



Maxwell Underground Mine
Environmental Monitoring Data
Quarter 1 2024

1 INTRODUCTION

This report has been compiled to present environmental monitoring data for the Maxwell Underground Mine (the project) in accordance with:

- Schedule 2, Condition E17 (a) (vii) of SSD-9526; and
- Condition 5 of EPBC 2018/8287. Specifically this requires the inclusion of hydrographs for all monitoring bores and an explanation of what the data means in relation to the groundwater performance measures specified in the State development consent (SSD 9526).

This report covers the reporting period 1 January to 31 March 2024. Summaries of historic environmental monitoring data (prior to this report) can be found on the Malabar Resources website.

2 MONITORING RESULTS

Deposited dust monitoring results are provided in **Table 1**.

Continuous TEOM PM₁₀ monitoring results are provided in **Figure 1**.

Continuous TEOM PM_{2.5} monitoring results are provided in **Figure 1**.

Mine storage surface water quality monitoring results are provided in **Table 2**.

Downstream surface water quality monitoring results are provided in **Table 3**.

Surface water quality field measurements from Saddlers Creek are compared to trigger levels in **Table 4**.

Surface water quality laboratory results from Saddlers Creek are compared to trigger levels in **Table 5**.

Groundwater quality results for Maxwell Infrastructure bores are provided in **Table 6**.

Groundwater quality monthly field measurements for Maxwell Infrastructure bore DS1 are provided in **Table 7**.

Groundwater quality results for Maxwell Underground bores are provided in **Table 8**.

Groundwater level results are provided in **Table 9**.

Locations of monitoring sites are shown in **Appendix 1** to **Appendix 3**.

The consultant hydrogeologist report providing the requirements of Condition 5 of EPBC 2018/8287, inclusive of hydrographs for all monitoring bores, and an explanation of the data relative to the groundwater performance measures in SSD 9526, is provided in **Appendix 4**.

Noise and blast monitoring results are not presented in this report as they are contained within the monthly reports required by the Environment Protection Licence and can be downloaded from the Malabar Resources website.

Table 1. Deposited dust monitoring results for reporting period

Gauge	Insoluble Solids Result (g/m ² /month)			Annual Mean Limit (g/m ² /month)	Rolling Annual Average to end of reporting period (g/m ² /month)
	Jan	Feb	Mar		
2175	1.4	1.8	1.2	4	1.5
2230	2.6	1.8	1.2	4	1.8
2235	2.0	1.9	1.1	4	1.8
2247	1.9	2.1	1.5	4	1.7

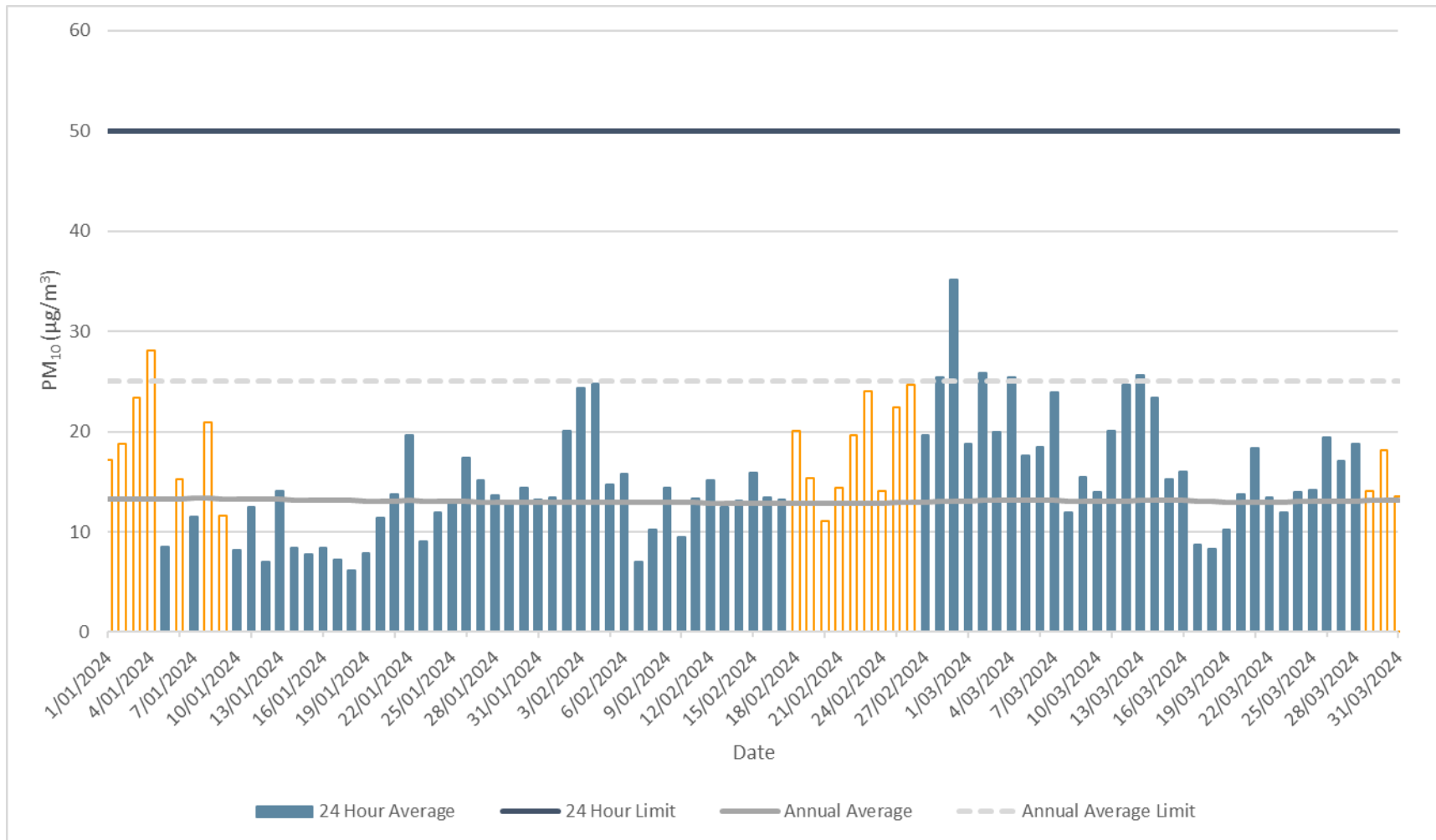


Figure 1. TEOM-1 PM₁₀ monitoring results for the reporting period. Refer to notes for explanation of data gaps as shown by orange bars.

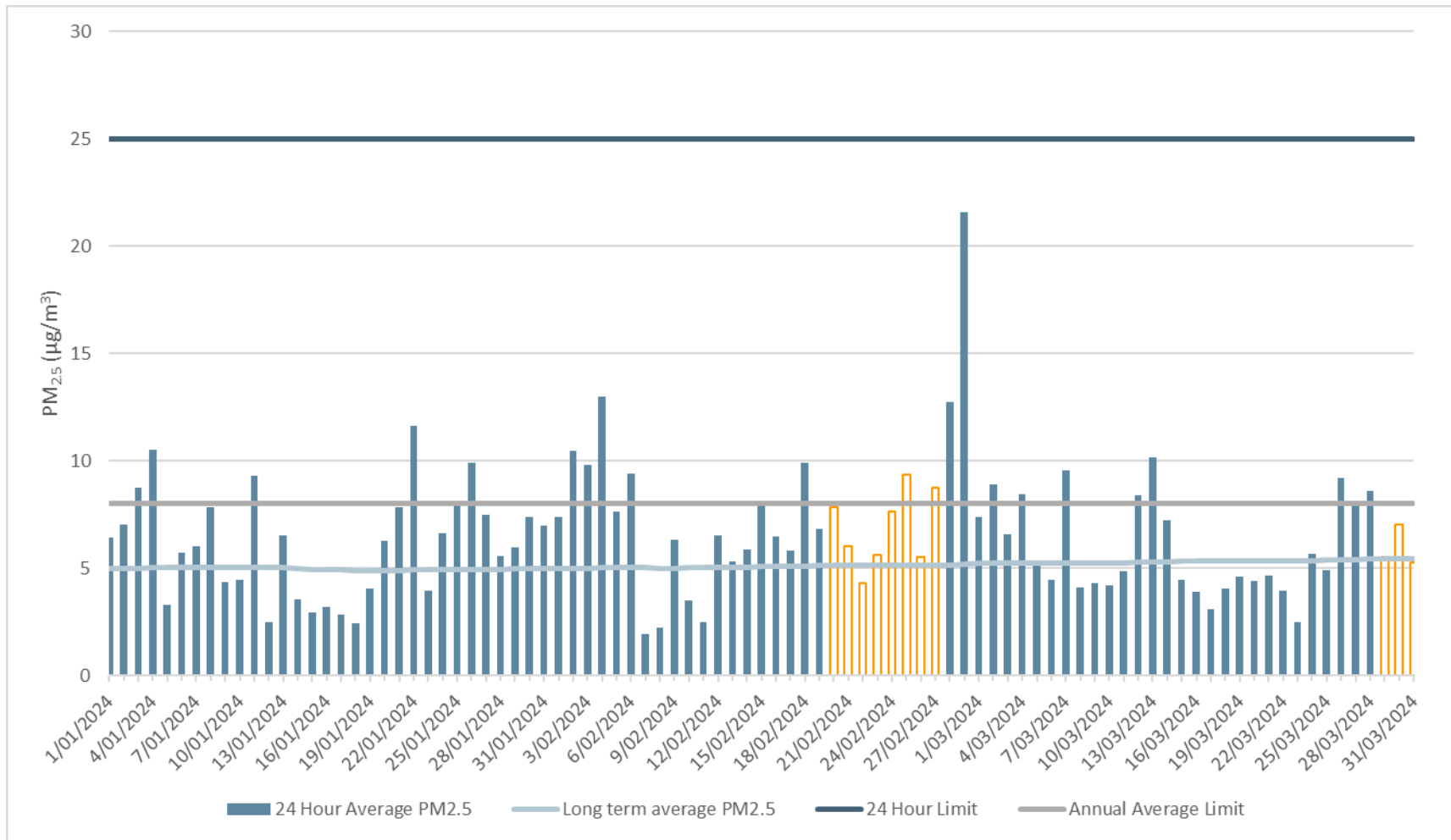


Figure 2. TEOM-1 PM_{2.5} monitoring results for the reporting period. Refer to notes for explanation of data gaps as shown by orange bars.

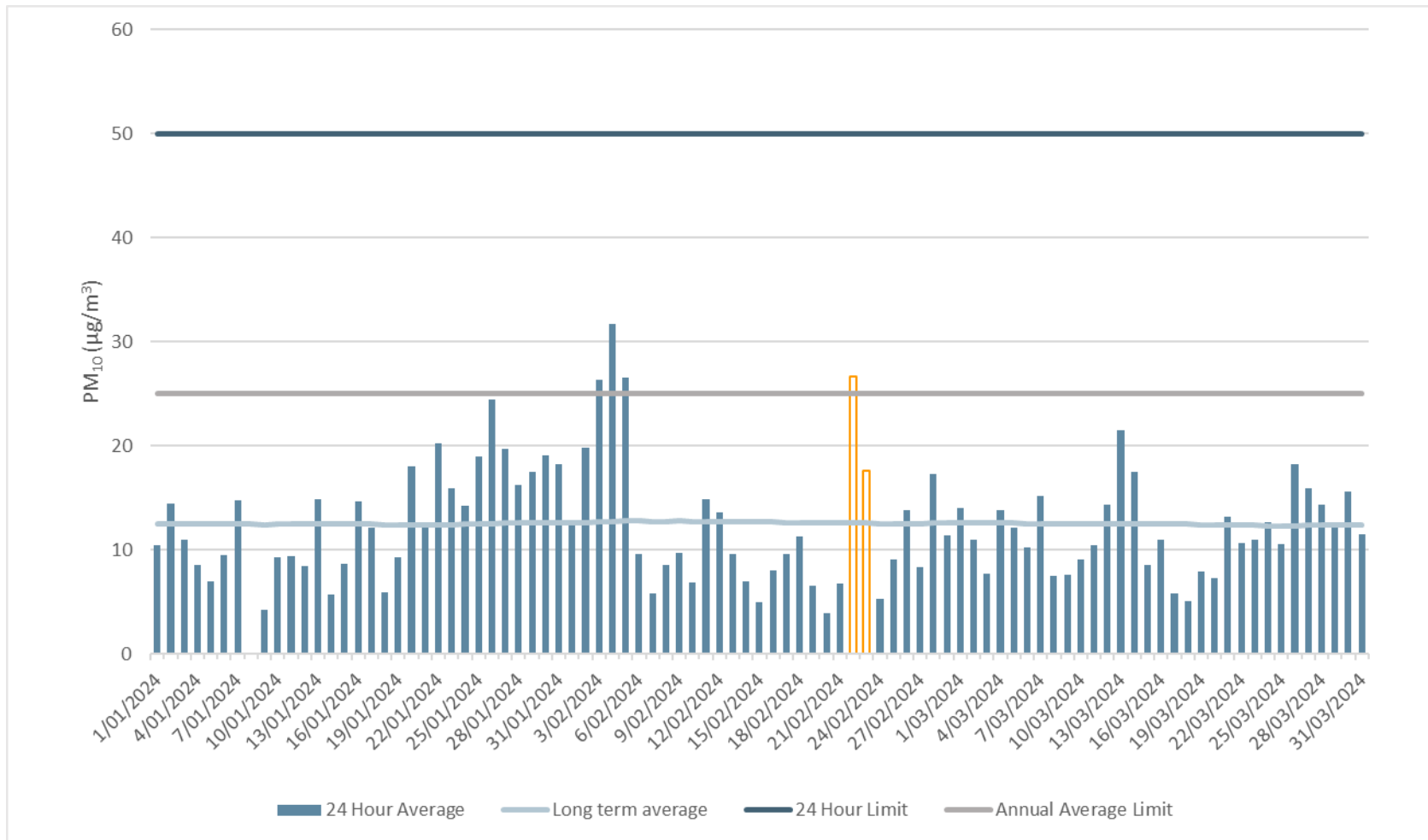


Figure 3. TEOM-2 PM₁₀ monitoring results for the reporting period. Refer to notes for explanation of data gaps as shown by orange bars.

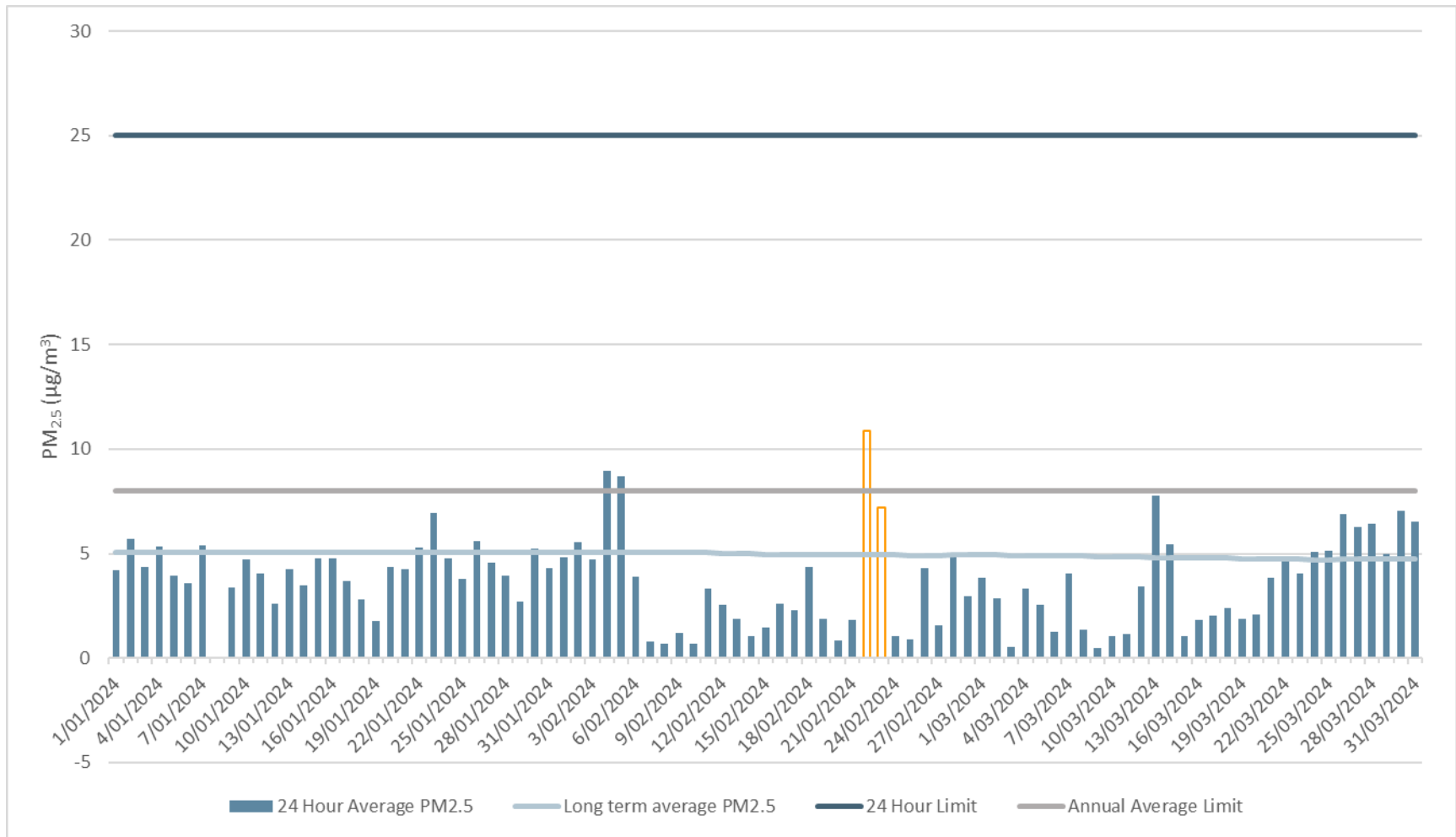


Figure 4. TEOM-2 PM_{2.5} monitoring results for the reporting period. Refer to notes for explanation of data gaps as shown by orange bars.

Notes:

- Monitoring of PM₁₀ and PM_{2.5} commenced at TEOM-2 on 12 December 2021.
- All 24-hour averages during the reporting period were below the 24-hour criteria for both PM₁₀ and PM_{2.5} at both TEOM-1 and TEOM-2. The results of the investigations into any exceedances of the criteria (if required) are provided in the Annual Review.
- Gaps in data are due to maintenance and scheduled calibration by monitoring contractor, plus occasionally issues such as power cuts and equipment failure. Note that values close to zero may appear as gaps in data in the graphs.
- Where there is no TEOM-generated rolling 24-hour average value reported by the TEOM, in accordance with the monitoring contractors data validation process, where such events result in 75% or less of valid 1-hour data during that 24-hour period (midnight to midnight), the 1-hour data is used to calculate the 24-hour average. This process has been applied from Q1 2022. Prior to this the raw data from the TEOM is presented, ie if no valid 24-hour value is generated by the TEOM, no data is presented for that day.
- Specific significant data gaps for the reporting period are noted as follows:

TEOM-1

- Invalid data for 18–27 Feb due to high negatives. Investigated by monitoring contractor (CBased) and deemed initially due to a leak in the PMC channel. Was unable to resolve, hence a replacement hire unit was installed on 27 Feb. Supplementary data presented from BHP air quality monitoring station 2km to the northwest, as shown by orange bars. Reported to NSW Dept. of Planning as a non-compliance – responded with ‘no comments on the document at this time’.
- Insufficient PM_{2.5} data for 29 Mar–10 Apr. Investigated by CBased who advised it was due to a failed motherboard and likely other failed electrics. A replacement TEOM was purchased by CBased from Melbourne for hire to Malabar, shipped to site and installed on 10 Apr. Reported to NSW Dept. of Planning as a non-compliance who responded with ‘no comments on the document at this time’.

TEOM-2

- 8 January 2024: Main switch tripped at power pole resulting in insufficient valid data to calculate a 24-hour average for both PM₁₀ and PM_{2.5}.
- 22&23 February 2024: Power was cut by contractors working on the river pump at the Plashett property resulting in insufficient data being available on those two days to calculate a valid 24-hour average for both PM₁₀ and PM_{2.5}.

Table 2. All mine water storage monitoring locations: laboratory water quality monitoring results for the reporting period compared to year-to-date averages. See notes for further details.

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TSS (mg/L)	TDS (mg/L)
Access Rd Dam (2081)	Mar	107	536	861	8030	632	8.7	84	738	3750	7.0	7850
	Avg	130	465	788	7080	531	8.5	69	643	3245	10	6358
DC2 Dam (2109)	Mar	189	316	2060	12400	557	7.6	21	2190	4010	5.0	11000
	Avg	451	261	2285	12800	581	7.8	16	2313	4013	7.5	10583
Rail Loop Dam (2114)	Mar	210	456	772	7130	535	7.5	61	722	3200	5.0	6650
	Avg	183	399	773	6570	457	7.6	50	645	2910	7.8	5805
Industrial Dam (1969)	Mar	140	386	588	5840	422	8.6	57	500	2500	9.0	5290
	Avg	146	310	509	4598	326	8.4	43	405	2038	7.0	3880
OPC Dam	Mar	130	72	92	1100	57	8.7	10	93	282	25	862
	Avg	129	196	364	3060	199	8.4	24	269	1256	17	2553
V Notch	Mar	437	468	1340	10200	484	7.8	30	1580	3960	5.0	9530
	Avg	387	508	1418	10341	501	7.8	30	1633	4095	5.3	8918
ES Void	Mar	216	559	828	8020	631	8.1	86	698	3910	5.0	8130
	Avg	240	575	841	7745	608	8.0	79	657	3805	6.8	7180
MEA Dam (MEA)	Dec*											
	Avg*											
Mine Water Dam (MWD)	Jan	180	189	592	4370	208	8.4	27	571	1370	5.0	3640
	Avg	262	264	833	6015	329	8.3	40	694	2185	12	4988
	Jan	131	508	858	8050	676	8.4	86	717	4200	5.0	8610

Site	Month	Bicarbonate (CaCO ₃) (mg/L)	Calcium (mg/L)	Chloride (mg/L)	EC (µS/cm)	Magnesium (mg/L)	pH	Potassium (mg/L)	Sodium (mg/L)	Sulphate (SO ₄) (mg/L)	TSS (mg/L)	TDS (mg/L)
Treated Water Dam (TWD)	Avg	134	496	866	7875	653	8.4	84	697	4220	5.0	8480
MEA Sedimentation Dam (SED)	Jan	226	205	762	5340	257	8.5	32	729	1640	39	2490
	Avg	282	242	843	5827	305	8.3	35	738	2073	26	4203

Notes:

The year-to-date value consists of an average of the quarterly sample for the current quarter plus the three previous quarters, as per the Water Management Plan. The exceptions are for the V Notch dam, where samples are taken monthly as is required by the EPL.

The MEA Dam, Mine Water Dam, Treated Water Dam and MEA Sedimentation Dam were progressively constructed and commissioned during 2023. Samples were taken when water was available and safe access permitted.

*The MEA Dam had no water at the time of the scheduled monitoring in December 2023 or previous; the next scheduled sampling is April 2024.

Table 3. All downstream surface water monitoring locations: surface water quality scheduled and sediment dams and; plus mine water dams (overflow events only) laboratory monitoring results for the reporting period compared to rolling year-to-date averages. See notes for further details. No creeks were flowing during scheduled sampling during the sampling period nor during the previous 12 months, and there were no uncontrolled releases from the sediment dams and mine water dams; hence no results are presented in this Table.

Site	Month	Antimony	Arsenic	Bicarbonate (CaCO ₃)	Calcium	Chloride	EC	Magnesium	Molybdenum	Potassium	Selenium	Sodium	Sulphate (SO ₄)	TSS	TDS	Turbidity
Saddlers U/S	Jan*															
	Avg*															
W3	Jan *															
	Avg*															
SW1/ Saddlers U/S	Jan *															
	Avg*															
Saddlers D/S (W4-Bowfield)	Jan *															
	Avg*															
MEA D/S	Jan *															
	Avg*															
Saltwater D/S	Jan *															
	Avg*															
SW3	Jan *															
	Avg*															
Sediment dams and mine water dams	Jan *															
	Avg*															

*Notes

In addition to quarterly scheduled sampling, the Maxwell Underground Mine Water Management Plan requires sampling and analysis following 25mm or more of rain over a 24-hour period (defined as midnight to midnight and as recorded at the Drayton South meteorological recording station (AWS-2)). The results from any such post-rainfall events have been included in the year-to-date averages.

The quarterly field measurements of pH, EC, redox potential and temperature are recorded to enable subsequent evaluation in case of need and are not included in the quarterly reporting.

The Transport and Services Corridor sediment dams (Access Road Dam 1, 2, 3 and 4) were progressively constructed and commissioned during 2023. The requirement for the sampling and analysis for these variables is required within 24 hours of commencement of an overflow from a sedimentation dam or mine water dam (taken to be defined as an uncontrolled release from those dams). During the reporting period there were no overflows from such dams and hence there are no results in Table 3.

All results are in mg/L except Conductivity ($\mu\text{S}/\text{cm}$), pH (in pH units) and turbidity (nephelometric turbidity units).

The following will be reported in the Annual Review:

- Comparison of water quality results from Saddlers Creek against Water Quality Trigger Values
- Results from the automatic weather stations (AWS-1 and AWS-2)
- Results of the stream health monitoring.

Following an investigation into the high EC readings at site Saddlers Upstream (U/S) in Q3 2023 it was found that due to a change in sampling personnel, the requirement (Section 5.3 of the Water Management Plan) to only sample waterways that are flowing was not occurring (ie samples were of stagnant (ie non-flowing) water). This was reflective of the regional drought conditions. It was determined that all samples taken in 2023 were of stagnant water; and hence should not be used for comparison against trigger values and hence are not presented in this report. Going forward, samples are only taken if water is flowing.

Table 4. Surface water scheduled field measurements at sites along Saddlers Creek for Q1 2023 to Q4 2023 and comparison against trigger levels. If an exceedance of the trigger level occurs (median over three consecutive samples), this is highlighted in red. TLTS = too low to sample. No sites were flowing during scheduled or post-rainfall sampling during the reporting period nor the previous 12 months, and hence there are no results presented in the Table.

Site	Field result												
		pH				EC				Turbidity			
	Units	pH				µS/cm				NTU			
	Trigger	6.5–8.5				7,600				64			
		Q1 2023	Q2 2023	Q3 2023		Q4 2022	Q1 2023	Q2 2023	Q3 2023		Q4 2022	Q1 2023	Q2 2023
W3*													
Saddlers D/S (W4 – Bowfield)*													
MEA D/S*													
Saddlers U/S*													
Saltwater D/S*													
SW1/ Saddlers*													
SW2*													
SW3*													

* As is explained in the Notes to Table 3, all surface water samples taken in 2023 were of stagnant water and there were no samples taken during the reporting period due to no flow. Hence there are no results in Table 3. Going forward, samples will only be taken in creeks when they are flowing.

Table 5. Surface water laboratory results at sites along Saddlers Creek (scheduled and post-rainfall sampling) from Q4 2022 to Q3 2023 and comparison against trigger levels. If an exceedance of the trigger level occurs (median over three consecutive samples), this is highlighted in red. Refer also to Notes at end of Table 5. No sites were flowing in 2023 hence no results are presented in this Table.

Site	Scheduled or post-rainfall sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9 ^(c)	13 ^(c)	24 ^(b) ^(c)	(a)	(a)	(a)	(a)	34 ^(c)	(a)	11 ^(c)	(a)	(a)	50	4900
W3	13/4/23	Scheduled*														
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	12/1/24	Scheduled*														
Saddlers D/S	13/4/23	Scheduled*														
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	11/1/24	Scheduled*														
MEA D/S	13/4/23	Scheduled*														
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	15/1/24	Scheduled*														

Site	Scheduled or post-rainfall sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9(c)	13(c)	24 (b) (c)	(a)	(a)	(a)	(a)	34(c)	(a)	11(c)	(a)	(a)	50	4900
Saddlers U/S	13/4/23	Scheduled*														
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	12/1/24	Scheduled*														
Saltwater D/S	13/4/23	Scheduled*														
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	10/1/24	Scheduled*														
SW1/ Saddlers D/S	13/4/23	Scheduled*														
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	11/1/24	Scheduled*														
SW2	-	-	Sampling location to be established – see notes													
SW3	13/4/23	Scheduled*														

Site	Scheduled or post-rainfall sample date	Sampling type	Laboratory result													
			Sb	As (V)	As (III)	CaCO3	Ca	Cl	Mg	Mb	K	Se	Na	SO4	TSS	TDS
Units			mg/L	mg/L mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	µg/L	µg/L	µg/L	µg/L	µg/L
Trigger			9 ^(c)	13 ^(c)	24 ^(b) ^(c)	(a)	(a)	(a)	(a)	34 ^(c)	(a)	11 ^(c)	(a)	(a)	50	4900
	11/7/23	Scheduled*														
	18/10/23	Scheduled*														
	10/1/24	Scheduled*														

Notes.

(a) No trigger; for interpretation purposes only. (b) Result is a combination of As (V) and As (III) (c) Trigger set as a preliminary guideline value. In accordance with the Surface Water Management Plan, results from Saddlers Creek (median over three consecutive samples) will be compared to the relevant trigger levels. Trigger values are values that trigger further investigation or management action.

* As is explained in the Notes to Table 3, all surface water samples taken in 2023 were of stagnant water and there were no samples taken during the reporting period due to no flow. Hence there are no results in Table 3. Going forward, samples will only be taken in creeks when they are flowing.

Table 6. Maxwell Infrastructure groundwater quality monitoring results for Quarter 1 2024 (rolling year to date average shown Apr 23–Mar 24). See notes for further details. If specified, NS = not sampled (as sampling for laboratory analysis is twice a year, next is due Q2 2024). EC and pH recording from quarterly field measurements is specified.

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	Carbonate Alkalinity as CO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead
R4241	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	4,590	6,253	NS	NS
Average	0.010	0.0010	565	565	1.0	0.23	211	946	0.0015	0.0010	5,130	-	0.63	0.0010
F1162	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,394	-	NS	NS
Average	0.010	0.0010	973	973	1.0	0.11	65	193	0.0025	0.0010	2,463	-	0.14	0.0010
F1164	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3,820	-	NS	NS
Average	0.010	0.0010	738	738	1.0	0.20	153	923	0.0025	0.0010	4,628	-	6.7	0.0010
GW01D	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	5,180	5,680	NS	NS
Average	0.010	0.0010	555	555	1.0	0.30	423	1,355	0.0010	0.0090	5,455	-	0.61	0.0010
GW01S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	9,260	NS	NS
Average	0.010	0.0010	653	653	1.0	0.17	226	1,820	0.0010	0.017	6,713	-	0.050	0.0010
GW02D	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	12,200	10,500	NS	NS
Average	0.015	0.0010	1,950	1,950	1.0	0.30	65	1,560	0.0010	0.0020	12,725	-	0.14	0.0010
GW02S	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	6,560	9,480	NS	NS
Average	0.010	0.0010	846	846	1.0	0.17	411	1,013	0.0010	0.0010	6,935	-	2.6	0.0010
GW04	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,860	-	NS	NS
Average	0.010	0.0010	813	813	1.0	0.75	126	145	0.0015	0.0010	1,927	-	1.1	0.0010

Table 6 continued

Site	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value	Selenium	Silver	Sodium	Sulfate as SO4 – Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
R4241	NS	NS	NS	NS	6.8	Min: 6.0, Max: 8.5	NS	NS	NS	NS	NS	NS	NS
Average	336	0.16	0.0045	0.011	6.9	-	0.010	0.0010	575	1,300	58	3,760	0.0060
F1162	NS	NS	NS	NS	6.9	-	NS	NS	NS	NS	NS	NS	NS
Average	45	0.17	0.0040	0.011	6.8	-	0.010	0.0010	136	2.5	60	846	0.0050
F1164	NS	NS	NS	NS	6.8	-	NS	NS	NS	NS	NS	NS	NS
Average	214	0.48	0.0020	0.0065	6.8	-	0.010	0.0010	668	694	63	3,095	0.0050
GW01D	NS	NS	NS	NS	6.5	Min: 6.0, Max: 8.5	NS	NS	NS	NS	NS	NS	NS
Average	175	0.20	0.0025	0.17	6.8	-	0.010	0.0010	559	680	17	3,955	0.037
GW01S	NS	NS	NS	NS	NS	Min: 6.0, Max: 8.5	NS	NS	NS	NS	NS	NS	NS
Average	225	0.12	0.0010	0.015	6.6	-	0.10	0.0010	846	657	363	4,690	0.041
GW02D	NS	NS	NS	NS	6.9	Min: 6.0, Max: 8.5	NS	NS	NS	NS	NS	NS	NS
Average	18	0.55	0.0050	0.27	7.0	-	0.010	0.0010	3,360	3,860	3,110	10,900	0.013
GW02S	NS	NS	NS	NS	6.6	Min: 6.0, Max: 8.5	NS	NS	NS	NS	NS	NS	NS
Average	423	2.1	0.0010	0.021	6.7	-	0.010	0.0010	1,085	2,700	870	5,745	0.034
GW04	NS	NS	NS	NS	6.4	-	NS	NS	NS	NS	NS	NS	NS
Average	66	0.18	0.0025	0.0045	6.6	-	0.010	0.0010	204	75	70	1,065	0.0075

Table 7. DS1 monitoring bore: Laboratory groundwater quality monthly monitoring results for Quarter 1 2024 (rolling year to date average shown Apr 23 – Mar 24). See notes for further details. NS = Not sampled.

Date of sample	pH value	Electrical conductivity	Total Dissolved Solids @180°C	Salinity (g/kg)
19/01/2024	6.3	8,500	8,180	4.7
05/02/2024	6.4	8,280	7,070	4.6
08/03/2024	6.3	8,770	7,700	4.9
Average				

Table 8. Maxwell Underground groundwater quality biennial monitoring results for Quarter 1 2024 (rolling year to date average shown Apr 23–Mar 24). See notes for further details. If applicable NS = not sampled (as sampling is twice a year, next is due Q3 2024).

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO ₃	Total Alkalinity	Carbonate Alkalinity as CO ₃	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead
DD1005	0.010	0.0010	989	989	1.0	0.20	116	1,770	0.0010	0.0070	7,170	-	0.050	0.0010
Average	0.010	0.0010	1,000	1,000	1.0	0.21	105	1,690	0.0010	0.019	6,630	-	0.050	0.0010
DD1014	0.010	0.0010	1,060	1,060	1.0	0.39	55	2,320	0.0010	0.0010	9,470	-	0.23	0.0010
Average	0.010	0.0010	1,075	1,075	1.0	0.38	53	2,475	0.0010	0.0010	9,192	-	0.31	0.0010
DD1015	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DD1016	0.010	0.0010	1,140	1,140	1.0	0.26	149	1,560	0.0010	0.0010	6,500	-	1.6	0.0010
Average	0.010	0.0010	1,155	1,155	1.0	0.26	153	1,580	0.0010	0.0010	6,306	-	1.7	0.0010
DD1025	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	14,200	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DD1027	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DD1032	0.010	0.0010	1,100	1,100	1.0	0.27	12	1,520	0.0010	0.0010	6,710	7,170	0.050	0.0010
Average	0.010	0.0010	1,115	1,115	1.0	0.27	12	1,550	0.0010	0.0010	6,795	-	0.050	0.0010
DD1043	0.010	0.0010	2,390	2,390	1.0	0.44	46	1,370	0.0010	0.0010	8,150	-	0.080	0.0010
Average	0.010	0.0010	2,410	2,410	1.0	0.47	44	1,395	0.0010	0.0010	8,190	-	0.11	0.0010
DD1052	0.020	0.0010	939	939	1.0	0.27	3.0	1,850	0.0060	0.0020	7,460	-	0.13	0.0010

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	Carbonate Alkalinity as CO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead
Average	0.050	0.0010	960	960	1.0	0.27	4.0	1,855	0.0050	0.0015	7,344	-	0.090	0.0010
DD1057	0.010	0.0020	3,840	3,840	1.0	0.36	9.0	1,360	0.0030	0.0010	10,200	-	1.1	0.0010
Average	0.010	0.0020	3,930	3,930	1.0	0.39	10	1,425	0.0030	0.0010	10,250	-	1.3	0.0010
MB03	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MB1A	0.010	0.0010	752	752	1.0	0.10	187	1,140	0.0010	0.014	4,890	-	0.050	0.0010
Average	0.010	0.0010	734	734	1.0	0.090	167	1,029	0.0010	0.010	4,244	-	0.050	0.0010
MB1R	0.010	0.0010	1,270	1,270	1.0	0.17	61	1,240	0.0010	0.0010	6,300	-	0.050	0.0010
Average	0.010	0.0010	1,285	1,285	1.0	0.18	59	1,300	0.0010	0.0010	6,030	-	0.095	0.0010
MB1W	0.010	0.0010	1,280	1,280	1.0	0.18	57	1,220	0.0010	0.0020	6,060	-	0.050	0.0010
Average	0.010	0.0010	1,290	1,290	1.0	0.18	56	1,250	0.0010	0.0015	6,010	-	0.070	0.0010
MB2A	0.010	0.0010	808	808	1.0	0.28	84	1,600	0.0010	0.0010	7,020	-	0.050	0.0010
Average	0.010	0.0010	824	824	1.0	0.27	75	1,620	0.0010	0.0010	6,852	-	0.050	0.0010
MB2R	0.010	0.0010	1,180	1,180	1.0	0.26	32	1,430	0.0010	0.0010	6,470	-	0.050	0.0010
Average	0.010	0.0010	1,215	1,215	1.0	0.25	35	1,480	0.0010	0.0010	6,416	-	0.050	0.0010
MB3A	0.010	0.0010	857	857	1.0	0.28	45	1,980	0.0010	0.0080	8,680	9,009	0.050	0.0010
Average	0.010	0.0010	863	863	1.0	0.27	44	2,110	0.0010	0.0080	8,300	-	0.055	0.0010
MB3R	0.010	0.0010	758	758	1.0	0.18	148	1,420	0.0010	1.7	6,520	6,327	0.050	0.0010
Average	0.010	0.0010	763	763	1.0	0.19	152	1,470	0.0010	1.5	6,280	-	0.050	0.0010

Site	Aluminium	Arsenic	Bicarbonate Alkalinity as CaCO3	Total Alkalinity	Carbonate Alkalinity as CO3	Boron	Calcium	Chloride	Chromium	Copper	Electrical conductivity	EC trigger value	Iron	Lead
MB4A	0.010	0.0010	307	307	1.0	0.050	61	91	0.0010	0.0010	901	-	0.050	0.0010
Average	0.010	0.0010	304	304	1.0	0.050	59	106	0.0010	0.0015	921	-	0.050	0.0010
MB4C	0.010	0.0010	593	593	1.0	0.13	14	470	0.0010	0.0010	2,450	-	0.050	0.0010
Average	0.010	0.0010	602	602	1.0	0.13	14	507	0.0010	0.0010	2,474	-	0.050	0.0010
MW1	0.010	0.0010	725	725	1.0	0.23	98	1,510	0.0020	0.033	6,750	-	0.050	0.0010
Average	0.010	0.0010	694	694	1.0	0.22	91	1,395	0.0020	0.026	5,920	-	0.050	0.0010
MW2	0.010	0.0010	880	880	1.0	0.23	65	1,620	0.0020	0.0090	6,810	-	0.050	0.0010
Average	0.010	0.0010	831	831	1.0	0.23	64	1,540	0.0020	0.0050	6,188	-	0.050	0.0010
MW3	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	-	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MB04	0.010	0.0010	1,410	1,410	1.0	0.21	155	2,780	0.0010	0.0010	11,200	-	0.050	0.0010
Average	0.010	0.0010	1,410	1,410	1.0	0.20	165	2,920	0.0010	0.0010	10,800	-	0.050	0.0010
MB05	0.010	0.0010	718	718	1.0	0.18	80	1,470	0.0010	0.0010	6,240	-	0.050	0.0010
Average	0.010	0.0010	670	670	1.0	0.17	102	1,525	0.0010	0.0010	5,992	-	0.050	0.0010
MB06D	0.010	0.0040	4,100	4,100	1.0	0.26	16	718	0.0010	0.0010	8,530	-	0.050	0.0010
Average	0.010	0.0040	4,065	4,065	1.0	0.28	26	729	0.0010	0.0010	8,283	-	0.050	0.0010
MB06S	0.010	0.032	2,180	2,180	1.0	0.26	22	556	0.0010	0.0010	5,440	-	0.27	0.0010
Average	0.010	0.032	2,125	2,125	1.0	0.26	28	568	0.0010	0.0010	5,213	-	0.16	0.0010
MB07	0.010	0.0010	721	721	1.0	0.22	128	1,840	0.0010	0.0010	7,680	-	0.050	0.0010
Average	0.010	0.0010	721	721	1.0	0.23	133	1,895	0.0010	0.0010	7,612	-	0.050	0.0010

Table 8. continued

Site	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value	Selenium	Silver	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DD1005	213	0.014	0.0040	0.012	7.2	-	0.010	0.0010	1,180	207	19	4,350	0.0050
Average	206	0.014	0.0070	0.015	7.1	-	0.010	0.0010	1,100	211	29	4,010	0.0085
DD1014	36	0.031	0.0010	0.0020	7.4	-	0.010	0.0010	1,990	207	5.0	5,640	0.0050
Average	36	0.028	0.0010	0.0025	7.3	-	0.010	0.0010	1,995	207	9.5	5,540	0.0050
DD1015	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-
DD1016	306	0.16	0.0010	0.0010	7.0	-	0.010	0.0010	820	91	16	4,200	0.0090
Average	305	0.16	0.0010	0.0010	6.9	-	0.010	0.0010	820	90	12	3,950	0.010
DD1025	NS	NS	NS	NS	NS	Min: 6.0, Max: 8.5	NS	NS	NS	NS	NS	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-
DD1027	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-
DD1032	6.0	0.022	0.0010	0.0010	7.5	Min: 6.0, Max: 8.5	0.010	0.0010	1,480	63	37	3,840	0.0050
Average	6.0	0.021	0.0010	0.0010	7.4	-	0.010	0.0010	1,510	57	25	3,915	0.0050
DD1043	27	0.024	0.0010	0.0010	7.0	-	0.010	0.0010	1,850	141	5.0	5,070	0.0050
Average	27	0.026	0.0015	0.0045	7.2	-	0.010	0.0010	1,845	141	12	5,115	0.0050

Table 8. continued

Site	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value	Selenium	Silver	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
DD1052	3.0	0.017	0.024	0.010	8.0	-	0.010	0.0010	1,600	91	8.0	4,710	0.0050
Average	3.0	0.029	0.014	0.010	8.1	-	0.010	0.0010	1,605	83	10	4,470	0.0050
DD1057	6.0	0.020	0.0080	0.0020	7.6	-	0.010	0.0010	2,560	10	5.0	6,700	0.0050
Average	6.0	0.028	0.0085	0.0025	7.5	-	0.010	0.0010	2,770	10	8.5	7,130	0.0050
MB03	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-
MB1A	176	0.0030	0.0020	0.016	7.3	-	0.010	0.0010	602	123	186	2,860	0.014
Average	148	0.0030	0.0020	0.011	7.3	-	0.010	0.0010	548	110	195	2,530	0.014
MB1R	58	0.017	0.0010	0.0010	7.2	-	0.010	0.0010	1,250	92	5.0	3,450	0.0050
Average	58	0.016	0.0010	0.0010	7.1	-	0.010	0.0010	1,255	89	5.0	3,505	0.0050
MB1W	57	0.039	0.0010	0.0020	7.2	-	0.010	0.0010	1,240	86	20	3,540	0.0050
Average	57	0.043	0.0010	0.0020	7.3	-	0.010	0.0010	1,260	82	17	3,540	0.0050
MB2A	193	0.70	0.0040	0.0030	7.4	-	0.010	0.0010	1,230	491	21	4,040	0.0050
Average	179	0.35	0.0035	0.0020	7.6	-	0.010	0.0010	1,215	441	15	4,085	0.0050
MB2R	52	0.0060	0.0010	0.0010	7.9	-	0.010	0.0010	1,340	1.0	28	3,670	0.0050
Average	51	0.0035	0.0010	0.0010	7.7	-	0.010	0.0010	1,350	1.0	19	3,800	0.0050

Table 8. continued

Site	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value	Selenium	Silver	Sodium	Sulfate as SO ₄ - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
MB3A	238	0.0020	0.0030	0.0020	7.5	Min: 6.0, Max: 8.5	0.010	0.0010	1,540	638	5.0	4,800	0.0050
Average	234	0.024	0.0030	0.0025	7.6	-	0.010	0.0010	1,545	617	5.0	4,985	0.0050
MB3R	328	0.27	0.0010	0.079	7.6	Min: 6.0, Max: 8.5	0.010	0.0010	785	577	5.0	4,080	0.028
Average	329	0.27	0.0015	0.088	7.5	-	0.010	0.0010	789	546	6.5	4,105	0.028
MB4A	43	0.0020	0.0010	0.0010	7.3	-	0.010	0.0010	71	31	200	559	0.0050
Average	42	0.0015	0.0010	0.0010	7.2	-	0.010	0.0010	71	31	142	525	0.0050
MB4C	28	0.0010	0.0020	0.0010	8.1	-	0.010	0.0010	512	17	5.0	1,410	0.0050
Average	28	0.0010	0.0015	0.0010	8.0	-	0.010	0.0010	514	17	5.0	1,390	0.0050
MW1	366	0.0010	0.0010	0.0020	7.5	-	0.010	0.0010	853	722	12,600	4,400	0.0050
Average	325	0.0010	0.0010	0.0015	7.4	-	0.010	0.0010	797	563	6,945	3,890	0.0050
MW2	145	0.0040	0.0010	0.0020	7.4	-	0.010	0.0010	1,210	138	1,860	3,820	0.0050
Average	141	0.0030	0.0010	0.025	7.4	-	0.010	0.0010	1,102	120	2,125	3,570	0.014
MW3	NS	NS	NS	NS	NS	-	NS	NS	NS	NS	NS	NS	NS
Average	-	-	-	-	-	-	-	-	-	-	-	-	-
MB04	392	0.23	0.0010	0.0030	6.9	-	0.010	0.0010	1,850	408	90	6,330	0.0080
Average	373	0.25	0.0010	0.0035	6.9	-	0.010	0.0010	1,750	392	93	6,395	0.011

Table 8. continued

Site	Magnesium	Manganese	Molybdenum	Nickel	pH value	pH trigger value	Selenium	Silver	Sodium	Sulfate as SO4 - Turbidimetric	Suspended Solids (SS)	Total Dissolved Solids @180°C	Zinc
MB05	159	0.0010	0.0020	0.0010	7.5	-	0.010	0.0010	1,030	252	19,600	3,710	0.0050
Average	167	0.096	0.0090	0.0015	7.5	-	0.010	0.0010	1,013	254	17,200	3,790	0.0050
MB06D	20	0.0010	0.015	0.0050	7.7	-	0.010	0.0010	2,240	92	5.0	5,010	0.0050
Average	21	0.23	0.017	0.010	7.7	-	0.010	0.0010	2,210	83	13	5,340	0.0050
MB06S	28	0.063	0.0080	0.0070	7.7	-	0.010	0.0010	1,330	149	58	3,410	0.0050
Average	32	0.10	0.012	0.013	7.7	-	0.010	0.0010	1,265	179	62	3,400	0.0080
MB07	351	0.017	0.0010	0.0010	7.2	-	0.010	0.0010	1,070	683	374	4,830	0.0050
Average	353	0.011	0.0010	0.0010	7.1	-	0.010	0.0010	1,075	650	387	4,815	0.0050

Notes

The Maxwell Underground Mine Water Management Plan (WMP) requires:

- the monthly recording of reduced standing water levels in all bores (standpipes either manually or using loggers and VWPs)
- quarterly recording (field measurement) of all standpipes for pH, EC, redox potential and temperature; and
- biennial sampling and analysis of all standpipes for TDS, TSS, major cations (Ca, Mg, Na), major anions (chloride, sulfate, carbonate, bicarbonate), total alkalinity, and total and dissolved metals (Al, As, B, Cr, Cu, Fe, Mn, Mo, Ni, Pb, Se, Ag & Zn).

The year-to-date averages includes samples taken on a biennial basis. The exception is for DS1 for which monthly samples are taken as per the EPL for pH, EC, TDS and salinity, and hence the average presented is the average of all samples taken during each of the past 12 months for those variables.

All results are in mg/L except Conductivity ($\mu\text{S}/\text{cm}$), pH (in pH units) and salinity (g/kg). Dissolved metal concentration (mg/L) are presented in **Table 6 and Table 8**. Plots of total and dissolved metal concentrations are shown in **Appendix 4**. Dissolved concentrations are the most applicable to groundwater quality evaluation and indications to change in trend and are presented here. EC and pH recordings are from field measurements, the remainder are from laboratory analysis.

See **Appendix 4** for an assessment against trigger levels.

Table 9. All groundwater bores: Reduced standing groundwater levels (mAHD) during Quarter 1 2024 compared to the rolling year-to-date average (Apr 23–Mar 24).

Site (with seam names for VWPs)	Jan	Feb	Mar	Rolling average	Type of bore	Type of measurement as of Mar 24
DS1	223.94	223.94	223.94	223.94	Standpipe	Manual
R4241	176.56	176.53	176.57	176.84	Standpipe	Logger
F1162	143.99	144.08	144.18	143.87	Standpipe	Logger
F1164	143.52	143.62	143.72	143.12	Standpipe	Logger
GW01D	199.99	199.85	199.80	201.11	Standpipe	Logger
GW01S	198.71	198.73	198.75	199.09	Standpipe	Logger
GW02D	135.68	135.76	135.82	135.87	Standpipe	Logger
GW02S	190.22	190.07	190.04	190.74	Standpipe	Logger
GW04	149.73	149.80	149.91	149.59	Standpipe	Logger
BLK6R12 – VW1 (WB)	162.02	(1)	(1)	162.35 ⁽¹⁾	VWP	Logger
BLK6R12 – VW2 (RB)	148.52	(1)	(1)	148.35 ⁽¹⁾	VWP	Logger
BLK6R12 – VW3 (WN)	122.35	(1)	(1)	122.66 ⁽¹⁾	VWP	Logger
BLK6R12 – VW4 (BK)	123.67	(1)	(1)	123.92 ⁽¹⁾	VWP	Logger
DD1005	143.61	(1)	(1)	143.68 ⁽¹⁾	Standpipe	Logger
DD1014	136.13	(1)	(1)	136.06 ⁽¹⁾	Standpipe	Logger
DD1015	(2)	(2)	(2)	(2)	Standpipe	Logger
DD1016	142.01	(1)	(1)	141.99 ⁽¹⁾	Standpipe	Logger
DD1025	(3)	(3)	(3)	(3)	Standpipe	Logger
DD1027	(4)	(4)	(4)	(4)	Standpipe	Logger
DD1032	128.28	(1)	(1)	128.34 ⁽¹⁾	Standpipe	Logger
DD1043	128.23	(1)	(1)	128.71 ⁽¹⁾	Standpipe	Logger
DD1052	123.35	(1)	(1)	119.87 ⁽¹⁾	Standpipe	Logger

Site (with seam names for VWPs)	Jan	Feb	Mar	Rolling average	Type of bore	Type of measurement as of Mar 24
DD1057	123.37	(1)	(1)	123.62 ⁽¹⁾	Standpipe	Logger
MB03	114.81 ⁽⁵⁾	(1)	(1)	114.83 ⁽¹⁾⁽⁵⁾	Standpipe	Logger
MB04	128.49	(1)	(1)	128.96 ⁽¹⁾	Standpipe	Logger
MB05	94.10	(1)	(1)	93.83 ⁽¹⁾	Standpipe	Logger
MB06D	121.45	(1)	(1)	121.40 ⁽¹⁾	Standpipe	Logger
MB06S	119.17	(1)	(1)	119.00 ⁽¹⁾	Standpipe	Logger
MB07	123.46	(1)	(1)	123.64 ⁽¹⁾	Standpipe	Logger
MB1-Alluvial	72.87	(1)	(1)	73.15 ⁽¹⁾	Standpipe	Logger
MB1-Redbank	75.17	(1)	(1)	75.49 ⁽¹⁾	Standpipe	Logger
MB1-Whybrow	74.53	(1)	(1)	74.79 ⁽¹⁾	Standpipe	Logger
MB2-Alluvial	113.48	(1)	(1)	113.58 ⁽¹⁾	Standpipe	Logger
MB2-Regolith	115.56	(1)	(1)	115.61 ⁽¹⁾	Standpipe	Logger
MB3-Alluvial	129.29	(1)	(1)	129.61 ⁽¹⁾	Standpipe	Logger
MB3-Regolith	128.85	(1)	(1)	129.14 ⁽¹⁾	Standpipe	Logger
MB4-Alluvial	70.17	(1)	(1)	70.63 ⁽¹⁾	Standpipe	Logger
MB4-Coal	70.36	(1)	(1)	70.53 ⁽¹⁾	Standpipe	Logger
MW1	129.11	(1)	(1)	129.39 ⁽¹⁾	Standpipe	Logger
MW2	112.53	0	(1)	112.71 ⁽¹⁾	Standpipe	Logger
MW3	⁽⁶⁾	⁽⁶⁾	⁽⁶⁾	⁽⁶⁾	Standpipe	Manual
RBD1 – VW1 (WB)	148.81	(1)	(1)	149.04 ⁽¹⁾	VWP	Logger
RBD1 – VW2 (RB)	145.21	(1)	(1)	145.58 ⁽¹⁾	VWP	Logger
RBD1 – VW3 (WN)	128.06	(1)	(1)	128.48 ⁽¹⁾	VWP	Logger
RBD1 – VW4 (BK)	88.90	(1)	(1)	89.17 ⁽¹⁾	VWP	Logger
RD1189 – VWP1 (WH)	184.41	(1)	(1)	184.76 ⁽¹⁾	VWP	Logger

Site (with seam names for VWPs)	Jan	Feb	Mar	Rolling average	Type of bore	Type of measurement as of Mar 24
RD1189 – VWP2 (AZZBF)	(7)	(7)	(7)	(7)	VWP	Logger
RD1189 – VWP3 (WW12)	147.80	(1)	(1)	147.32 ⁽¹⁾	VWP	Logger
RD1189 – VWP4 (Mt Arthur seam)	141.16	(1)	(1)	141.13 ⁽¹⁾	VWP	Logger
RD1189 – VWP5 (PF2)	(7)	(7)	(7)	(7)	VWP	Logger
RD1189 – VWP6 (BY)	134.71	(1)	(1)	135.36 ⁽¹⁾	VWP	Logger
RD1189 – VWP7 (WY)	(7)	(7)	(7)	(7)	VWP	Logger
RD1192- VWP1 (WB)	152.81	(1)	(1)	152.75 ⁽¹⁾	VWP	Logger
RD1192- VWP2 (RB)	135.48	(1)	(1)	135.62 ⁽¹⁾	VWP	Logger
RD1192-VWP3 (BK)	152.86	(1)	(1)	152.49 ⁽¹⁾	VWP	Logger
MB1VWP (VWP1) (INT)	75.36	(1)	(1)	75.65 ⁽¹⁾	VWP	Logger
MB1VWP (VWP2) (INT)	86.56	(1)	(1)	86.81 ⁽¹⁾	VWP	Logger
MB1VWP (VWP3) (INT)	95.40	(1)	(1)	95.37 ⁽¹⁾	VWP	Logger
MB1VWP (VWP4) (WB)	96.46	(1)	(1)	96.47 ⁽¹⁾	VWP	Logger
MB1VWP (VWP5) (WN)	100.12	(1)	(1)	99.86 ⁽¹⁾	VWP	Logger
WND16 (VWP1) (WB)	112.72	(1)	(1)	112.89 ⁽¹⁾	VWP	Logger
WND16 (VWP2) (WN)	(8)	(8)	(8)	(8)	VWP	Logger

Site (with seam names for VWPs)	Jan	Feb	Mar	Rolling average	Type of bore	Type of measurement as of Mar 24
WND16 (VWP3) (BK)	(8)	(8)	(8)	(8)	VWP	Logger
WND16 (VWP4) (BK)	109.52	(1)	(1)	109.53 ⁽¹⁾	VWP	Logger
WND26 (VWP1) (WY)	136.77	(1)	(1)	136.85 ⁽¹⁾	VWP	Logger
WND26 (VWP2) (RB)	134.38	(1)	(1)	134.15 ⁽¹⁾	VWP	Logger
WND26 (VWP3) (WB)	141.13	(1)	(1)	141.02 ⁽¹⁾	VWP	Logger
WND26 (VWP4) (WN)	(8)	(8)	(8)	(8)	VWP	Logger

Notes

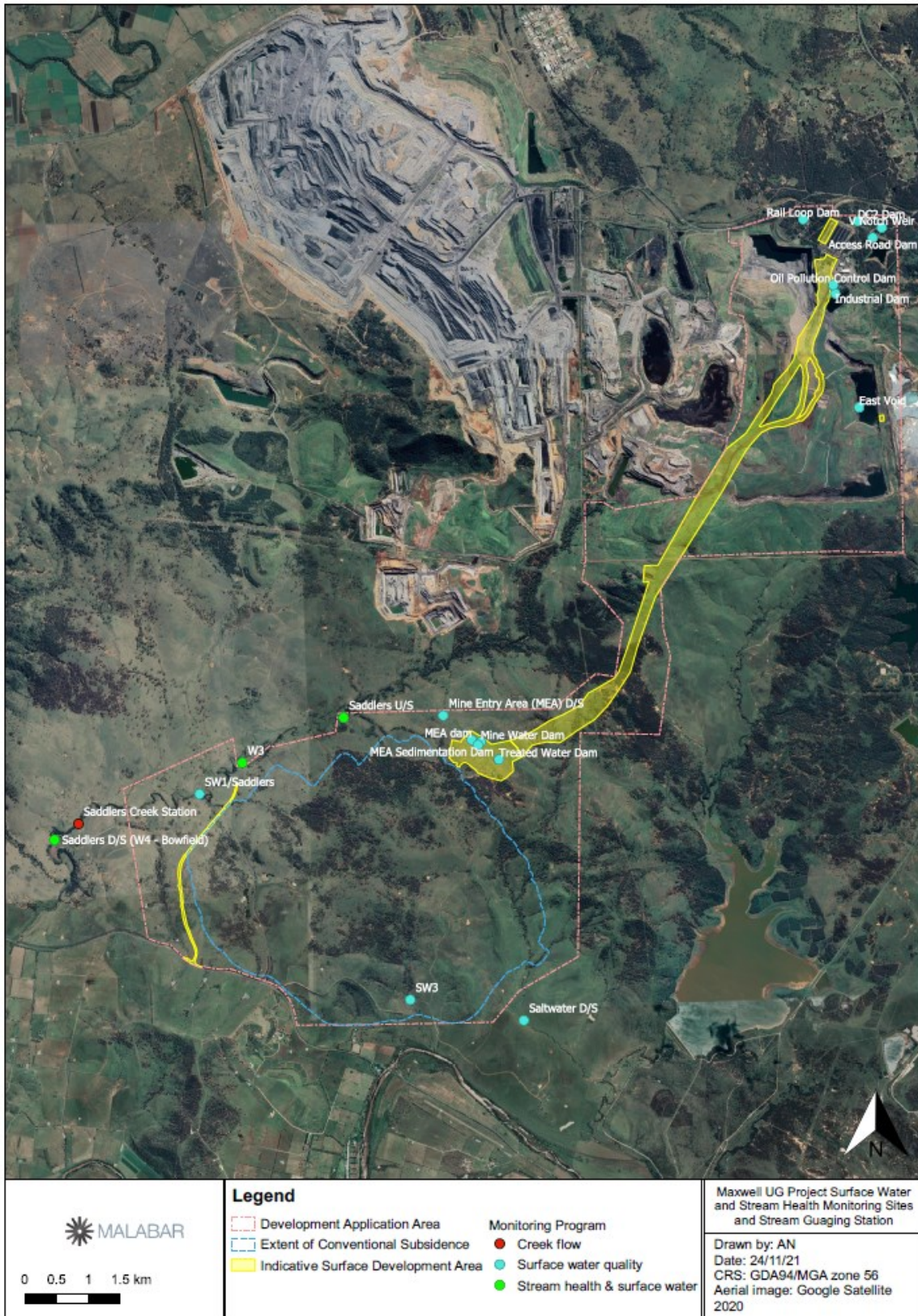
- Measurements for Q1-2024 taken during January 2024. All remaining data to be downloaded as part of Q2-2024.
- DD1015 is reported blocked during the reporting period; DD1027 is deemed to bring no significant value to future groundwater assessments as it monitors the Edderton Seam which is not targeted by the Maxwell UG Mine. As per the recommendations in the 2022 Annual Review, these monitoring locations will be removed from the reporting, once the next version of the Management Plan is approved.
- DD1025 was decommissioned in December 2022 for safety reasons (to prevent inrush to the upcoming underground mining operations). As per the recommendations in the 2022 Annual Review, it is proposed that this site will be replaced by a replacement bore] for the purposes of the TARP assessment in Appendix A, once a revised GWMP has been approved.
- Bore not accessible for safety reasons.
- Bore reported as dry during monitoring period. Readings reflects stagnant water level in bore and not true water level.
- MW3 are recorded dry during the reporting period. As per the recommendations in the 2022 Annual Review, it is proposed that MW3 will be removed from the reporting, once the next version of the Management Plan is approved.
- Groundwater levels at RD1189 VWP2, VWP7 & VWP8 appear unstable hence are not reported. As per the recommendations in the 2022 Annual Review, these monitoring datasets will be removed from the reporting, once the next version of the Management Plan is approved.
- The following VWPs wires are considered disabled: WND16-VWP2 and WND16-VWP3 (unstable and disabled respectively), WND26-VWP4 (disabled).

Acronyms: DD = diamond drill hole. mAHD = meters above Australian Height Datum (the elevation of the water level is calculated by subtracting the Depth to Water from the reference elevation). n/a = not available. NS = not sampled. RH = rotary drill hole. VWP = Vibrating wire piezometer and logger. Seam acronyms: BK = Blakefield seam; BY = Bayswater seam; MA = Mt Arthur seam; PF = Piercefield seam; INT = Interburden; WB = Wambo seam; RB = Redbank Creek seam; WA = tbc; WH = Woodlands Hill seam; WN = Whynot seam; WY = Wynn seam. WW = Warkworth seam; ZZ = indicates that the seam is intruded or heat affected.

APPENDIX 1 – AIR QUALITY MONITORING LOCATIONS



APPENDIX 2 – SURFACE WATER MONITORING LOCATIONS



APPENDIX 3 – GROUNDWATER MONITORING LOCATIONS



**APPENDIX 4 – CONSULTANT HYDROGEOLOGIST REPORT PROVIDING
HYDROGRAPHS AND DATA ANALYSIS**



Maxwell Underground Mine

Groundwater Monitoring Report – Quarter 1 – 2024

Malabar Resources Pty Ltd

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SLR Project No.: 610.031830.00001

Client Reference No.: ANE145 Maxwell Quarterly Groundwater Reviews 2024

19 April 2024

Revision: 1

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1	19 April 2024	Raymond Minnaar	Shaun Troon	Shaun Troon

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 Malabar Resources Pty 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.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the Client and others in respect of any matters outside the agreed scope of the work.



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Appendices

- Appendix A Trigger Action Response Plan & Groundwater Level Triggers**
- Appendix B Groundwater and Trigger Levels**
- Appendix C Groundwater Quality and Trigger Levels (only sites within the TARP)**



Acronyms and Abbreviations

Cbased	Cbased Environmental Pty Ltd
EC	Electrical Conductivity
GWMP	Groundwater Management Plan
mAHD	Metres <i>above</i> Australian Height Datum
Malabar	Malabar Resources Pty Ltd
mbgl	Metres below ground level
mbTOC	Metres below top of casing
MI	Maxwell Infrastructure
MU	Maxwell Underground
SLR	SLR Consulting Australia Pty Ltd
TARP	Trigger Action Response Plan
VWP	Vibrating Wire Piezometer



1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) was engaged by Malabar Resources Pty Ltd (Malabar) to perform a quarterly groundwater review of data collected by Cbased Environmental Pty Ltd (CBased) for the Maxwell Underground (MUG) and Maxwell Infrastructure (MI) referred to as the Maxwell Project. The quarterly groundwater assessment will support the annual review compliance reporting conducted by Malabar Resources for the site and acts as an early warning procedure for any performance trigger exceedances.

This quarterly report provides an overview of the groundwater data collected at the relevant monitoring bores for the period January – March 2024 and assesses this data against the Trigger Action Response Plan (TARP) threshold level presented in the Groundwater Management Plan (GWMP) contained within the Maxwell Water Management Plan (February 2023) for the Maxwell Underground Project. The Maxwell Project and groundwater monitoring network is illustrated in **Figure 1**.

1.1 Groundwater Data Gaps

The following outlines any data gaps in groundwater levels or quality identified for the review period:

- Groundwater levels and quality results for private bores were not available and therefore not presented.

1.2 Groundwater Monitoring Parameters and Frequency

The groundwater monitoring parameters and the frequency of monitoring as per the GWMP is presented below:

- Standpipes
 - Reduced standing water level (for bores with no data logger) – monthly manual measurements.
 - Automatic dataloggers have been installed in the monitoring standpipes/ bores and no monthly manual groundwater level measurements are taken from August 2023 onwards.
 - pH, electrical conductivity, redox potential, temperature – quarterly.
 - Total dissolved solids, total suspended solids, major cations/anions, total alkalinity, dissolved and total metals – biennial (twice yearly).
- DS1 (in accordance with EPL 1323 Condition U1.1)
 - Reduced standing water level, pH, electrical conductivity, total dissolved solids, salinity – monthly.
- Data loggers and VWP's
 - Reduced standing water level – downloaded quarterly.



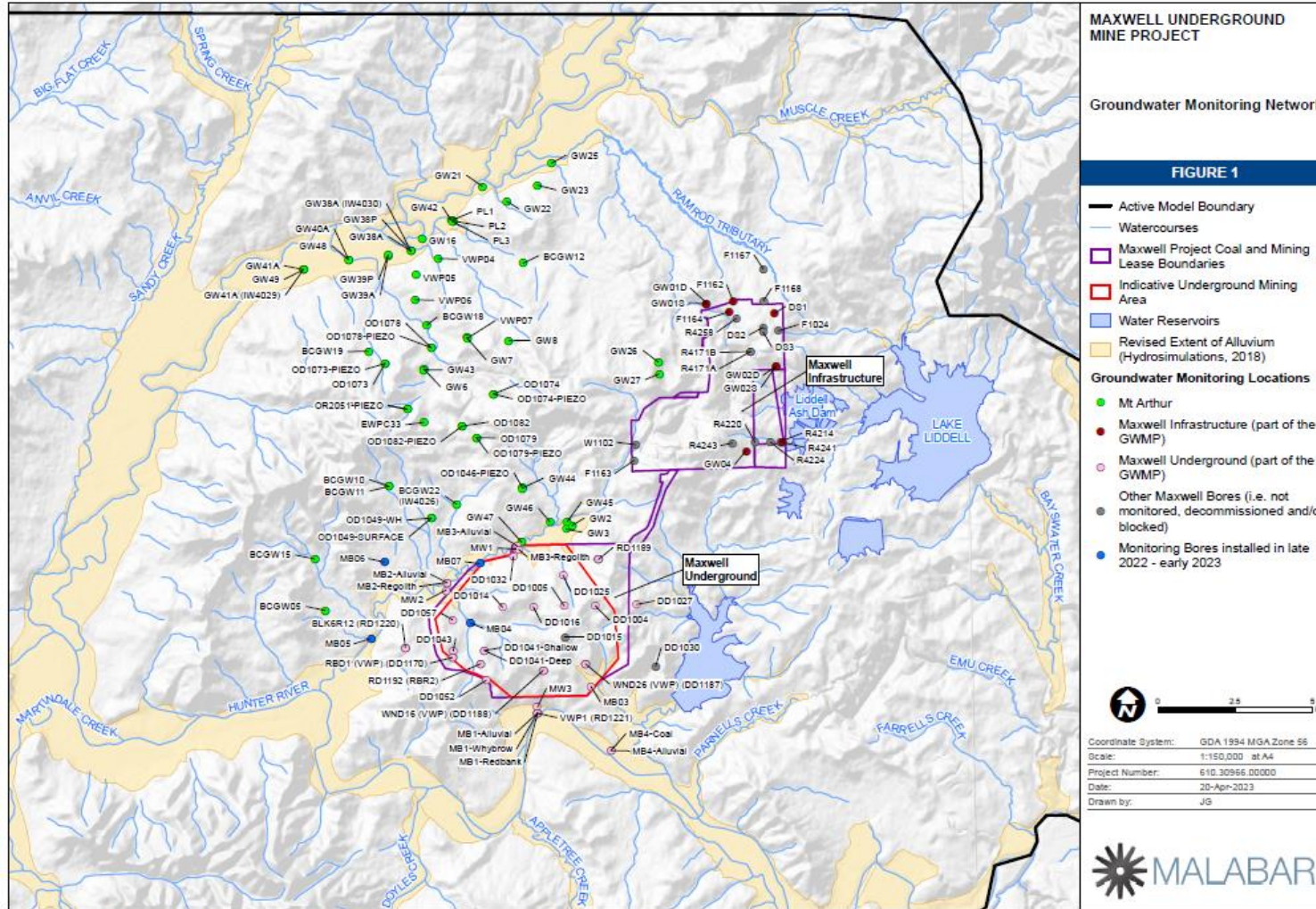


Figure 1: Malabar Project and groundwater monitoring network



2.0 Groundwater Level Trigger Review

This section addresses the compliance of groundwater levels at MUG and MI during the reporting period in relation to a trigger analysis.

All groundwater level monitoring bores and VWP's in the vicinity of the Maxwell Project, and their available completion details, are listed in **Table 1** below.

Table 2 outlines groundwater level trigger exceedances during the review period at each of the monitored bore locations as per the approved trigger criteria presented in **Appendix A**. Hydrographs for all groundwater monitoring locations including those with approved groundwater level trigger levels are presented in **Appendix B**.

Section 2.0 discusses briefly any groundwater level exceedances observed during the reporting period only, as identified in **Table 2**.

Table 1: Groundwater Monitoring Bore Network – Maxwell Project

Monitoring bore or VWP ID	Easting ¹ (GDA94)	Northing ¹ (GDA94)	Geology	Bore screen or VWP sensor depth (mBGL)	Status
Maxwell Infrastructure - MI (standpipe)					
DS1	305592	6420380	Shallow bedrock aquifer	15	Open
F1162	301045	6420755	Greta Coal Measures	274	Open
F1164	304223	6420406	Greta Coal Measures	190.5	Open
R4241	305793	6416224	Jurassic Volcanics	150	Open
GW01S	303386	6420691	Base Regolith	12–15	Open
GW01D	303391	6420683	Greta Coal Measures	29–32	Open
GW02S	305592	6420380	Base Regolith	8–14	Open
GW02D	301045	6420755	Greta Coal Measures	69–72	Open
GW04	304223	6420406	Permian Sequence	101–104	Open
Maxwell Underground (MUG) – standpipes					
MB1 - Redbank	297930	6407453	Redbank Seam	51–57	Open
MB1 - Whybrow	297928	6407448	Whybrow Seam	25–28	Open
MB1A	297933	6407459	Hunter River Alluvium	8–11	Open
MB2R	295004	6411675	Regolith	20–29	Open
MB2A	294998	6411669	Saddlers Creek Alluvium	5–7	Open
MB3R	297328	6412729	Regolith	27–30	Open
MB3A	297269	6412850	Saddlers Creek Alluvium (upslope)	8.5–14.5	Open
MB4 - Coal	300302	6406234	JPS-Coal	42–47	Open



Monitoring bore or VWP ID	Easting ¹ (GDA94)	Northing ¹ (GDA94)	Geology	Bore screen or VWP sensor depth (mBGL)	Status
MB4A	300307	6406231	Hunter River Alluvium	10–18	Open
MB03	299649	6408297	Saltwater Creek Alluvium	5–8	Open
MW1	297254	6412760	Saddlers Creek Alluvium (upslope)	6–9	Open
MW2	294977	6411419	Saddlers Creek Alluvium	4–9.5	Open
MW3	297904	6407652	Hunter River Alluvium	2.9–6.9	Problem ²
MB04	295755	6410371	Unnamed Creek Regolith	10-13	Open
MB05	292546.7	6409857	Saddlers Creek alluvium	1.8-3.8	Open
MB06_S	292980.2	6412335	Woodland Hill Overburden	29-32	Open
MB06_D	292980.2	6412335	Bowfield Seam	95-101	Open
MB07	296070.3	6412297	Saddlers Creek Alluvium	3-5.5	Open
DD1005	298799	6410901	Blakefield Overburden	138.6	Open
DD1014	296799	6410864	Blakefield Overburden	90.5	Open
DD1015	298815	6409900	Blakefield Overburden	162.5	Problem ³
DD1016	297801	6410882	Blakefield Overburden	126.4	Open
DD1025	298764	6411901	Blakefield Overburden	44.6	Problem ⁴
DD1027	301133	6410960	Edderton Seam	252.8	Problem ⁵
DD1032	297143	6412495	Piercefield Overburden	276.5	Open
DD1043	295200	6409458	Woodlands Hill Overburden	182–203	Open
DD1052	296274	6408513	Whynot Seam Overburden	105–127	Open
DD1057	295181	6410458	Arrowfield Overburden	164–188	Open
Maxwell Underground (MUG) – Vibrating Wire Piezometers (VWPs)					
RD1189 (SD1_DD001)	299896	6412419	Woodlands Hill Seam	78.9	Open
			AZZBF	145.5	Problem ⁶
			WW12	186.2	Open
			MAL	230	Open
			PF2	255.5	Problem ⁶
			BY2	315	Open
			WY2	322	Problem ⁶
	296092	6409038	Wambo Seam	61.2	Open



Monitoring bore or VWP ID	Easting ¹ (GDA94)	Northing ¹ (GDA94)	Geology	Bore screen or VWP sensor depth (mBGL)	Status
RD1192 (RBR2)			Redbank Seam	80	Open
			Blakefield Seam	148.5	Open
BLK6R12 (RD1220)	293653	6409558	WB2 Seam	25	Open
			Redbank Seam	40.5	Open
			Whynot Seam	86.5	Open
			Blakefield Seam	148.5	Open
VWP1 (RD1221) (RDW006A)	297926	6407444	Interburden	21	Open
			Interburden	40	Open
			Interburden	73	Open
			Whybrow Seam	87	Open
			Whynot Seam	109.2	Open
			Blakefield Seam	138	Problem ⁷
RBD1 (DD1170)	295178	6409246	Whybrow Seam	24.65	Open
			Redbank Seam	33.55	Open
			Whynot Seam	79.5	Open
			Blakefield Seam	103.3	Open
WND16 (DD1188)	298122	6408842	Wambo Seam	33.75	Open
			Whynot Seam	59.25	Problem ⁸
			Blakefield Seam	90.15	Problem ⁸
			Blakefield Seam	110.5	Open
WND26 (DD1187)	299487	6409044	Whybrow Seam	77.3	Open
			Redbank Seam	84.6	Open
			Wambo Seam	123.45	Open
			Whynot Seam	144.25	Problem ⁸

¹ Coordinates in metres (GDA 1994 MGA Zone 56).

² MW3 are recorded dry during the reporting period. As per the recommendations in the 2022 Annual Review, it is proposed that MW3 will be removed from the reporting, once the next version of the Management Plan is approved.

³ DD1015 is reported blocked during the reporting period; DD1027 is deemed to bring no significant value to future groundwater assessments as it monitors the Edderton Seam which is not targeted by the Maxwell UG Mine. As per the recommendations in the 2022 Annual Review, these monitoring locations will be removed from the reporting, once the next version of the Management Plan is approved.

⁴ DD1025 was decommissioned in December 2022 for safety reasons (to prevent inrush to the upcoming underground mining operations). As per the recommendations in the 2022 Annual Review, it is proposed that this site will be replaced by a replacement bore] for the purposes of the TARP assessment in Appendix A, once a revised GWMP has been approved.



5 DD1027 Inaccessible due to safety reasons.

6 Groundwater levels at RD1189 VWP2, VWP7 & VWP9 appear unstable hence are not reported. As per the recommendations in the 2022 Annual Review, these monitoring datasets will be removed from the reporting, once the next version of the Management Plan is approved.

7 VWP1 sensor 6 indicates no data and not reported.

8 The following VWPs wires are considered disabled: WND16-VWP2 and WND16-VWP3 (unstable and disabled respectively), WND26-VWP4 (disabled).

VWP – vibrating wire piezometer mBGL – metres below ground level EX – Existing

A – Alluvium R – Regolith JPS – Jerry’s Plain Subgroup

Open – Functional for pressure/water level measurements and/or quality sampling

Closed –Decommissioned/ To be removed

Problem – Blocked/Dry/Issue detected during monitoring period

Table 2: Groundwater Level Trigger Exceedances – shallow and deep open standpipe bores

Bore	TARP Level [mAHD]	Previous Monitoring Period Q4-2023			Current Monitoring Period Q1-2024		
		Oct 23	Nov 23	Dec 23	Jan 24	Feb 24	Mar 24
Maxwell Infrastructure		Water Management Plan (Feb 2023)					
R4241	173.6	N	N	N	N	N	N
GW01D	198.2	N	N	N	N	N	N
GW01S	197.0	N	N	N	N	N	N
GW02D	135.7	N	N	N	Y	Y	N
GW02S	187.7	N	N	N	N	N	N
Maxwell Underground		Water Management Plan (Feb 2023)					
DD1025	157.3	Decommissioned			Decommissioned		
DD1032	130.6	Y	Y	Y	Y	*	*
MB3-Alluvial	127.7	N	N	N	N	*	*
MB3-Regolith	127.3	N	N	N	N	*	*

LX: maximum trigger level exceedances recorded

#: manual measurement used

mAHD – metres above Australian Height Datum

N: Normal Level TARP Level 1 TARP Level 2

Y: “Yes”, short-term exceedance, less than 3 consecutive exceedances.

“*” no groundwater level data available for this period – logger data downloaded quarterly.

2.1 Normal Level

Groundwater levels at the Maxwell Infrastructure groundwater monitoring sites R4241, GW01D, GW01S, GW02D, GW02S (**Appendix B**) and at the Maxwell Underground sites MB3-Alluvial and MB3-Regolith (**Appendix B**) are observed above the groundwater trigger



level over the reporting period hence are within the Normal Level of the TARP criteria (**Appendix A**).

2.2 TARP Level 1

There was one TARP Level 1 groundwater level trigger exceedance over the reporting period – this was for DD1032. DD1032 exceeded the TARP Level 1 groundwater level trigger exceedance during 2023 and is discussed in more detail in the site quarterly monitoring reports as well as 2023 Annual Review. The exceedance is not expected to be related to site activities, given that as of end of the monitoring period the drift for the Woodlands Hill mine has only progressed 165m deep, no additional actions are judged to be required other than continued continuous monitoring.

Following a Level 1 exceedance, if the trigger exceedances are not caused by site activities and have not resulted in an exceedance of a Water Performance Measure in Table 4 of Development Consent for SSD 9526, then the GMMP requires a review of the monitoring frequency. DD1032 has been installed with a datalogger and records readings daily and this is considered appropriate to evaluate groundwater levels. The exceedance will be investigated further during 2024 in a TARP trigger investigation.

Apart from DD1032, there were no other TARP Level 1 groundwater level trigger exceedances over the reporting period.

2.3 TARP Level 2

A TARP Level 2 exceedance is defined as where a Level 1 trigger review indicates trigger exceedances are caused by site activities and this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526. There were no TARP Level 2 groundwater level trigger exceedances over the reporting period.

2.4 General Observations

- Mud has been noticed historically on GW02D logger during 2023 and water levels are very close to bottom of the borehole (~ 2 m). The logger for GW02D was cleaned and repositioned up by 44 cm on the 20th of November 2023.
- MB03 was reported as dry during January 2024.
- GW02D exceeded the TARP water level trigger periodically during January and February 2024. Exceedance was minor with minimum water levels recorded during January and February 2024 were 135.57 mAHD and 135.62 mAHD, respectively.
- GW01S is close to the bottom of the bore with water level measured on 8 March 2024 being 0.44 metres above the bottom of the bore.
- MB3-Alluvium had a recorded manual measurement of 14.48 m from Top of Casing (TOC); however, this was adjusted to 4.48 m TOC to be inline with previous manual measurements as well as the logger data. The logger data did not indicate a significant change. The measurement will be confirmed during the next sampling round.



3.0 Groundwater Quality Trigger Review

Trigger Action Response Plan (TARP) levels are defined for five sites for the Maxwell Infrastructure area and four sites for the Maxwell Underground area (Malabar Resources, February 2023) and presented in **Appendix A**.

An assessment of groundwater quality (EC and pH) at each of the monitored bore locations against the TARP threshold levels has been completed. EC and pH plots for groundwater monitoring locations with approved groundwater quality trigger levels are presented in **Appendix C**. During the reporting period, EC and pH recorded at the groundwater monitoring sites were within the TARP Normal Level threshold.

A summary of the groundwater quality (electrical conductivity and pH) trigger levels during the reporting period at the monitored bores are presented in **Table 3**.

No groundwater quality results were available for the private bores for the reporting period. Results for the private bores are reviewed annually.

Table 3: Trigger Exceedances for pH and EC for the period January – March 2024

Bore	Period [month sampled]	TARP Level		Q4 2023			Q1 2024		
		EC (µS/cm)	pH min/max	EC (µS/cm)	pH lower	pH upper	EC (µS/cm)	pH lower	pH upper
R4241	Q3-2023 [Sep 23 – Field]	6,253	6 / 8.5	N	N	N	N	N	N
GW01S	Q3-2023 [Sep 23 – Field]	9,260		*	*	*	*	*	*
GW01D	Q3-2023 [Sep 23 – Field]	5,680		N	N	N	N	N	N
GW02S	Q3-2023 [Sep 23 – Field]	9,480		N	N	N	N	N	N
GW02D	Q3-2023 [Sep 23 – Field]	10,500		Y	N	N	Y	N	N
DD1025	<i>Decommissioned</i>			-	-	-	-	-	-
DD1032	Q3-2023 [Jul 23 – Laboratory]	7,170	6 / 8.5	N	N	N	N	N	N
MB3-Alluvial	Q3-2023 [Jul 23 – Laboratory]	9,009		N	N	N	N	N	N
MB3-Regolith	Q3-2023 [Jul 23 – Laboratory]	6,327		N	N	N	Y	N	N

N: Normal Level TARP Level 1 TARP Level 2

Y: "Yes", short-term exceedance, less than 3 consecutive exceedances.

"*" no groundwater quality data available for this period

3.1 Normal Level

Groundwater quality at the Maxwell Infrastructure groundwater monitoring sites R4241, GW01D, GW01S, GW02S, GW02D (**Appendix C**) and at the Maxwell Underground sites DD1032, MB3-Alluvial and MB3-Regolith (**Appendix C**) are observed below the trigger level over the reporting period hence are within the Normal Level of the TARP criteria (**Appendix A - Table A1**).



3.2 TARP Level 1

During Q1-2024 GW02D continued to exceed the TARP Level 1 EC trigger. The TARP Level 1 exceedance triggered during 2023 and is discussed in more detail in the quarterly monitoring reports and 2023 Annual Review.

It is expected that the increase in EC above the trigger level at GW02D is not caused by site activities and does not result in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526. Further monitoring at GW02D is required to confirm the EC trend per the site's GWMP.

Apart from GW02D, there were no other TARP Level 1 quality trigger exceedances over the reporting period.

3.3 TARP Level 2

There were no TARP Level 2 groundwater quality trigger exceedances over the reporting period.

3.4 General Observations

- MB3-Regolith exceeded the EC exceedance trigger during Q1-2024. This is a single exceedance during the reporting period.
- GW01S could not be sampled during Q1-2024 due to water level being too deep for sampling equipment.
- MB3-Alluvial's manual measurement on 12 January 2024 was recorded as 14.48 m from top of casing (TOC). However, the reading was manually adjusted as 4.48 m TOC in line with historic data. Additionally, the logger data from Q1-2024 did not indicate a change in excess of 10 m. The manual reading will be verified during Q2-2024.

4.0 Recommendations

Based on the trigger exceedances assessed in **Section 2.0** and **Section 3.0** and the TARP criteria presented in **Appendix A**, the following actions are recommended:

4.1 Actions – Trigger Assessment

- Continue the monitoring programme, reporting groundwater level and quality data in the next groundwater quarterly review report in June 2024.
- For all sites with a Normal Level in place for groundwater levels, continue monitoring groundwater trends against TARP trigger levels.
- For all sites with a Normal Level in place for groundwater quality, continue monitoring pH and EC against TARP trigger levels.
- For all sites with a single exceedance of the TARP trigger levels continual monitoring is recommended per the GWMP. Once a Level 1 TARP trigger level is confirmed the GWMP requires continual monitoring at the current monitoring frequency.
- There were one TARP Level 1 groundwater level trigger exceedances over the reporting period for DD1032. Historic data indicates a steady decline in groundwater



levels due to below average rainfall conditions. Past quarterly groundwater monitoring reports noted that the groundwater levels were consistently close to the TARP trigger level. Additional monitoring is required according to the GWMP. As the exceedance is not expected to be related to site activities, no additional actions are required other than continual monitoring. The GMMP required changes to the monitoring frequency where required. DD1032 has been installed with a datalogger and records readings daily and this is considered appropriate to evaluate groundwater levels.

- A trigger exceedance study should be commissioned to investigate the Level 1 TARP exceedance for groundwater level (DD1032) and electrical conductivity (GW02D). GW01S should also be included in the study as it could not be sampled for at least 2 quarters due to not enough water being present within the bore for sampling purposes.

4.2 Actions – Reporting

- Reference levels for future reviews to calculate groundwater drawdown at all monitoring bores should be established.
- Following the decommission of DD1025 in December 2022, it is planned to incorporate an existing groundwater monitoring bore in the TARP assessment as a replacement to DD1025.

4.3 Actions – Monitoring and Sampling

- Incorporate any mine dewatering volume and mining floor elevations into the quarterly groundwater monitoring database and reporting as this data will be useful when interpreting groundwater level responses due to mining activities.



5.0 Closing

SLR was engaged by Malabar to perform a quarterly groundwater review of data collected by Cbased for the Maxwell Project. This quarterly report provides an overview of the groundwater data collected at the relevant monitoring bores for the period January - March 2024 and assesses this data against the TARP Trigger Criteria presented in the GWMP contained within the Water Management Plan for the Maxwell Underground Project.

There were one TARP Level 1 groundwater level trigger exceedances over the reporting period for DD1032. Historic data indicates a steady decline in groundwater levels well before active mining commencement at the site. Past quarterly groundwater monitoring reports noted that the groundwater levels were consistently close to the TARP trigger level. As the exceedance is not expected to be related to site activities, no additional actions are required other than continual monitoring. The GMMP required changes to the monitoring frequency where required. DD1032 has been installed with a datalogger and records readings daily and this is considered appropriate to evaluate groundwater levels.

MB3-Regolith exceeded the EC exceedance trigger during Q1-2024. This is a single exceedance during the reporting period. During Q1-2024 GW02D continued to exceed the TARP Level 1 electrical conductivity trigger. It is therefore judged likely that the increase in EC above the trigger level at GW02D is not caused by site activities and does not result in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526. Continual monitoring at GW02D is required to confirm the EC trend per the site's GWMP.

Sincerely,

SLR Consulting Australia

Raymond Minnaar
Associate Hydrogeologist

Subhas Nandy
Principal Hydrogeologist



6.0 References

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7.0 Feedback

At SLR, we are committed to delivering professional quality service to our clients. We are constantly looking for ways to improve the quality of our deliverables and our service to our clients. Client feedback is a valuable tool in helping us prioritise services and resources according to our client needs.

To achieve this, your feedback on the team's performance, deliverables and service are valuable and SLR welcome all feedback via <https://www.slrconsulting.com/en/feedback>. We recognise the value of your time and we will make a \$10 donation to our 2023 Charity Partner - Lifeline, for every completed form.





Appendix A Trigger Action Response Plan & Groundwater Level Triggers

Maxwell Underground Mine

Groundwater Monitoring Report – Quarter 1 – 2024

Malabar Resources Pty Ltd

SLR Project No.: 610.031830.00001

19 April 2024

Table A-1: Trigger Action Response Plan for the Maxwell Project monitoring bores – Groundwater Levels and Quality

Status	Trigger	Action	Response
Maxwell Infrastructure			
Normal	Groundwater level and quality below Maxwell Infrastructure Stage 1 groundwater triggers (<i>Table A3</i>).	Continue to minimise the long-term catchment areas of the mine voids and transfer water to and from voids. Continue water balance monitoring, groundwater monitoring, and assessment.	None
Level 1	Three consecutive groundwater level, pH or EC results exceed Maxwell Infrastructure Stage 1 groundwater triggers (<i>Table A3</i>).	A suitably qualified hydrogeologist reviews groundwater level or quality data to determine if trigger exceedances are caused by site activities and whether this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	If trigger exceedances are not caused by site activities and have not resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then review monitoring frequency. If trigger exceedances are caused by site activities and resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then undertake Level 2 Actions.
Level 2	Investigation following Level 1 trigger review indicates trigger exceedances are caused by site activities and this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	Undertake actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Report non-compliance. Undertake adaptive management strategies.
Maxwell Underground			
Normal	Groundwater level and quality below Maxwell Underground Stage 1 groundwater level triggers (<i>Table A3</i>).	Continue groundwater monitoring, and assessment.	None
Level 1	Three consecutive groundwater level, pH or EC results exceed Maxwell Underground Stage 1 groundwater level triggers (<i>Table A3</i>).	A suitably qualified hydrogeologist reviews groundwater level or quality data to determine if trigger exceedances are as a result of activities at the site and whether this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	If trigger exceedances are not caused by site activities and have not resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then review monitoring frequency.



Status	Trigger	Action	Response
			If trigger exceedances are caused by site activities and resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526, then undertake Level 2 Actions.
Level 2	Investigation following Level 1 trigger review indicates trigger exceedances are caused by activities at the Project and this has resulted in an exceedance of a Water Management Performance Measure in Table 4 of Development Consent SSD 9526.	Undertake actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Report non-compliance. Undertake adaptive management strategies. In consultation with suitably qualified hydrogeologist and other relevant specialists, undertake repair, mitigate and/or offset any adverse groundwater impacts of the development.



Table A-2: Trigger Action Response Plan for Privately-owned bores - Groundwater Levels and Quality

Status	Trigger	Action	Response
Groundwater levels			
Normal	Drawdown at privately-owned bores less than 2 m. No complaints about potential impacts of the site on privately- owned bores.	Continue regular monitoring and review of potentially impacted private bores (<i>refer to Section 5.2.2 of the GWMP</i>).	None
Level 1	Drawdown at privately-owned bores more than 2 m and/or complaint about potential impacts of the site on private bores.	A suitably qualified hydrogeologist reviews groundwater data to determine if 2 m drawdown is as a result of activities at the site (and/or MAC). Collect relevant data on privately-owned bores that are the subject of the complaint. Suitably qualified hydrogeologist to determine if privately-owned bore the subject of the complaint has been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible).	If drawdown is not as a result of activities at the Project (and/or MAC) then review monitoring frequency. If privately-owned bore the subject of the complaint has not been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible) then review monitoring frequency. If drawdown, or impacts the subject of the complaint, are due to site activities then undertake Level 2 actions.
Level 2	Investigation following Level 1 trigger review indicates drawdown is as a result of activities at the site.	Notify relevant bore owner and implement compensatory water supply actions. Undertake any other actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Review groundwater monitoring program.
Groundwater quality			
Normal	No change in beneficial use category	Continue regular monitoring and review of potentially impacted private bores (<i>refer to Section 5.2.2 of the GWMP</i>).	None
Level 1	Two consecutive monitoring results indicate a change in beneficial use category.	A suitably qualified hydrogeologist reviews groundwater data to determine if change in water quality is caused by activities at the site.	If a privately-owned bore has not been adversely and directly impacted as a result of the activities at the site, then review monitoring frequency. If change in water quality is changed by activities at the site, then undertake Level 2 actions.



Status	Trigger	Action	Response
Level 2	Investigation following Level 1 trigger review indicates change in water quality is caused by activities at the site.	Implement compensatory water supply actions. Undertake any other actions recommended by suitably qualified hydrogeologist which may include update to the groundwater model and/or review of monitoring program.	Review groundwater monitoring program.



Table A-3: Summary of groundwater level and quality triggers for alluvium and hard rock aquifers (Maxwell Project) – (GWMP – Malabar Resources, Feb 2023) and Annual Review 2022

Bore	Groundwater level, trigger level (mAHD)	pH trigger level - minimum	pH trigger level - maximum	EC trigger level (µS/cm)
Maxwell Infrastructure				
R4241	173.6	6.0	8.5	6,253
GW01D	198.2	6.0	8.5	5,680
GW01S	197.0	6.0	8.5	9,260
GW02D	135.7	6.0	8.5	10,500
GW02S	187.7	6.0	8.5	9,480
Maxwell Underground				
DD1025	157.3 (155.1 #)	6.0	8.5	14,200
DD1032	130.6 (128.3 #)	6.0	8.5	7,170
MB3-A	127.7	6.0	8.5	9,009
MB3-R	127.3	6.0	8.5	6,327

Proposed levels in 2022 Annual Review and subject to approval of the GWMP

Table A-4: Groundwater Quality Categories: Electrical Conductivity - (GWMP – Malabar Resources, Nov 2021)

Beneficial use	Quality Range	Description
Marginal Potable	800 – 2,350 µS/cm (500 - 1,500 mg/L TDS)*	At the upper level this water is at the limit of potable water, but is suitable for watering of livestock, irrigation and other general uses
Irrigation	2,350 – 7,800 µS/cm (1,500 - 5,000 mg/L TDS)*	At the upper level, this water requires shandyng for use as irrigation water or to be suitable for selective irrigation and watering of livestock
Saline	7,800 – 22,000 µS/cm (5,000 - 14,000 mg/L TDS)*	Generally unsuitable for most uses. It may be suitable for a diminishing range of salt-tolerant livestock up to about 6,500mg/L [~10,150 µS/cm] and some industrial uses
Highly Saline	>22,000 µS/cm (14,000 mg/L TDS)*	Suitable for coarse industrial processes up to about 20,000 mg/L [~31,000 µS/cm].

* Approximate EC ranges derived from TDS ranges, with conversion factor of 1.5625 applied. Source: National Land and Water Resources Audit (Murray Darling Basin Commission, 2005).





Appendix B Groundwater and Trigger Levels

Maxwell Underground Mine

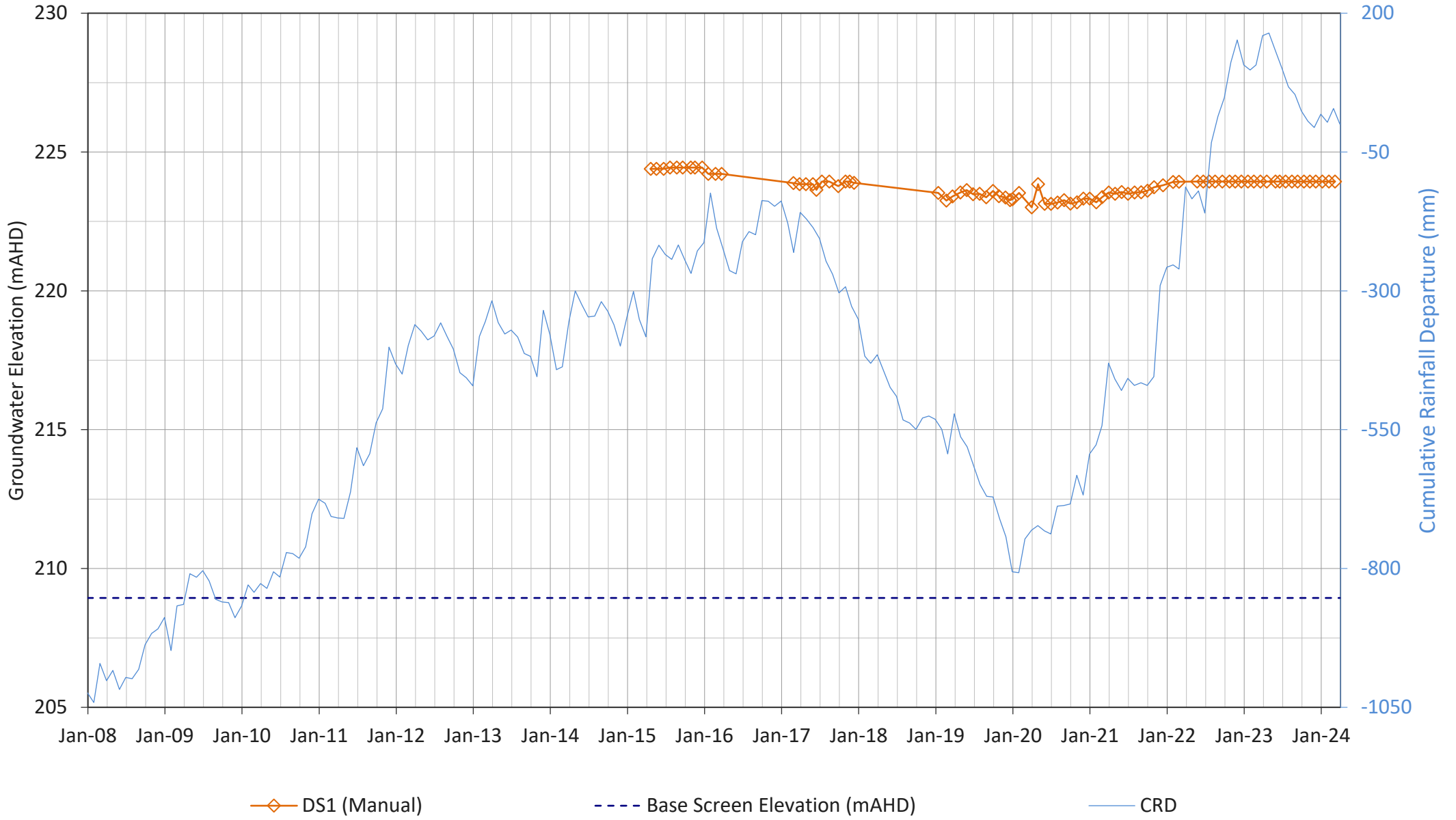
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Malabar Resources Pty Ltd

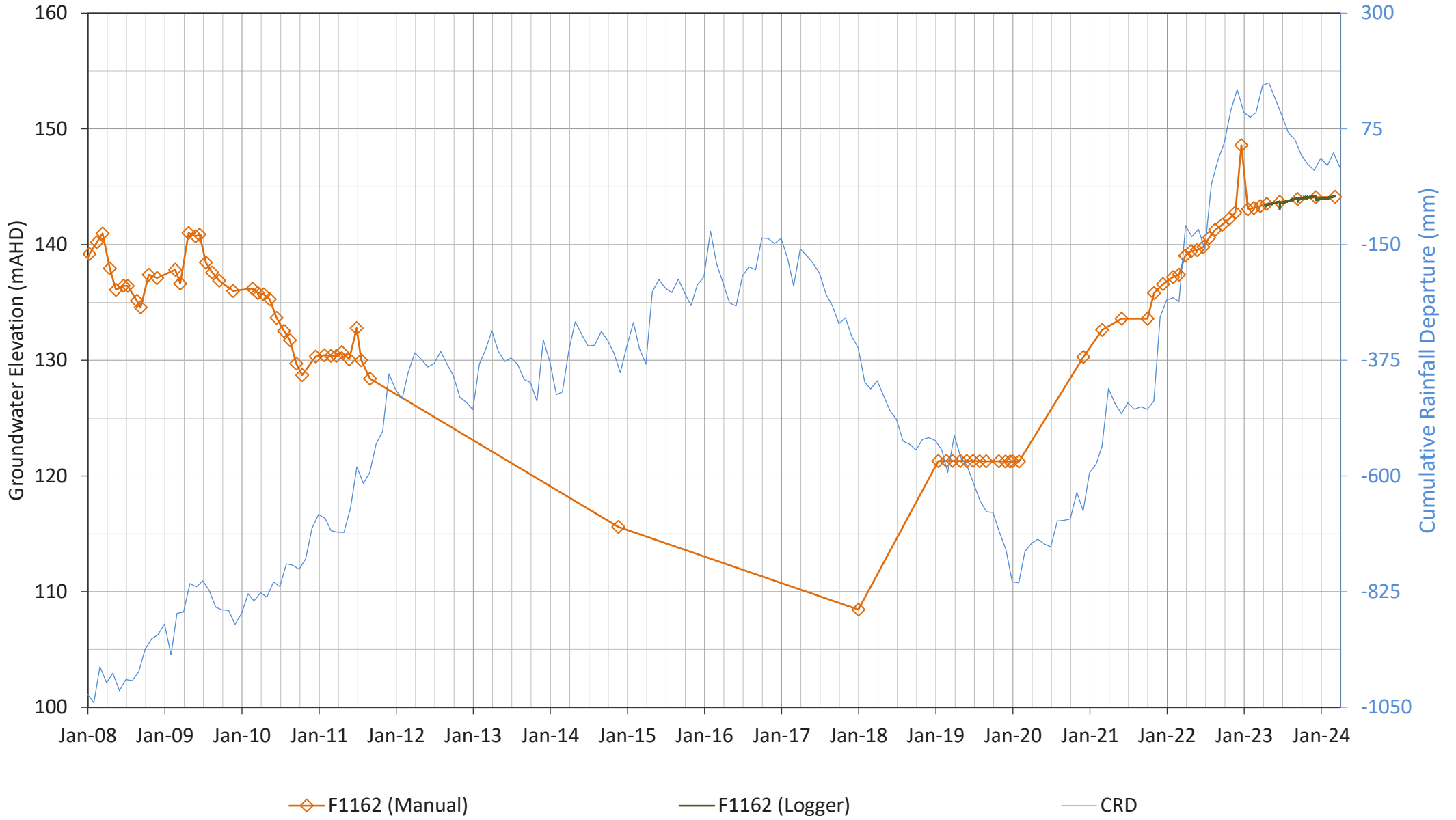
SLR Project No.: 610.031830.00001

19 April 2024

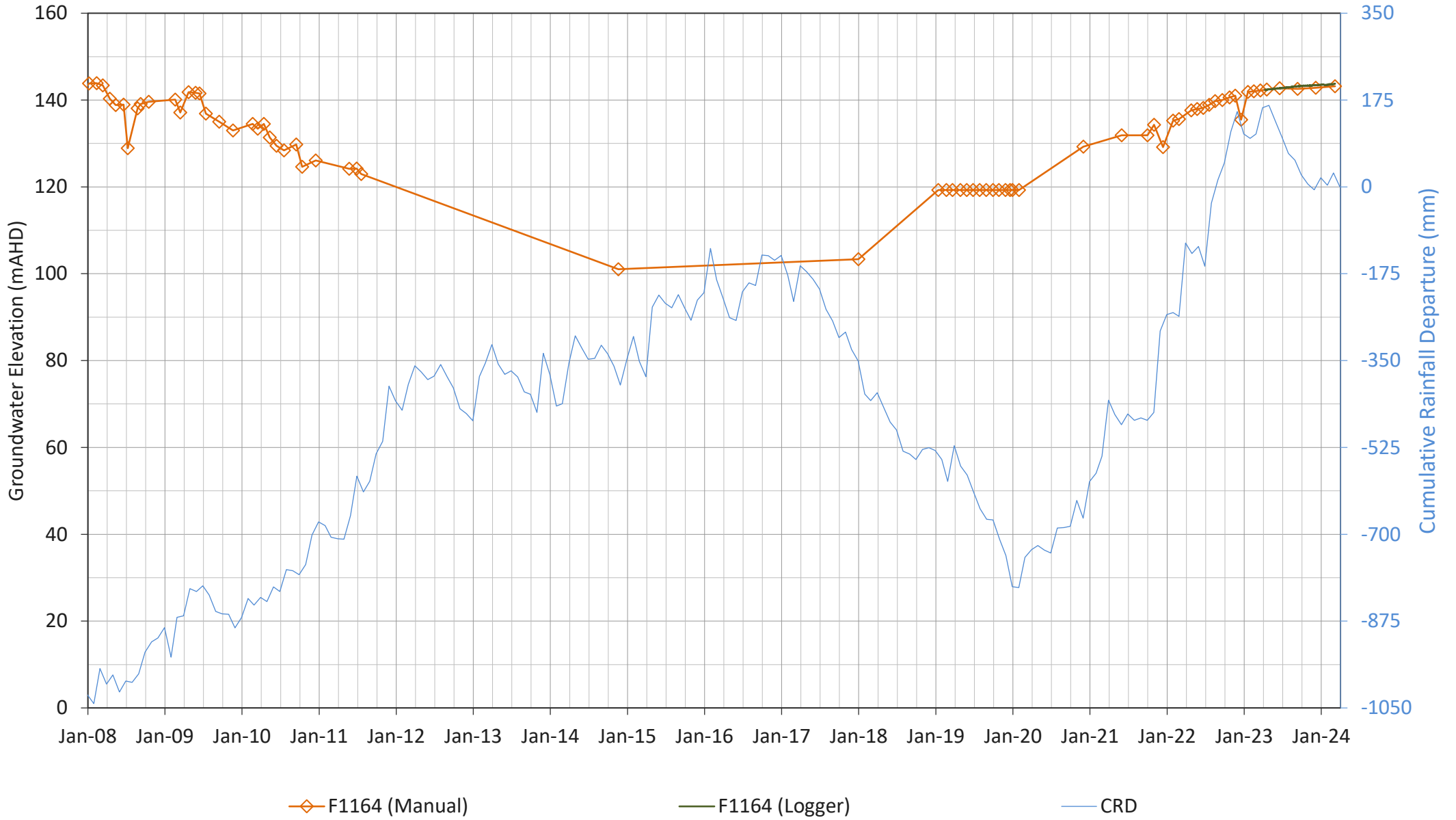
DS1



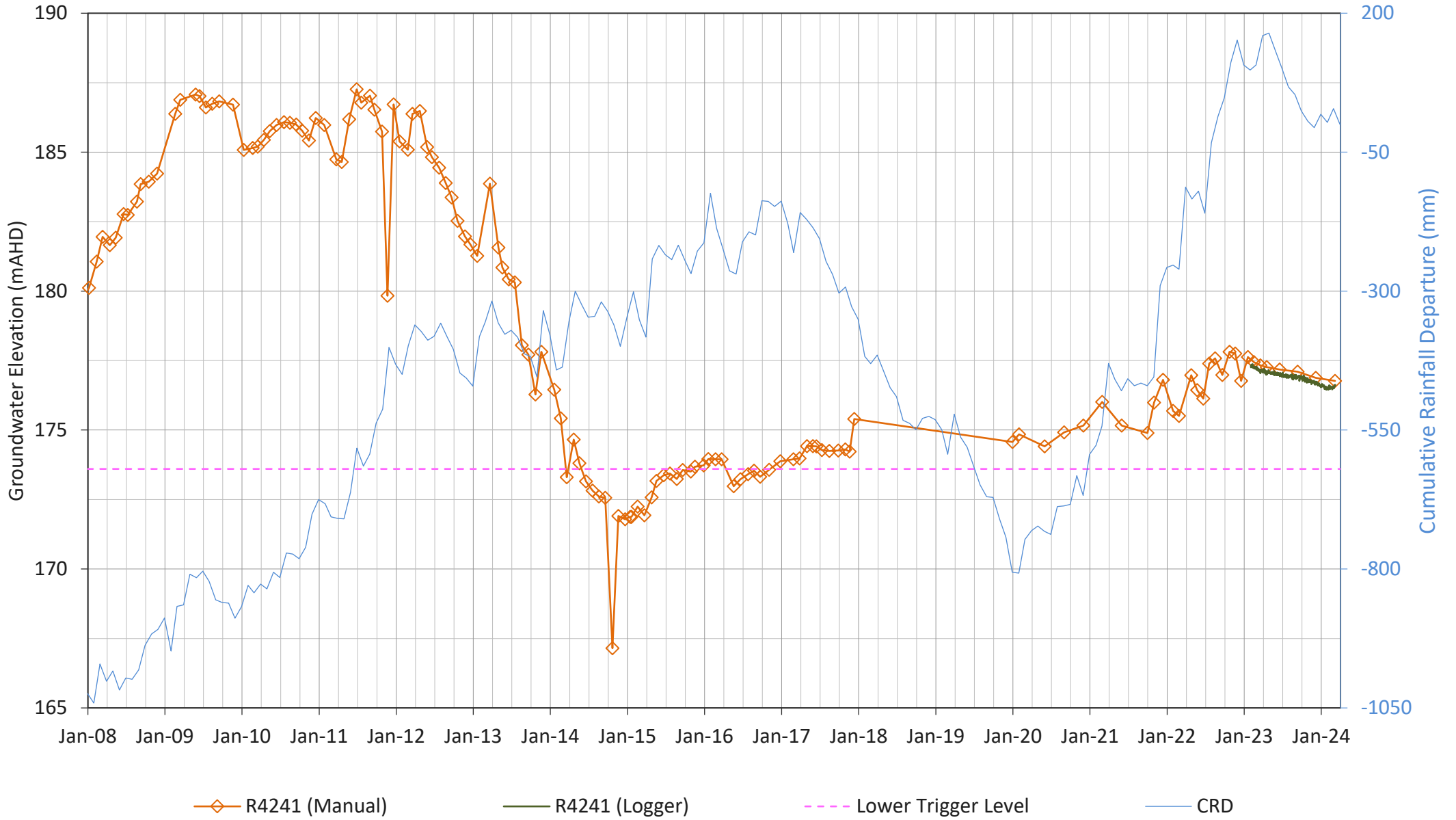
F1162



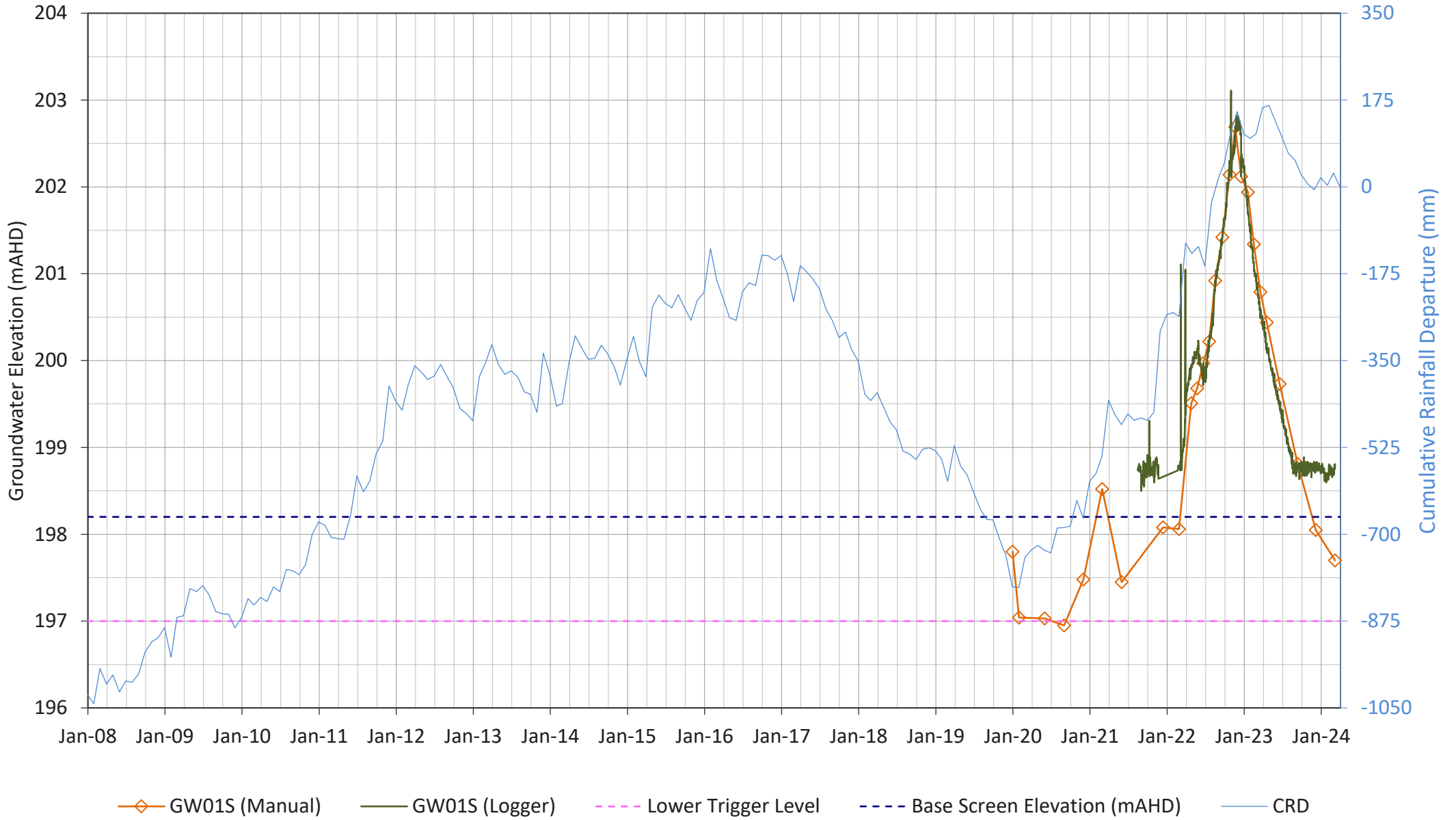
F1164



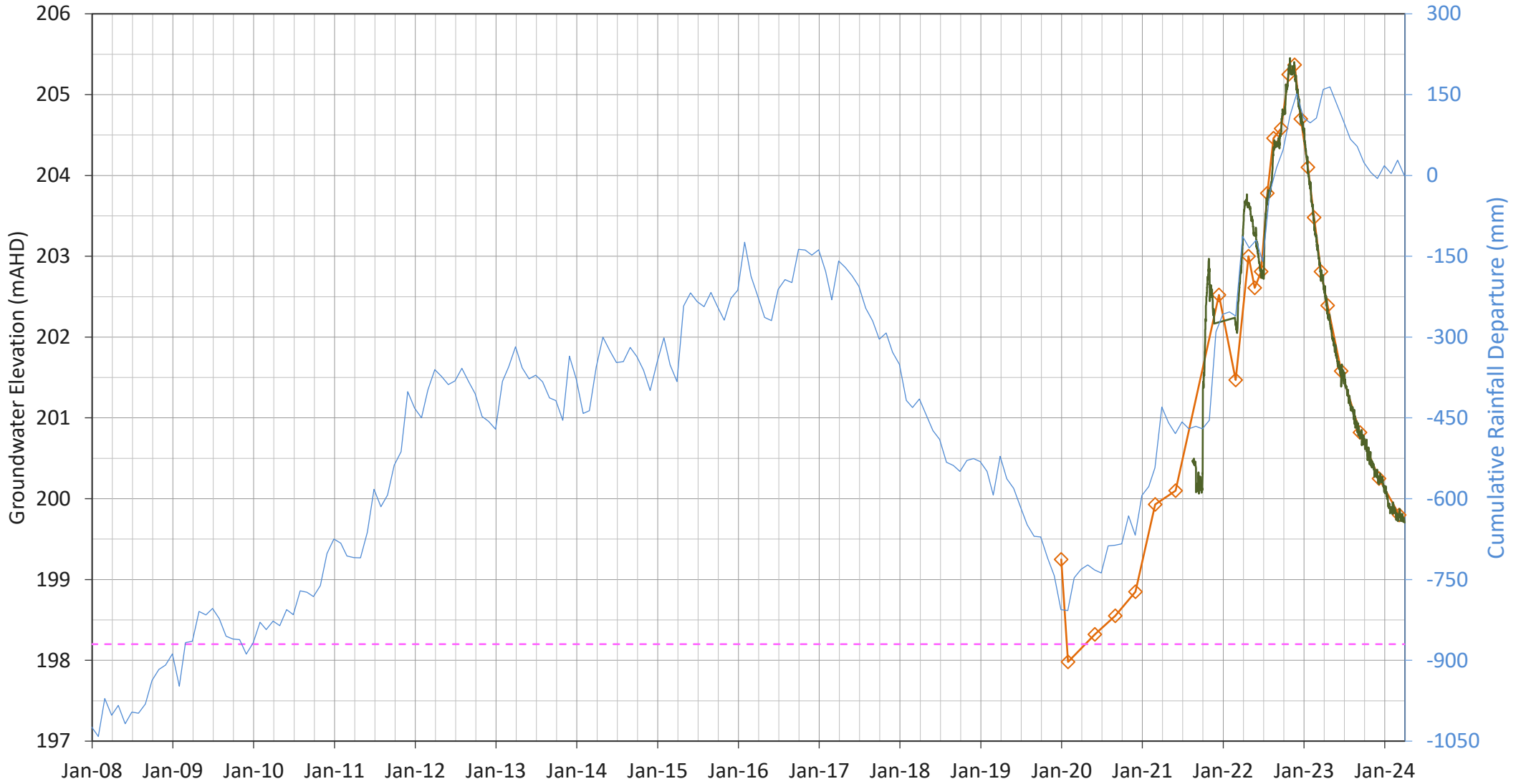
R4241



GW01S

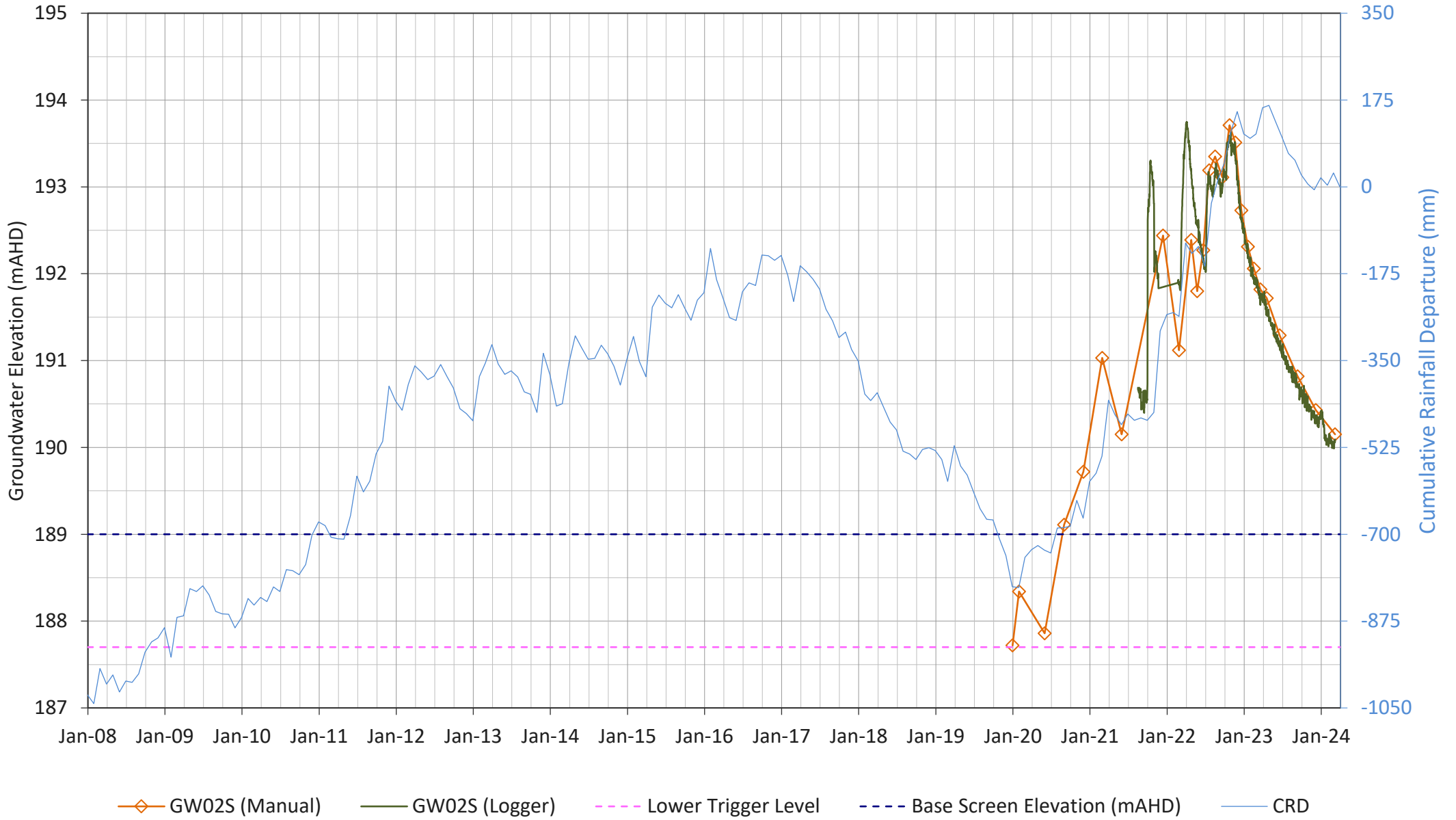


GW01D

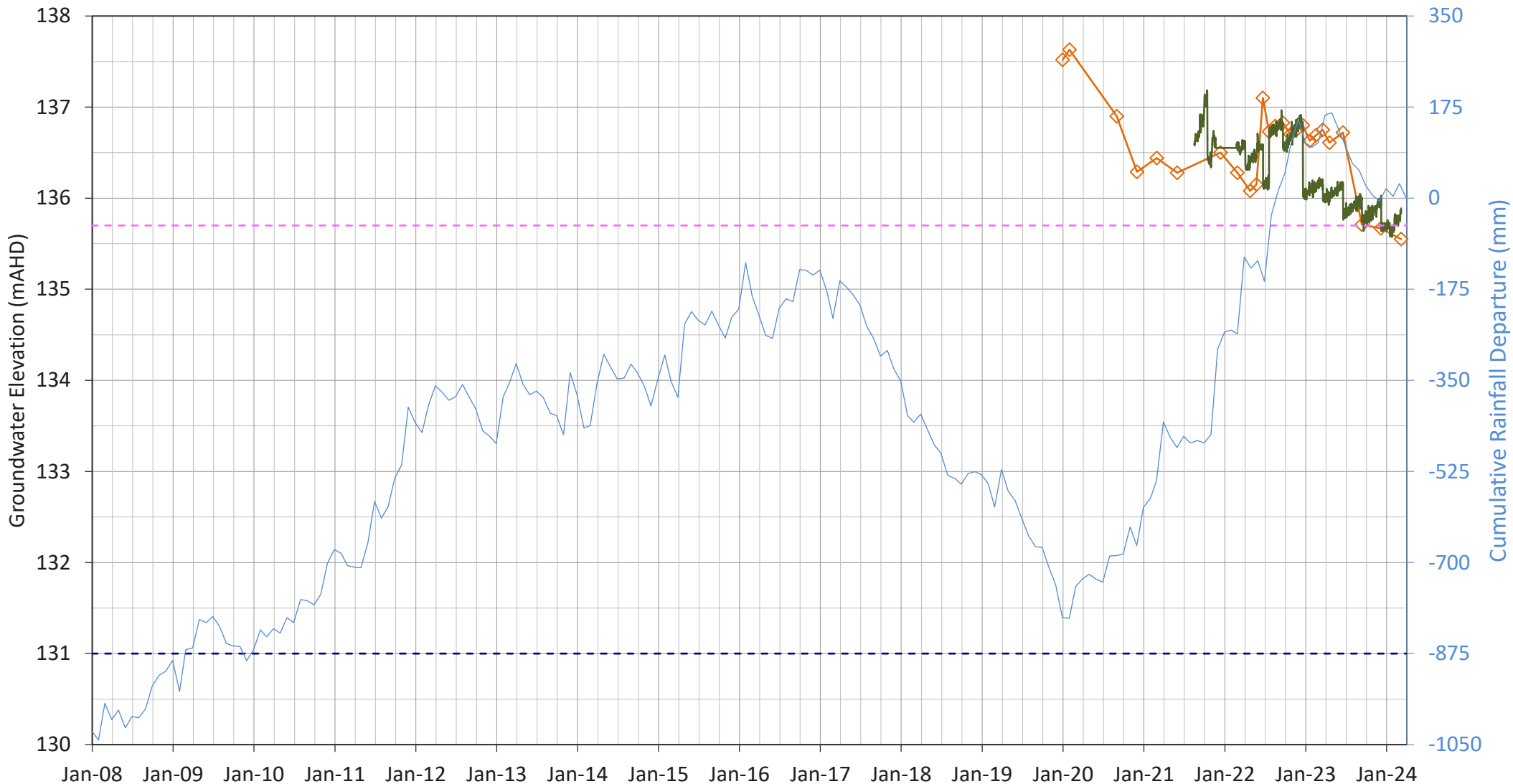


—◇— GW01D (Manual) — GW01D (Logger) - - - Lower Trigger Level - - - Base Screen Elevation (mAHd) — CRD

GW02S

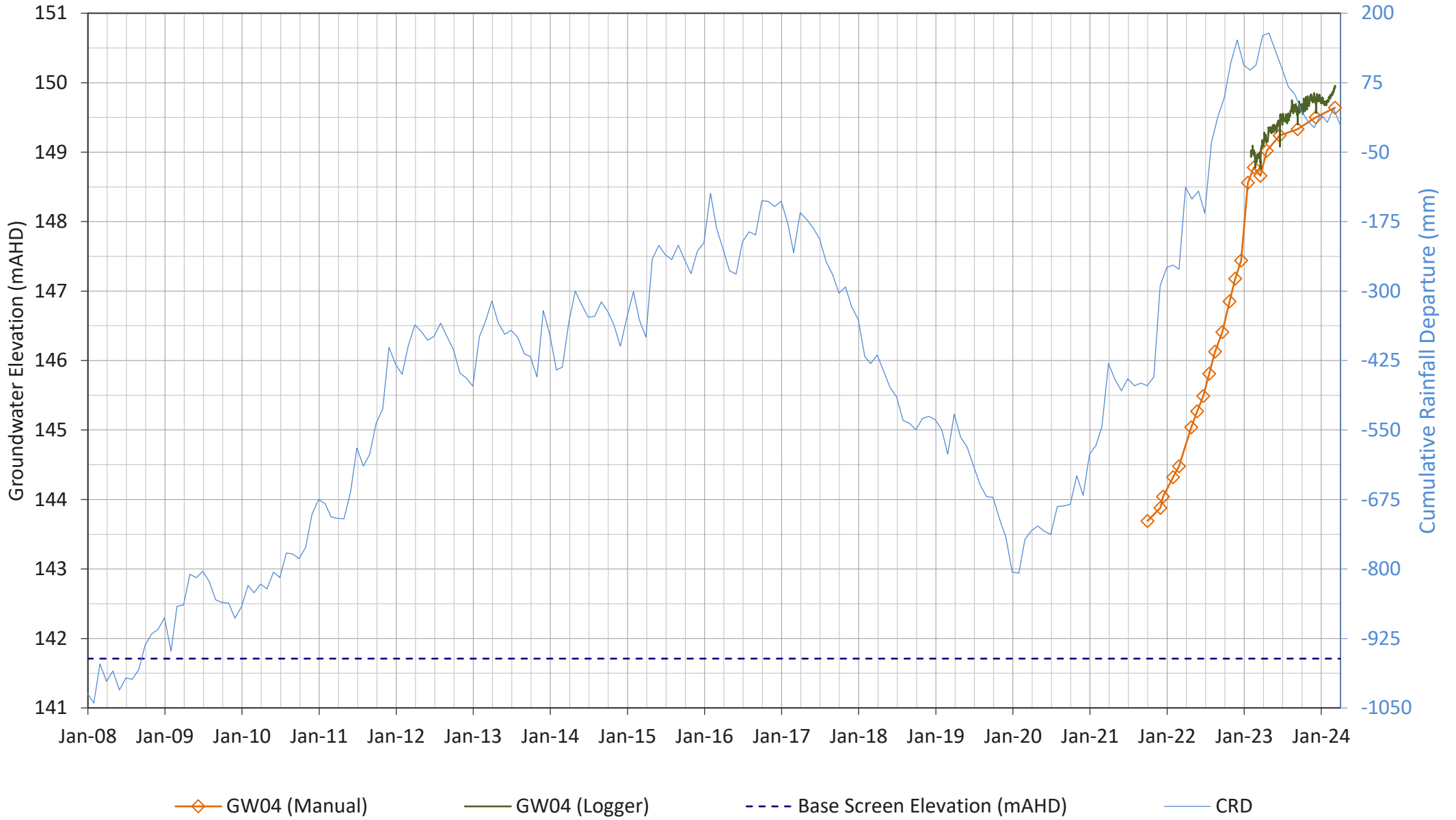


GW02D

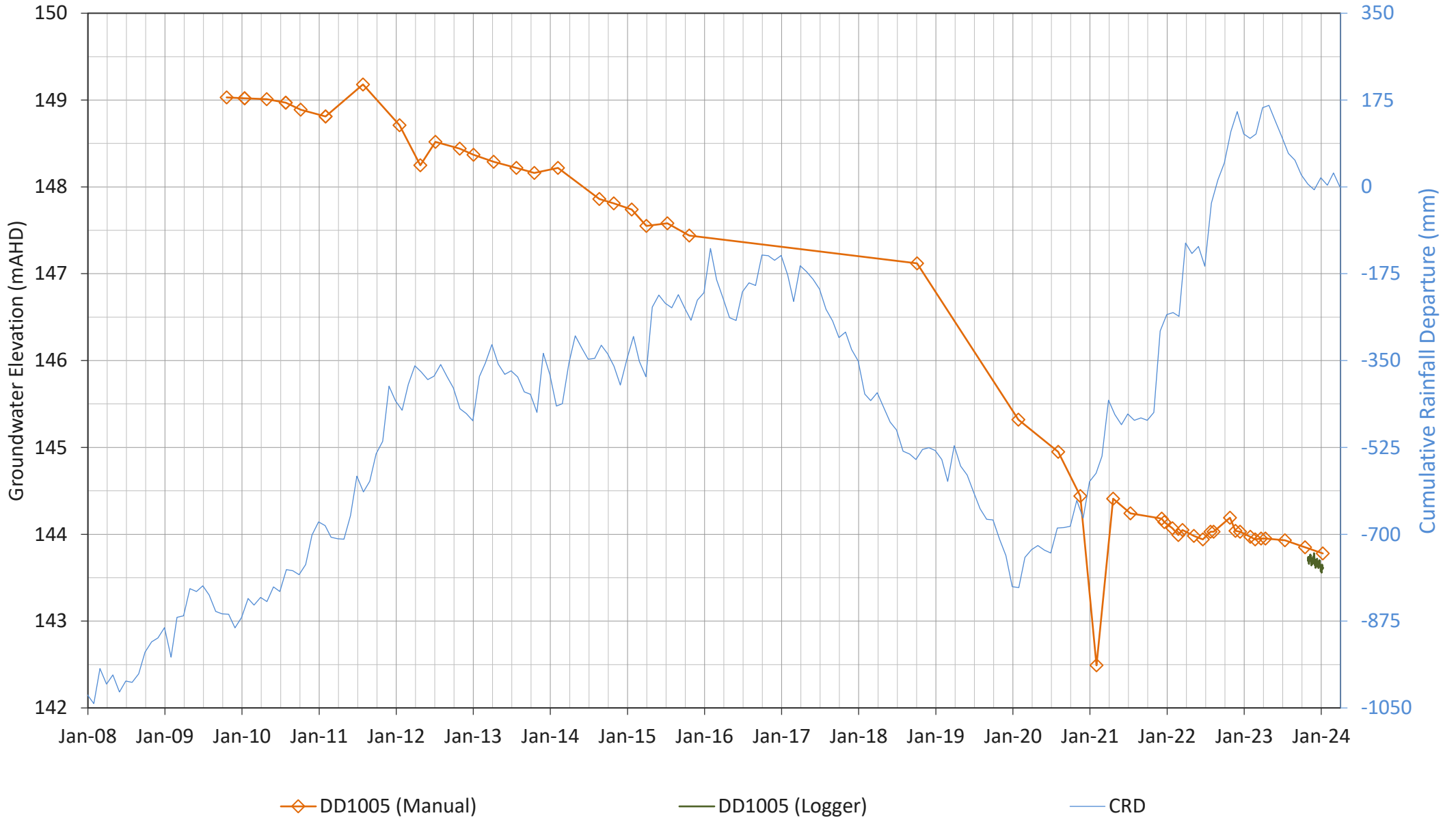


GW02D (Manual) GW02D (Logger) Lower Trigger Level Base Screen Elevation (mAHd) CRD

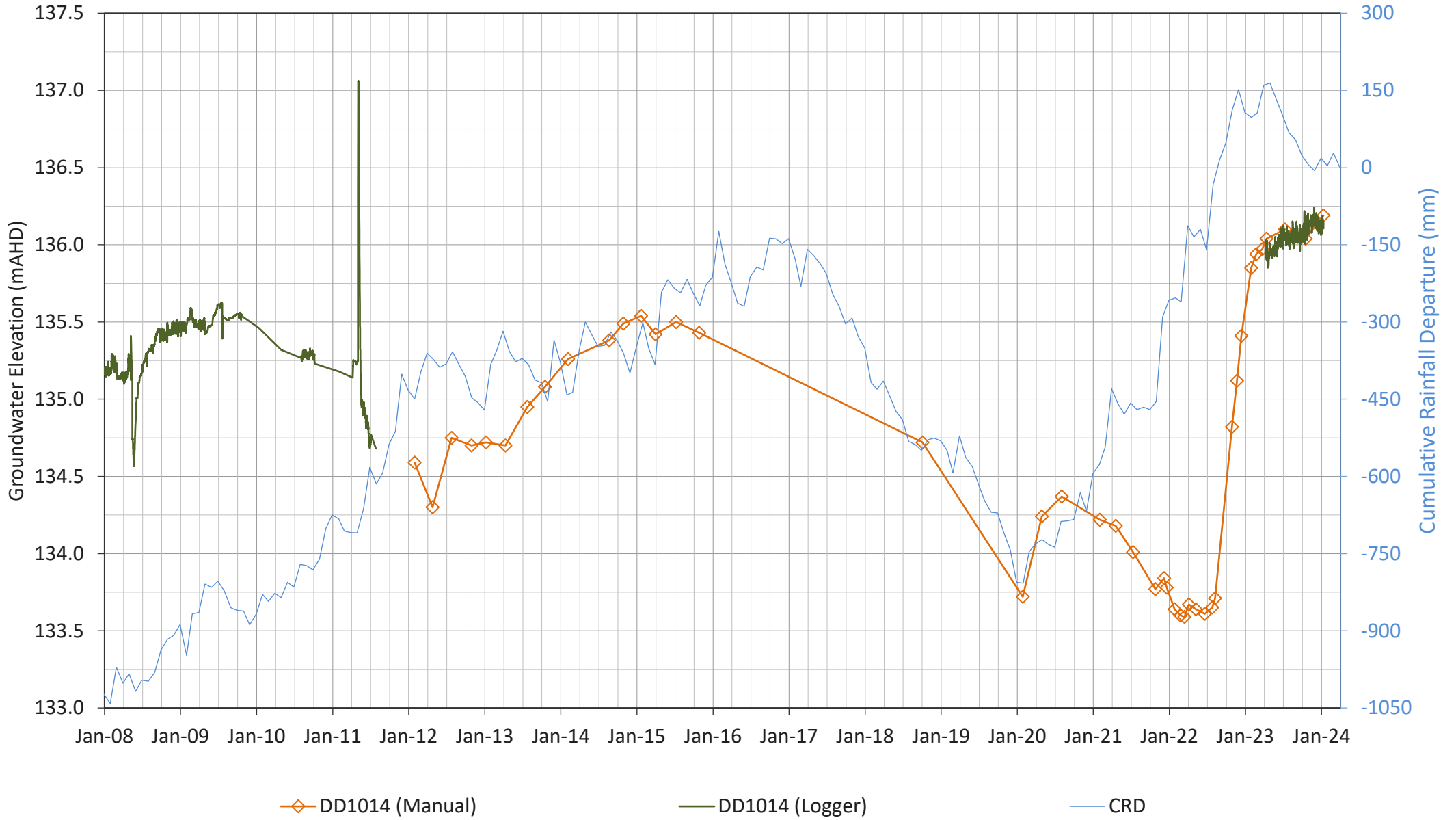
GW04



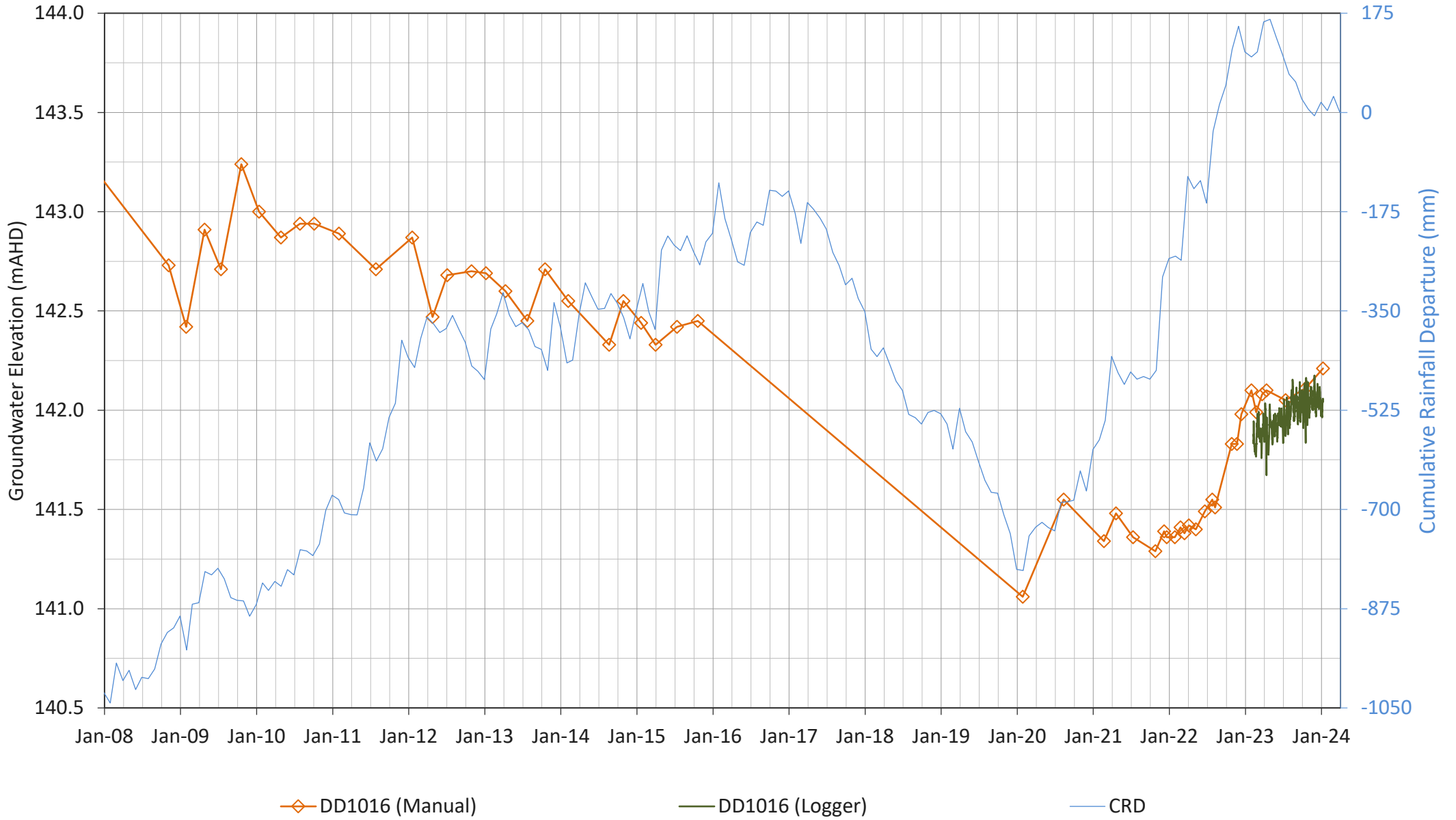
DD1005



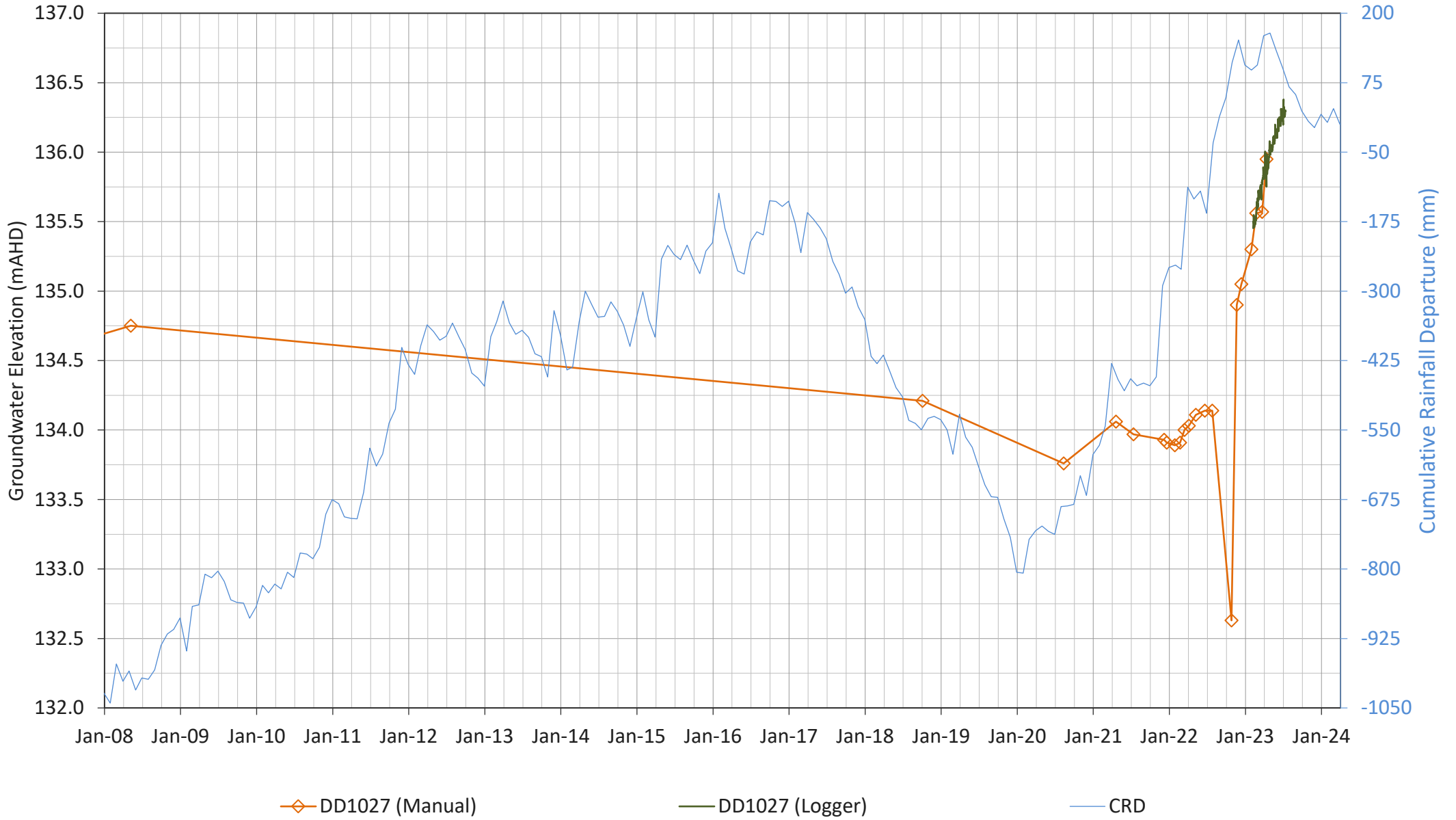
DD1014



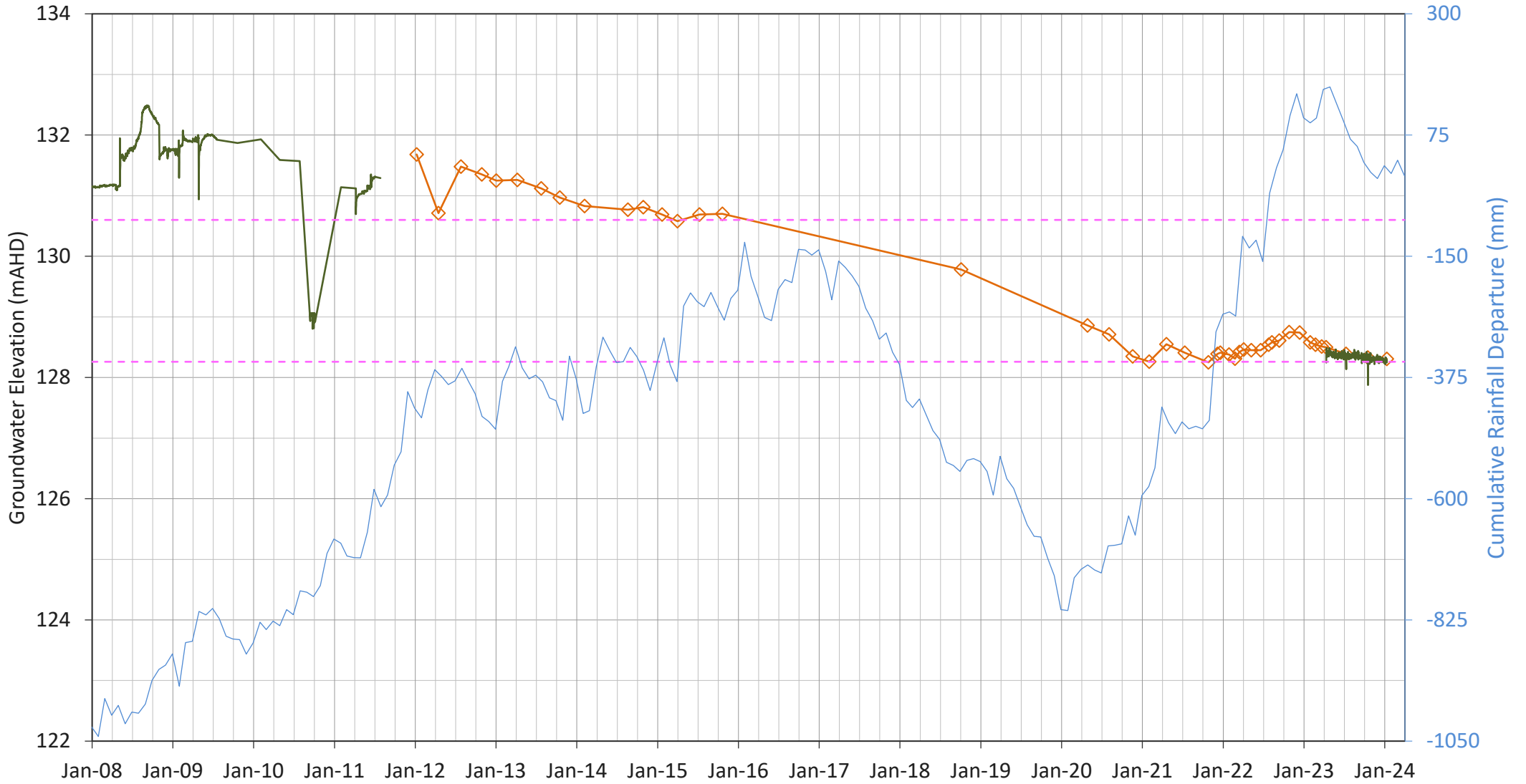
DD1016



DD1027

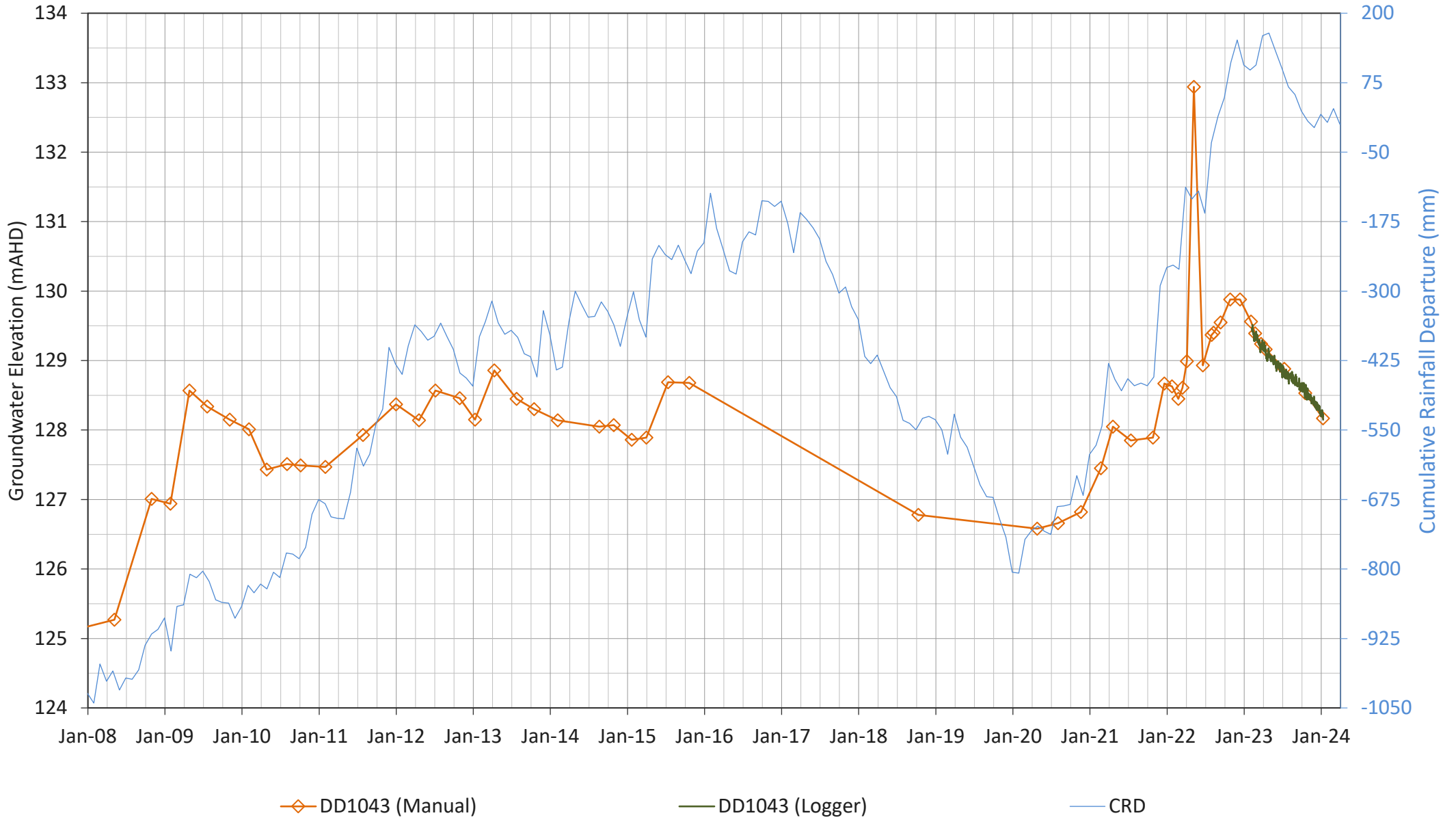


DD1032

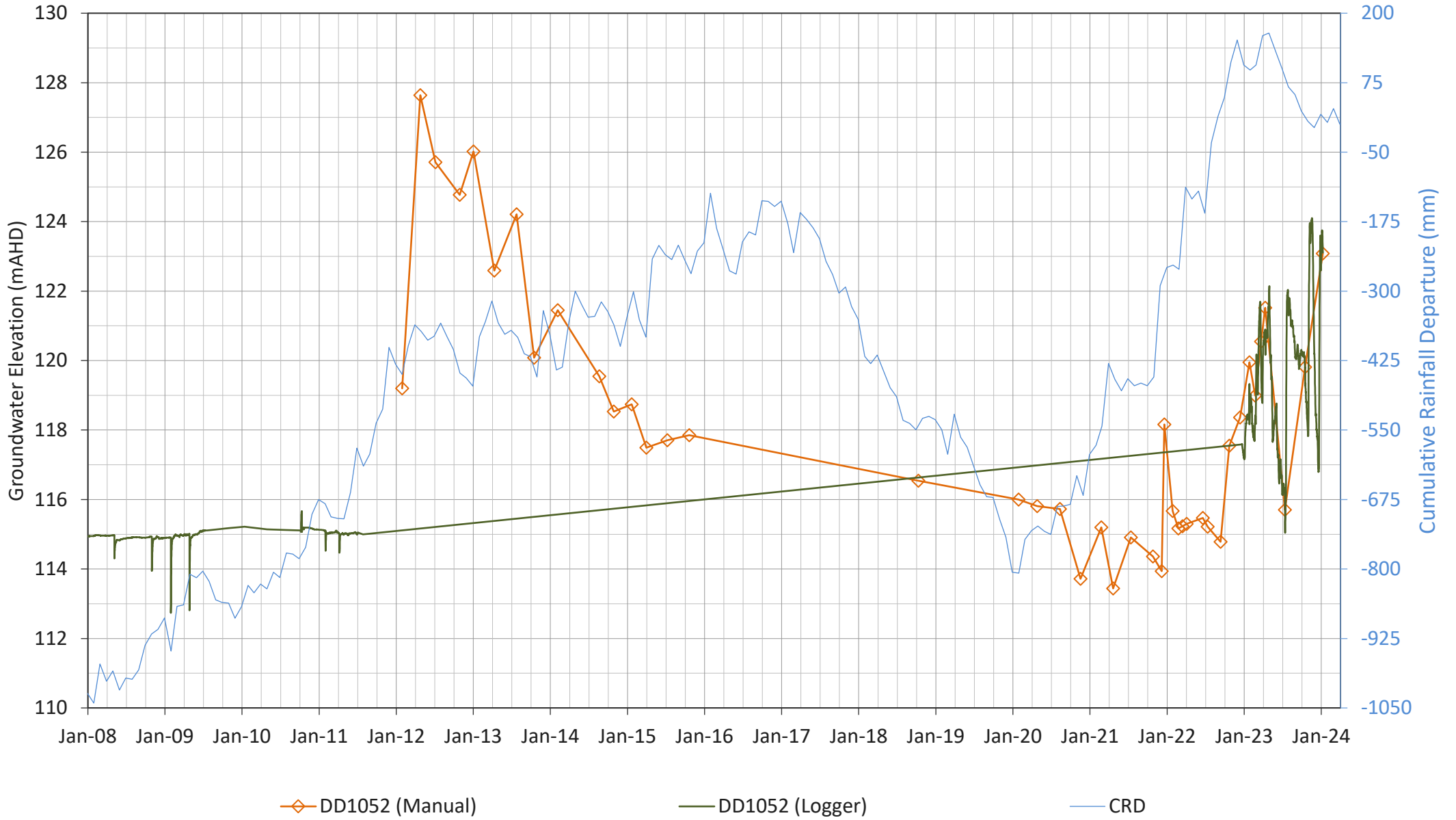


—◇— DD1032 (Manual) — DD1032 (Logger) - - - Lower Trigger Level - - - Lower Trigger Level (revised) — CRD

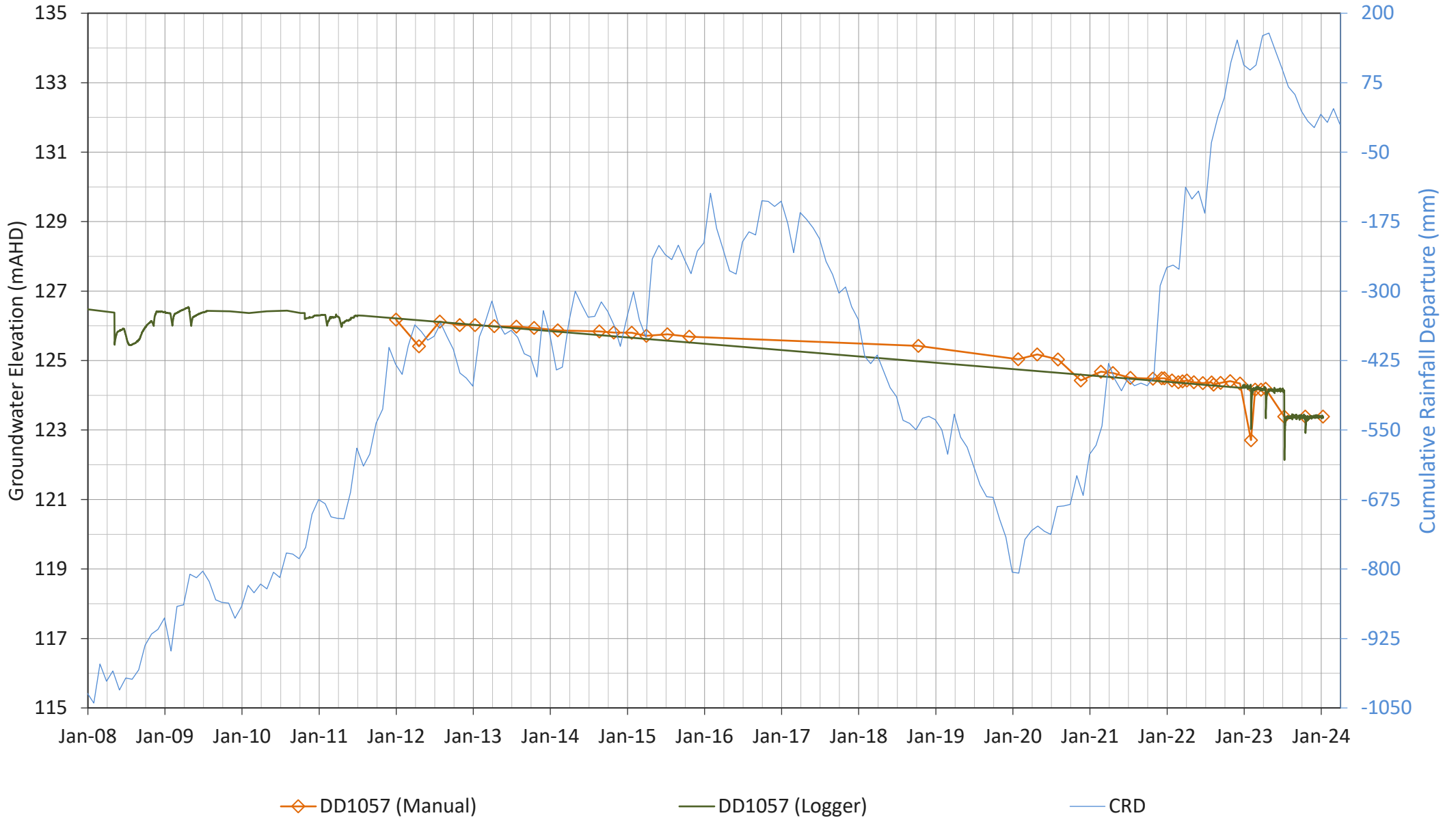
DD1043



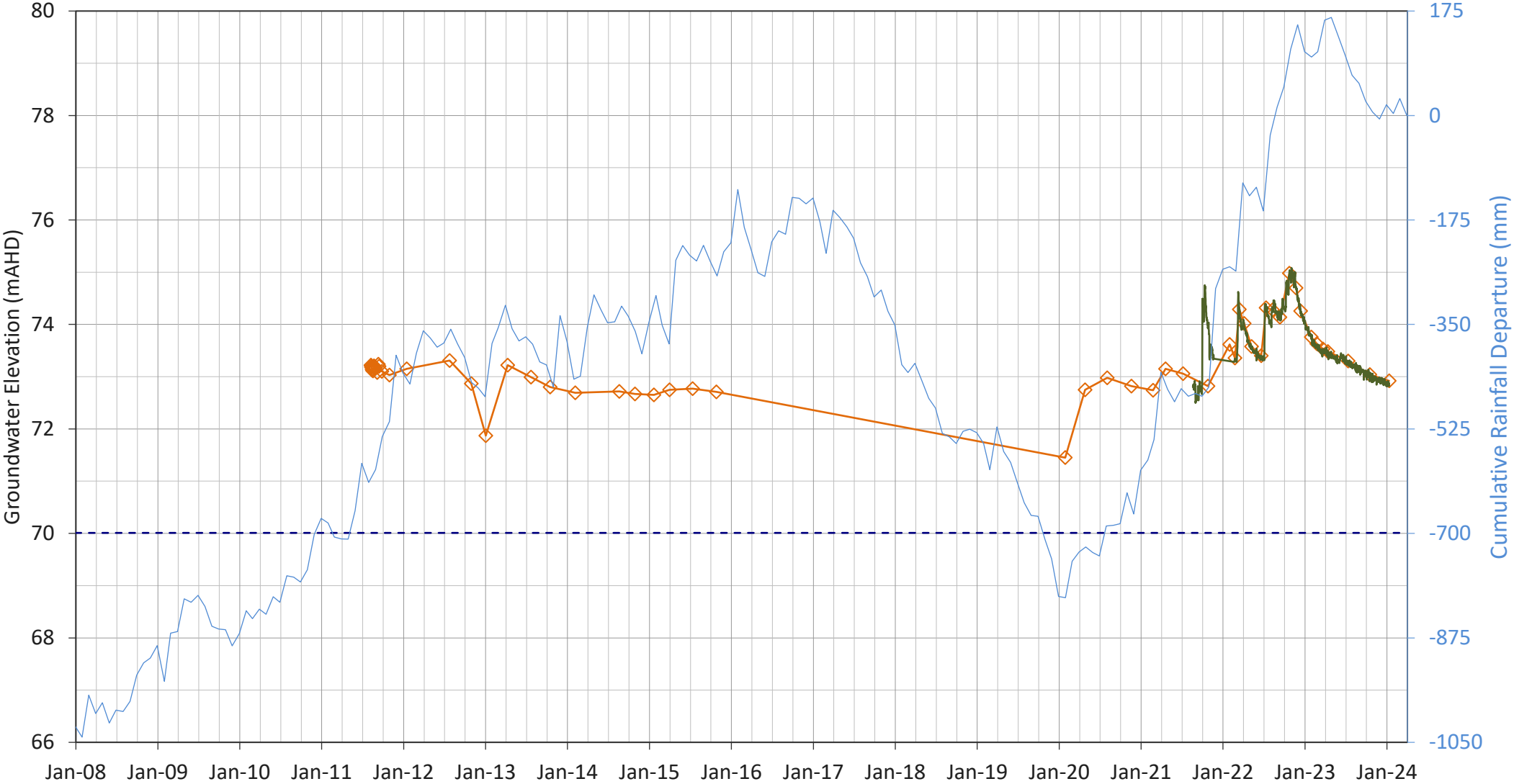
DD1052



DD1057



MB1-Alluvial



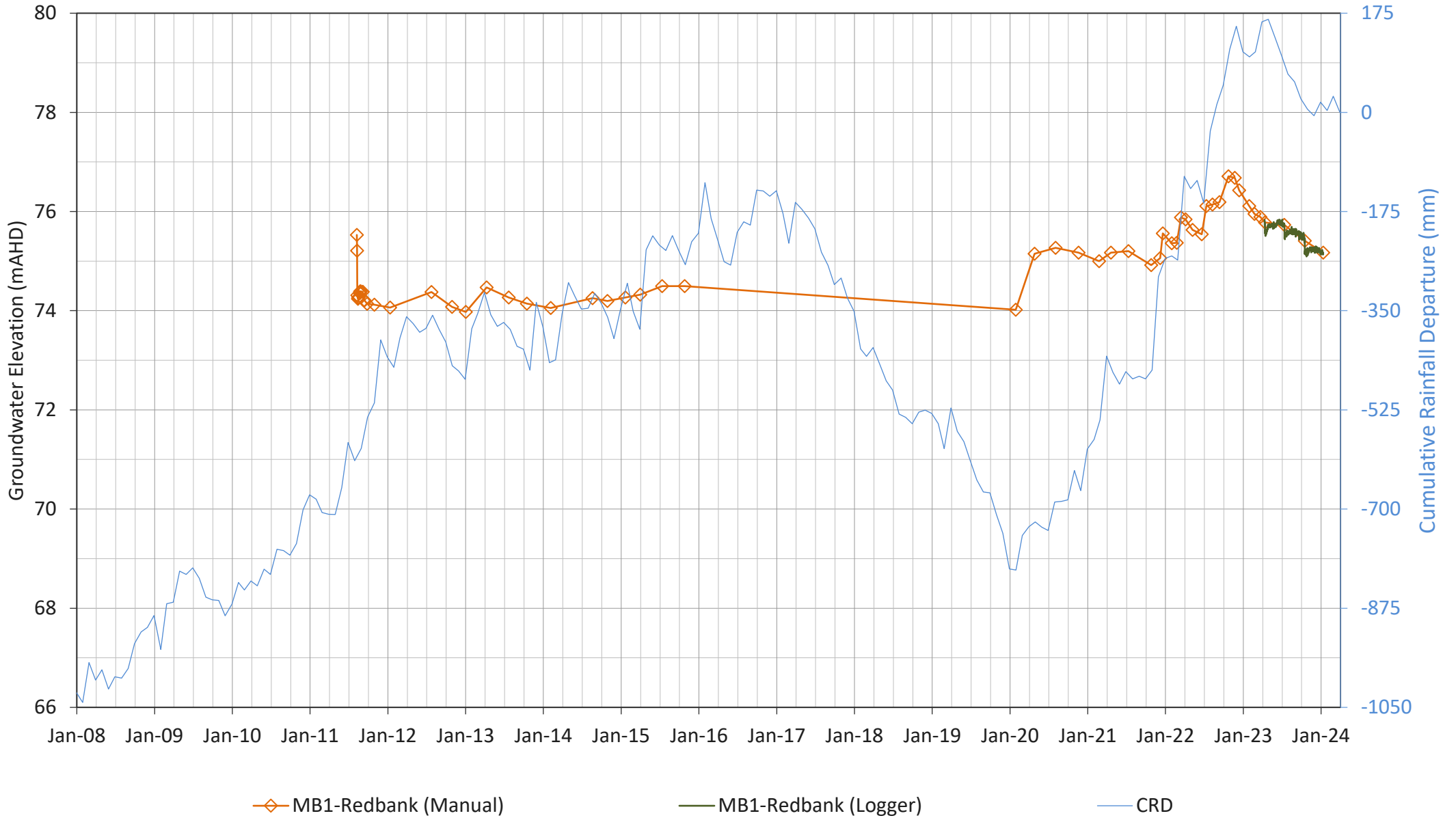
—◇— MB1-Alluvial (Manual)

— MB1-Alluvial (Logger)

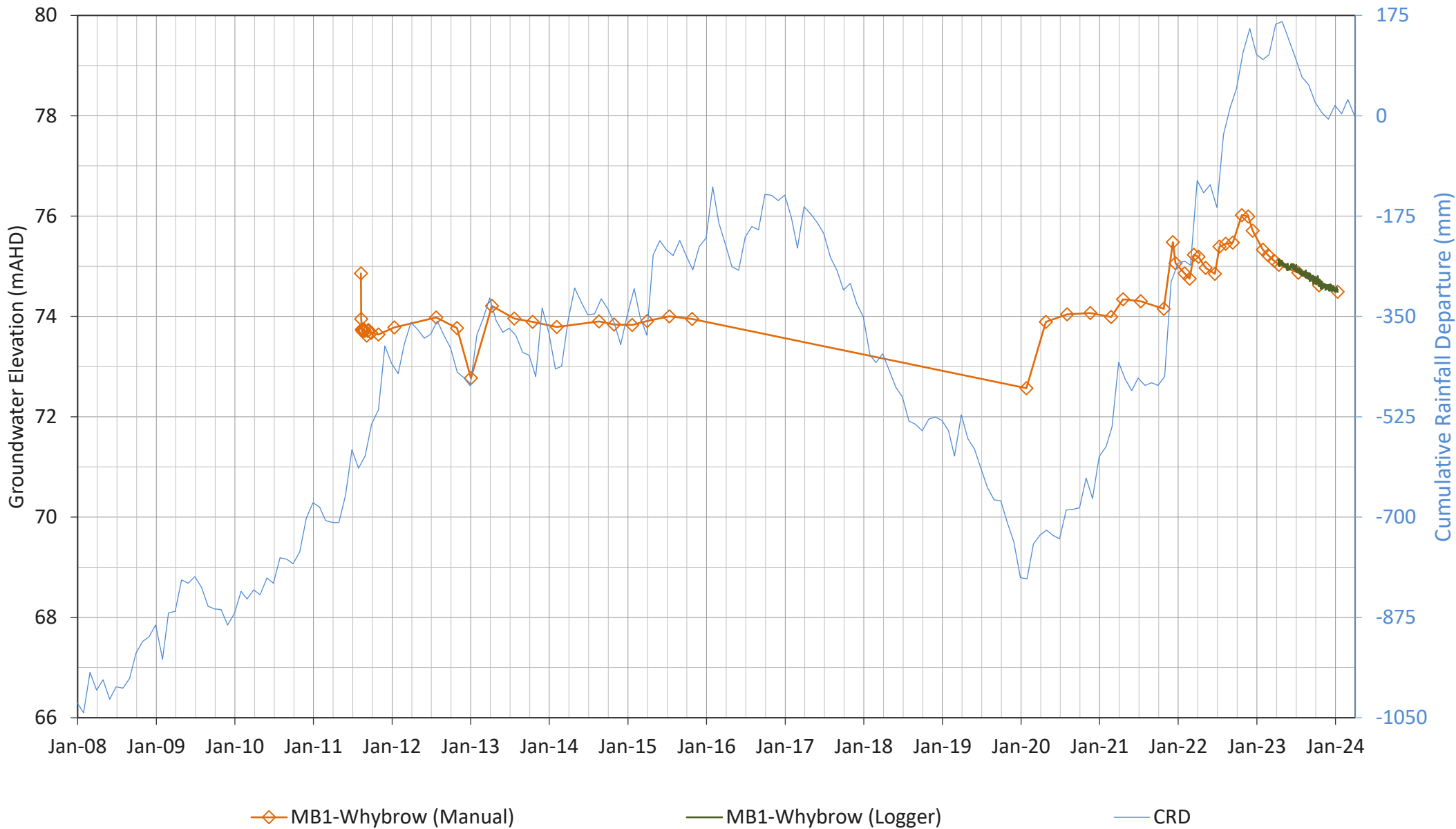
- - - Base Screen Elevation (mAHD)

— CRD

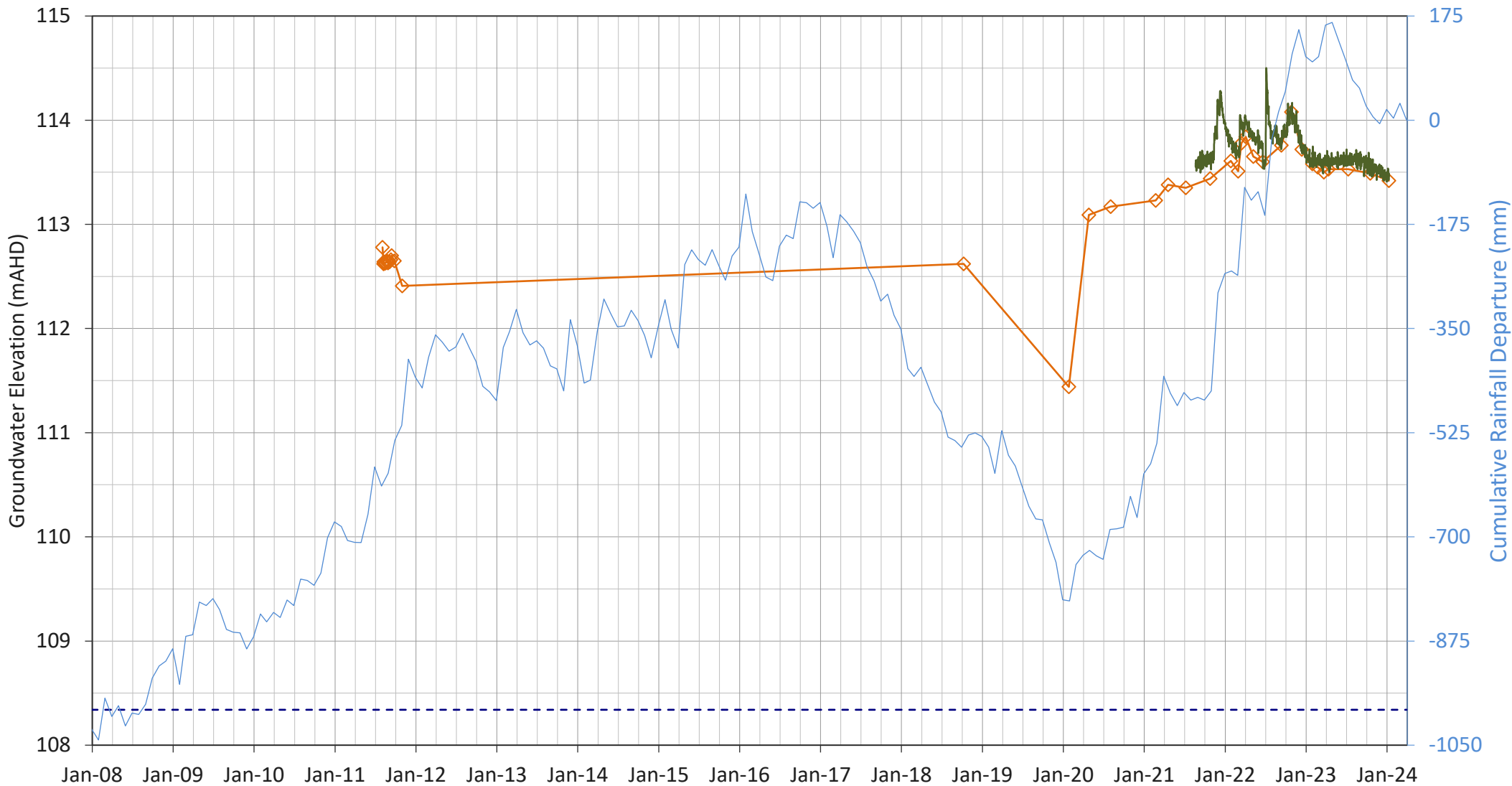
MB1-Redbank



MB1-Whybrow



MB2-Alluvial



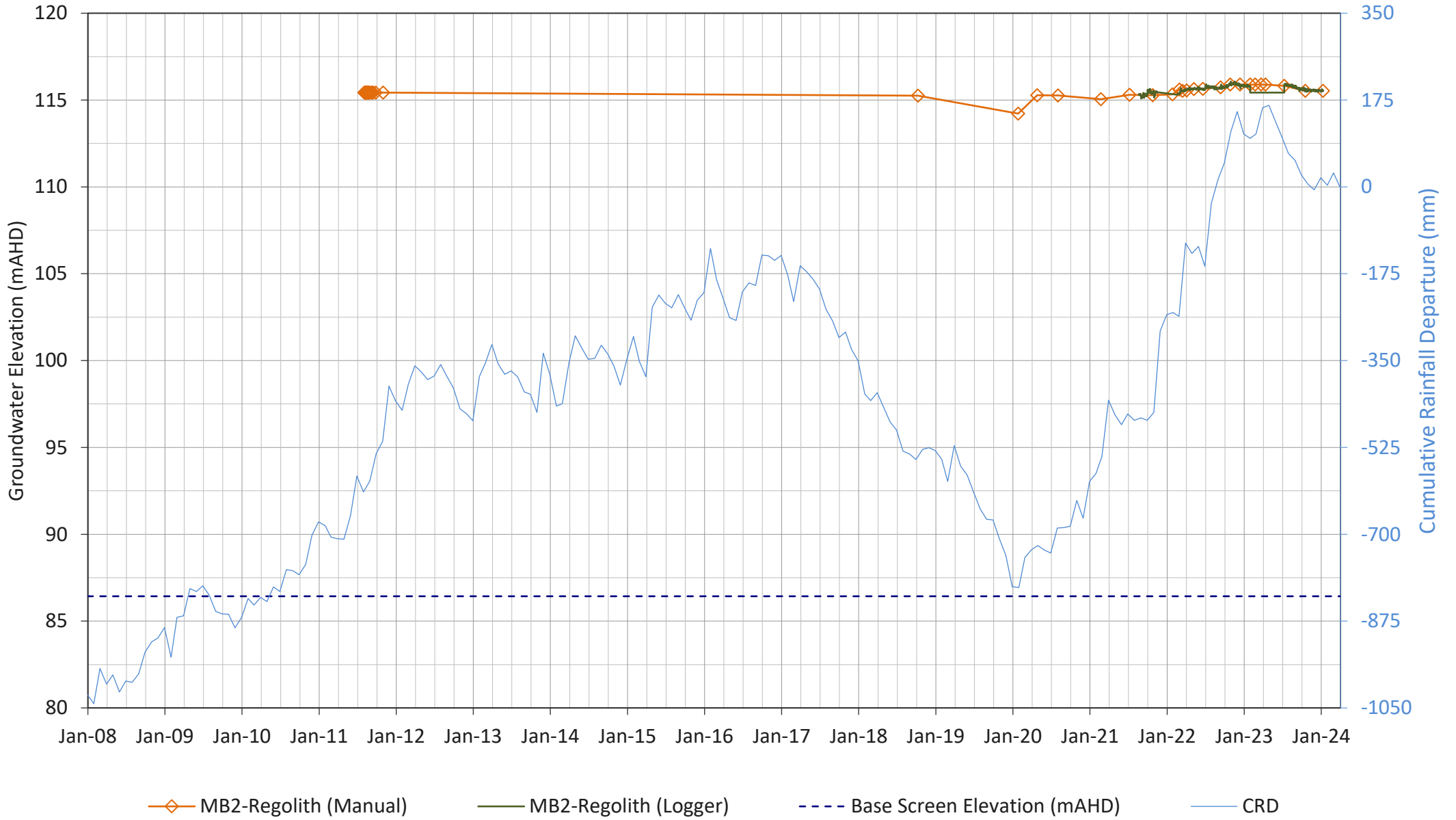
◇ MB2-Alluvial (Manual)

— MB2-Alluvial (Logger)

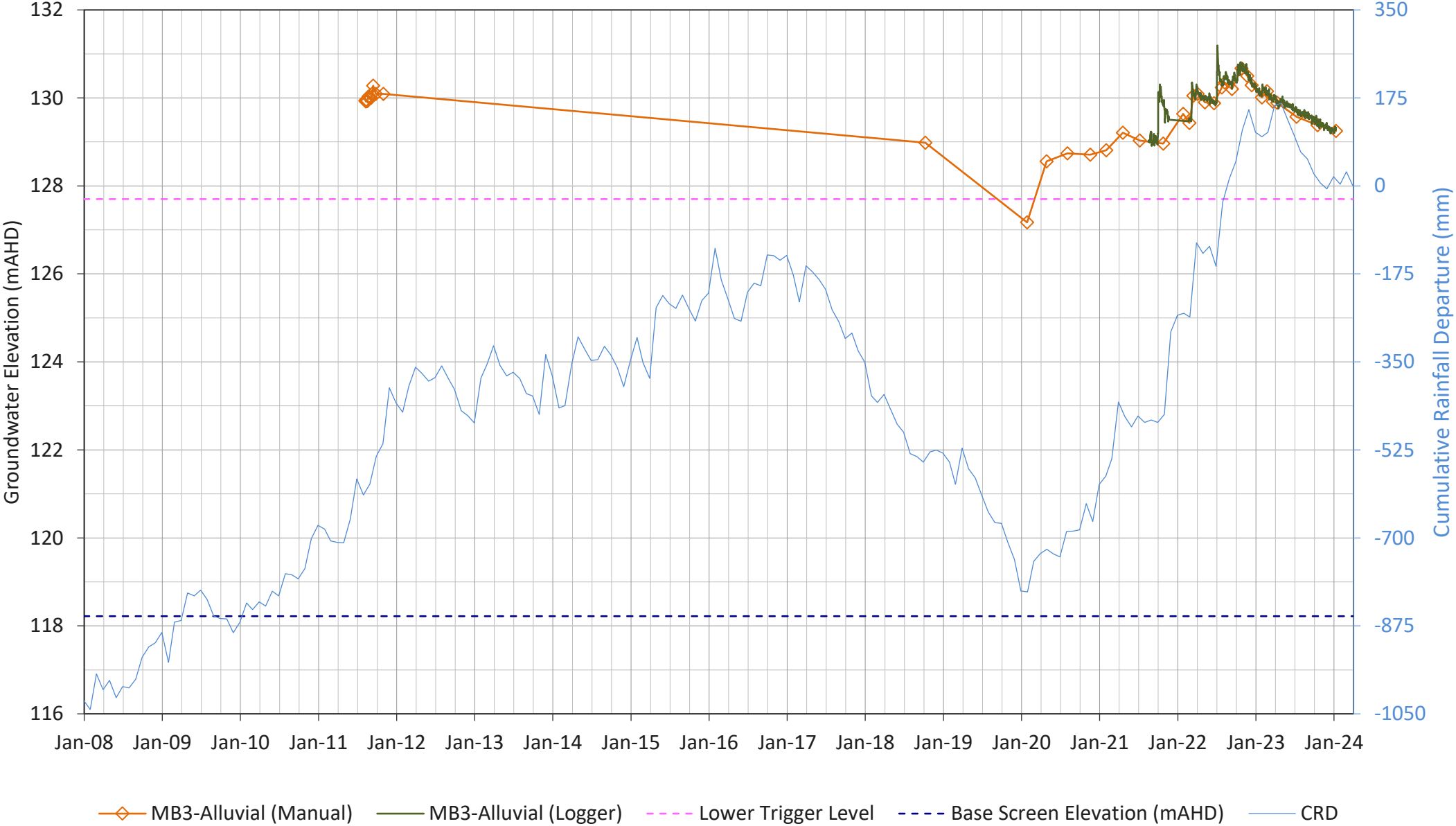
- - - Base Screen Elevation (mAHD)

— CRD

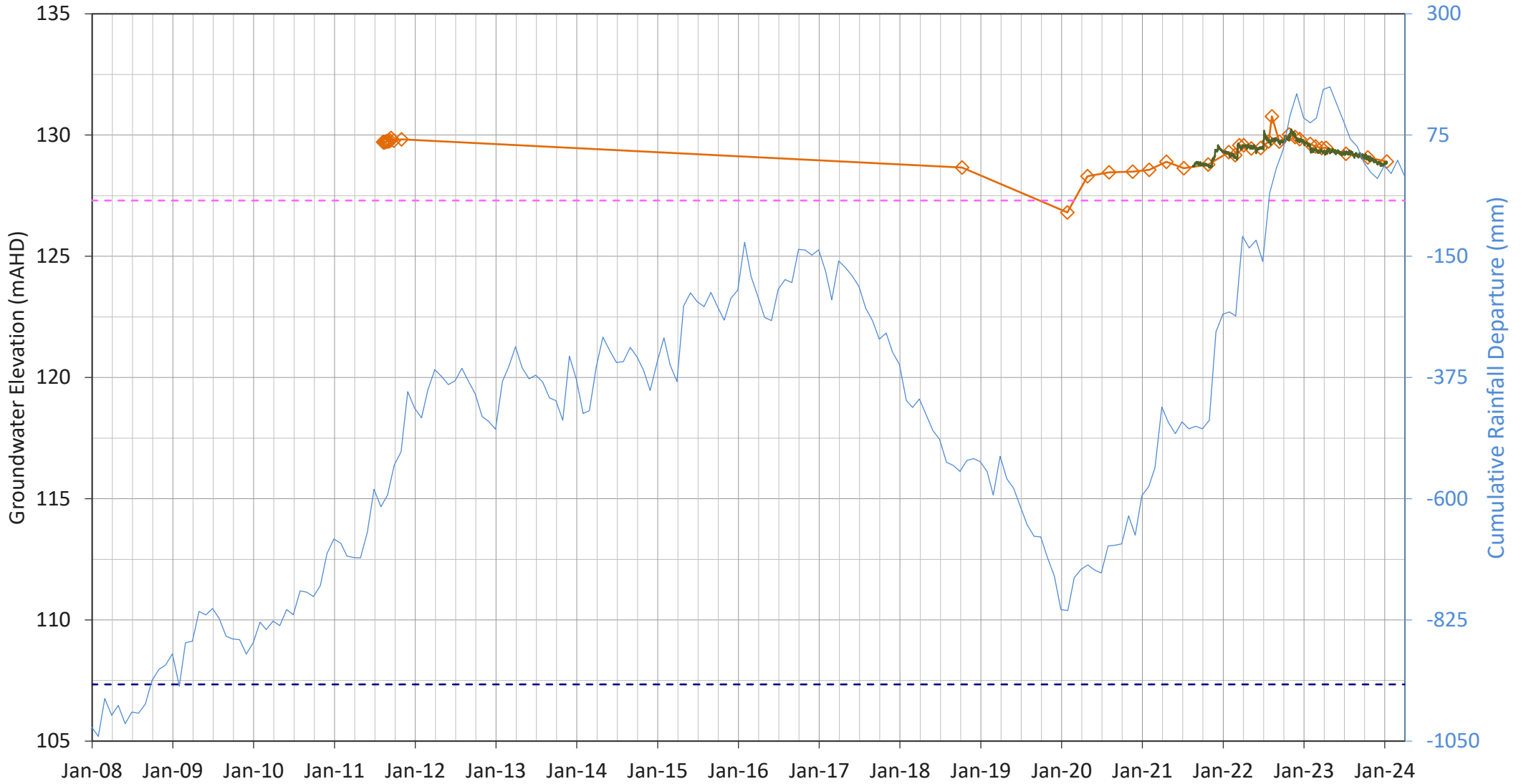
MB2-Regolith



MB3-Alluvial

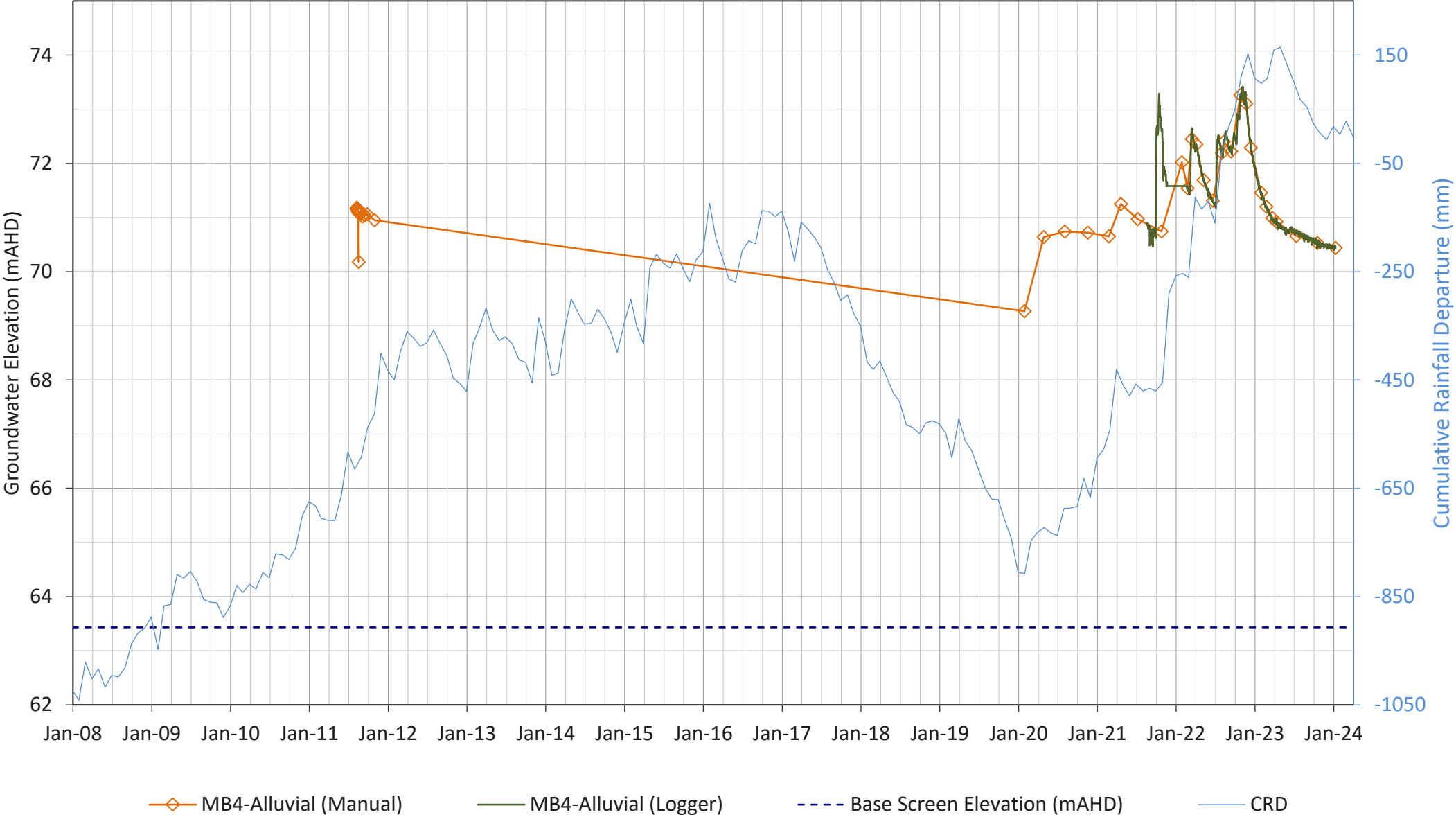


MB3-Regolith

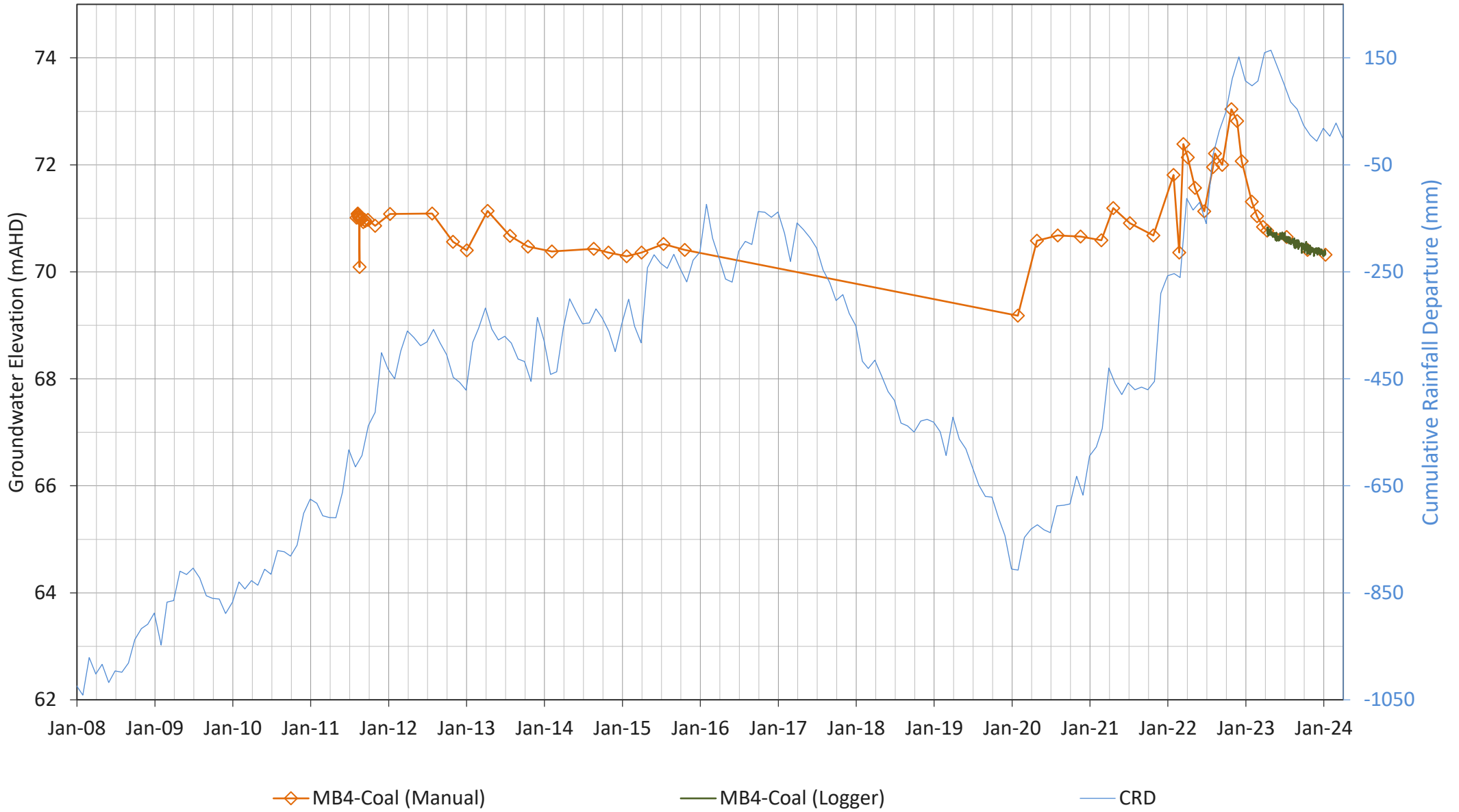


—◇— MB3-Regolith (Manual) — MB3-Regolith (Logger) - - - Lower Trigger Level - - - Base Screen Elevation (mAHD) — CRD

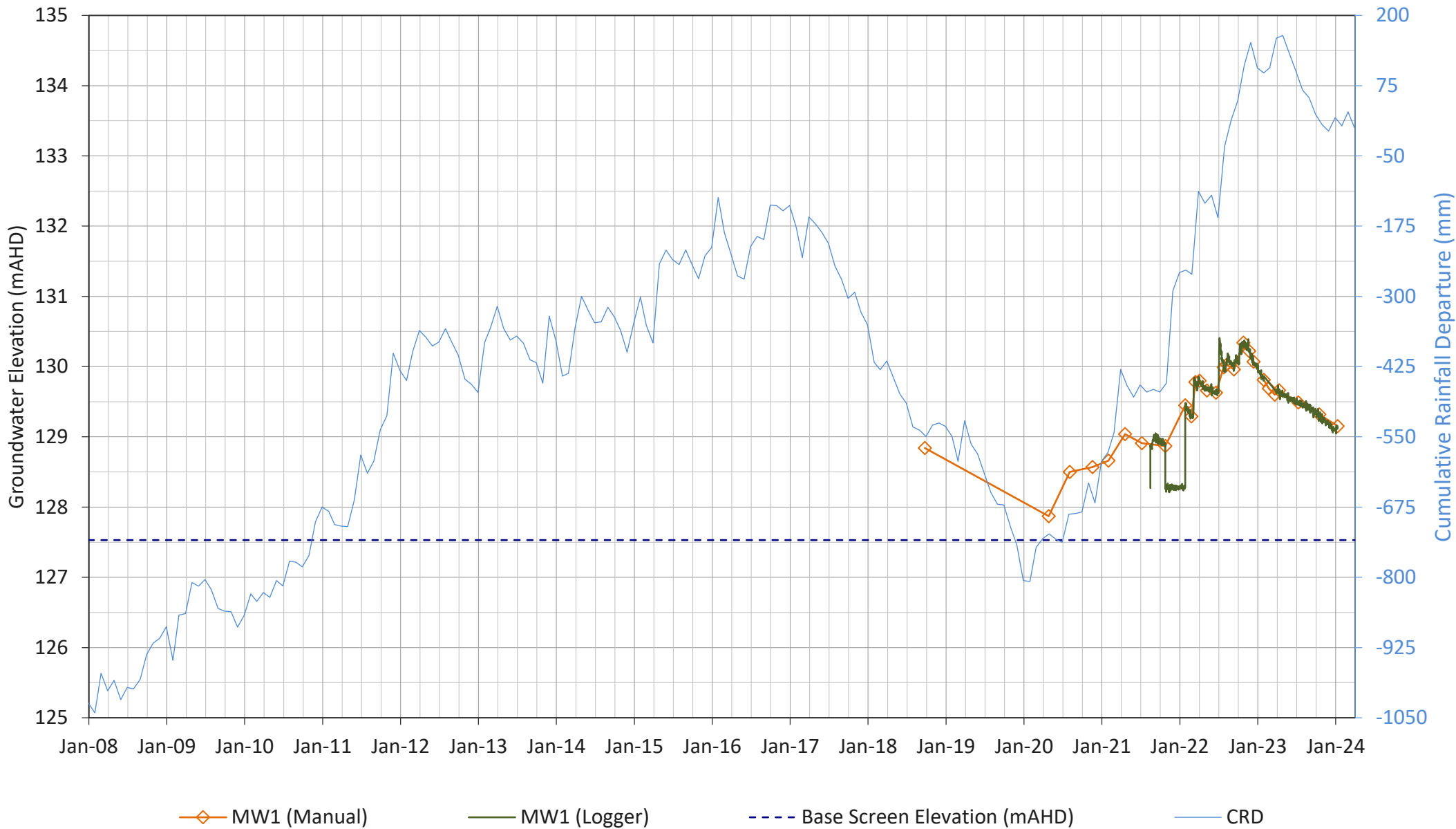
MB4-Alluvial



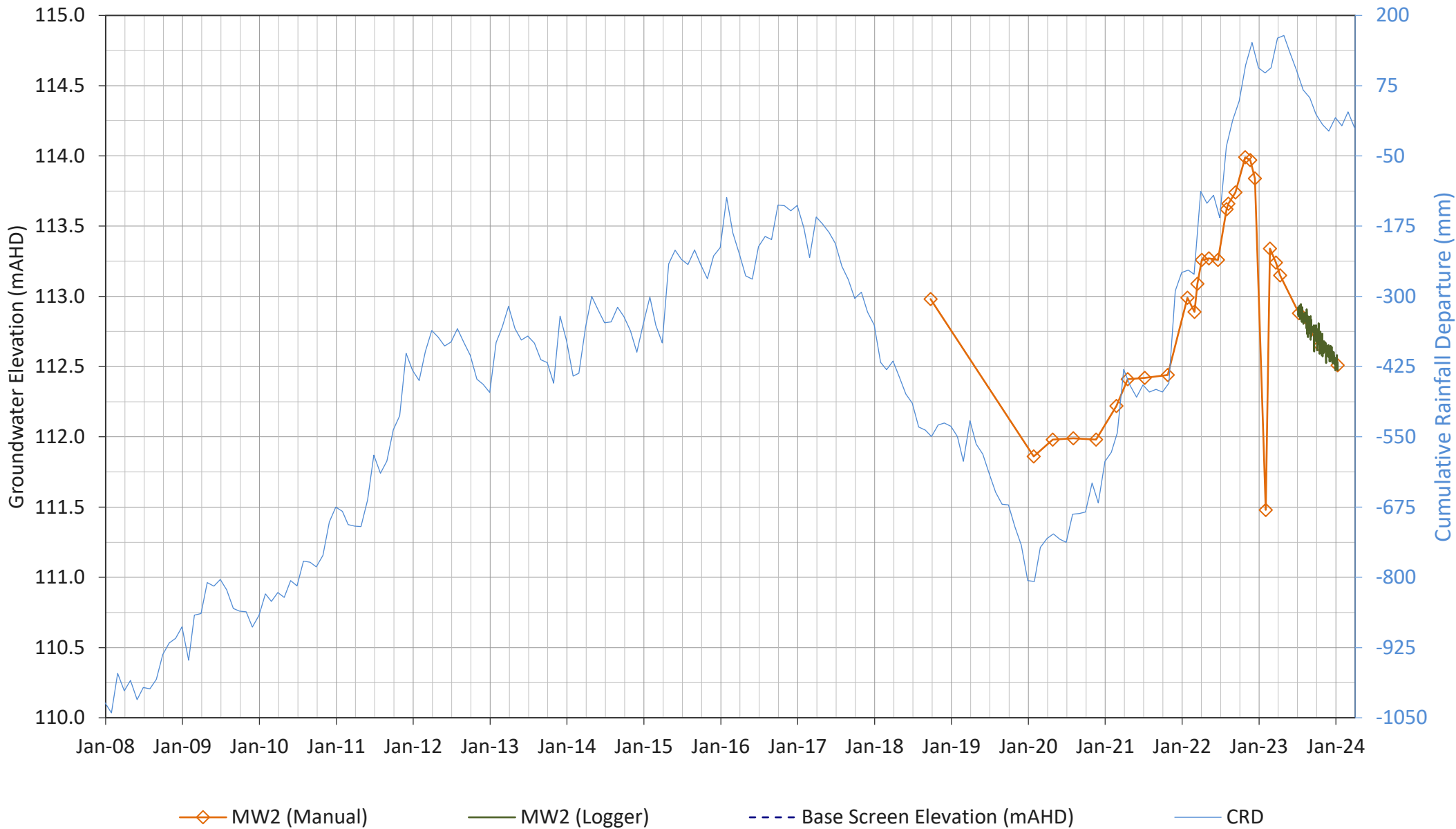
MB4-Coal



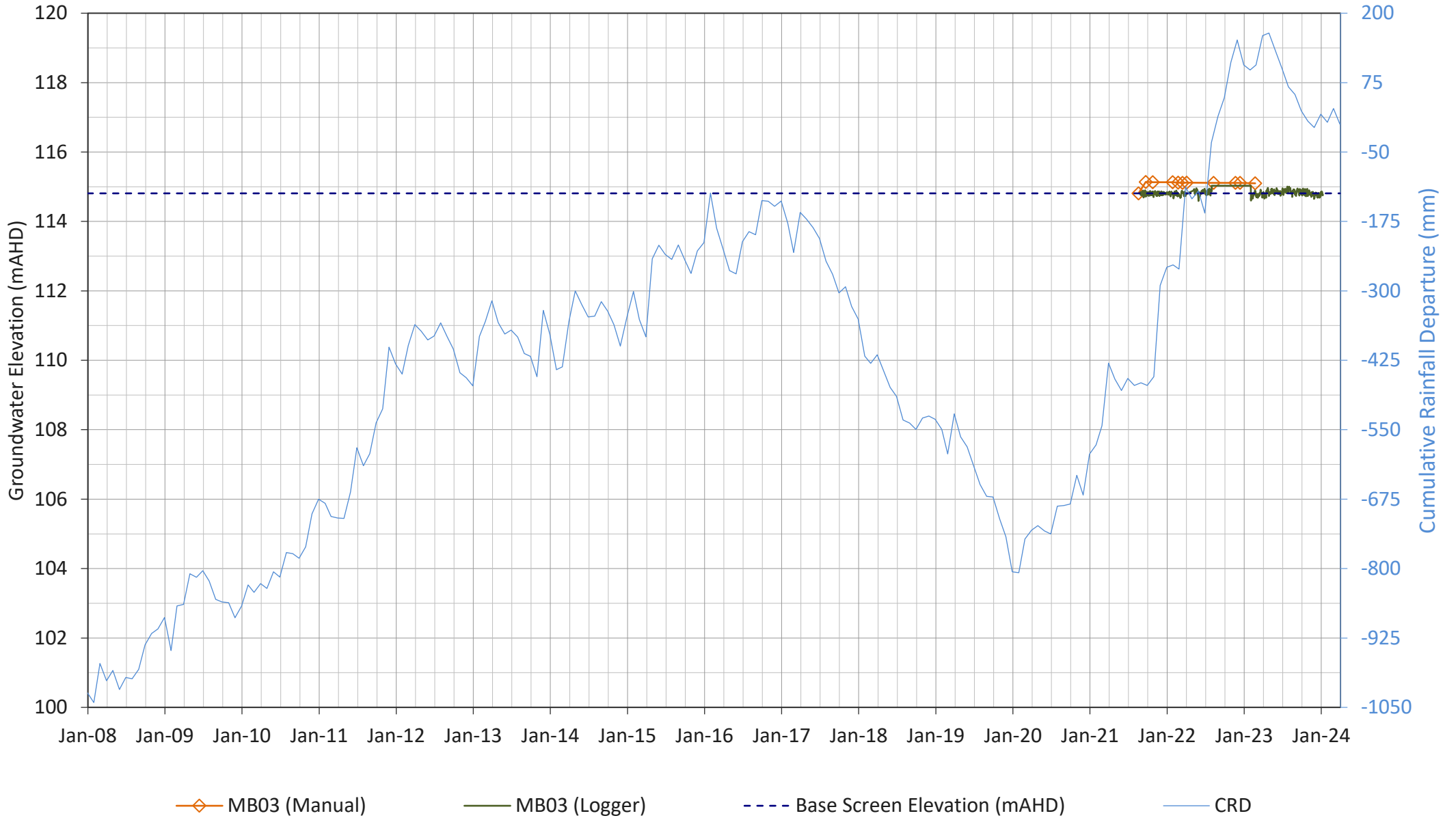
MW1



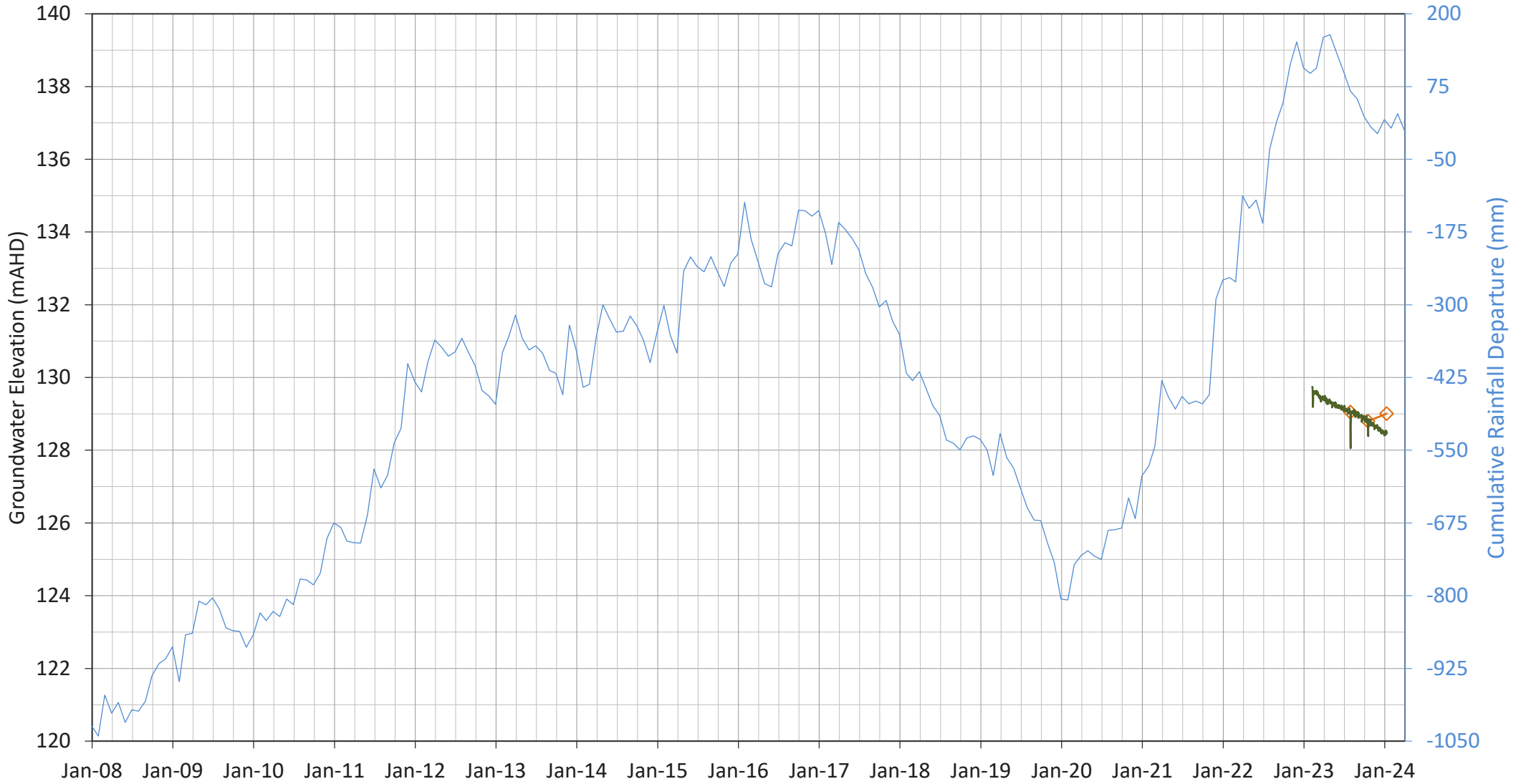
MW2



MB03



MB04

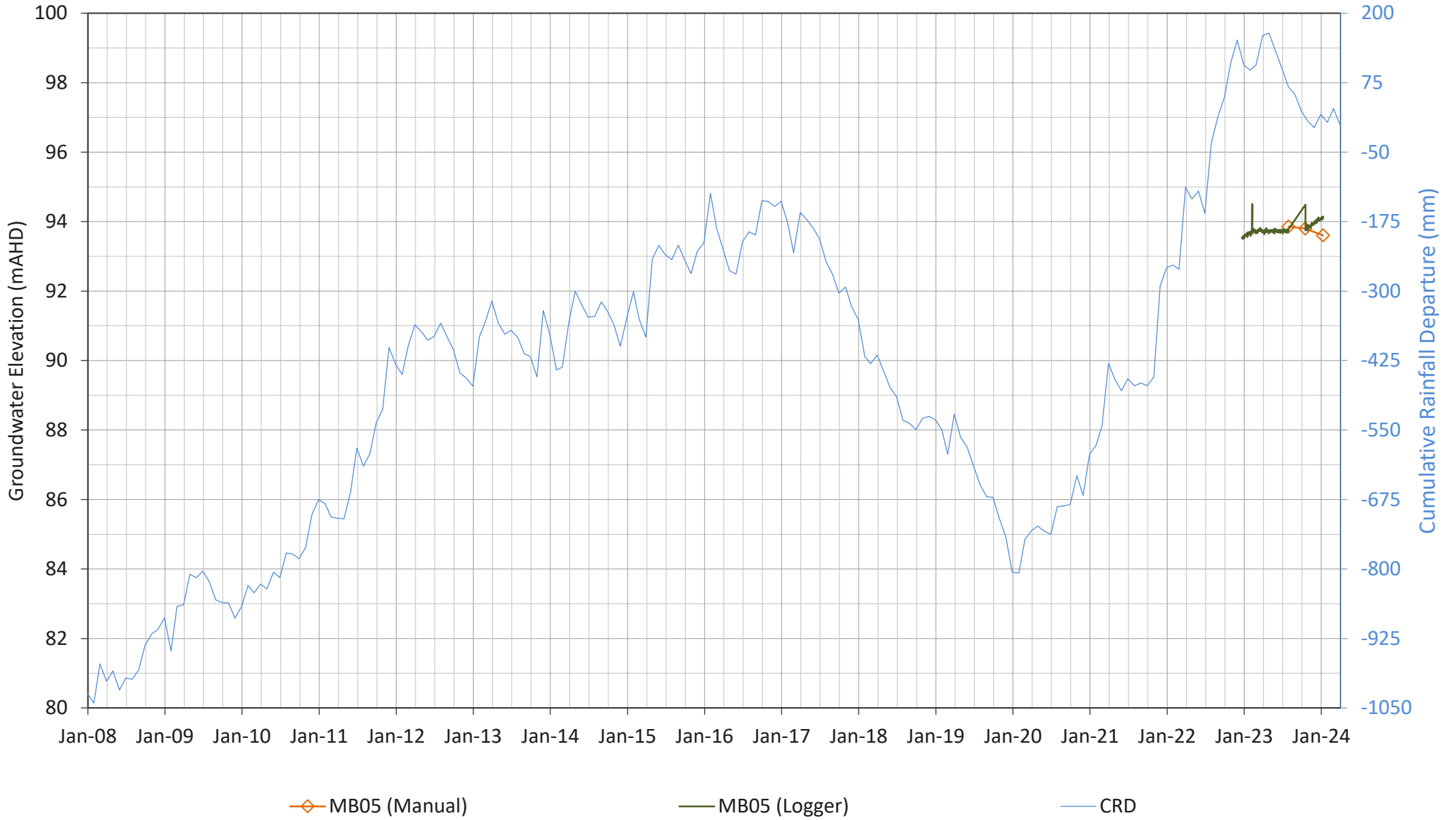


◇ MB04 (Manual)

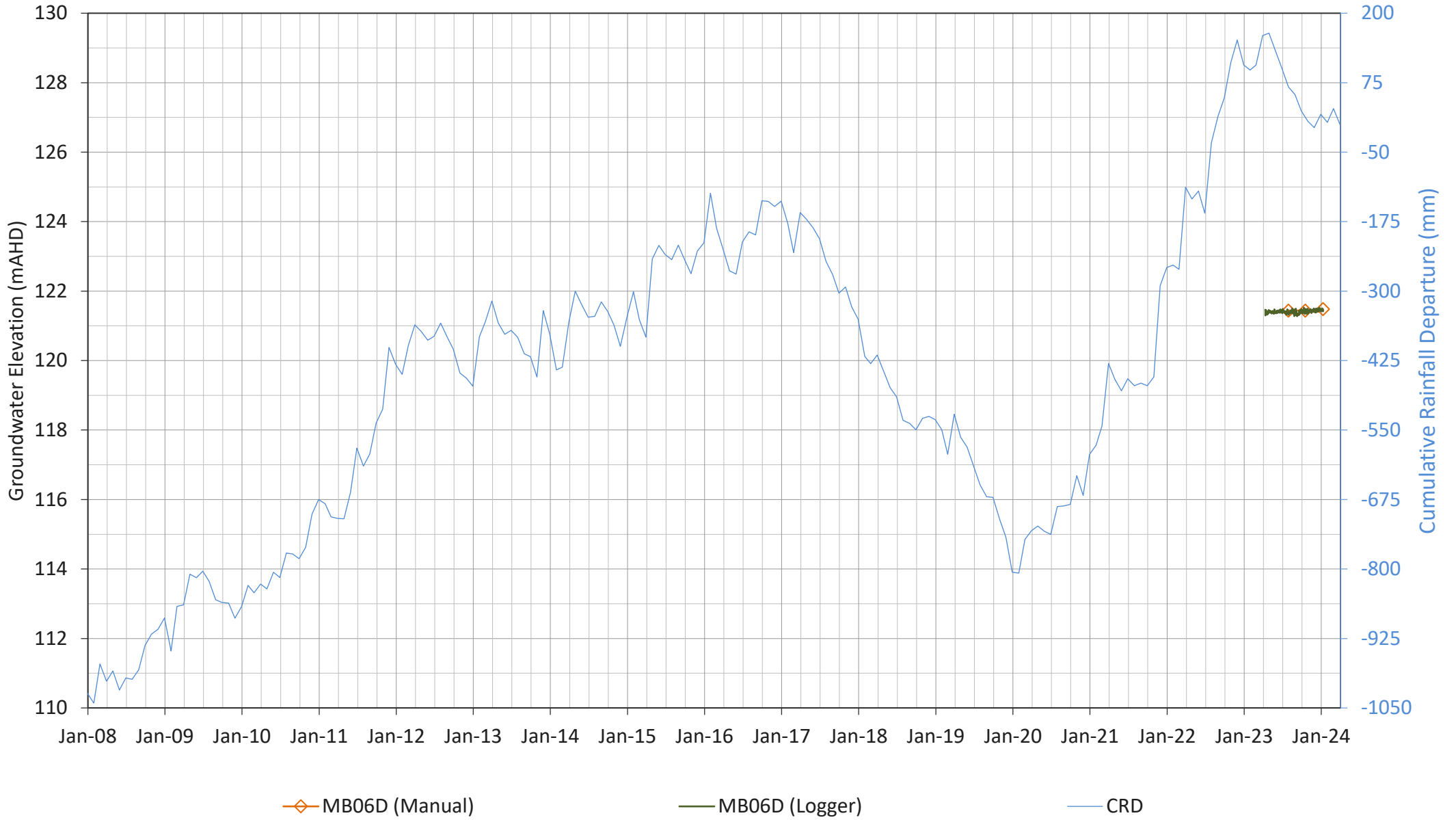
— MB04 (Logger)

— CRD

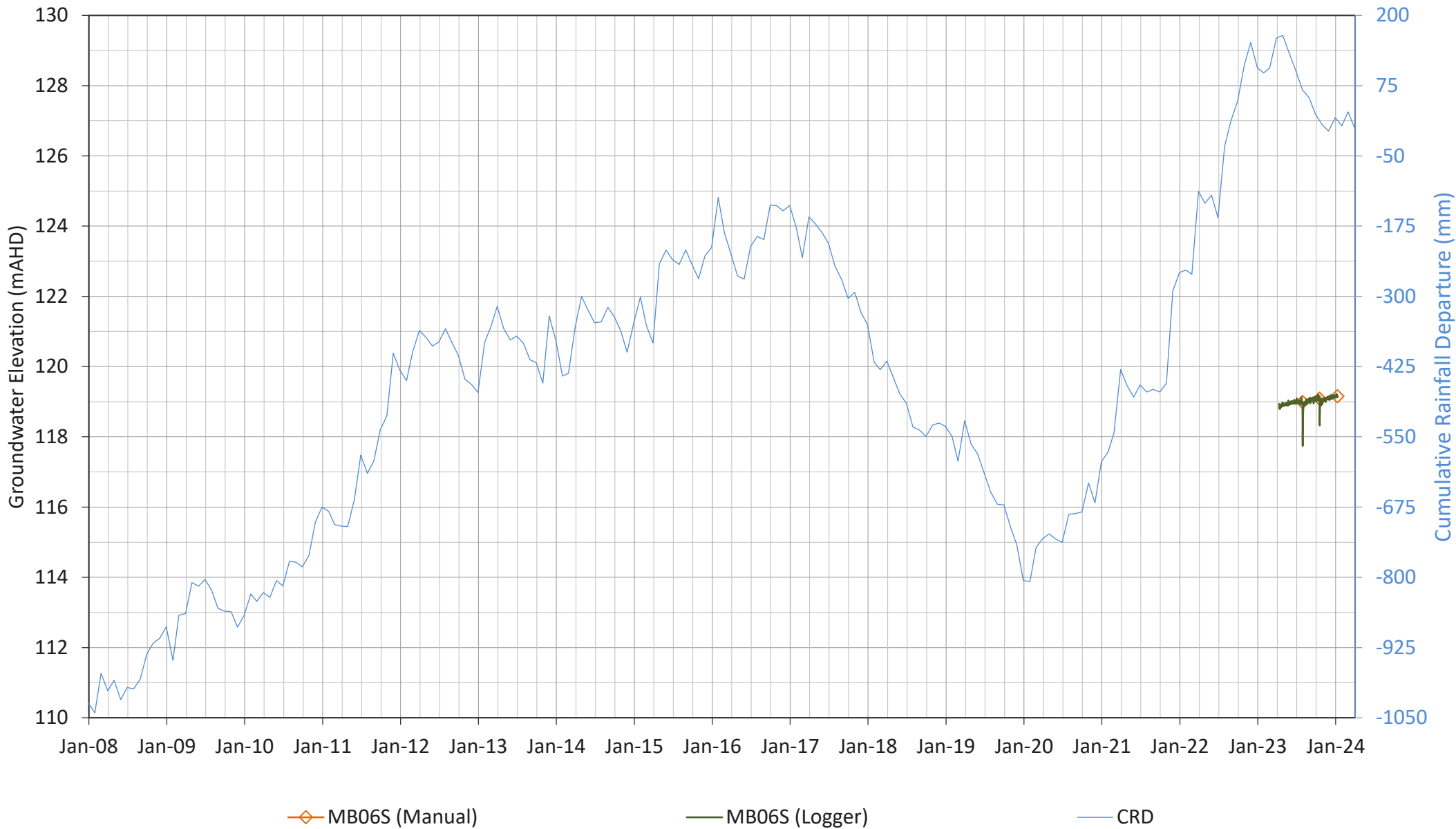
MB05



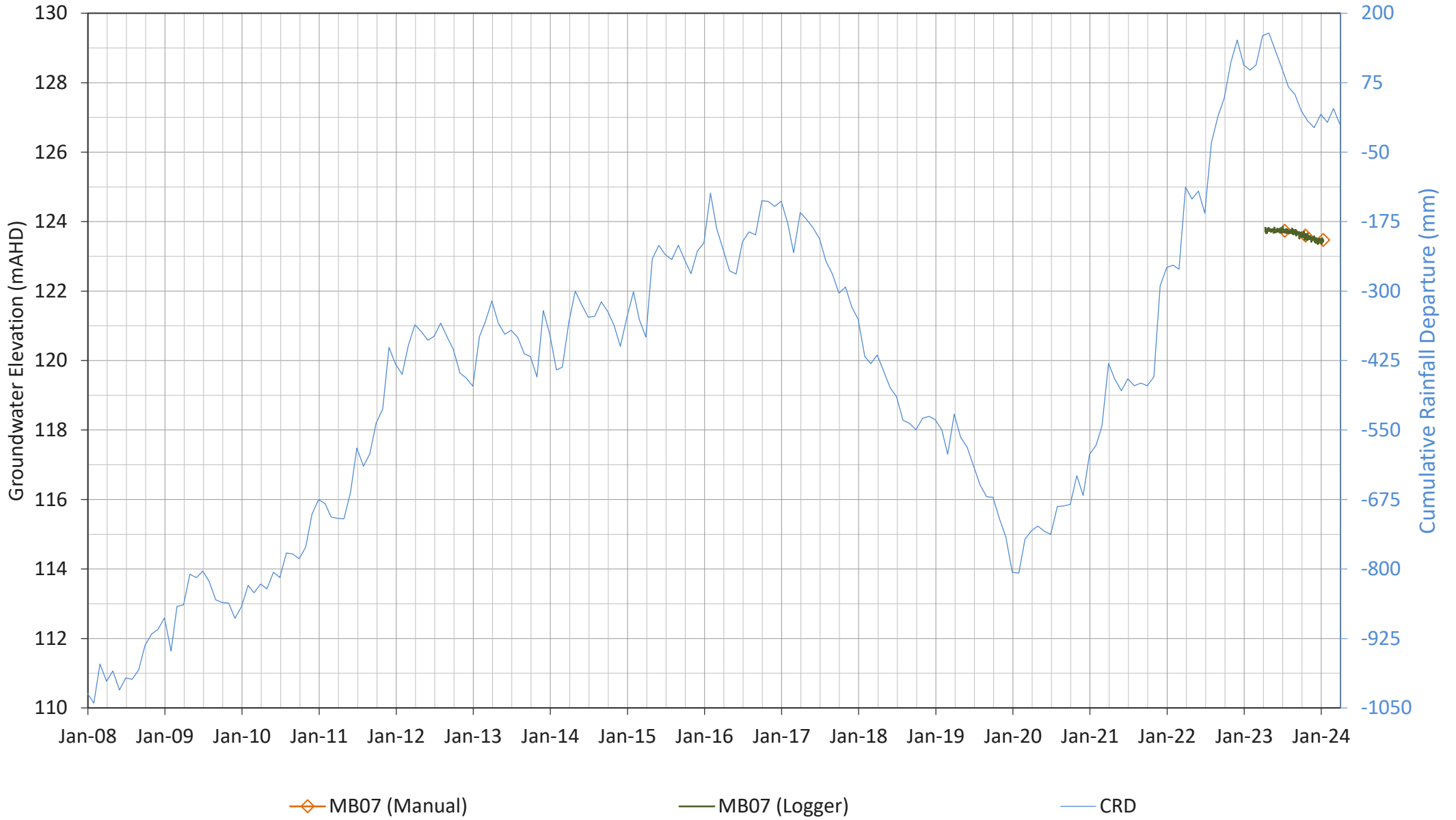
MB06D



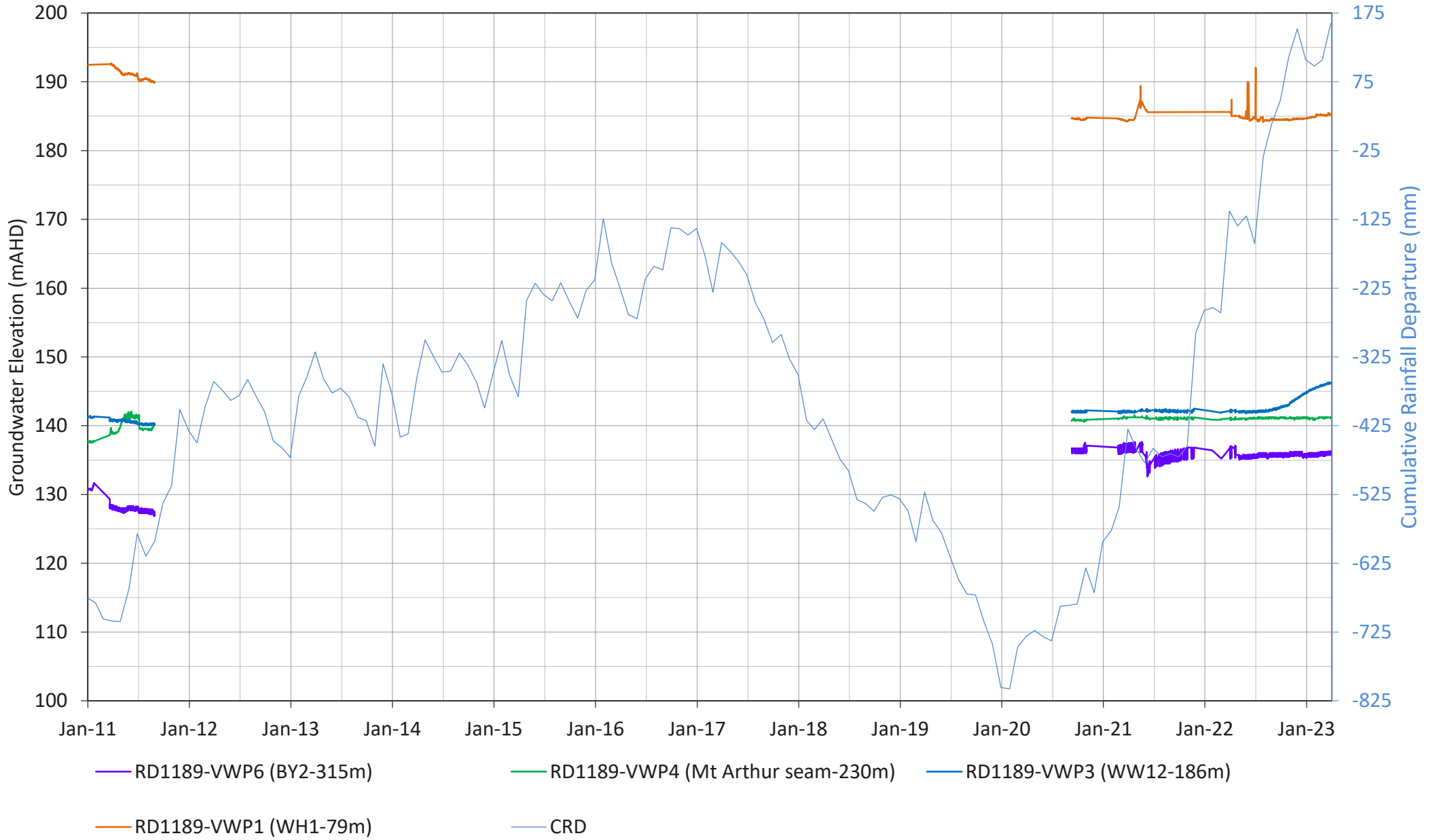
MB06S



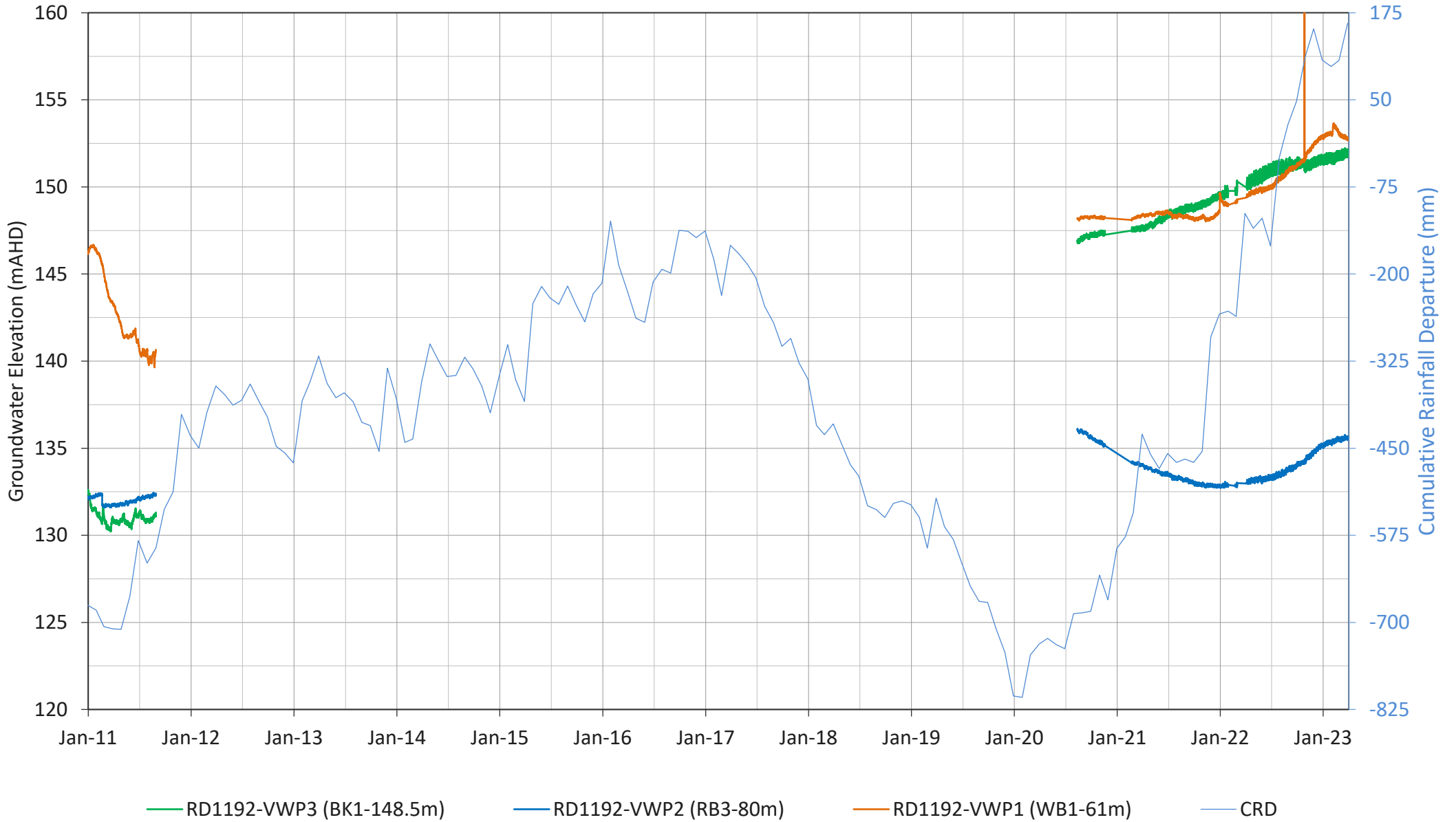
MB07



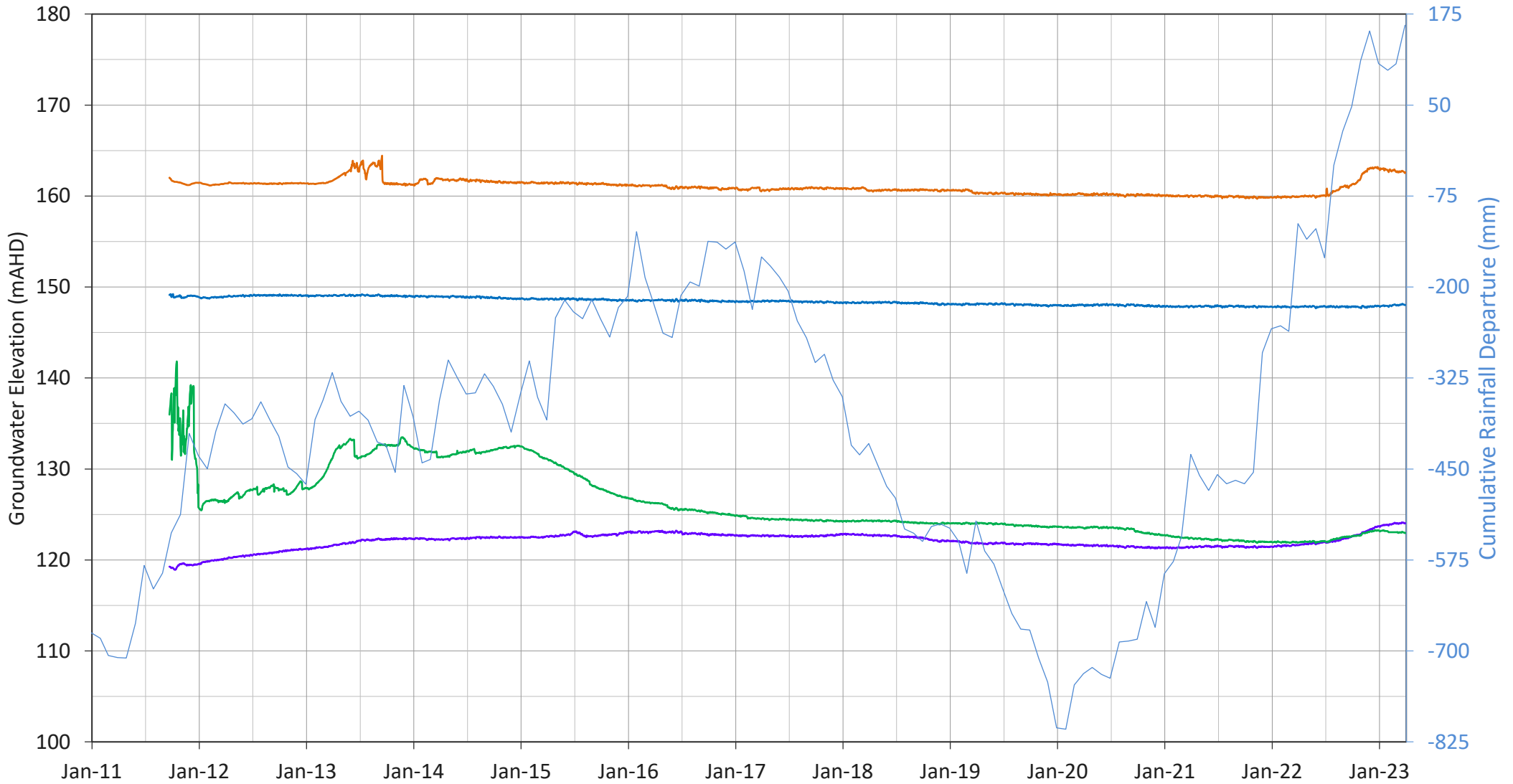
RD1189



RD1192



BKL6R12



— BKL6R12-VWP1 (WB2-25m)

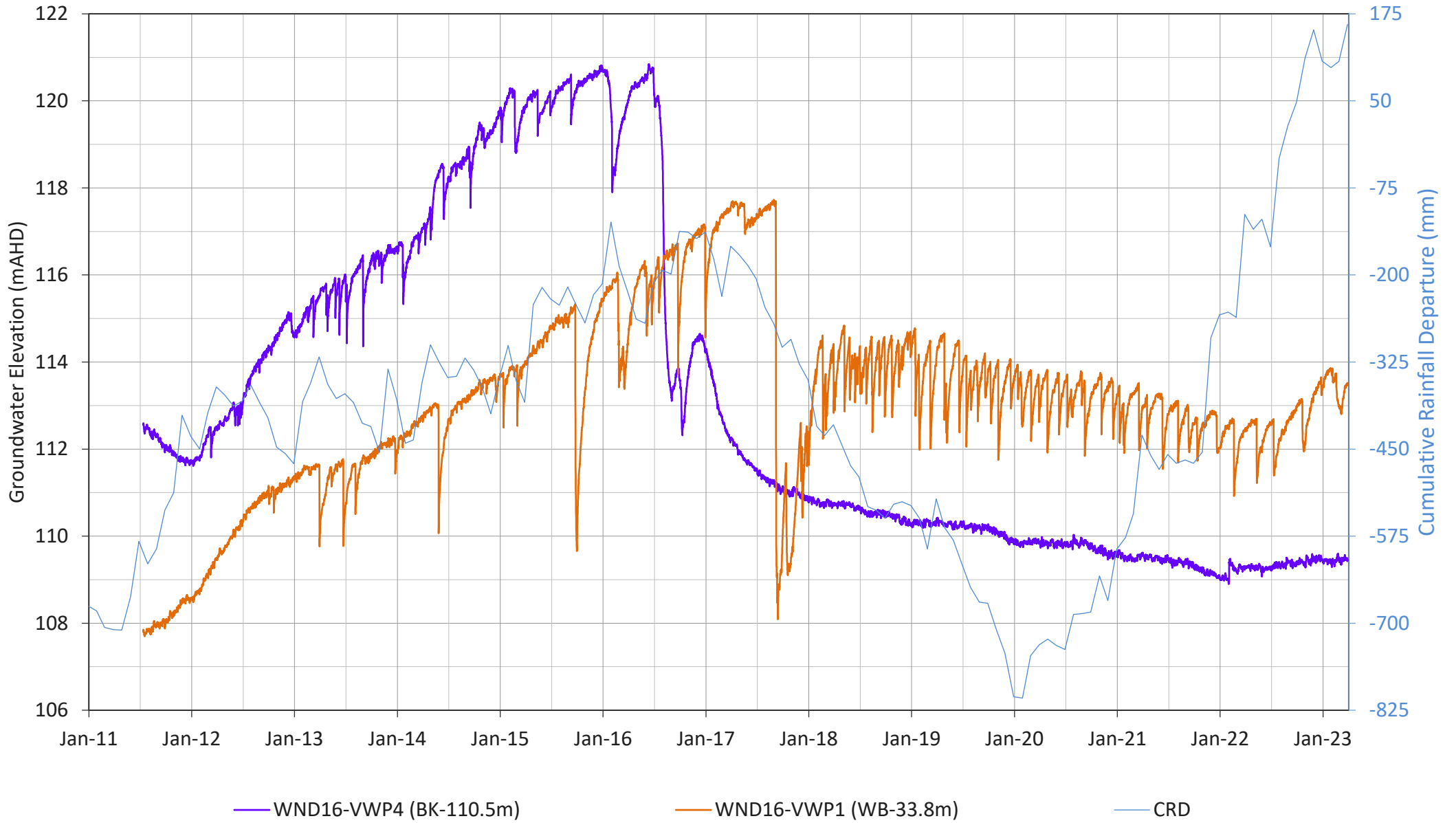
— BKL6R12-VWP4 (BK1-113.7m)

— BKL6R12-VWP3 (WN2-86.5m)

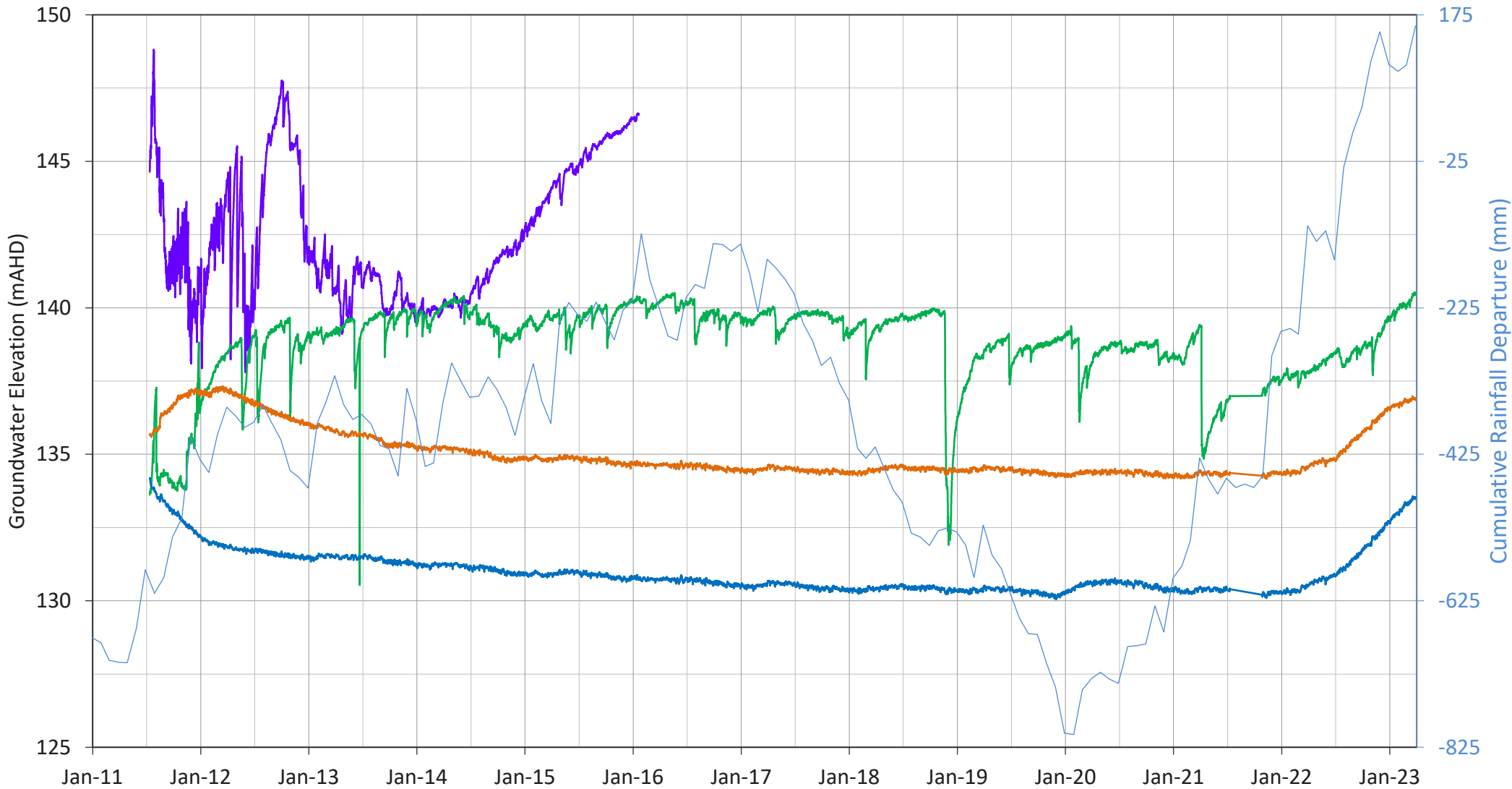
— BKL6R12-VWP2 (RB-40.5m)

— CRD

WND16

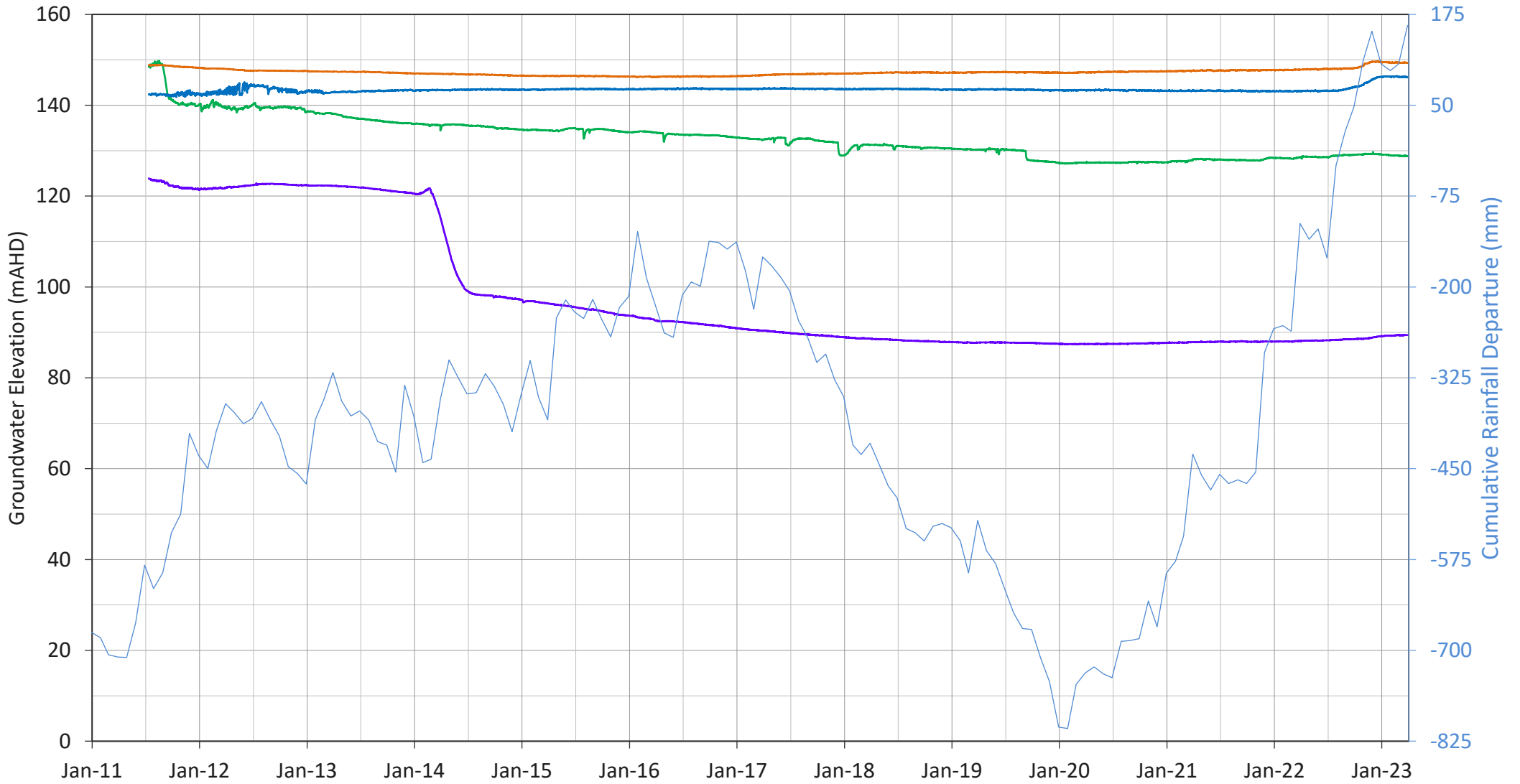


WND26



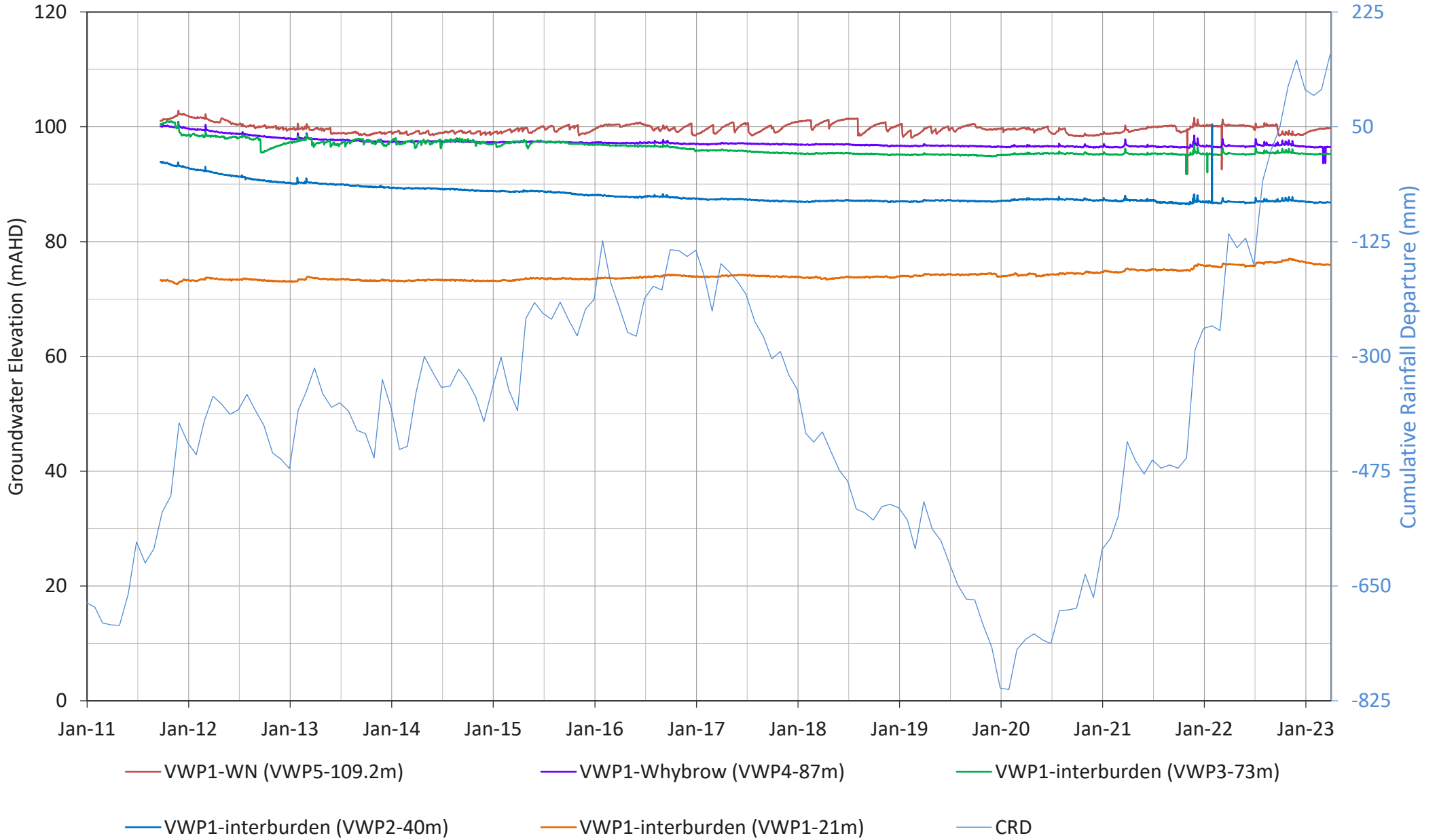
— WND26-VWP4 (WN-144.3m) — WND26-VWP3 (WB-123.5m) — WND26-VWP2 (RB-84.6m)
— WND26-VWP1 (Whybrow-77.3m) — CRD

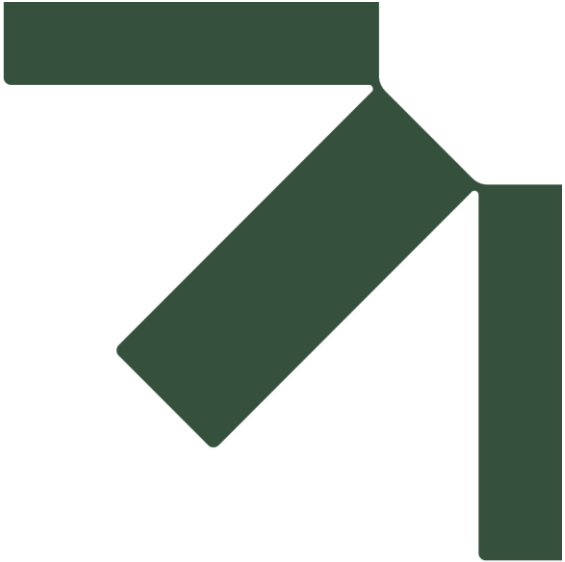
RBD_1



RBD_1-VWP4 (BK-103.3m) RBD_1-VWP3 (WN-79.5m) RBD_1-VWP2 (RB-33.6m) RBD_1-VWP1 (Whybrow-24.7m) CRD

VWP1





Appendix C Groundwater Quality and Trigger Levels (only sites within the TARP)

Maxwell Underground Mine

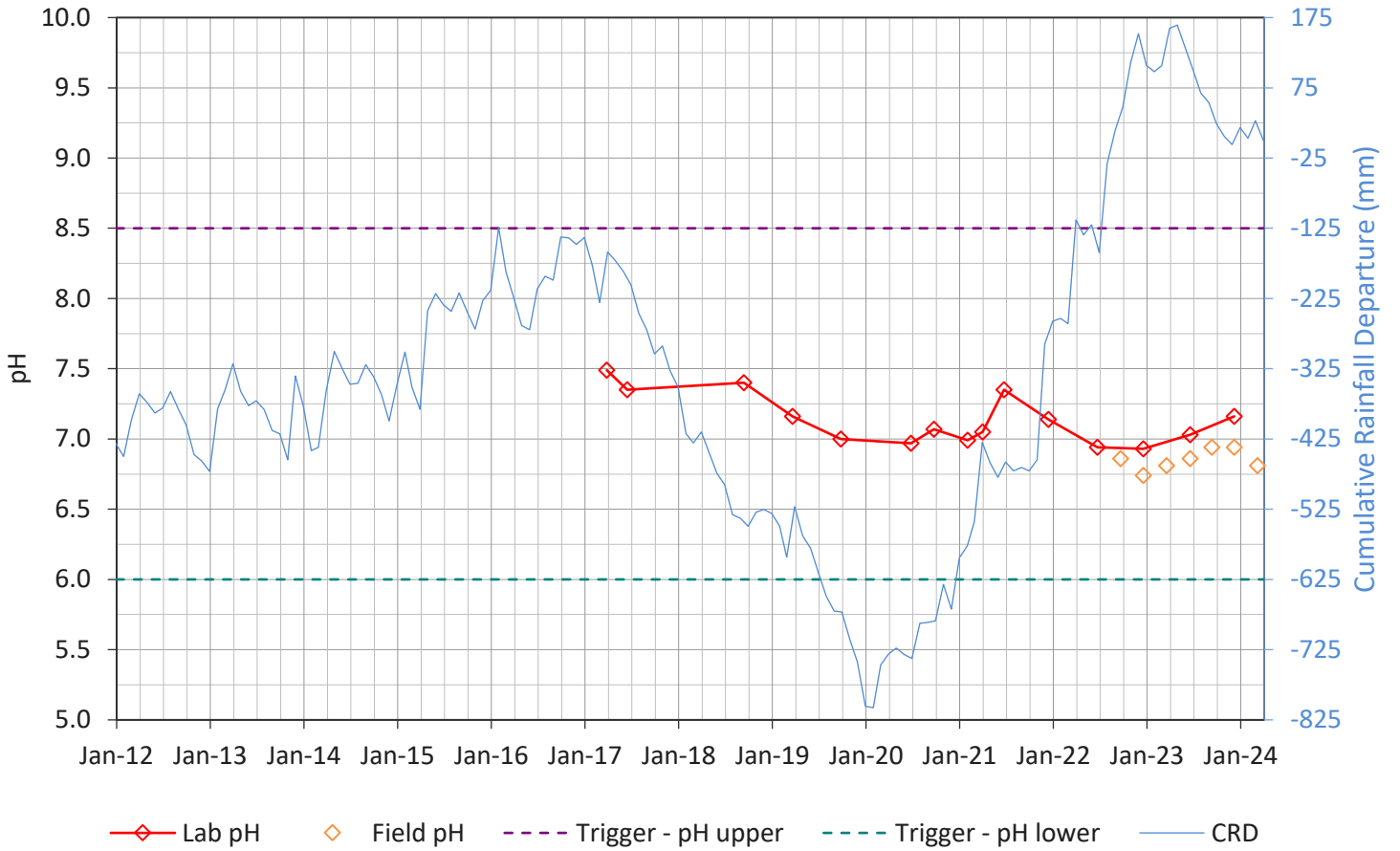
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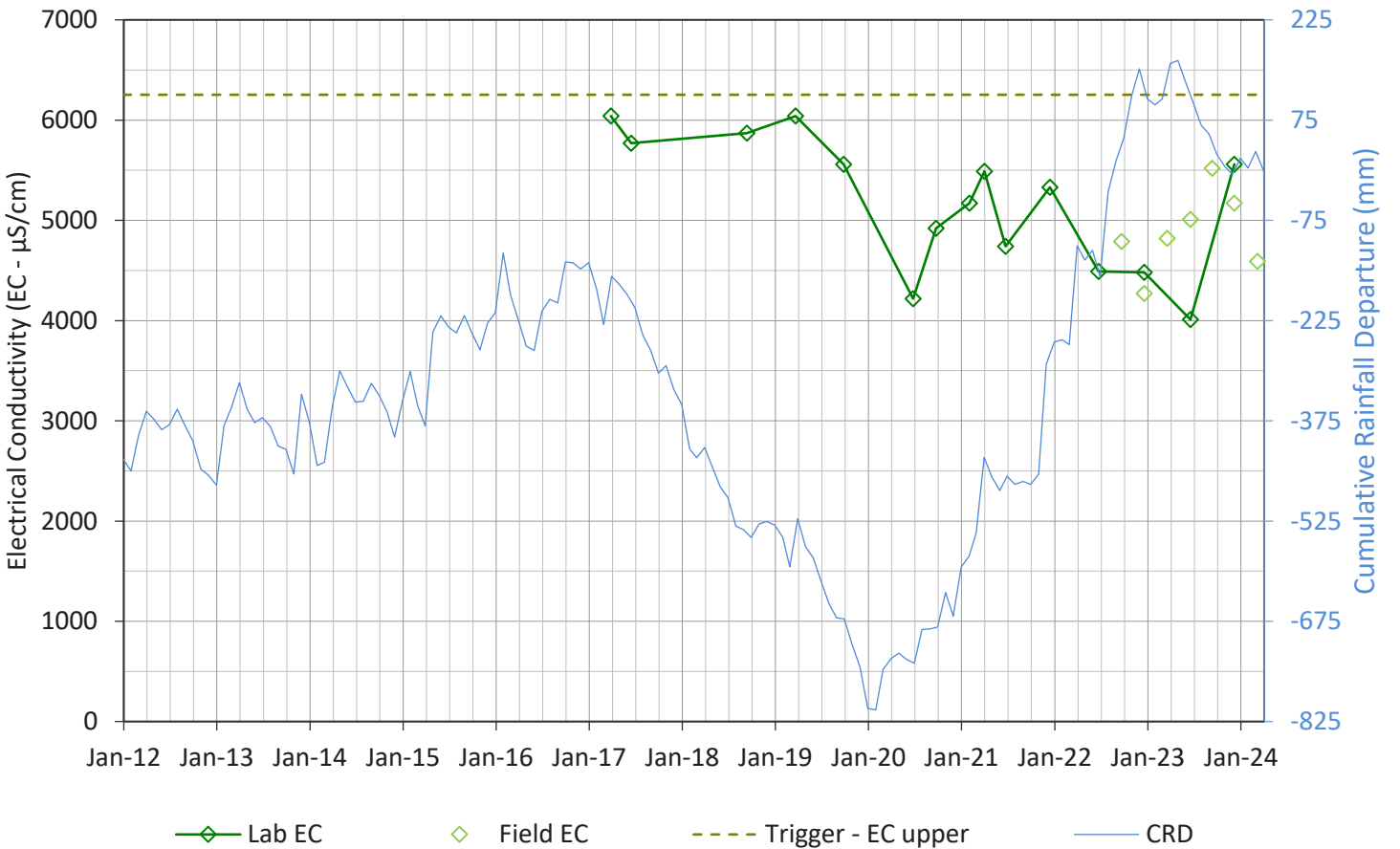
SLR Project No.: 610.031830.00001

19 April 2024

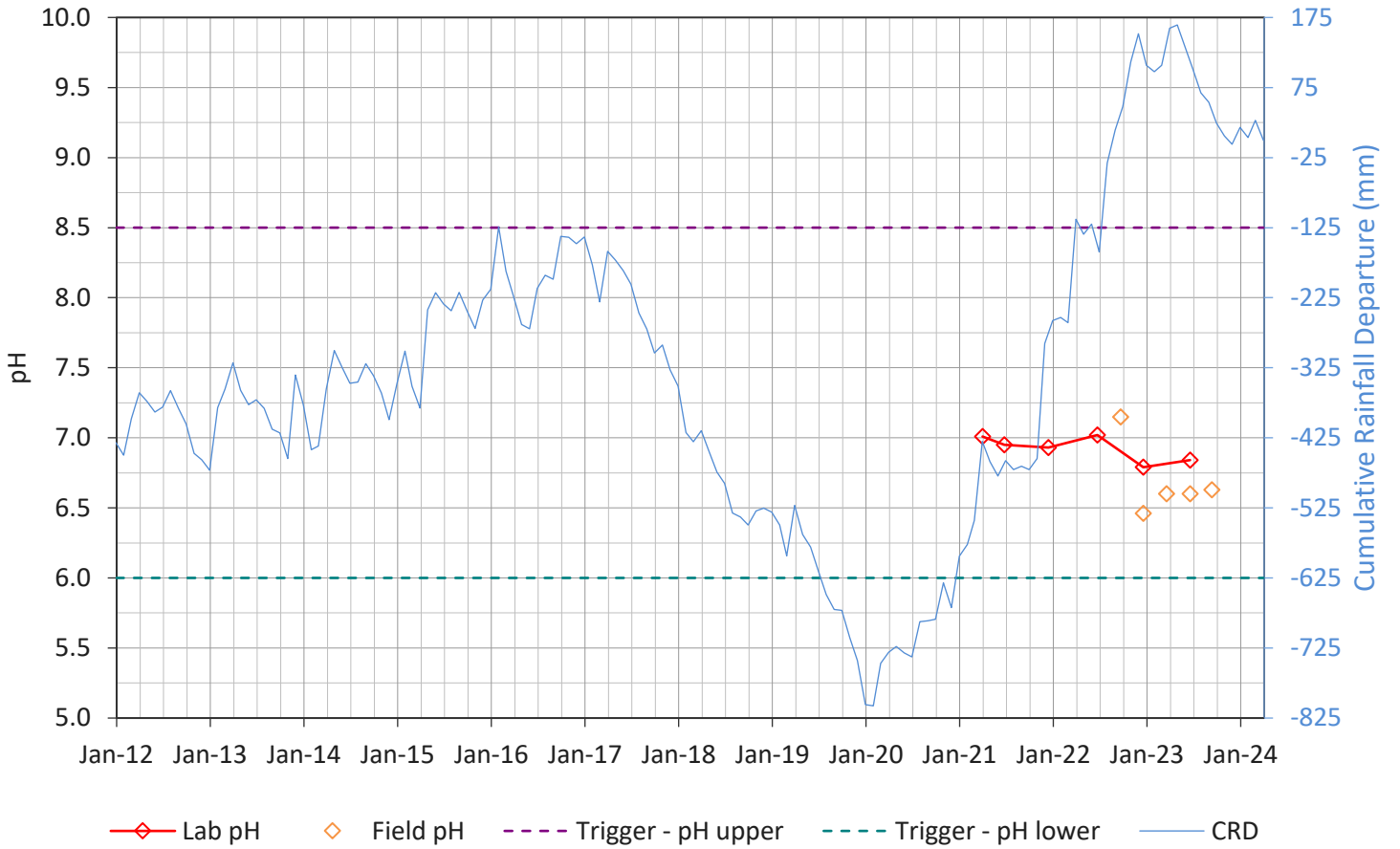
R4241 - pH



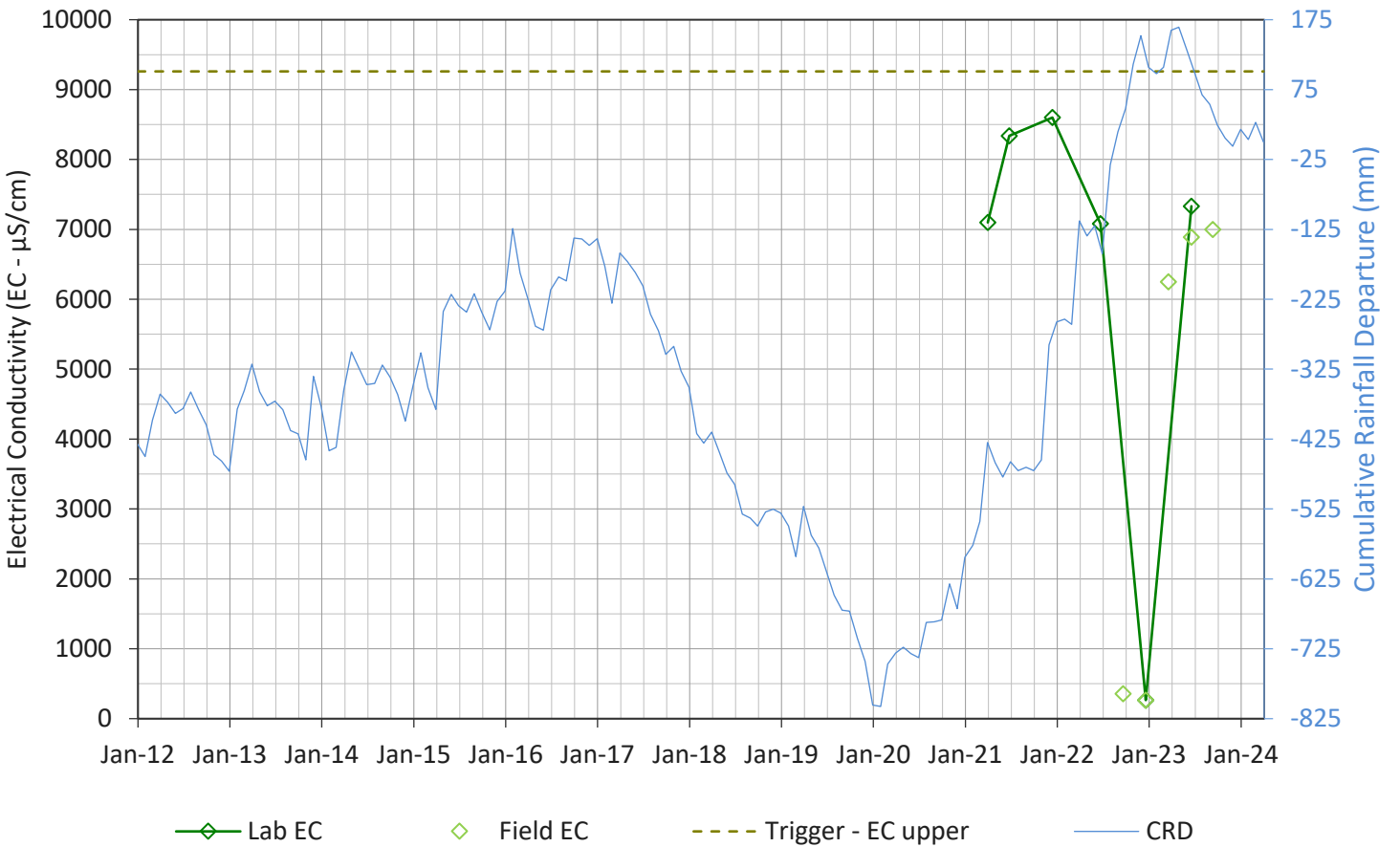
R4241 - EC



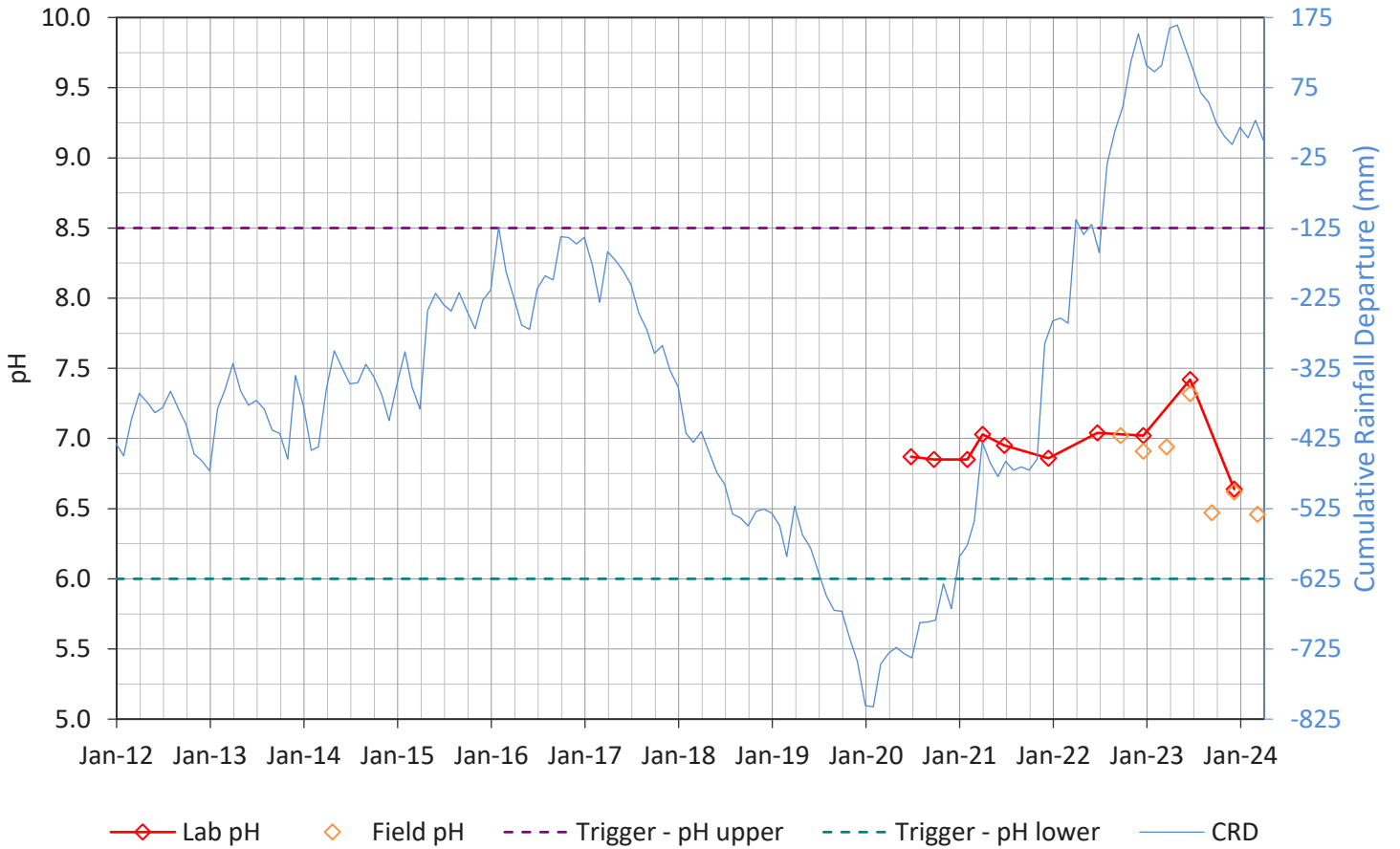
GW01S - pH



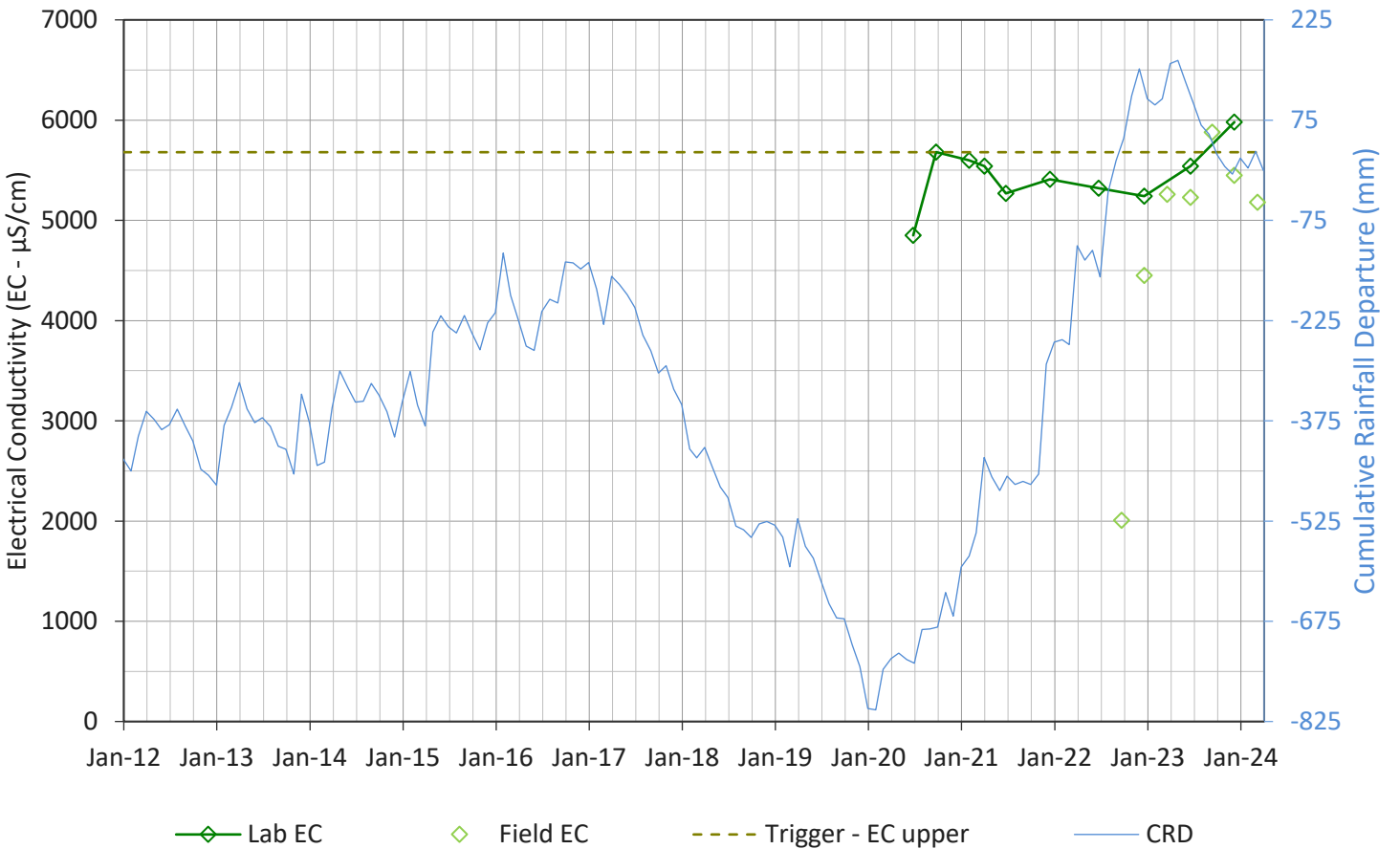
GW01S - EC



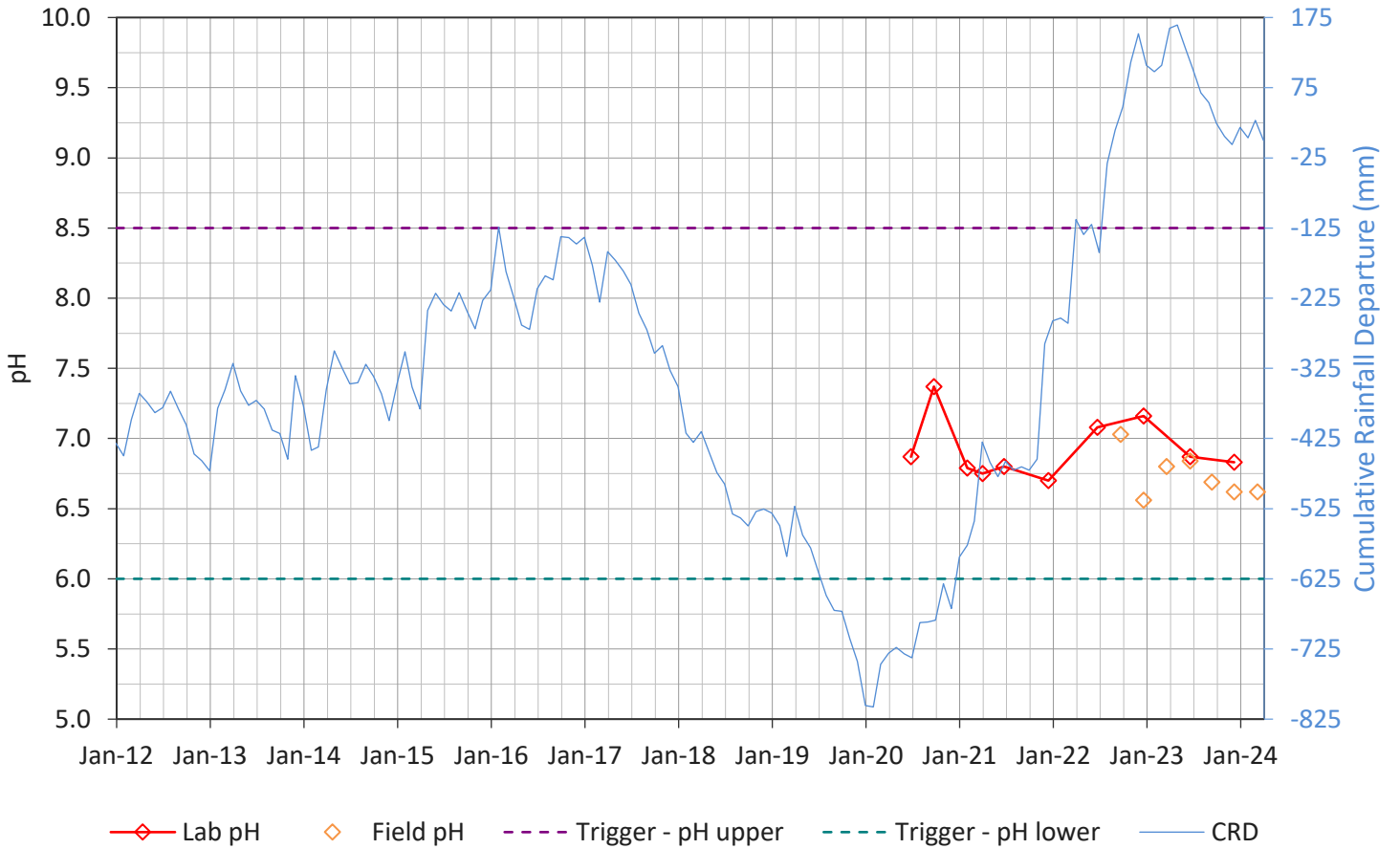
GW01D - pH



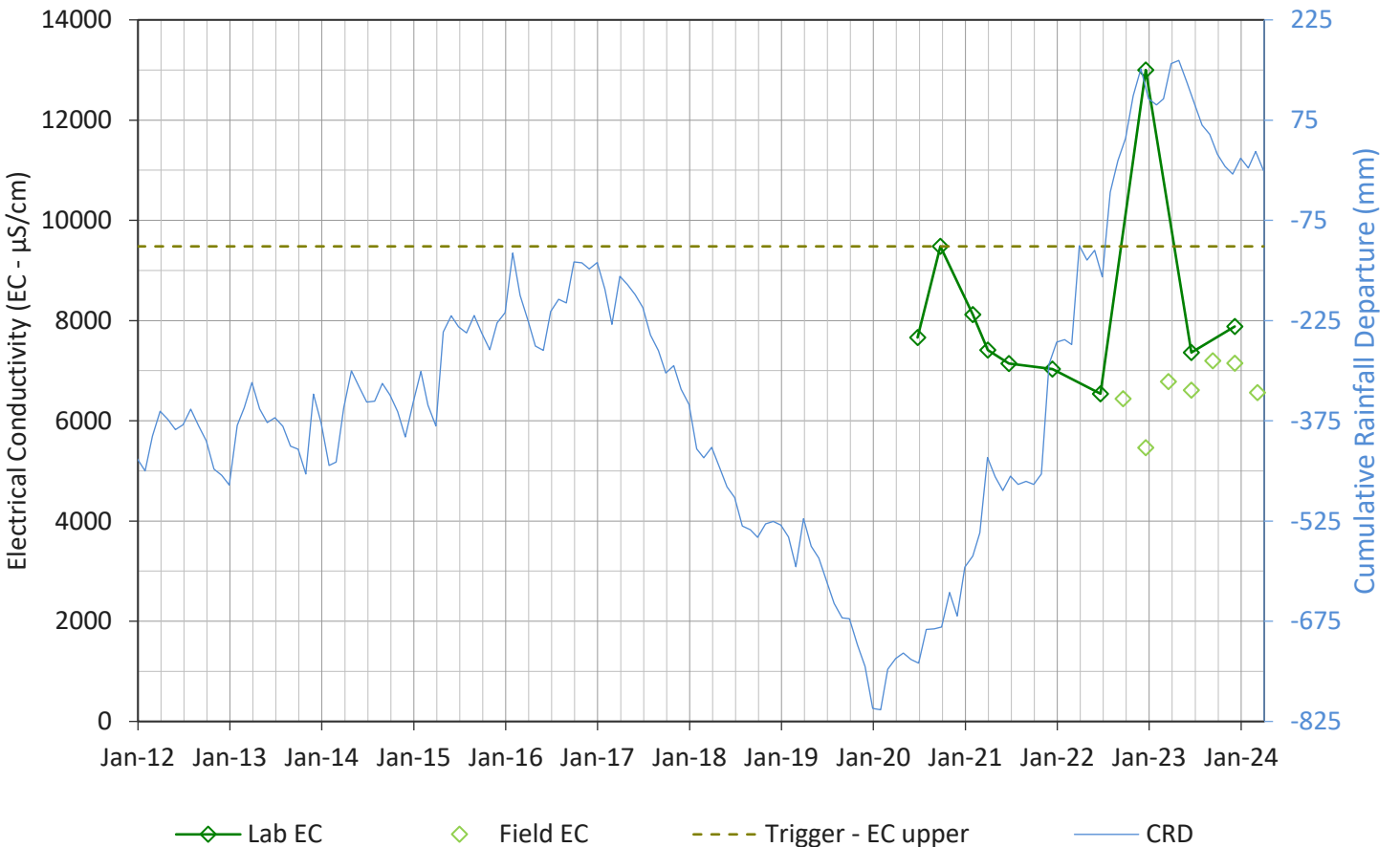
GW01D - EC



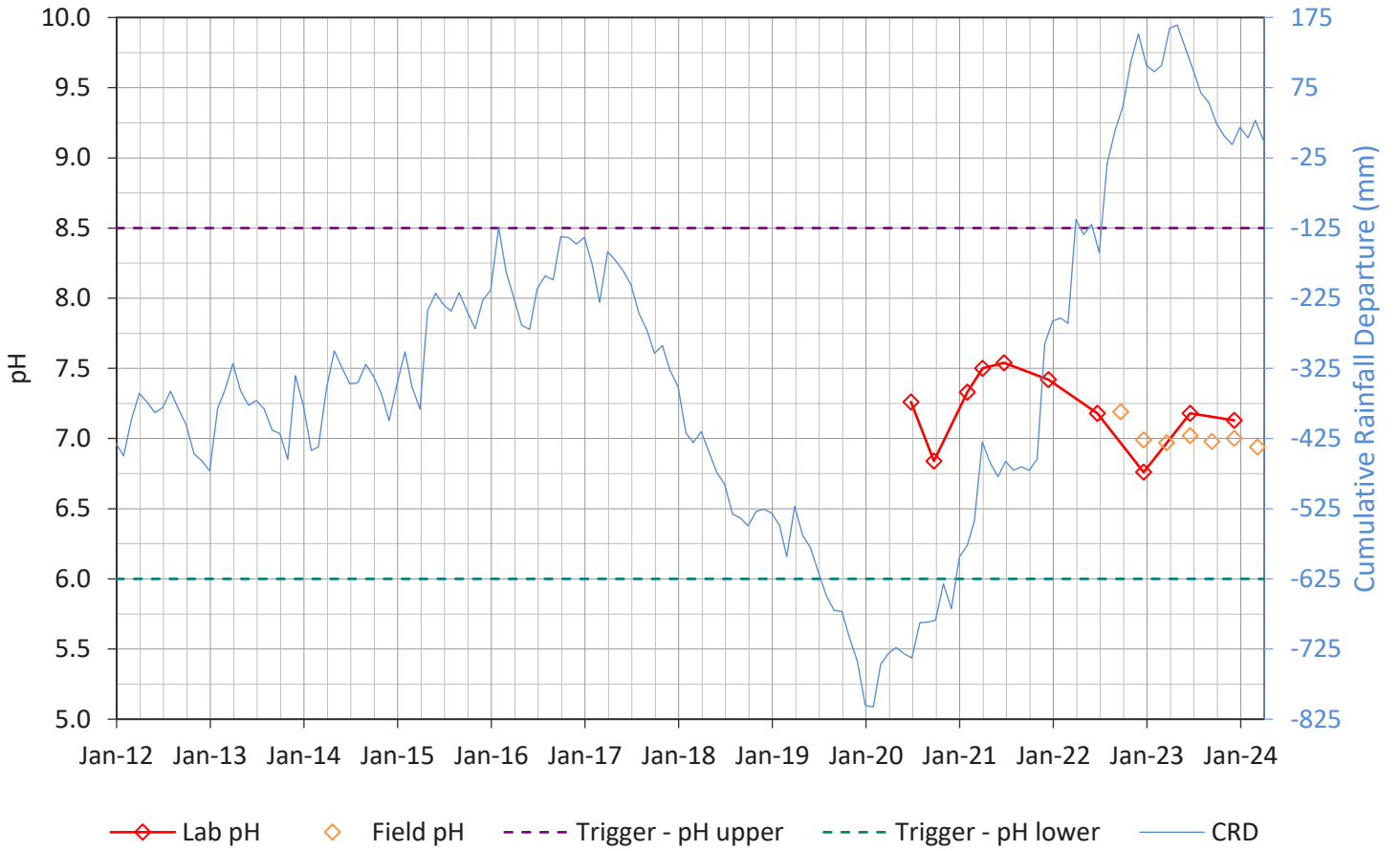
GW02S - pH



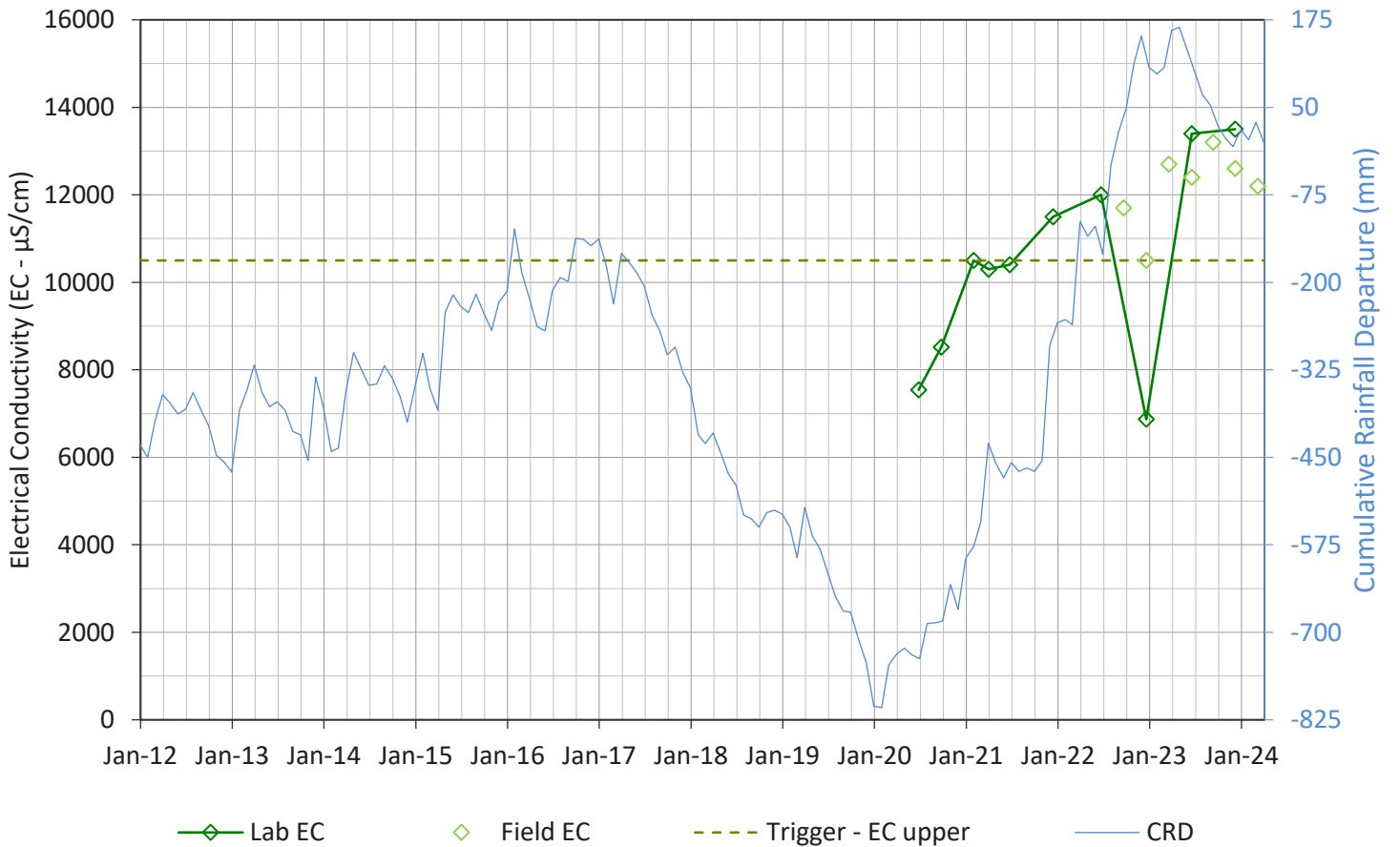
GW02S - EC



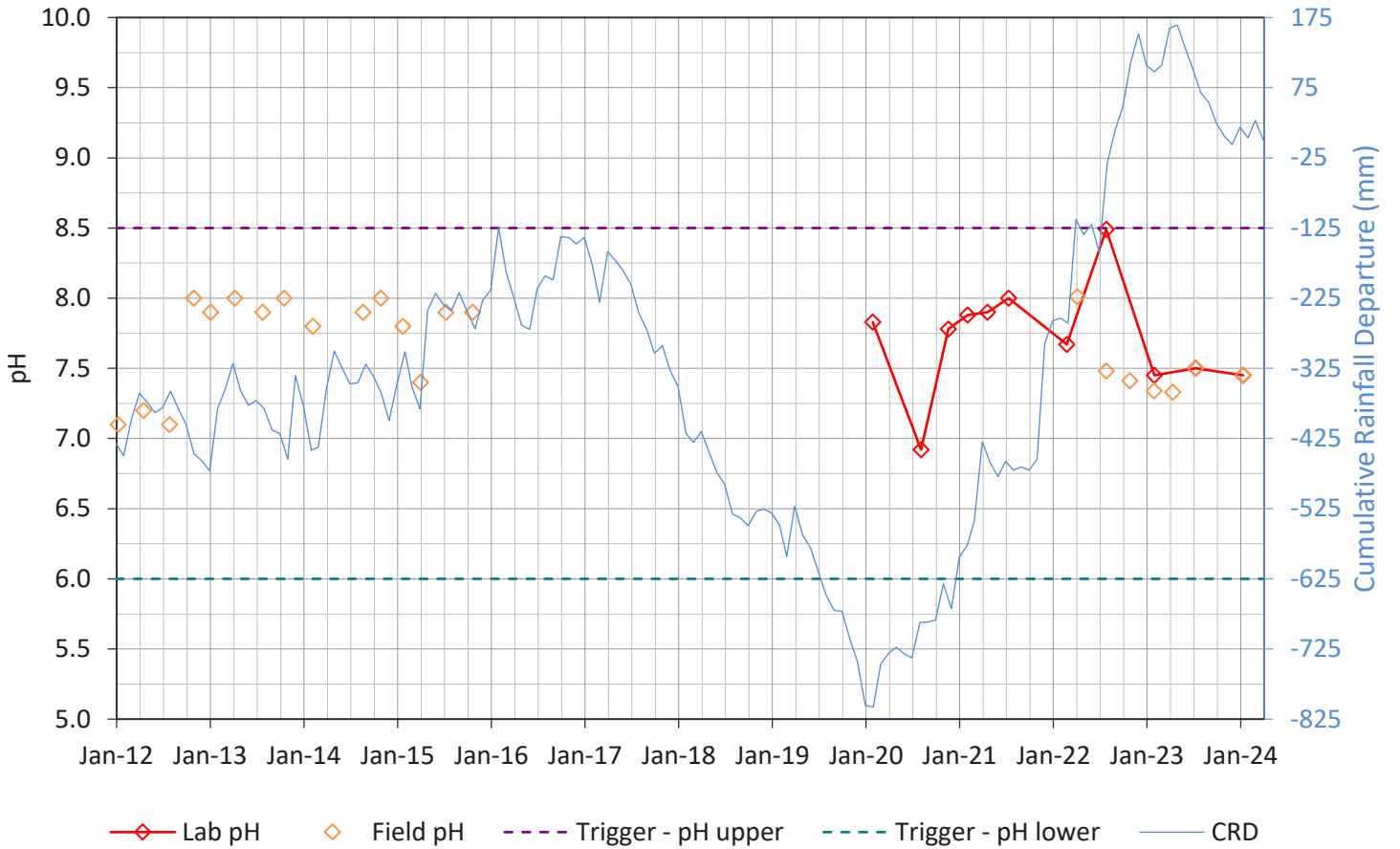
GW02D - pH



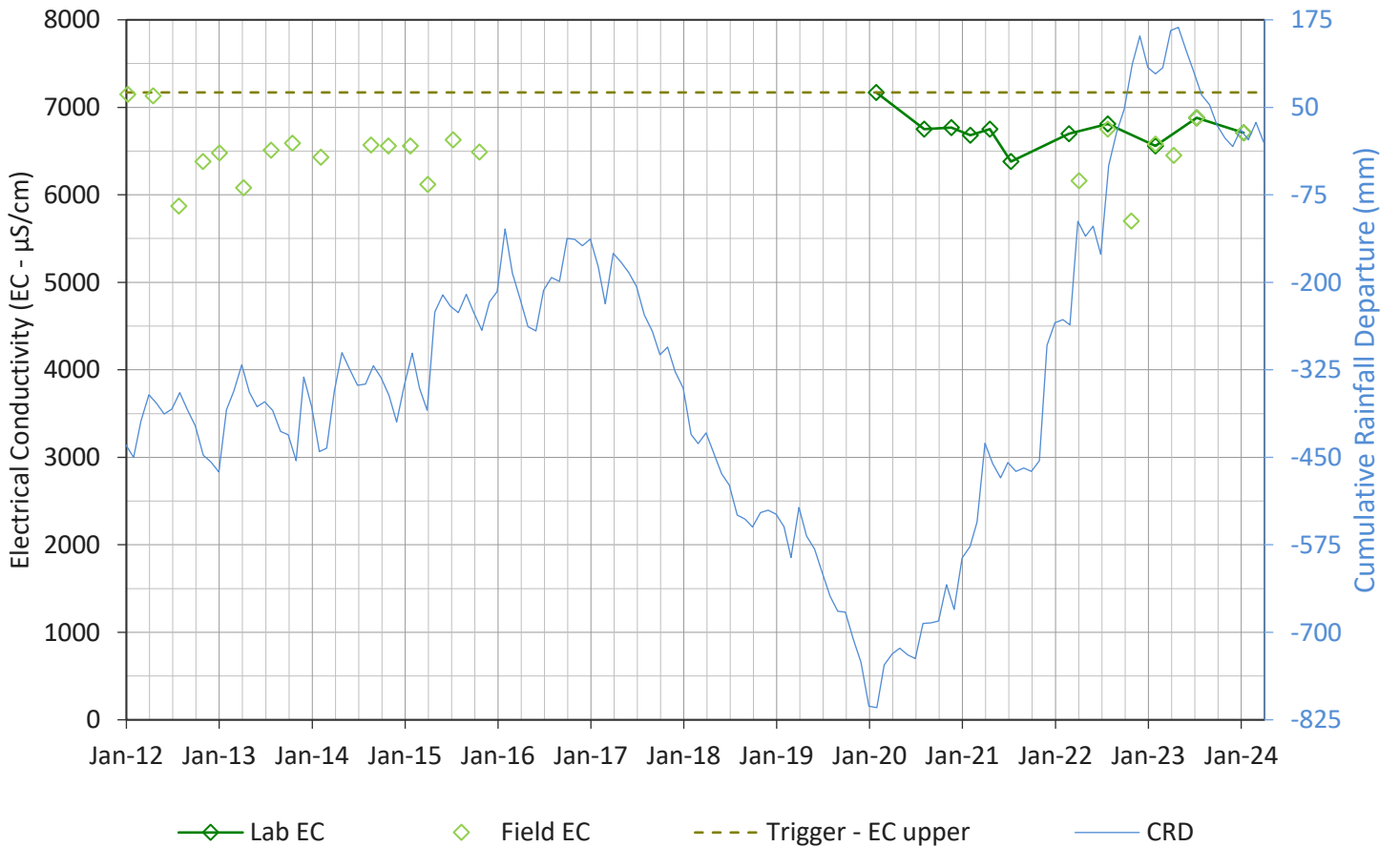
GW02D - EC



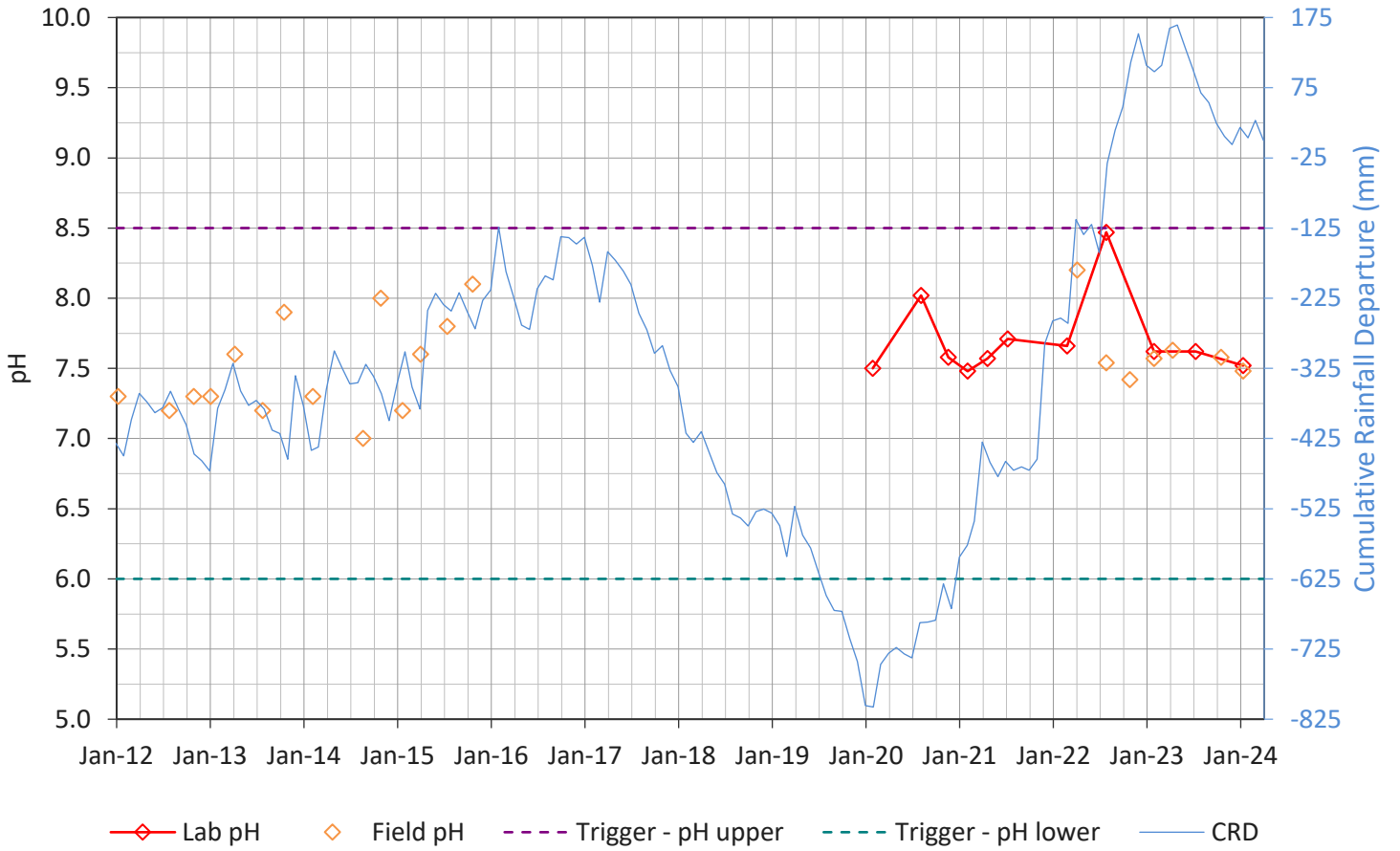
DD1032 - pH



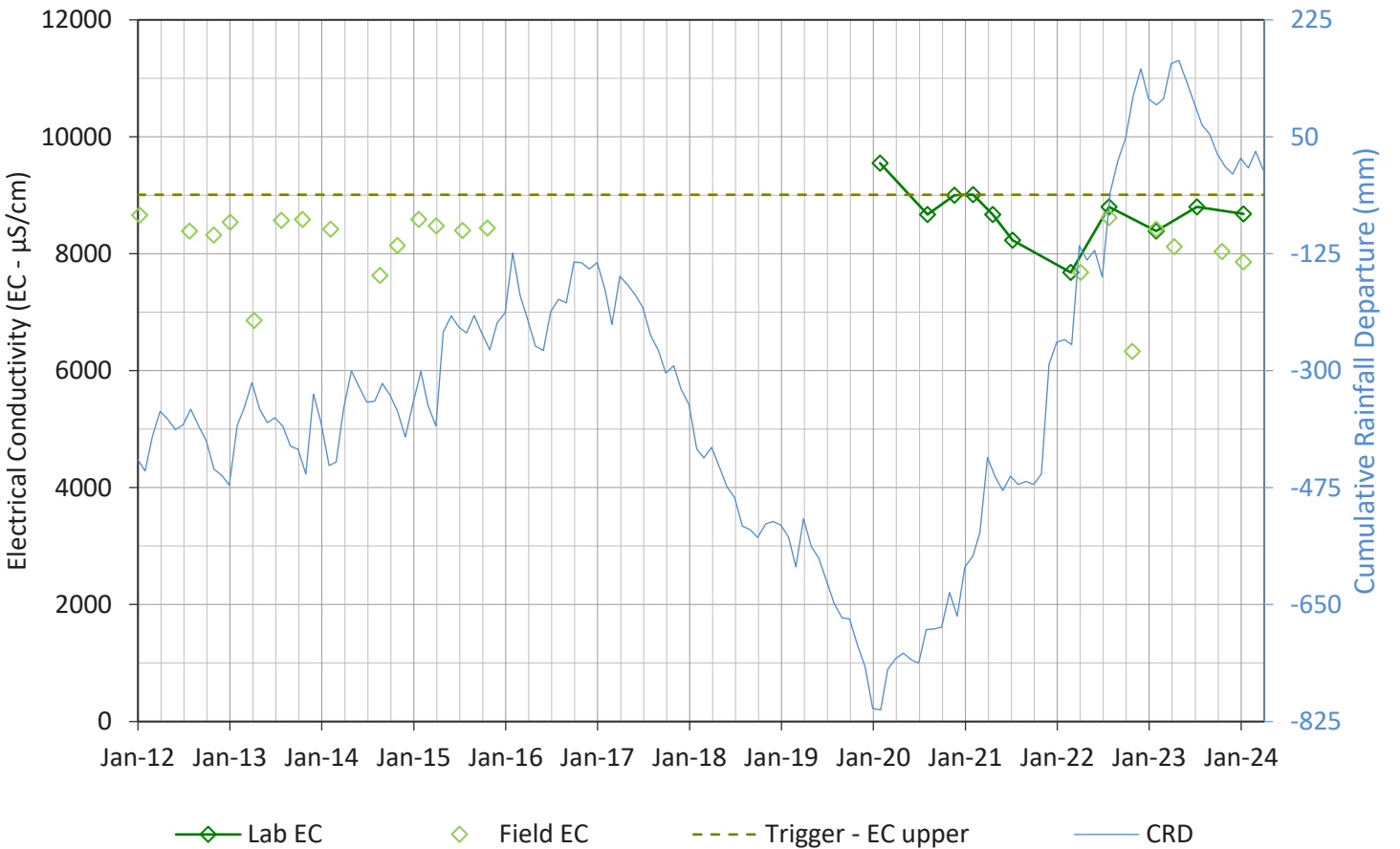
DD1032 - EC



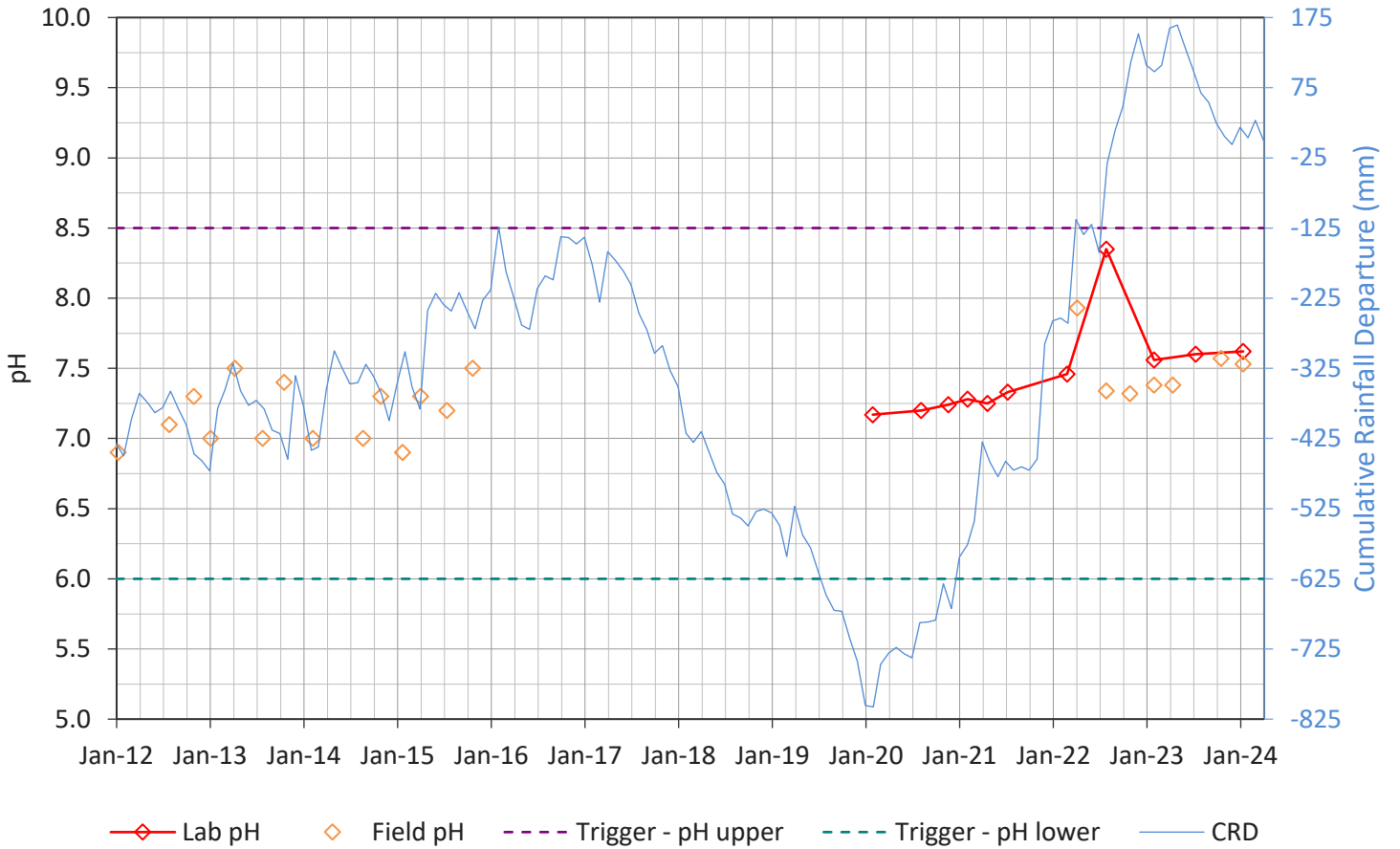
MB3-Alluvial - pH



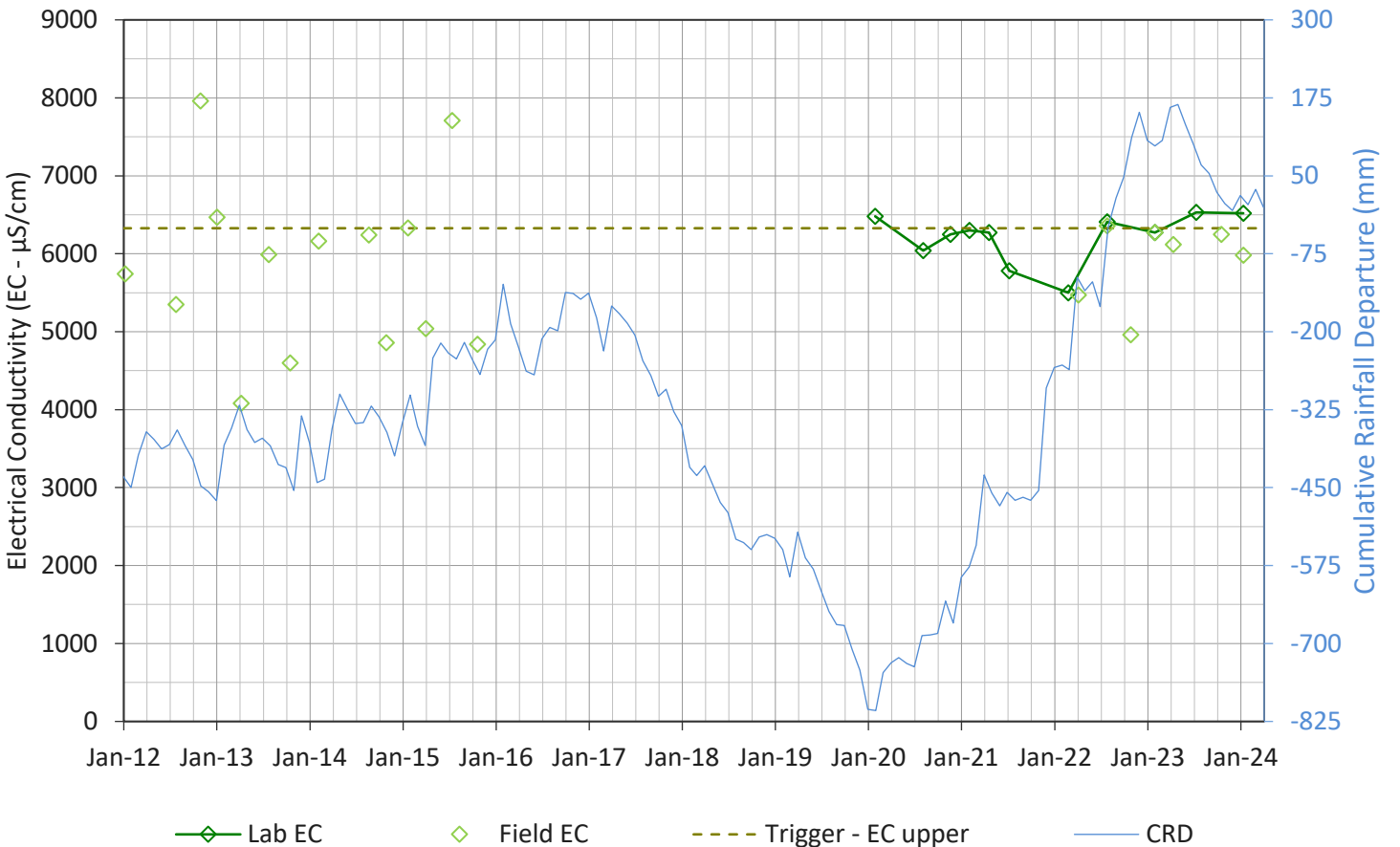
MB3-Alluvial - EC

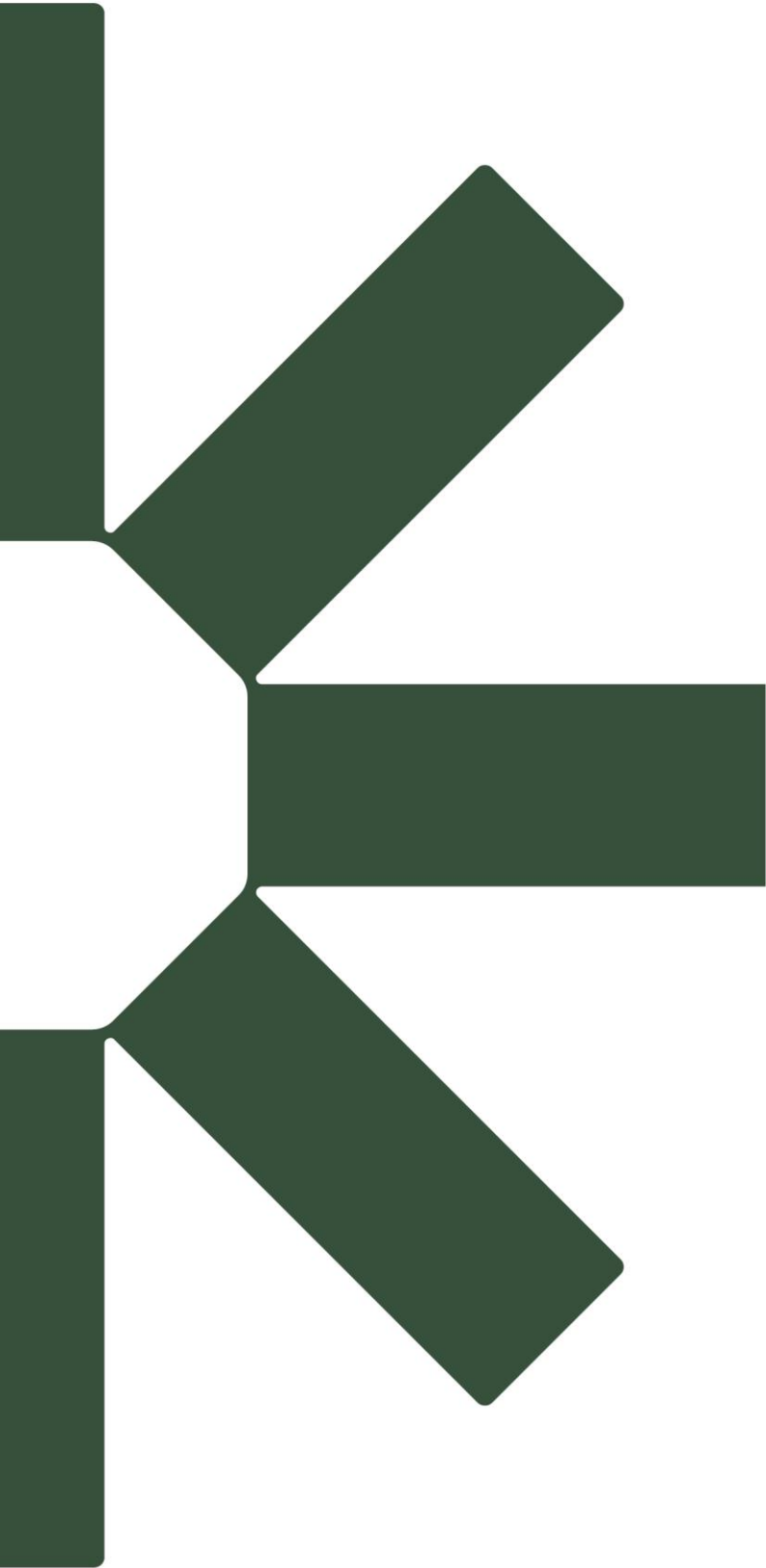


MB3-Regolith - pH



MB3-Regolith - EC





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