1327	0.33	-114.4	35	14.7		32	116	10	4	39	6	348	0.01	0.001	11.1	0.17	0.045	1.4	0.01	0.01	1.4	0.91	0.01
	4/09/2019	Logger removed on 04/09/19 and replaced on 06/09/19	0.98	0.22	22.1	6.9	918	0.7	-137	17	12.2		44	111	10	4	40	5	336	0.01	0.001	11.7	0.2	0.108	1.6	0.01	0.01	1.6	1.11	0.01
	2/10/2019		1.13	0.07	21.9	6.9	852	1.7	-93.8	26	3.2	5	42	114	10	4	48	1	313	0.01	0.001	10	0.23	0.079	2.6	0.01	0.01	2.6	1.44	0.01
	6/11/2019		1.3	-0.1	21.8	6.8	756	2.6	-72.1	86	6.1		32	105	10	4	36	2	364	0.01	0.001	10.9	0.25	0.011	1.8	0.01	0.01	1.8	0.97	0.01
	15/01/2020	data logger would not sync. pH 8.4 - meter calibration issue - spurious data.	1.6	-0.4	22.1		744	0.55	-67.9	5	1.3		43	103	10	4	43	2	302				0.19	0.01	1.4	0.01	0.01	1.4	0.62	0.01
	28/04/2020	Monitoring bore damaged (buried during drain cleaning) and requires repair. No sample could be obtained. Bore and logger recovered 10/07/20.																												
2020/2021	16/09/2020		0.61	0.59	20.3	6.76	705	1.39	-113.3	47	2546.77	5	27	112	11	4	27	1	368	0.01	0.001	10.9	0.22	0.017	0.01	0.01	0.01	1.2	0.56	0.01
	14/10/2020	Overcast	0.79	0.41	21.2	6.51	670	2.09	-92.6	30	25.4	5	26	119	11	4	28	1	355	0.01	0.001	10.2	0.18	0.001	0.01	0.01	0.01	1	0.47	0.01
	11/11/2020		0.83	0.37	22	6.67	722	1.69	-94.7	29	4.9		28	117	11	4	27	5	332	0.01	0.001	13	0.18	0.044	0.04	0.01	0.04	1.2	0.62	0.04
	10/06/2021		0.47	0.73	18.9	6.88	528	2.4	7.5	20	48.38		23	93	9	3	26	4	280	0.01	0.001	0.05	0.04	0.001	0.4	0.01	0.05	0.3	0.01	0.05
2021/2022	20/10/2021		0.49	0.71	22.41	7.04	642	1.15	-14.1	NLM	63	NLM	22	100	7	3	28	1	297	0.01	0.001	12.3								
	25/01/2022		0.42	0.78	22.7	7.04	610	2.55	-34.5	NLM	63	NLM	23	107	8	9	22	1	308	0.01	0.004	6.79	1.28		6.6	0.01	0.01	6.6	4.99	0.01
	22/02/2022		0.47	0.73	23.79	7.16	527	1.42	-36.3	NLM	66	NLM	23	99	7	5	29	1	290	0.01	0.001	8.93								
	27/04/2022		0.3	0.9	21.66	6.46	74	1.22	-11.5	NLM	83	NLM	12	6	3	3	20	7	24	0.01	0.001	0.05	0.16		1.3	0.01	0.31	1	0.08	0.31
	23/05/2022	Due to major flood event, high rainfall, and poor drainage the site was deemed inaccessible to undertake sampling during May 2022.																												
22/06/2022	Due to previous major flood events, ongoing rain and slow drainage, the site was deemed inaccessible to undertake sampling during June 2022.																													
2022/2023	27/07/2022	Within a waterlogged area	0.42	0.78	17.6	7.27	554	0.44	107		47		27	78	9	3	24	4	241	0.01	0.001	0.05								
	31/08/2022		0.54	0.66	17.9	7.26	507	1.22	194.9		10.2		26	77	8	3	31	2	235	0.01	0.001	0.05	0.06		0.7	0.01	0.34	0.4	0.03	0.34
	28/09/2022		0.46	0.74	19.9	7.25	539	1.46	-64.6		4.7		31	83	10	5	32	2	260	0.01	0.001	0.05								
	26/10/2022	Clear, waterlogged area	0.35	0.85	21.2	7.14	577	5.56	72.1				28	84	9	3	33	1	270	0.01	0.001	0.05								
	29/11/2022		0.67	0.53	19.6	6.55	587	2.91	84.5		4.5		28	90	9	4	32	1	266	0.01	0.001	0.43	0.04		0.8	0.01	0.33	0.5	0.03	0.33
	23/01/2023		0.81	0.39	22.2	6.62	585	2.24	68.9		4.3		26	82	8	3	24	1	277	0.01	0.001	4.9								
	23/02/2023		0.72	0.48	22.1	6.83	599	2.55	-82.4		5.5		28	87	9	3	26	1	267	0.01	0.001	4.78	0.14		0.8	0.01	0.02	0.8	0.4	0.02
	29/03/2023	Dead ants and slime in water	0.81	0.39	22.3	7.29	633	1.43	-128.4		41.3		30	87	10	5	30	1	255	0.01	0.001	3.87								
	27/04/2023		0.87	0.33	21.8	7.66	602	3.43	-24.2		33.5		28	91	10	4	32	1	262	0.01	0.001	0.05								
	30/05/2023		0.85	0.35	19.5	7.02	625	1.05	-13.9		74.9		33	86	11	4	39	2	285	0.01	0.001	0.05								
	28/06/2023		0.80	0.40	18.5	7.49	569	5.2	-30.7		30.4		30	75	10	4	34	2	264	0.01	0.001	0.05	0.09		0.6	0.01	0.25	0.3	0.01	0.25
31/07/2023		0.95	0.25	18.2	7.36	464	2.51	-27.9		8.3		30	81	11	4	38	2	257	0.01	0.001	0.05									
2023/2024	23/08/2023	Laptop battery fail. Loggers returned to HMC offices to download & returned to site 24.08.2023	0.96	0.24	19.2	6.84	601	1.13	-10.1		7.7		35	84	12	4	39	3	268	0.01	0.001	0.05								
	20/09/2023		0.97	0.23	20.3	6.88	609	6.08	-6.1		1.3		34	83	12	4	38	4	276	0.01	0.001	6.24								
	25/10/2023		1.1	0.1	20.9	6.5	526	6.13	-9.4		4.2		31	84	9	4	31	2	248	0.01	0.001	6.62	0.2		0.6	0.01	0.03	0.6	0.34	0.03
	22/11/2023		0.7	0.5	21.7	6.78	563	6.26	-2.1		3.1		30	78	8	3	28	1	246	0.01	0.001	7.4								
	19/12/2023		0.87	0.33	25.5	6.55	658	3.29	1.2		24.1		31	85	10	4	31	2	278	0.01	0.001	6.31	0.21		1.4	0.01	0.05	1.4	0.43	
	21/02/2024	Lots of ants within bore	0.44	0.76	24.6	6.43	593	2.32	16.4		14.1		29	97	9	6	28	<1	284	0.01	0.001	6.18	0.51		2.1	0.01	0.01	2.1	1.2	
	28/03/2024	Ants present Redox meter failed	0.4	0.8	23.2	6.84	697	2.43			15.2		11	114	11	5	35	1	338	0.01	0.001	8.11								
	22/04/2024	Ants present	0.3	0.9	22.1	9	652	2.88	-6.9		87.1		29	105	10	5	28	1	299	0.01	0.001	0.05								
	21/05/2024	Ants nesting in the bore casing	0.34	0.86	20.5	6.8	604	2.71	-0.53		67.1		26	117	9	5	31	1	286	0.01	0.001	0.06								
24/06/2024		0.51	0.69	18.8	6.73	702	2.87	4.3		72.9		26	114	10	4	32	2	329	0.01	0.001	0.05	0.14		0.9	0.01	0.26	0.6	0.03	0.26	
2024/2025	23/07/2024		0.4	0.8	16.6	6.73	666	3.96	-1.9		22.8		25	99	8	4	31	1	343	0.01	0.001	0.05								
	26/08/2024		0.41	0.79	19.4	6.73	664	3.8	-10.2		20.9		24	112	8	4	29	1	297	0.01	0.001	0.05								
	24/09/2024	Ants nesting in bore	0.58	0.62	19.3	6.62	629	3.6	-7.1		283		29	101	8	4	30	1	270	0.01	0.001	0.13								
	23/10/2024	Ants nesting in bore	0.36	0.84	19.2	6.13	579	3.4	37.9		10.97		24	97	8	4	23	1	289	0.01	0.001	11.2	0.23		1.1	0.01	0.12	1	0.49	0.12
	19/11/2024																													

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB2

Site: MB2			Physical										Major Cations & Anions							Metals			Nutrients									
Sample Date		Comments	Water Level Top of Casing	Water Level m AHD	Temp °C	pH	Electrical Conductivity µS/cm	Dissolved Oxygen mg/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L		
			-	-	-	5.2-6.5	<3000	-	-	-	-	10	<500	-	<100	<40	<1000	<800	<400	<1.67	<0.42	<20.92	-	-	-	-	-	-	<150	-		
Pre-Extraction	22/05/2002		-														20	27		0.86		7.77										
	2/07/2002					7.42	1875										20	17		1.08		7.04										
	18/07/2002					6.88	2380	1.13																								
	19/07/2002																															
	28/08/2002					5.93	160										14	17		0.97		7.93										
	1/10/2002					7.72	180	0.67									10	18		1.45		9.5										
	23/10/2002					7.38	2394	0.86																								
	24/10/2002																	22	13		1.5		8.06									
	28/11/2002					6.67	178	0.79																								
	13/12/2002					6.36	174	1.15																								
	16/12/2002																	27	19		1.32		8.28									
	20/01/2003					6.92	1909											24	16		1.92		8.84									
	24/06/2003					6.39		0.8	216				18	1	1			24	13	11	0.44		3.13									
	22/07/2003					6.53		5.09																								
	28/08/2003					6.61		3.8																								
	29/09/2003					5.96		0.6																								
	24/10/2003					6.66		3.47																								
	30/11/2004					5.65	138																									
	16/12/2004					6.43	139																									
	13/01/2005					6.67	365																									
	2/02/2005					6.22		0.37																								
	8/03/2005					6.81	115	0.28	-130				15	0.43	0.46	17	22	14	15.9	6.37		9.14										
	10/05/2005					5.56	118												24													
	19/07/2005					4.62	161	0.21					18	0.8	0.4	17	40	17	14.6	3.95		6.57										
	10/11/2005					5.87	348	0.21					15	1.42	0.4	14	45	14	17	4.81		7.38										
	12/01/2006					5.49	182	0.26					17	1.8	0.6	19	34		60	6.16		7.71										
	7/04/2006					5.88	188	0.20																								
	3/05/2006					5.6	142	0.25											23													
	10/05/2006					6.07	88	0.16	-104				12	0.2	0.2	19	14	14	14	0.73		3.12										
	19/05/2006					5.61	123	0.32																								
	26/05/2006					6.1	139	0.23																								
	1/06/2006					6.07	199	0.43																								
	8/06/2006					6.4	139	0.30																								
	15/06/2006					6.05	134	0.28					16	0.5	0.2	20	37	16	11	1.21		4.85										
	23/06/2006					4.95	131	0.23	-29																							
	29/06/2006					5.75	133	0.28																								
	6/07/2006					5.28	115	0.17	-21																							
	13/07/2006																			7.8												
	14/07/2006					5.33	132	0.27																								
	8/02/2007					5.05	150	0.33	-10				16	0.4	0.3	20	27	16		1.98		6.88										
	29/08/2007					5.69	178.4	0.24	110.9				17	0.4	0.6	15	28	16	10	2.08		5.76										
	26/10/2007					5.4	124.4	0.17					23	0.7	1	15	33	14	7	1.42		5.8										
	14/11/2007					5.76	129.3	0.22					22	0.3	2	13	38	21	7	1.5		6.78										
	2/09/2008					6.1	127.6																									
	4/09/2017		1.64	0.31	20.8	5.47	114	0.17	46		7.3	5	12	0.9	0.9	6	16	0.9	16	0.48	0.011	3.84	0.07	0.07	0.80	0.01	0.01	0.8	0.29	0.01		
	5/10/2017		1.77	0.18	21.7	5.53	9																									

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB2

2020/2021	7/07/2020	Cloudy	1.35	0.6	21.8	6.9	153	0.9	9.2	5	153	5	19	2	1	4	25	10	7	0.46	0.071	5.84	0.25	0.22	1.9	0.01	0.01	1.9	0.2	0.01		
	12/08/2020	Clear	1.22	0.73	21	5.2	98	0.77	-47	16	431	5	14	1	1	3	8	7	17	0.39	0.027	1.2	0.21	0.028	2	0.01	0.01	2	0.15	0.01		
	16/09/2020		1.36	0.59	20.8	5.49	118.4	2.01	26.1	14	4009.23	5	16	2	1	4	15	8	13	0.62	0.058	4.6	0.26	0.026	0.01	0.01	0.01	2	0.28	0.01		
	14/10/2020		1.57	0.38	20.2	6.09	123.3	1.74	-26.7	6	724.5	5	15	2	1	4	25	10	11	0.58	0.051	4.85	0.17	0.006	0.01	0.01	0.01	2	0.29	0.01		
	11/11/2020	Cloudy, Odour	1.61	0.34	21.3	5.72	159.7	1.86	-13.9	5	133.7		18	2	1	4	31	8	5	0.49	0.047	7.44	0.08	0.013	0.01	0.01	0.01	1.3	0.24	0.01		
	10/06/2021		1.25	0.7	20.6	5.32	121.2	1.23	80.33	10	13.5		17	2	1	4	21	8	11	0.32	0.001	0.05	0.07	0.002	1.3	0.01	0.01	1.3	0.31	0.01		
2021/2022	20/10/2021		1.2	0.75	20.9	5.18	174	0.53	92.4		10		22	2	2	5	31	8	11	0.34	0.01	6.01										
	25/01/2022		1.13	0.82	24.4	5.73	65	3.05	51.3		15		15	2	1	6	20	2	17	0.13	0.008	2.83	0.12			1.5	0.01	0.03	1.5	0.61	0.03	
	22/02/2022		1.2	0.75	25.05	5.31	69	1.83	70.7		14		15	2	15	6	30	2	10	0.12	0.007	2.55										
	27/04/2022		0.98	0.97	22.73	5.59	78	1.68	38.4		45.7		18	2	1	7	32	10	12	0.1	0.007	0.2	0.07			1.1	0.01	0.28	0.8	0.09	0.28	
	23/05/2022	Due to major flood event, high rainfall, and poor drainage the site was deemed inaccessible to undertake sampling during May 2022.																														
22/06/2022	Due to previous major flood events, ongoing rain and slow drainage, the site was deemed inaccessible to undertake sampling during June 2022.																															
2022/2023	27/07/2022		1.12	0.83	18.6	5.36	131	0.41	117		53		17	2	1	15	21	11	27	0.13	0.017	0.56										
	31/08/2022		1.37	0.58	18.66	5.49	96	1.68	210.1		40.2		24	2	2	13	28	11	22	0.19	0.012	0.71	0.09			1	0.01	0.18	0.8	0.01	0.18	
	28/09/2022	Groundwater level lower than surrounding bores	1.2	0.75	19.89	5.37	136	1.33	49.1		32.9		17	2	1	16	22	10	26	0.14	0.056	1.85										
	26/10/2022	Clear	1.03	0.92	20.4	5.45	189.9	2.55	86.5				17	3	2	19	28	12	19	0.12	0.051	2.6										
	29/11/2022		1.46	0.49	19.94	7.42	206	1.49	-32.1		13.1		16	4	2	21	33	14	21	0.13	0.069	2.54	0.12			1.3	0.01	0.14	1.2	0.24	0.14	
	23/01/2023	Ants	1.61	0.34	22	4.7	266	2.4	37		22.5		16	3	2	23	23	13	25	0.15	0.15	2.75										
	23/02/2023		1.6	0.35	22.5	5.35	190.5	1.89	64.4		32.8		22	2	2	13	6	1	25	0.45	0.189	3.13	0.13			1.5	0.01	0.01	1.5	0.26	0.01	
	29/03/2023	Ants	1.64	0.31	22.93	5.72	274	0.64	-98.1		54.3		25	2	2	10	39	3	26	0.44	0.05	3.16										
	27/04/2023		1.76	0.19	22.92	6.04	179	5.59	62.7		88.9		22	3	2	10	27	8	26	0.33	0.009	0.72										
	30/05/2023		1.56	0.39	21.29	5.07	147	0.11	86.5		116		22	3	2	11	28	10	22	0.17	0.007	0.62										
	28/06/2023		1.7	0.25	19.5	5.25	153	3.91	85.7		76.5		24	2	2	10	34	11	19	0.2	0.014	1.09	0.14			1.4	0.01	0.05	1.4	0.18	0.05	
31/07/2023		1.75	0.2	20.27	5.36	110	0.13	74.4		64.1		35	3	2	9	36	12	40	0.26	0.009	1.08											
2023/2024	23/08/2023	Laptop battery fail. Loggers returned to HMC offices to download & returned to site 24.08.2023	1.71	0.24	20.21	5.13	165	0.53	78.5		65.1		28	3	2	8	29	14	25	0.26	0.016	1.2										
	20/09/2023		1.68	0.27	20.3	5.06	127	5.66	85.5		58.8		21	2	2	9	22	16	29	0.22	0.013	0.73										
	25/10/2023		1.77	0.18	21.03	5.19	102	5.51	69.8		52.9		17	2	2	10	21	10	20	0.24	0.07	3.44	0.19			1.7	0.01	0.07	0.07	0.38	0.04	
	22/11/2023		1.41	0.54	20.65	5.58	66	5.72	67.1		28.5		15	2	2	8	19	10	19	0.21	0.078	2.4										
	19/12/2023		1.5	0.45	27.06	6.45	105	5.84	43.7		40.5		13	2	1	6	18	7	18	0.49	0.077	3.57	0.13			1.6	0.01	0.02	1.6	0.18		
	21/02/2024		1.13	0.82	24.84	5.04	99	4.51	100.1		22.5		10	2	2	9	18	8	10	0.12	0.009	1.24	0.05			0.5	0.01	0.01	0.5	0.15		
	28/03/2024		1.07	0.88	23.72	5.64	117	4.59			36.6		2	2	2	10	20	8	10	0.09	0.005	0.44										
	22/04/2024	Ants present	0.92	1.03	23.08	5.97	76	2.22	58.1		20.2		11	2	2	8	21	5	8	0.09	0.007	1.13										
	21/05/2024	Ants nesting in the bore casing	1.03	0.92	27.53	5.32	463	3.12	81.9		25.1		15	3	3	7	32	5	8	0.04	0.001	0.17										
	24/06/2024	Ants nesting in bore casing	1.2	0.75	20.42	5.72	137	2.14	64.1		64.1		13	2	1	6	23	3	14	0.48	0.017	2.04	0.11			1.2	0.01	0.01	1.2	0.2	0.01	
	23/07/2024	Ants nesting in bore casing	1.19	0.76	19.3	5.14	101	2.85	83.4		49.5		12	3	2	5	24	5	11	0.22	0.004	0.7										
2024/2025	26/08/2024	Ants nesting in bore casing	1.08	0.87	19.8	5.42	38	3.73	67.8		42.3		16	3	2	4	24	10	11	0.1	0.002	0.5										
	24/09/2024	Ants nesting in bore casing	1.26	0.69	20.5	5.45	150	3.72	84		26.3		15	2	1	6	23	1	12	0.5	0.028	3.73										
	23/10/2024		1.03	0.92	19.3	5.33	106	2.61	86.9		19.18		10	2	2	4	17	2	15	0.23	0.012	2.9	0.15			1.3	0.01	0.0	1.3	0.71	0.01	
	19/11/2024		0.97	0.98	21.1	5.03	164	0.85	82.5		11.3		10	3	2	3	14	6	15	0.13	0.008	1.6										
	21/01/2025	Ants nesting in bore	0.93	1.02	24.1	5.51	131	1.47	76.8		22.3		9	2	1	4	11	3	14	0.11	0.007	1.17										
	25/02/2025		1.13	0.82	24.4	5.63	120	1.41	80.1		19.5		8	2	1	4	12	2	15	0.16	0.008	1.49	0.06			0.6	0.01	0.0	0.6	0.17	0.01	
	25/03/2025		0.97	0.98	23.4	5.87	31	1.68	74.8		17.9		45	183	22	8	82	240	308	0.01	0.001	26.5										
	23/04/2025		1.02	0.93	24.5	5.72	133	0.96	75.1		19.3		12	3	2	4	23	6	10	0.06	0.001	0.17										
	27/05/2025		1.1	0.85	1.1	5.38	127	2.01	81.2		40.1		11	3	2	6	22	10	10	0.06	0.001	0.16	0.08			1.1	0.01	0.2	0.9	0.04	0.16	
	24/06/2025		1.09	0.86	20.0	5.63	194	1.76	71.3		41.9		10	3	2	5	18	8	10	0.12	0.002	0.52										
2025/2026	24/07/2025		1.02	0.93	19.3	5.6	92	1.93	81.4		37		10	3	2	4	9	9	14	0.1	0.002	0.37										
	19/08/2025	slightly cloudy brown	1.16		18.6	5.53	184	1.2	58.7		0.1		9	2	1	3	2	3	5	0.1	0.002	0.72	0.13			0.6	0.01	0.1	0.5	0.01	0.08	
	25/09/2025		1.18		19.8	5.52	117	3.33	-33.9		25.7		11	2	2	5	18	3	13	0.46	0.036	7.36										

Reporting Period (2025/2026)	Average	1.12	0.93	19.25	5.55	131	2.15	35.40	0.00	20.93	0.00	10.00	2.33	1.67	4.00	9.67	5.00	10.67	0.22	0.01	2.82	0.13	0.00	0.60	0.01	0.08	0.50	0.01	0.08
	Maximum	1.18	0.93	19.80	5.60	184	3.33	81.40	0.00	37.00	0.00	11.00	3.00	2.00	5.00	18.00	9.00	14.00	0.46	0.04	7.36	0.13	0.00	0.60	0.01	0.08	0.50	0.01	0.08
	Minimum	1.02	0.93	18.61	5.52	92	1.20	-33.90	0.00	0.10	0.00	9.00	2.00	1.00	3.00	2.00	3.00	5.00	0.10	0.00	0.37	0.13	0.00	0.60	0.01	0.08	0.50	0.01	0.08
All Results	Average	1.53	0.41	21.91	5.71	328	1.48	33.84	14.65	104.87	5.00	33.76	6.42	3.06	9.65	52.82	33.26	17.55	0.61	0.03	9.13	0.09	0.02	0.97	0.01	0.03	1.02	0.30	0.03
	Maximum	2.89	1.03	27.53	7.72	2394	5.84	216.00	62.00	4009.23	5.00	119.00	183.00	22.00	26.00	189.00	240.00	308.00	6.37	0.19	37.40	0.26	0.22	2.00	0.01	0.28	2.00	0.77	0.28
	80th Percentile	1.77	0.84	24.36	6.09	473	2.53	81.36	26.60	55.20	5.00	69.60	7.80	5.00	14.00	100.80	70.60	21.60	0.60	0.06	19.26	0.13	0.03	1.42	0.01	0.01	1.50	0.39	0.02
	Median (50th Percentile)	1.54	0.39	22.03	5.56	158	0.80	54.85	8.00	20.20	5.00	18.00	2.00	2.00	9.00	28.00	13.00	12.50	0.20	0.02	4.85	0.07	0.01	0.90	0.01	0.01	0.90	0.28	0.01
	20th Percentile	1.12	0.16	20.21	5.25	116	0.28	-20.80	5.00	6.94	5.00	13.00	2.00	1.00	5.00	19.60	6.60	7.32	0.12	0.01	1.11	0.05	0.01	0.60	0.01	0.01	0.60	0.18	0.01
	Minimum	0.92	-0.94	1.10	4.62	31	0.11	-130.00	2.00	0.00	5.00	2.00	0.20	0.20	3.00	2.00	0.90	1.00	0.01	0.00	0.05	0.02	0.00	0.01	0.01	0.01	0.07	0.01	0.01

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB11

Site: MB11			Physical									Major Cations & Anions							Metals			Nutrients								
Sample Date		Comments	Water Level Top of Casing	Water Level m AHD	Temp °C	pH	Electrical Conductivity uS/cm	Dissolved Oxygen mg/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L
			Objective	-	-	6.5-8.5	<3000	-	-	-	-	10	<500	-	<100	<40	<1000	<800	<400	<0.5	<0.42	<20	-	-	-	-	-	-	<20	-
Pre-Extraction	16/06/2005																													
						6.81	1625	0.65					220	211	72	19	300	484		3.13		11								
	19/07/2005					7.42	1553	1.00					127	289	65	11	311	456	302	0.64		3.57								
	5/08/2005					7.54	1492	1.13																						
	10/11/2005					7.37	1505	0.54					51	191	50	11	90	520	235	0.15		1.08								
	12/01/2006					7.25	1743	0.40					149	215	67	16	74		432	0.15		3.14								
	3/05/2006																	360												
	8/02/2007					7.32	1312	2.11	-144																					
	2/09/2008					7.6	1552																							
	4/09/2017	Purged for 5 mins to clear debris - sulphide (black) particles & ants removed. Strong odour	1.39	0.2	19.1	7.14	1056	0.37	-74		43.1	5	39	180	49	10	47	328	351	0.39	0.001	5.42	0.64	0.01	4.60	0.01	0.01	4.6	1.48	0.01
	5/10/2017	Few black particles (sulphides)	1.29	0.3	20.8	7.08	1174	1.99	-104	5	11.3	5	34	168	45	9	54	346	345	0.01	0.001	0.87	0.42	0.27	2.80	0.01	0.01	2.8	1.8	0.01
2017/2018	30/10/2017	Commencement of extraction																												
	28/11/2017		1.21	0.38	24.5	7.56	1130	0.98	-36.4	5	0.1	5	37	173	48	10	48	335	352	0.01	0.001	0.09	0.24	0.16	2.20	0.33	0.39	1.5	0.54	0.72
	13/12/2017		1.25	0.34	24.5	7.37	1365	0.18	-134		0.7		41	181	55	11	50	347	317	0.01	0.001	0.08	0.29	0.19	1.80	0.06	0.32	1.4	1.15	0.38
	11/01/2018		1.48	0.11	27.1	7.34	1234	1.16	-139		9.4	5	38	192	51	11	46	324	326	0.01	0.001	0.06	0.31	0.28	2.10	0.02	0.02	2.1	1.66	0.04
	24/01/2018		1.56	0.03	24.6	6.99	1222	0.37	-30		6.6		20	33	8	2	17	21	98	0.01	0.001	3.58	0.1	0.01	0.20	0.01	0.02	0.2	0.04	0.02
	6/02/2018		1.37	0.22	25.5	7.29	1334	0.73	-88		3.7	5	39	172	47	10	49	334	341	0.01	0.001	0.38	0.24	0.22	1.40	0.04	0.11	1.3	0.94	0.15
	8/02/2018	Last day of first extraction campaign.																												
	8/03/2018		0.77	0.82	23.9	6.89	1115	0.28	-42		7.8		35	170	42	10	55	338	324	0.02	0.001	0.16	0.24	0.16	1.80	0.03	0.56	1.2	0.47	0.59
	13/04/2018		1.24	0.35	24	7.45	1531	3.1	-91		5.4		85	176	52	11	46	337	320	0.01	0.001	0.26	0.2	0.12	1.30	0.03	0.3	1	0.53	0.33
	31/05/2018		1.13	0.46	21.6	7.32	1083	2.02	41		8.8	5	33	160	41	9	43	326	336	0.01	0.001	1.25	0.23	0.03	1.50	0.01	0.07	1.4	0.66	0.08
2018/2019	24/10/2018		1.03	0.56	20.7	7.29	1345	0.14	-238	11	6.7	5	33	166	53	10	52	387	333	0.05	0.005	0.21	0.51	0.34	2.4	0.05	0.2	2.2	1.26	0.25
	3/12/2018		1.48	0.11	22	7.51	1625	2.74	-285	20	9.1		39	201	45	10	83	222	466	0.02	0.001	0.45	0.9	1	6.8	0.01	0.03	6.8	5.9	0.03
	17/12/2018		1.27	0.32	21.6	7.75	1303	0.64	-295	32	13.4		41	161	42	11	115	174	500	0.02	0.001	0.47	1.37	0.89	11.8	0.01	0.08	11.7	9.71	0.08
	15/01/2019		1.56	0.03	24.2	7.24	1388	0.26	-334.6	6	3.7	5	38	177	45	10	81	203	460	0.01	0.001	0.08	0.75	0.63	5.2	0.01	0.01	5.2	5.22	0.01
	6/02/2019		1.63	-0.04	24.8	7.21	1183	1.1	-309	35	2.7		36	165	42	9	54	280	364	0.01	0.001	0.72	0.3	0.261	2.6	0.01	0.01	2.6	1.15	0.01
	21/02/2019		1.72	-0.13	23.4	7.18	1242	0.27	297.1	5	25.5		50	43	45	10	43	286	331	0.01	0.001	0.19	0.36	0.05	1.8	0.01	0.03	1.8	1.18	0.03
	6/03/2019		1.65	-0.06	26.2	7.38	1272	7.07	-243	5	0.6		42	164	43	11	44	277	350	0.05	0.001	0.39	0.32	0.355	1.4	0.1	0.01	1.4	0.96	0.01
	20/03/2019		0.89	0.7	25.5	7.36	1744	0.48	-34.8	8	0.88		44	180	54	12	46	303	343	0.01	0.001	0.73	0.22	0.098	1.4	0.01	0.01	1.4	0.6	0.01
	4/04/2019		0.74	0.85	25.5	7.32	1498	0.34	-33.5	93	0.75	5	50	192	50	12	52	282	367	0.01	0.001	0.08	0.61	0.464	3.6	0.01	0.01	3.6	2.75	0.01
	1/05/2019		0.96	0.63	22.9	7.02	1264	0.1	-354	18	21.2		40	195	50	11	88	172	496	0.01	0.001	0.34	0.71	0.342	5.6	0.01	0.03	5.6	4.42	0.03
5/06/2019		1.2	0.39	21.2	7.6	1212	2	-288	9	-5.5		42	193	52	11	50	312	360	0.02	0.001	0.11	0.34	0.267	2.4	0.01	0.01	2.4	1.84	0.01	
2019/2020	4/07/2019		0.9	0.69	19.83	7.58	1935	0.2	-145.1	5	25.1	5	45	198	54	11	50	319	348	0.01	0.001	0.26	0.19	1.75	1.2	0.01	0.01	1.2	0.78	0.01
	31/07/2019		1.22	0.37	19.4	7.48	1901	2.92	-138.3	5	34.8		36	189	48	10	44	302	369	0.01	0.001	0.13	0.24	0.229	1.6	0.01	0.01	1.6	1.27	0.01
	4/09/2019		1.34	0.25	20.4	7.3	1398	0.6	-100.9	5	40.6		32	167	42	9	42	310	340	0.01	0.001	0.23	0.16	0.1	1.6	0.01	0.01	1.6	1.67	0.01
	2/10/2019		1.52	0.07	21.5	7.4	1349																							

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB11

2023/2024	31/07/2023		1.46	0.13	17.16	7.41	1166	2.66	-29.4		1.9		31	151	42	9	51	205	346	0.01	0.001	0.1								
	23/08/2023	Laptop battery fail. Loggers returned to HMC offices to download & returned to site 24.08.2023																												
			1.94	-0.35	18.65	7.39	1170	2.47	-37.9		19		33	165	47	9	42	237	349	0.01	0.001	0.13								
	20/09/2023		2.21	-0.62	19.17	7.11	1043	6.68	-17.1		77.5		28	149	37	9	43	146	360	0.01	0.001	0.17								
	25/10/2023		2.27	-0.68	19.4	7.3	1103	6.75	-32.1		21		29	139	38	9	39	169	351	0.01	0.001	1.62	0.19		0.7	0.01	0.01	0.01	0.23	0.01
	22/11/2023		1.74	-0.15	21.11	7.13	1103	6.73	-20.5		13.6		31	151	40	9	41	185	338	0.01	0.001	4.25								
	19/12/2023		2.15	-0.56	20.98	7.24	1413	0.34	-26.4		1.6		37	191	52	10	46	354	352	0.01	0.001	3.36	0.25		1.2	0.02	0.12	1.1	0.25	
	21/02/2024		1.24	0.35	23.38	7.06	1722	4.64	-7.4		6.9		36	223	53	11	43	478	335	0.01	0.001	3.23	0.16		0.7	0.02	0.08	0.6	0.22	
	28/03/2024		1.17	0.42	23.43	6.99	2168	3.56			12.4		103	355	103	13	52	984	293	0.01	0.001	9.5								
	22/04/2024		0.92	0.67	21.58	7.43	2559	3.82	-31.9		140		48	411	130	14	52	1640	226	0.01	0.001	2.09								
21/05/2024	Ants present. Water very turbid orange	1.03	0.56	20.71	7.03	2844	3.26	-7.6		392		52	592	173	17	52	2240	102	0.01	0.001	56.8									
24/06/2024	Water turbid orange	2.05	-0.46	20.47	7.08	2781	3.74	-8.7		332		50	534	158	16	44	2000	151	0.01	0.001	40.1	0.41		1.1	0.06	0.01	1.1	0.33	0.01	
2024/2025	23/07/2024	Water turbid orange	1.64	-0.05	18.8	7.05	2871	3.04	-11.6		668		46	450	139	17	42	1500	183	0.01	0.001	28.9								
	26/08/2024	Water turbid orange	1.33	0.26	19.1	6.75	1739	3.81	-10.5		122		24	233	64	11	26	729	190	0.01	0.001	30.7								
	24/09/2024	Water turbid orange	2.18	-0.59	19.9	6.91	1891	3.52	-20.2		185		18	173	42	10	23	450	203	0.01	0.001	34.5								
	23/10/2024		1.45	0.14	19.8	6.62	1618	2.93	-24.8		60.81		19	189	53	11	18	556	235	0.01	0.001	28.7	0.22		0.8	0.01	0.0	0.8	0.13	0.01
	19/11/2024		1.47	0.12	21.2	6.63	974	1.24	3.2		87.8		13	104	20	8	14	153	196	0.01	0.001	29.3								
	21/01/2025		0.79	0.8	25.1	7.01	1188	1.62	-0.3		147		14	116	23	9	16	200	187	0.01	0.001	7.22								
	25/02/2025		1.36	0.23	25.6	7.12	1714	1.85	-5.5		48.2		37	324	78	12	43	776	274	0.01	0.001	8.61	0.17		1	0.01	0.1	1	0.35	0.05
	25/03/2025		0.8	0.79	24.1	7.09	1817	1.85	-8.7		47.3		40	308	67	12	65	755	312	0.01	0.001	0.12								
	23/04/2025		1.07	0.52	23.3	7.51	1782	3.06	-33.7		104		39	285	62	11	60	652	324	0.01	0.001	0.05								
	27/05/2025	Orange flocking	1.48	0.11	1.5	6.93	2281	1.3	-6.1		166		36	375	92	13	40	981	277	0.01	0.001	11.3	0.17		1.1	0.01	0.0	1.1	0.32	0.01
24/06/2025		1.41	0.18	21.2	7.11	1984	1.78	-15.1		219		37	316	72	11	50	716	302	0.01	0.001	9.78									
2025/2026	24/07/2025		1.57	0.02	18.8	7.01	1803	1.54	-12.6		97.6		26	316	77	13	27	749	215	0.01	0.001	22.6								
	19/08/2025		1.59		19.1	6.76	1857	1.08	-13.4		0.4		30	290	70	12	40	870	254	0.01	0.001	16.8	0.29		0.9	0.01	0.0	0.9	0.22	0.01
	25/09/2025		1.19		19.6	6.76	2480	2.32	-44.1		194.6		37	309	64	11	56	534	314	0.01	0.001	2.23								

Reporting Period (2025/2026)	Average	1.45	0.02	19.19	6.8	2046.7	1.65	-23.37	0.00	97.53	0.00	31.0	305.00	70.3	12.00	41.00	717.7	261.00	0.01	0.001	13.88	0.29	0.00	0.90	0.01	0.01	0.90	0.22	0.01
	Maximum	1.59	0.02	19.60	7.0	2480.0	2.32	-12.60	0.00	194.60	0.00	37.0	316.00	77.0	13.00	56.00	870.0	314.00	0.01	0.001	22.60	0.29	0.00	0.90	0.01	0.01	0.90	0.22	0.01
	Minimum	1.19	0.02	18.83	6.8	1803.0	1.08	-44.10	0.00	0.40	0.00	26.0	290.00	64.0	11.00	27.00	534.0	215.00	0.01	0.001	2.23	0.29	0.00	0.90	0.01	0.01	0.90	0.22	0.01
All Results	Average	1.28	0.31	21.47	7.2	1415.5	2.03	-71.42	23.70	61.03	5.00	40.3	198.44	52.3	10.43	53.51	403.3	314.82	0.07	0.002	5.13	0.36	0.35	2.14	0.02	0.11	2.19	1.44	0.12
	Maximum	2.27	1.46	27.10	7.8	2871.0	7.67	297.10	140.00	668.00	5.00	220.0	592.00	173.0	19.00	311.00	2240.0	500.00	3.13	0.063	56.80	1.37	1.75	11.80	0.33	1.30	11.70	9.71	1.30
	80th Percentile	1.57	0.67	24.48	7.4	1743.4	3.16	-8.70	33.20	87.80	5.00	42.0	223.00	64.0	12.00	52.00	520.0	360.00	0.02	0.001	5.78	0.61	0.56	2.90	0.02	0.19	3.30	1.84	0.22
	Median (50th Percentile)	1.25	0.34	21.19	7.2	1253.0	1.78	-34.80	11.00	13.25	5.00	35.0	173.00	45.0	10.00	46.00	284.0	336.00	0.01	0.001	0.42	0.29	0.26	1.60	0.01	0.01	1.50	0.96	0.01
	20th Percentile	0.92	0.03	19.40	7.0	1082.6	0.56	-165.58	5.00	2.10	5.00	27.0	151.00	38.0	9.00	40.00	174.0	255.60	0.01	0.001	0.10	0.19	0.10	0.90	0.01	0.01	1.00	0.23	0.01
Minimum		0.13	-0.68	1.48	5.3	157.8	0.10	-354.00	5.00	-5.50	5.00	13.0	2.00	1.0	2.00	14.00	11.0	3.00	0.01	0.001	0.05	0.08	0.01	0.01	0.01	0.01	0.01	0.01	0.01

Red and bold values exceed the objective value for that analyte. IS - Insufficient data for statistical analysis. NS = No Sample Required. ND = No Data. NLM = No Longer Monitored

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB12

Site: MB12			Physical										Major Cations & Anions							Metals			Nutrients								
Sample Date		Comments	Water Level Top of Casing	Water Level m AHD	Temp °C	pH	ElectricalConductivity uS/cm	Dissolved Oxygen mol/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L	
			Objective	-	-	-	6.5-8.5	<3000	-	-	-	-	10	<500	-	<100	<40	<1000	<800	<400	<0.5	<0.42	<20	-	-	-	-	-	-	<20	-
Pre-Extraction	16/06/2005					6.9	1588	0.68					66	433	54	13	147	706		0.74		2.98									
	19/07/2005					6.8	1587	0.54					43	322	59	12	87	528	223	0.12		1.61									
	5/08/2005					7.5	1619	1.02																							
	10/11/2005					7.150	1531.000	0.110					47.00	219.000	54.000	11.000	62.000	643.000	238.000	0.18		1.310									
	12/01/2006					7.110	1818.000	0.110					39.00	261.000	58.000	12.000	54.000		230.000	0.15		1.450									
	3/05/2006																	410													
	8/02/2007					7.2	1433	1.55	-98.0																						
	2/09/2008					7.4	1962																								
	4/09/2017	Purged for 5 mins to clear debris	1.19	0.18	20.7	6.74	1795	0.09	-54		7.1	5	55	375	52	12	122	646	329	0.01	0.001	20.4	0.11	0.02	0.60	0.01	0.01	0.6	0.33	0.01	
	5/10/2017		1.06	0.31	21.9	6.91	2080	1.65	-72.9	15	20.1	5	45	362	46	10	131	720	317	0.009	0.001	14.2	0.11	0.01	0.60	0.01	0.01	0.6	0.34	0.01	
2017/2018	30/10/2017	Commencement of extraction																													
	28/11/2017		0.99	0.38	24.1	7.16	1795	3.75	8	14	32.7	5	49	363	49	11	138	728	340	0.01	0.001	0.05	0.01	0.01	0.70	0.01	0.3	0.4	0.12	0.3	
	11/01/2018		1.24	0.13	25.6	7.04	1836	1.43	-69		21.8	5	44	373	49	11	112	719	304	0.01	0.001	0.05	0.03	0.01	0.80	0.01	0.02	0.8	0.34	0.02	
	24/01/2018		1.32	0.05																											
	6/02/2018		1.15	0.22	26.5	6.82	1984	0.74	-81		7.1	5	42	336	46	11	115	686	319	0.01	0.001	7.65	0.05	0.01	0.5	0.01	0.01	0.5	0.38	0.02	
	8/02/2018	Last day of first extraction campaign.																													
	31/05/2018		0.9	0.47	20.3	6.96	1593	2	45		47.9	5	38	324	40	10	111	658	324	0.01	0.001	11.7	0.03	0.01	0.40	0.01	0.05	0.4	0.36	0.05	
2018/ 2019	24/10/2018		0.79	0.58	19.9	6.98	1580	1.83	-69	5	9.9	5	29	324	43	10	122	771	290	0.05	0.005	0.05	0.03	0.01	0.8	0.02	0.44	0.3	0.1	0.46	
	15/01/2019		1.33	0.04	24.4	6.86	1810	0.63	-124.1	32	32.4	5	49	342	42	10	115	653	314	0.01	0.001	13.6	0.01	0.01	0.5	0.01	0.02	0.5	0.38	0.02	
	4/04/2019		0.52	0.85	25.03	7.04	2146	2.17	-17.5	43	1.09	5	55	371	43	11	91	664	313	0.01	0.001	0.06	0.02	0.007	0.6	0.01	0.02	0.6	0.38	0.02	
	4/07/2019		0.69	0.68	20.49	7.26	2667	2.77	73.5	29	33.6	5	57	354	41	11	84	596	316	0.01	0.001	0.61	0.02	0.001	0.7	0.01	0.18	0.5	0.25	0.18	
2019 / 2020	2/10/2019		1.3	0.07	20.7	7.1	2055	3.1	1	5	74.4	5	67	350	41	11	89	666	278	0.01	0.001	0.05	0.01	0.001	0.5	0.01	0.36	0.1	0.01	0.36	
	15/01/2020	pH 11.2 - meter calibration issue - spurious data.	1.58	-0.21	22.4		1885	1.7	-80	5	7.4		76	334	39	12	72	673	268				0.01	0.01	0.2	0.01	0.04	0.2	0.03	0.04	
	28/04/2020	Land-based extraction commenced 16/04/20.	0.82	0.55	23.3	7.2	1757	6.78	-75.2	28	19.9	5	79	259	35	11	72	675	288	0.01	0.001	4.98	0.01	0.003	0.8	0.01	0.08	0.7	0.37	0.08	
	6/07/2020		0.9	0.47	20.2	6.4	1755	5.6	28	155	24	5	82	331	36	11	59	790	309	0.01	0.001	12.8	0.04	0.026	0.7	0.01	0.09	0.6	0.31	0.09	
2020/2021	13/08/2020	Clear	0.73	0.64	21.1	6.7	1814	3.8	77	12	138	5	94	302	38	12	64	759	310	0.01	0.001	0.05	0.22	0.001	0.9	0.01	0.06	0.8	0.28	0.06	
	16/09/2020		0.87	0.5	19.7	6.68	1866	1.62	172	5	197.64	5	98	308	39	12	64	794	306	0.01	0.001	0.05	0.04	0.004	0.24	0.01	0.24	0.2	0.02	0.24	
	14/10/2020		1.21	0.16	20.5	6.74	1766	0.52	-177.9	26	71.8	5	90	317	37	11	64	699	302	0.01	0.001	8.55	0.14	0.001	0.01	0.01	0.01	0.6	0.36	0.01	
	11/11/2020	Ants & Eggs	1.16	0.21	20.7	7.21	1995	1.66	-117.1	42	10.4		82	309	36	10	81	756	378	0.01	0.001	17.7	0.13	0.001	0.01	0.01	0.01	0.6	0.31	0.01	
	24/02/2021	Clear, ants	0.52	0.85	23.7	7.05	1917	1.33	-145.2	32	25.2		34	314	40	11	68	790	287	0.01	0.001	15.6	0.02	0.002	0.6	0.01	0.04	0.6	0.38	0.04	
	10/06/2021		0.89	0.48	20.3	7.29	1974	5.83	2.8	23	5.49		88	318	42	12	86	814	285	0.01	0.001	3.86	0.01	0.001	0.5	0.01	0.43	0.1	0.05	0.43	
	20/10/2021		0.89	0.48	19.4	7.21	1213	2.25	-23.3		4.1		32	165	44	9	41	255	353	0.01	0.001	0.8									
2021/2022	25/01/2022		0.88	0.49	24.42	7.63	1094	3.7	-70		67		31	190	42	10	35	256	357	0.01	0.001	0.19	0.32		1.5	0.01	0.29	1.2	0.67	0.3	
	22/02/2022		0.72	0.65	24.27	7.19	1858	1.68	-38.2		6		79	317	46	12	248	650	246	0.01	0.001	6.69									
	27/04/2022		0.56	0.81	21.6	7.41	1712	1.71	-66.3		13		87	265	40	9	318	430	193	0.01	0.007	0.05	0.06		0.9	0.01	0.4	0.5	0.03	0.4	
	23/05/2022	Due to major flood event, high rainfall, and poor drainage the site was deemed inaccessible to undertake sampling during May 2022.																													
2022/2023	22/06/2022	Due to previous major flood events, ongoing rain and slow drainage, the site was deemed inaccessible to undertake sampling during June 2022.																													
	27/07/2022		0.67	0.7	17.66	7.18	1948	0.37	132.1		22.4		69	266	45	9	260	482	206	0.01	0.001	0.05									
	31/08/2022		0.86	0.51	7.48	7.2	2083	1.71	192.8		4.2		81	278	47	11	3														

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB12

2024/2025	23/07/2024		1.4	-0.03	18.8	7.17	1183	3.19	-20.5		19.5		53	140	16	8	101	94	364	0.01	0.001	0.05								
	26/08/2024		1.11	0.26	18.7	6.91	2297	3.95	-22.6		10.4		51	160	16	8	107	101	298	0.01	0.001	0.09								
	24/09/2024		1.95	-0.58	19.6	7.04	1138	2.75	28.9		69.9		56	161	18	8	104	105	327	0.01	0.001	0.09								
	23/10/2024		1.23	0.14	19.8	6.75	1045	2.69	-20.7		6.62		49	159	19	8	96	111	348	0.01	0.001	3.3	0.03		1	0.02	0.1	0.9	0.26	0.1
	19/11/2024		1.27	0.1	21.3	6.51	1219	1.26	-4.3		6.3		53	174	19	8	96	114	361	0.01	0.001	4.48								
	21/01/2025		0.55	0.82	24.3	7.13	1173	2.12	-8.8		13.7		58	163	20	8	106	140	338	0.01	0.001	5.9								
	25/02/2025		1.13	0.24	25.0	7.17	1138	1.68	-7.9		11.7		56	164	21	9	102	146	314	0.01	0.001	7.9	0.02		1.1	0.01	0.1	1	0.25	0.13
	25/03/2025		0.57	0.8	23.7	6.92	1309	1.19	-0.2		11.5		9	2	2	4	14	4	10	0.09	0.005	0.59								
	23/04/2025		0.85	0.52	23.6	7.24	1159	3.39	-19.2		208		43	183	22	8	68	243	298	0.01	0.001	2.45								
	27/05/2025		1.26	0.11	1.3	6.95	1301	1.91	-6.7		119		45	182	21	8	68	247	317	0.01	0.001	33	0.31		1.6	0.01	0.1	1.6	0.63	0.05
	24/06/2025	Orange floccing	1.19	0.18	21.3	7.19	292	1.58	-18.5		281		41	176	20	7	61	248	281	0.01	0.001	10.4								
2025/2026	24/07/2025	Turbid Water	1.35	0.02	18.8	7.07	1109	2.37	-14.4		66.7		33	185	22	7	50	205	264	0.01	0.001	21.1								
	19/08/2025		1.37		19.2	6.68	1123	1.19	-10.5		0.2		31	153	20	7	46	254	269	0.01	0.001	10.4	0.24		1.5	0.01	0.0	1.5	0.45	0.04
	25/09/2025		0.97		19.8	6.91	1041	2.95	-117.3		4.7		29	175	18	6	45	207	277	0.01	0.001	23.5								

Reporting Period (2025/2026)	Average	1.23	0.02	19.24	6.9	1091.0	2.17	-47.40	0.00	23.87	0.00	31.0	171.00	20.0	6.67	47.00	222.0	270.00	0.01	0.001	18.33	0.24	0.00	1.50	0.01	0.04	1.50	0.45	0.04
	Maximum	1.37	0.02	19.80	7.1	1123.0	2.95	-10.50	0.00	66.70	0.00	33.0	185.00	22.0	7.00	50.00	254.0	277.00	0.01	0.001	23.50	0.24	0.00	1.50	0.01	0.04	1.50	0.45	0.04
	Minimum	0.97	0.02	18.75	6.7	1041.0	1.19	-117.30	0.00	0.20	0.00	29.0	153.00	18.0	6.00	45.00	205.0	264.00	0.01	0.001	10.40	0.24	0.00	1.50	0.01	0.04	1.50	0.45	0.04
All Results	Average	1.08	0.29	20.73	7.1	1677.3	2.56	-8.84	29.44	41.86	5.00	62.3	261.03	34.7	10.05	135.91	462.1	288.92	0.03	0.001	4.78	0.07	0.01	0.73	0.01	0.17	0.61	0.23	0.18
	Maximum	2.06	0.85	26.50	7.6	2667.0	7.95	192.80	155.00	281.00	5.00	108.0	433.00	59.0	13.00	474.00	814.0	378.00	0.74	0.007	33.00	0.32	0.03	1.60	0.02	0.50	1.60	0.67	0.50
	80th Percentile	1.33	0.64	23.72	7.3	2017.8	3.78	28.72	38.00	66.70	5.00	87.0	326.00	44.0	12.00	243.00	686.0	327.40	0.01	0.001	10.40	0.11	0.01	1.00	0.01	0.37	0.90	0.38	0.37
	Median (50th Percentile)	1.03	0.34	20.70	7.1	1766.0	1.96	-18.80	24.50	20.50	5.00	56.5	280.00	38.0	11.00	105.50	487.0	297.00	0.01	0.001	0.61	0.03	0.01	0.65	0.01	0.08	0.60	0.27	0.10
	20th Percentile	0.75	0.05	19.07	6.8	1204.0	1.19	-69.00	5.00	6.30	5.00	42.0	175.00	20.0	8.00	64.00	205.0	253.00	0.01	0.001	0.05	0.01	0.00	0.50	0.01	0.02	0.30	0.02	0.02
	Minimum	0.52	-0.69	1.26	6.4	292.0	0.09	-177.90	5.00	0.20	5.00	9.0	2.00	2.0	4.00	14.00	4.0	10.00	0.01	0.001	0.05	0.01	0.00	0.01	0.01	0.01	0.10	0.01	0.01

Red and bold values exceed the objective value for that analyte. IS - Insufficient data for statistical analysis. NS = No Sample Required. ND = No Data. NLM = No Longer Monitored

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB13

MB13		Physical										Major Cations & Anions							Metals			Nutrients										
Sample Date		Comments	Water Level Top of Casing	Water Level m AHD	Temp °C	pH	Electrical Conductivity uS/cm	Dissolved Oxygen mol/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L		
			Objective	-	-	6.5-8.5	<36384	-	-	-	-	10	<6884	-	<1146	<215	<12600	<2276	<545	<0.5	<0.42	<20	-	-	-	-	-	-	<20	-		
Pre-Extraction	16/06/2005				6.87	32200	0.22						6940	1170	2040	215	15198	4000		0.75		19										
	19/07/2005				6.36	36800	0.24						6870	559	1050	217	247	2260	304	0.17		1.8										
	5/08/2005				7.18	33300	1.22																									
	10/11/2005				6.84	32300	0.24						6600	609	925	127	12600	2110	401	0.08		10										
	12/01/2006				6.77	35400	0.45						6040	2350	1370	240	11365		194	0.32		6.06										
	3/05/2006																	2170														
	8/02/2007				7.1	21800	1.48	-250																								
	2/09/2008				7	38200																										
	4/09/2017	Purged for 5 mins to clear debris	1.46	0.25	20.7	6.63	2826	0.05	-34			5.9	5	6850	539	1090	200	12600	2240	534	0.05	0.005	0.05	0.56	0.02	0.80	0.01	0.3	0.5	0.14	0.3	
	5/10/2017		1.63	0.08	24	6.8	33318	2.97	-52.3	26	1.6	5	5700	533	888	157	12200	2160	496	0.009	0.001	13.7	0.27	0.01	2.90	0.01	0.02	2.9	2.59	0.02		
2017/2018	30/10/2017	Commencement of extraction																														
	28/11/2017		1.53	0.18	24.5	6.79	30674	2.56	-58.2	33	24.2	5	6070	551	935	168	10900	2300	544	0.01	0.001	0.05	0.3	0.01	3.40	0.33	0.13	2.9	2.3	0.46		
	11/01/2018		1.8	-0.09	24.4	6.83	30446	2.17	-81		39.6		7080	629	1060	189	11700	1540	466	0.05	0.005	0.05	0.22	0.01	4.50	0.35	0.33	3.8	2.36	0.68		
	24/01/2018		1.88	-0.17																												
	6/02/2018		1.7	0.01	24.3	6.76	34036	2.42	-73		30.1	5	5970	541	908	163	12000	2170	495	0.01	0.001	10.2	0.16	0.01	2.7	0.18	0.09	2.4	2.41	0.27		
	8/02/2018	Last day of first extraction campaign.																														
2018/2019	31/05/2018		1.6	0.11	22.1	6.87	29235	0.73	-41		3.8	5	5420	430	821	150	11400	1980	503	0.05	0.005	11.7	0.08	0.01	2.30	0.03	0.05	2.2	2.32	0.08		
	24/10/2018		1.38	0.33	20.1	6.82	35760	1.33	-24	5	0.7	5	5860	530	892	155	11400	2270	468	0.05	0.005	0.05	0.06	0.01	1.4	0.01	0.01	1.4	1.03	0.01		
	15/01/2019		1.9	-0.19	23.4	6.66	29980	0.38	-217.2	19	0.9	5	5200	503	845	147	11400	1990	547	0.05	0.005	2.79	0.59	0.01	4.6	0.01	0.01	4.6	4.49	0.01		
	4/04/2019	Very dark colour			25.42	7.33	37420	0.74	-34	22	23.7	5	6820	595	1020	186	10500	1860	582	0.05	0.005	0.34	1	0.848	4.8	0.01	0.01	4.8	3.63	0.01		
2019 / 2020	4/07/2019		1.24	0.47	20.72	7.12	46890	0.91	72	13	12.2	5	6530	609	1000	182	11100	2000	571	0.05	0.005	0.99	0.32	0.325	5.7	0.01	0.01	5.7	4.82	0.01		
	2/10/2019		1.85	-0.14	20.4	6	35800	2.9	-68.9	6	24.3	5	6700	601	1070	183	11500	2050	488	0.05	0.005	2.91	0.08	0.076	4.6	0.01	0.01	4.6	3.47	0.01		
	15/01/2020	pH 9.0 - meter calibration issue - spurious data.	2.12	-0.41	22.9		32749	0.6	-267	7	5.4		6060	568	959	167	11000	1860	597				0.99	0.5	11.5	0.01	0.01	11.5	9.21	0.01		
	28/04/2020	Land-based extraction commenced 16/04/20.	1.4	0.31	23.4	6.8	31094	1.14	-206.7	16	92.5	5	6520	592	1030	174	11500	2050	545	0.05	0.005	0.31	0.73	0.743	7.6	0.01	0.01	7.6	5.79	0.01		
2020/2021	6/07/2020		1.47	0.24	20.8	6.2	31499	0.9	-156	5	9.4	5	6080	578	954	169	10700	2220	557	0.01	0.001	0.14	1.2	0.827	6.1	0.01	0.02	6.1	5.12	0.02		
	13/08/2020	Clear	1.3	0.41	21.1	7.1	31437	0.9	-117	5	4.1	5	5830	519	944	158	11100	1880	581	0.05	0.005	1.6	0.52	0.492	5.1	0.01	0.01	5.1	4.7	0.01		
	16/09/2020		1.41	0.3	19.1	6.5	33096	1.34	-70.3	11	112.75	5	6030	580	932	166	12100	2270	560	0.05	0.005	3.22	0.16	0.106	0.01	0.01	0.01	4.2	3.83	0.01		
	14/10/2020		1.78	-0.07	20	6.75	31185	0.53	-195	18	5.3	5	6050	576	955	174	11200	2040	491	0.05	0.005	8.55	0.2	0.001	0.01	0.01	0.01	3.6	3.51	0.01		
	11/11/2020	Ants & Eggs	1.73	-0.02	21	6.6	32924	1.04	-66.4	22	0.4		6220	588	1040	168	11600	2040	476	0.01	0.005	11	0.2	0.152	0.01	0.01	0.01	3.3	2.94	0.01		
	24/02/2021	Clear, ants	1.08	0.63	25.4	6.47	32870	1.02	-57.6	14	48.4		6090	621	949	171	11600	2320	504	0.05	0.005	8.64	0.3	0.276	3.3	0.01	0.01	3.3	3.38	0.01		
	10/06/2021	Ants	1.41	0.3	20.6	6.85	30919	4.45	-47.7	10	97.61		5970	557	905	174	11300	2110	490	0.01	0.001	5.75	0.27	0.001	2.9	0.01	0.01	2.9	2.4	0.01		
	20/10/2021	Ants	1.22	0.49	20.1	6.85	33440	1.1	-3.6		78		6770	617	1040	204	11000	1870	544	0.05	0.005	3.46										
2021/2022	25/01/2022		1.2	0.51	23.66	6.81	32976	2.17	-23.1		92		6660	607	1020	180	11400	2060	540	0.05	0.005	4.9	0.41		4.2	0.03	0.38	3.8	3.23	0.41		
	22/02/2022		1.28	0.43	23.5	7.04	36440	1.39	-29.7		94		5640	491	882	153	11100	1980	481	0.01	0.001	4.39										
	27/04/2022		1.13	0.58	21.7	6.87	30010	1.24	-34.6		101		5070	452	768	139	10400	1720	452	0.05	0.005	6.67	0.42				5.8	0.01	0.45	5.3	4.75	0.45
	23/05/2022	Due to major flood event, high rainfall, and poor drainage the site was deemed inaccessible to undertake sampling during May 2022.																														
	22/06/2022	Due to previous major flood events, ongoing rain and slow drainage, the site was deemed inaccessible to undertake sampling during June 2022.																														
2022/2023	27/07/2022		1.24	0.47	17.7	7.07	33500	0.19	152.4		36		6510	546	954	163	11000	1970	475	0.05	0.005	0.05										
	31/08/2022		1.41	0.3	17.45	7.17	36180	0.85	195.8		0.5		6190	544	947	168	10400	1900	466	0.05	0.005	0.05	0.05			3.2	0.05	2	1.2	0.71	2.05	
	28/09/2022		1.22	0.49	18.72	7.2	32580	1.57	-61.1		0.6		6420	532	961	157	10900	2070	506	0.05	0.005	0.05										
	26/10/2022	Clear	1.11	0.6	20.3	6.82	32593	1.97	187.2				5750	632	940	167	11000	2100	524	0.05	0.005	0.61										
	29/11/2022		1.6	0.11	19.2	6.67	32960	0.79	5.1		1.4		6100	548	940	164	11400	2080	497	0.05	0.005	2.16	0.09			2.2	0.03	0.49	1.7	1.19	0.49	
	23/01/2023		1.71	0	22.1	6.64	32137	1.86	60.2		22.4		5830	557	906	161	11000	2040	480	0.05	0.005	2.07										
	23/02/2023		1.36	0.35	22.8	6.51	32378	1.96	-24.8		4.9		6350	596	935	169	10600	1820	480	0.05	0.005	7	0.17			2	0.01	0.19	1.8	1.22	0.2	
	29/03/2023		1.57	0.14	23.04	7.31	33180	1.13	-4.6		17.4		6070	495	936	149	10500	1920	494	0.05	0.005	8.59										
	27/04/2023		1.6	0.11	21.59	7.41	32460	4.34	-11.4		16.4		6170	631	933	173	10700	2040	463	0.05	0.005	0.05										
	2/06/2023		1.49	0.22	19.3	7.2	33970	3.22	175		22.5		6000	598	924	162	10500	1890	496	0.05	0.005	0.05										
	28/06/2023		1.51	0.2	18.45	7.05	33270	9.15	-11.3		34.5		5550	576	822	162	10600	1880	500	0.05	0.005	0.05	0.21			2.2	0.01	1.55	0.6	0.06	1.55	
	2023/2024	31/07/2023		0.78	0.93	18.04	7.15	33210	4.43	-18.8		20.3		5120	614	925	155	10800	2010	491	0.05	0.005	0.05									
23/08/2023		Laptop battery fail. Loggers returned to HMC offices to download & returned to site 24.08.2023	1.27	0.44	18.65	6.86	33240	2.92	-8.1		4.7		6080	558	963	154	10800	1940	469	0.05	0.005	0.05										
20/09/2023			2.53	-0.82	19.02	6.98	32620	4.69	-10.2		36.5		5660	543	910	157	10400	1990	477	0.05	0.005	0.05										
25/10/2023			2.6	-0.89	20.7	6.97	31850	4.83	-14.1		8.3		5740	546	913	150	10300	1820	437	0.05												

617 - CUDGEN LAKES SAND QUARRY Groundwater Monitoring Site MB13																														
	27/05/2025	Ants in bore	1.56	0.15	1.6	7.27	5201	3.87	-25.1		16.6		516	398	143	31	1080	1220	395	0.01	0.001	0.08	0.12		1.5	0.01	0.7	0.8	0.01	0.66
	24/06/2025		1.57	0.14	19.9	7.31	5174	2.28	-28.7		56.5		552	425	153	34	1020	1240	386	0.01	0.001	0.07								
2025/2026	24/07/2025		1.75	-0.04	19.1	7.34	5277	2.89	-31.5		22.7		563	488	158	35	908	1240	394	0.01	0.001	0.05								
	19/08/2025		1.75		18.3	7.05	5345	2.4	-29.5		0		550	458	149	36	1060	1320	404	0.01	0.001	0.06	0.11		1	0.01	0.6	0.4	0.01	0.59
	25/09/2025		1.34		19.4	6.7	5006	2.85	24.2		12.8		574	419	155	34	967	771	401	0.01	0.001	0.24								

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB13

Reporting Period (2025/2026)	Average	1.61	-0.04	18.92	7.03	5209	2.71	-12.27	0.00	11.83	0.00	562	455	154	35	978	1110	400	0.01	0.00	0.12	0.11	0.00	1.00	0.01	0.59	0.40	0.01	0.59
	Maximum	1.75	-0.04	19.40	7.34	5345	2.89	24.20	0.00	22.70	0.00	574	488	158	36	1060	1320	404	0.01	0.00	0.24	0.11	0.00	1.00	0.01	0.59	0.40	0.01	0.59
	Minimum	1.34	-0.04	18.26	6.70	5006	2.40	-31.50	0.00	0.00	0.00	550	419	149	34	908	771	394	0.01	0.00	0.05	0.11	0.00	1.00	0.01	0.59	0.40	0.01	0.59
All Results	Average	1.55	0.16	20.90	6.93	25560	2.07	-30.06	14.50	29.33	5.00	4574	544	754	132	8348	1806	468	0.05	0.00	3.23	0.32	0.22	3.00	0.04	0.22	3.05	2.51	0.27
	Maximum	2.60	0.93	25.42	7.41	46890	9.15	195.80	33.00	169.00	5.00	7080	2350	2040	240	15198	4000	597	0.75	0.01	19.00	1.20	0.85	11.50	0.35	2.00	11.50	9.21	2.05
	80th Percentile	1.80	0.47	23.48	7.19	33367	2.91	-3.80	22.00	48.40	5.00	6420	598	963	174	11400	2110	526	0.05	0.01	6.30	0.56	0.50	4.80	0.03	3.88	4.80	4.49	0.47
	Median (50th Percentile)	1.52	0.20	20.76	6.95	31850	1.97	-24.85	13.50	16.40	5.00	5830	542	912	157	10700	1910	475	0.05	0.01	1.60	0.22	0.05	2.50	0.01	0.02	2.90	2.38	0.02
	20th Percentile	1.24	-0.10	19.09	6.68	9224	0.87	-65.34	5.40	4.10	5.00	995	419	251	54	1700	1240	404	0.01	0.00	0.05	0.09	0.01	0.80	0.01	0.01	0.60	0.34	0.01
	Minimum	0.78	-0.89	1.56	6.00	2826	0.05	-267.00	5.00	0.00	5.00	458	276	143	31	247	771	194	0.009	0.00	0.05	0.02	0.00	0.01	0.01	0.01	0.01	0.01	0.01

Red and bold values exceed the objective value for that analyte. IS - Insufficient data for statistical analysis. NS = No Sample Required. ND = No Data. NLM = No Longer Monitored

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB14

Site: MB14		Physical										Major Cations & Anions							Metals			Nutrients								
Sample Date		Comments	Water Level	Water Level	Temp	pH	Electrical	Dissolved Oxygen	Redox	Total Suspended Solids	Turbidity	Oil & Grease	Sodium	Calcium	Magnesium	Potassium	Chloride	Sulfate	Bicarbonate	Aluminium	Arsenic	Iron (filterable)	Total Phosphorous	Reactive Phosphorous	Total Nitrogen	Nitrite	Nitrate	TKN	Ammonia	NOx
			Top of Casing	m AHD	°C		Conductivity uS/cm	mol/L	mV	mg/L	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
		Objective	-	-	-	6.5-8.5	<3000	-	-	-	-	10	<500	-	<100	<40	<1000	<800	<400	<0.5	<0.42	<20	-	-	-	-	-	-	<20	-
2017/2018	30/10/2017	Commencement of extraction																												
	28/11/2017				21.1	7.7	572	0.3	-145	195		5	66	48	21	2	32	82	245	0.01	0.001	0.05	0.28	0.1	0.60	0.01	0.01	0.6	0.03	0.01
	13/12/2017		1.7	0.475	23.5	6.37	795	0.85	-42		9.2		50	77	26	3	33	94	284	0.01	0.001	0.05	0.3	0.01	0.40	0.01	0.01	0.4	0.15	0.01
	11/01/2018		2.08	0.095	25.6	7.55	505	0.51	-118		9.1	5	27	61	14	5	37	39	161	0.01	0.001	0.05	0.12	0.01	0.20	0.01	0.01	0.2	0.07	0.01
	24/01/2018		2.33	-0.155	28.3	7.5	545	0.39	-109.2		34.6		20	33	8	2	17	21	98	0.01	0.001	3.58	0.1	0.01	0.2	0.01	0.02	0.2	0.04	0.02
	7/02/2018		2.57	-0.395	22.4	6.99	751	5.91	-125.6		69.4	5	27	59	29	2	38	81	161	0.05	0.005	22.9	0.43	0.01	0.4	0.01	0.01	0.4	0.06	0.01
	8/02/2018	Last day of first extraction campaign.																												
	8/03/2018		1.82	0.355	22.6	7.61	2296	2.05	61		14.8		182	154	39	8	491	181	218	0.01	0.001	5.03	0.15	0.01	0.50	0.01	0.02	0.5	0.11	0.02
13/04/2018		1.78	0.395	23.7	6.78	1326	3.96	-95		2.9		122	94	24	7	277	92	197	0.02	0.001	3.96	0.17	0.01	0.40	0.01	0.01	0.4	0.06	0.01	
31/05/2018		1.75	0.425	21.6	6.98	954	0.61	-6		27.1	5	123	86	23	7	296	84	190	0.01	0.001	1.45	0.08	0.01	0.30	0.01	0.01	0.3	0.06	0.01	
2018/2019	3/12/2018		1.92	0.255	21.5	7.76	928	0.81	-121.9	34	17	112	61	23	7	156	49	191	0.01	0.001	0.94	0.1	0.01	0.3	0.01	0.01	0.3	0.06	0.01	
	17/12/2018		1.92	0.255	21.7	6.94	840	3.18	-100	42	26.8		85	60	18	6	151	54	185	0.01	0.001	0.63	0.27	0.01	1.1	0.01	0.15	0.9	0.1	0.16
	15/01/2019		2.12	0.055	22.1	7.56	797	0.7	-181.4	45	34	5	99	65	20	7	155	43	193	0.01	0.001	0.63	0.13	0.01	0.4	0.01	0.01	0.4	0.12	0.01
	6/02/2019		2.27	-0.095	22.6	7.26	805	0.32	-161.6	30	13.7		98	60	18	6	143	52	196	0.01	0.001	1.06	0.1	0.022	0.3	0.01	0.01	0.3	0.1	0.01
	21/02/2019		2.37	-0.195	21.9	7.73	838	0.6	210.7	6	217.4		100	143	20	7	143	45	185	0.01	0.001	1.23	0.1	0.01	0.4	0.01	0.01	0.4	0.1	0.01
	6/03/2019		2.36	-0.185	22.9	7.54	851	10.3	-206	14	3.3		83	60	19	6	149	47	194	0.01	0.001	1.29	0.09	0.021	0.2	0.1	0.01	0.2	0.07	0.01
	21/03/2019		7.54	-5.365	24.2	7.54	1102	1.94	-105	26	0.55		85	56	20	5	136	42	196	0.01	0.001	5.22	0.16	0.004	0.4	0.01	0.01	0.4	0.06	0.01
	3/04/2019		1.67	0.505	23.8	6.78	909	1.26	-67	25	8.7	5	80	63	22	5	102	43	205	0.01	0.001	6.06	0.14	0.006	0.3	0.01	0.01	0.3	0.08	0.01
	30/04/2019		1.7	0.475	22.7	7.05	593	-0.3	-244	7	3.1		68	44	14	5	90	33	172	0.01	0.001	0.99	0.09	0.033	0.2	0.01	0.01	0.2	0.06	0.01
	5/06/2019		1.73	0.445	22.1	7.6	675	1.15	-9.5	9	19.2		98	51	14	6	110	28	186	0.01	0.001	0.71	0.1	0.054	0.3	0.01	0.01	0.3	0.03	0.01
2019/2020	4/07/2019	Site inaccessible (too wet)																												
	31/07/2019		1.71	0.465	21.1	8.17	1172	0.77	33.2	5	31.3		76	44	12	5	83	29	202	0.01	0.001	0.21	0.17	0.042	0.2	0.01	0.01	0.2	0.03	0.01
	4/09/2019		1.88	0.295	20.9	7.9	683	0.4	79.1	5	46		38	52	14	5	49	29	168	0.01	0.001	0.05	0.2	0.03	0.1	0.01	0.01	0.1	0.02	0.01
	2/10/2019		2.09	0.085	22.1	7.9	583	2.3	-131.9	14	10.8	5	42	53	15	5	56	29	155	0.01	0.001	0.99	0.36	0.054	0.3	0.01	0.01	0.3	0.01	0.01
	6/11/2019		2.28	-0.105	21.9	7.7	487	1.4	-119.3	18	14.2		30	46	13	5	42	33	169	0.01	0.001	0.73	0.2	0.029	0.3	0.01	0.01	0.3	0.04	0.01
	15/01/2020	Knocked over by cattle. pH meter calibration issue - spurious data.	2.55	-0.375	22.2	10.6'	566	1.7	-39	13	18.5		49	48	12	5	56	25	154				0.11	0.02	0.2	0.01	0.01	0.2	0.04	0.01
28/04/2020	Land-based extraction commenced 16/04/20.	1.59	0.585	23.4	7	562	0.84	-117.4	22	127.2	5	69	53	17	6	84	30	190	0.01	0.001	0.74	0.12	0.033	0.3	0.01	0.01	0.3	0.05	0.01	
2020/2021	7/07/2020		1.66	0.515	21.3	7.17	319	2.57	-59	19	10.3	5	72	53	17	6	83	31	207	0.01	0.001	0.78	0.12	0.47	0.4	0.01	0.01	0.4	0.06	0.01
	12/08/2020	Clear	1.52	0.655	20.9	7	588	1.2	47	15	99	5	52	52	16	5	60	34	196	0.01	0.001	0.2	0.12	0.008	0.2	0.01	0.01	0.2	0.05	0.01
	16/09/2020		1.67	0.505	21.3	7.58	598	1.04	-18.8	8	203.55	5	45	54	16	5	58	43	192	0.01	0.001	0.93	0.11	0.067	0.01	0.01	0.01	0.2	0.04	0.01
	14/10/2020		0.191	1.984	21.5	7.64	502	0.97	-107.9	5	18.8	5	34	58	16	5	48	36	176	0.01	0.001	0.74	0.11	0.024	0.01	0.01	0.01	0.1	0.05	0.01
	11/11/2020		1.93	0.245	21.4	7.72	533	0.69	-156.1	12	21.6		27	62	22	6	46	39	168	0.01	0.001	1.03	0.12	0.052	0.01	0.01	0.01	0.1	0.03	0.01
	24/02/2021	Clear, no cap	1.31	0.865	23.5	7.02	471	2.08	-115.5	5	31.1		50	56	16	5	50	42	175	0.01	0.006	6.6	0.3	0.008	3.2	0.01	0.01	3.2	3.29	0.01
	10/06/2021	Ants	1.57	0.605	20.7	7.51	590	1.68	59.2	15	44.16		48	60	16	5	71	40	186	0.01	0.001	0.07	0.26	0.007	0.1	0.01	0.02	0.1	0.01	0.02
	20/10/2021		1.58	0.595	20.5	7.34	632	0.71	-31.1		32		47	57	14	5	61	30	170	0.01	0.001	0.24								
25/01/2022		1.46	0.715	23.4	6.50	137	2.7	29		45		20	22	6	2	23	24	71	0.03	0.015	5.52	0.23		1.1	0.05	0.05	1.1	0.23	0.04	
22/02/2022		1.49	0.685	23.34	6.55	219	1.54	-1.1		43		24	28	19	5	29	20	87	0.04	0.022	10.5									
23/05/2022	Due to major flood event, high rainfall, and poor drainage the site was deemed inaccessible to undertake sampling during May 2022.																													
22/06/2022	Due to previous major flood events, ongoing rain and slow drainage, the site was deemed inaccessible to undertake sampling during June 2022.																													
2022/2023	27/07/2022	Small orange flecks	1.48	0.695	18.18	7.29	529	3.8	131.8		24.8		41	49	13	5	42	30	159	0.01	0.001	0.05								
	31/08/2022		1.65	0.525	18.25	7.59	471	1.54	205.1		7.9		38	51	15	10	46	28	166	0.01	0.001	0.05	0.09		0.2	0.01	0.05	0.2	0.01	0.05
	28/09/2022		1.5	0.675	19.77	6.69	468	1.52	-36.1		16.7		32	53	16	6	46	26	172	0.01	0.001	0.05								
	26/10/2022	Clear	1.31	0.865	21	6.89	414.9	1.44	107.4				27	45	12	4	40	24	130	0.02	0.002	0.46								
	29/11/2022		1.77	0.405	19.64	7.82	480	3.37	58.2		10.4		26	57	13	6	42	23	166	0.01	0.001	0.31	0.12		0.6	0.01	0.22	0.4	0.01	0.22
	23/01/2023		1.95	0.225	22.3	6.75	510	3.05	137.4		12.47		25	55	12	5	36	30	174	0.01	0.001	0.09								
	23/02/2023		1.86	0.315	23.6	6.35	578	4.71	159.2		2.4		25	71	13	6	40	31	178	0.01	0.001	0.05	0.08		0.6	0.01	0.37	0.2	0.01	0.37
	29/03/2023		1.92	0.255	23.6	7.35	618	1.71	-30.4		2.4		29	150	35	9	49	144	321	0.01	0.001	1.24								
	27/04/2023		1.96	0.215	21.95	7.76	522	5.13	-29		0.9		23	70	12	6	38	31	175	0.01	0.001	0.05								
	30/05/2023		1.8	0.375	20.33	7.53	515	3.54	-42.2		0.9		24	69	12	5	38	26	195	0.01	0.001	0.05								
28/06/2023		1.97	0.205	19.76	7.65	531	4.56	-43.5		5.5		24	64	12	5	39	7	212	0.01	0.001	0.05	0.1		0.3	0.01	0.02	0.3	0.01	0.02	
2023/2024	31/07/2023		2	0.175	19.26	7.65	457																							

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB14

2024/2025	23/07/2024		1.49	0.685	25.7	7.81	680	3.77	-53.4		18.4		33	68	18	7	61	34	215	0.03	0.001	2.4								
	26/08/2024	Bore damaged and to be repaired																												
	24/09/2024		1.54	0.635	21.4	7.31	784	2.84	-39.9		37.5		48	92	20	8	98	38	208	0.02	0.001	1.53								
	23/10/2024		1.35	0.825	20.6	7.03	595	2.71	65.4		14.21		33	72	16	6	68	34	208	0.02	0.001	1.66	0.17		0.5	0.01	0.01	0.5	0.09	0.01
	19/11/2024	Bore cap needs replacing	1.93	0.245	21.71	6.84	643	1.49	-19.5		13.8		29	58	13	6	53	29	165	0.05	0.001	2.88								
	21/01/2025		1.25	0.925	24.4	6.64	246	1.75	18.5		16.1		11	12	4	2	20	5	43	0.16	0.001	2.17								
	25/02/2025	Bore knocked down and damaged																												
	25/03/2025		1.33	0.845	24.12	6.53	171	1.14	29.1		13.4		12	4	2	5	18	2	21	0.22	0.002	1.85								
	23/04/2025	Ants nesting in bore	1.38	0.795	24.23	6.77	344	0.54	14.6		5.4		22	19	6	5	44	4	56	0.11	0.004	5.51								
	27/05/2025	Bore knocked down and damaged	1.38	0.795	1.38	7.36	561	1.06	-29.3		210		30	46	8	20	60	13	172	0.1	0.003	1.01	0.99		11.9	0.01	0.01	11.9	7.92	0.01
24/06/2025	Bore knocked down and damaged																													
2025/2026	24/07/2025	Visible floating particles and slight odour	1.36	0.815	20.24	6.85	380	1.44	-5.8		53.3		18	39	7	12	27	1	140	0.09	0.001	2.83								
	19/08/2025	Odorous brown/grey with floating particles	1.45		19.88	6.9	508	1.09	-20.5		0.7		23	45	8	11	41	3	164	0.05	0.001	1.71	1.57		4.8	0.01	0.04	4.8	3.55	0.04
	25/09/2025		1.47		21	7.15	664	2.71	-132		14.9		36	87	15	9	88	16	226	0.03	0.001	0.78								

Reporting Period (2025/2026)	Average	1.43	0.82	20.37	6.97	517.3	1.75	-52.77	0.00	22.97	0.00	25.7	57.00	10.0	10.67	52.00	6.7	176.67	0.06	0.001	1.77	1.57	0.00	4.80	0.01	0.04	4.80	3.55	0.04
	Maximum	1.47	0.82	21.00	7.15	664.0	2.71	-5.80	0.00	53.30	0.00	36.0	87.00	15.0	12.00	88.00	16.0	226.00	0.09	0.001	2.83	1.57	0.00	4.80	0.01	0.04	4.80	3.55	0.04
	Minimum	1.36	0.82	19.88	6.85	380.0	1.09	-132.00	0.00	0.70	0.00	18.0	39.00	7.0	9.00	27.00	1.0	140.00	0.03	0.001	0.78	1.57	0.00	4.80	0.01	0.04	4.80	3.55	0.04
	Average	1.83	0.42	21.72	7.30	622.7	2.31	-32.79	24.54	30.43	5.00	47.9	60.39	15.6	5.95	74.97	37.8	175.81	0.03	0.002	1.80	0.22	0.04	0.83	0.01	0.04	0.81	0.41	0.04
All Results	Maximum	7.54	2.18	28.30	8.17	2296.0	10.30	210.70	195.00	217.40	5.00	182.0	154.00	39.0	20.00	491.00	181.0	321.00	0.22	0.022	22.90	1.57	0.47	11.90	0.10	0.37	11.90	7.92	0.37
	80th Percentile	2.02	0.75	23.60	7.70	795.0	3.54	33.20	30.00	35.76	5.00	76.0	70.00	20.0	7.00	98.00	43.0	202.00	0.03	0.001	2.49	0.27	0.05	0.60	0.01	0.03	0.50	0.10	0.03
	Median (50th Percentile)	1.71	0.47	21.81	7.36	564.0	1.69	-39.45	14.50	15.35	5.00	33.0	58.00	15.0	6.00	48.50	30.0	184.50	0.01	0.001	0.78	0.12	0.01	0.30	0.01	0.01	0.30	0.06	0.01
	20th Percentile	1.47	0.18	20.52	6.85	468.0	0.77	-117.40	6.00	4.80	5.00	24.0	46.00	12.0	5.00	36.00	24.0	161.00	0.01	0.001	0.05	0.10	0.01	0.20	0.01	0.01	0.20	0.02	0.01
	Minimum	0.19	-5.37	1.38	6.35	137.0	-0.30	-244.00	5.00	0.55	5.00	11.0	4.00	2.0	2.00	17.00	1.0	21.00	0.01	0.001	0.05	0.05	0.00	0.01	0.01	0.01	0.10	0.01	0.01

Red and **bold** values exceed the objective value for that analyte. IS - Insufficient data for statistical analysis. NS = No Sample Required. ND = No Data. NLM = No Longer Monitored

617 - CUDGEN LAKES SAND QUARRY
Groundwater Monitoring Site MB15

Site: MB15		Physical											Major Cations & Anions							Metals			Nutrients								
Sample Date		Comments	Water Level Top of Casing	Water Level m AHD	Temp °C	pH	Electrical Conductivity uS/cm	Dissolved Oxygen mol/L	Redox mV	Total Suspended Solids mg/L	Turbidity NTU	Oil & Grease mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L	Potassium mg/L	Chloride mg/L	Sulfate mg/L	Bicarbonate mg/L	Aluminium mg/L	Arsenic mg/L	Iron (filterable) mg/L	Total Phosphorous mg/L	Reactive Phosphorous mg/L	Total Nitrogen mg/L	Nitrite mg/L	Nitrate mg/L	TKN mg/L	Ammonia mg/L	NOx mg/L	
			Objective	-	-	6.5-8.5	<3000	-	-	-	-	10	<500	-	<100	<40	<1000	<800	<400	<0.5	<0.42	<20	-	-	-	-	-	-	<20	-	
2017/2018	4/09/2017		1.06	0.375	20.6	7.45	555	0.01	-87		62	5	86	40	14	8	74	37	208	0.52	0.001	1.35	0.22	0.21	0.30	0.01	0.01	0.3	0.12	0.01	
	5/10/2017		1.27	0.165	21.6	7.63	625	0.65	-152.6	14	10.9	5	116	25	10	6	83	48	217	0.03	0.002	0.13	0.33	0.22	0.60	0.01	0.01	0.6	0.26	0.01	
	30/10/2017	Commencement of extraction																													
	28/11/2017		1.84	-0.405	25.1	7.51	916	1.4	-31.3	8	18.7	5	132	30	14	11	99	91	217	0.01	0.001	0.05	0.28	0.19	0.80	0.03	0.02	0.7	0.51	0.05	
	13/12/2017		1.47	-0.035	24.6	7.87	670	0.52	-107		48		68	41	15	8	60	47	176	0.01	0.001	0.05	0.15	0.16	0.20	0.01	0.01	0.2	0.19	0.01	
	11/01/2018		1.87	-0.435	24.8	7.88	614	0.48	-183		6.9	5	106	28	12	11	66	53	189	0.01	0.001	0.05	0.27	0.18	0.80	0.02	0.01	0.8	0.48	0.02	
	24/01/2018		2.43	-0.995	22.6	7.45	948	0.38	-67.7		23.9		144	32	15	14	119	138	181	0.01	0.001	0.81	0.27	0.14	1.40	0.01	0.01	1.4	0.66	0.01	
	7/02/2018		2.39	-0.955	23.4	7.52	835	6.45	-55.3		8.4	5	107	40	18	13	88	83	199	0.01	0.001	0.36	0.26	0.14	0.40	0.01	0.01	0.4	0.39	0.01	
	8/02/2018	Last day of first extraction campaign.																													
	8/03/2018		0.79	0.645	24.5	7.67	850	0.52	-72		2.4		95	41	15	11	98	79	198	0.01	0.001	0.32	0.18	0.12	0.80	0.01	0.02	0.8	0.48	0.02	
	13/04/2018		0.97	0.465	24.9	7.44	767	2.29	87		2.4		78	51	16	10	82	71	186	0.01	0.001	0.07	0.21	0.15	0.40	0.03	0.19	0.2	0.04	0.22	
31/05/2018		1.02	0.415	21.1	7.96	627	0.54	-85		32.9	5	76	42	13	9	79	62	194	0.01	0.001	0.05	0.12	0.11	0.20	0.01	0.03	0.2	0.17	0.03		
2018/2019	24/10/2018		0.86	0.575	19.9	7.32	735	0.03	-175	24	13.4	5	71	48	17	9	92	67	190	0.05	0.005	0.24	0.2	0.11	0.5	0.01	0.01	0.5	0.31	0.01	
	3/12/2018		1.21	0.225	22.2	3.18	990	2.4	169	16	3.6		61	59	17	8	90	41	206	0.01	0.001	0.19	0.13	0.08	0.3	0.01	0.01	0.3	0.21	0.01	
	17/12/2018		1.22	0.215	21.1	8.38	699	0.57	-157	6	1.8		60	56	16	8	89	41	206	0.01	0.001	0.28	0.17	0.11	0.3	0.01	0.01	0.3	0.22	0.01	
	15/01/2019		1.44	-0.005	24.7	7.64	683	0.32	-200	5	8	5	64	52	17	9	87	41	203	0.01	0.001	0.24	0.18	0.12	0.4	0.01	0.01	0.4	0.29	0.01	
	6/02/2019	Cap Missing	1.62	-0.185	23	7.49	674	0.65	-152.5	12	0		84	48	17	10	84	56	201	0.01	0.001	0.34	0.17	0.105	0.4	0.01	0.02	0.4	0.32	0.03	
	21/02/2019		1.73	-0.295	22.7	7.6	703	0.53	203.7	5	1.4		78	83	16	10	83	53	190	0.01	0.001	0.27	0.17	0.14	0.4	0.01	0.01	0.4	0.28	0.01	
	6/03/2019		1.68	-0.245	25	7.78	731	0.79	-197	12	1.1		75	45	17	9	87	53	198	0.01	0.001	0.33	0.18	0.136	0.4	0.1	0.01	0.4	0.24	0.01	
	20/03/2019		1.03	0.405	24.84	7.29	978	1.06	-25.4	6	0.48		97	42	17	12	93	68	203	0.01	0.001	0.42	0.2	0.113	0.5	0.01	0.01	0.5	0.46	0.01	
	4/04/2019		0.88	0.555	23.81	7.26	824	0.45	-30	19	0.4	5	124	46	17	13	98	91	202	0.01	0.001	0.58	0.23	0.134	0.4	0.01	0.01	0.4	0.28	0.01	
	30/04/2019		0.99	0.445	22.6	7.15	740	0.64	-135	11	4		80	42	15	10	86	58	196	0.01	0.001	0.1	0.23	0.165	0.7	0.01	0.34	0.4	0.2	0.34	
	5/06/2019		1.06	0.375	21.9	7.1	670	0.53	-148	20	-7.1		84	52	16	10	84	53	196	0.01	0.001	0.21	0.2	0.149	0.5	0.01	0.01	0.5	0.31	0.01	
2019/2020	4/07/2019		0.65	0.785	21.65	7.7	1170	0.2	32.2	8	20	5	87	50	17	11	86	45	213	0.01	0.001	0.28	0.19	0.169	0.8	0.01	0.01	0.8	0.63	0.01	
	31/07/2019		0.99	0.445	20.1	8.13	1135	3.13	-136	5	22		71	60	17	9	85	35	228	0.02	0.001	0.11	0.2	0.188	0.7	0.01	0.01	0.7	0.65	0.01	
	4/09/2019		1.14	0.295	21.7	7.8	865	0.7	-147.8	5	7.2		66	60	18	9	98	30	216	0.01	0.001	0.11	0.16	0.146	0.6	0.01	0.01	0.6	0.25	0.01	
	2/10/2019		1.34	0.095	22.6	7.8	868	0.9	-180.4	5	0	5	70	69	20	9	121	29	203	0.01	0.001	0.06	0.18	0.154	1.6	0.01	0.01	1.6	0.35	0.01	
	6/11/2019		1.58	-0.145	22.6	7.5	704	2	-90.7	20	-3.1		70	46	17	10	84	26	222	0.01	0.001	0.16	0.19	0.123	0.4	0.01	0.01	0.4	0.32	0.01	
	15/01/2020	pH meter calibration issue - spurious data.	1.87	-0.435	24.1	8.5	755	0.7	-149	5	0.9		77	49	17	11	86	4	178				0.21	0.22	4.8	0.01	0.01	4.8	0.28	0.01	
	28/04/2020	Land-based extraction commenced 16/04/20.	0.73	0.705	23.6	7.5	689	1.13	-224.4	6	20.8	5	67	46	15	8	101	31	187	0.01	0.001	0.05	0.14	0.16	0.3	0.01	0.01	0.3	0.16	0.01	
2020/2021	7/07/2020	Clear, Ants	0.84	0.595	21.1	6.6	683	0.9	-142	8	4.1	5	74	55	16	9	90	39	194	0.01	0.001	0.13	0.17	0.173	0.6	0.01	0.01	0.6	0.19	0.01	
	12/08/2020	Clear	0.7	0.735	20.5	7.5	685	1.2	-162	5	6.8	5	71	55	16	9	96	37	200	0.01	0.001	0.11	0.31	0.17	0.3	0.02	0.01	0.3	0.18	0.02	
	16/09/2020		0.79	0.645	20.8	7.54	727	1.8	-149.2	8	69.94	5	72	57	16	9	97	52	201	0.01	0.001	0.09	0.16	0.129	0.01	0.01	0.01	0.5	0.16	0.01	
	14/10/2020		1.07	0.365	20	7.45	665	1.49	-180.6	6	4.4	5	68	64	15	8	98	40	196	0.01	0.001	0.06	0.13	0.126	0.02	0.01	0.02	0.6	0.15		

2024/2025	23/07/2024	Ants nesting in bore	0.63	0.805	20.0	7.34	493	2.03	-31.1		2.9		62	33	9	7	42	8	206	0.01	0.001	0.05											
	26/08/2024	Ants nesting in bore	0.55	0.885	20.6	7.49	452	3.49	-51.2		1.8		58	35	8	7	41	11	168	0.01	0.001	0.07											
	24/09/2024	Ants nesting in bore	0.7	0.735	20.0	7.34	504	3.59	-46.8		5.9		58	32	8	6	34	12	179	0.01	0.001	0.05											
	23/10/2024	Ants nesting in bore	0.51	0.925	20.1	6.73	450	2.55	-73.2		2.43		56	34	8	7	30	16	193	0.01	0.001	0.05	0.37			1.6	0.01	0.01	1.6	1.41	0.01		
	19/11/2024	Ants nesting in bore	0.48	0.955	21.26	7.25	549	1.53	-44.3		0.5		54	37	8	7	32	11	198	0.1	0.001	0.05											
	21/01/2025	Ants nesting in bore	0.42	1.015	25.85	7.77	462	1.92	-42.5		3.9		51	34	9	6	33	13	182	0.01	0.001	0.05											
	25/02/2025		0.62	0.815	25.61	7.98	459	2.5	-52.2		0.3		47	41	10	7	37	12	190	0.01	0.001	0.05	0.21			0.4	0.01	0.01	0.4	0.41	0.01		
	25/03/2025		0.49	0.945	23.8	7.3	442	2.2	-26.2		0.5		43	44	12	7	38	18	176	0.01	0.001	0.08											
	23/04/2025		0.54	0.895	23.01	7.52	457	1.62	-37.9		1.1		40	46	12	7	41	18	182	0.01	0.001	0.05											
	27/05/2025		0.48	0.955	0.48	7.83	512	1.49	-50.7		1.8		39	48	12	7	38	20	190	0.01	0.001	0.05	0.16			0.4	0.01	0.15	0.3	0.01	0.15		
24/06/2025		0.56	0.875	20.24	7.89	512	1.19	-56.6		2.1		40	51	12	7	36	19	180	0.01	0.001	0.5												
2025/2026	24/07/2025		0.52	0.915	17.61	8.02	503	1.23	-60.9		3.4		42	49	12	8	38	19	181	0.01	0.001	0.05											
	19/08/2025		0.6		17.32	7.61	554	1.76	-53.5		0		43	43	11	8	37	20	186	0.01	0.001	0.05	0.12			0.4	0.01	0.08	0.3	0.01	0.08		
	25/09/2025		0.65		19.8	7.68	461	4.78	104.8		1.3		40	48	11	7	34	16	192	0.01	0.001	0.05											
Reporting Period (2025/2026)		Average	0.59	0.92	18.24	7.8	506.0	2.59	-3.20	0.00	1.57	0.00	41.7	46.67	11.3	7.67	36.33	18.3	186.33	0.01	0.001	0.05	0.12	0.00	0.40	0.01	0.08	0.30	0.01	0.08			
		Maximum	0.65	0.92	19.80	8.0	554.0	4.78	104.80	0.00	3.40	0.00	43.0	49.00	12.0	8.00	38.00	20.0	192.00	0.01	0.001	0.05	0.12	0.00	0.40	0.01	0.08	0.30	0.01	0.08			
All Results		Minimum	0.52	0.92	17.32	7.6	461.0	1.23	-60.90	0.00	0.00	0.00	40.0	43.00	11.0	7.00	34.00	16.0	181.00	0.01	0.001	0.05	0.12	0.00	0								