Vickery Extension Project Groundwater Monitoring Report

Quarterly Review May 2024 – July 2024

Whitehaven Coal Ltd

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Prepared by:

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SLR Project No.: 640.031099.00001

2 October 2024

Revision: 1.0

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	2 October 2024	Joy Xie/Sharon Hulbert	Sharon Hulbert	Brian Rask

Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Whitehaven Coal Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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Acronyms and Abbreviations

CMAs	Corrective Management Actions
EC	Electronic Conductivities
EP&A Act	Environmental Planning and Assessment Act, 1979
GWMP	Groundwater Management Plan
mbgl	meter below ground level
mbtoc	meters below top of casing
pH	potential of Hydrogen
TARP	Trigger Action Response Plan
VCPL	Vickery Coal Pty Ltd
VEP	Vickery Extension Project
WMP	Water Management Plan

1.0 Introduction

1.1 Background

SLR Consulting Australia Pty Ltd (SLR) was engaged by Whitehaven Coal Pty Ltd (Whitehaven) to undertake a review of groundwater data for the Vickery Extension Project (VEP) between 1st May 2024 through 31st July 2024.

The VEP Development Consent (SSD-7480) was granted to Vickery Coal Pty Ltd. (VCPL) on 12 August 2020 by the NSW Independent Planning Commission as a delegate of the NSW Minister for Planning under Section 75J of the NSW Environmental Planning and Assessment Act 1979 (EP&A Act).

Pertinent to the groundwater monitoring and subsequent reporting, is Condition 8, that states:

> *8. In Addition to the Groundwater Management Plan monitoring requirements specified in condition B53 of the State Development Consent, the approval holder must:*
>
> *a. Establish and maintain a network of groundwater monitoring bores designed to detect changes in groundwater levels and include bores that are co-located or paired with surface water monitoring sites to allow monitoring and analysis of groundwater – surface water interactions. These monitoring bores must be installed prior to the commencement of mining operations.*
>
> *b. Monitor groundwater levels in each bore (required under condition 8.a) at least once every 3 months, starting within one week of the commencement of mining operations for the life of this approval.*
>
> *c. Publish on the website all groundwater monitoring data from the bore network, updated at least once every three months to include the most recent readings available and to maintain the data on the website for the life of this approval. The monitoring data must include hydrographs for the bore network and explain what the data means in relation to the groundwater performance measures specified in the State Development Consent.*

This quarterly report has been compiled for Vickery Coal Mine (VCM) to comply with Condition 8(c) of EPBC 2016/7649. Groundwater monitoring commenced in October 2023 aligning with the commencement of mining in October 2023 and in accordance with Condition 8(b). Reporting to date includes:

1. Initial Quarterly Report (August 2023 through October 2023), published January 2024.
2. 2023 Annual Review (1st January 2023 through 31st December 2023), to be published on the website following approval from NSW Department of Planning, Housing and Infrastructure (DPHI).
3. Second Quarterly Report (November 2023 through January 2024), published April 2024.
4. Third Quarterly Report (February 2024 through April 2024), published July 2024.

Mining operations have commenced on site, with coal extraction occurring. Within the reporting period, Whitehaven Coal is progressing both the Mine Water dam 2 deeper and continuing in the main box cut pit. As production zones become deeper, there is increased in-pit water, indicating potential groundwater inflow. In-pit water is being managed via extraction through sump pumps into water carts for dust suppression and pumping excess water into the Canyon void.

1.2 Trigger Action Response Plan

A Trigger Action Response Plan (TARP) was established in the Groundwater Management Plan (GWMP), as a means of providing specific suitable action where exceedances of the groundwater performance criteria are observed. The aim of the TARPs is to evaluate potential adverse changes to existing groundwater sources, confirm if they are due to the development, and provide a means to repair, mitigate and/or offset any adverse groundwater impacts (Whitehaven 2023). The groundwater level and quality TARP for the open cut activities at VEP is shown in **Appendix A**.

The GWMP states the procedure for the review, as follows. The confirmed exceedances will prompt an investigation, carried out by suitably qualified personnel, to assess the reasons for trigger exceedance, which could include but not be limited to climatic conditions, agriculture abstraction, and or mining activities. In the case exceedances are attributed to mining activities, the changes in groundwater conditions, such as a decrease in water level or changes in groundwater quality, will be compared to performance measures (discussed in Section 8.1 of GWMP) to evaluate the significance of any impacts manifested on the groundwater systems.

The results of the trigger investigations will be reported in each annual review. WHC will use the annual review following each reporting period to analyse the data and revise the trigger thresholds in response to additional baseline data as it becomes available. When this occurs the GWMP will be updated.

1.3 Report Objective

This report assesses the VEP groundwater monitoring data against the trigger levels for all required parameters (as per the TARP in the site GWMP) for the reporting period from 1st May 2024 through 31st July 2024.

This report includes:

- A summary of TARP exceedances, if any, during the reporting period;
- A summary of trigger exceedances, if any, over time including the identification of breaches of triggers that remain within normal condition in this reporting period;
- A high-level outline of potential influence factors for exceedances (a detailed analysis of exceedances is not discussed in this report) during the reporting period; and
- Recommendation of relevant actions and responses to be undertaken, in alignment with the TARPs.

The information in this monitoring report will be included in the ongoing quarterly monitoring reports for VEP and summarised in the 2024 Annual Review.

2.0 Monitoring Results

This section summarises the climate information, groundwater monitoring network, and monitoring results available to the conclusion of the reporting period.

2.1 Climate Data

Local climate data was obtained from the Canyon MET station, approximately 7km from VEP. Collection of meteorological data at VEP commenced in September 2023 and will be utilised as more data becomes available. In order to understand long-term rainfall trends, the SILO climate record for the location 0.05° x 0.05° tile centred on a location within proximity of VEP (latitude: -30.75, longitude: 150.15) has been utilised (Queensland Government 2024). Comparison of the data sets show analogous trends, indicating the SILO data is a suitable representation of long-term trends.

Rainfall over the past 12 months, in comparison to the long-term average (i.e., January 1900 – present) is shown in **Table 1**. The local Canyon MET station showed above long-term average rainfall for all months in the reporting period, most notably in June.

Table 1: Monthly Rainfall vs Long-Term Average Rainfall

Year	2023						2024						
Month	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**
SILO 2023-2024 monthly rainfall (mm)	11.5	8.2	5	20.3	93.3	71.7	52.7	20.7	17.5	68.7	33.0	70.3	51.1
SILO Long-term average rainfall (mm)	38.5	34.7	37.3	49.1	58.0	60.9	69.6	57.8	46.0	33.2	39.2	40.5	38.6
On-site Rainfall (mm)	9.6	10.6	4.2	27.6	123.8	87.4	29.4	40.8	25.8	101.8	52.8	74.0	43.0

2.2 Groundwater Monitoring Network

Based on the GWMP, the existing groundwater monitoring network consists of 51 monitoring sites, including

- 24 monitoring locations in Alluvial aquifer; and
- 25 monitoring locations in Permian aquifer.
- Two sites (WR1 and WR2) positioned to monitor the potential for seepage from the spoil dump (installed January 2024).

VEP will incorporate an additional nine monitoring locations in the next reporting period, including:

- Two locations screening the alluvium to the southeast of the mine, situated outside the 1 metre predicted drawdown impact zone of the mine;
- Five locations screening the alluvium to the north of the mine in proximity of the proposed VEP bore field; and
- Two locations screening the Permian aquifer to the north of the mine.

The groundwater network is presented on **Figure 1**, and full details provided in the GWMP.

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Groundwater Monitoring Locations

Paper size A4

Scale: 1:80,000

500 0 500 1000 1500 2000 2500 3000

Metres

Spatial Reference
Name: GDA 1994 MGA Zone 56
Datum: GDA 1994
Projection: Transverse Mercator

Date Exported: 25/07/2023 10:15 AM

Legend

- Government monitoring wells
- Vickery northern borefield (proposed)
- VEP bore
- Proposed seepage monitoring locations
- Private bore
- Proposed monitoring location
- Proposed monitoring location (data logger)

VEP Monitoring locations

Geological Unit

- Alluvial
- Permian
- Alluvial (data logger)
- Permian (data logger)
- Yr 2 overburden emplacement
- Yr 5 overburden emplacement
- Mine lease
- Yr 5 Mining Pit

Geology

- Alluvial

2.3 Data Availability

In line with the VCM GWMP, the full suite of bores was monitored during the reporting period, excluding the following monitoring sites:

- GW-2 has been located in April 2024 monitoring round, but was reported as “cannot locate” in this reporting period (i.e., July 2024 monitoring round).
- VNW223 was reported a blockage at 1.3 m below top of casing (btoc) and was unable to be sampled.

The small number of unavailable bores does not impact the overall ability of the network to monitor for adverse impacts to the groundwater system resultant from mining operations. A suitable number of bores monitoring the same strata at locations appropriate to capture potential impacts (i.e. closer to the extraction site), exist within the monitored suite.

2.4 Groundwater Levels

Groundwater levels are measured via both manual dip and continuous loggers. The data available since April-22 is presented in this section, and shown in **Appendix B**.

2.4.1 Groundwater Level Data Summary

A summary of the groundwater level data available to date is presented below.

2.4.1.1 Alluvial Groundwater Bores

The groundwater levels in the alluvial monitoring bores are summarised in **Table 2** and presented in **Figure 2**.

Table 2: Groundwater Levels in Alluvial Aquifer

Sample Location	Depth to Water (mbgl*)						
	Apr-22	Dec-22	May-23	Oct-23	Jan-24	Apr-24	Jul-24
GW01	9.12	8.2	8.40	8.53	9.19	9.45	8.79
GW02	-	7.45	8.34	8.48	8.78	8.96	8.83
GW-11	-	-	-	16.70	16.64	16.64	14.15
GW-2	-	-	-	-	-	19.59	-
GW-9	-	-	-	17.76	18.4	17.8	17.79
SB01	7.34	6.37	7.23	7.19	7.38	7.86	7.67
SB02	10.3	9.84	9.68	9.46	9.74	9.99	9.78
SB04	7.5	6.34	7.59	7.33	7.64	8.18	8.08
SB05	8.32	7.1	7.90	7.73	8.11	8.59	8.37
SB06	9.82	8.43	8.77	8.87	8.98	9.36	9.18
SB07	-	8.01	8.89	8.79	8.83	9.53	9.45
SB08	7.77	6.73	7.60	7.70	7.63	8.12	7.99
SB09	7.85	6.36	7.33	7.22	7.49	7.95	7.75
SB10	8.14	7.45	8.00	8.15	8.21	8.6	8.46
SB11	9.78	8.1	8.72	8.6	9.19	9.51	9.13
SB15	9.3	8.18	8.77	9.12	9.57	9.82	9.14

Sample Location	Depth to Water (mbgl*)						
	Apr-22	Dec-22	May-23	Oct-23	Jan-24	Apr-24	Jul-24
VNW223	-	-	-	22.01	21.9	22.05	22.2
VNW394	-	6.73	6.83	6.49	6.53	6.52	6.68
VNW395	-	7.43	7.25	7.26	7.3	7.48	6.48
WR1	-	-	-	-	-	14.55	14.54
WR2	-	-	-	-	-	12.13	12.36

* mbgl = metres below ground level

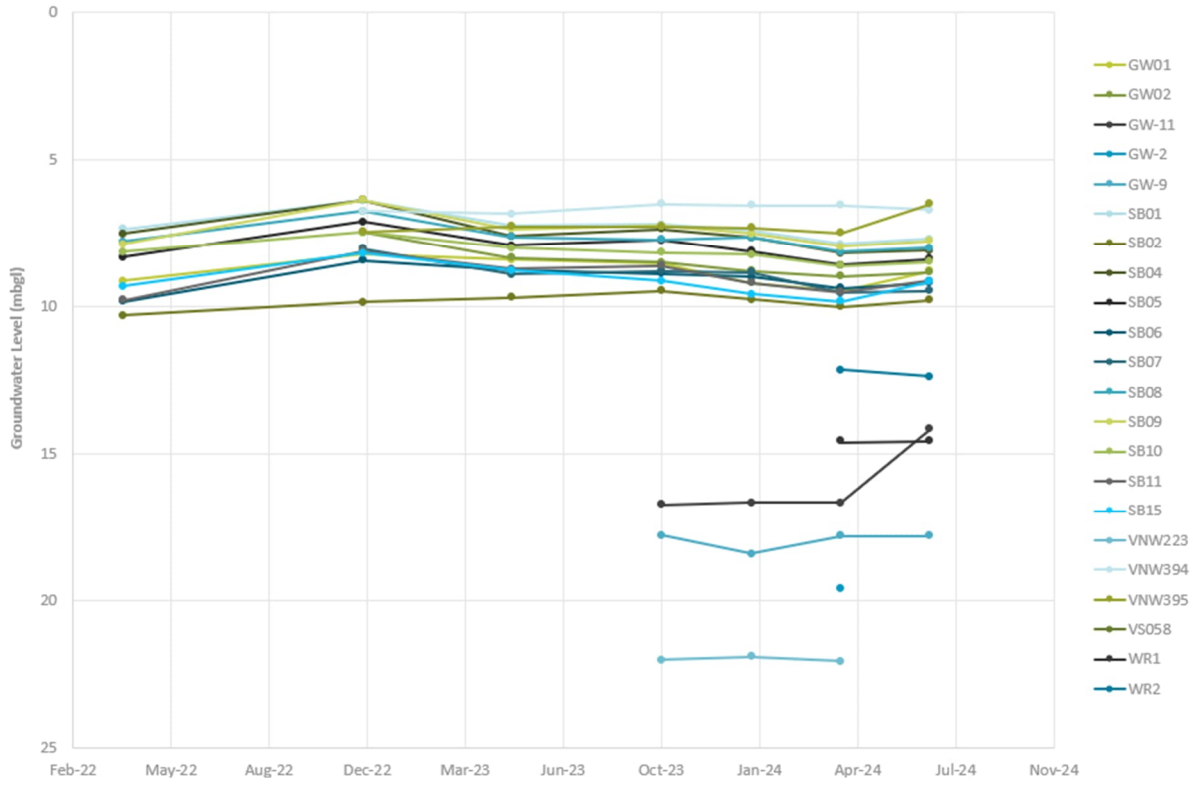


Figure 2: Alluvial Bores Hydrograph (Manual Dips, below ground level)

2.4.1.2 Permian Groundwater Bores

The groundwater levels in the Permian monitoring bores are summarised in **Table 3**, and presented in **Figure 3**.

Table 3: Groundwater Levels in Permian Aquifer

Sample Location	Depth to Water (mbgl*)						
	Apr-22	Dec-22	May-23	Oct-23	Jan-24	Apr-24	Jul-24
GW03	-	6.12	6.85	7.23	7.27	7.13	7.45
GW-7	-	-	-	27.86	27.80	27.92	27.96

Sample Location	Depth to Water (mbgl*)						
	Apr-22	Dec-22	May-23	Oct-23	Jan-24	Apr-24	Jul-24
GW-8	-	-	-	21.74	21.69	21.63	21.62
MD01	-	28.02	27.63	27.68	27.57	27.96	27.61
MD02	-	40.98	40.57	40.30	40.03	39.88	39.82
TR18	-	13.04	13.38	12.92	13.17	13.26	13.38
TR26	-	12.44	12.39	12.24	12.21	12.31	12.35
TR35	-	18.16	18.17	18.04	11.23	18.43	18.54
TR7	-	9.85	9.93	9.75	9.69	9.84	10.97
VKY034C	-	39.79	39.97	39.61	40.27	39.37	40.1
VKY035C	-	42.37	42.03	42.01	42.04	41.89	42.6
VKY036C	-	49.23	47.24	49.17	49.88	49.53	49.83
VKY042C	-	42.68	42.40	42.56	42.80	42.53	42.67
VKY043C	-	16.41	15.56	15.70	15.82	15.15	15.69
VNW390	-	9.38	9.33	9.36	9.37	9.46	9.46
VNW391	-	7.80	7.75	7.76	7.79	7.94	7.98
VNW392	-	6.25	6.14	6.21	6.24	6.4	6.46
VNW393	-	10.64	10.50	10.48	10.57	10.6	10.67

* Metres below ground level

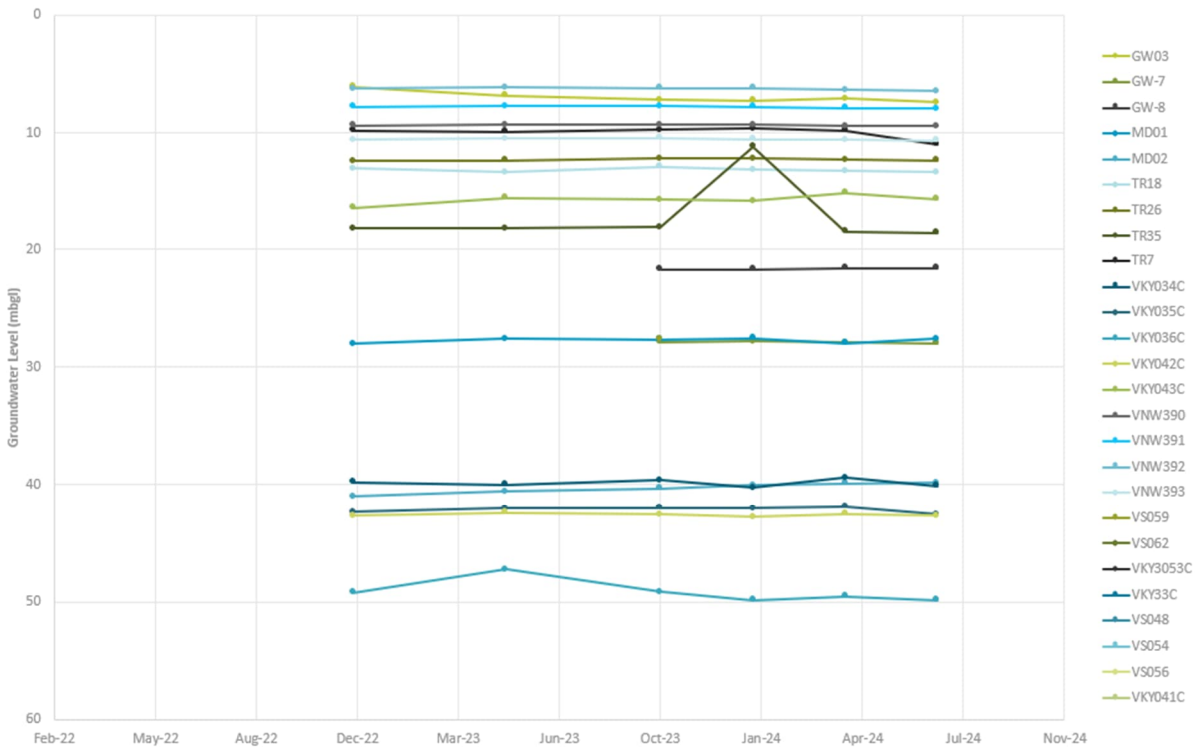


Figure 3: Permian Bores Hydrograph (Manual Dips)

2.4.1.3 Data Loggers

A summary of the available logger data is presented in **Table 4**. An example of a logger plot is provided in **Figure 4**, with all plots provided in Appendix B.

Table 4: Summary of Logger Data Availability

Bore ID	Logger Type	Recording Period	Number of Data Points	Comments
GW01	VWP	10/10/2023 – 01/07/2024	-	Data were not adopted due to significant drifting in logger readings, with generally unrealistic water levels results (i.e., above ground level). Sensor is considered malfunctioned; further investigation required.
GW02	VWP	15/11/2023 – 01/07/2024	-	Data were not adopted due to significant drifting in logger readings, with generally unrealistic water levels results (i.e., above ground level). Sensor is considered malfunctioned; further investigation required.
GW03	VWP (01-10-6743)	17/01/2024 – 01/07/2024	3,203	-
GW-9	Logger (Rugged TROLL 100)	24/04/2020 – 08/07/2024	600	-
VNW395	Logger (Rugged TROLL 100)	17/01/2024 – 17/04/2024	272	Water level calculated in mbtoc, as no reference level (mAHD) available. Logger data was not downloaded during the July 2024 monitoring round. A temporary logger has been deployed while searching for a replacement.
TR7	Logger (Rugged TROLL 100)	17/03/2012 – 19/03/2014; and 03/06/2020 – 17/04/2024	1,391	Logger data is not available in July 2024 monitoring round
TR18	Logger (Rugged TROLL 100)	16/04/2020 – 04/07/2024	1,939	-
VKY034C	Logger (Rugged TROLL 100)	07/01/2020 – 05/07/2024	6,512	-
VKY035C	Logger (Rugged TROLL 100)	04/11/2020 – 08/07/2024	5,204	-
VKY036C	Logger (Rugged TROLL 100)	07/01/2020 – 08/07/2024	6,863	-

Bore ID	Logger Type	Recording Period	Number of Data Points	Comments
VKY041C (38, 51, 70, 95, 115 m)	VWP (DT2055-02023)	11/03/2015 – 17/04/2024	-	Calibration factors and sensor depths to be confirmed.
VKY041C (140, 170, 199 m)	VWP (DT2055-02027)	11/03/2015 – 17/04/2024	-	Calibration factors and sensor depths to be confirmed.
VKY042C	Logger (Rugged TROLL 100)	04/11/2020 – 08/07/2024	5,255	-
VKY043C	Logger (Rugged TROLL 100)	07/01/2020 – 13/07/2023	5,135	Logger stopped reading in July 23
VKY3053C	VWP	04/03/2020 – 17/01/2024		No data in April 2023. Calibration factors and sensor depths to be confirmed.
VKY33C (38, 51, 70, 95, 115m)	VWP (DT2055-02029)	11/03/2015 – 22/01/2024	-	Calibration factors and sensor depths to be confirmed.
VKY33C (140, 170, 190m)	VWP (DT2055-02087)	11/03/2015 – 22/01/2024	-	Calibration factors and sensor depths to be confirmed.
VS048 (30m)	VWP	17/06/2011 – 15/06/2012; and 04/03/2020 – 04/07/2024	7,155	-
VS054 (23, 96, 120, 167m)	VWP (SN11-1769)	"17/06/2012 – 15/06/2012; and		
16/11/2023 – 17/04/2024"	~7,722/sensor	-		
VS056 (25, 100m)	VWP (SN11-1765)	04/03/2020 – 04/07/2024	VS056-25m: 7,756; VS056-100m: 1,333	-
VS058 (18, 88, 159m)	VWP (SN11-1768)	16/04/2020 – 01/07/2024	~6,147/sensor	
VS059 (30, 65, 113m)	VWP	16/04/2020 – 04/07/2024	~6,160/sensor	
VS062	VWP	12/02/2021 – 30/06/2024	10,218	
WR-1	Logger (Rugged TROLL 100)	30/04/2024 - 08/07/2024	5,133	Water level calculated in mbtoc, as no reference level (mAHD) available.

Bore ID	Logger Type	Recording Period	Number of Data Points	Comments
WR-2	Logger (Rugged TROLL 100)	30/04/2024 - 08/07/2024	5,133	Water level calculated in mbtoc, as no reference level (mAHD) available.

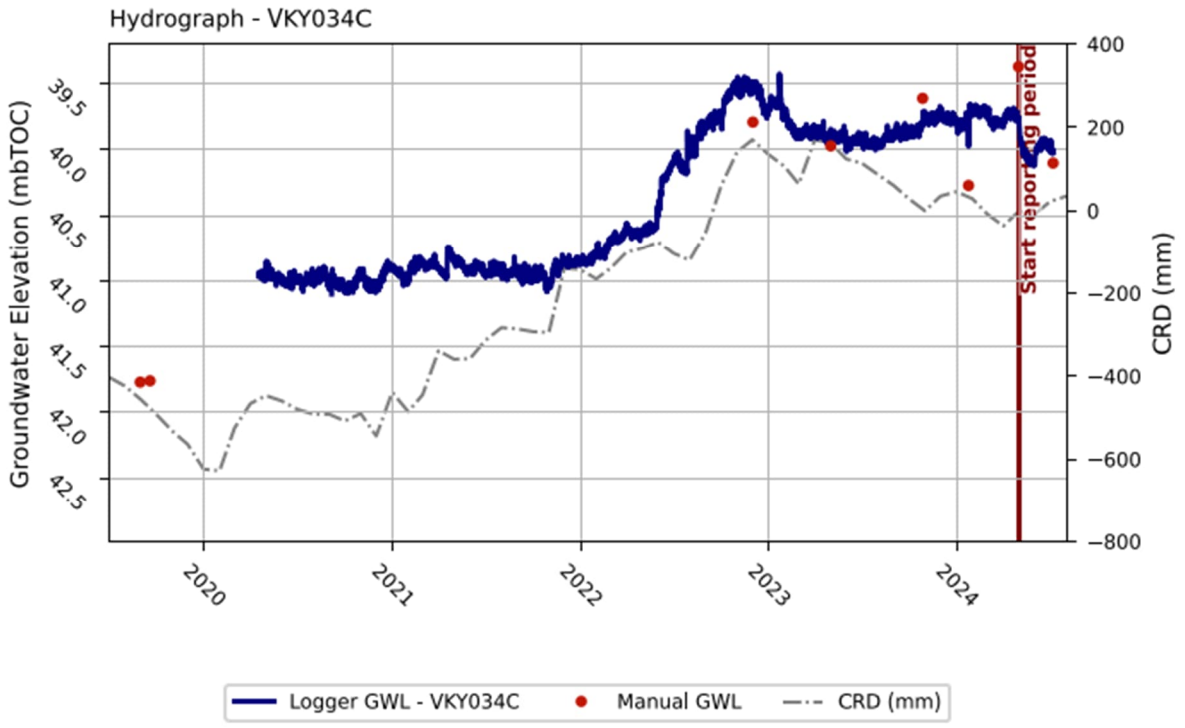


Figure 4: Logger Hydrograph – VKY034C

2.4.2 TARP Trigger Level Review

The installation details and calibration data for the VWP sensors were originally derived from historical reporting, available data and other such inference sources. Upon provision of the original installation records and calibration certificates a preliminary review was undertaken indicating disparity between the two. Consequently, the baseline data required recalculation (from recorded pressure to water levels) based on the updated information. Subsequently, the trigger levels initially calculated are no longer suitable and also require revision.

The VWPs for which this review could be required, include: VKY3053C, VKY041C, VS058, VS062, VS059, VS054, and VS048 (those presented in Table 4-1 of the GWMP).

VKY036c, VKY3033 (eight VWPs) and VS056 (two VWPs) and TR26 are all within the VCM open cut mining footprint, and have approved drawdowns (Hydrosimulations, 2018) of greater than 100 m. These have not been assigned trigger levels, and consequently do not require updates to triggers. However, a review of the data and calibration statistics has been undertaken where possible.

During the course of this review, the water level baseline data for the open standpipes was also reviewed for completeness. Updated elevation data and additional water level data availability required review and revision of the interim trigger levels provided in the GWMP.

A technical memorandum summarising the approach and findings of the data review, update and trigger level revision is provided in **Appendix C**.

2.4.3 TARP Trigger Level Summary

Groundwater levels Alluvial bores have remained primary (89%) shown an increase in water levels between April and June. For those bores with more than three water level readings, all excluding GW-11 and VNW395 are within historical fluctuations. GW-11 had an observed increase of 2.49 metres between April and July, previous stable between January and April. It is now recording its shallowest groundwater level. Additionally, VNW395 showed an increase of 1.0 metres between April and June, previously showing a small decline between January and April. It is also currently presenting its shallowest water level. Ongoing monitoring it requires to establish if an increasing trend is ongoing, however it is presumed likely a response to notably high rainfall during the reporting period.

Groundwater levels in the Permian have shown minor increase and decrease across the suite of bores. The largest decline in water level was observed at TR7, with a decline of 1.13 metres between April and June. Further monitoring it required to establish if a declining trend is occurring.

It was noted that the potential of groundwater intersection occurred during this reporting period, as observed by increased in-pit water. Additionally, higher than average rainfall was recorded. The stable to increasing groundwater levels in the alluvial, and relatively stable water levels in the Permian do not indicate significant flux of water from the aquifer resulting in groundwater drawdown. Historically, groundwater levels have typically shown a strong correlation to rainfall trends and any review of trends will need to consider mining operations and climatic conditions.

Given the current status of mining and the stable to increasing groundwater levels, the current groundwater levels are considered to be reflective of natural conditions and not impacted by extraction activities. Additionally, review against the newly derived triggers does not indicate any breach in trigger levels. Therefore, the groundwater levels do not result in the enactment of the TARPs.

2.5 Groundwater Quality and Exceedance Summary

Routine groundwater monitoring commenced in October 2023 and continues quarterly. The full July 2024 field and laboratory suite results are summarised in **Appendix D**.

Table 5 summarises the bores that have exceedances of the interim trigger values as set out in Table 8-3 of the GWMP. **Appendix E** provides a summary of all monitoring rounds to date compared to the interim trigger values or ANZECC default guideline values for slightly to moderately disturbed ecosystems.

Table 5: Summary of GW Interim Trigger Values Compared to Initial Results

Groundwater Bore ID	Parameters	Unit	Trigger Value	Monitoring Results
GW02	pH	pH unit	7.2 – 8.6	7.14
GW03	EC	µS/cm	811	862
GW-11	pH	pH unit	7.0 – 9.3	6.55
GW-7	pH	pH unit	7.7 – 8.5	8.79

Groundwater Bore ID	Parameters	Unit	Trigger Value	Monitoring Results
	SO_4^{2-}	mg/L	86	399
GW-8	SO_4^{2-}	mg/L	86	100
GW-9	SO_4^{2-}	mg/L	86	128
MD01	pH	pH unit	6.7 – 8.4	10.73#
MD02	pH	pH unit	6.7 – 8.4	6.59
SB02	SO_4^{2-}	mg/L	365	1,106
SB05	SO_4^{2-}	mg/L	365	520
TR18	pH	pH unit	6.7 – 8.4	6.69
	EC	µS/cm	12,315	12,730
	SO_4^{2-}	mg/L	86	592
TR26	SO_4^{2-}	mg/L	86	180
TR35	EC	µS/cm	12,315	16,740
	SO_4^{2-}	mg/L	86	622
TR7	pH	pH unit	7.4 – 7.8	6.71
	EC	µS/cm	12,970	14,410
	SO_4^{2-}	mg/L	365	501
VKY034C	SO_4^{2-}	mg/L	86	116
VKY035C	SO_4^{2-}	mg/L	86	88
VKY036C	SO_4^{2-}	mg/L	86	281
VKY042C	pH	pH unit	6.7 – 8.4	6.61
	SO_4^{2-}	mg/L	86	312
VNW390	pH	pH unit	6.7 – 8.4	6.59
	SO_4^{2-}	mg/L	86	106
VNW391	SO_4^{2-}	mg/L	86	96
VNW392	pH	pH unit	6.7 – 8.4	6.66
	SO_4^{2-}	mg/L	86	296
VNW393	SO_4^{2-}	mg/L	86	200
VNW394	SO_4^{2-}	mg/L	365	560
GW-2	pH	pH unit	6.9 – 8.3	6.85
WR-1	pH	pH unit	6.9 – 8.3	6.70
	EC	µS/cm	10,083	26,500
	SO_4^{2-}	mg/L	365	1,320
WR-2	pH	pH unit	6.9 – 8.3	6.57
	EC	µS/cm	10,083	25,340
	SO_4^{2-}	mg/L	365	1,540

- value considered not representative of aquifer. Bore investigation and purge undertaken in Feb 2024, found bore potentially failed and high pH due to grout contamination.

The trigger level exceedances summarised in **Table 5** are unlikely to be a result of mining and highly likely to be due to natural variation in water. The interim trigger levels were defined utilising standard guideline value and consequently are not reflective of the local natural conditions. As per the GWMP, these trigger values will be updated when reasonable baseline data is collected.

Review of the individual temporal plots do not indicate consistent increasing or decreasing trends over time, or across multiple locations. Additionally, there is no correlation with groundwater level trends (as groundwater is typically stable). Consequently, the groundwater quality results indicate a ‘normal condition’ TARP response.

3.0 Action and Response

Based on the results summary presented in **Section 2.0**, the fact that both Groundwater Level and Groundwater Quality are considered “Normal Conditions”, there are no specific action and responses required.

4.0 Recommendations

Table 6 provides a summary of the historical recommendations, from Annual and prior quarterly reporting, with a comment on their current status.

Table 6: Summary and Status of Recommendations to Date

Recommendation	Cited	Status
Several monitoring wells were unlocated (GW-2) or inaccessible (GW030051, GW030052, and GW036459) during the reporting period. It is recommended to locate these wells for future monitoring or provide justifications for updating the GWMP.	2023 Annual Review/Quarterly Report	ONGOING: GW-2 was located in April 2024 monitoring event, but unable to be located in July 2024 monitoring event. In addition, the depth of GW-2, cited as >150 mbgl in April 2024, is inconsistent with historical records indicating a shallow bore screening the alluvium. Therefore, the location and suitability of GW-2 should be reviewed for the ongoing monitoring. COMPLETE: Water level data for GW030051, GW030052, and GW036459 have been obtained from WaterNSW, and therefore continue monitoring in the ongoing events. Monitoring network review underway.
Continue the monitoring program and the quarterly reporting on groundwater levels and quality as outlined in the GWMP.	2023 Annual Review	COMPLETE/ONGOING: ongoing monitoring and reporting established.
Survey two new bores WR1 and WR2 for location and incorporate into the next monitoring round.	January 2024 Quarterly	COMPLETE: Based on the fieldnote, the locations have been surveyed for WR1 (227743, 6596215) and WR2 (227762, 6595746)
Review necessity of MD01 to network, as investigation indicate the bore is damaged. Confirm whether requires replacement or removal from the monitoring regime.	January 2024 Quarterly	ONGOING: Bore replacement planned.
Logger to be replaced in bore VKY043C.	January 2024 Quarterly	COMPLETE: The faulty logger in VKY043C was removed in April 2024, and no replacement has been installed as continuous monitoring of this bore is not required according to the GWMP; thus, a logger is considered unnecessary.
GW-7: field sampling contractors noted this site was overgrown and dangerous. It is recommended to perform site maintenance prior to next monitoring event.	January 2024 Quarterly	COMPLETE: GW-7 has been sampled in April 2024.
VNW223 is blocked at ~1.3 mbtoc and was unable to be sampled since January. Recommend investigate blockage and action accordingly.	January 2024 Quarterly	ONGOING: VNW223 remained blocked in April and July 2024 monitoring events. Review planned.
Review logger data from TR7 and GW01, as appears erroneous, and replace as necessary.	April 2024 Quarterly	ONGOING: Loggers review underway.
Elevation survey of all bores to assist with groundwater level trigger development and plotting of bores as reduced water levels (i.e. as metres below Australian height datum – mAHD).	April 2024 Quarterly	ONGOING: Elevation survey has been done for majority of the bores, except for VNW395, WR1, and WR2. Water level plots have been updated as reduced water levels (refer to **Appendix C**)

Recommendation	Cited	Status
Verify sensor depths for all VWPs in the network to assist with groundwater level calculation (calibration certificates in hand for review and update of database). Revise trigger levels based on updated sensor depth and calibration data.	April 2024 Quarterly	ONGOING: Verify sensor depths for VKY033C (or VKY3033C) and VKY041C to assist with groundwater level calculation. COMPLETE: Sensor depths have been verified for all standpipe loggers and VWPs, except for abovementioned VKY033C and VKY041C.

Recommendations based on the review and analysis completed herein, are as follows:

- GW-2 was located in April 2024 monitoring event, but unable to be located in July 2024 monitoring event. In addition, the depth of GW-2, cited as >150 mbgl in April 2024, is inconsistent with historical records indicating a shallow bore screening the alluvium. Therefore, the location and suitability of GW-2 should be reviewed for the ongoing monitoring.
- VNW223 is blocked at 1.3 mbtoc and was unable to be sampled since January. Recommend investigate blockage and action accordingly.
- Verify sensor depths for VKY033C (or VKY3033C) and VKY041C to assist with groundwater level calculation.
- When adequate baseline data becomes available, review and update the quality trigger values.

5.0 References

Hydrosimulations. 2018. “Vickery Extension Project: Groundwater Assessment. Report .”

Queensland Government. 2024. *SILO Long Paddock.* https://www.longpaddock.qld.gov.au/.

Whitehaven. 2023. “Vickery Coal Mine Water Management Plan Appendic C Groundwater Management Plan.”

Appendix A Trigger Action Response Plan

Vickery Extension Project Groundwater Monitoring Report

Quarterly Review May 2024 – July 2024

Whitehaven Coal Ltd

SLR Project No.: 640.031099.00001

2 October 2024

Table A-1: Tigger Action Response Plan

PERFORMANCE MEASURE AND INDICATOR, TARP OBJECTIVE AND ASSESSMENT CRITERIA	MONITORING PROGRAM	MANAGEMENT		
		TRIGGER	ACTION	RESPONSE
Performance Measure Feature Negligible groundwater level impact on the Namoi Alluvium aquifer and associated surface watercourses, groundwater dependent ecosystems, and private landowner bores. Negligible groundwater level impact on the Permian bedrock and associated private landowner bores, outside that predicted by the approved groundwater impacts (Hydrosimulations 2018). **TARP Objective** This TARP defines levels of deviation in groundwater level from 'normal' conditions and the actions to be implemented in response to each level deviation as a result of open cut mining. **Assessment Criteria** Bore specific trigger values are based on the water levels across the entire history of monitoring in each individual bore and the predicted impacts from the Hydrosimulations (2018) numerical groundwater model.	**Locations** **Open standpipes and VWPs** All monitoring locations as set out in Table 4-1 of the Groundwater Management Plan (GWMP). All monitoring locations are shown in Figure 4-1 of the GWMP. **Monitoring Frequency** During mining Quarterly manual measurements of water level. Continuous monitoring in bores installed with Vibrating Wire Piezometers (VWPs). **Post-mining** TBC	**Normal Condition**		
		• Groundwater level remains above the respective trigger limits (defined as the 95th percentile over the baseline period and detailed in Table 8-2 of the GWMP) for each individual groundwater bore.	• Continue monitoring and review of data as per monitoring program.	• No response required.
		Level 1		
		• One quarterly monitoring result shows an exceedance of the trigger limit as detailed in Table 8-2 of the GWMP.	• Actions as required for Normal Condition. • Re-sample of groundwater level within seven days.	• Report declines and climate investigation outcomes in Annual Review.
		Level 2		
		• Groundwater level in a groundwater bore exceeds the respective trigger limit during three consecutive quarterly monitoring rounds. OR • Complaint received by landowners of private bores regarding groundwater level declines.	• Actions as stated in Level 1. For Open Standpipe Monitoring Bores, VWPs, and Private Bores: • Undertake a preliminary hydrogeological investigation as efficiently as practicable to check and validate the data and assess cause of trigger exceedances to determine if mining related as per the requirements set out in Section 8.3 of the GWMP. Review of groundwater levels to be carried out by qualified personnel. • Increase monitoring and review of data frequency for sites where Level 2 has been reached, subject to land access. For Private Bores: • Undertake investigation to demonstrate if the decline will impact the long-term viability of the affected water supply works. • Commence level monitoring of said private bore in quarterly monitoring rounds, subject to negotiation and land access restrictions. The investigation will be commenced/ completed as efficiently as practicable.	• Responses as stated in Level 1. • Include outcomes from the preliminary investigation report in Annual Review.
		Level 3		

PERFORMANCE MEASURE AND INDICATOR, TARP OBJECTIVE AND ASSESSMENT CRITERIA	MONITORING PROGRAM	MANAGEMENT		
		TRIGGER	**ACTION**	**RESPONSE**
		• The reduction in water level is determined in the Level 2 preliminary investigation not to be controlled by climatic or external anthropogenic factors. OR • Groundwater level in a groundwater bore continues to exceed the respective trigger limit during six consecutive monitoring rounds.	• Actions as stated in Level 2. For Open Standpipe Monitoring Bores, VWPs, and Private Bores: • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g., catchment changes, another effect unrelated to mining). • Review groundwater model. For Private Bores: • Review corrective management actions (CMAs) as specified in Section 8.3 of the GWMP considering findings from further investigations and consider additional reasonable and feasible options.	• Responses as stated in Level 2. • Report trigger exceedance to DPE and key stakeholders. Provide the detailed investigation report to relevant agencies within a reasonable timeframe of identifying the non-compliance. • Report trigger exceedance and investigation outcomes in Annual Review. • Develop/design contingency and remedial measures based on the results of the above investigations. Contingency and remedial measures considered practical for implementation may include: 1 Undertake landholder and government consultation; 2 Offset groundwater leakage from the Namoi Alluvium aquifer; 3 Review and refine the GWMP including undertaking additional 4 specific monitoring of private landholder bores; 5 Review Site Water Balance and predictive groundwater model; and 6 Review mine plan impacts on alluvial groundwater source. For Private Bores: • Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g., extending the depth of the bore, establishment of additional bores, compensation to affected landowners as per Section 8.3 of the GWMP). • Implement CMAs, subject to land access (finalise negotiations and implement the agreed “make-good” arrangements). • Monitor and report on success of CMAs in Annual Review.
Performance Measure Feature Negligible quality impact on the Namoi Alluvium aquifer and associated surface watercourses and private landholder bores. Negligible quality impact on the Permian bedrock and associated private landowner bores, outside that predicted by the approved groundwater (Hydrosimulations 2018). **TARP Objective** This TARP defines levels of deviation in groundwater quality from baseline conditions and the actions to be implemented in response to each level deviation. **Assessment Criteria** Quality in each monitoring bore remains within the 5th and 95th percentile of the baseline conditions set out in Table 8-4 of the GWMP for the following parameters: • Electrical Conductivity; • pH; and • Sulfate. Other major and metal ions will be assessed against the relevant ANZECC guidelines.	**Locations** **Open standpipes** All open standpipe monitoring locations as set out in Table 4-2 of the GWMP. **Monitoring Frequency** **During mining** Six-monthly measurements of pH and electrical conductivity parameters. Other parameters (detailed in Table 4-2 of the GWMP) to be measured on an annual basis. **Post-mining** TBC	**Normal Condition**		
		• Groundwater pH remains within the baseline 5th and 95th percentile range, as specified in the GWMP. • Other groundwater quality parameters remain below the baseline 95th percentile, as specified in the GWMP.	• Continue monitoring and review of data as per monitoring program.	• No response required.
		Level 1		
		• Two six-monthly exceedances or one annual quality exceedances outside of the specified baseline range (pH) or above 95th percentile baseline (other quality parameters).	• Actions as required for Normal Condition. • Re-sample of groundwater quality within seven days	• Report declines and climate investigation outcomes in Annual Review.
		Level 2		
		• Three consecutive six-monthly exceedances or two annual quality exceedances (including re-samples from Level 1) outside of the specified baseline range (pH) or above 95th percentile baseline (other quality parameters). OR • Complaint received by landowners of private bores regarding groundwater quality declines.	• Actions as stated in Level 1. For Open Standpipe Monitoring Bores: • Undertake a preliminary hydrogeological investigation as efficiently as practicable to assess cause of quality exceedances and determine if mining related as per the requirements set out in Section 8.3 of the GWMP. Review of groundwater quality to be carried out by qualified personnel. Increase monitoring and review of data frequency for sites where Level 2 has been reached, subject to land access. For Private Bores: • Collect quality sample from said private bore for comparison with wider aquifer data, subject to negotiation and land access restrictions. • Undertake investigation to demonstrate if quality will impact the long-term viability of the affected water supply works. The investigation will be commenced/ completed as efficiently as practicable.	• Responses as stated in Level 1. • Include outcomes from the preliminary investigation report in Annual Review.

PERFORMANCE MEASURE AND INDICATOR, TARP OBJECTIVE AND ASSESSMENT CRITERIA	MONITORING PROGRAM	MANAGEMENT		
		TRIGGER	ACTION	RESPONSE
		Level 3		
		• The water quality changes are determined from Level 2 preliminary investigation to not be controlled by climatic, local land uses, or other external anthropogenic factors. OR • Groundwater quality continues to decline with six consecutive six-monthly exceedances or three annual quality exceedances outside of the specified baseline range (pH) or above 95th percentile baseline (other quality parameters). AND • Quality exceedances are widespread (three or more bores in an aquifer show water quality exceedances) across the aquifers being monitored.	• Actions as stated in Level 2. For Private Bores and Open Standpipe Monitoring Bores • Increase monitoring to at least quarterly measurements for sites where Level 3 has been reached, subject to land access. • Undertake a detailed investigation to assess if the change in behaviour is related to mining effects (e.g., catchment changes, another effect unrelated to mining). • Review corrective management actions (CMAs) as specified in Section 8.3 of the WMP considering findings from further investigations and consider additional reasonable and feasible options.	• Responses as stated in Level 2. For Private Bores and Open Standpipe Monitoring Bores: • Report trigger exceedance to DPE and key stakeholders. • Report trigger exceedance and investigation outcomes in Annual Review. For Private Bores, if the changes have been confirmed to be related to mining effects: • Initiate negotiations with impacts landowners as soon as practicable. Consider all reasonable and feasible options for remediation as relevant (e.g., isolation, remediation, etc.). • Provide DPE and key stakeholders with proposed corrective management actions (CMAs) for consultation (e.g., extending the depth of the bore, establishment of additional bores, compensation to affected landowners as per Section 10.2.2 of the WMP). • Implement CMAs, subject to land access (finalise negotiations and implement the agreed “make-good” arrangements). • Monitor and report on success of CMAs in Annual Review.

Appendix B Groundwater Level Results

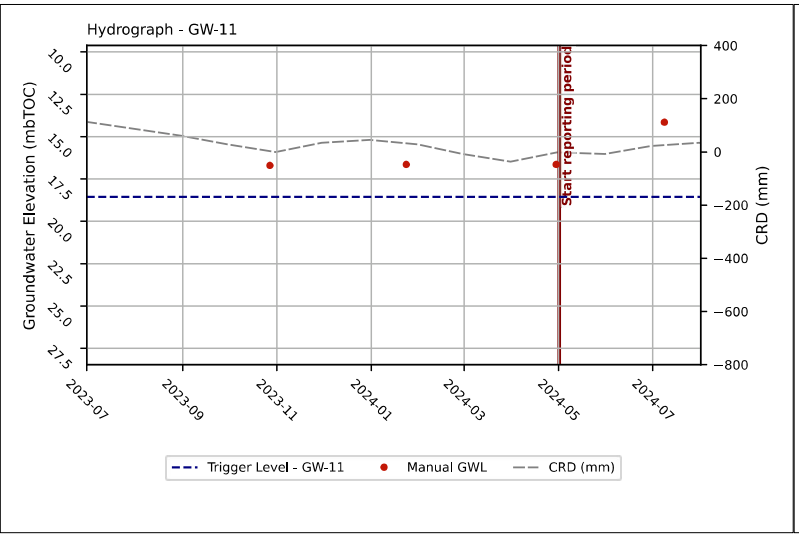
Vickery Extension Project Groundwater Monitoring Report

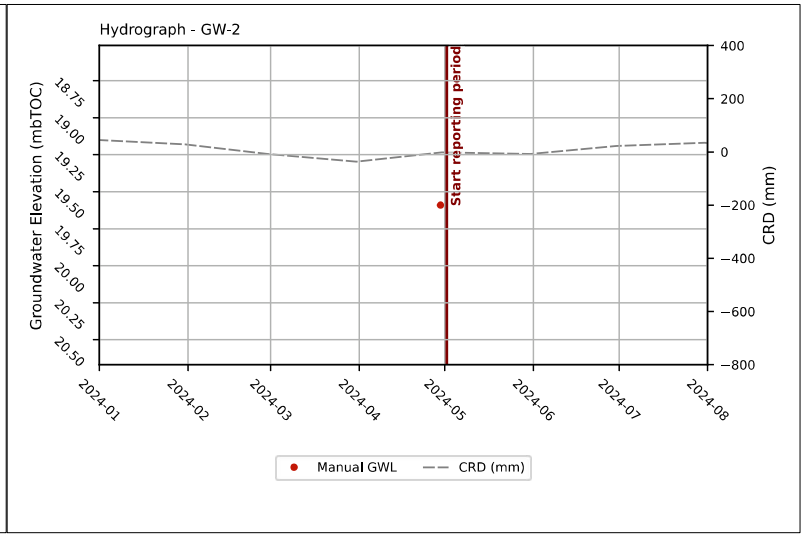
Quarterly Review May 2024 – July 2024

Whitehaven Coal Ltd

SLR Project No.: 640.031099.00001

2 October 2024


Hydrograph - GW-11
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - GW-11
Manual GWL
CRD (mm)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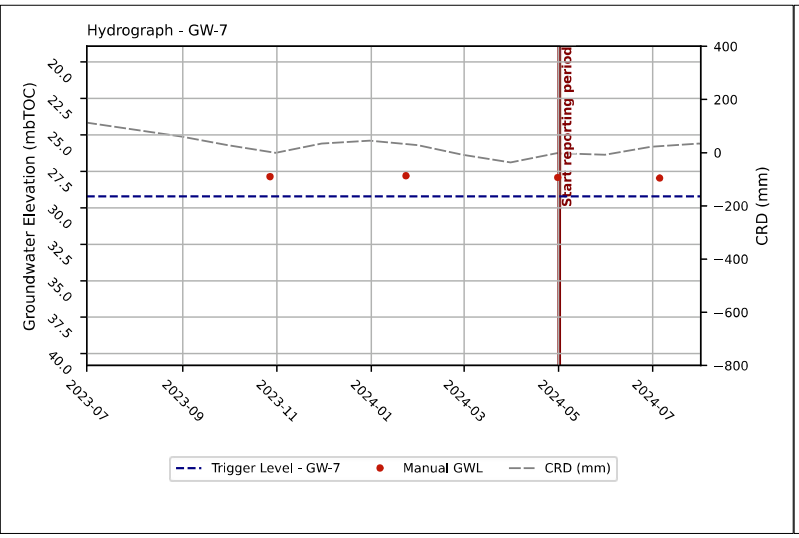
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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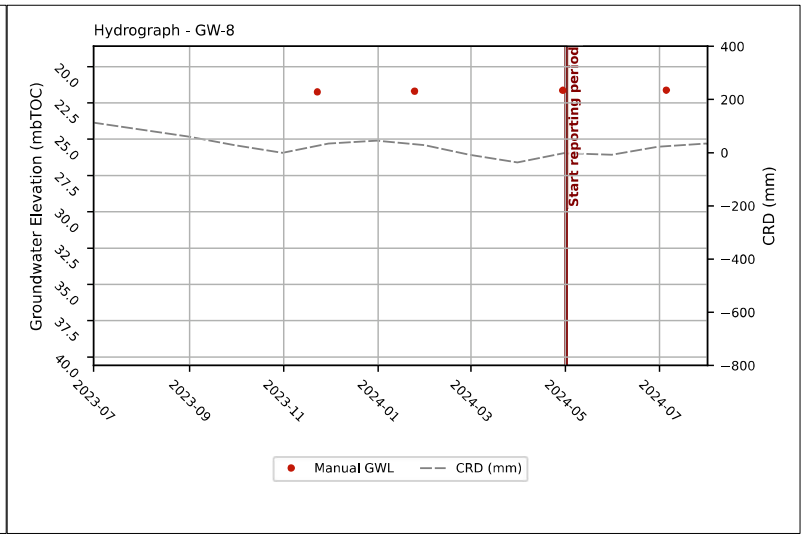
CRD (mm)
Start reporting period
Trigger Level - GW-7
Manual GWL
CRD (mm)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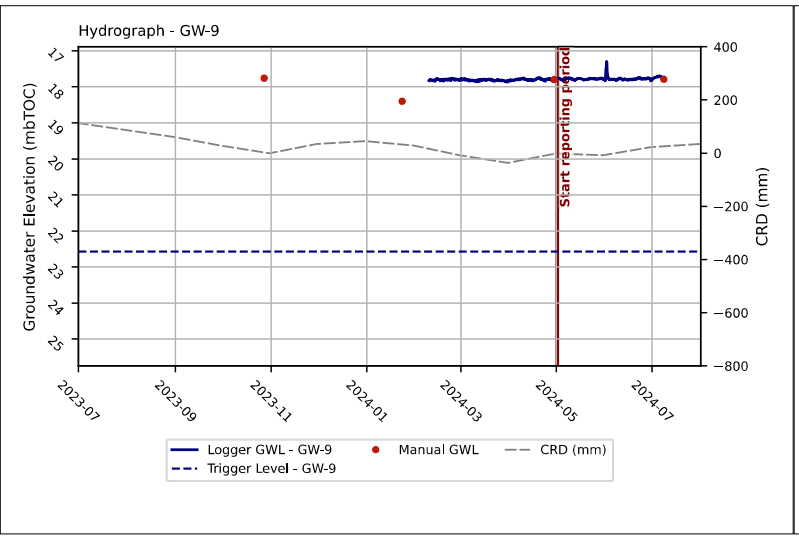
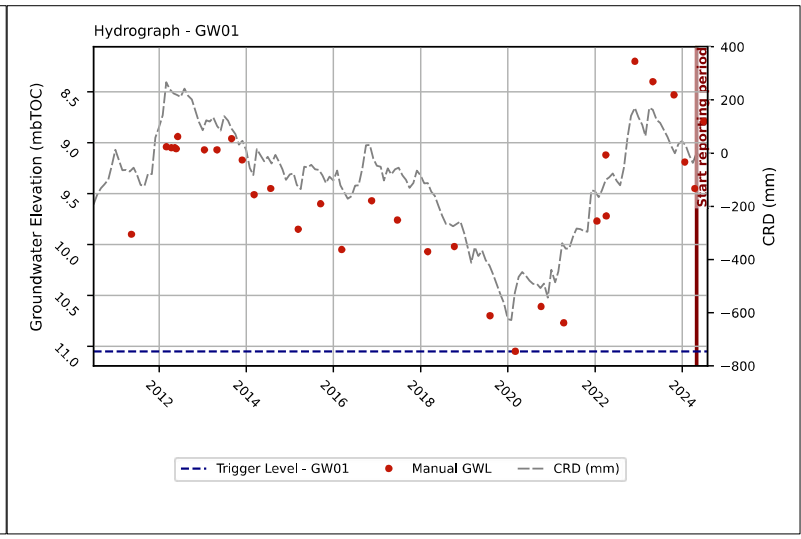
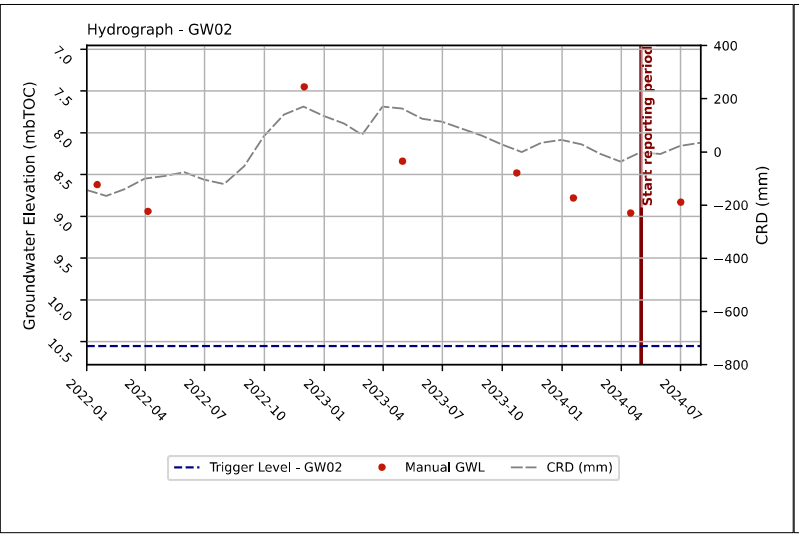
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)


Hydrograph - GW-9
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - GW-9
Trigger Level - GW-9
Manual GWL
CRD (mm)


Hydrograph - GW01
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - GW01
Manual GWL
CRD (mm)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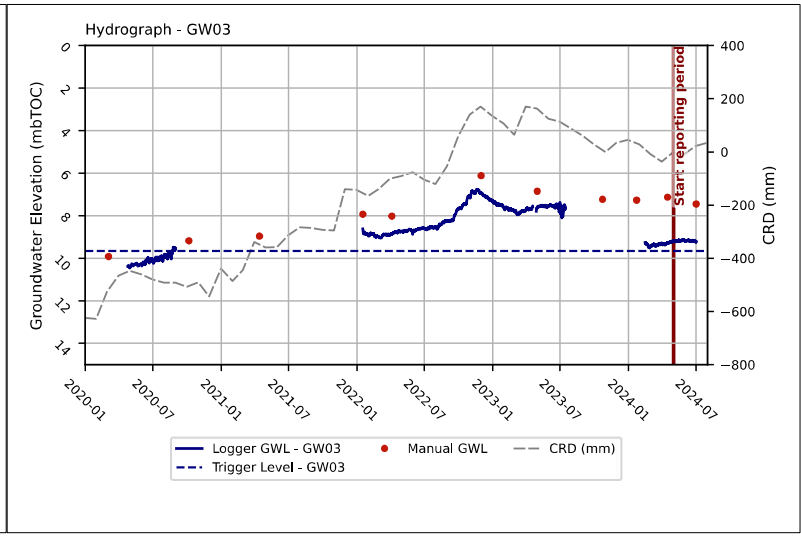
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - GW02
Manual GWL
CRD (mm)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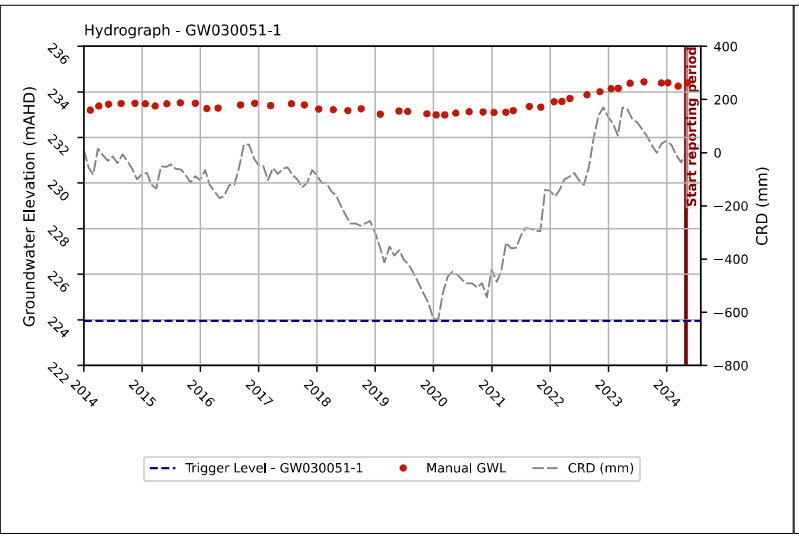
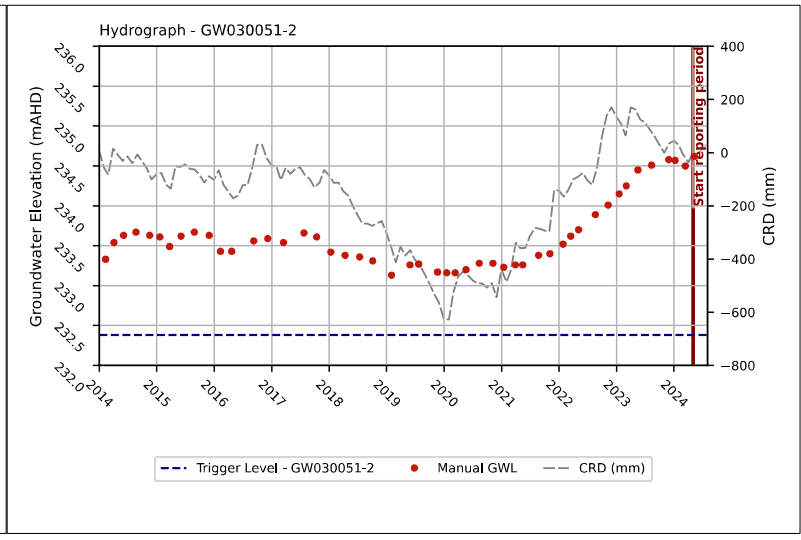
CRD (mm)
Start reporting period
Logger GWL - GW03
Trigger Level - GW03
Manual GWL
CRD (mm)


Hydrograph - GW030051-1
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Trigger Level - GW030051-1
Manual GWL
CRD (mm)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Groundwater Elevation (mAHD)
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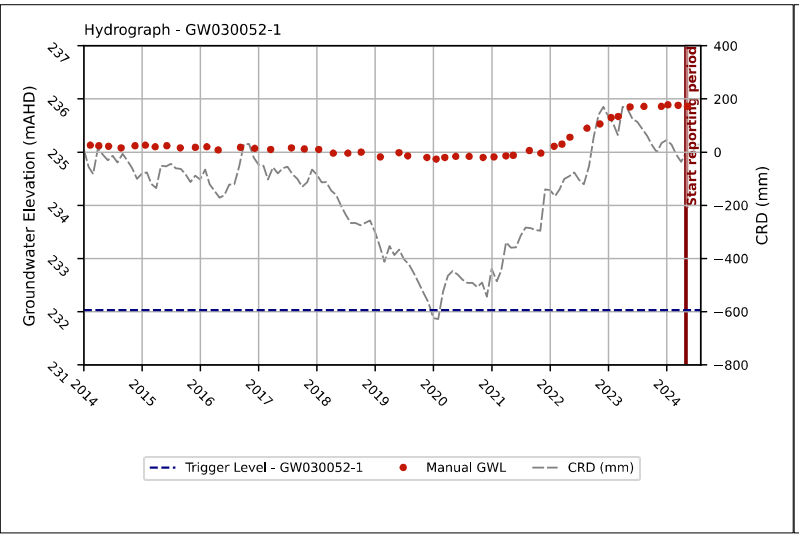
Start reporting period
Trigger Level - GW030051-2
Manual GWL
CRD (mm)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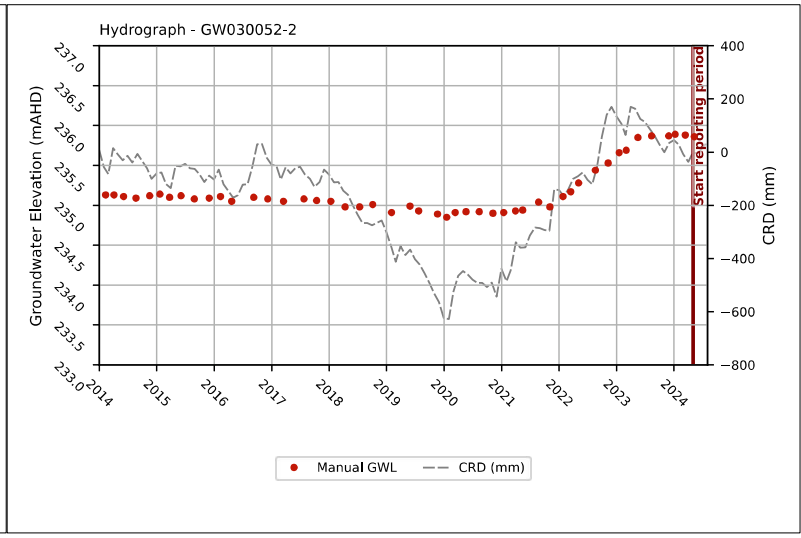
Manual GWL
CRD (mm)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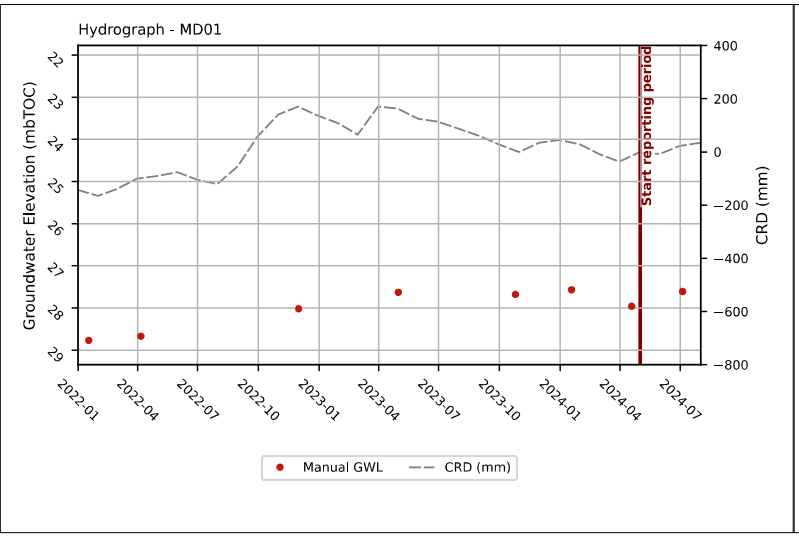
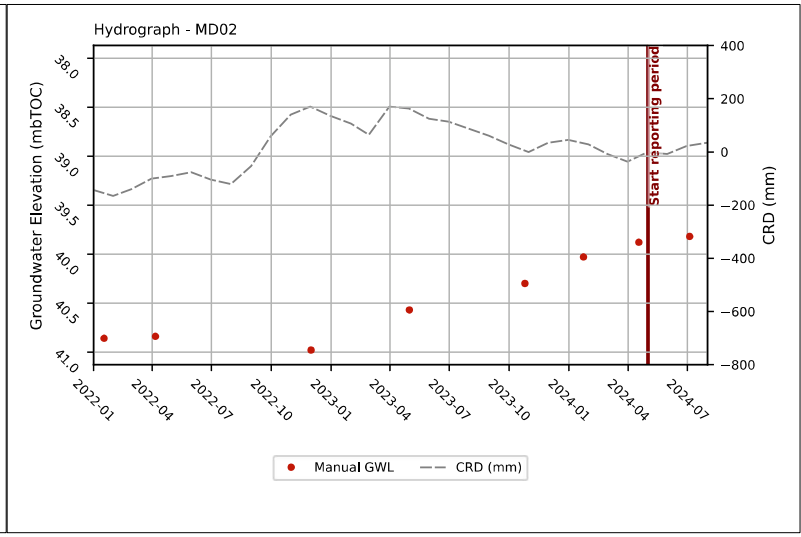
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)


Hydrograph - MD01
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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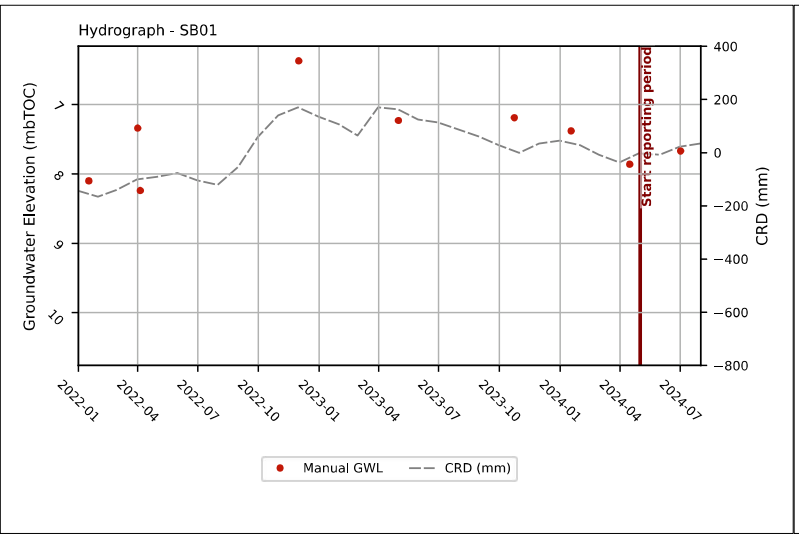
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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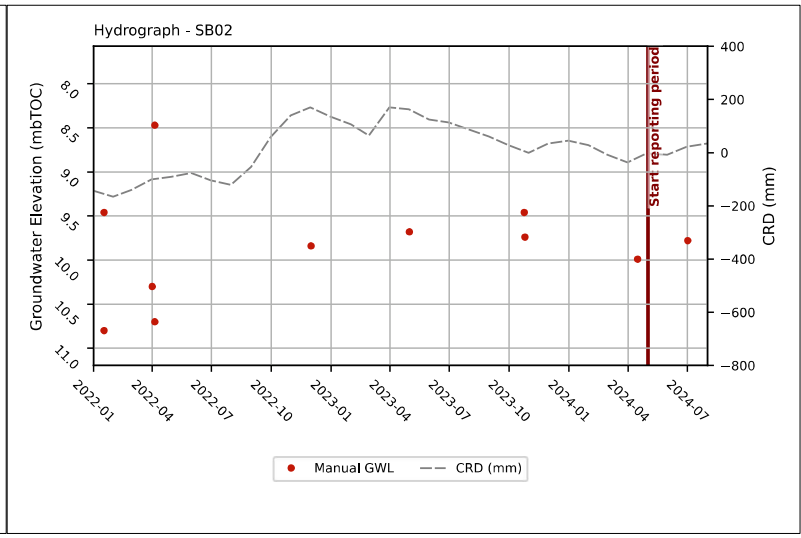
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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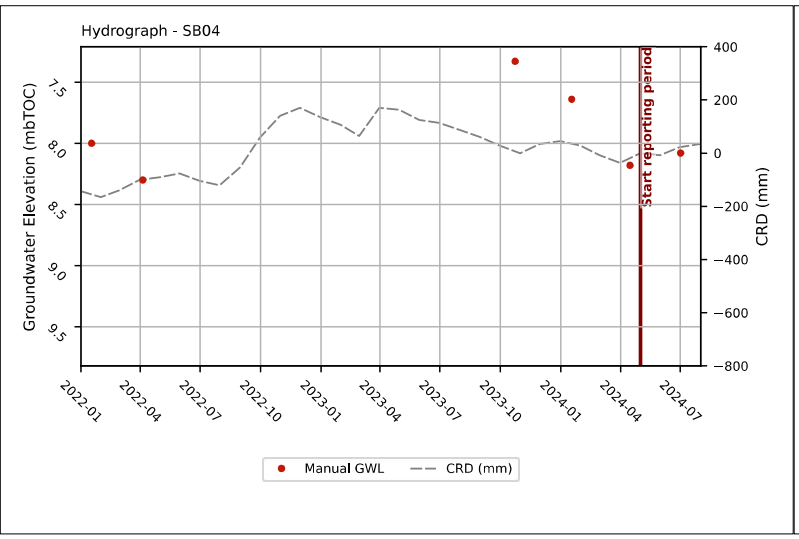
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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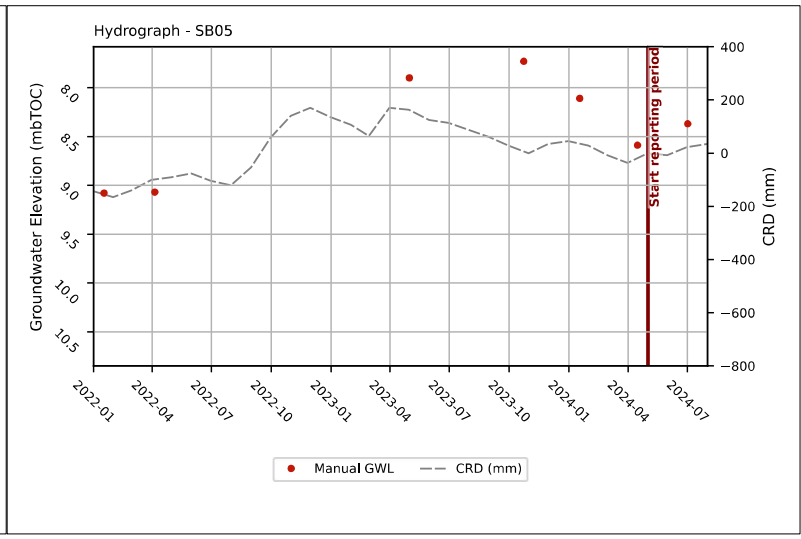
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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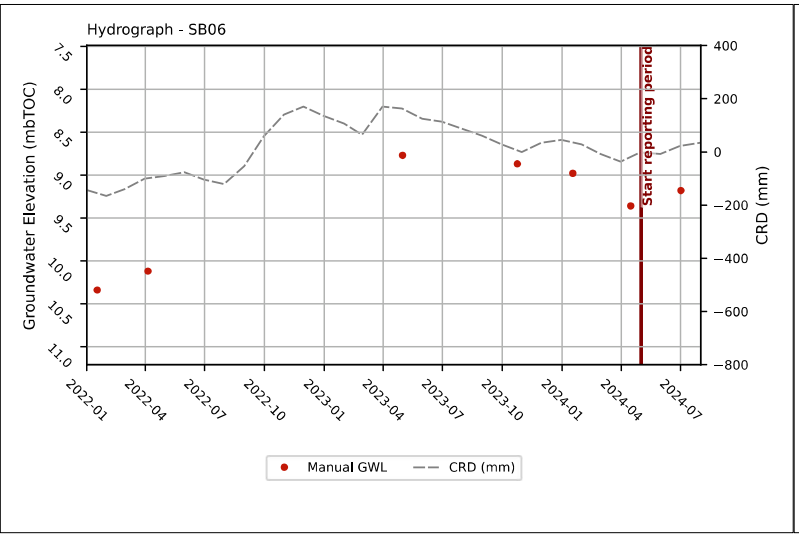
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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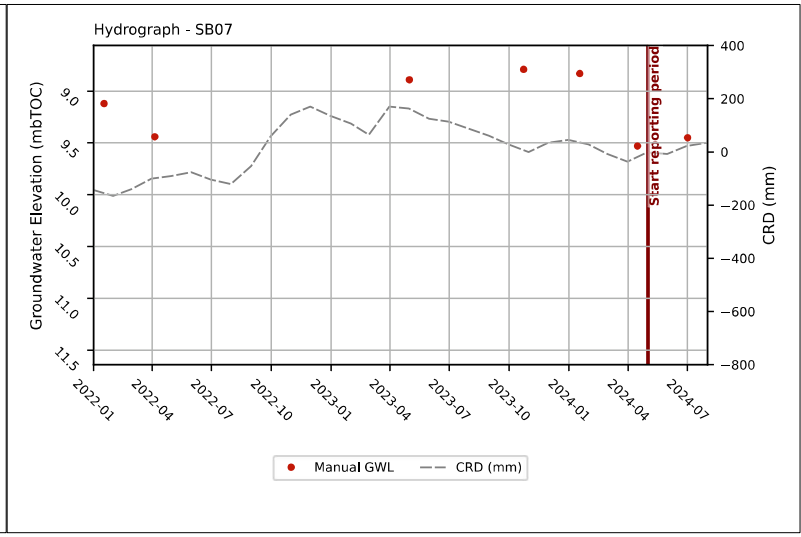
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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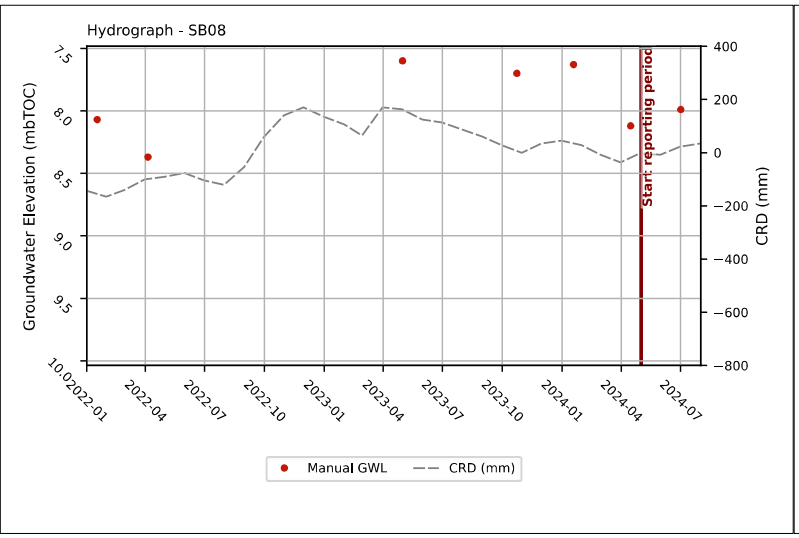
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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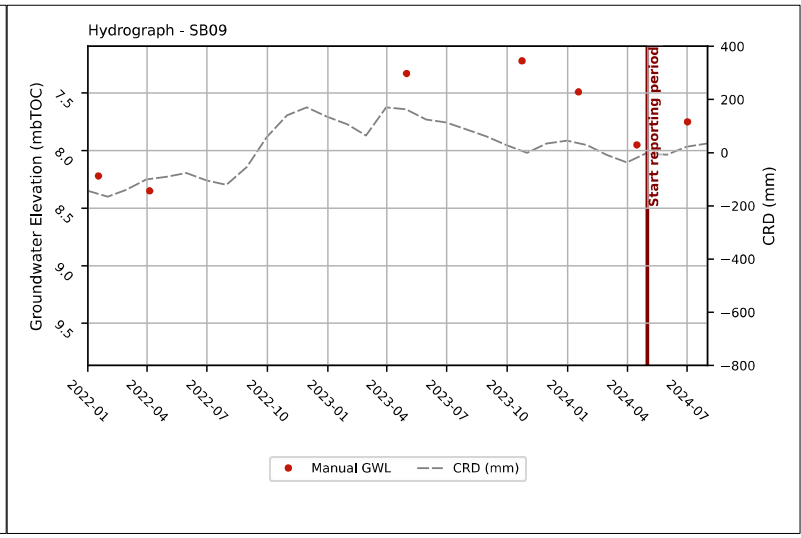
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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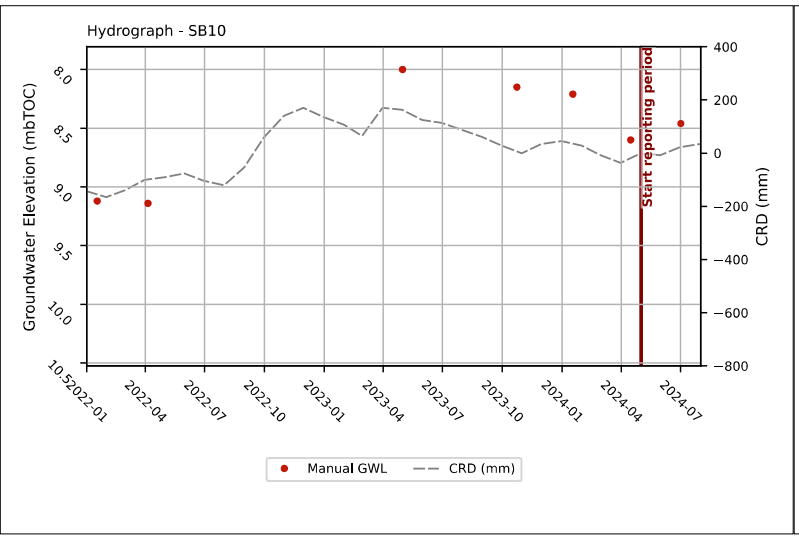
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)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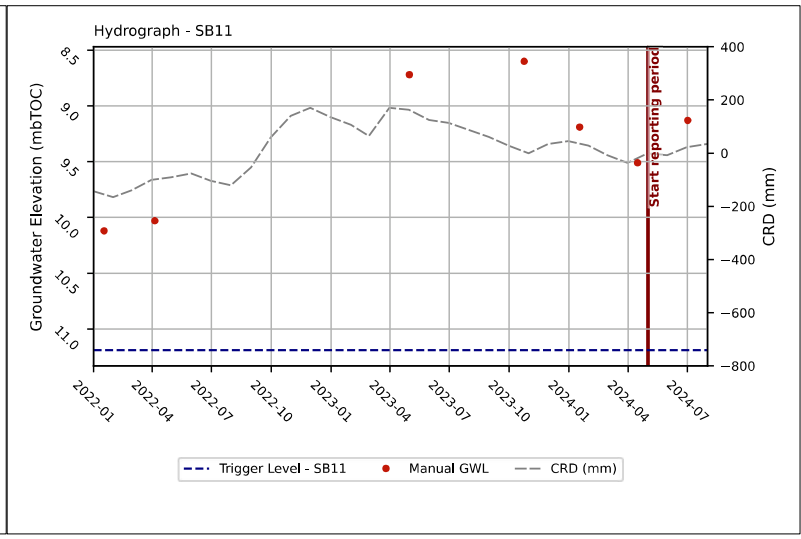
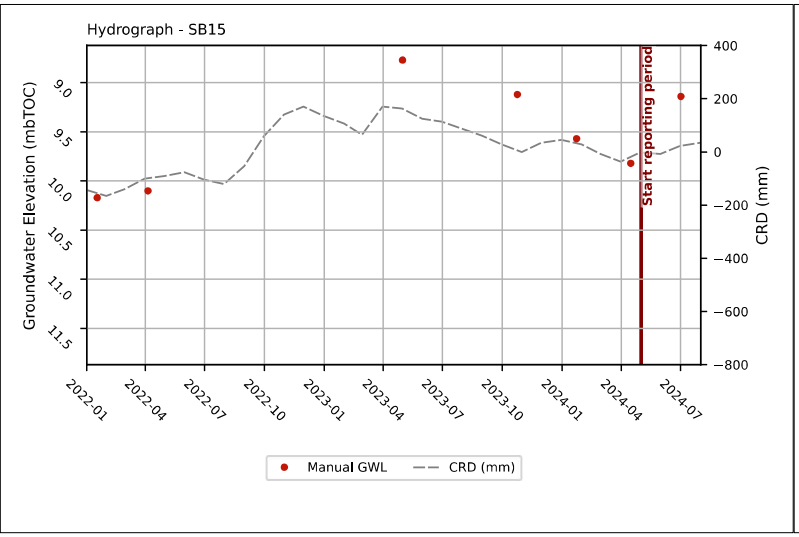
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)


Hydrograph - SB11
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - SB11
Manual GWL
CRD (mm)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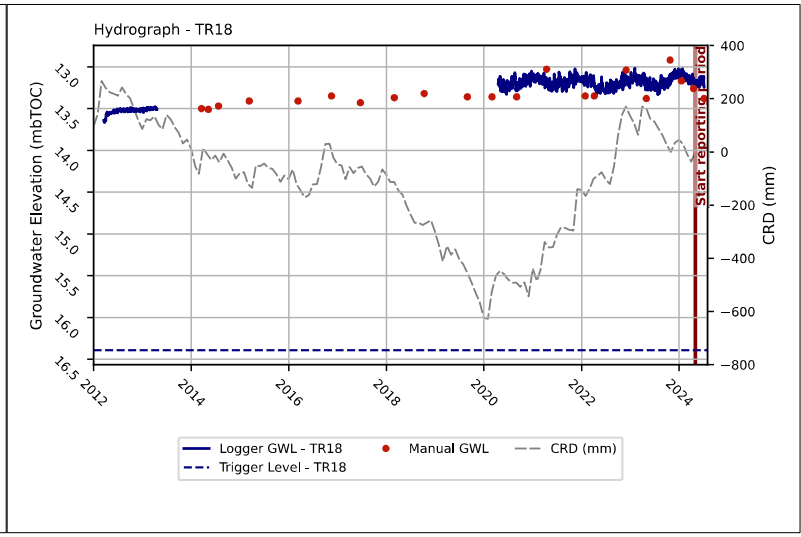
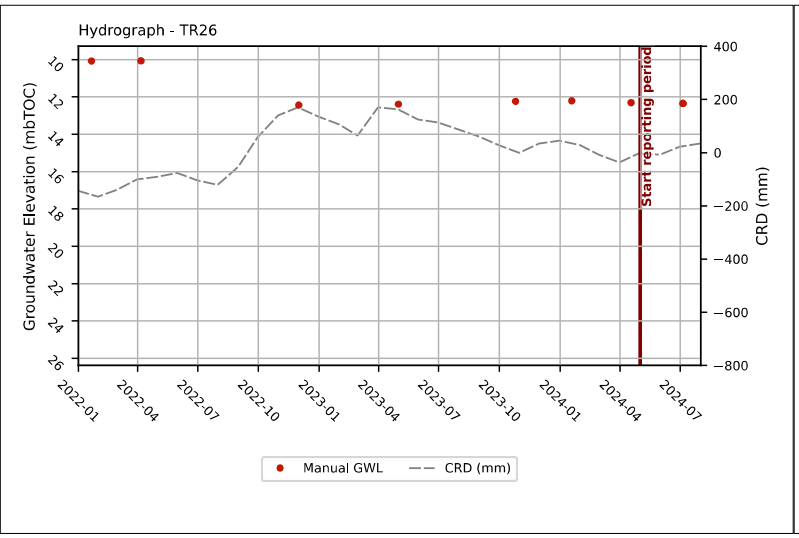
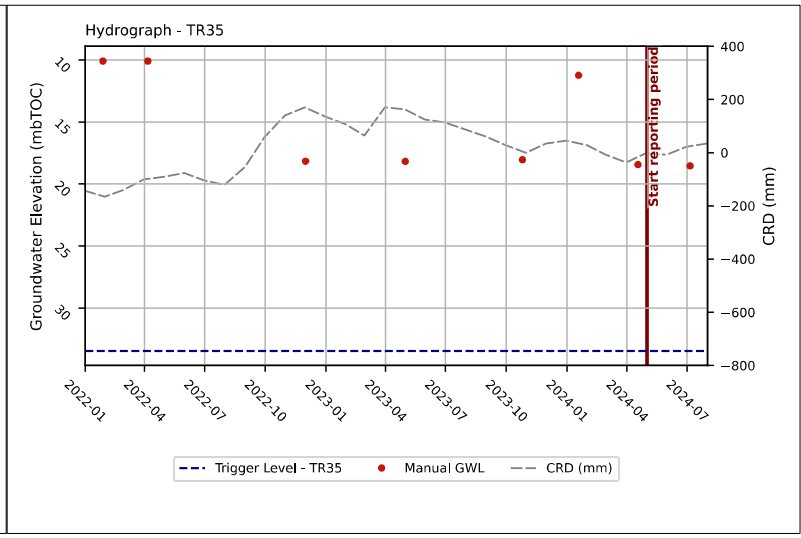
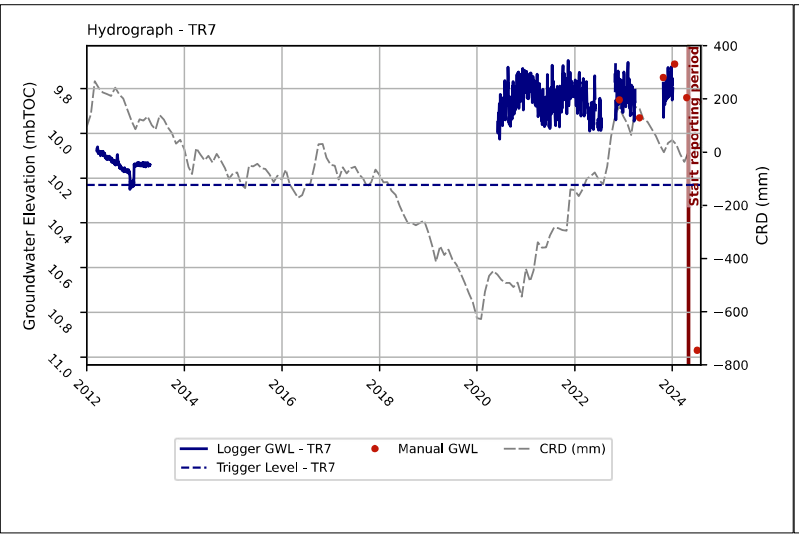
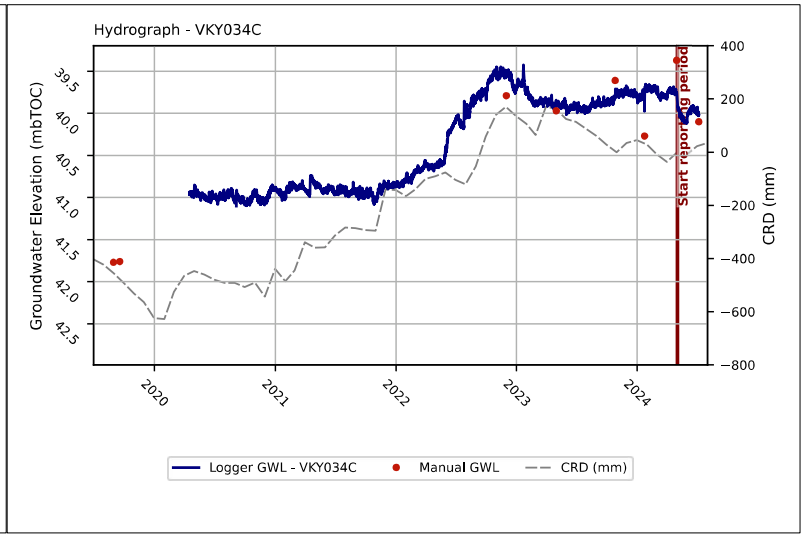
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

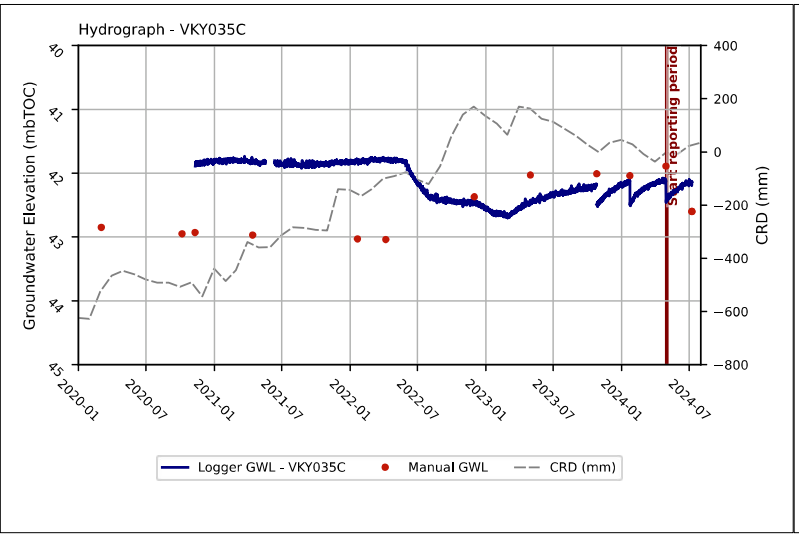

Hydrograph - TR18
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - TR18
Manual GWL
CRD (mm)
Trigger Level - TR18

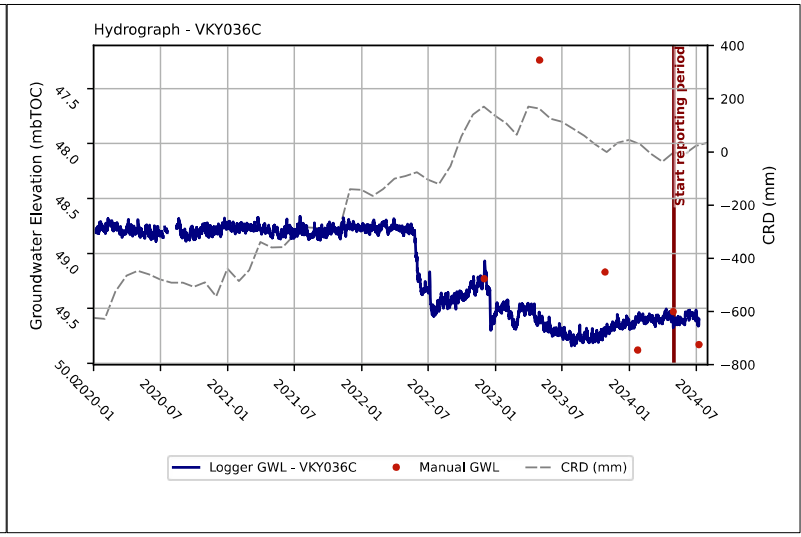

Hydrograph - TR26
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

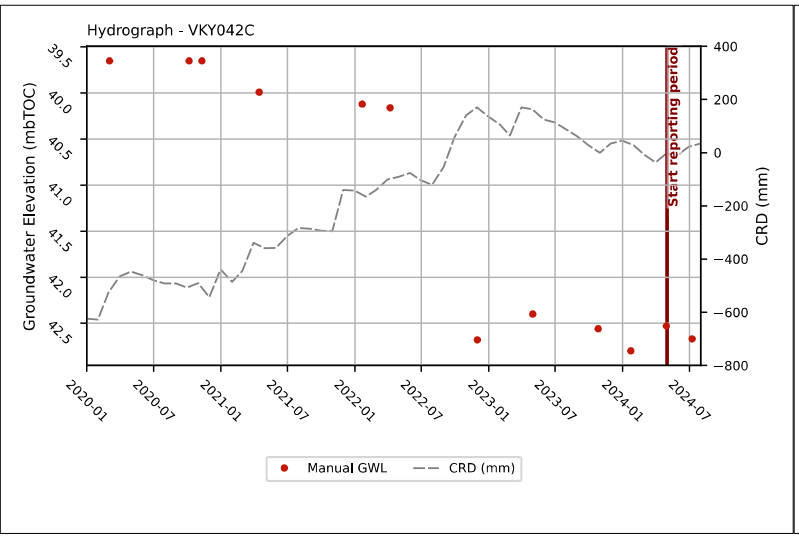

Hydrograph - TR35
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - TR35
Manual GWL
CRD (mm)

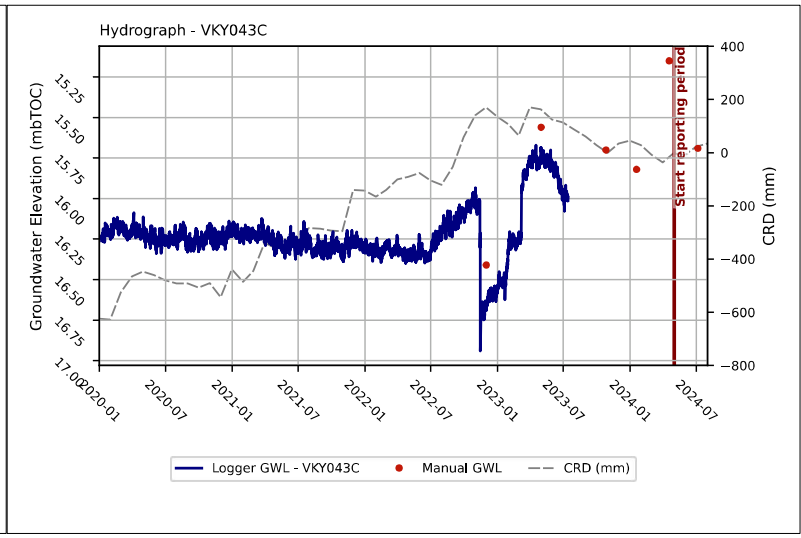

Hydrograph - TR7
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - TR7
Manual GWL
CRD (mm)
Trigger Level - TR7

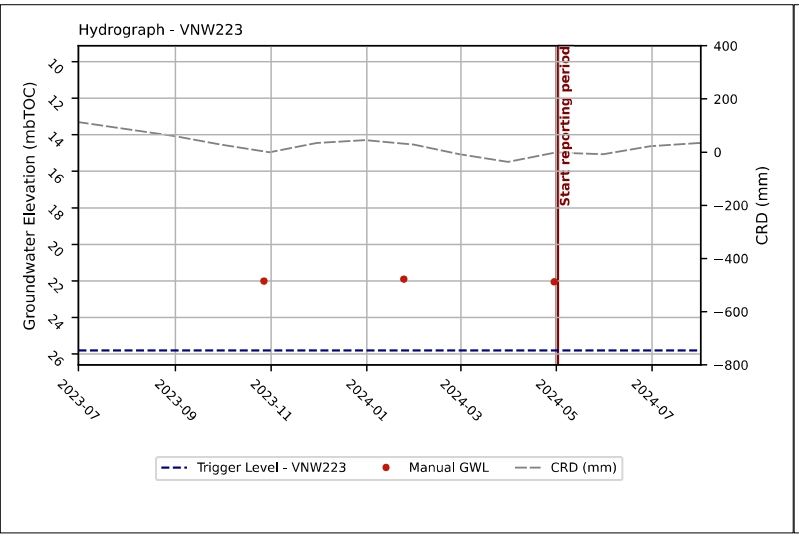

Hydrograph - VKY034C
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VKY034C
Manual GWL
CRD (mm)

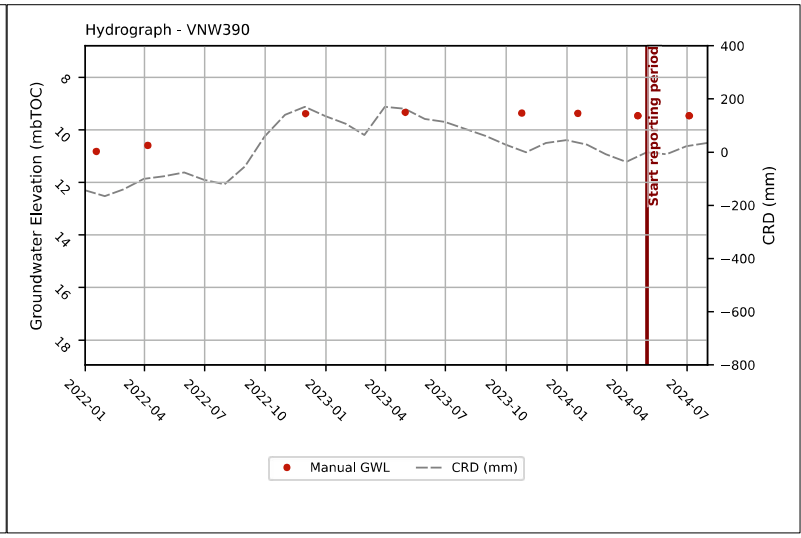

Hydrograph - VKY035C
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VKY035C
Manual GWL
CRD (mm)

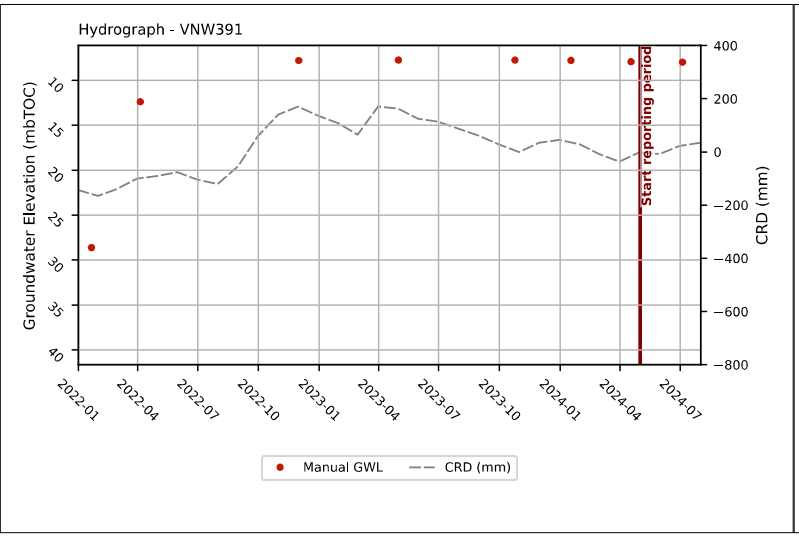

Hydrograph - VKY036C
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VKY036C
Manual GWL
CRD (mm)

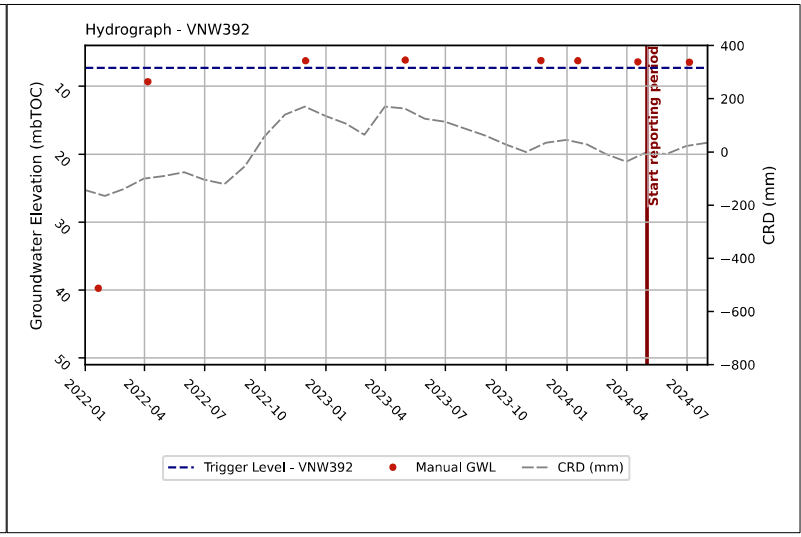

Hydrograph - VKY042C
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

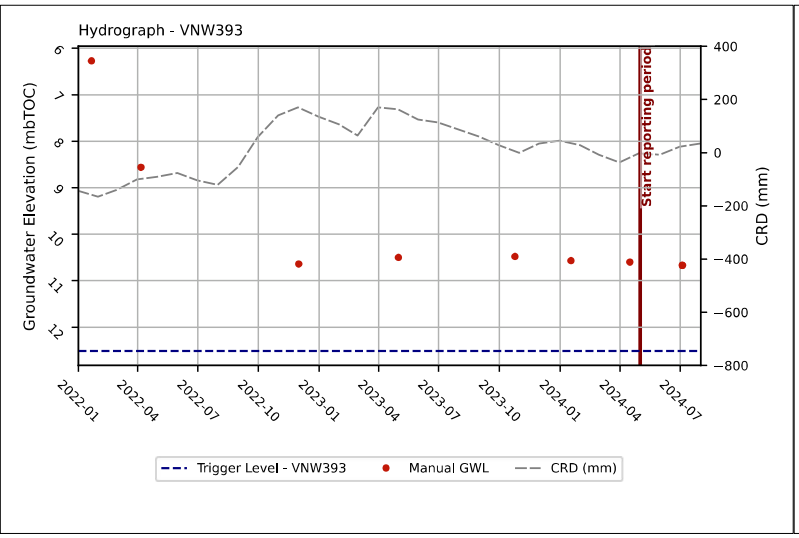

Hydrograph - VKY043C
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VKY043C
Manual GWL
CRD (mm)

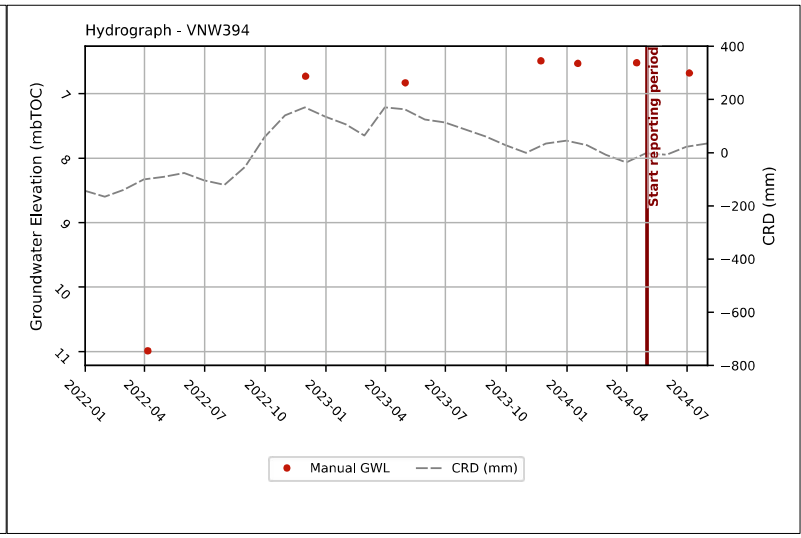

Hydrograph - VNW223
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - VNW223
Manual GWL
CRD (mm)

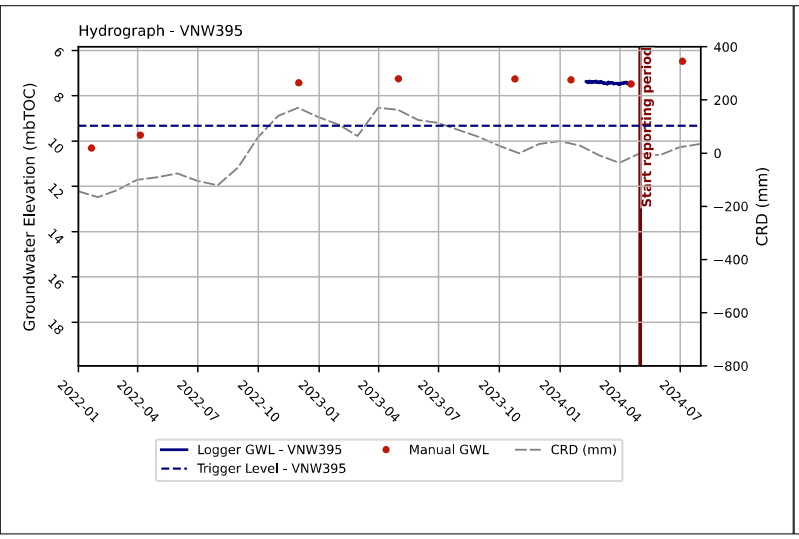

Hydrograph - VNW390
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

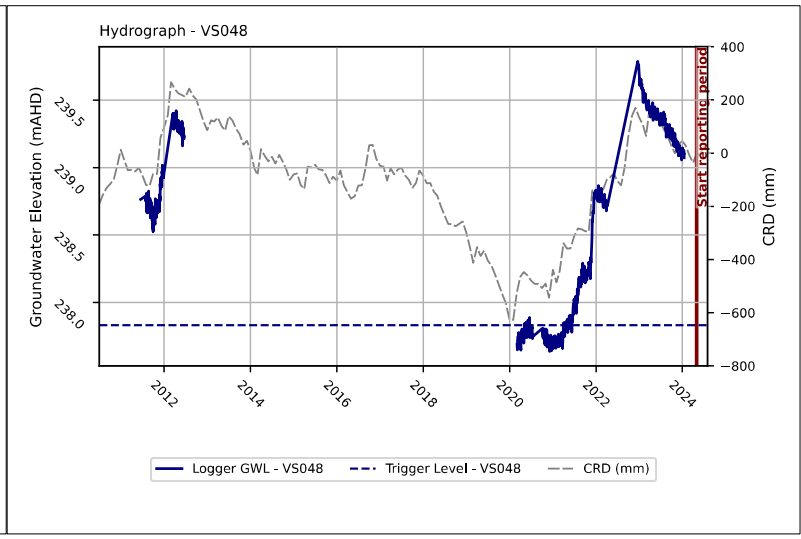

Hydrograph - VNW391
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

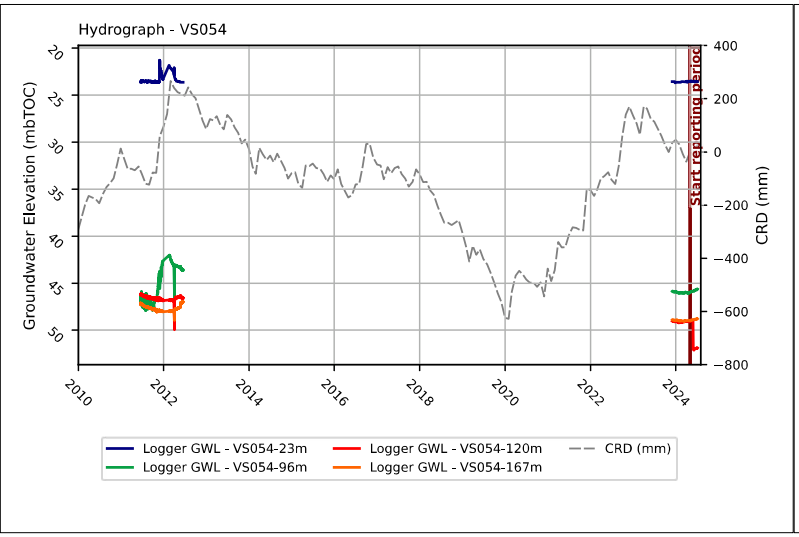

Hydrograph - VNW392
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - VNW392
Manual GWL
CRD (mm)

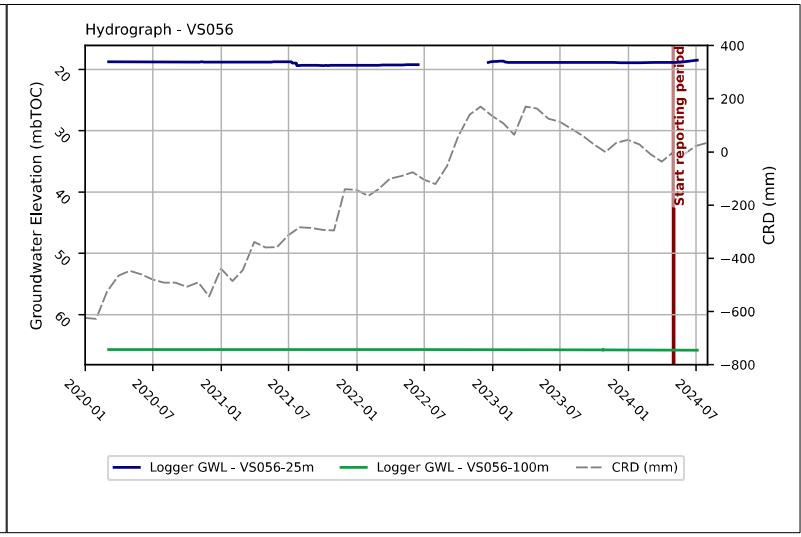

Hydrograph - VNW393
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Trigger Level - VNW393
Manual GWL
CRD (mm)

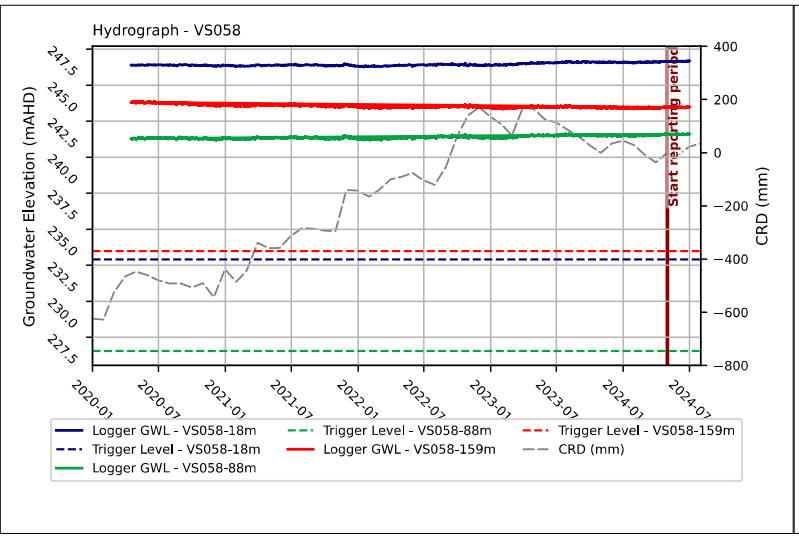

Hydrograph - VNW394
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

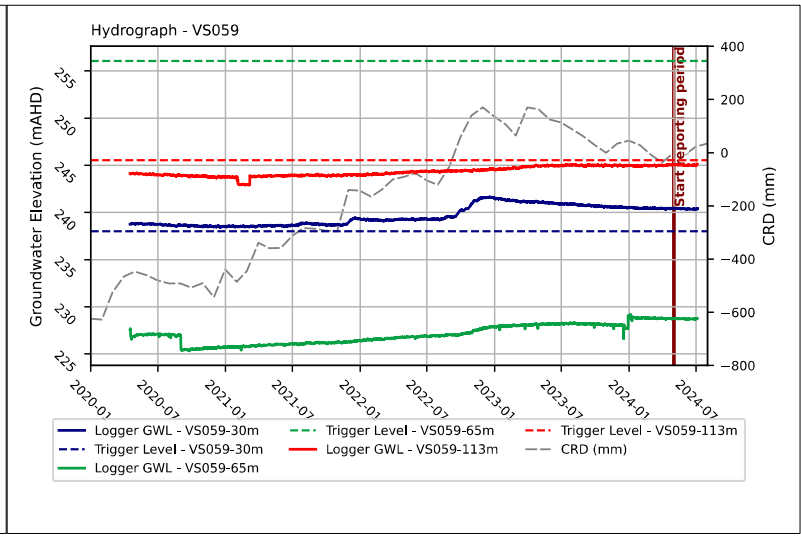

Hydrograph - VNW395
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VNW395
Trigger Level - VNW395
Manual GWL
CRD (mm)

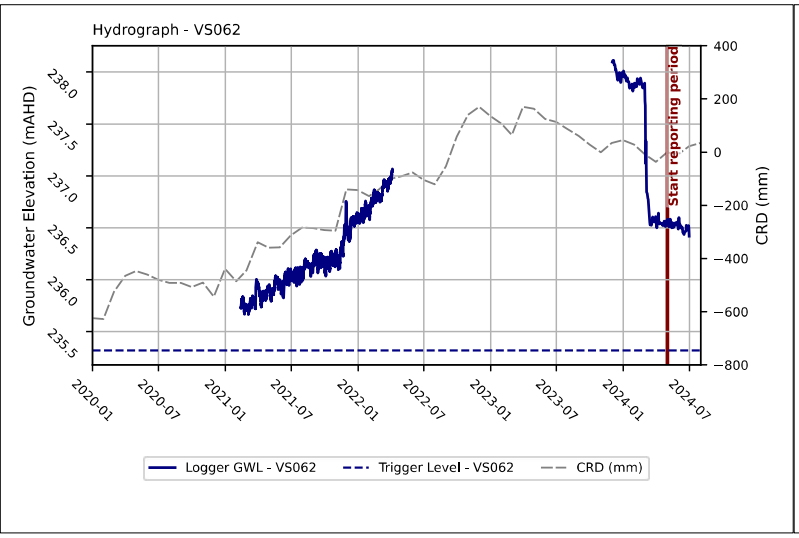

Hydrograph - VS048
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS048
Trigger Level - VS048
CRD (mm)

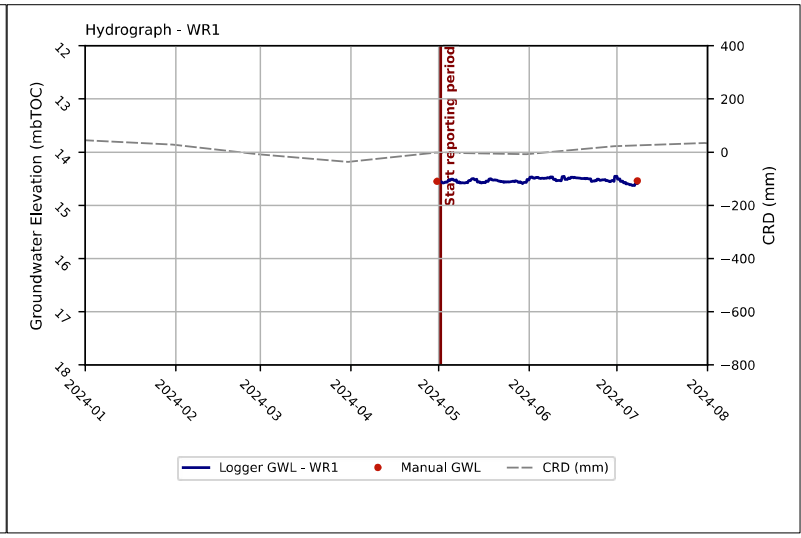

Hydrograph - VS054
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VS054-23m
Logger GWL - VS054-96m
Logger GWL - VS054-120m
Logger GWL - VS054-167m
CRD (mm)

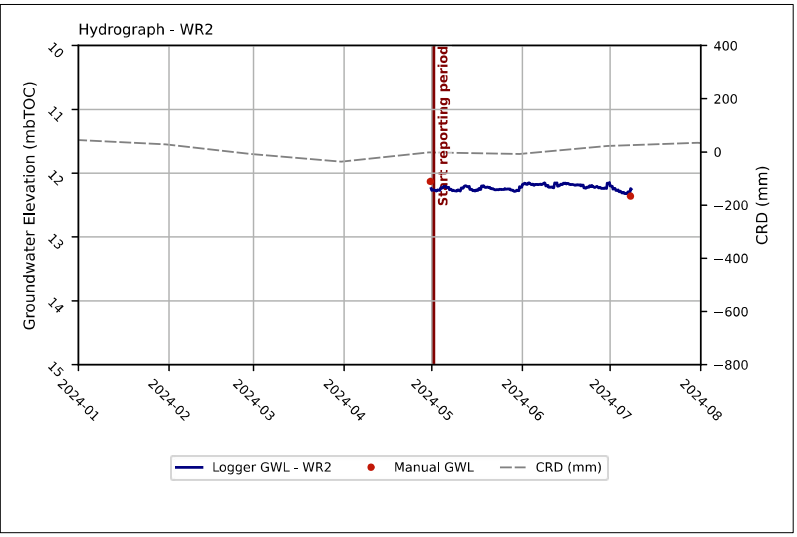

Hydrograph - VS056
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VS056-25m
Logger GWL - VS056-100m
CRD (mm)


Hydrograph - VS058
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS058-18m
Trigger Level - VS058-18m
Logger GWL - VS058-88m
Trigger Level - VS058-88m
Logger GWL - VS058-159m
Trigger Level - VS058-159m
CRD (mm)


Hydrograph - VS059
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS059-30m
Trigger Level - VS059-30m
Logger GWL - VS059-65m
Trigger Level - VS059-65m
Logger GWL - VS059-113m
Trigger Level - VS059-113m
CRD (mm)


Hydrograph - VS062
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS062
Trigger Level - VS062
CRD (mm)


Hydrograph - WR1
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - WR1
Manual GWL
CRD (mm)


Hydrograph - WR2
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
10
11
12
13
14
15
400
200
0
−200
−400
−600
−800
2024-01
2024-02
2024-03
2024-04
2024-05
2024-06
2024-07
2024-08
Logger GWL - WR2
Manual GWL
CRD (mm)

Appendix C Groundwater Level Review and Trigger Update

Vickery Extension Project Groundwater Monitoring Report

Quarterly Review May 2024 – July 2024

Whitehaven Coal Ltd

SLR Project No.: 640.031099.00001

2 October 2024

Technical Memorandum

To:	Harry Mills	**From:**	Sharon Hulbert
Company:	Whitehaven Coal	**SLR Consulting Australia**	
cc:	Megan Martin	**Date:**	13 September 2024
		Project No.	640.031099.00001

RE: Vickery GWMP
VWP Baseline data update and Trigger Level Update

1.0 Introduction

The groundwater monitoring network at the Vickery Expansion Project (VEP) is made up of both Vibrating Wire Piezometers (VWPs) and Open Standpipes (OSPs). Multiple OSPs have loggers installed, for continuous data recording.

Initially, the installation details and calibration data for the VWP sensors were derived from historical reporting, available data and other inference sources. Upon provision of the original installation records and calibration certificates a preliminary review was undertaken which indicated disparity between the two records. Consequently, the baseline data requires recalculation (from recorded pressure to water levels) based on the updated installation/calibration information. Subsequently, the trigger levels initially derived are no longer suitable and require revision.

The VWPs for which this review could be required, include: VKY3053C, VKY041C, VS058, VS062, VS059, VS054, and VS048 (those presented in Table 4-1 of the GWMP).

VKY036c, VKY3033 (eight VWPs) and VS056 (two VWPs) and TR26 are all within the VCM open cut mining footprint, and have approved drawdowns (Hydrosimulations, 2018) of greater than 100 m. These have not been assigned trigger levels, and consequently do not require updates to triggers. However, a review of the data and calibration statistics will be undertaken.

During the course of this review, the water level baseline data for the open standpipes was also reviewed for completeness. Updated elevation data and additional water level data availability required review and revision of the interim trigger levels provided in the GWMP.

Described below are the amendments made, and the revised trigger levels.

These revisions will be appended to the relevant quarterly reporting report, and following the 2024 Annual Review, the Groundwater Management Plan (GWMP) will be updated.

1.1 Data Received

At the time of this review, the following datasets have been recieved:

- Raw sensor data (this was provided without headers, and consequently, sensor depths have been assigned based on the provided temperature data).
- Calibration certificates have been obtained for all VWPs, except for VKY041C, VKY3033, and VKY3053C.
- New survey data was received for majority of the OSPs.

1.2 Summary of amendments

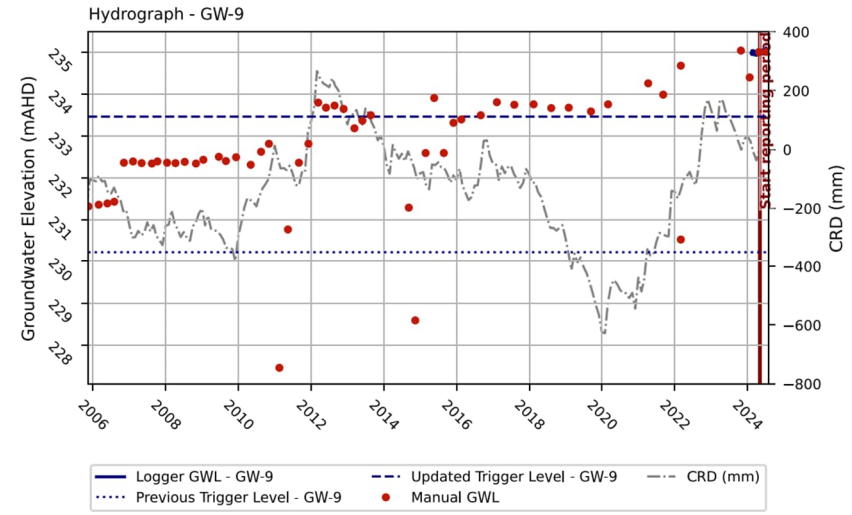
Table 1presents the water level monitoring bores and commentary on the amendments made and why, as well as the historic and revised trigger levels.

Subsequently, the updated hydrographs with the historic interim triggers and the revised triggers are appended to this memo.

1.2.1 Additional notes

The revised trigger levels were based on all available data, including logger and manual dips.

Where logger data is inconsistent across the monitoring record, its availability has the capacity to sway the 95th percentile trigger due to the high number of monitoring points associated with the loggers. For example, at GW-9 (see two figures below). The high number of data points, post early-2024 has resulted in a 95th percentile trigger that does not look representative of the long-term data. These trigger levels will be revised as more data comes to hand and review of the whole record will be considered when assessing potential impacts from mining.



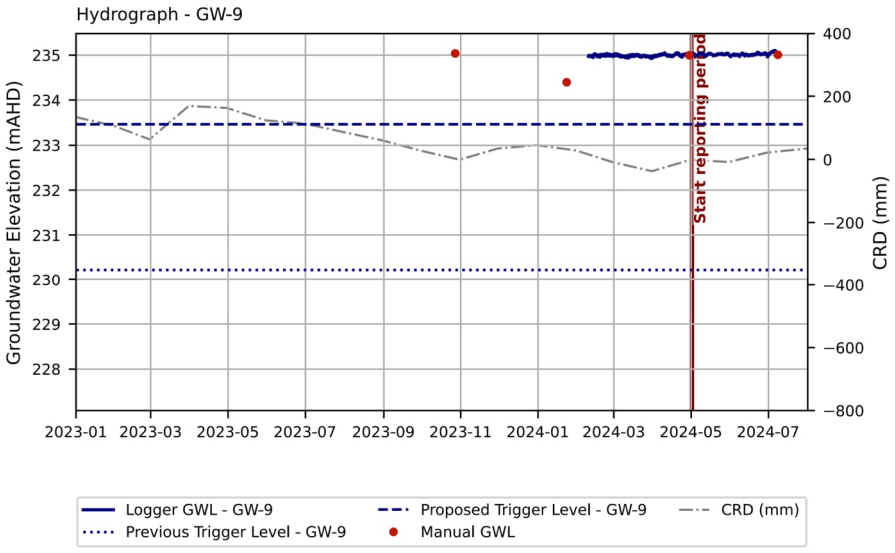


Table 1 Summary of updates

Bore ID	Bore Type	Recording Period	Number of Data Points	Baseline data revised	Comments	Current Trigger Levels (mAHD unless otherwise specified)	Proposed Trigger Levels (mAHD unless otherwise specified)
GW01	OSP	05/14/11 - 07/01/24	32	Yes	Manual dips were updated based on new survey and recent monitoring data. Logger data were not adopted due to significant drifting in logger readings, with generally unrealistic water levels results (i.e., above ground level). Sensor is considered malfunctioned; further investigation required.	11.05 (mBRP)	242.61
GW02	OSP	05/17/11 - 07/01/24	31	Yes	Manual dips were updated based on new survey and recent monitoring data. Logger data were not adopted due to significant drifting in logger readings, with generally unrealistic water levels results (i.e., above ground level). Sensor is considered malfunctioned; further investigation required.	10.55 (mBRP)	240.56
GW03	OSP	05/23/11 - 07/01/24	3,236	Yes	Manual dips were updated based on new survey and recent monitoring data. Logger data are to be reviewed. The last period of data looks disconnected/different from the previous period.	9.66 (mBRP)	241.59
GW030051-1^	OSP	02/10/14 - 05/09/24	48	Yes	Data have been revised based on updated monitoring data	223.95	233.03
GW030051-2^	OSP	02/10/14 - 05/09/24	48	Yes	Data have been revised based on updated monitoring data	232.38	233.16
GW030052-1^	OSP	02/10/14 - 05/09/24	48	Yes	Data have been revised based on updated monitoring data	232.03	234.9
GW030052-2^	OSP	02/10/14 - 05/09/24	48	Yes	Data have been revised based on updated monitoring data	-	234.9
GW036459^	OSP	02/11/14 - 05/08/24	46	Yes	No monitoring data	243.01	242.74
GW-11	OSP	04/08/08 - 07/08/24	46	Yes	Data have been revised based on new survey data, and the recent monitoring data.	18.56 (mBRP)	231.44
GW-7	OSP	11/16/05 - 07/05/24	57	Yes	Data have been revised based on new survey data, and the recent monitoring data.	29.22 (mBRP)	239.32
GW-8	OSP	11/16/05 - 07/05/24	38	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	238.72
GW-9	OSP	11/16/05 - 07/08/24	654	Yes	Data have been revised based on new survey data, and the recent monitoring data.	22.57 (mBRP)	233.46

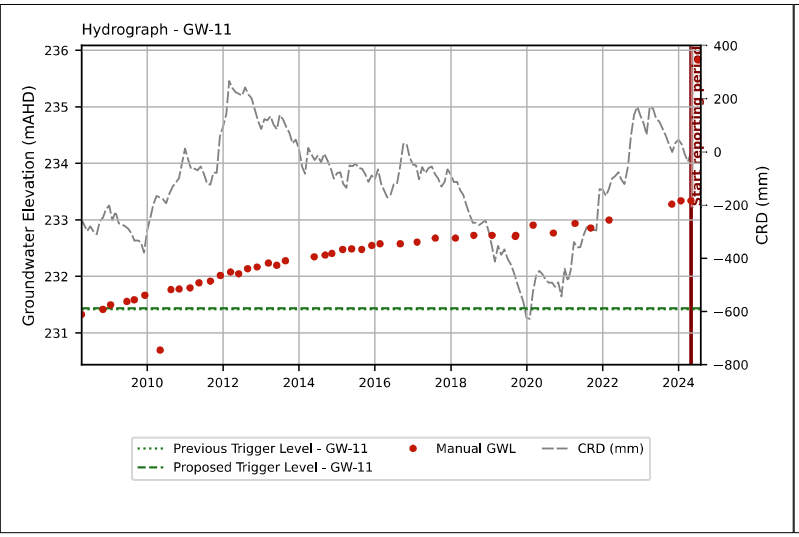
Bore ID	Bore Type	Recording Period	Number of Data Points	Baseline data revised	Comments	Current Trigger Levels (mAHD unless otherwise specified)	Proposed Trigger Levels (mAHD unless otherwise specified)
MD01	OSP	01/14/13 - 07/04/24	25	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	246.5
MD02	OSP	01/14/13 - 07/04/24	26	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	256.75
SB01	OSP	01/05/11 - 07/01/24	32	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	241.49
SB02	OSP	01/05/11 - 07/01/24	33	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	243.18
SB04	OSP	03/12/12 - 07/01/24	23	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	241.55
SB05	OSP	01/05/11 - 07/01/24	31	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	241.82
SB06	OSP	01/05/11 - 07/01/24	29	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	242.14
SB07	OSP	12/30/11 - 07/01/24	31	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	240.65
SB08	OSP	03/12/12 - 07/01/24	27	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	241
SB09	OSP	01/05/11 - 07/01/24	31	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	241.51
SB10	OSP	01/05/11 - 07/01/24	31	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	241.72
SB11	OSP	01/05/11 - 07/01/24	31	Yes	Data have been revised based on new survey data, and the recent monitoring data.	11.19 (mBRP)	242.24
SB15	OSP	01/05/11 - 07/01/24	31	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	242.33
TR18	OSP	03/17/12 - 07/05/24	1,960	Yes	Data have been revised based on new survey data, and the recent monitoring data.	16.39 (mBRP)	246.3
TR35	OSP	03/17/12 - 07/05/24	24	Yes	Data have been revised based on new survey data, and the recent monitoring data.	33.46 (mBRP)	246.76

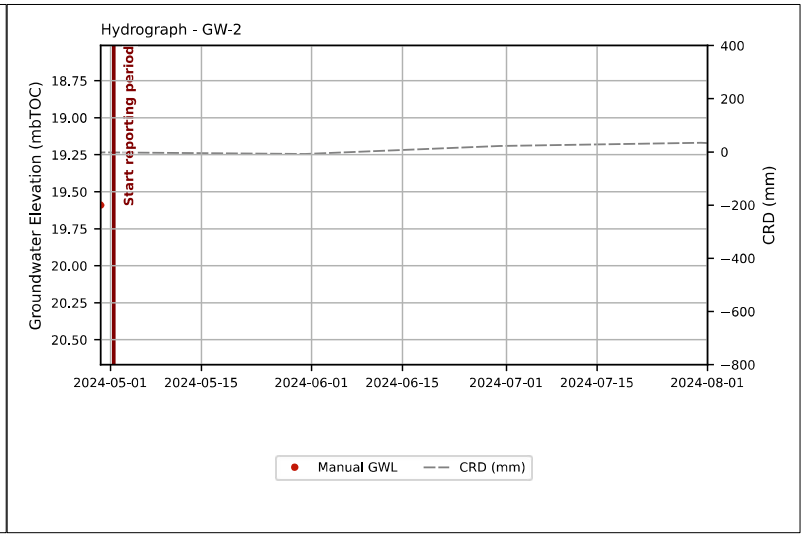
Bore ID	Bore Type	Recording Period	Number of Data Points	Baseline data revised	Comments	Current Trigger Levels (mAHD unless otherwise specified)	Proposed Trigger Levels (mAHD unless otherwise specified)
TR7	OSP	03/17/12 - 07/05/24	1,416	Yes	Logger data is not available in July 2024 monitoring round	10.23 (mBRP)	245.85
VKY034C	OSP	03/17/12 - 07/05/24	6,535	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	246.34
VKY035C	OSP	03/19/14 - 07/08/24	5,229	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	248.21
VKY041C (140, 170, 199 m)	VWP	11/03/2015 – 17/04/2024	3,325/ sensor	No	No calibration certificate provided.	-	#N/A
VKY041C (38, 51, 70, 95, 115 m)	VWP	11/03/2015 – 17/04/2024	~3,325/ sensor	No	No calibration certificate provided.	-	#N/A
VKY042C	OSP	03/17/12 - 07/08/24	5,280	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	248.76
VKY043C	OSP	03/19/14 - 07/05/24	4,760	Yes	Logger stopped reading in July 23	-	248.07
VKY3053C	VWP	-	-	No	No data from April 2024 onwards. No calibration certificate provided to convert readings to water levels. VWP raw data suggested 5 sensors; SLR database found one dataset (~42mbtoc/219mAHD) between 2012 and 2013.	-	-
VNW223	OSP	11/07/06 - 04/29/24	50	Yes	Data have been revised based on new survey data, and the recent monitoring data.	25.8 (mBRP)	226.75
VNW390	OSP	03/02/20 - 07/04/24	12	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	242.42
VNW391	OSP	03/02/20 - 07/04/24	12	Yes	Data have been revised based on new survey data, and the recent monitoring data.	-	242.39
VNW392	OSP	03/02/20 - 07/04/24	12	Yes	Data have been revised based on new survey data, and the recent monitoring data.	7.27 (mBRP)	242.42
VNW393	OSP	03/02/20 - 07/04/24	12	Yes	Data have been revised based on new survey data, and the recent monitoring data.	12.51 (mBRP)	240.23
VNW395	OSP	09/18/19 - 07/04/24	285	Yes	Water level calculated in mbtoc, as no reference level (mAHD) available. Logger data was not downloaded during the July 2024	9.32 (mBRP)	7.42 (mBRP)

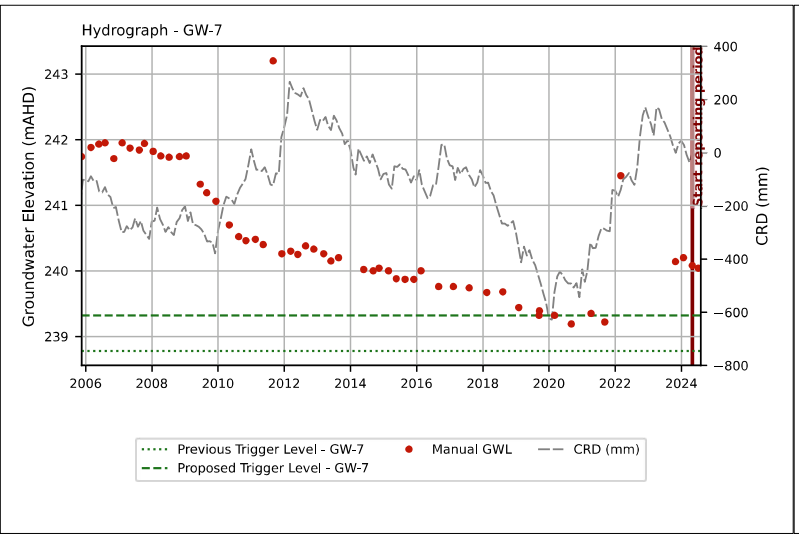
Bore ID	Bore Type	Recording Period	Number of Data Points	Baseline data revised	Comments	Current Trigger Levels (mAHD unless otherwise specified)	Proposed Trigger Levels (mAHD unless otherwise specified)
					monitoring round. A temporary logger has been deployed while searching for a replacement.		
VS048	VWP	06/17/11 - 01/17/24	6,983	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	237.83	239.33
VS054-120m	VWP	06/17/11 - 07/04/24	7,706	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	-	251.06
VS054-167m	VWP	06/17/11 - 07/04/24	7,706	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	-	249.9
VS054-23m	VWP	06/17/11 - 07/04/24	7,722	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	-	274.27
VS054-96m	VWP	06/17/11 - 07/04/24	7,706	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	-	250.24
VS058-159m	VWP	04/16/20 - 07/01/24	11,986	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	233.49	243.42
VS058-18m	VWP	04/16/20 - 07/01/24	6,147	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	232.91	246.33
VS058-88m	VWP	04/16/20 - 07/01/24	11,986	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	226.56	241.25
VS059-113m	VWP	04/16/20 - 07/04/24	6,160	Yes	Data have been revised based on the provided calibration certificate and new survey data. Verify the calculated water level. The middle sensor has the lowest water level.	245.55	243.76
VS059-30m	VWP	04/16/20 - 07/04/24	6,160	Yes	Data have been revised based on the provided calibration certificate and new survey data. Verify the calculated water level. The middle sensor has the lowest water level.	238.01	238.52
VS059-65m	VWP	04/16/20 - 07/04/24	6,160	Yes	Data have been revised based on the provided calibration certificate and new survey data. Verify the calculated water level. The middle sensor has the lowest water level.	256.07	225.62
VS062	VWP	02/12/21 - 06/30/24	10,218	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data.	235.32	235.76
WR1	OSP	04/30/24 - 07/08/24	277	Yes	Water level calculated in mbtoc, as no reference level (mAHD) available.	-	14.59 (mBRP)

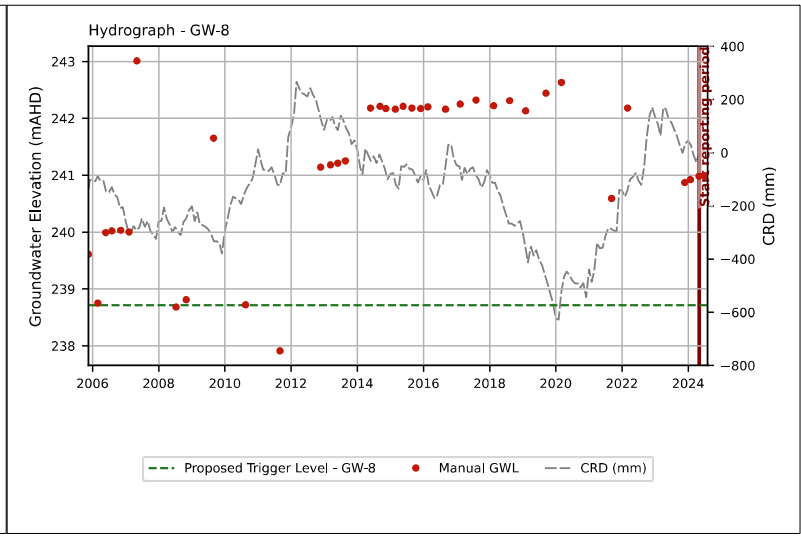
Bore ID	Bore Type	Recording Period	Number of Data Points	Baseline data revised	Comments	Current Trigger Levels (mAHD unless otherwise specified)	Proposed Trigger Levels (mAHD unless otherwise specified)
WR2	OSP	04/30/24 - 07/08/24	277	Yes	Water level calculated in mbtoc, as no reference level (mAHD) available.	-	12.29 (mBRP)
TR26*	OSP	03/17/12 - 07/05/24	28	Yes	Manual water level data received. Logger data not received. Within the VCM open cut mining footprint, and has approved drawdowns of >100m, no trigger level assigned.	N/A	N/A
VKY036C*	OSP	03/17/12 - 07/08/24	6,886	Yes	Data has been updated to include the recently monitoring results. Within the VCM open cut mining footprint, and has approved drawdowns of >100m, no trigger level assigned.	N/A	N/A
VKY33C (140, 170, 190m) *	VWP	11/03/2015 – 22/01/2024	3,241/ sensor	No	No calibration certificate provided. Within the VCM open cut mining footprint, and has approved drawdowns of >100m, no trigger level assigned.	N/A	N/A
VKY33C (38, 51, 70, 95, 115m) *	VWP	11/03/2015 – 22/01/2024	3,240/ sensor	No	No calibration certificate provided. Within the VCM open cut mining footprint, and has approved drawdowns of >100m, no trigger level assigned.	N/A	N/A
VS056-100m*	VWP	03/04/20 - 07/04/24	1,333	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data. Within the VCM open cut mining footprint, and has approved drawdowns of >100m, no trigger level assigned.	N/A	N/A
VS056-25m*	VWP	06/17/11 - 07/04/24	7,756	Yes	Data have been revised based on the provided calibration certificate, new survey data, and the recent monitoring data. Within the VCM open cut mining footprint, and has approved drawdowns of >100m, no trigger level assigned.	N/A	N/A
GW-2#	Unknown	04/29/24 - 04/29/24	1	Yes	Only one data point. Cannot locate bore during all monitoring rounds, except for April 24 monitoring round. No trigger set as insufficient data.	-	-
VNW394#	OSP	12/01/22 - 07/04/24	6	No	No trigger set as insufficient data.	-	

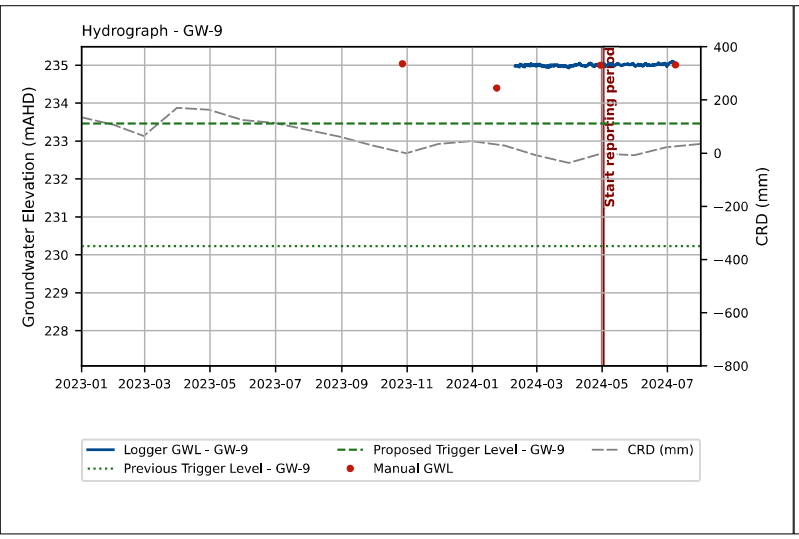
* bore located in mine footprint, with approved drawdown > 100 metres, no requirement for trigger level.
# Insufficient baseline data to calculate triggers
mBRP = metres below reference point
OSP = Open standpipe
VWP = vibrating wire piezometer

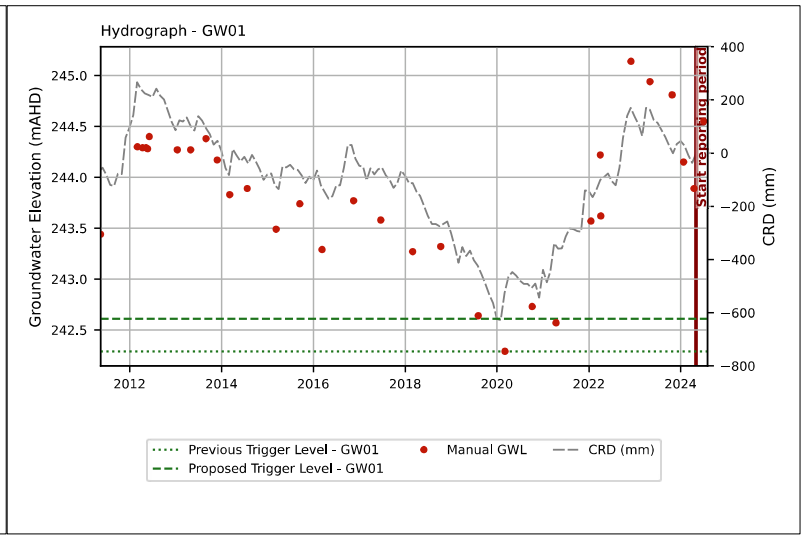

Hydrograph - GW-11
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW-11
Proposed Trigger Level - GW-11
Manual GWL
CRD (mm)

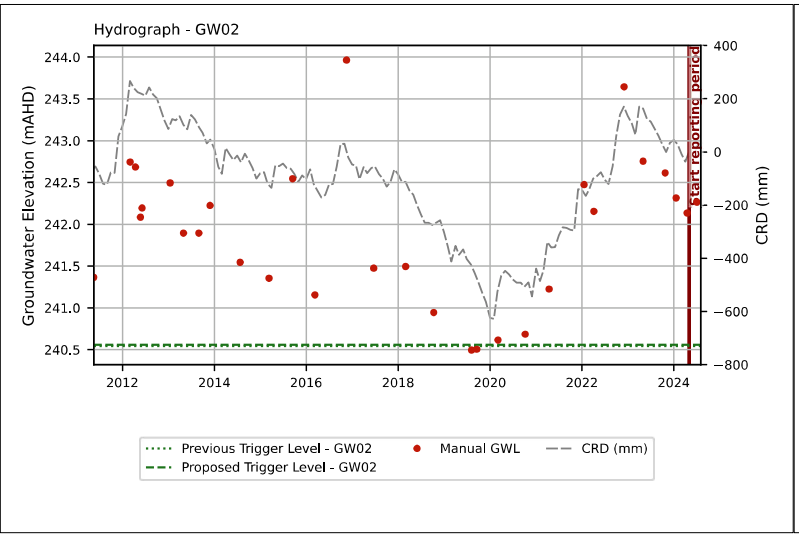

Hydrograph - GW-2
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Manual GWL
CRD (mm)

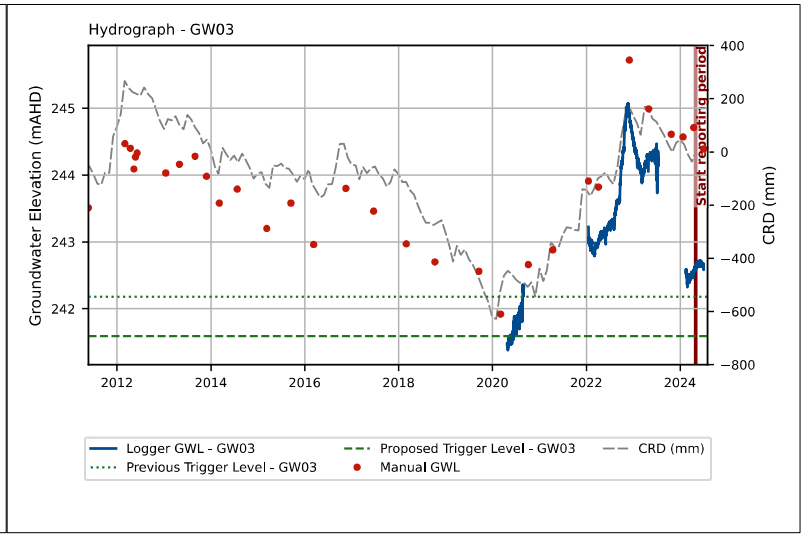

Hydrograph - GW-7
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW-7
Proposed Trigger Level - GW-7
Manual GWL
CRD (mm)

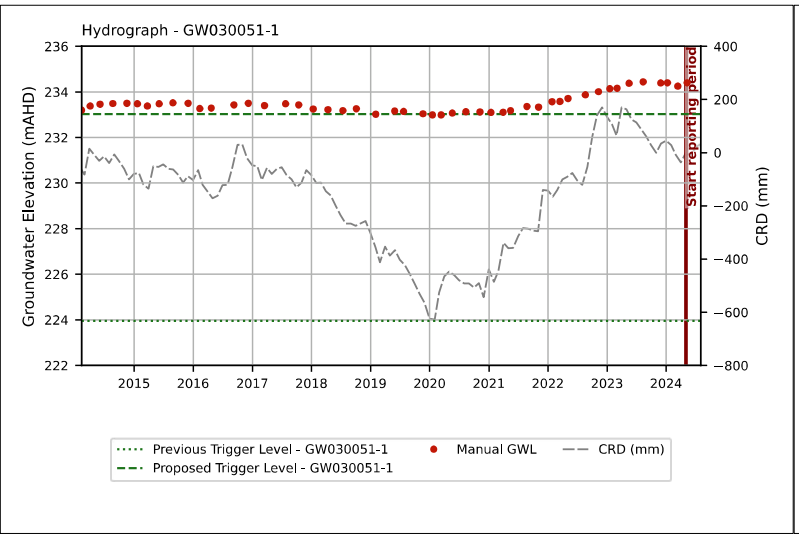

Hydrograph - GW-8
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - GW-8
Manual GWL
CRD (mm)

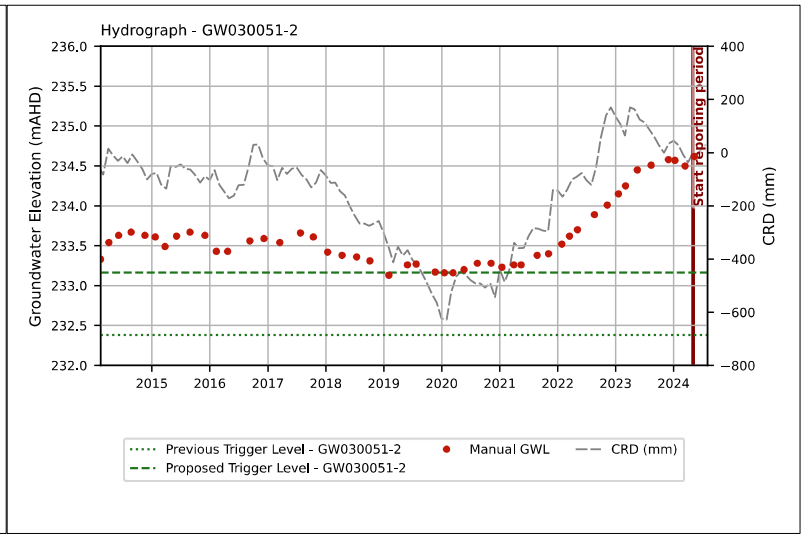

Hydrograph - GW-9
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - GW-9
Previous Trigger Level - GW-9
Proposed Trigger Level - GW-9
Manual GWL
CRD (mm)

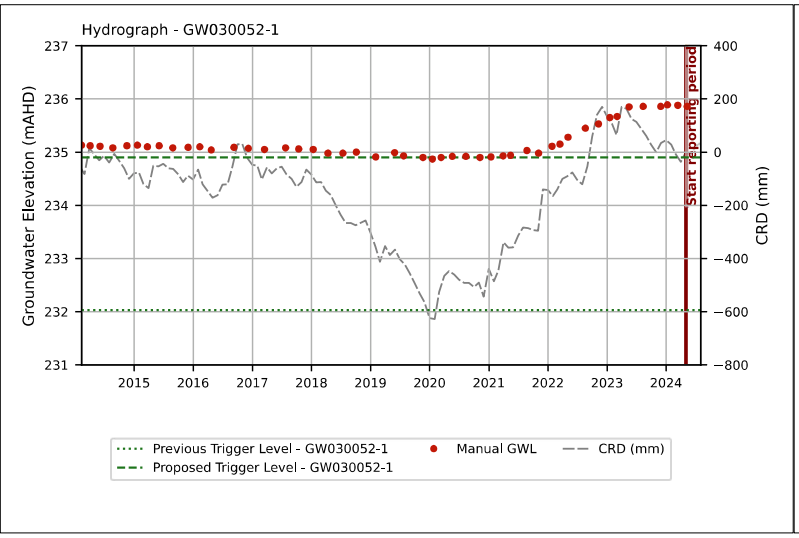

Hydrograph - GW01
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW01
Proposed Trigger Level - GW01
Manual GWL
CRD (mm)

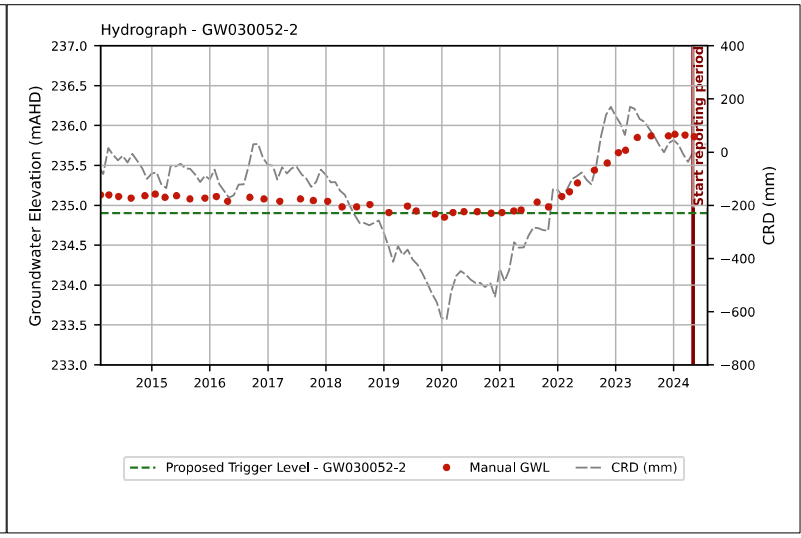

Hydrograph - GW02
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW02
Proposed Trigger Level - GW02
Manual GWL
CRD (mm)

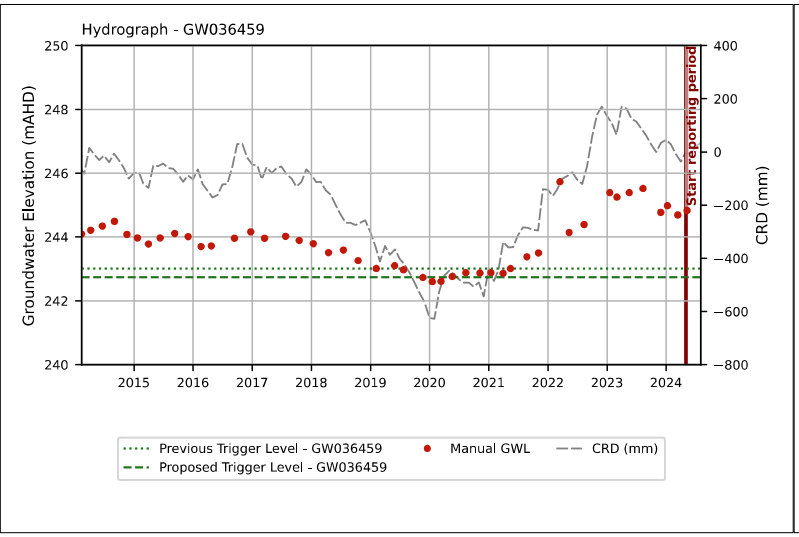

Hydrograph - GW03
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - GW03
Previous Trigger Level - GW03
Proposed Trigger Level - GW03
Manual GWL
CRD (mm)

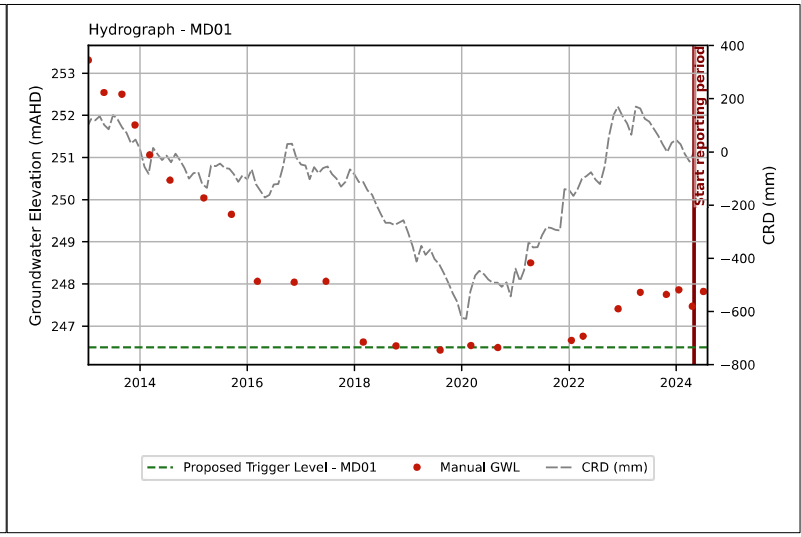

Hydrograph - GW030051-1
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW030051-1
Proposed Trigger Level - GW030051-1
Manual GWL
CRD (mm)

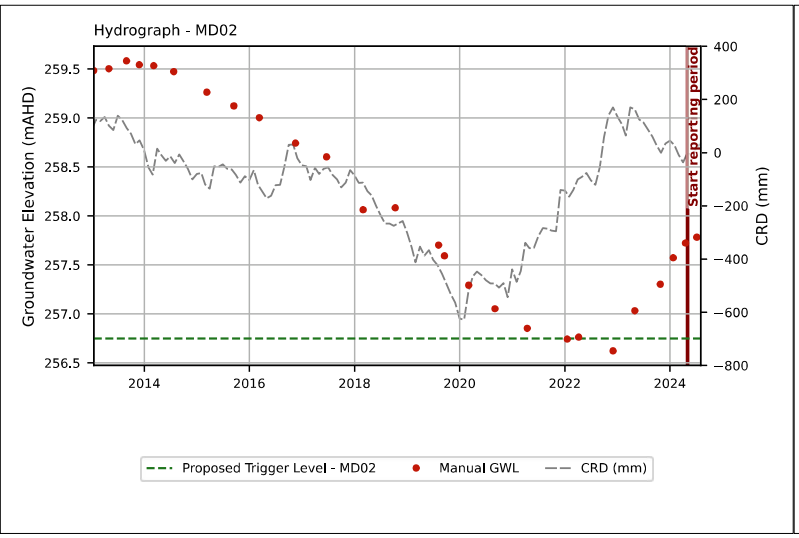

Hydrograph - GW030051-2
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW030051-2
Proposed Trigger Level - GW030051-2
Manual GWL
CRD (mm)

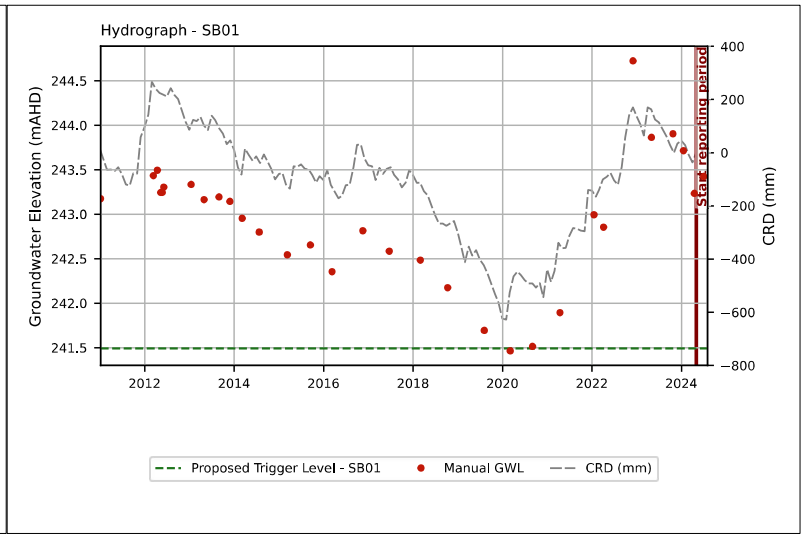

Hydrograph - GW030052-1
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW030052-1
Proposed Trigger Level - GW030052-1
Manual GWL
CRD (mm)

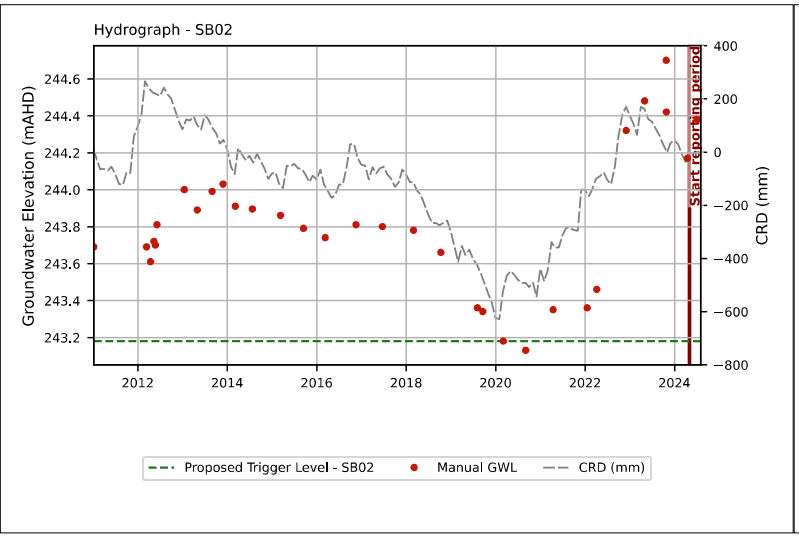

Hydrograph - GW030052-2
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - GW030052-2
Manual GWL
CRD (mm)

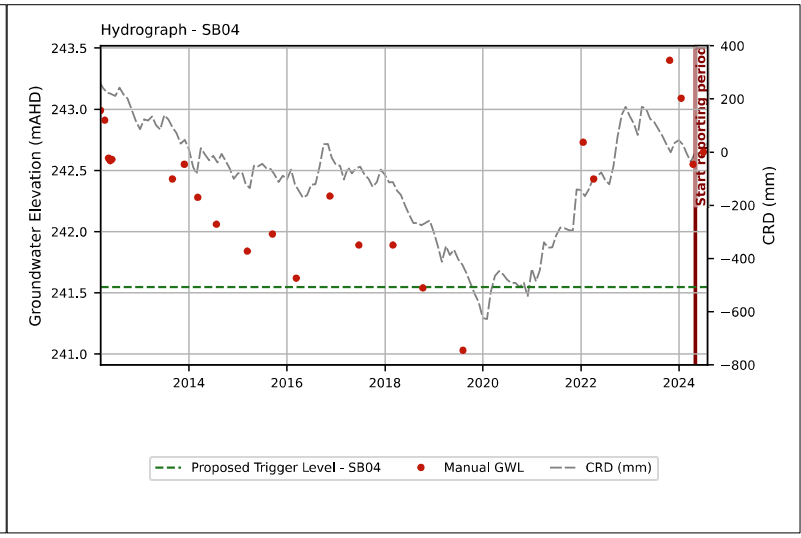

Hydrograph - GW036459
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - GW036459
Proposed Trigger Level - GW036459
Manual GWL
CRD (mm)

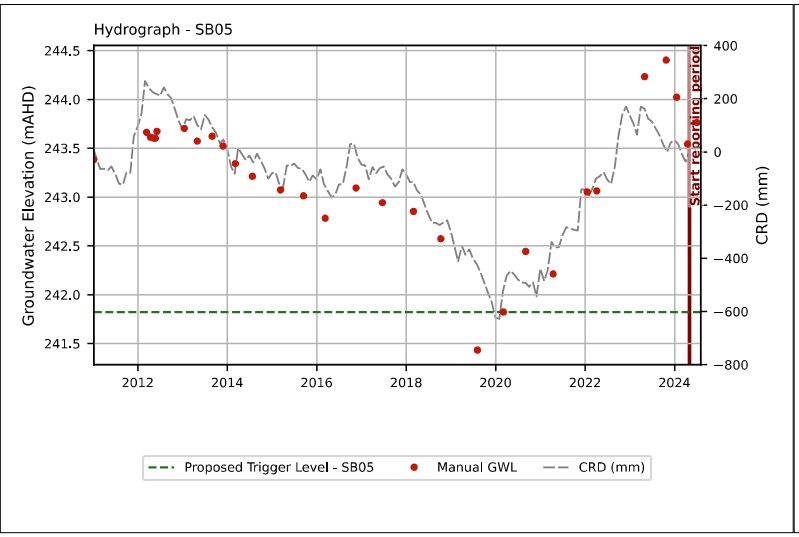

Hydrograph - MD01
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - MD01
Manual GWL
CRD (mm)

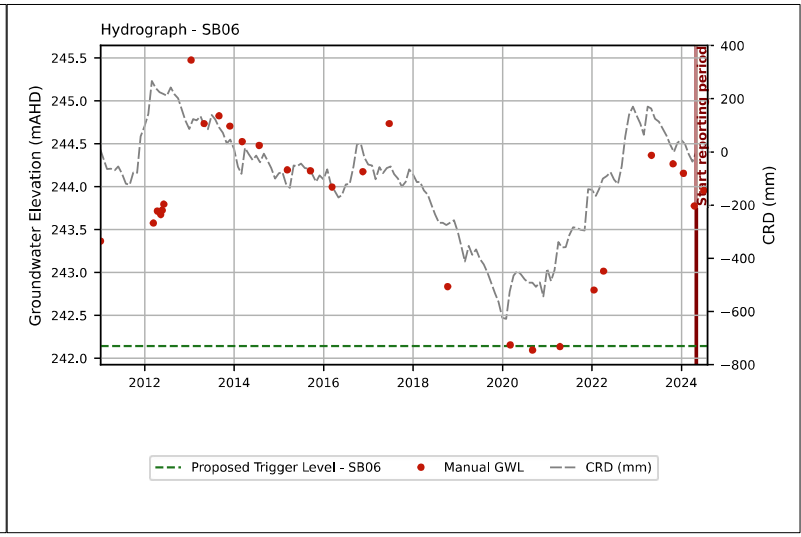

Hydrograph - MD02
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - MD02
Manual GWL
CRD (mm)

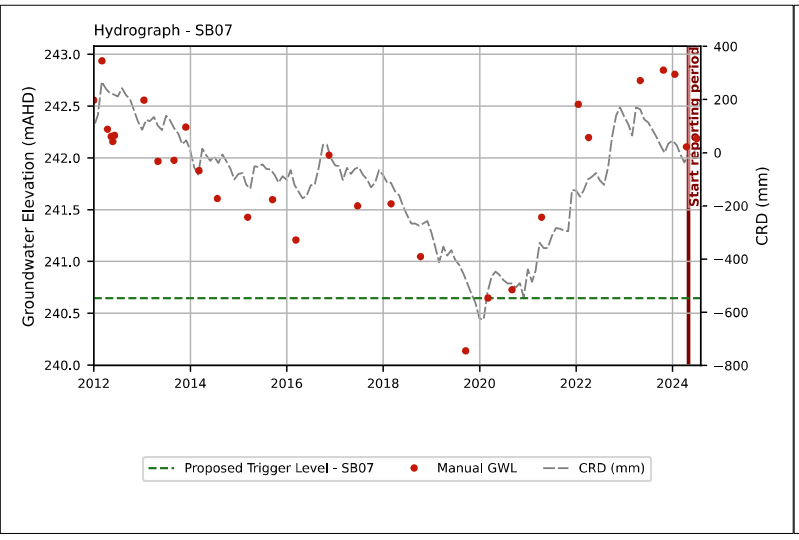

Hydrograph - SB01
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB01
Manual GWL
CRD (mm)

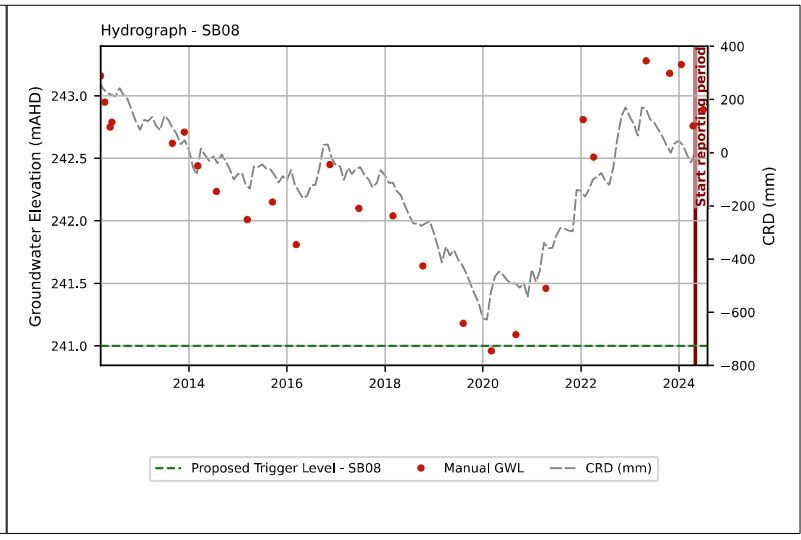

Hydrograph - SB02
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB02
Manual GWL
CRD (mm)

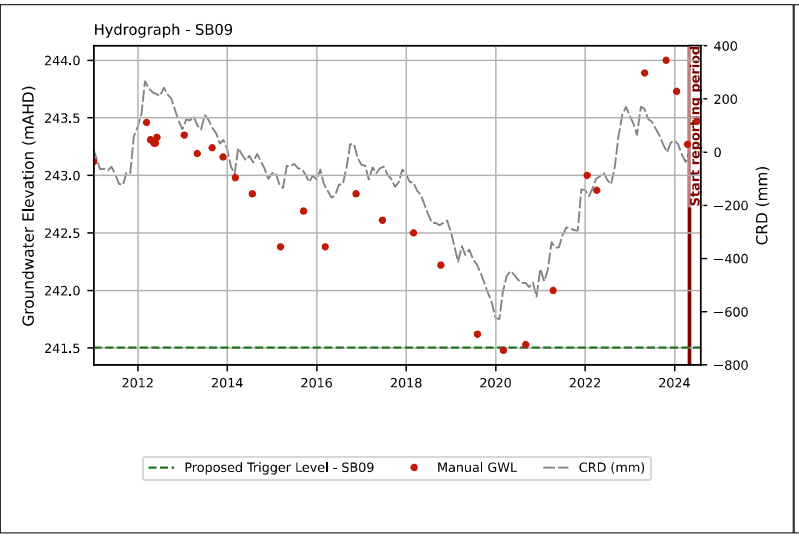

Hydrograph - SB04
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB04
Manual GWL
CRD (mm)

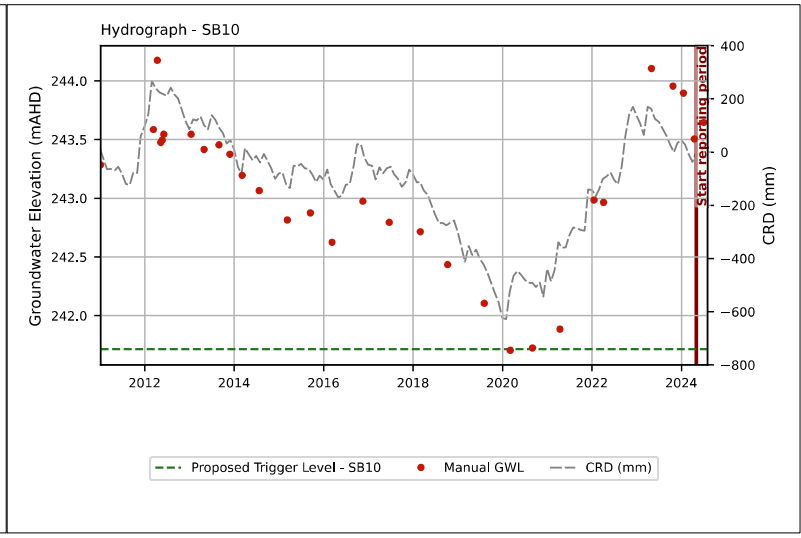

Hydrograph - SB05
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB05
Manual GWL
CRD (mm)

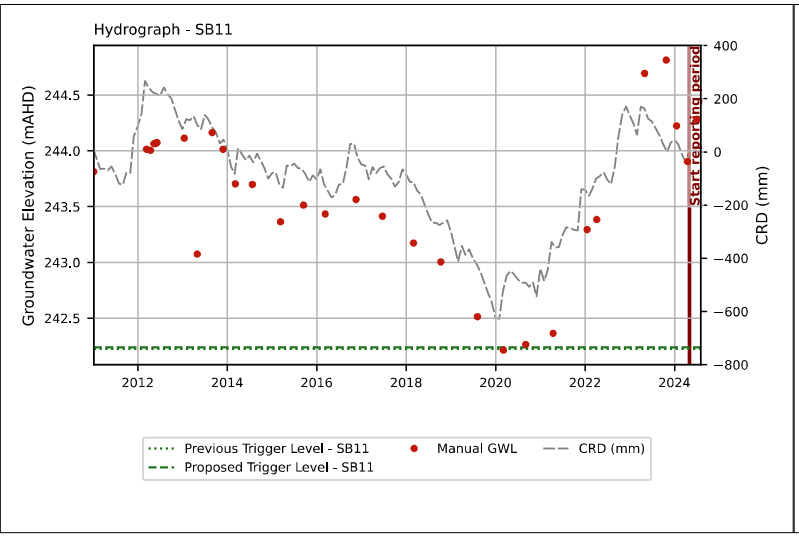

Hydrograph - SB06
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB06
Manual GWL
CRD (mm)

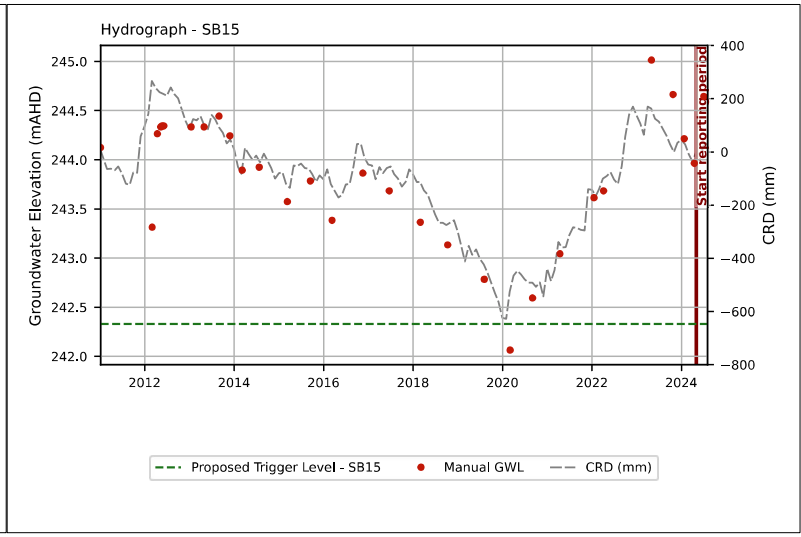

Hydrograph - SB07
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB07
Manual GWL
CRD (mm)

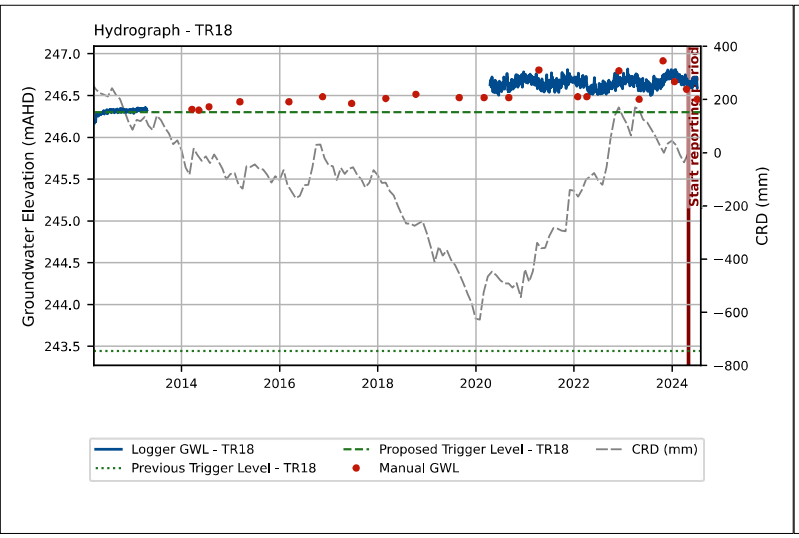

Hydrograph - SB08
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB08
Manual GWL
CRD (mm)

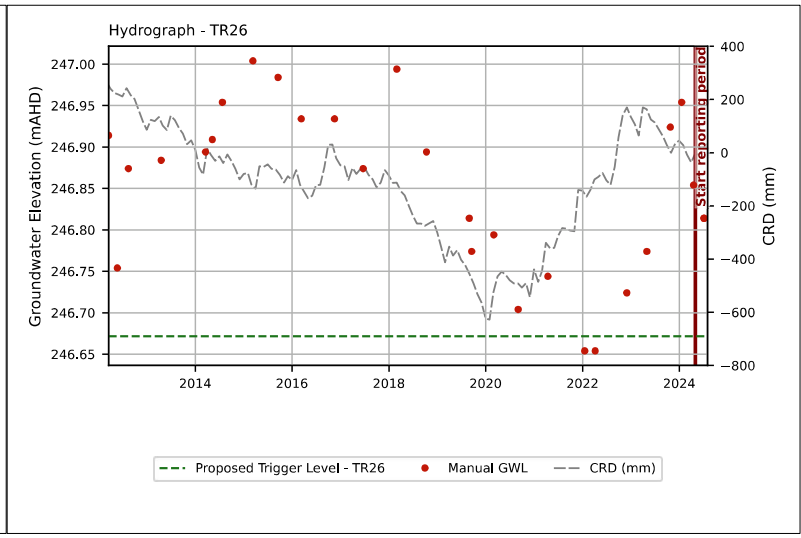

Hydrograph - SB09
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB09
Manual GWL
CRD (mm)

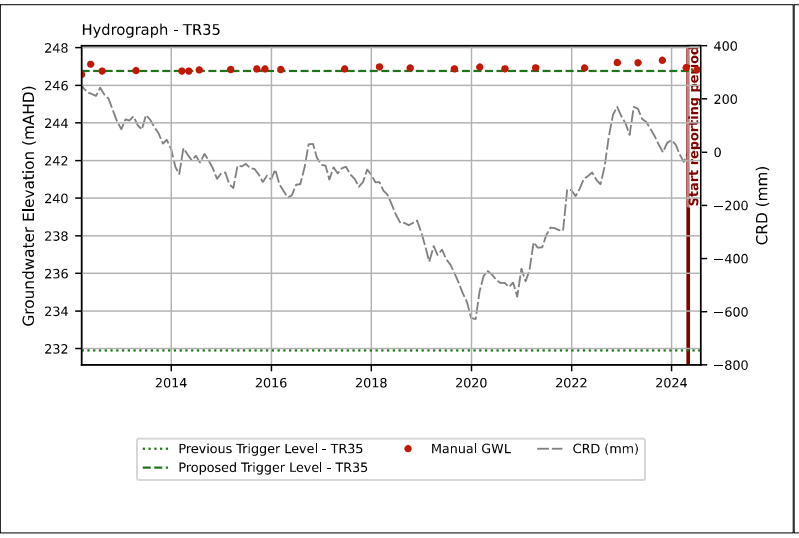

Hydrograph - SB10
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB10
Manual GWL
CRD (mm)

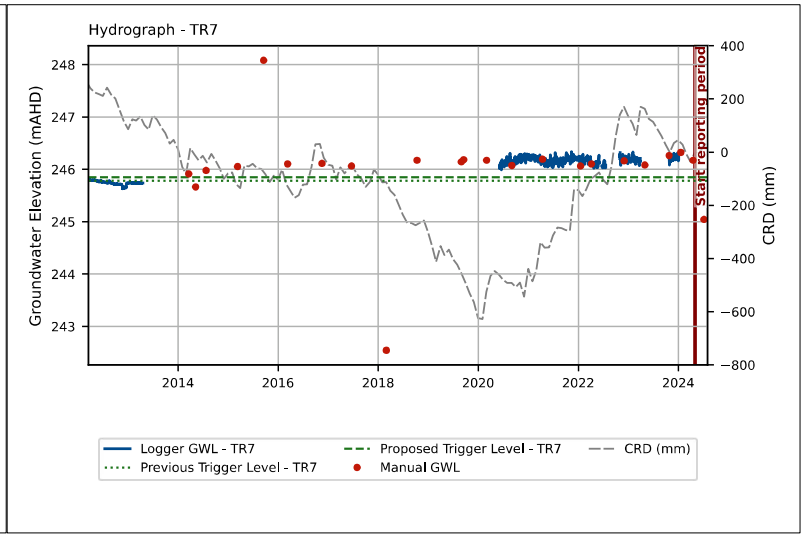

Hydrograph - SB11
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - SB11
Proposed Trigger Level - SB11
Manual GWL
CRD (mm)

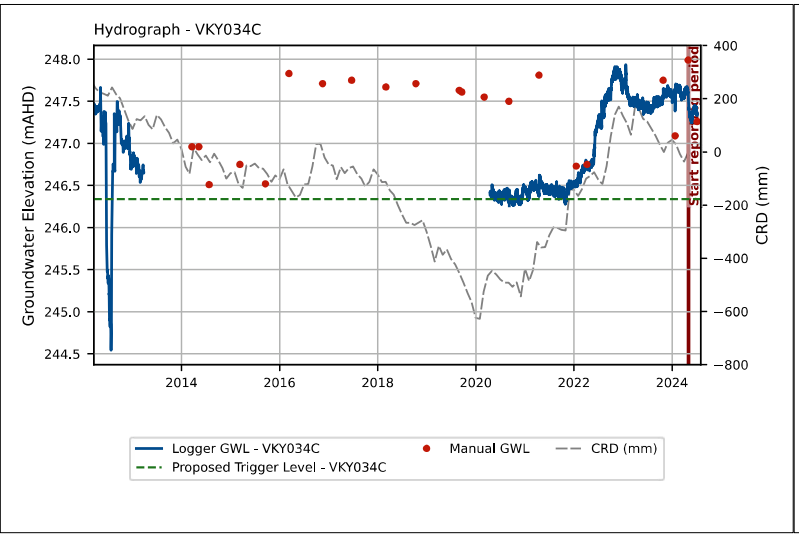

Hydrograph - SB15
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - SB15
Manual GWL
CRD (mm)

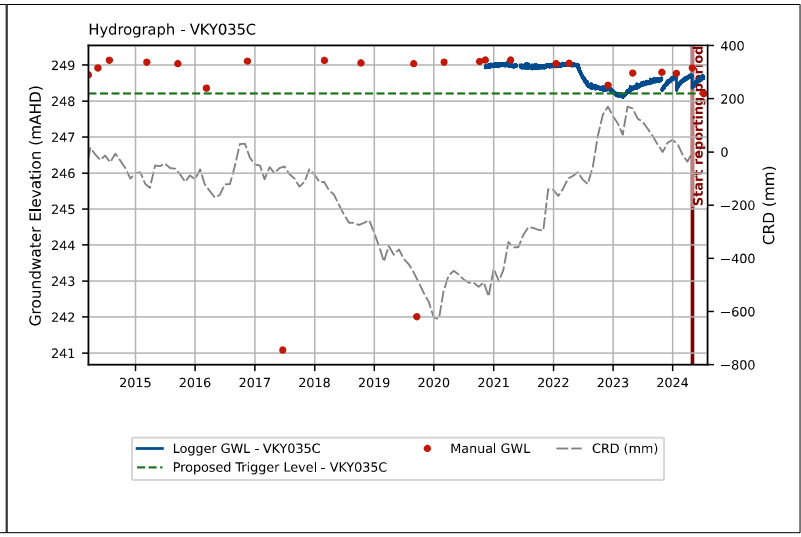

Hydrograph - TR18
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - TR18
Previous Trigger Level - TR18
Proposed Trigger Level - TR18
Manual GWL
CRD (mm)

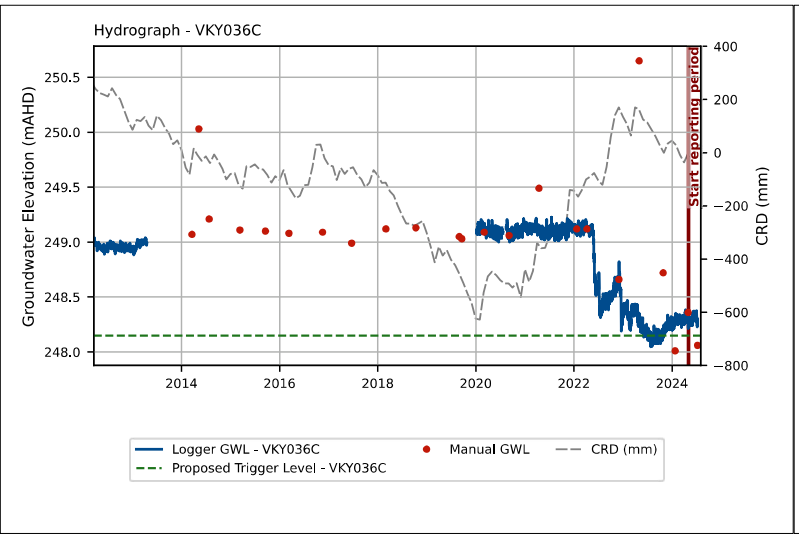

Hydrograph - TR26
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - TR26
Manual GWL
CRD (mm)

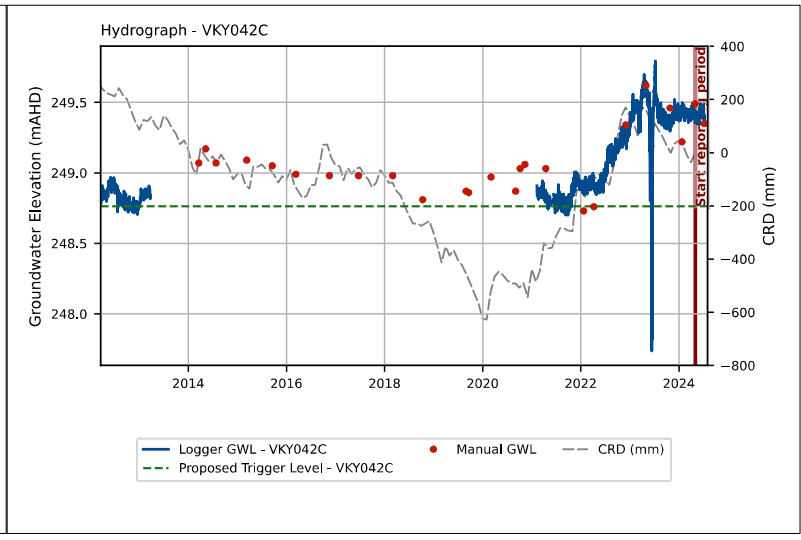

Hydrograph - TR35
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - TR35
Proposed Trigger Level - TR35
Manual GWL
CRD (mm)

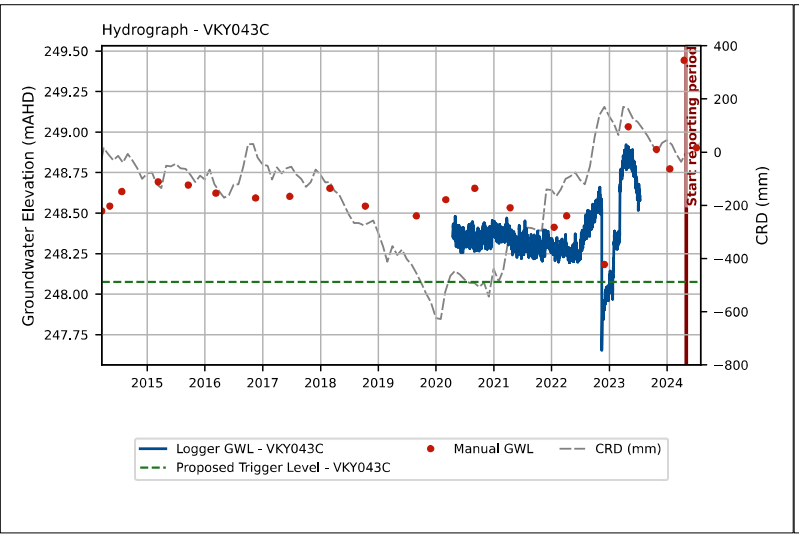

Hydrograph - TR7
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - TR7
Previous Trigger Level - TR7
Proposed Trigger Level - TR7
Manual GWL
CRD (mm)

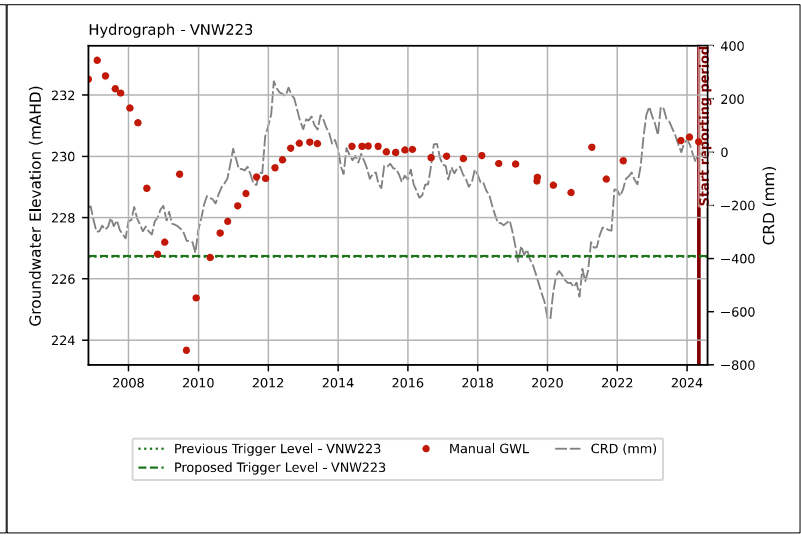

Hydrograph - VKY034C
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VKY034C
Manual GWL
CRD (mm)
Proposed Trigger Level - VKY034C

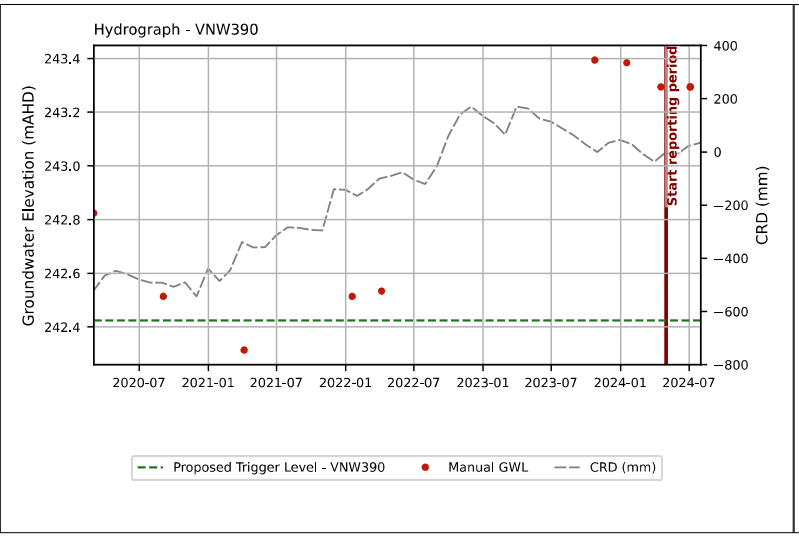

Hydrograph - VKY035C
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VKY035C
Manual GWL
CRD (mm)
Proposed Trigger Level - VKY035C

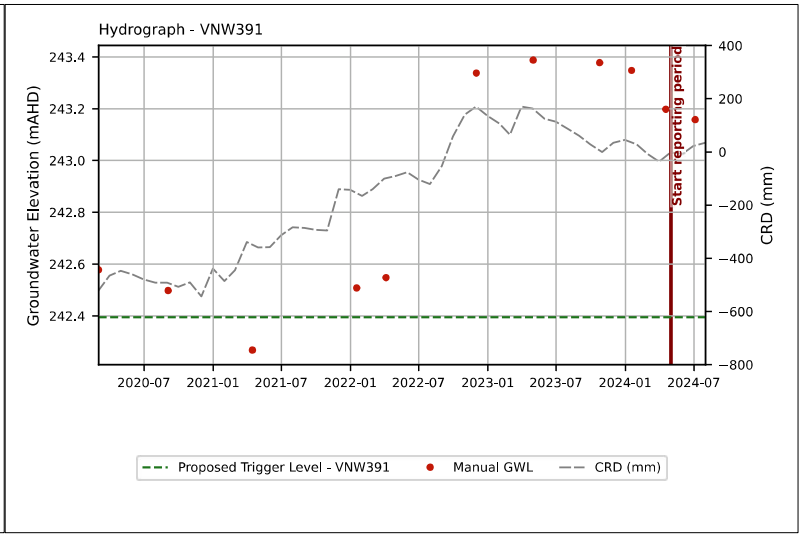

Hydrograph - VKY036C
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VKY036C
Manual GWL
CRD (mm)
Proposed Trigger Level - VKY036C

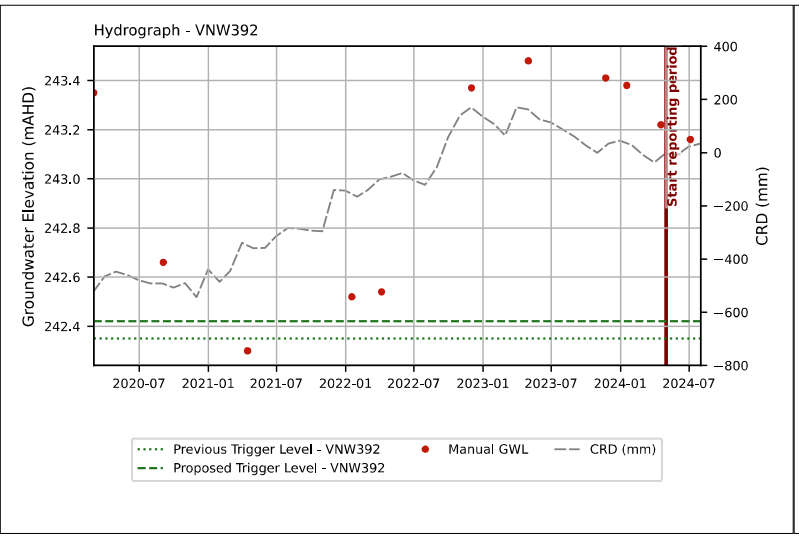

Hydrograph - VKY042C
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VKY042C
Manual GWL
CRD (mm)
Proposed Trigger Level - VKY042C

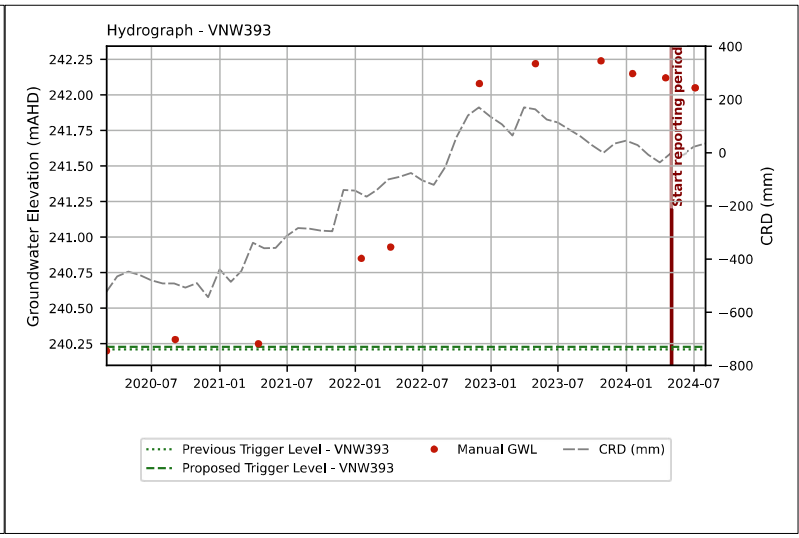

Hydrograph - VKY043C
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VKY043C
Manual GWL
CRD (mm)
Proposed Trigger Level - VKY043C

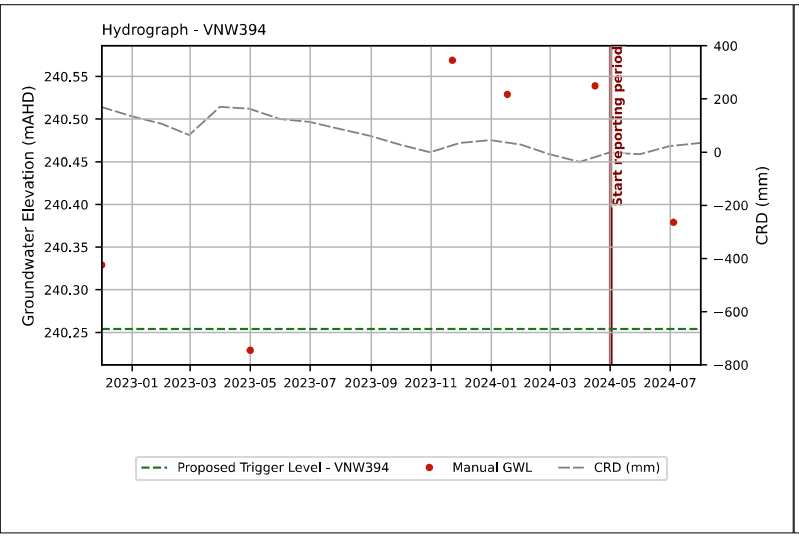

Hydrograph - VNW223
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - VNW223
Manual GWL
CRD (mm)
Proposed Trigger Level - VNW223

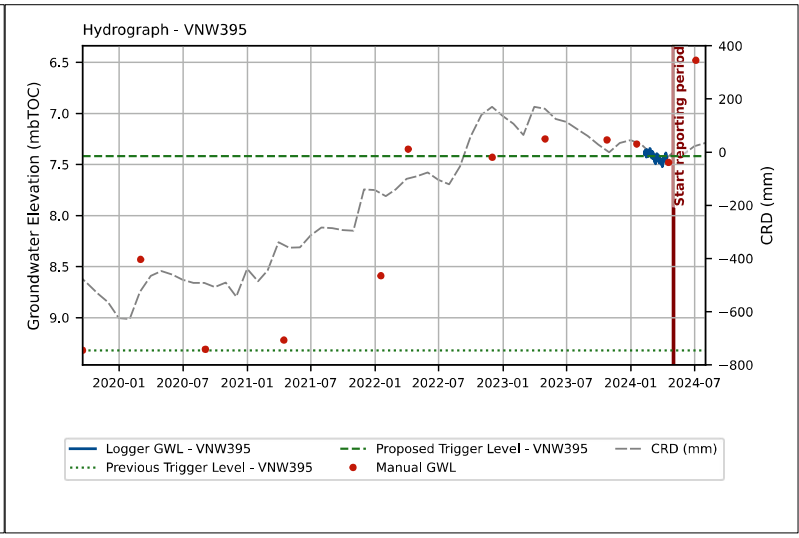

Hydrograph - VNW390
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - VNW390
Manual GWL
CRD (mm)

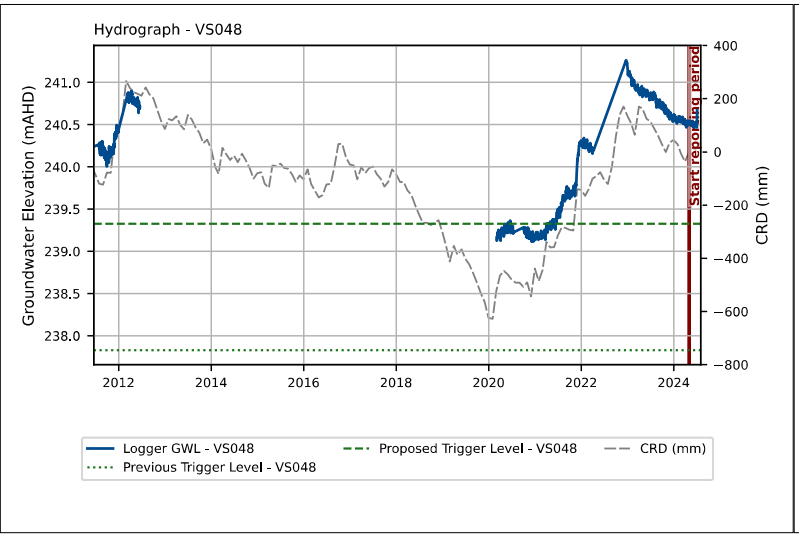

Hydrograph - VNW391
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - VNW391
Manual GWL
CRD (mm)

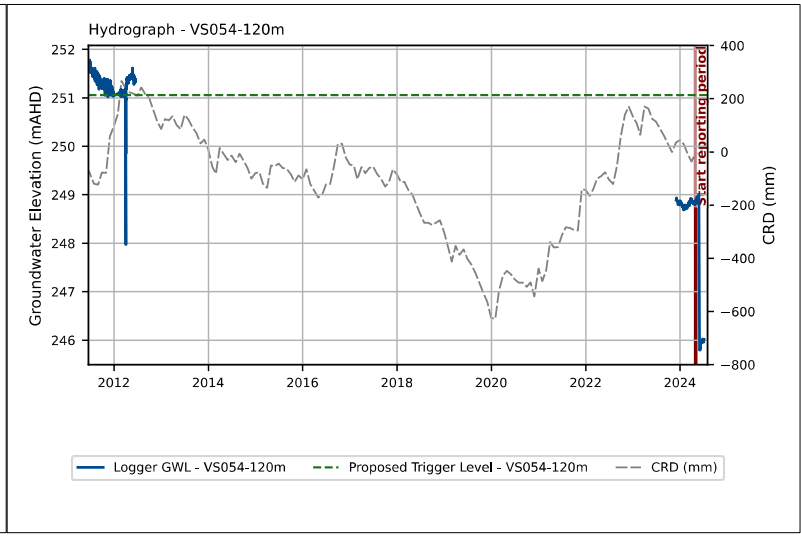

Hydrograph - VNW392
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - VNW392
Proposed Trigger Level - VNW392
Manual GWL
CRD (mm)

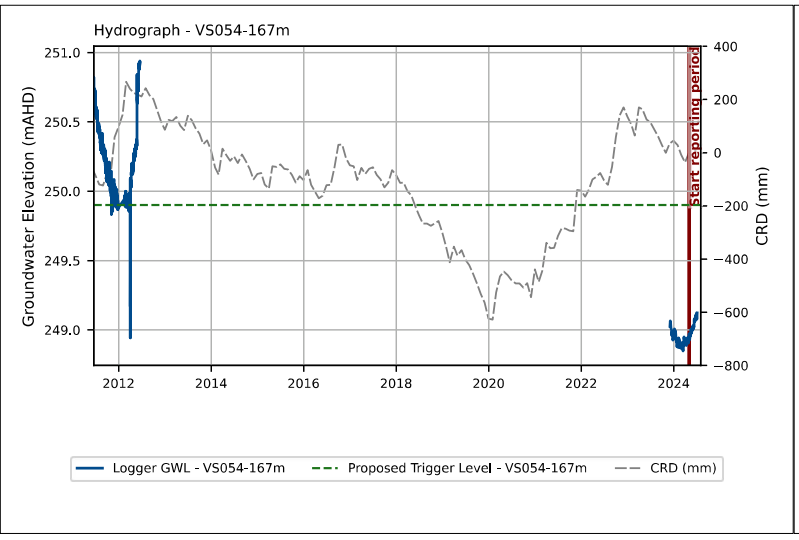

Hydrograph - VNW393
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Previous Trigger Level - VNW393
Proposed Trigger Level - VNW393
Manual GWL
CRD (mm)

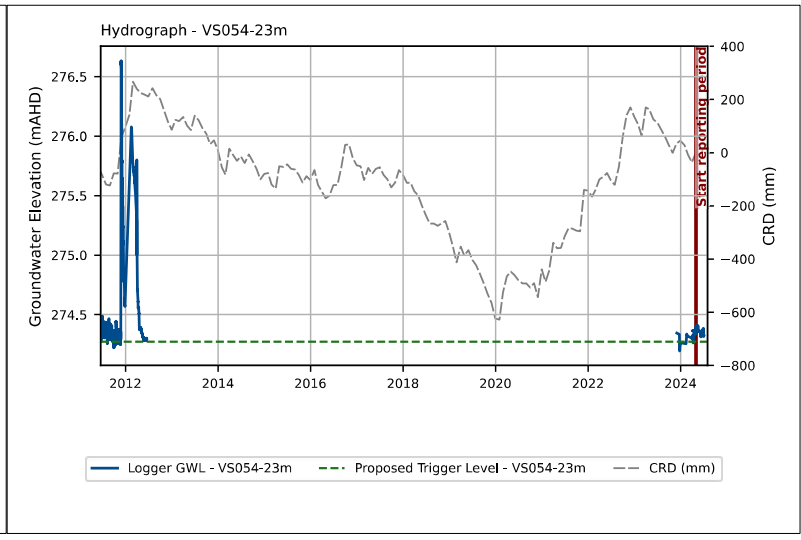

Hydrograph - VNW394
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Proposed Trigger Level - VNW394
Manual GWL
CRD (mm)

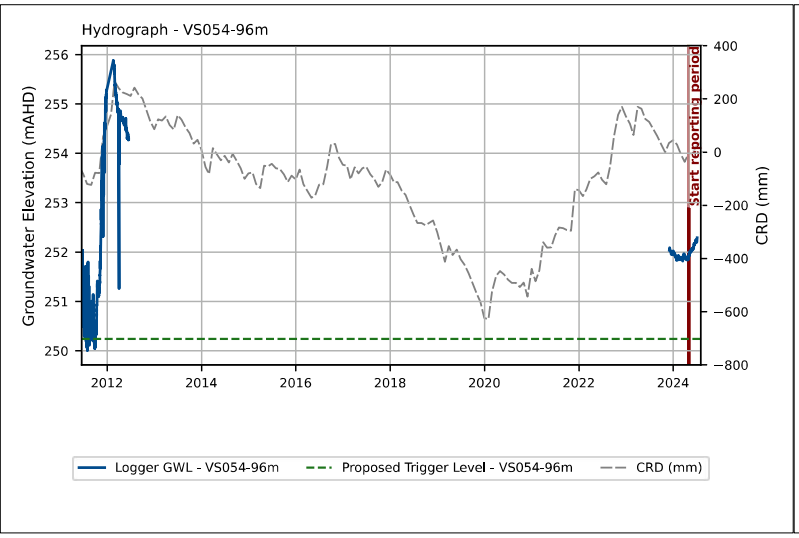

Hydrograph - VNW395
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - VNW395
Previous Trigger Level - VNW395
Proposed Trigger Level - VNW395
Manual GWL
CRD (mm)

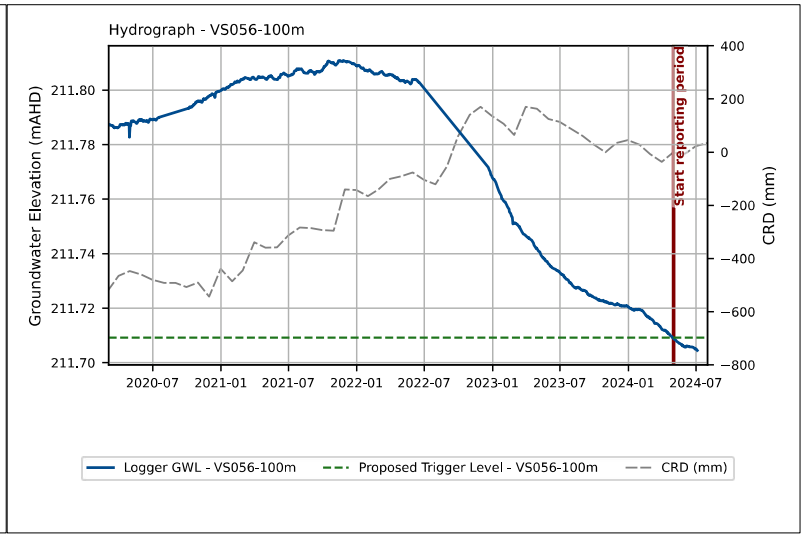

Hydrograph - VS048
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS048
Proposed Trigger Level - VS048
CRD (mm)
Previous Trigger Level - VS048

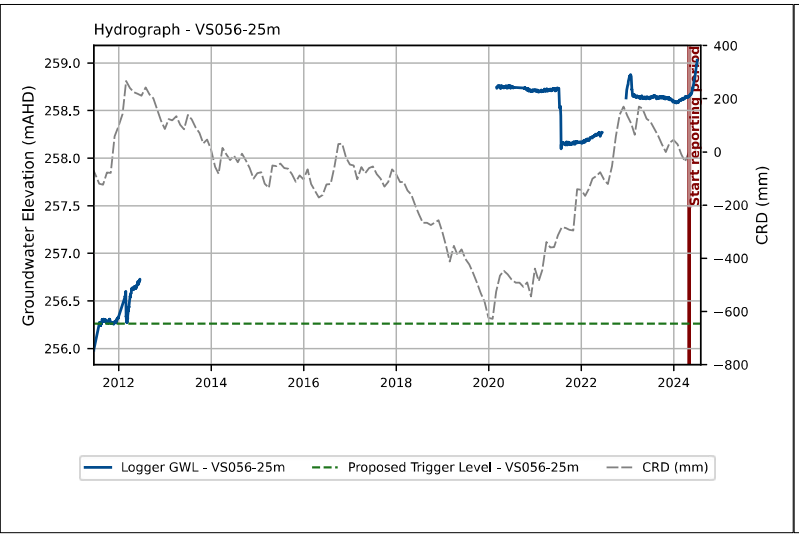

Hydrograph - VS054-120m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS054-120m
Proposed Trigger Level - VS054-120m
CRD (mm)

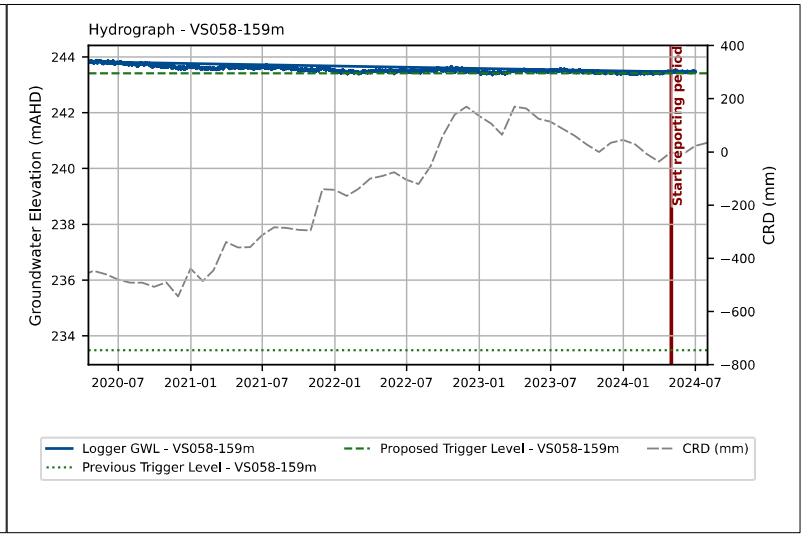

Hydrograph - VS054-167m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS054-167m
Proposed Trigger Level - VS054-167m
CRD (mm)

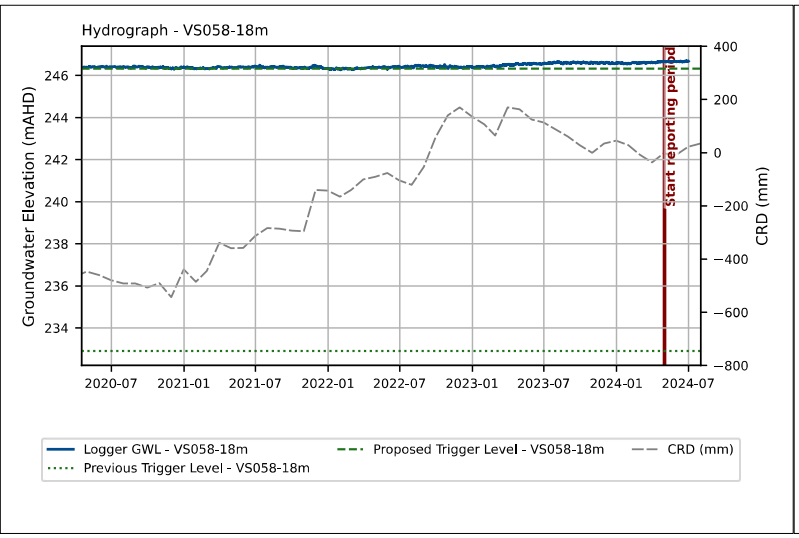

Hydrograph - VS054-23m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS054-23m
Proposed Trigger Level - VS054-23m
CRD (mm)

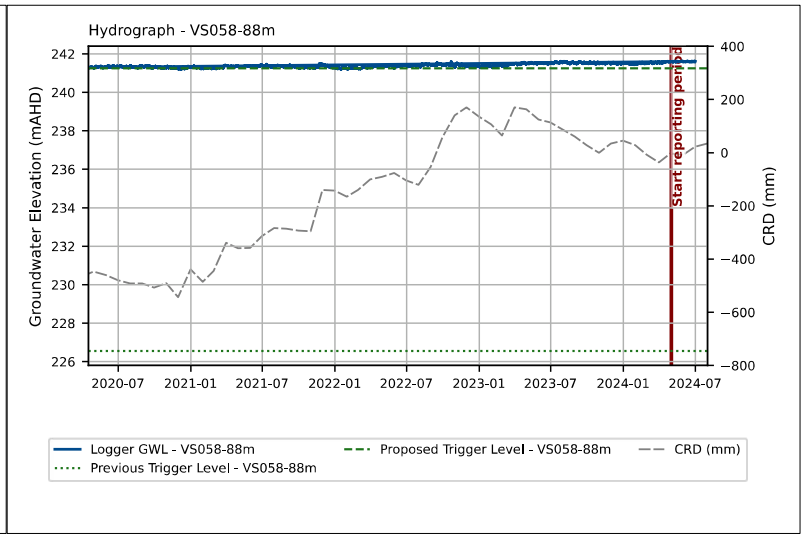

Hydrograph - VS054-96m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS054-96m
Proposed Trigger Level - VS054-96m
CRD (mm)

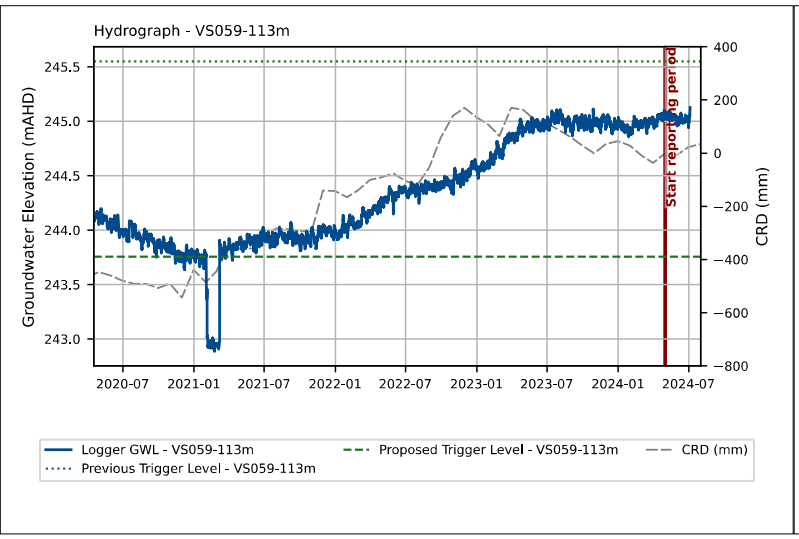

Hydrograph - VS056-100m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS056-100m
Proposed Trigger Level - VS056-100m
CRD (mm)

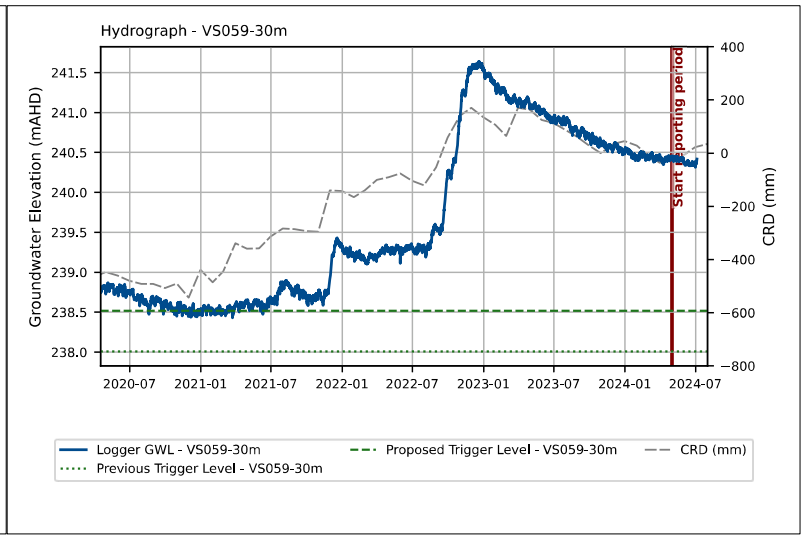

Hydrograph - VS056-25m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS056-25m
Proposed Trigger Level - VS056-25m
CRD (mm)

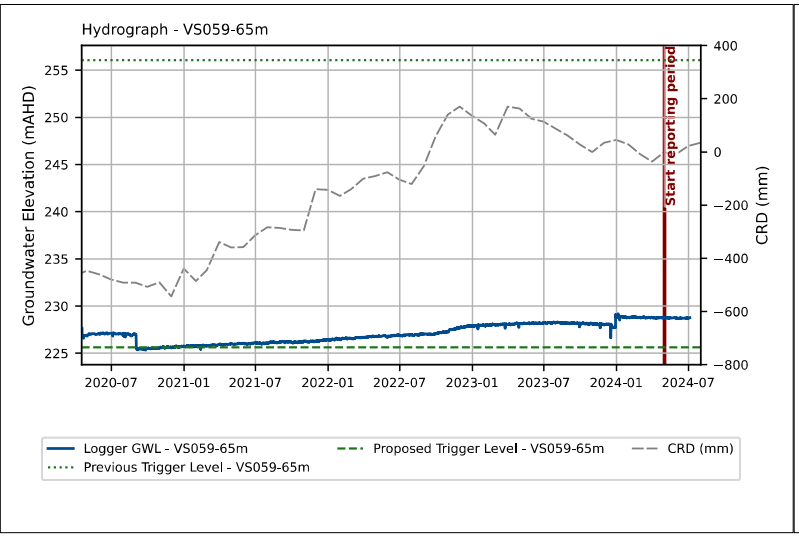

Hydrograph - VS058-159m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS058-159m
Proposed Trigger Level - VS058-159m
CRD (mm)
Previous Trigger Level - VS058-159m

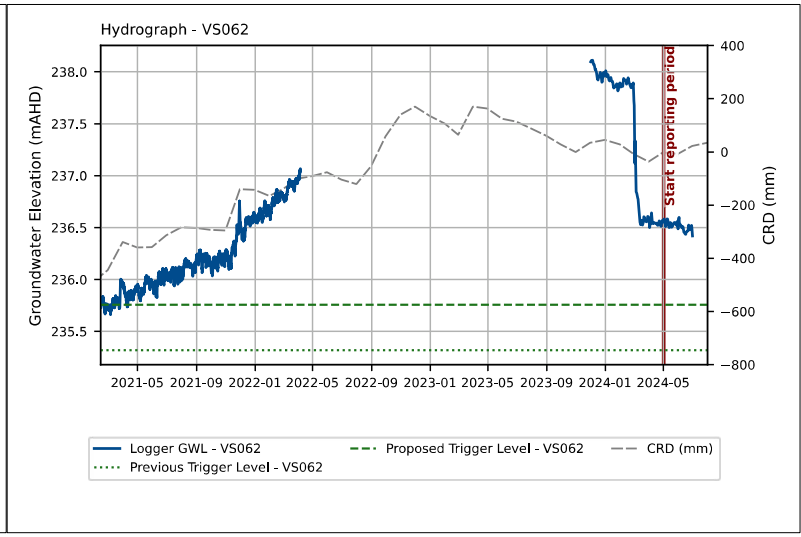

Hydrograph - VS058-18m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS058-18m
Proposed Trigger Level - VS058-18m
CRD (mm)
Previous Trigger Level - VS058-18m

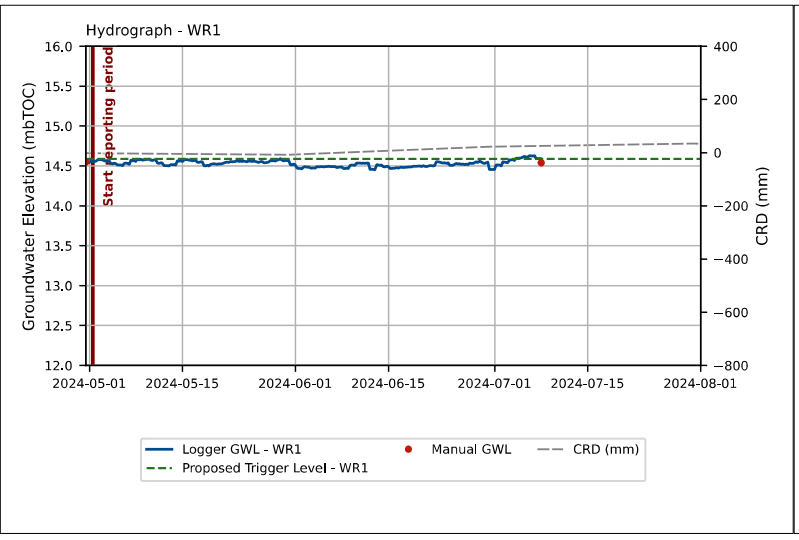

Hydrograph - VS058-88m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS058-88m
Proposed Trigger Level - VS058-88m
CRD (mm)
Previous Trigger Level - VS058-88m

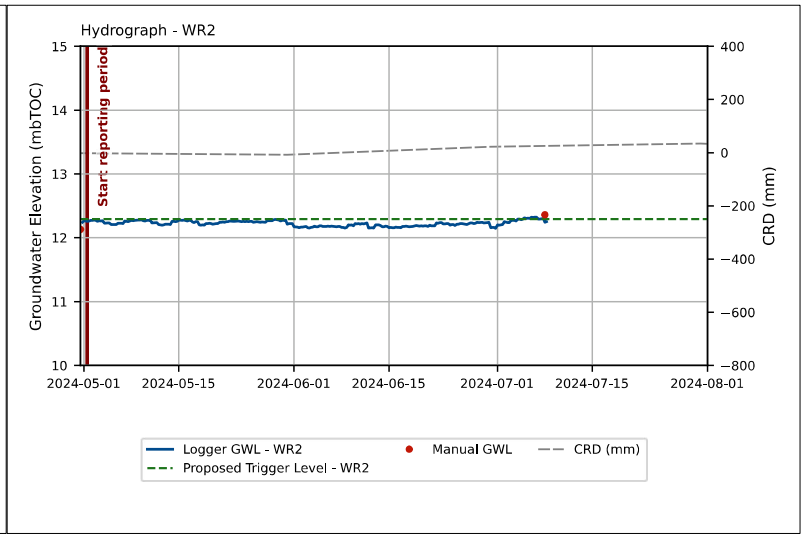

Hydrograph - VS059-113m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS059-113m
Proposed Trigger Level - VS059-113m
CRD (mm)
Previous Trigger Level - VS059-113m


Hydrograph - VS059-30m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS059-30m
Proposed Trigger Level - VS059-30m
CRD (mm)
Previous Trigger Level - VS059-30m


Hydrograph - VS059-65m
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS059-65m
Proposed Trigger Level - VS059-65m
CRD (mm)
Previous Trigger Level - VS059-65m


Hydrograph - VS062
Groundwater Elevation (mAHD)
CRD (mm)
Start reporting period
Logger GWL - VS062
Proposed Trigger Level - VS062
CRD (mm)
Previous Trigger Level - VS062


Hydrograph - WR1
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - WR1
Manual GWL
CRD (mm)
Proposed Trigger Level - WR1


Hydrograph - WR2
Groundwater Elevation (mbTOC)
CRD (mm)
Start reporting period
Logger GWL - WR2
Manual GWL
CRD (mm)
Proposed Trigger Level - WR2

Appendix D Groundwater Quality Results

Vickery Extension Project Groundwater Monitoring Report

Quarterly Review May 2024 – July 2024

Whitehaven Coal Ltd

SLR Project No.: 640.031099.00001

2 October 2024

Table C-1: Field GW Monitoring Data

Sample Location	Date	pH - Field	EC - Field (uS)	Temperature	Redox	Odour	Appearance	Colour	Comments
SB02	24-10-2023 10:40	7.21	7250	24.1	44	Nil	Slightly turbid	Orange	Quarterly sampling
GW01	24-10-2023 9:36	7.33	1042	22.4	79	Nil	Clear	Colourless	Quarterly sampling
SB15	24-10-2023 10:10	7.29	1019	22.6	59	Nil	Clear	Colourless	Quarterly sampling
SB06	24-10-2023 7:35	7.35	3280	20.6	41	Nil	Clear	Colourless	Quarterly sampling
SB11	24-10-2023 8:25	7.26	1080	22.6	46	Nil	Clear	Colourless	Quarterly sampling
SB10	23-10-2023 15:55	7.43	1880	24.3	34	Nil	Clear	Colourless	Quarterly sampling; small amount of sediment in water
SB05	23-10-2023 16:20	2.09	3740	25	43	Nil	Clear	Colourless	Quarterly sampling
SB09	23-10-2023 15:20	3.32	949	27.3	28	Nil	Slightly turbid	Orange/brown	Quarterly sampling; a lot of sediment in water, possible rust particles
SB01	23-10-2023 15:00	7.44	1541	26.5	36	Nil	Clear	Colourless	Quarterly sampling
SB04	23-10-2023 13:19	7.29	2680	28.2	47	Slight	Slightly turbid	Grey	Quarterly sampling; bailed due to depth; Standpipe extremely unstable; too shallow to hydrasleeve so bailed to test.
SB08	23-10-2023 13:35	7.24	983	26.3	41	Nil	Clear	Colourless	Quarterly sampling
SB07	23-10-2023 11:47	7.35	770	23.2	46	Nil	Clear	Colourless	Quarterly sampling
GW02	23-10-2023 10:51	7.59	731	25.2	25	Nil	Clear	Colourless	Quarterly sampling
MD01	25-10-2023 9:50	11.58	1799	25.6	-91	Slight	Clear	Colourless	Quarterly sampling; Slight unknown odour. No cap on bore;
MD02	25-10-2023 11:10	6.84	1195	27.4	-69	Nil	Clear	Colourless	Quarterly sampling
GW03	23-10-2023 14:14	7.19	862	25.9	21	Nil	Clear	Colourless	Quarterly sampling; fence panels down and logger missing (assume down the bore).
TR26	25-10-2023 12:00	7.06	6290	26.3	52	Nil	Clear	Colourless	Quarterly sampling
TR7	25-10-2023 12:25	6.53	####	26.4	61	Nil	Clear	Colourless	Quarterly sampling
TR18	25-10-2023 13:30	6.58	####	27.8	99	Nil	Clear	Colourless	Quarterly sampling
TR35	25-10-2023 14:10	6.66	####	25.5	-55	Slight	Clear	Colourless	Quarterly sampling
VKY043C	26-10-2023 8:25	7.72	2990	20	-32	Nil	Clear	Colourless	Quarterly sampling
VKY042C	26-10-2023 11:45	6.75	5420	28.1	-28	Nil	Clear	Colourless	Quarterly sampling; Unable to determine total bore depth as it was greater than 150m (length of the dip tape)
VKY035C	26-10-2023 10:40	7.1	3110	25.5	-26	Nil	Clear	Colourless	Quarterly sampling
VKY034C	26-10-2023 9:15	7.3	3590	23.4	70	Nil	Clear	Colourless	Quarterly sampling
VKY036C	26-10-2023 12:40	7.08	5600	25.1	-39	Nil	Clear	Colourless	Quarterly sampling
VNW390	24-10-2023 12:35	6.92	2300	22.6	-96	Moderate	Clear	Colourless	Quarterly sampling; Sulphur odour
VNW391	24-10-2023 14:20	7.04	2530	23.9	-60	Nil	Clear	Colourless	Quarterly sampling
VNW392	22-11-2023 13:58	6.74	3690	20.8	-96	Slight	Clear	Colourless	Quarterly sampling; No access - locked out on 24/10/2023; Sampled 22/11/2023; Slight H2S odour
VNW393	24-10-2023 13:05	7.36	2740	22.1	26	Slight	Clear	Colourless	Quarterly sampling; Slight sulphur odour
VNW394	22-11-2023 13:12	7.13	5520	12.8	-70	Nil	Slight	Grey	Quarterly sampling;
VNW395	24-10-2023 13:41	7.47	463	20.9	57	Slight	Clear	Colourless	Quarterly sampling; no logger
GW-8	22-11-2023 15:47	7.11	4290	22.5	-176	Nil	Slight	Brown	Quarterly sampling; Unable to locate on 27/10/2023; Sampled 22/11/2023
GW-7	27-10-2023 11:50	8.89	4300	22.7	60	Nil	Clear	Colourless	Quarterly sampling; Suspended matter in water
VNW223	27-10-2023 10:10	7.25	5940	19.9	49	Nil	Clear	Colourless	
GW-11	27-10-2023 9:40	7.36	4360	21.5	-111	Nil	Clear	Colourless	Quarterly sampling; old windmill overhead
GW-9	27-10-2023 12:55	7.94	6110	22.6	-87	Nil	Clear	Brown	Quarterly sampling; old windmill overhead
VKY GW Duplicate 1	24-10-2023 8:25	7.26	1081	22.6	46	Nil	Clear	Colourless	Quarterly sampling; site duplicate taken from SB11
VKY GW Duplicate 2	26-10-2023 8:25	7.71	2990	20.1	-32	Nil	Clear	Colourless	Quarterly sampling; site duplicate taken from VKY0043C
VKY GW Lab Split Dup 1	24-10-2023 8:25	7.27	1080	22.7	47	Nil	Clear	Colourless	Quarterly sampling; site split duplicate taken from SB11
VKY GW Lab Split Dup 2	26-10-2023 8:25	7.71	2990	20	-33	Nil	Clear	Colourless	Quarterly sampling; site split duplicate taken from VKY0043C

Sample Location	Date	pH - Field	EC - Field (uS)	Temperature	Redox	Odour	Appearance	Colour	Comments
VKY GW Blank	24-10-2023 7:35	8.77	13	15.4	70	Nil	Clear	Colourless	Quarterly sampling; blank
SB02	25-10-2023 12:25	7.28	7330	22.5	Clear	Nil	Slightly turbid	Orange	
GW01	23-01-2024 7:39	7.2	1265	19.6	-15.7	Nil	Clear	Colourless	
SB15	23-01-2024 8:05	7.23	1070	21.1	-88	Nil	Clear	Colourless	
SB06	17-01-2024 12:55	7.61	3460	26.5	-84	Nil	Turbid	Brown	
SB11	17-01-2024 13:26	7.7	1021	26.4	-62	Nil	Clear	Colourless	
SB10	17-01-2024 13:49	7.47	1972	29.7	-69	Nil	Clear	Colourless	
SB05	17-01-2024 14:31	7.73	3690	28	-131	Nil	Clear	Colourless	
SB09	17-01-2024 15:18	7.56	1014	26.1	-70	Nil	Slightly turbid	Black	
SB01	17-01-2024 14:58	7.31	1716	28.3	-70	Nil	Clear	Colourless	
SB04	17-01-2024 15:51	7.43	3360	24.6	-188	Slightly	Clear	Colourless	Slight H2S odour
SB08	18-01-2024 16:09	7.39	1115	23.4	-119	Nil	Clear	Colourless	
SB07	17-01-2024 16:32	7.47	919	24.5	-87	Nil	Clear	Colourless	
GW02	18-01-2024 10:54	7.79	971	23.9	-74	Nil	Clear	Colourless	
MD01	18-01-2024 9:10	11.69	1786	22.9	-135	Nil	Slightly turbid	Brown	
MD02	23-01-2024 10:29	6.78	1306	24.3	-140	Nil	Clear	Colourless	
GW03	23-01-2024 6:59	7.16	888	19.6	66	Nil	Clear	Colourless	
TR26	18-01-2024 13:35	7.16	8380	24.8	-62	Nil	Slightly turbid	Brown	
TR7	18-01-2024 13:55	7.05	1539	25.2	-30	Nil	Slightly turbid	Brown	
TR18	18-01-2024 14:28	6.85	1364	24.5	-21	Nil	Slightly turbid	Brown	
TR35	18-01-2024 15:25	6.75	1733	24	-63	Nil	Clear	Colourless	
VKY043C	18-01-2024 14:58	7.8	3410	24.1	-74	Nil	Clear	Colourless	
VKY042C	23-01-2024 12:58	6.72	5430	31	-119	Nil	Clear	Colourless	
VKY035C	23-01-2024 12:14	7.01	3340	27.2	-170	Nil	Clear	Colourless	
VKY034C	23-01-2024 11:05	6.94	3850	29.4	-149	Nil	Slightly turbid	Brown	
VKY036C	23-01-2024 11:35	6.79	5810	28.7	-139	Nil	Clear	Colourless	
VNW390	17-01-2024 11:23	7.13	2376	24.3	-69	Nil	Clear	Colourless	
VNW391	17-01-2024 11:52	7.31	2471	23.1	-109	Nil	Clear	Colourless	
VNW392	17-01-2024 12:22	6.74	3310	26.1	-149	Nil	Clear	Grey	
VNW393	17-01-2024 10:51	7.56	2830	29.5	-90	Slightly	Clear	Colourless	Very slight H2S odour
VNW394	17-01-2024 9:30	6.92	5410	23.9	-104	Nil	Slightly turbid	Grey	
VNW395	17-01-2024 11:39	7.77	1395	27	-168	Nil	Clear	Grey	
GW-8	24-01-2024 13:55	7.03	3950	26.5	-208	Nil	Clear	Black	
GW-7	23-01-2024 9:12	8.82	4490	23	-64	Nil	Clear	Colourless	Site overgrown and dangerous - Need cleanning up
VNW223	24-01-2024	-	-	-	-	-	-	-	Blocked at 1.3 mbtoc
GW-11	23-01-2024 14:26	6.93	4340	30.6	-192	Nil	Slightly turbid	Orange	
GW-9	23-01-2024 13:49	6.68	3320	24.2	-196	Nil	Slightly turbid	Brown	No logger
GW030051	-	-	-	-	-	-	-	-	No access - NSWWater locked bore
GW030052	-	-	-	-	-	-	-	-	No access - NSWWater locked bore
GW-2	-	-	-	-	-	-	-	-	Unable to locate

Sample Location	Date	pH - Field	EC - Field (uS)	Temperature	Redox	Odour	Appearance	Colour	Comments
VKY GW Duplicate 1 - MD01	18-01-2024 9:38	11.54	1848	22.9	-147	Nil	Slightly turbid	Brown	
VKY GW Duplicate 2 - GW-11	23-01-2024 14:26	-	-	-	-	-	-	-	
VKY GW Lab Split Dup 1 - MD01	18-01-2024 9:42	11.73	1872	22.9	-149	Nil	Slightly turbid	Brown	
VKY GW Lab Split Dup 2 -	23-01-2024 13:53	6.65	3490	24.8	-193	Nil	Slightly turbid	Brown	
VKY GW Blank	17-01-2024 9:35	8.94	3.1	22.8	100	Nil	Clear	Colourless	
VS058	15-04-2024 13:49								Li Battery 3.67V
SB02	15-04-2024 13:36	7.14	7210	24.7	-128	Nil	Slightly Turbid	Orange	
GW01	15-04-2024 13:12	7.14	1384	26.5	-127	Nil	Slightly Turbid	Black	Suspended solids minor
SB15	15-04-2024 12:56	7.17	972	27	43	Nil	Clear	Clear	Suspended solids minor
SB06	15-04-2024 12:21	7.42	3410	26.1	-70	Nil	Turbid	Black	
SB11	15-04-2024 12:37	7.45	1048	24.3	69	Nil	Clear	Clear	
SB10	15-04-2024 11:11	7.28	1859	24	-5	Nil	Slightly Turbid	Black	Suspended solids minor
SB05	15-04-2024 11:31	7.63	3680	22.9	-113	Nil	Slightly Turbid	Black	Suspended solids moderate
SB09	15-04-2024 10:52	7.27	973	21.7	-61	Nil	Turbid	Black	Suspended solids minor
SB01	15-04-2024 10:34	7.2	1698	24.1	-91	Nil	Clear	Grey	Suspended solids minor
SB04	15-04-2024 9:21	7.27	1868	24.1	-214	Yes	Turbid	Black	Sufer odour, suspended solids
SB08	15-04-2024 9:31	7.17	1039	21.2	-55	Nil	Clear	Clear	
SB07	15-04-2024 8:48	7.28	934	21	57	Nil	Clear	Clear	Suspended solids minor
GW02	15-04-2024 8:16	7.14	926	24.3	8	Nil	Clear	Clear	Suspended solids moderate
VS062	15-04-2024 9:04								Li Battery 3.64V
VS059	15-04-2024 12:05								Li Battery 3.64V
VS056	17-04-2024 11:23								
	17-04-2024 11:26								
MD01	18-04-2024 10:23	10.73	1283	24.2	-286	Strong	Slightly Turbid	Grey	Strong fecal odour
VS048	17-04-2024 10:59								
VS054	17-04-2024 11:50								Li Battery 3.65V
MD02	17-04-2024 11:38	6.59	1210	31.1	-114	Slight	Clear	Clear	Suspended solids moderate
GW03	15-04-2024 9:56	7.05	862	24	-26	Nil	Clear	Grey	Suspended solids minor
TR26	17-04-2024 12:31	7.11	5180	29.4	60	Nil	Clear	Clear	
TR7	17-04-2024 12:49	6.71	####	27.4	157	Nil	Clear	Orange	Logger length recorded
TR18	17-04-2024 13:26	6.69	####	27.8	57	Nil	Slightly Turbid	Orange	Logger length recorded
TR35	17-04-2024 14:20	6.72	####	22.8	48	Nil	Clear	Clear	
VKY43C	17-04-2024 14:06	7.65	3410	23.6	-47	Nil	Slightly Turbid	Orange	Logger was not working, removed at client request, not being replaced
VKY041C	17-04-2024 12:14								51.7% (should be battery)
	17-04-2024 12:17								35.2% (battery?)
VKY042C	29-04-2024 10:32	6.61	5480	24.3	-36	Nil	Clear	Clear	last 8m of logger cable rusty
VKY33C	18-04-2024 11:03	-	-	-	-	-	-	-	-
	18-04-2024 11:04	-	-	-	-	-	-	-	-
VKY035C	29-04-2024 14:41	6.88	3230	25	-120	Nil	Clear	Clear	
VKY034C	29-04-2024 9:58	7.05	4030	23.4	-80	Nil	Clear	Grey	
VKY036C	29-04-2024 14:10	6.8	5780	24.6	-93	Nil	Clear	Clear	

Sample Location	Date	pH - Field	EC - Field (uS)	Temperature	Redox	Odour	Appearance	Colour	Comments
VKY3053C	29-04-2024 8:41	-	-	-	-	-	-	-	In forest? Incline to east VKY034C; Battery = 34.9%
VNW390	17-04-2024 8:30	6.59	2291	23.9	-98	Yes	Clear	Clear	Very slight sulfur odour
VNW391	17-04-2024 10:11	7.06	2352	24.3	-107	Nil	Clear	Clear	
VNW392	17-04-2024 10:25	6.66	3480	21.9	-90	Nil	Clear	Grey	Suspended solids minor
VNW393	15-04-2024 14:40	7.2	2840	26.9	-103	Nil	Clear	Grey	
VNW394	15-04-2024 14:16	6.94	5400	25.7	-104	Nil	Turbid	Black	
VNW395	17-04-2024 9:28	7.77	1681	27.1	41	Nil	Clear	Clear	Logger length recorded
GW036459	-	-	-	-	-	-	-	-	-
GW-8	29-04-2024 8:28	6.95	4000	19.7	-151	Nil	Clear	Grey	
GW-7	30-04-2024 11:31	8.79	4560	21.9	97	Nil	Clear	Clear	
VWN223	29-04-2024 13:42	-	-	-	-	-	-	-	Blocked at 1.3m
GW-11	29-04-2024 12:59	6.59	4550	25.1	-123	Nil	Clear	Orange	
GW-9	29-04-2024 12:10	6.81	5630	22.2	-125	Nil	Slightly Turbid	Orange	
GW030051	-	-	-	-	-	-	-	-	No access, NSW Water locked bore
GW030052	-	-	-	-	-	-	-	-	No access, NSW Water locked bore
GW-2	29-04-2024 11:30	6.85	1218	25.3	70	Nil	Clear	Clear	Located, NotE?
WR-1	30-04-2024 10:15	6.7	####	22.7	217	Nil	Clear	Grey	Logger + HS installed
WR-2	30-04-2024 11:50	6.57	####	22.5	155	Nil	Slightly Turbid	Orange	Logger + HS installed
VKY GW Duplicate 1 - VWN390	17-04-2024 9:07	6.72	2320	22.4	-96	Nil	Clear	Clear	
VKY GW Duplicate 2 - GW-9	29-04-2024 12:33	6.72	5650	22.4	-155	Nil	Clear	Orange	
VKY GW Blank	17-04-2024 8:25	7.56	3.7	18.1	141	Nil	Clear	Clear	
VKY GW Lab Split Dup 1 - TR18	17-04-2024 13:52	6.77	####	25.2	139	Nil	Slightly Turbid	Orange	
VKY GW Lab Split Dup 2 - GW-11	29-04-2024 13:20	6.55	4520	25.1	-121	Nil	Clear	Orange	
VS058	01-07-2024 14:28	-	-	-	-	-	-	-	-
SB02	01-07-2024 14:04	7.2	6860	20.3	-109	Nil	Slightly Turbid	Brown	-
GW01	01-07-2024 13:42	7.2	1052	19.1	-32	Nil	Clear	Clear	-
SB15	01-07-2024 13:25	7.3	1049	19.6	8	Nil	Clear	Clear	-
SB06	01-07-2024 12:36	7.56	3440	18.6	-56	Nil	Turbid	Brown	Turbid brown
SB11	01-07-2024 13:05	7.77	461	17.9	-11	Nil	Clear	Clear	-
SB10	01-07-2024 12:01	7.5	1928	18	-23	Nil	Clear	Clear	Black particulate
SB05	01-07-2024 12:18	7.58	3490	18.6	-126	Nil	Clear	Clear	-
SB09	01-07-2024 11:40	7.52	1013	18.4	-84	Nil	Clear	Clear	Black particulate
SB01	01-07-2024 11:15	7.21	1756	17.6	-134	Nil	Clear	Clear	Black particulate
SB04	01-07-2024 10:07	7.12	2390	15.5	-204	H2S	Clear	Clear	H_2S
SB08	01-07-2024 10:16	7.29	1088	16.9	-132	Nil	Clear	Clear	-
SB07	01-07-2024 9:51	7.22	978	15.8	28	Nil	Clear	Clear	-
GW02	01-07-2024 9:00	7.23	1065	14.4	151	Nil	Clear	Clear	-
VS062	01-07-2024 8:44	-	-	-	-	-	-	-	-
VS059	01-07-2024 13:25	-	-	-	-	-	-	-	-
VS056	04-07-2024 12:50	-	-	-	-	-	-	-	-
	04-07-2024 12:55	-	-	-	-	-	-	-	-

Sample Location	Date	pH - Field	EC - Field (uS)	Temperature	Redox	Odour	Appearance	Colour	Comments
MD01	04-07-2024 12:45	9.59	1505	19.6	-244	-	Slightly Turbid	Brown	H2S; Vegetable matter
VS048	04-07-2024 11:55	-	-	-	-	-	-	-	-
VS054	04-07-2024 12:15	-	-	-	-	-	-	-	Comm Port 25 (V3.66)
MD02	04-07-2024 12:24	6.57	1224	19.9	-117	-	Clear	Clear	Black particulate; vegetable matter
GW03	01-07-2024 10:45	7.36	947	15.7	-143	-	Clear	Clear	Slight H2S
TR26	05-07-2024 9:37	6.69	7330	20.4	-	-	Slightly Turbid	Brown	
TR7	05-07-2024 10:27	6.82	####	17.9	-	-	Clear	Clear	
TR18	05-07-2024 10:53	6.64	####	17.2	-	-	Slightly Turbid	Brown	
TR35	05-07-2024 12:02	6.75	####	18.7	-	-	Clear	Clear	
VKY43C	05-07-2024 11:38	7.85	3290	7.2	-	-	Clear	Clear	
VKY041C	04-07-2024 13:45	-	-	-	-	-	-	-	Battery 53%
	04-07-2024 13:45	-	-	-	-	-	-	-	Battery 34%
VKY042C	08-07-2024 15:02	6.65	5990	19.5	-13	-	Clear	Clear	
VKY33C	05-07-2024 12:32	-	-	-	-	-	-	-	Lithium 34%
	05-07-2024 12:32	-	-	-	-	-	-	-	Lithium 37.1%
VKY035C	08-07-2024 13:25	6.9	3290	20.6	-88	-	Clear	Clear	-
VKY034C	05-07-2024 12:40	7.25	4170	19.3	-	-	Slightly Turbid	Grey	Slightly turbid; too turbid to filter, lab to filter; Grey
VKY036C	08-07-2024 14:27	7.19	5830	20.5	-111	-	Clear	Clear	-
VKY3053C	05-07-2024 8:31	-	-	-	-	-	-	-	Lithium
VNW390	04-07-2024 9:45	6.84	2473	17.7	-117	-	Clear	Clear	
VNW391	04-07-2024 11:03	6.81	2458	19.2	-134	-	Clear	Clear	
VNW392	04-07-2024 11:24	6.51	3510	19.6	-78	-	Clear	Clear	Slight H2S odor, black particulate
VNW393	04-07-2024 8:45	7.13	3090	18.4	104	-	Clear	Clear	
VNW394	04-07-2024 8:28	6.62	5620	18.2	227	-	Slightly Turbid	Grey	
VNW395	04-07-2024 10:27	7.61	1832	18.5	-4	-	Clear	Clear	Logger not responding
GW036459	-	-	-	-	-	-	-	-	No access - WaterNSW locked bore
GW-8	05-07-2024 8:00	6.49	4100	12.5	-	-	Slightly Turbid	Brown	
GW-7	05-07-2024 10:39	8.67	4710	18.1	135	-	Clear	Clear	
VWN223	05-07-2024 12:58	-	-	-	-	-	-	-	Blocked at 1.38mboc
GW-11	08-07-2024 12:20	6.09	4760	18.8	-54		Slightly Turbid	Brown	
GW-9	08-07-2024 11:50	6.76	1591	19.3	-130		Slightly Turbid	Green	Slightly turbid; green
GW030051	-	-	-	-	-	-	-	-	No access - WaterNSW locked bore
GW030052	-	-	-	-	-	-	-	-	No access - WaterNSW locked bore
GW-2	-	-	-	-	-	-	-	-	Unable to locate
WR-1	08-07-2024 0:00	6.47	####	18.2	254	-	Slightly Turbid	Brown	
WR-2	08-07-2024 0:00	6.52	####	17	10	-	Slightly Turbid	Brown	
VKY GW Duplicate 1 - VNW390	04-07-2024 0:00	6.69	2366	19	-111	-	Clear	Clear	
VKY GW Duplicate 2 - TR26	05-07-2024 0:00	7.03	7330	20.4	-	-	Slightly Turbid	Brown	
VKY GW Blank	01-07-2024 0:00	7.1	2315	14.4	-124	-	Clear	Clear	
VKY GW Lab Split Dup 1 - VNW393	04-07-2024 0:00	6.97	3270	20.5	-85	-	Clear	Clear	
VKY GW Lab Split Dup 2 - VKY035C	08-07-2024 0:00	8	1.6	11	92	-	Clear	Clear	

Appendix E Quality Trigger Level Anlaysis

Vickery Extension Project Groundwater Monitoring Report

Quarterly Review May 2024 – July 2024

Whitehaven Coal Ltd

SLR Project No.: 640.031099.00001

2 October 2024

Table D-1: pH (Field) Trigger Level Review (Red Text Showing Exceedance of Trigger Level)

Bore	Trigger Level		Oct/Nov-23	Jan-24	Apr-24	Jul-24
GW01	6.90	8.30	7.33	7.20	7.14	7.2
GW02	7.20	8.60	7.59	7.79	7.14	7.23
GW03	6.10	8.10	7.19	7.16	7.05	7.36
GW-11	7.00	9.30	7.36	6.93	6.55	6.09
GW-7	7.70	8.50	8.89	8.82	8.79	8.67
GW-8	6.70	8.40	7.11	7.03	6.95	6.49
GW-9	6.60	8.20	7.94	6.68	6.81	6.76
MD01	6.70	8.40	11.58	11.69	10.73	9.59
MD02	6.70	8.40	6.84	6.78	6.59	6.57
SB01	6.90	8.30	7.44	7.31	7.20	7.21
SB02	6.90	8.30	7.28	7.28	7.14	7.2
SB04	6.90	8.30	7.29	7.43	7.27	7.12
SB05	6.90	8.30	2.09	7.73	7.63	7.58
SB06	6.90	8.30	7.35	7.61	7.42	7.56
SB07	6.90	8.30	7.35	7.47	7.28	7.22
SB08	6.90	8.30	7.24	7.39	7.17	7.29
SB09	6.90	8.30	3.32	7.56	7.27	7.52
SB10	6.90	8.30	7.43	7.47	7.28	7.5
SB11	6.90	8.30	7.26	7.70	7.45	7.77
SB15	6.90	8.30	7.29	7.23	7.17	7.3
TR18	6.70	8.40	6.58	6.85	6.69	6.64
TR26	6.70	8.40	7.06	7.16	7.11	6.69
TR35	6.70	8.40	6.66	6.75	6.72	6.75
TR7	7.40	7.80	6.53	7.05	6.71	6.82
VKY034C	6.70	8.40	7.30	6.94	7.05	7.25
VKY035C	6.70	8.40	7.10	7.01	6.88	6.9
VKY036C	6.70	8.40	7.08	6.79	6.80	7.19
VKY042C	6.70	8.40	6.75	6.72	6.61	6.65
VKY043C	6.70	8.40	7.72	7.80	7.65	7.85
VNW223	6.90	7.40	7.25	no data	no data	no data
VNW390	6.70	8.40	6.92	7.13	6.59	6.84
VNW391	6.70	8.40	7.04	7.31	7.06	6.81
VNW392	6.70	8.40	6.74	6.74	6.66	6.51
VNW393	6.70	8.40	7.36	7.56	7.20	7.13
VNW394	6.90	8.30	7.13	6.92	6.94	6.62

Bore	Trigger Level		Oct/Nov-23	Jan-24	Apr-24	Jul-24
VNW395	6.90	8.30	7.47	7.77	7.77	7.61
GW-2	6.90	8.30	no data	no data	6.85	no data
WR1	6.90	8.30	no data	no data	6.70	6.47
WR2	6.90	8.30	no data	no data	6.57	6.52

Note: Reported as field pH value; Red Text Showing Exceedance of Trigger Level.

Table D-2: EC Trigger Level Review

Bore ID	Trigger Level	Oct/Nov-23	Jan-24	Apr-24	Jul-24
GW01	10,083	1,042	1,265	1,384	1,052
GW02	969	731	971	926	1,065
GW03	811	862	888	862	947
GW-11	4,912	4,360	4,340	4,520	4,760
GW-7	5,378	4,300	4,490	4,560	4,710
GW-8	12,315	4,290	3,950	4,000	4,100
GW-9	12,740	6,110	3,320	5,630	1,591
MD01	12,315	1,799	1,786	1,283	1,505
MD02	12,315	1,195	1,306	1,210	1,224
SB01	10,083	1,541	1,716	1,698	1,756
SB02	10,083	7,330	7,330	7,210	6,860
SB04	10,083	2,680	3,360	1,868	2,390
SB05	10,083	3,740	3,690	3,680	3,490
SB06	10,083	3,280	3,460	3,410	3,440
SB07	10,083	770	919	934	978
SB08	10,083	983	1,115	1,039	1,088
SB09	10,083	949	1,014	973	1,013
SB10	10,083	1,880	1,972	1,859	1,928
SB11	10,083	1,080	1,021	1,048	461
SB15	10,083	1,019	1,070	972	1,049
TR18	12,315	13,400	13,640	12,730	15,350
TR26	12,315	6,290	8,380	5,180	7,330
TR35	12,315	15,300	17,330	16,740	17,260
TR7	12,970	14,800	15,390	14,410	15,380
VKY034C	12,315	3,590	3,850	4,030	4,170
VKY035C	12,315	3,110	3,340	3,230	3,290
VKY036C	12,315	5,600	5,810	5,780	5,830
VKY042C	12,315	5,420	5,430	5,480	5,990
VKY043C	12,315	2,990	3,410	3,410	3,290
VNW223	10,120	5,940	no data	no data	no data
VNW390	12,315	2,300	2,376	2,291	2,473
VNW391	12,315	2,530	2,471	2,352	2,458
VNW392	12,315	3,690	3,310	3,480	3,510
VNW393	12,315	2,740	2,830	2,840	3,090
VNW394	10,083	5,520	5,410	5,400	5,620

Bore ID	Trigger Level	Oct/Nov-23	Jan-24	Apr-24	Jul-24
VNW395	10,083	463	1,395	1,681	1,832
GW-2	10,083	no data	no data	1,218	no data
WR1	10,083	no data	no data	26,500	26,800
WR2	10,083	no data	no data	25,340	26,600

Note: Reported as field EC value; Red Text Showing Exceedance of Trigger Level.

Table D-3: Sulfate Trigger Level Review

Bore ID	Trigger Level	Oct/Nov-23	Jan-24	Apr-24	Jul-24
GW01	365	96	171	132	54
GW02	365	77	74	81	102
GW03	365	52	56	58	46
GW-11	365	<1	1	<1	1
GW-7	86	364	385	399	380
GW-8	86	no data	100	109	72
GW-9	86	102	128	51	25
MD01	86	22	23	26	36
MD02	86	28	29	28	29
SB01	365	182	183	190	148
SB02	365	1120	no data	1160	741
SB04	365	284	394	220	195
SB05	365	735	551	520	595
SB06	365	372	362	362	324
SB07	365	74	74	78	66
SB08	365	86	87	88	79
SB09	365	71	63	70	62
SB10	365	190	188	196	168
SB11	365	85	72	93	80
SB15	365	90	79	95	53
TR18	86	702	620	592	622
TR26	86	194	230	180	198
TR35	86	660	651	622	624
TR7	365	508	714	501	518
VKY034C	86	123	185	116	98
VKY035C	86	87	77	88	73
VKY036C	86	244	294	281	100
VKY042C	86	302	309	312	283
VKY043C	86	<1	<1	<1	<1
VNW223	365	97	no data	no data	no data
VNW390	86	95	95	106	55
VNW391	86	88	88	96	52
VNW392	86	no data	284	296	263
VNW393	86	179	185	200	165
VNW394	365	no data	551	560	574
VNW395	365	14	61	143	91

Bore ID	Trigger Level	Oct/Nov-23	Jan-24	Apr-24	Jul-24
GW-2	365	no data	no data	23	no data
WR1	365	no data	no data	1,320	901
WR2	365	no data	no data	1,540	1,120

Note: Sulfate as SO_4 in mg/L; Red Text Showing Exceedance of Trigger Level.

Table D-4: Metal Trigger Against ANZECC Default Guideline Values

Bore ID	Date	Aluminium	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
Unit		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
DGV		0.055	0.009	0.013	0.94	0.0002	0.001	0.0014	0.0014	0.0034	1.9	0.0006	0.034	0.011	0.011	0.00005	0.008
GW01	Jan-24	<0.01	<0.001	<0.001	0.14	<0.0001	<0.001	<0.001	<0.001	<0.001	0.967	<0.0001	<0.001	0.013	<0.01	<0.001*	<0.005
GW01	Apr-24	<0.01	<0.001	<0.001	0.06	<0.0001	<0.001	<0.001	<0.001	<0.001	0.063	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
GW01	Jul-24	<0.01	<0.001	<0.001	0.07	<0.0001	<0.001	<0.001	<0.001	<0.001	0.126	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
GW02	Jan-24	<0.01	<0.001	<0.001	0.1	<0.0001	<0.001	<0.001	0.002	<0.001	0.021	<0.0001	<0.001	0.375	<0.01	<0.001*	0.013
GW02	Apr-24	<0.01	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	0.007	<0.001	0.026	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
GW02	Jul-24	<0.01	0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.003	<0.001	0.018	<0.0001	<0.001	<0.001	<0.01	<0.001*	0.006
GW03	Jan-24	<0.01	<0.001	<0.001	0.09	<0.0001	<0.001	<0.001	<0.001	<0.001	0.014	<0.0001	<0.001	0.971	<0.01	<0.001*	<0.005
GW03	Apr-24	<0.01	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<0.001	0.01	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
GW03	Jul-24	<0.01	<0.001	<0.001	0.06	<0.0001	<0.001	<0.001	<0.001	<0.001	0.012	<0.0001	<0.001	0.002	<0.01	<0.001*	0.006
GW-11	Jan-24	<0.01	<0.001	<0.001	0.13	<0.0001	<0.001	<0.001	<0.001	0.001	2.2	<0.0001	-	0.00075	<0.01	<0.001*	0.0075
GW-11	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	-	0.004	<0.01	<0.001*	0.012
GW-11	Jul-24	<0.01	<0.001	<0.001	0.13	0.0003	<0.001	<0.001	0.002	<0.001	1.06	<0.0001	<0.001	0.002	<0.01	<0.001*	0.043
GW-2	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
GW-7	Jan-24	<0.01	<0.001	<0.001	0.18	<0.0001	<0.001	<0.001	0.003	<0.001	0.011	<0.0001	0.002	0.002	<0.01	<0.001*	<0.005
GW-7	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
GW-7	Jul-24	<0.01	<0.001	<0.001	0.17	0.0002	<0.001	<0.001	0.016	0.002	0.024	<0.0001	0.001	0.005	<0.01	<0.001*	0.018
GW-8	Jan-24	<0.01	<0.001	<0.001	0.09	<0.0001	<0.001	<0.001	<0.001	<0.001	0.092	<0.0001	<0.001	0.001	<0.01	<0.001*	0.012
GW-8	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
GW-8	Jul-24	<0.01	<0.001	0.002	0.07	0.0001	<0.001	<0.001	<0.001	<0.001	0.089	<0.0001	<0.001	0.003	<0.01	<0.001*	0.01
GW-9	Jan-24	<0.01	<0.001	<0.001	0.05	0.0001	<0.001	0.00075	<0.001	<0.001	3.8	<0.0001	<0.001	<0.001	<0.01	<0.001*	0.00825
GW-9	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012

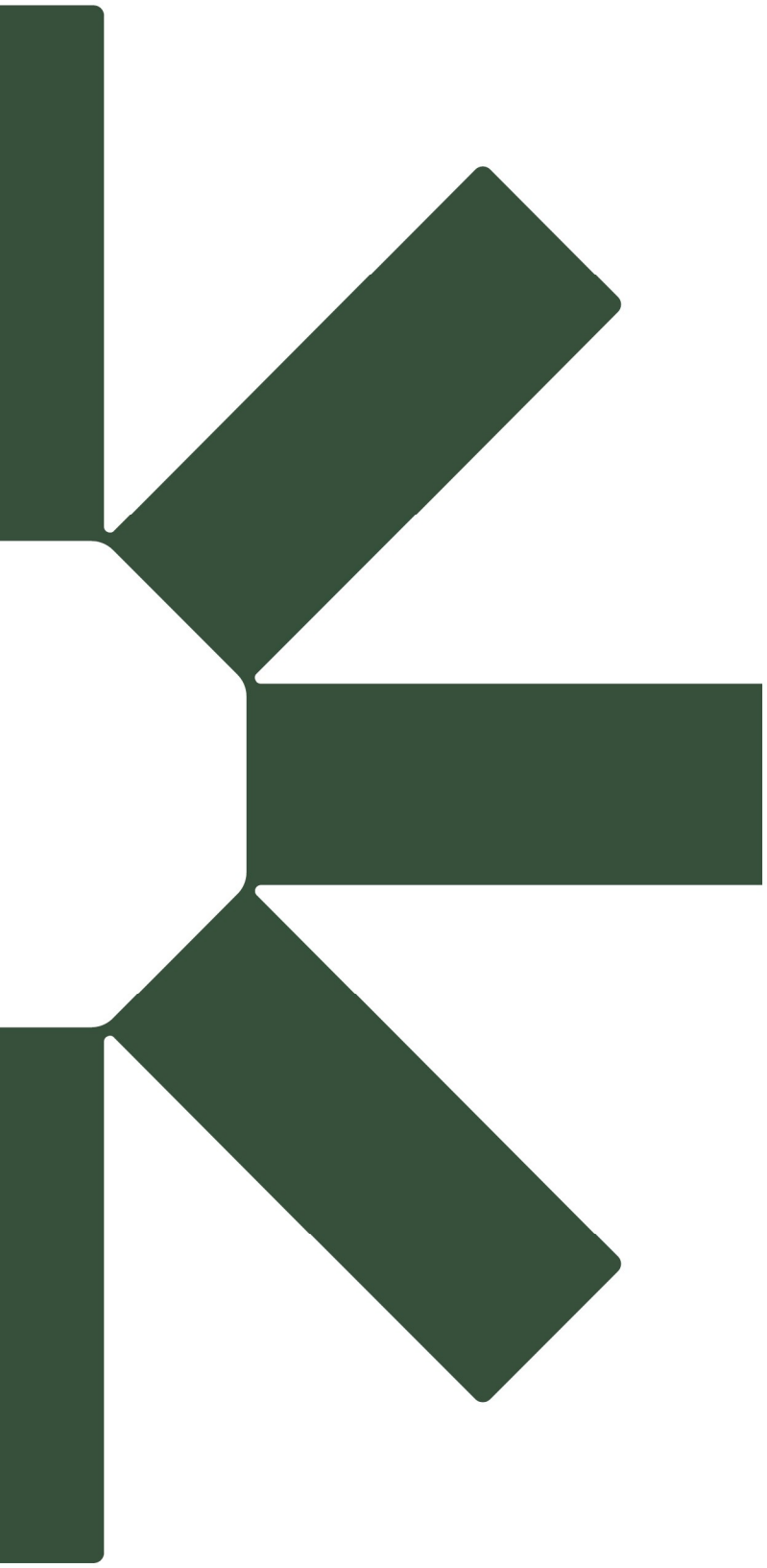
Bore ID	Date	Aluminium	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
GW-9	Jul-24	<0.01	<0.001	<0.001	0.07	0.0001	<0.001	<0.001	<0.001	<0.001	1.71	<0.0001	<0.001	0.003	<0.01	<0.001*	0.008
MD01	Jan-24	0.58	0.001	<0.001	0.04	<0.0001	<0.001	<0.001	0.020	0.001	0.004	<0.0001	0.018	0.005	<0.01	<0.001*	0.31
MD01	Apr-24	0.28	<0.001	0.002	<0.05	<0.0001	<0.001	<0.001	0.006	0.001	<0.001	<0.0001	0.019	0.006	<0.01	<0.001*	0.213
MD01	Jul-24	0.04	0.002	0.001	<0.05	<0.0001	<0.001	<0.001	0.002	0.003	0.013	<0.0001	0.007	0.006	<0.01	<0.001*	0.106
MD02	Jan-24	<0.01	<0.001	0.001	0.08	<0.0001	<0.001	<0.001	<0.001	<0.001	0.039	<0.0001	0.001	0.036	<0.01	<0.001*	<0.005
MD02	Apr-24	<0.01	<0.001	0.003	<0.05	<0.0001	<0.001	<0.001	<0.001	<0.001	0.051	<0.0001	0.003	0.019	<0.01	<0.001*	<0.005
MD02	Jul-24	<0.01	<0.001	0.002	0.05	<0.0001	<0.001	<0.001	<0.001	0.002	0.044	<0.0001	0.002	0.012	<0.01	<0.001*	0.009
SB01	Jan-24	<0.01	<0.001	<0.001	0.11	<0.0001	<0.001	0.003	<0.001	<0.001	0.39	<0.0001	<0.001	0.032	<0.01	<0.001*	<0.005
SB01	Apr-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	0.005	<0.001	<0.001	0.73	<0.0001	0.005	0.027	<0.01	<0.001*	<0.005
SB01	Jul-24	0.11	<0.001	0.004	0.08	<0.0001	0.004	0.024	<0.001	<0.001	1.65	<0.0001	<0.001	0.011	<0.01	<0.001*	0.01
SB02	Jan-24	<0.01	<0.001	0.003	0.21	<0.0001	0.003	0.002	<0.001	<0.001	0.735	<0.0001	0.003	0.012	<0.01	<0.001*	0.007
SB02	Apr-24	<0.01	<0.001	0.001	0.07	<0.0001	<0.001	0.003	<0.001	<0.001	0.315	<0.0001	0.002	0.014	<0.01	<0.001*	<0.005
SB02	Jul-24	<0.01	<0.001	0.004	0.14	<0.0001	<0.001	0.002	<0.001	<0.001	0.68	<0.0001	0.003	<0.001	<0.01	<0.001*	<0.005
SB04	Jan-24	<0.01	<0.001	<0.001	0.16	<0.0001	<0.001	<0.001	<0.001	<0.001	0.38	<0.0001	0.001	<0.001	<0.01	<0.001*	<0.005
SB04	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	<0.001	<0.001	0.094	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
SB04	Jul-24	<0.01	<0.001	<0.001	0.09	<0.0001	<0.001	<0.001	<0.001	<0.001	0.076	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
SB05	Jan-24	<0.01	<0.001	0.004	0.21	<0.0001	<0.001	<0.001	<0.001	<0.001	0.233	<0.0001	0.004	0.002	<0.01	<0.001*	<0.005
SB05	Apr-24	<0.01	<0.001	0.004	0.13	<0.0001	<0.001	<0.001	<0.001	<0.001	0.405	<0.0001	0.005	0.002	<0.01	<0.001*	<0.005
SB05	Jul-24	<0.01	<0.001	0.008	0.15	<0.0001	<0.001	<0.001	<0.001	<0.001	0.516	<0.0001	0.003	<0.001	<0.01	<0.001*	<0.005
SB06	Jan-24	0.02	<0.001	0.003	0.19	<0.0001	<0.001	0.002	0.003	<0.001	1.18	<0.0001	0.002	0.002	<0.01	<0.001*	<0.005
SB06	Apr-24	<0.01	<0.001	0.003	0.12	<0.0001	<0.001	0.002	<0.001	<0.001	1.19	<0.0001	0.003	0.002	<0.01	<0.001*	<0.005
SB06	Jul-24	<0.01	<0.001	0.003	0.13	<0.0001	<0.001	0.001	<0.001	<0.001	0.771	<0.0001	0.002	<0.001	<0.01	<0.001*	0.006
SB07	Jan-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	0.07	<0.01	<0.001*	<0.005
SB07	Apr-24	<0.01	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005

Bore ID	Date	Aluminium	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
SB07	Jul-24	<0.01	<0.001	0.001	0.08	0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	0.001	<0.01	<0.001*	0.009
SB08	Jan-24	<0.01	<0.001	<0.001	0.1	<0.0001	<0.001	<0.001	0.004	<0.001	0.002	<0.0001	<0.001	0.063	<0.01	<0.001*	<0.005
SB08	Apr-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	<0.001	0.011	<0.001	0.001	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
SB08	Jul-24	<0.01	<0.001	0.001	0.09	<0.0001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
SB09	Jan-24	<0.01	<0.001	<0.001	0.11	<0.0001	<0.001	<0.001	<0.001	<0.001	0.335	<0.0001	0.001	0.015	<0.01	<0.001*	<0.005
SB09	Apr-24	<0.01	<0.001	<0.001	<0.05	<0.0001	<0.001	<0.001	<0.001	<0.001	0.306	<0.0001	<0.001	<0.001	<0.01	<0.001*	0.013
SB09	Jul-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	<0.001	<0.001	0.466	<0.0001	0.001	<0.001	<0.01	<0.001*	<0.005
SB10	Jan-24	<0.01	<0.001	0.001	0.16	<0.0001	<0.001	<0.001	<0.001	<0.001	0.074	<0.0001	0.002	<0.001	<0.01	<0.001*	<0.005
SB10	Apr-24	<0.01	<0.001	0.001	0.08	<0.0001	<0.001	<0.001	<0.001	<0.001	0.146	<0.0001	0.002	<0.001	<0.01	<0.001*	<0.005
SB10	Jul-24	<0.01	<0.001	0.001	0.1	<0.0001	<0.001	<0.001	<0.001	<0.001	0.024	<0.0001	0.001	<0.001	<0.01	<0.001*	<0.005
SB11	Jan-24	<0.01	<0.001	<0.001	0.13	<0.0001	<0.001	<0.001	0.01	<0.001	0.023	<0.0001	<0.001	0.057	<0.01	<0.001*	<0.005
SB11	Apr-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	<0.001	0.021	<0.001	0.006	<0.0001	<0.001	0.002	<0.01	<0.001*	<0.005
SB11	Jul-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.003	<0.001	0.01	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
SB15	Jan-24	<0.01	<0.001	<0.001	0.12	<0.0001	<0.001	<0.001	0.001	<0.001	0.008	<0.0001	<0.001	0.032	<0.01	<0.001*	<0.005
SB15	Apr-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	<0.001	<0.001	<0.001	0.004	<0.0001	<0.001	<0.001	<0.01	<0.001*	0.018
SB15	Jul-24	<0.01	<0.001	<0.001	0.07	<0.0001	<0.001	<0.001	<0.001	<0.001	0.02	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
TR18	Jan-24	<0.01	<0.001	<0.001	0.11	<0.0001	<0.001	<0.001	0.07	<0.001	0.042	<0.0001	0.001	0.021	<0.01	<0.001*	<0.005
TR18	Apr-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	<0.001	0.032	<0.001	0.023	<0.0001	0.002	0.020	<0.01	<0.001*	0.009
TR18	Jul-24	<0.01	<0.001	<0.001	0.08	0.0001	<0.001	<0.001	0.033	<0.001	0.094	<0.0001	0.002	0.019	<0.01	<0.001*	0.008
TR26	Jan-24	<0.01	<0.001	<0.001	0.14	<0.0001	<0.001	<0.001	0.01	<0.001	0.07	<0.0001	0.002	0.014	<0.01	<0.001*	<0.005
TR26	Apr-24	<0.01	<0.001	<0.001	0.07	<0.0001	0.002	<0.001	<0.001	<0.001	0.033	<0.0001	0.005	0.017	<0.01	<0.001*	0.012
TR26	Jul-24	<0.01	<0.001	<0.001	0.11	0.0001	<0.001	<0.001	<0.001	<0.001	0.053	<0.0001	0.002	0.004	<0.01	<0.001*	0.007
TR35	Jan-24	<0.01	<0.001	<0.001	0.12	0.0002	0.002	0.007	1.24	<0.001	1.72	<0.0001	0.011	0.713	<0.01	<0.001*	0.015
TR35	Apr-24	<0.01	<0.001	<0.001	0.06	0.0004	0.002	0.010	1.730	<0.001	1.76	<0.0001	0.017	0.558	<0.01	<0.001*	0.030

Bore ID	Date	Aluminium	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
TR35	Jul-24	<0.01	<0.001	0.001	0.08	0.0003	<0.001	0.011	7.09	<0.001	1.51	<0.0001	0.009	0.435	<0.01	<0.001*	0.02
TR7	Jan-24	<0.01	<0.001	<0.001	0.1	<0.0001	<0.001	0.008	0.863	<0.001	0.637	<0.0001	0.002	0.39	<0.01	<0.001*	0.006
TR7	Apr-24	<0.01	<0.001	<0.001	<0.05	<0.0001	<0.001	0.004	0.346	<0.001	0.262	<0.0001	0.002	0.118	<0.01	<0.001*	0.006
TR7	Jul-24	<0.01	<0.001	<0.001	0.07	0.0001	<0.001	0.008	0.471	<0.001	0.526	<0.0001	0.003	0.272	<0.01	<0.001*	0.01
VKY034C	Jan-24	<0.01	<0.001	0.002	0.09	<0.0001	<0.001	<0.001	<0.001	<0.001	0.102	<0.0001	0.007	0.008	<0.01	<0.001*	<0.005
VKY034C	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
VKY034C	Jul-24	<0.01	<0.001	0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.003	<0.0001	<0.001	0.001	<0.01	<0.001*	0.005
VKY035C	Jan-24	<0.01	<0.001	0.001	0.07	<0.0001	0.002	<0.001	<0.001	<0.001	0.329	<0.0001	0.007	0.006	<0.01	<0.001*	0.006
VKY035C	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
VKY035C	Jul-24	<0.01	<0.001	0.002	<0.05	<0.0001	0.002	<0.001	<0.001	0.001	0.32	<0.0001	0.008	0.005	<0.01	<0.001*	0.008
VKY036C	Jan-24	<0.01	<0.001	<0.001	0.09	<0.0001	<0.001	<0.001	<0.001	<0.001	0.013	<0.0001	0.001	0.013	<0.01	<0.001*	<0.005
VKY036C	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
VKY036C	Jul-24	<0.01	<0.001	0.008	0.1	<0.0001	<0.001	<0.001	<0.001	<0.001	0.153	<0.0001	0.004	0.005	<0.01	<0.001*	<0.005
VKY042C	Jan-24	<0.01	<0.001	<0.001	0.1	0.0001	<0.001	<0.001	0.006	<0.001	0.223	<0.0001	0.002	0.015	<0.01	<0.001*	0.014
VKY042C	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
VKY042C	Jul-24	<0.01	0.002	<0.001	0.07	0.001	<0.001	0.004	0.008	<0.001	0.217	<0.0001	0.001	0.038	<0.01	<0.001*	0.033
VKY043C	Jan-24	<0.01	<0.001	<0.001	0.11	<0.0001	<0.001	<0.001	<0.001	<0.001	0.005	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
VKY043C	Apr-24	<0.01	<0.001	<0.001	0.06	<0.0001	<0.001	<0.001	<0.001	<0.001	0.004	<0.0001	<0.001	0.002	<0.01	<0.001*	0.006
VKY043C	Jul-24	<0.01	<0.001	<0.001	0.1	<0.0001	<0.001	<0.001	0.002	<0.001	<0.001	<0.0001	<0.001	<0.001	<0.01	<0.001*	<0.005
VNW390	Jan-24	<0.01	<0.001	<0.001	0.14	<0.0001	<0.001	<0.001	0.005	<0.001	0.003	<0.0001	<0.001	0.002	<0.01	<0.001*	0.026
VNW390	Apr-24	<0.01	<0.001	0.002	0.09	<0.0001	<0.001	0.002	<0.001	<0.001	0.239	<0.0001	<0.001	0.002	<0.01	<0.001*	0.007
VNW390	Jul-24	<0.01	<0.001	0.002	0.12	0.0001	<0.001	0.003	<0.001	<0.001	0.298	<0.0001	0.005	0.036	<0.01	<0.001*	<0.005
VNW391	Jan-24	<0.01	<0.001	<0.001	0.13	<0.0001	<0.001	<0.001	0.001	<0.001	0.006	<0.0001	<0.001	<0.001	<0.01	<0.001*	0.006
VNW391	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.225	<0.0001	0.001	0.007	<0.01	<0.001*	0.013

Bore ID	Date	Aluminium	Antimony	Arsenic	Boron	Cadmium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Molybdenum	Nickel	Selenium	Silver	Zinc
VNW391	Jul-24	<0.01	0.002	<0.001	0.11	0.0003	<0.001	<0.001	<0.001	0.002	0.246	<0.0001	<0.001	0.006	<0.01	<0.001*	0.018
VNW392	Jan-24	<0.01	<0.001	0.001	0.12	<0.0001	<0.001	0.003	<0.001	<0.001	0.333	<0.0001	0.002	0.02	<0.01	<0.001*	0.008
VNW392	Apr-24	<0.01	<0.001	0.001	0.07	<0.0001	<0.001	0.003	<0.001	<0.001	0.315	<0.0001	0.002	0.014	<0.01	<0.001*	<0.005
VNW392	Jul-24	<0.01	<0.001	0.002	0.1	<0.0001	<0.001	0.003	<0.001	<0.001	0.286	<0.0001	0.002	0.01	<0.01	<0.001*	0.007
VNW393	Jan-24	<0.01	<0.001	<0.001	0.1	<0.0001	<0.001	<0.001	<0.001	<0.001	0.092	<0.0001	0.003	<0.001	<0.01	<0.001*	<0.005
VNW393	Apr-24	<0.01	<0.001	<0.001	0.05	<0.0001	<0.001	<0.001	<0.001	<0.001	0.15	<0.0001	0.005	0.005	<0.01	<0.001*	<0.005
VNW393	Jul-24	<0.01	<0.001	0.001	0.09	0.0001	<0.001	<0.001	<0.001	<0.001	0.181	<0.0001	0.004	0.006	<0.01	<0.001*	0.005
VNW394	Jan-24	<0.01	<0.001	0.007	0.1	<0.0001	<0.001	0.011	<0.001	<0.001	2.12	<0.0001	0.003	0.035	<0.01	<0.001*	0.007
VNW394	Apr-24	<0.01	<0.001	0.006	<0.05	<0.0001	<0.001	0.002	<0.001	<0.001	1.27	<0.0001	0.003	0.006	<0.01	<0.001*	<0.005
VNW394	Jul-24	<0.01	<0.001	0.005	0.07	<0.0001	<0.001	0.002	<0.001	<0.001	0.982	<0.0001	0.002	0.007	<0.01	<0.001*	0.013
VNW395	Jan-24	<0.01	<0.001	0.001	0.08	<0.0001	<0.001	<0.001	0.002	<0.001	0.032	<0.0001	<0.001	0.001	<0.01	<0.001*	<0.005
VNW395	Apr-24	<0.01	<0.001	0.001	0.0575	<0.0001	<0.001	0.00125	0.00625	<0.001	0.125	<0.0001	0.00575	0.2285	<0.01	<0.001*	0.007
VNW395	Jul-24	<0.01	<0.001	0.001	0.06	<0.0001	<0.001	0.001	0.007	0.002	0.071	<0.0001	0.008	0.371	<0.01	<0.001*	0.016
WR-1	Jan-24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
WR-1	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
WR-1	Jul-24	<0.01	<0.001	0.001	0.15	0.0003	<0.001	<0.001	0.001	0.002	0.122	0.0017	0.002	0.037	<0.01	<0.001*	0.014
WR-2	Jan-24	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data	no data
WR-2	Apr-24	<0.01	<0.001	<0.001	0.08	<0.0001	<0.001	<0.001	0.001	<0.001	0.224	<0.0001	<0.001	0.004	<0.01	<0.001*	0.012
WR-2	Jul-24	<0.01	<0.001	<0.001	0.09	0.0001	<0.001	0.008	<0.001	<0.001	0.724	<0.0001	0.022	0.118	<0.01	<0.001*	<0.005

*Limit of reporting value is higher than DGV value



Making Sustainability Happen