UNITED WAMBO
JOINT VENTURE

GLENCORE

2024 Annual Review

Number:	2024 Annual Review	**Status:**	Approved	**Effective:**	31/03/2024
Owner:	Environment & Community Manager	**Version:**	1	**Review:**	01/01/2025

Name of Operation	United Wambo Open Cut Coal Mine
Name of Operator	United Collieries Pty Ltd
Development consent / project approval #	SSD 7142
Name of holder of development consent / project approval	United Collieries Pty Ltd
Mining lease #	A444, CCL743, CCL775, CL374, CL397, ML1572, ML1594, ML1824, ML1842, EL7211, EL8456, EL9460, Sublease 1, Sublease 2
Name of holder of mining lease	Mining and Energy Union, United Collieries Pty Ltd, Wambo Coal Pty Limited
Water licence #	WAL 10541, WAL 18445, WAL 18549, WAL 41510
Name of holder of water licences	Mining and Energy Union, United Collieries Pty Ltd
RMP start date	1 January 2024
RMP end date	31 December 2024
Annual Review start date	1 January 2024
Annual Review end date	31 December 2024

I, Aislinn Farnon,

certify that this audit report is a true and accurate record of the compliance status of United Collieries for the period 1 January 2024 to 31 December 2024 and that I am authorised to make this statement on behalf of United Collieries Pty Ltd.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer	Aislinn Farnon
Title of authorised reporting officer	Environment and Community Manager
Signature of authorised reporting officer	
Date	28/03/2025

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1. Statement of Compliance

The compliance status of operations at United Wambo Joint Venture (United Wambo) against the relevant approval conditions during the reporting period is outlined in ***Table 1-1***, ***Table 1-2*** and ***Table 1-3***.

Table 1-1 Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
SSD 7142	No
Environment Protection Licence (3141)	No

Table 1-2 Compliance Status Categories

Risk Level	**Colour Code**	**Description**
High	Non-Compliant	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	Non-Compliant	Non-compliance with potential for serious environmental consequences, but is unlikely to occur; or potential for moderate environmental consequences, but is likely to occur
Low	Non-Compliant	Non-compliance with potential for moderate environmental consequences, but is unlikely to occur; or potential for low environmental consequences, but is likely to occur
Administrative non-compliance	Non-Compliant	Non-compliance which does not result in any risk of environmental harm

Table 1-3 Non- Compliance Status – United Wambo

Relevant Approval	Condition/ Legislative Reference	Condition Description (Summary)	Compliance Status	Details of Non-compliance	Corrective Action/s	Where Addressed in Annual Review
EPL 3141	Condition M2.3	Air Quality Monitoring (TEOMs)	Non-Compliant	Not required to have been reported previously. United Wambo are required to monitor air quality (PM_{10}) on a continuous basis with TEOMS at four locations. As per AS3580.19:2020, there is a requirement for >75% data availability for a valid 24-hour average to be calculated. On several occasions, TEOMs failed to collect >75% of the daily data required due to: • storms and power outages • software and logger issues • planned maintenance/calibration • telemetry communication errors • delay in contractor maintenance The days of incomplete data collection at each monitor in 2024 included: • AQ01 PM10: 20-21/02 • AQ02 PM10: 04-05/01, 18/04, 23-24/07 • AQ03 PM10: 05/01, 03-05/02, 21-23/02, 15-16/10 • AQ04 PM10: 28-29/05	The real time monitoring network is monitored remotely each day, with routine maintenance conducted monthly by an external technical contractor, to minimise the downtime of any real time monitoring units. Upon notification of a breakdown of equipment, efforts are made to address the issue remotely. If the issue continues, maintenance is scheduled for repair of the unit within 48 hours.	Section 6.4.4 and 11.2
SSD 7142	Condition A30 SSD					

Relevant Approval	Condition/ Legislative Reference	Condition Description (Summary)	Compliance Status	Details of Non-compliance	Corrective Action/s	Where Addressed in Annual Review
EPL 3141	Condition M2.3	Air Quality Monitoring (TSP)	Non-Compliant	United Wambo are required to monitor TSP every 6 days. Data was not collected for the 13/11. The HVAS02 TSP monitor did not sample the required sampling period due to sampling error by the contractor, power outages, and equipment failure.	This monitor is owned by Hunter Valley Operations (HVO). The data from HVAS 02 for TSP data is shared between HVO and United Wambo. It was identified that the power supply tripped and was unable to monitor the required sampling period. This was reported by HVO to DPHI. An inspection of the unit's power supply was completed by an electrician on 18 November and found that the residual current device (RCD) switch had tripped at the mains distribution board. Power was subsequently restored, and an inspection of the unit set up, power supply and further testing was completed with no issues being detected.	Section 6.4.4 and 11.2
SSD 7142	Condition A30 SSD					
SSD7142	Condition B52 (v)	Groundwater Level Monitoring (VWPs)	Non-Compliant	United Wambo are required to monitor groundwater levels using a series of vibrating wire piezometers (VWPs) and groundwater bores across site as provided in the approved Groundwater Management Plan (GWMP). A number of VWPs detailed in the GWMP require maintenance, replacement or removal.	The GWMP is being revised in consultation with DCCEEW to include changes to the VWP network proposed by Groundwater Specialist.	Section 7.3.7

2. Introduction

United Wambo Open Cut Coal Mine (United Wambo) is situated approximately 15 kilometres west of Singleton, near the village of Warkworth, New South Wales (***Figure 2-1).*** United Wambo is a 50:50 joint venture between United Collieries Pty Ltd (United) and Wambo Coal Pty Limited (Wambo). United is owned 95 per cent by Abelshore Pty Limited, a wholly owned subsidiary of Glencore Coal Pty Limited (Glencore) and five per cent by the Mining and Energy Union (MEU). Wambo is a subsidiary of Peabody Energy Australia Pty Ltd. See Figure 2-2 for coal mine boundary.

United Wambo is managed by Glencore and has approval to extract up to 10 million tonnes per annum (mtpa) of Run of Mine (ROM) coal up until 31 August 2042. ROM coal is processed through the Wambo Coal Handling and Preparation Plant (CHPP) and transported by rail from Wambo to the Port of Newcastle for export.

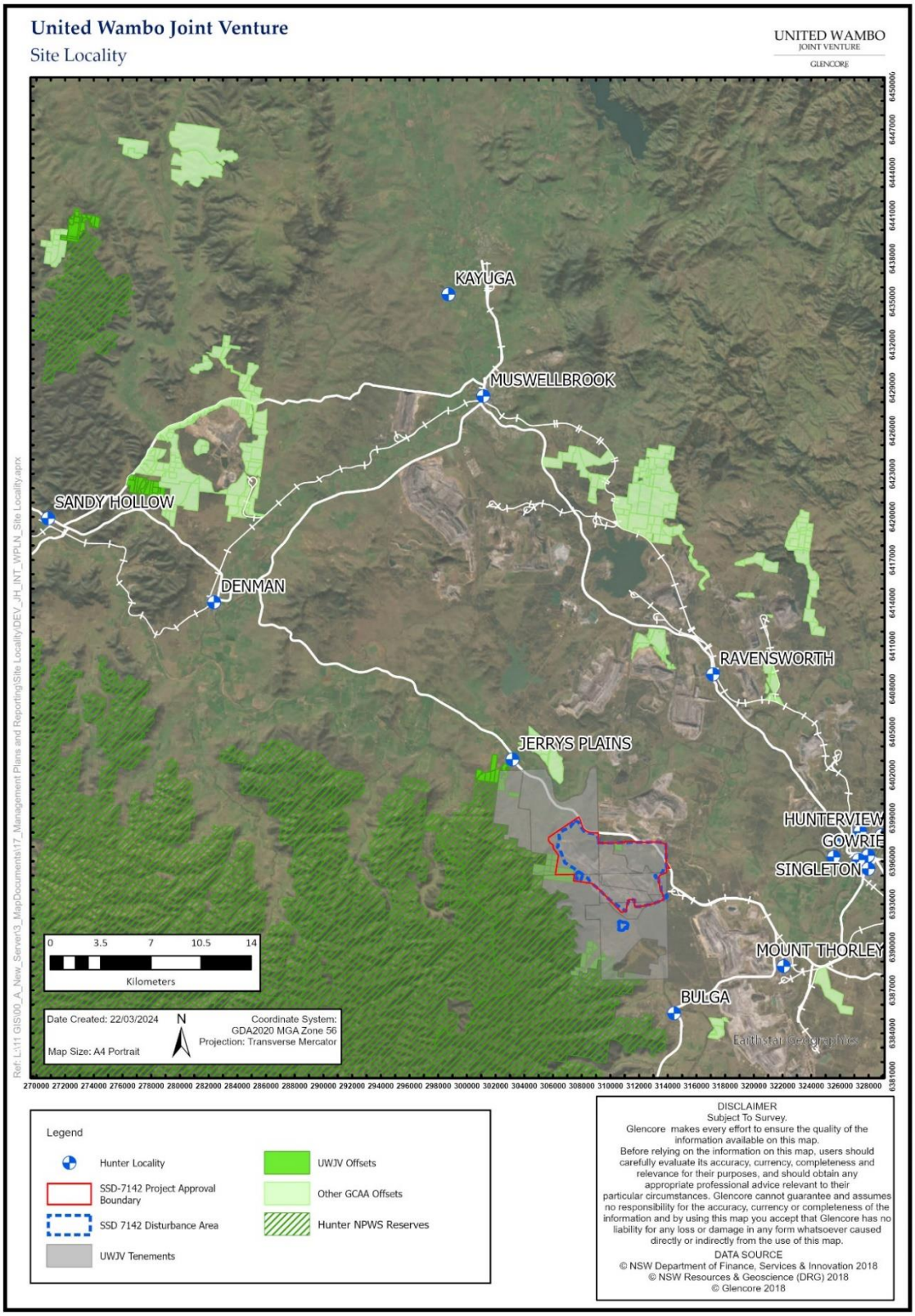

Figure 2-1 Regional Location Plan

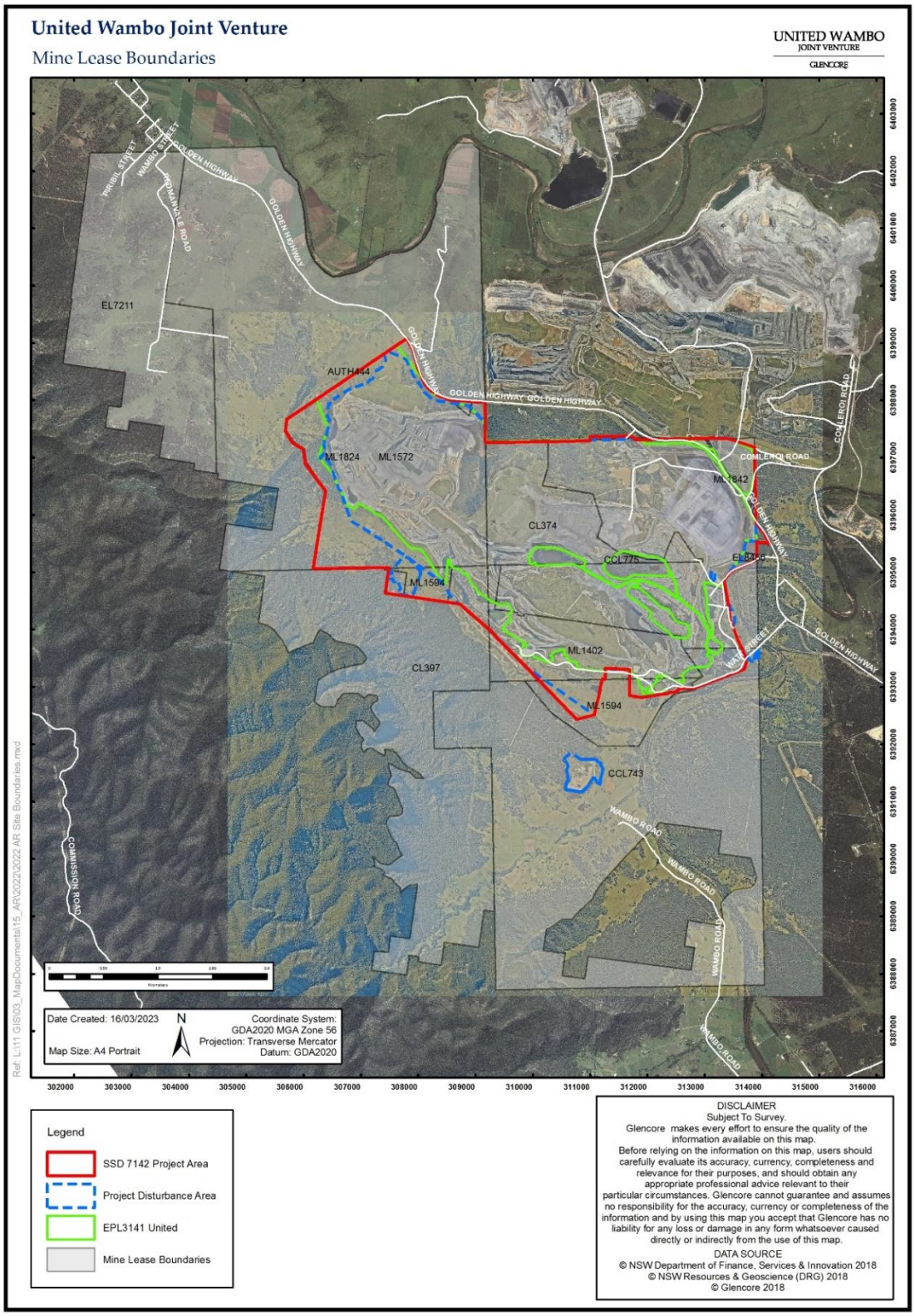

Figure 2-2 United Wambo Coal Mine Boundaries

2.1 Site Contacts

Contact details for key personnel are provided in ***Table 2-1*** below.

Table 2-1 Contact Details for Key Mine Personnel

Name	Role	Telephone	Email
Nick Slater	Operations Manager	02 6578 9500	*Nick.Slater@glencore.com.au*
Aislinn Farnon	Environment and Community Manager	02 6578 9506	*Aislinn.Farnon@glencore.com.au*
Community Complaints and Enquiries		1800 801 440	
Website	https://www.glencore.com.au/operations-and-projects/coal/current-operations/united-wambo-open-cut		

3. Approvals

United Wambo operate in accordance with approvals/licences of the following legislation:

- Environmental Planning and Assessment Act (1979)
- Protection of the Environment Operations Act (1997)
- Environmental Protection and Biodiversity Conservation Act (1999)
- Mining Act (1992)
- Water Management Act (2000)
- National Parks and Wildlife Act (1974)

These approvals and licences are summarised in ***Table 3-1*****,** except for operational water licences which are summarised in ***Table 7-2.***

Table 3-1 Approvals relating to United Wambo

Instrument	Date of Issue	Expiry Date	Comment
State Significant Development (SSD) 7142 MOD 1	29 August 2019	1 August 2042	Modified during 2021 to allow for changes to ROM stockpiling arrangements.
Environment Protection Licence (EPL) 3141	30 November 1999	Anniversary Date: 30 November	Current issue dated 10 December 2021. Note: The EPL was not varied during the reporting period.
Environmental Protection and Biodiversity Conservation (EPBC) 2015/7600	6 December 2019	31 December 2052	
CCL 743	9 March 1990	14 August 2043	
CCL 775	2 September 1992	2 March 2033	
CL 374	6 December 1991	21 March 2026	
CL 397	4 June 1992	4 June 2034	
ML 1572	21 December 2005	21 December 2026	
ML 1594	1 May 2007	30 April 2028	

Instrument	Date of Issue	Expiry Date	Comment
ML 1824	29 November 2021	29 November 2042	
ML 1842	3 December 2022	3 December 2043	
Sublease 1	21 June 2023	14 August 2043	
Sublease 2	10 September 2021	17 December 2044	
A 444	4 October 2007	16 May 2027	
EL 7211	29 September 2008	29 September 2026	
EL 8456	8 August 2016	8 August 2025	
EL 9460	13 September 2022	13 September 2028	
S87 Care and Control Permit #3062	24 December 2021		ISEMS/AHIMS Permit #: 10913446/2997
S85 Care and Control Permit #5315	23 October 2024	31 August 2042	Artefacts moved to Minimbah Keeping Place
4094/2010	3 May 2010	30 June 2024	North MIA Office Administration – currently not in use with plans to decommission in the future
ST 15.2020.39	14 January 2021	30 June 2024	South MIA Admin Building – in operation

4. Operations Summary

4.1 Mining Operations

Mining operations were conducted in both United and Montrose open cut pits. United Pit reached pit floor with significant coal seams being mined in 2024, this increased ROM coal production compared to 2023, the operations production output is summarised in ***Table 4-1*****.**

Table 4-1 Production Summary

Material	Unit	Approved Limit	Previous reporting period (actual)	This reporting period (actual)	Next reporting period (forecast)
Waste Rock/Overburden	bcm	NA	44.16	42.10	44.71
ROM Coal/Ore[1]	Mt	10Mt / year (SSD 7142)	6.77	9.66	9.26
Coarse Reject	Mt	NA	2.22	3.04	2.51
Fine Reject (Tailings)	Mt	NA	0.82	0.76	0.63
Saleable Product	Mt	14.7Mt transported from the Complex	4.71	5.87	6.02

[1]CHPP operated by Wambo and includes processing of Wambo Underground ROM

While there were no significant changes to mining operations at United Wambo over the reporting period, an increase in production rates was observed. The forecasted values for the next reporting period are expected to be comparable to the results of this reporting period.

4.2 Other Operations

4.2.1 Hours of Operations

The site operates 24-hours per day, 7-days a week.

4.2.2 Reject and Tailings Management

ROM coal mined from the United and Montrose Pits is hauled to the ROM pad located near the CHPP. Coal is either placed directly into the ROM bin or onto the ROM coal stockpile area. ROM coal is crushed and washed at the CHPP and product coal stockpiled prior to reclaim for train loading and transport off site. The Wambo CHPP is managed by Wambo under ***DA 305-7-2003 MOD 19***.

Tailings produced by the washing of open cut coal are managed by Wambo Underground Mine. A summary of the tailing's storage facilities used to store tailings produced by washing United Wambo and Wambo ROM coal are shown in ***Table 4-2.***

Table 4-2 Active Tailings storage facilities (TSF) at United Wambo

Item No	Tailings Storage Facility	Type	Status	Comment
1.	Homestead Inpit	Void with embankment	Active	Active deposit of United Wambo tailings by Wambo Underground.

Item No	Tailings Storage Facility	Type	Status	Comment
2.	Hunter Pit	Void with embankment	Active	Periodic deposit of United Wambo tailings by Wambo Underground to assist with consolidation and preparation for capping.

Coarse rejects from coal preparation are transported by truck to overburden emplacement areas for subsequent covering by overburden material.

4.2.3 Next Reporting Period

Table 4-3 outlines the forecast operations for the next reporting period.

Table 4-3 Forecast Operations for the Next Reporting Period

Aspect	Forecast for Next Reporting Period
Pit expansion areas	Mining will continue in United Pit and Montrose Pit. Overburden waste material will be hauled to in-pit emplacements at Montrose and to in-pit/out-of-pit emplacements at United.
Infrastructure development/upgrades	Decommissioning of United Collieries NMIA and administration buildings will continue. Commence excavation of a new mine water dam near United Pit, as part of Stage 3 water management.
Mining fleet upgrades	New mining equipment to be commissioned includes excavators and watercarts.

5. Actions Required from Previous Annual Review

The actions required as an outcome of the previous 2023 Annual Review, and their current status, are detailed in **Table 5-1.** These actions were commitments from United Wambo.

Table 5-1 2023 Annual Review Actions and Feedback

Proposed Action	Action Detail	Comments
Noise	Procurement of eleven new Cat 789 with sound suppression and retire older 789 trucks without sound suppression.	All Cat 789 have been commissioned in 2024. Older 789 and 793 have been decommissioned.
Air Quality	Procurement of four new water carts	All water carts have been procured. They will be commissioned in 2025.
Cultural Heritage	Relocate all artefacts to the Minimbah Teaching Place	All artefacts were transferred to Minimbah in November 2024 with RAPs
Waste	Removal of all legacy waste at United Wambo	The process for removing legacy waste has commenced, however, not finalised.

Proposed Action	Action Detail	Comments
		Waste removal has been completed in consultation with Wambo Coal.
	Scope and prepare contracts for demolition of the North MIA	The NMIA demolition scope was developed in 2024. A Project Manager has been appointed, with works planned to commence in May 2025.
Water Management	Stage 3 Water Management detailed design and contract arrangements to be completed to allow mining further to the west	Dam design has progressed. Construction and commissioning planned for 2025.
Approvals	Remove Tailings Dam 2 from Dam Safety NSW Register	United Wambo submitted the delisting plan 20 May 2024, It has not been approved by Dam Safety.
	Complete Biodiversity Stewardship Agreements	Biodiversity Stewardship Agreements finalised, execution occurred on 14 February (Glencore) and 1 March (Wambo) 2024.
	Retire Stage 1 Credits	All Stage 1 credits were retired in 2024.
Rehabilitation	59 hectares of rehabilitation will be undertaken	59 hectares of rehabilitation was completed.
	Targeted weed control onsite and offset properties	Weed and pest control program implemented across site and offset properties.

6. Environmental Performance

The Annual Review Guideline (DPE 2015) requires summarising the outcomes achieved during the reporting period for key environmental aspects.

It should be noted that the 2024 Annual Review includes EIS predictions from:

- United Wambo Open Cut Coal Mine Project – Environmental Impact Statement (Umwelt, 2016)
- United Wambo Open Cut Coal Project – Response to Submissions Part A (Umwelt, 2017)
- United Wambo Open Cut Coal Project – Response to Submissions Part B (Umwelt, 2017a)
- United Wambo Open Cut Coal Project – Response to Independent Planning Commission Recommendations (Umwelt, 2018).

All monitoring locations for United Wambo are shown in ***Figure 6-1*** and ***Figure 6-2***.

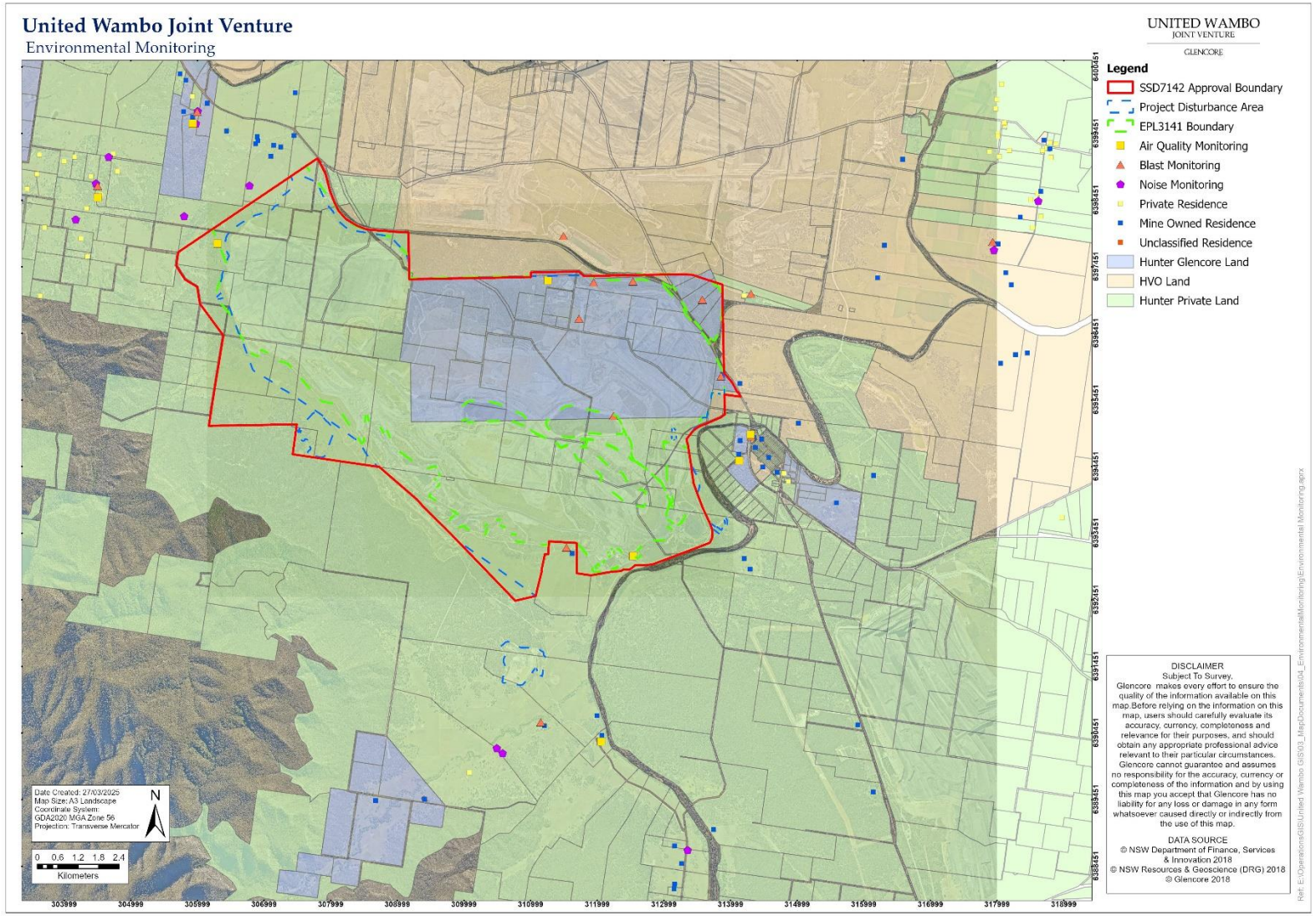

Figure 6-1 United Wambo Air Quality, Noise and Blast Monitoring Locations

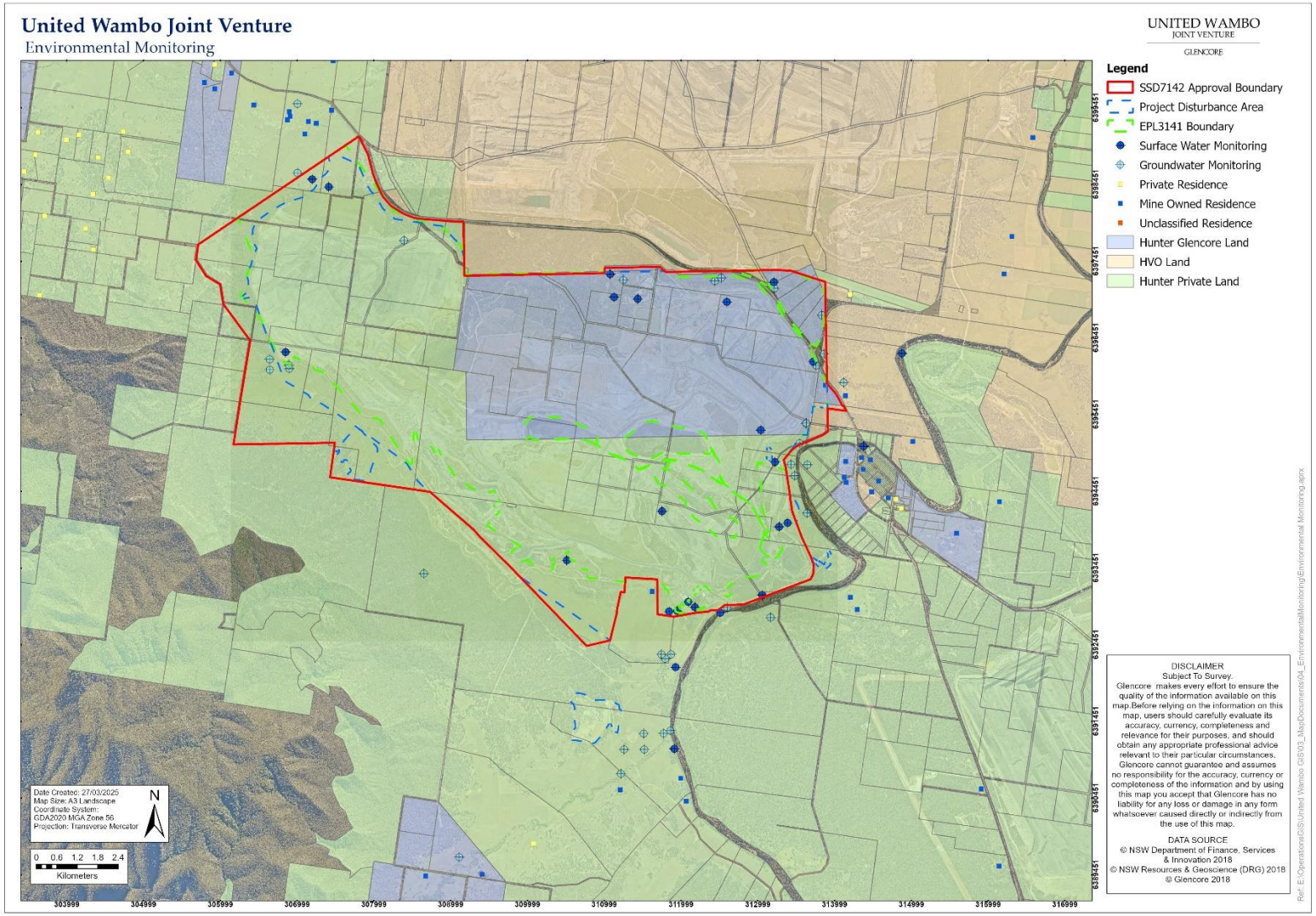

Figure 6-2 United Wambo Surface Water and Groundwater Monitoring Locations

6.1 Meteorological Data

Meteorological monitoring was undertaken at the United Wambo meteorological station (M7) located just north of the United Mine Infrastructure Area (MIA) as shown in ***Figure 6-1***. A summary of the 2024 meteorological data is provided in ***Table 6-1***.

Table 6-1 Yearly Summary of 2024 Meteorological Data

	Temperature °C			Windspeed m/s			Rainfall mm	No. of Rain Days >1mm
Date	Min	Av.	Max	Min	Av.	Max	Total	
January	16.1	24.9	40.1	0.1	1.8	7.8	72.0	4
February	16.0	24.2	39.9	0.1	1.4	6.8	73.0	6
March	14.1	22.5	36.2	0.0	1.4	6.5	36.6	4
April	9.1	18.3	29.4	0.0	1.2	8.2	163.0	8
May	5.3	14.6	22.6	0.0	1.2	4.9	78.8	8
June	2.9	11.6	20.7	0.0	2.0	6.7	82.6	5
July	3.9	11.5	20.6	0.1	2.3	9.7	38.2	6
August	2.9	14.9	28.1	0.0	1.7	9.1	42.8	6
September	4.3	16.4	29.0	0.0	2.3	10.3	45.6	3
October	6.7	18.2	30.7	0.0	1.2	6.1	49.2	7
November	13.7	22.6	38.3	0.0	1.6	11.4	68.2	10
December	13.0	25.0	39.6	0.0	1.6	9.7	8.6	3

The maximum 24hr average temperature in 2024 was 24.8 degrees Celsius (°C). In 2024, there was an increase in total rainfall with 758.6mm, which was higher than the 537.4mm received in 2023. This is due to general rainfall fluctuations. There was a decrease in wind speed in 2024 (annual average of 1.64 m/s) from 2023 (annual average of 1.72 m/s).

6.2 Noise

6.2.1 Environmental Management

Noise monitoring is undertaken in accordance with the ***Noise Management Plan***.

The location of noise monitoring sites is shown on ***Figure 6-1***. The monitoring program includes:

- monthly attended night-time monitoring at six sites
- real time noise monitoring at four sites
- additional monitoring as initiated by alarms or in response to community concerns

The real-time monitoring network assists with the management of noise impacts from mining operations. Monitors are operated at locations representative of Redmanvale, Jerrys Plains, Maison Dieu and South Wambo. Data is recorded continuously and reported real-time to the United Wambo control room via an internal website.

A fleet monitoring system that records the location and activity of all major equipment in real time is operated onsite. The fleet monitoring system in combination with the real time noise monitoring program facilitates the implementation of appropriate noise mitigation measures. Should DPHI or the EPA request data relating to equipment use, United Wambo will provide the required data within 72 hours of receiving the request.

6.2.1.1 Management Measures

United Wambo implements noise management measures in accordance with the ***Noise Management Plan***. The management measures are summarised below:

- reasonable and feasible noise attenuation measures are undertaken on new plant and equipment that has the potential to contribute to the site's noise level
- 'silent horns' are used to communicate with trucks and smart broadband 'Quacker' reversing alarms
- bunds constructed in strategic locations along haul roads are implemented to shield trucks and equipment on exposed sections of the haul road ramps where possible
- the drop height of the first load into truck bodies is managed to minimise impact noise from the material
- noise management training is provided for key employees to facilitate effective noise management
- regular inspection and maintenance of noise attenuation systems are undertaken
- implementation of an automated real-time noise monitoring and notification system, SiteEye. The system enables access to live noise data (including directional noise data), issues alarms to relevant site personnel and tracks responses to noise alarms to assist with operational changes and compliance 24 hours a day
- in the event real time noise monitoring indicates potential noise impact, operational equipment can be relocated from elevated locations or progressively stood down under adverse licensable meteorological conditions.

6.2.2 Approved Criteria

SSD 7142 noise criteria is summarised in the ***Table 6-2***.

Table 6-2 SSD 7142 Operational Noise Criteria

Noise Assessment Group	Noise Assessment Location	Day	Evening	Night	Night
		L_{Aeq} (15 min)	L_{Aeq} (15 min)	L_{Aeq} (15 min)	L_{A1} (1 min)
Area 1 - North Bulga	R007, R379	36	35	35	45
	All other privately-owned residences	35	35	35	45
Area 2 - South	R025	39	38	38	48

Noise Assessment Group	Noise Assessment Location	Day	Evening	Night	Night
		L_{Aeq} (15 min)	L_{Aeq} (15 min)	L_{Aeq} (15 min)	L_{A1} (1 min)
Wambo	All other privately-owned residences	35	35	35	45
Area 3 - Warkworth Village	All privately-owned residences	44	44	43	53
Area 4 - Maison Dieu	All privately-owned residences	42	42	41	51
Area 5 - Moses Crossing	R050C	41	41	41	51
	R050A	41	40	40	50
	R044	41	40	39	49
	All other privately-owned residences	41	40	38	48
Area 6 - Redmanvale	R320	40	40	40	50
	R033, R343	40	40	39	49
	R042	40	40	38	48
	R029, R345	40	40	37	47
	R048	39	39	39	49
	R030, R049, R163	39	39	38	48
	R075	39	39	37	47
	R041B	38	38	38	48
	R344, R346	38	38	37	47
	R348	38	38	36	46
	R041A	37	37	37	47
	All other privately-owned residences	35	35	35	45
Area 7 - Jerrys Plains	All privately-owned residences	40	40	36	46

Noise Assessment Group	Noise Assessment Location	Day	Evening	Night	Night
		L_{Aeq} (15 min)	L_{Aeq} (15 min)	L_{Aeq} (15 min)	L_{A1} (1 min)
All other areas	All privately-owned residences	35	35	35	45

6.2.3 Key Environmental Performance

6.2.3.1 Attended Noise Monitoring

United Wambo engaged an acoustic consultant to undertake monthly attended noise monitoring during the reporting period. Attended noise monitoring results include locations required by the United Wambo Noise Management Plan and EPL3141. United Wambo complied with relevant noise criteria for all measurements recorded in 2024.

Table 6-3 is a summary of attended noise monitoring for 2024. Results are presented as the maximum noise levels recorded from United Wambo at each location during the reporting period and have been compared to relevant noise criteria specified under SSD 7142 and EPL3141.

Detailed monitoring results are provided in Monthly Noise Monitoring Reports available on the United Wambo website.

Table 6-3 Summary of Attended Noise Monitoring Data – 2024 (January - December)

Location	NAG	United Wambo Noise Monitoring Results - dBA (Max)		United Wambo Project Specific Noise Criteria - dBA		EIS Predictions – dBA	
		LAeq (15minute)	LA1 (1minute)	LAeq (15minute)	LA1 (1minute)	LAeq (15minute)	LAeq Winter (15minute)
NM01	1	30	36	36	46	-	-
NM02	2	33	38	38	48	35	38
NM04	4	30	30	41	51	-	-
NM05	5	38	46	46	56	47	46
NM06	6	35	38	37	47	37	38
NM07	7	35	39	39	49	-	-

6.2.4 EIS Predictions

The United Wambo Open Cut Coal Mine Project (August 2016) modelled operation scenarios for years 2, 6, 11 and 16 of the conceptual mine plan.

The noise criteria detailed in the SSD 7142 and EPL3141 were based on the noise impact predictions provided in the EIS.

For 2024, attended noise monitoring results were at or below the noise criteria. Refer to ***Table 6-3*** for comparison of noise monitoring results, noise criteria and EIS predictions.

Noise management will be undertaken as per the ***Noise Management Plan*** which has been approved by DPHI under Condition B5 of SSD 7142.

6.2.5 Improvements

6.2.5.1 Current reporting period

Several improvements were made in the current reporting period including:

- review of mine design for lower dumps in times of peak inversion (meteorological conditions enabling elevated noise)
- alarm responses are reviewed regularly to ensure all alarms are being assessed and any changes implemented are recorded
- purchase of eleven new CAT 789 trucks to replace the older CAT 793 hire trucks, the new trucks have sound suppression equipment fitted from the factory and are quieter than the older larger trucks that they replaced.

6.2.5.2 Next reporting period

United Wambo will continue to review mine design and utilise lower dumps where possible in times of peak inversion (meteorological conditions enabling elevated noise) and continue to monitor and review alarm responses.

6.3 Blasting

6.3.1 Environmental Management

Blasting is undertaken in accordance with the ***Blast Management Plan*** to ensure blast related impacts, including ground vibration, airblast overpressure, flyrock, fume, dust and misfire are minimised on the local community, infrastructure and heritage sites to the extent required by SSD 7142 and EPL 3141.

6.3.2 Management Measures

United Wambo implements blast management measures in accordance with the ***Blast Management Plan***. The management measures are summarised below:

- develop a detailed blast design and loading specification to be undertaken for each blast to meet the required criteria and minimise impact on the environment
- use a modified blast design when appropriate, for example, around identified geological features (including geological faults, series of joints, dykes, etc), to avoid potential flyrock incident or when blasting through old underground workings
- implement the Pre-Blast Assessment Protocol, including various meteorological assessments and notification procedures
- implement the Road Closure Management Plan where blasting is to occur within 500 m of a public road
- Coordinate blast times between the United Wambo pits and HVO to avoid concurrent blasting
- detailed liaison and risk management between United Wambo, Wambo UG and HVO when blasting will occur within 500m boundary or when potentially affected by flyrock, fumes, dust or other areas beyond the 500m zone (e.g. equipment movement).

- reviewing weather conditions regularly to ensure wind speed and wind direction are in line with model predictions to minimise impact of potential overpressure, fume and dust impact caused by blasting.
- Implementation of a safe management system for location and handling of misfires.

6.3.2.1 Approval Criteria

Condition B8 of Part B in SSD 7142 and Condition L4 of Section 3 in EPL 3141 outline the blasting criteria adopted for airblast overpressure and ground vibration. This criterion is in place for human comfort for residences on privately owned land, the prevention of structural damage of heritage sites and infrastructure, and to minimise ground vibration at public infrastructure. The monitoring locations and criteria are summarised in ***Table 6-4*** to ***Table 6-7.*** EPL 3141 also has criteria in regard to blast fume, this is summarised in

Table 6-8***.***

Table 6-4 Residence on Privately Owned Land Monitoring Locations and Criteria

Monitoring Locations	Airblast overpressure (dB Lin Peak)	Ground Vibration (mm/s)	Allowable exceedance
South Wambo BM03 / EPA ID 19	115	5	5% of the total number of blasts over a calendar year
Moses Crossing BM05 / EPA ID 20			
Redmanvale BM07 / EPA ID 21	120	10	0% of the total number of blasts over a calendar year
Maison Dieu BM08 / EPA ID 22			

Table 6-5 Heritage Blasting Monitoring Locations and Criteria

Monitoring Locations	Airblast overpressure (dB Lin Peak)	Ground Vibration (mm/s)	Allowable exceedance
St Phillips Church BM02	N/A	5	0%
Wambo Homestead BM01	120	5	0%
All other heritage items[1] BM02	133	5	0%

[1] beyond those predicated in SSD 7142 and generally in accordance with the EIS. Includes the Former, Piggery and Butcher's Hut, former Queen Victoria Inn, and Springwood Homestead. For the Warkworth Public School, Montrose property and Shearing Shed, and Dog-leg Fence see section 10.1.3 of the Blast Management Plan (Glencore 2020e).

Table 6-6 Infrastructure Monitoring Locations and Criteria

Monitoring Locations	Airblast overpressure (dB Lin Peak)	Ground Vibration (mm/s)	Allowable exceedance
Hunter Valley Gliding Club GliderClub[1]	133	25	0%
Warkworth Shooting Complex BM02[2]			
HVO Infrastructure - occupied BM02[2]			
HVO surface infrastructure – unoccupied[3]	133	100	0%

[1] This monitor is the representative monitoring location.

[2] Monitor installed 9 June 2020.

[3] No specific sites monitored under this consent condition. Monitoring locations committed to in the Blast Management Plan (Glencore 2020e) are considered representative. Note United Wambo monitors other infrastructure (ie. transmission towers) closer to the pit with lower criteria.

Table 6-7 Public Infrastructure Monitoring Locations and Criteria

Monitoring Locations	Ground Vibration (mm/s)	Allowable exceedance
Transmission suspension towers[1] **Transmission tension towers[1]**	100 50	0%
Prescribed dams[2]	50 (unless otherwise directed by the DS NSW)	0%
Public Roads[3] **Telecommunication infrastructure and cables[3]**	100	0%
All other public infrastructure[3]	50 (or a limit determined by the structural design methodology AS 2187.2 – 2006, or its latest version, or other alternative limit for public infrastructure, to the satisfaction of the Planning Secretary)	0%

[1] Transmission suspension and tension towers were monitored as per SSD consent conditions using representative sites and/or portable monitors when blasting was in close proximity.

[2] Prescribed dams were monitored as per SSD 7142 consent conditions. This includes Wambo Tailings Dam (North East Tailings Dam), HVO Riverview Void In-pit Water Storage 2, United Tailings Dam 2, and Wambo Hunter Pit Tailings Dam (HPTD). These prescribed dams were monitored all year round.

[3] No specific sites monitored under this consent condition. Monitoring locations committed to in the Blast Management Plan (Glencore 2020e) are considered representative.

Table 6-8 Offensive Blast Fumes

Condition	Details
Condition L4.5 of Section 3 in EPL 3141	**Offensive blast fume must not be emitted from the premises.** Definition: Offensive blast fume means post-blast gases from the detonation of explosives at the premises that by reason of their nature, duration, character or quality, or the time at which they are emitted, or any other circumstances: 1. are harmful to (or likely to be harmful to) a person that is outside the premises from which it is emitted, or; 2. interferes unreasonably with (or is likely to interfere unreasonably with) the comfort or repose of a person who is outside the premises from which it is emitted.

6.3.3 Key Environmental Performance

United Wambo Open Cut monitored 177 blasts during 2024. As per Condition B10 and B11 of SSD 7142, all blasting on site was between 9am and 5pm (Monday to Saturday inclusive) and there were less than three single blast events a day and less than 15 single blast events a week, averaged over a calendar year.

Monitoring data was collected at all locations outlined in the SSD 7142 and EPL 3141 consent conditions. Summarised monitoring data for these locations are provided in ***Table 6-9*** to ***Table 6-11***.

Table 6-9 Blast Monitoring Data for Residences on Privately Owned Land

Monitoring Location			Airblast Overpressure Level dBL (Lin Peak)			Ground Vibration ppv (mm/s)			
Name	**Monitor**	**Average**	**Max**	**Results >115 dBL**	**Results >120 dBL**	**Average**	**Max**	**Results >5 mm/s**	**Results >10 mm/s**
South Wambo **EPA ID 19**	BM03	90.3	115.0	0.6%	0%	0.10	0.81	0%	0%
Moses Crossing **EPA ID 20**	BM05	92.4	112.6	0%	0%	0.10	1.58	0%	0%
Redmanvale **EPA ID 21**	BM07	90.0	113	0%	0%	0.08	2.73	0%	0%
Maison Dieu **EPA ID 22**	BM08	96.5	116.1	0.6%	0%	0.13	1.99	0%	0%

Table 6-10 Heritage Monitoring Data

Monitoring Location		Airblast Overpressure Level dBL (Lin Peak)				Ground Vibration ppv (mm/s)		
Name	**Monitor**	**Average**	**Max**	**Results >120 dBL**	**Results >133 dBL**	**Average**	**Max**	**Results >5 mm/s**
St Phillips Church[1]	BM02	99.9	125.8	N/A	0%	0.73	7.01	0%
Wambo Homestead	BM01	95.1	118.5	0%	0%	0.16	1.50	0%
All other heritage items	BM02	99.9	125.8	N/A	0%	0.73	7.01	0%

[1]: St Phillips Church is 500m further away from United Wambo than BM02, modelling shows vibration level at St Phillips Church <5mm/s.

Table 6-11 Infrastructure Monitoring Data

Monitoring Location		Airblast Overpressure Level dBL (Lin Peak)			Ground Vibration ppv (mm/s)		
Name	**Monitor**	**Average**	**Max**	**Results >133 dBL**	**Average**	**Max**	**Results > Criteria mm/s**
Hunter Valley Gliding Club	Glider Club	96.5	121.3	0%	0.57	3.63	0%
Warkworth Shooting Complex	BM02	99.9	125.8	0%	0.73	7.01	0%
HVO Infrastructure - occupied	BM02	99.9	125.8	0%	0.73	7.01	0%
Transmission suspension tower	Portable 1	N/A	N/A	N/A	2.33	20.14	0%
Transmission tension tower	Tower 634 E and Tower 634 A-B	N/A	N/A	N/A	1.85	28.38	0%

Monitoring Location		Airblast Overpressure Level dBL (Lin Peak)			Ground Vibration ppv (mm/s)		
Prescribed dams	HPTD, HVO Riverview East/West	N/A	N/A	N/A	1.52	14.39	0%
Public Roads[1] Telecommunication infrastructure and cables	Portable 1, 634 A-B, 634 E	N/A	N/A	N/A	1.86	28.38	0%

[1] Monitors located adjacent to transmission suspension towers located between the approved pit shell and the Golden Highway are considered representative of public roads, telecommunication infrastructure.

6.3.4 EIS Predictions

A ground vibration predictive model and an airblast overpressure predictive model was developed to determine potential blasting impacts for the EIS. A range of blast scenarios were modelled. The results of the blasting impact assessment indicate that ground vibration and air blast overpressure levels can be managed to meet relevant blast emission criteria at all sensitive receiver locations through appropriate blast design. All results from blasting in 2024 were compliant with criteria, and consistent with predictions.

6.3.5 Improvements

6.3.5.1 Current reporting period

In the current reporting period, two additional blast monitors were installed at Dam 2 and Dam U2.

6.3.5.2 Next reporting period

Investigate ways to improve the accuracy of the pre-blast modelling for fume, dust and overpressure, incorporating historical data and the potential to include other parameters such as elevation.

Installation of four blast monitors are to be installed for additional monitoring for additional data for future modelling purposes.

6.4 Air Quality

6.4.1 Environmental Management

Air Quality monitoring is undertaken in accordance with the ***Air Quality and Greenhouse Gas Management Plan***.

The location of air quality monitoring sites is shown on ***Figure 6-1***. The monitoring program includes:

- continuous monitoring of PM_{10} at four sites
- High Volume Air Sampler (HVAS) monitoring every six days (continuously for 24 hours) at two sites
- continuous meteorological monitoring at two sites

Each real time air quality monitoring unit is connected to web-based software that is fitted with alarming capabilities. The alarming capabilities can advise mining personnel that air quality at the monitor has reached the trigger levels. Alarms are sent via SMS and email to relevant United Wambo

staff to notify that air quality is reaching, or has reached, the predetermined limit. In such an event, action can then be taken to modify operations where practical as per the United Wambo Dust TARP.

Note: HVAS 01 and HVAS 02 are owned and operated by HVO, with results forwarded to United Wambo monthly.

6.4.2 Management Measures

The principal sources of atmospheric dust emissions from activities at United Wambo during operation are associated with:

- disturbance from mining, exploration and drilling works
- wind-blown dust from exposed surfaces
- vehicle movements on the internal unsealed hardstand areas, haul roads or access roads around the site

United Wambo implements dust and greenhouse gas management measures in accordance with the ***Air Quality and Greenhouse Gas Management Plan***. The management measures are summarised in ***Table 6-12***.

Table 6-12 Greenhouse Gas Mitigation Measures

Mitigation Measure	Application at United Wambo	Status During Reporting Period
Limiting the length of material haulage routes to reduce diesel usage and associated emissions	Length of haulage routes has been optimised to minimise dust, noise, fuel use and improve operating efficiency.	Ongoing as part of the mine planning processes.
Optimising ramp gradients to reduce diesel usage and associated emissions	Ramp gradients have been optimised according to pit geometry parameters and mobile equipment performance characteristics.	Ongoing as part of the mine planning processes.
Continually improve the fuel efficiency of haul trucks operating at the mine to reduce diesel usage and associated emissions	Where new trucks are purchased during the life of the Project, fuel/energy efficiency will be considered in the selection criteria. Haul road design parameters such as gradient and haul length are optimised resulting in the efficient haulage of overburden per unit of fuel consumed.	Ongoing as part of the mine planning process.
Payload management to reduce diesel usage and associated emissions	Payload will be constantly monitored and actively managed to maintain efficiency, over time reducing the overall diesel consumption of the mine and, thereby, reducing GHG emissions.	Ongoing. Payload targets were set for all trucks at United Wambo and are fitted with an onboard management system to optimise payload size. United Wambo have been following the Excavator Operator Guideline (developed in 2021) to consider payload management.
Increasing haul truck payload to reduce the number of truck loads required and consequently reduce	Truck tray capacity will be reviewed as part of the efficient management of the operation, including the option of fitting custom-built trays to maximise payloads. Payload will also be maximised by blasting	Payload study completed to optimise new 930E-5 tray designs.

Mitigation Measure	Application at United Wambo	Status During Reporting Period
diesel usage and associated emissions	strategies that optimise material size characteristics.	
Improving rolling resistance of haul roads to reduce diesel usage and associated emissions	Haul roads are planned to be constructed on solid rock rather than on soil or subsoil material where practical.	Ongoing as part of the mine planning processes and maintenance strategies.
Reducing idling times to reduce diesel usage and associated emissions	Reducing idle times will be an ongoing performance measure. Initiatives to reduce idle times will continue to be introduced over the life of the Project. A reduction in idle times will improve fuel consumption rates per volume of material moved.	United Wambo has implemented a fleet management system to reduce queue time. In addition, multiple dumps are operated simultaneously (where practical) to reduce queue time.
Scheduling activities so that equipment operation is optimised to reduce energy usage and associated emissions	Scheduling activities to optimise equipment operation will be a routine activity. United will prepare long, medium and short term plans to optimise production. Over time, this will reduce the overall diesel consumption of the mine and, thereby, reduce greenhouse gas emissions.	Ongoing as part of the mine planning processes.
Seek to continually improve the fuel efficiency and diesel emissions of mine equipment during the purchase of new equipment	Where new equipment is purchased during the life of the Project; fuel/energy efficiency and reasonable and feasible diesel emissions reduction technology will be considered in the selection criteria.	All trucks have been fitted to Tier 4 emission standards, fitted with fuel/energy efficiency technology.
Blasting strategies to improve extraction and processing energy use efficiency and reduce associated emissions	Blast management practices will be employed to size material for optimum payloads and minimise the need for secondary treatment of waste material.	Blasts during 2024 were designed to minimise rehandling of material. During the reporting period secondary treatment of blasted material was not required.
Maximising resource recovery efficiency to maximise energy use efficiency and reduce associated emissions	Long, medium and short term operational plans will be developed to optimise the recovery of approved resources.	Ongoing as part of the mine planning processes.
Working machines to their upper design performance to optimise energy usage and associated emissions	Glencore's business objectives support and promote effective equipment utilisation and performance rates, resulting in improved fuel consumption rates per volume of material moved.	Ongoing as part of the mine planning processes.
Preventing unnecessary water ingress to reduce pump energy usage and associated emissions	The surface water management system is designed to maximise separation of clean and dirty water systems. Clean water will be diverted away from mining areas, consistent with the mine water	Ongoing as part of water system processes/management of water.

Mitigation Measure	Application at United Wambo	Status During Reporting Period
	management system design outlined in the EIS.	
In-pit servicing to reduce diesel usage associated with transporting equipment	Equipment will be serviced in pit, where practical, reducing unnecessary unproductive travel time and energy use.	In-pit servicing is completed where practical. In-pit refuelling station continues to be used and maintained.
High efficiency workshop lighting	Workshop areas will use high efficiency lighting, reducing energy use.	Energy efficient LED lighting continues to be used throughout operation
High efficiency heating, ventilation, and cooling (HVAC) systems for administrative buildings	Administration buildings will use high efficiency HVAC systems reducing energy use.	HVAC systems installed are still providing energy efficiencies to the administration building.

6.4.3 Approval Criteria – SSD 7142

Air quality criteria is included as Condition B25 of SSD 7142 and is reproduced in ***Table 6-13***.

Table 6-13 Air Quality Criteria

Pollutant	Averaging period	Criterion (µg/m³)
Particulate Matter <10 mm (PM_{10})	Annual	[a,c]25
	24 hour	[b]50
Particulate Matter <2.5 mm ($PM_{2.5}$)	Annual	[a,c]8
	24 hour	[b]25
Total suspended particulate (TSP) matter	Annual	[a,c]90

[a] Total impact (i.e. incremental increase in concentrations due to the development plus background concentrations due to all other sources).
[b] Incremental impact (i.e. incremental increase in concentrations due to the development on its own).
[c] Excludes extraordinary events such as bushfires, prescribed burning, dust storms, fire incidents or any other activity agreed by the Planning Secretary.

6.4.4 Key Environmental Performance

A list of air quality monitoring sites, parameters and frequencies are provided in ***Table 6-14***.

Table 6-14 Air Quality Monitoring Sites

Monitoring site (s)	Indicator (s)	Equipment Type	Frequency
HVAS 01 and HVAS 02	TSP	HVAS	Six-day cycle
AQ01, AQ02, AQ03 and AQ04	PM10	TEOM	Continuous
WS1 and WS2	Meteorology	Met Station	Continuous

6.4.4.1 High Volume Air Samplers

Table 6-15 presents a summary of HVAS monitoring results and compares annual averages for TSP against consent criteria.

Table 6-15 HVAS Results for 2024

Gauge	Maximum TSP (µg/m³)	Annual Average TSP[1] (µg/m³)
Consent Criteria	-	90.0
HVAS 01 (Warkworth)	673.0	137.5
HVAS 02 (Moses Crossing)	145.0	54.6

As shown in

Table 6-15 Annual TSP averages were within criteria limits of 90 µg/m^3 for HVAS 02. HVAS 01 is above the criteria however consent criteria no longer applies due to no private land ownership in Warkworth Village. As part of the action response a notification was made in accordance with Condition B27(a) and Condition D6 of SSD 7142.

6.4.4.2 Continuous Monitoring PM_{10}

A summary of the recorded PM_{10} levels at the TEOM units is presented in ***Table 6-16***. The number of days that exceeded the consent criterion is also shown. During the reporting period, TEOM units failed to collect valid data on several occasions for varying lengths of time. As a result, sometimes <75% of the daily data was not collected. During these occurrences, a valid 24-hour average was not able to be calculated. For additional details please see Section 1.

Table 6-16 provides a summary of the annual average and maximum 24-hour PM_{10} and 24-hour $PM_{2.5}$ averages recorded at TEOM units in 2024**.** The relevant criterion for PM_{10} and $PM_{2.5}$ were not exceeded at any sites throughout 2024.

Table 6-16 Summary of TEOM Sampling Results – Maximum 24-Hr Average

Annual average			Maximum 24-hour averages			
Gauge	**$PM_{2.5}$ (µg/m³)**	**PM_{10} (µg/m³)**	**$PM_{2.5}$ (µg/m³)**	**Number of days exceeding criterion**	**PM_{10} (µg/m³)**	**Number of days exceeding criterion**
Consent Criteria	8	25	25	0	50	0
AQ01	7.5	22.7	27.3	[b]0	73.1	[ab]0
AQ02	-	14.3	-	0	41.0	[b]0
AQ03	5.6	11.5	16.7	0	36.5	0
AQ04	-	18.6	-	0	51.2	[b]0

[a] Criteria does not apply to Warkworth area, as it is mine-owned land.
[b] Contribution Calculations completed and reviewed below criteria. This recalculation takes into account wind speed and wind direction.

6.4.5 Long Term Trends

6.4.5.1 TSP

Long- term annual average HVAS results for TSP at United Wambo in 2024 are shown in ***Table 6-17***.

Table 6-17 Long-Term High Volume Air Sampler TSP Results

	Moses Crossing (HVAS 02)			Warkworth (EPA ID 8) (HVAS 01)		
Year	MIN	MAX	AVG	MIN	MAX	AVG
2010	-	-	-	13.2	82.7	40.7
2011	-	-	-	13.0	140.0	49.8
2012	-	-	-	8.0	143.0	50.7
2013	-	-	-	8.0	141.0	55.7
2014	-	-	-	13.0	147.0	53.9
2015	-	-	-	10.0	166.0	51.8
2016	-	-	-	8.0	132.0	50.1
2017	-	-	-	19.0	159.0	65.0
2018	-	-	-	22.0	186.0	79.9
2019 (All Data)	-	-	-	12.0	214.0	80.0
2019 (Extraordinary removed)	-	-	-	12.0	196.0	74.0
2020 (All Data)	5.0	322.0	83.0	24.0	214.0	75.6
2020 (Extraordinary removed)[1]	5.0	214.0	70.3	24.0	144.0	70.8
2021 (All Data)[1]	2.1	125.0	36.4	14.4	447.0	94.6
2022 (All Data)[1]	2.9	117.0	37.7	15.4	254.0	72.3
2023	7.4	221.0	66.8	22.2	362.0	130.9
2024	4.5	145	54.6	19.9	673.0	137.5

[1] PM10 results were calculated using 0.4 multiplied by the corresponding TSP result for HVAS 01 and HVAS 02

Annual average HVAS results for TSP has shown a moderate level of variability throughout the period of 2010 to 2024. The 2024 average values for HVAS TSP shows an increase at HVAS 01 from 2023 and a decrease at HVAS 02.

6.4.5.2 EIS Predictions

The United Wambo Open Cut Coal Mine Project (August 2016) modelled operation scenarios for years 2, 6, 11 and 16 of the conceptual mine plan. A comparison of air quality monitoring results and those predicted in the EIS for Year 2 is summarised below.

The EIS predicted that cumulative annual average PM_{10} and $PM_{2.5}$ criteria would not be exceeded at all surrounding private residences, with the exception of one residential receiver at Warkworth

Village, however, since the EIS was submitted, this property has been purchased and is no longer privately owned. Cumulative Maximum 24Hr PM_{10} 24 hr concentrations were predicted to exceed on at least one occasion a year. Monitoring results identified that Maximum PM_{10} 24 hr was exceeded by United Wambo for 2024. There were no exceedances of $PM_{2.5}$ Annual Average or Maximum 24-hour concentration for United Wambo throughout 2024.

The EIS did not predict any exceedance of TSP at any private residences. Monitoring results show that there have been no exceedances of the TSP criteria at any private residence.

6.4.6 Reported Greenhouse Gas Emissions

United Wambo reports greenhouse gas emissions (GHG) in accordance with National Energy and Greenhouse Gases (NGER) legislation. Each financial year, United Wambo is required to submit to the Federal Government the emissions from their NGERs registered facility. The NGERs reporting year is based on a financial year, not a calendar year, such as this Annual Review. In order to prevent incompatible public reporting, the values in this report also cover a financial year. ***Table 6-18*** below contains the Scope 1 (direct emissions from the mining activities during the year), and Scope 2 emissions (electricity consumption by the mine during the year).

Table 6-18 2024 Direct Emissions and Electricity Consumption

Site	Scope 1 CO2-e	Scope 2 CO2-e
United Wambo Joint Venture	*433,266 tonnes*	*1,599 tonnes*

6.4.6.1 EIS Predictions - Emissions

The EIS predicted the operation to produce approximately 253,000 t CO2-e Scope 1 emissions and approximately 35,000 t CO2-e of Scope 2 emissions per annum. The EIS Scope 2 predictions included the electricity used for operation of the CHPP, Wambo own, manage and operate the CHPP and are responsible for reporting Scope 2 emissions for that facility.

6.4.6.2 Continuous Improvement Measures - Energy Efficiency and Reduce GHG Emissions

United Wambo is a part of the wider coal assets held by Glencore across Australia. Glencore Coal Assets Australia (GCAA) are themselves a part of the global Glencore mining portfolio. In line with the ambitions of the 1.5^{o}C scenarios set out by the IPCC, Glencore target a short-term reduction of 15% by 2026 and a medium-term 50% reduction of our total (Scope 1, 2 and 3) emissions by 2035 on 2019 levels. Post 2035, Glencore's ambition is to achieve, with a supportive policy environment, net zero total emissions by 2050.

Glencore incorporates energy costs and our carbon footprint into our annual planning process. Commodity departments, such as Glencore Coal Assets Australia, are required to provide energy and GHG emissions forecasts for each asset over the forward planning period and provide details of emissions reduction projects.

In the case of United Wambo, this includes involvement with GCAA when considering available GHG abatement technology and mine planning to optimise efficiency (which usually translates into reduced fuel consumption) see ***Table 6-12*** for United Wambo's greenhouse gas mitigation measures.

6.4.7 Improvements

6.4.7.1 Current reporting period

United Wambo ordered four new water carts (Komatsu 785 models) and hired an additional watercart to increase water cart availability.

6.4.7.2 Next reporting period

United Wambo will be replacing four water trucks with new Komatsu 785 models. The new machines will increase the overall availability of the water carts which will improve dust suppression capability. United Wambo will be investigating the use of polymers for dust suppression on build pads and maintenance areas to minimise dust potential.

6.5 Biodiversity

6.5.1 Biodiversity Offset Strategy

United Wambo has approval to retire biodiversity credits progressively based on the staging of vegetation disturbance in line with the progressive development of the mine. The three stages of disturbance are approximately seven-year stages, and are referred to as Stage 1, Stage 2 and Stage 3. An overview of the current proposed Stage 1, Stage 2 and Stage 3 credit requirements, as outlined in SSD 7142, are provided in ***Table 6-19***.

Table 6-19 Staged Offsetting Requirements

Impacted Feature	STAGE 1 Credits Required	STAGE 2 Credits Required	STAGE 3 Credits Required	Total
Central Hunter Valley Eucalypt Forest and Woodland CEEC under the EPBC Act	11,287	2,570	620	14,477
Hunter Floodplain Red Gum Woodland EEC under the BC Act	0	20	0	20
Central Hunter Ironbark - Spotted Gum - Grey Box Forest EEC under the BC Act	1,424	0	0	1,424
Central Hunter Grey Box - Ironbark Woodland EEC under the BC Act	356	101	0	457
HU905 - Narrow-leaved Ironbark - Grey Box grassy Woodland of the Central and Upper Hunter	3,562	1,344	1	4,907
HU906 - Bull Oak Grassy Woodland of the Central Hunter Valley	2,973	0	0	2,973
HU945 - Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley	1,844	281	0	2,125
Southern Myotis (*Myotis Macropus*)	15	547	0	562
TOTAL ECOSYSTEM CREDITS	21,446	4,316	621	26,383
TOTAL SPECIES CREDITS	15	547	0	562

A Biodiversity Offset Strategy (BOS) was subsequently developed and included in the ***Biodiversity Management Plan***, which outlines the proposed method of retiring these credits.

Stage 1 Credits

The proposed retirement method for Stage 1 credits was the establishment of Biodiversity Stewardship Agreements (BSA's), ensuring in-perpetuity conservation and reporting consistent with the NSW Biodiversity Offset Scheme (NSW BOS). The BSA's established to satisfy the Stage 1 requirements include:

- Brosi
- Highfields
- Jerrys Plains
- Mangrove
- Wambo
- South Wambo

During 2024, United Wambo finalised all six BSA's and retired all of the required offset credits for Stage 1 of the Project. This included retirement of ecosystem credits generated at the six BSA's, as well as payment into the Biodiversity Conservation Fund (BCF) for the 15 Southern Myotis credits required for Stage 1.

Upon completion of the Stage 1 credit requirements, United Wambo completed a review of the Stage 1 offset areas and identified an area of proposed disturbance on the eastern side of the Golden Highway that was offset under Stage 1 but would no longer be disturbed in the sites long term mine plan. Subsequently, United Wambo applied to DPHI under Condition B59 of SSD7142 to carry these surplus credits over to the Stage 2 and 3 credit obligations. DPHI approved the application in March 2025.

Stage 2 and 3 Credits

United Wambo is proposing to use a combination of the following methods to satisfy the Stage 2 and 3 credit obligations:

- surplus credits carried over from Stage 1
- remaining credits generated on the BSA's
- purchase of credits on the biodiversity credit market
- payment into the BCF

It is anticipated that Stage 2 and 3 credit obligations will be fulfilled during Quarter 2 2025. Disturbance of Stage 2 offset areas will then commence.

6.5.2 Key Environmental Performance

6.5.2.1 Disturbance

A total of 8.6 hectares of new disturbance was undertaken for the development of the open cut mining areas, infrastructure areas and overburden emplacement areas. A comparison of the total actual disturbance to date for each offset stage is provided in ***Table 6-20.***

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Table 6-20 Proposed Stage 1 vs Actual to Date Disturbance

Impacted Feature	Stage 1 Proposed Disturbance (ha)	Stage 1 Total Disturbance to Date (ha)	Stage 2 Proposed Disturbance (ha)	Stage 2 Total Disturbance to Date (ha)	Stage 3 Proposed Disturbance (ha)	Stage 3 Total Disturbance to Date (ha)
***Central Hunter Valley Eucalypt Forest and Woodland CEEC* under the EPBC Act**	195.54	137.0	41.55	0	9.68	0
***Hunter Floodplain Red Gum Woodland EEC* under the BC Act**	0	0	0.29	0	0	0
***Central Hunter Ironbark - Spotted Gum - Grey Box Forest EEC* under the BC Act**	28.25	28.25	0	0	0	0
***Central Hunter Grey Box - Ironbark Woodland EEC* under the BC Act**	6.28	4.88	1.57	0	0	0
HU905 - Narrow-leaved Ironbark - Grey Box grassy Woodland of the Central and Upper Hunter	120.34	111.52	40.63	0	0.01	0
HU906 - Bull Oak Grassy Woodland of the Central Hunter Valley	51.05	48.12	0	0	0	0
HU945 - Swamp Oak - Weeping Grass Grassy Riparian Forest of the Hunter Valley	27.33	26.70	4.17	0	0	0

6.5.2.2 Weed and Pest Management

United Wambo focused on targeting weeds in the future clearing areas and rehabilitation areas and maintaining vegetation around key infrastructure areas. Species targeted in weed management activities included:

- African Olive (*Olea europaea* subsp. *cuspidata*)
- Mother-of-Millions (*Byrophyllum delagoense*) – Noxious Weed Class 3
- Galenia (*Galenia pubescens*)
- Prickly Pear (*Opuntia stricta*)
- African Boxthorn (*Lycium ferocissimum)* – Weed of National Significance (WONS)

United Wambo complete two pest control campaigns, Autumn and Spring, along with non-routine pig trapping when the species was observed. This was across both operational and non-operational areas. Species targeted in vertebrate pest management activities included:

- Red Fox (Vulpes vulpes)
- Wild Dogs (*Canis familiaris*)
- Feral Pigs

6.5.3 Management Measures

Measures to Minimise Direct Impacts on Biodiversity

As per the approved United Wambo ***Biodiversity Management Plan***, the management measures are described in ***Table 6-21.***

Table 6-21 Biodiversity Management Measures

Action	2024 Measures
Minimise the impacts of the development on biodiversity	Suitably experienced personnel undertook pre-clearance surveys and tree-felling supervision for all clearing areas. Suitable biological resources, including topsoil and fallen trees , were salvaged from clearing areas prior to removal of vegetation. All vegetation is mulched and incorporated into the topsoil. Dog baiting and pig trapping was undertaken as per above.
Manage the remnant vegetation and fauna habitat at the site	Clear delineation of the clearing disturbance footprints to avoid accidental clearance beyond the areas approved for disturbance Weed and pest management as per above.
Employee Education and Training	All employees and contractors are provided with an awareness of biodiversity values of United Wambo and requirements of the BMP in relation to site operations through the site induction process.

6.5.4 Improvements

There are no improvements noted for biodiversity management. Active management of the biodiversity offsets started in 2024 and the completion of all year 1 activities will be the focus for United Wambo.

Where possible any improvements will be reviewed and actioned.

6.6 Heritage

6.6.1 EIS Predictions

6.6.1.1 Aboriginal Heritage

The United Wambo Open Cut Coal Mine Project EIS provided details of the survey undertaken for the cultural heritage assessment in 2015. The Aboriginal heritage surface survey recorded 25 new artefact scatters, 20 extensions to previously recorded sites and 34 isolated finds. This surface survey was followed by eight test excavations, with surprisingly sparse results. One hundred and ninety-two artefacts were recovered, with an average of 1.25 artefacts per excavation square, which is an extremely low density of artefacts.

6.6.1.2 European Heritage Sites

A detailed heritage impact statement was conducted in 2016 for the proposed United Wambo Joint Venture Project (Umwelt, 2016). In consultation with Enviro Strata (the Blasting Impact Assessment consultant), it was determined that items further than 2 kilometres from the Project Area would not be affected by blasts. As such, the search for this assessment was limited to a conservative distance of 3 kilometres. Three Listed Heritage items were identified as being within the vicinity of the Project (within 3 kilometres), but outside the Project Area. These are Wambo Homestead, St Philips Church Warkworth and the Former Queen Victoria Inn (ruins). A number of potential historical heritage sites/items with no statutory listing were identified during the Assessment. Two items of historic interest were present within the Project Area - the Dog- leg Fence and the former House Site and six within the vicinity of the Project Area, including - Springwood Homestead, Montrose Property, the former Warkworth Public School and the Piggery and Butcher's Hut.

6.6.2 Key Environmental Performance

6.6.2.1 Aboriginal Heritage

Aboriginal due diligence assessment

An Aboriginal due diligence assessment was undertaken for six exploration boreholes (the proposal) on the 23rd January 2024 by OzArk Environment & Heritage. The due diligence process resulted in the conclusion that no Aboriginal objects or intact archaeological deposits will be harmed by the proposal, therefore an Aboriginal Heritage Impact Permit application was not necessary for the proposed exploration works. See ***OzArk, 2024a*** for the full Aboriginal due diligence assessment report.

Tree determination meeting and artefact salvage

On 4th April 2024, a meeting was held at UWJV to undertake salvage activities at Aboriginal site UWJV OS-1 (37-6-4260) and discuss management measures for a tree considered by some Registered Aboriginal Parties (RAPs) to be a culturally modified (scarred) tree. Aboriginal site UWJV OS-1 (37-6-4260) was recorded on 15th February 2023 by an OzArk Archaeologist and a consultant from Gomery Cultural Consultants following identification by UWJV staff on the artificial bank of U3 Dam. Notification was made to RAPs (2nd February 2023) and DPHI (16th February 2023). Aboriginal site UWJV OS-1 (37-6-4260) falls within the ***Aboriginal Heritage Impact Permit (AHIP) 2222*** operative area – leading to the site being managed in accordance with the ***Wambo AHMP***. ***AHIP 2222*** was granted for harm to all Aboriginal objects in or under the land to which each AHIP applies (excluding harm to human remains). However, in the interest of the Aboriginal community, UWJV proposed salvaging the objects as per the methodology outlined in the ***Wambo AHMP***.

With reference to the potentially modified (scarred) tree, after the inspection and a review of findings of previous assessments all attending RAPs agreed that the scarring on the tree is a result of natural trauma and not the result of cultural modification. It was agreed that no management measures are required for the tree based on this determination.

Additional salvage activities were undertaken at a previously salvaged Aboriginal site (United OS-7; 37-5-0710) following the identification of further artefacts during the tree inspection. As the Aboriginal objects were identified at the location of a previously recorded Aboriginal site, a revision of the ***UWJV ACHMP*** and notification to the DPHI was not required. See ***OzArk, 2024b*** for the full Salvage report.

Artefact relocations

Relocation of artefacts from the NMIA to the SMIA was undertaken on the 24th September 2024 under the existing ***Care Agreement Notice 3062***.

UWJV received a ***Care and Control Agreement 5315*** on 23rd October 2024 for the relocation of artefacts from secure temporary storage at UWJV to Minimbah Teaching and Keeping Place. This relocation occurred on the 19th December 2024 with RAPs in attendance under the guidance of an OzArk Archaeologist.

Existing and ongoing management measures

The recommended management measures for the Aboriginal heritage sites remaining within the United Wambo area have been implemented, which includes, but is not limited to, the fencing and signposting of in situ sites. ***Figure 6-3*** illustrates the current status of Aboriginal heritage sites in the United Wambo area. United Wambo will continue to ensure cultural heritage sites are not impacted through the implementation of the Ground Disturbance Permit process and due diligence practices onsite.

Cultural Program Funding

No applications were received in 2024 for the Cultural Program Funding outlined in the ***Aboriginal Cultural Heritage Management Plan***, ***Section 4.3***, United Wambo continued and will continue to seek projects within the community for potential support.

Two representatives from UWJV attended the Tidda Yarns Art Show by invitation on the 9th April 2024. The exhibition showcased the Possum Pelt Cloak (worn by the Puwampi Unti Kunarr dance group) and artworks crafted by students from Tidda Yarns. Both programs were supported through the United Wambo JV Cultural Program Funding in 2023.

The third and final tertiary education scholarship was awarded as part of the United Wambo JV Cultural Program funding.

6.6.2.2 Historic Heritage Sites

There were no historical heritage activities undertaken during 2024. There was no disturbance to historic heritage items during 2024.

6.6.3 Management Measures

United Wambo will continue to monitor Aboriginal heritage sites in accordance with the ***United Wambo Aboriginal Cultural Heritage Management Plan (ACHMP)***, as required by condition ***B79*** of ***SSD 7142***. For management measures and salvage methods refer to ***Table 1*** and ***Section 6*** of the ***ACHMP*** respectively.

United Wambo will continue to manage all European heritage items in accordance with the ***United Wambo Historical Heritage Management Plan (HHMP)***, which is required by condition ***B82*** of ***SSD 7142***. For mitigation and management measures refer to ***Table 1*** and ***Section 7*** of the ***HHMP***.

6.6.4 Improvements

6.6.4.1 Current reporting period

There were no significant improvements made to Cultural or Historic Heritage in 2024.

6.6.4.2 Next reporting period

United Wambo JV propose to continue to actively seek appropriate cultural programs for funding and development in the community.

Figure 6-3 Aboriginal Heritage Sites

6.7 Waste Management

Waste management practices at United Wambo are based on the waste management hierarchy of reduce, reuse, recycle and as a last resort, dispose.

The overall aim of the waste management system at United Wambo is to minimise waste being disposed from the site, but also to maximise resource use where possible. Waste is managed, tracked if necessary and records kept for reporting purposes.

Further detail regarding waste management at United Wambo is within the Environmental Management Strategy (***EM Strategy***).

6.7.1 General Waste and Recycling

Waste generated at United Wambo is managed in accordance with the ***EM Strategy***. Paper, cardboard and scrap steel are all recycled. United Wambo currently has a total waste management system which includes training, segregation, disposal and reporting.

6.7.2 Sewage Treatment and Disposal

United Wambo currently have a certified sewerage treatment system which services the main pit top facilities including the administration area, stores, and bathhouse. The sewage system is serviced on a regular basis by licensed contractors. Sewerage from temporary buildings, is pumped out by a licenced waste contractor and managed offsite in accordance with council and legislative requirements ***– SSD 142 Cond. B91(c).***

6.7.3 Hydrocarbon Management

In 2024, United Wambo continued to remove and manage unwanted materials produced by undertakings onsite. All maintenance areas and refuelling bays have appropriate spill response equipment placed in accessible locations. Employees were, and will continue to be, trained on how to maintain and utilise the spill response equipment.

6.7.4 Summary of Waste Performance in 2024

United Wambo tracks all waste generated by mining activities. In 2024, United Wambo generated 2,502,184 kg of waste that required removal from site. Of this total volume, 345,401 kg of waste was disposed (3.23% decrease from 2023), and 2,156,783 kg was sent to be recycled (3.16% decrease from 2023).

In 2024 United Wambo saw a minor increase in the recycling of non-hazardous waste (0.36%). Large increases are noted in the volume of paper & cardboard (26.39%) and timber (53.54%) being recycled. In contrast United Wambo reported a 6.03% decrease in the recycling of hazardous waste. Key drivers of this result include a 84.65% reduction of contaminated sludge, and a 28.26% decline in oily water recycling.

The disposal of both hazardous and non-hazardous waste decreased by 9.39% and 2.46% respectively. The key waste contributor to the decrease in hazardous waste included the 10.37% decline in oily rags/absorbents. A 262.5% increase of medical waste in 2024 is noted, however is not of concern as the volume disposed in 2023 was less than average.

These waste decreases are a result of less maintenance and waste generating projects at United Wambo in 2024 when compared to the increased operational performance and additional waste generation activities - removal of redundant equipment and increased equipment maintenance, that

were experienced in 2024. A detailed breakdown of offsite waste disposal is contained within ***Appendix E -Waste Performance***.

United Wambo will continue to investigate measures to reduce the volume of waste produced across site. ***Section 0*** outlines improvements which United Wambo plan to implement in 2025.

6.7.5 Management Measures

United Wambo undertook waste management in accordance with waste criteria under conditions ***B91 and B92 of SSD 7142*** during 2024.

Management measures included:

- weekly removal of general waste, including scrap by a licenced contractor
- weekly and monthly inspections are undertaken to monitor the implementation of the Waste Management Plan
- additional training of relevant personnel highlighting any waste management issues
- assessment and appropriate management of specific wastes such as contaminated wastes

The weekly and monthly inspections showing general site compliance indicates the current waste management measures applied at United Wambo are effective.

6.7.6 Improvements

6.7.6.1 Current reporting period

A plan for site waste management was developed in 2022, with waste removal continuing throughout 2024 and will continue through operations including the implementation of further improvements such as additional waste bins for waste segregation and awareness training of operational staff in waste segregation requirements. United Wambo began the segregation and collection of plastic bottles and aluminium cans as a proposed charity initiative.

6.7.6.2 Next reporting period

As United Wambo continues operations, the legacy waste associated with past operations will be identified and targeted for removal offsite. This project will focus on the removal of equipment tyres which have been placed in laydown areas across site, then all redundant equipment will be assessed for sale or removal.

United Wambo will continue to implement the current management measures to ensure effectiveness of the waste management system. This includes, but is not limited to:

- providing waste management training to site personnel
- reviewing site waste management and looking for options to reduce waste and increase recycling opportunities.

6.8 Visual and Lighting

6.8.1 Environmental Management

Control strategies are implemented to reduce potential visual and light related impacts associated with mining operations. Management is undertaken in accordance with the United Wambo Lighting Management Procedure.

Visual and lighting impacts are assessed through monitoring and inspection regimes. Onsite monitoring includes assessments of lighting impacts, compliance with development consent conditions and the angle at which light is emitted from lamps and luminaries, glare, spill and sky glow.

6.8.2 Environmental Performance

Potential lighting impacts are assessed as part of the overburden dump design process. Dumps are orientated, where practicable, and windrows or bunds are designed and constructed to mitigate lighting impacts.

A sensitive lighting receiver map is updated and communicated to mining personnel prior to commencing exposed dumps that have the potential to cause lighting impacts offsite.

6.8.3 Improvements

6.8.3.1 Current Reporting Period

During 2024 there was continued focus on dump designs, utilising day-time and night-time dumps where practicable, precise lighting plant placement in exposed areas and offsite monitoring to confirm the direction of the lighting plant is not obtrusive to the community.

United Wambo JV planted trees along exposed areas to the Golden Highway adjacent to the United Pit.

6.8.3.2 Next Reporting Period

United Wambo JV have commenced a program to install GPS and directional tracking devices to mobile lighting plants to enable a more robust system of checking direction of lighting prior to the use of lighting plants.

7. Water Management

7.1 Water Take and Licensing

Condition B40 of United Wambo's Development Consent (SSD 7142) requires water extracted from the site each year, both directly and indirectly, is reported in the Annual Review.

As described in the ***United Wambo Water Management Plan***, water sharing occurs between United Wambo and Wambo Underground, as part of the "Wambo Complex Water Management System". This system facilitates sharing of licences for the complex.

Table 7-1 shows the predicted annual groundwater volumes required to be licensed for the Wambo Complex (Wambo Underground and United Wambo Open Cut). These values are from the groundwater model which incorporate as-mined and proposed future UWOC mining.

Table 7-1 - Groundwater Licencing Summary for United Wambo OC and Wambo UG

Water Sharing Plan	Management Zone/ Groundwater Source	Complex Licensed Entitlement (ML/ year)	Complex Predicted Annual Groundwater Inflow Requiring Licensing [4] (ML/year)	Complex Modelled Groundwater Inflow 2024
Hunter Unregulated and Alluvial Water Sources Water Sharing Plan 2009	Lower Wollombi Brook Water Source	736.9 [2]	Av. 135 Max. 209	0 [5]
	Jerrys Water Source	0	0	0
North Coast Fractured and Porous Rock Groundwater Sources [1]	Porous Rock	1,947 [3]	Av. 714 Max. 1,110	636

[1] Porous Rock is the Sydney Basin - North Coast Groundwater Source, as defined in the WSP for the North Coast Fractured and Porous Rock Groundwater Sources, released 1 July 2016.
[2] Licence No. WAL23897, WAL18437, WAL18455, WAL18549.
[3] Licence No. WAL42373, WAL41532, WAL41510.
[4] Over the life of Wambo Complex Mining Operations
[5] It is noted that predicted take from the Lower Wollombi Brook Water Source in the updated model does not exceed 70 ML (provided in WAL23897) until after 2028.

Table 7-2 outlines the water take across the complex (i.e. United Wambo Open Cut and Wambo Underground) against all relevant licences, in accordance with the requirement of the Annual Review Guideline (DPE 2015).

Table 7-2 Water Take Against Water Licences for United OC and Wambo UG

Licence Number[1]	WAL Reference Number	Description	Nominated Water Supply Work Approval	Works Approval Expiry Date	Purpose	License Holder	Entitlement (Units)	Passive Take / Inflows (ML)	Active Take / Pumping (ML)	Total
Hunter Regulated River Water Source										
WAL 718	20AL200631	Hunter River Pump	20WA200632	30/06/2027	E Industrial	Wambo Coal Pty Ltd	1000	0	415[4]	415
WAL 8599	20AL201457	Hunter River Pump	20CA201459	25/09/2028	I Irrigation K Farming	Wambo Coal Pty Ltd	6	0	0	0
WAL 8600	20AL201458	Hunter River Pump	20CA201459	25/09/2028		Wambo Coal Pty Ltd	868	0	0	0
WAL 8604	20AL203044	TBC (extraction via Hunter River Pump)	-	-		Wambo Coal Pty Ltd	240	0	0	0
WAL 10541	20AL200927	Hunter River Pump	20WA200928	30/06/2027	Industrial	Maher Anthony John & Kelly Grahame Patrick	300	0	0	0
Hunter Unregulated and Alluvial Water Sources (Lower Wollombi Brook Water Source)										
WAL 23897	20AL211371	Well No. 2	20WA211372	31/07/2032	Industrial	Wambo Coal Pty Ltd	70	0[3]	0	0
WAL 18437	20AL208641	Wollombi Brook Pump	20WA208642	31/07/2032	E Industrial	Wambo Coal Pty Ltd	366.9	0	0	0
WAL 18445	20AL208713	Bywash Dam	20WA208714	13/03/2033	Industrial	Maher Anthony John & Kelly Grahame Patrick	200	218.74[5]	0	218.74
WAL 18549	20AL208705	Other Pump	20WA208706	18/11/2032	Industrial	Maher Anthony John & Kelly Grahame Patrick	100		0	
North Coast Fractured and Porous Rock Groundwater Sources (Sydney Basin - North Coast Groundwater Source)										
WAL 42373[2]	20AL219997	-	20MW065010	-	H Mining	Wambo Coal Pty Ltd	1549	636[3]	0	636
WAL 41532	20AL218994	Dewatering	20MW065010	-	H Mining	Wambo Coal Pty Ltd	98	0	0	0
WAL 41510	20AL217075	Dewatering	20MW065011	-	H Mining	United Collieries Pty Ltd	300	0	0	0

[1] All water licences (WALs) are in perpetuity, i.e. no expiry date.
[2] WAL 42373 was issued in 2019 to consolidate six of WCPL's previous WALs under the North Coast Fractured and Porous Rock groundwater Sources (Sydney Basin – North Coast Groundwater Source) including WAL 39735, WAL 39738, WAL 39803, WAL 41494, WAL 41528 and WAL 41520.
[3] Value derived from the Wambo Complex Numerical Groundwater Model (SLR 2022), Complex modelled groundwater inflow for 2024
[4] Extraction at Hunter River pump against WAL 718 for the Financial Year 2023/2024
[5] Surface water runoff captured in U2 (3rd order stream) that is not accounted for under harvestable rights. UWJV have sought clarification from DCCEEW licencing whether this passive take requires its own miscellaneous works approval against the WALs.

7.2 Surface Water

7.2.1 Key Environmental Performance

United Wambo implements surface water monitoring in accordance with the ***United Wambo Water Management Plan*** and the ***United Wambo Surface Water Management Plan***.

7.2.1.1 Annual Surface Water Speciation Results

Annual surface water speciation results for 2024 are presented in ***Table 7-3.*** The annual sampling was scheduled for December on a calendar year, to capture seasonal consistency in the dataset. During the sampling round, only WB04 contained water and was sampled. All other sites were dry due to the ephemeral nature of the watercourses.

There were no exceedances of ANZECCC criteria for the 2024 annual speciation monitoring. Most metals and nutrients were at very low levels.

The last time NWC03 had running water for sampling was October 2022. RC01 had pooled water in October 2024.

Table 7-3 Annual Speciation Results

Site ID	ANZECCC Criteria (mg/L)	WB04	NWC03	RC01	WFC01
Date sampled	-	12/12/2024	No sample available for testing[1]	No sample available for testing[1]	No sample available for testing[1]
Aluminium (Al)	0.055	0.02			
Arsenic (As)	0.024	<0.001			
Cobalt (Co)	N/A	<0.001			
Copper (Cu)	0.0014	<0.001			
Iron (Fe)	N/A	0.43			
Manganese (Mn)	1.9	0.276			
Nickel (Ni)	0.011	<0.001			
Selenium (Se)	0.011	<0.010			
Zinc(Zn)	0.008	<0.005			
Mercury (Hg)	0.0006	<0.00			
Lead (Pb)	0.0034	<0.001			
Potassium (K)	N/A	6			
Silver (Ag)	0.00005	<0.001			
Fluoride (Fl)	N/A	0.1			
Boron (B)	0.37	<0.050			

Site ID	ANZECCC Criteria (mg/L)	WB04	NWC03	RC01	WFC01
Calcium (Ca)	N/A	17			
Barium (Ba)	N/A	0.064			
Magnesium (Mg)	N/A	20			
Cadmium (Cd)	0.0002	<0.0001			
Sodium (Na)	N/A	115			
Total phosphorous (P)	N/A	0.02			
Nitrite	N/A	<0.01			
Nitrate	N/A	0.01			
Total Kjeldahl Nitrogen (TKN)	N/A	0.3			
Total nitrogen (Total N)	N/A	0.3			
Ions - Chloride (Cl)	N/A	208			
Bicarbonate (CaCO3)	N/A	104			
Sulphate (SO4)	N/A	11			

[1]No sample available for testing due to ephemeral nature of creek at time of sampling. Sample will be taken at next opportunity when water available.

7.2.1.2 Routine Surface Water Monitoring Results

Table 7-4 summarises the water monitoring results at on-site water storages for the reporting period. The on-site locations do not have quality criteria but are used to support overall understanding and modelling of water migration on site. ***Table 7-5*** summarises the water monitoring results at offsite locations, compared to criteria in the ***United Wambo Surface Water Management Plan***.

Table 7-4 Summary of surface water monitoring results for 2024

Sample site	Sample Description	2024 Count	Field pH (pH unit)			Lab EC (µg/cm)			Lab TSS (mg/L)			Lab TDS (mg/L)		
			Min	*Mean*	*Max*	*Min*	*Mean*	*Max*	*Min*	*Mean*	*Max*	*Min*	*Mean*	*Max*
WB01	Wollombi Brook - Upstream	3	6.80	7.07	7.30	267	425	529	8	10	11	-	-	-
WB02	Wollombi Brook - Pumps	22	7.00	7.44	7.90	272	1025	3750	<5	10	73	208	716	2200
WB03	Wollombi Brook - Warkworth	25	7.06	7.43	7.80	271	2434	971	<5	<5	10	200	358	498
NWC01	North Wambo Creek - Upstream	0	D	D	D	D	D	D	D	D	D	D	D	D
NWC02	North Wambo Creek - Midstream	0	D	D	D	D	D	D	D	D	D	D	D	D
W02	Dam 2	7	8.46	8.92	9.16	1500	2839	4500	13	52	143	1260	2011	2760
W03	United UG Boxcut	10	8.44	8.73	9.02	1520	1977	4860	<5	40	104	903	1289	3140
W07	Dam 14	12	7.53	8.62	9.17	228	285	442	<5	12	26	141	207	314
W09	CHPP Dams	12	8.90	9.08	9.30	2720	4704	6440	40	316	981	2100	2550	3000
W10	Process Water Dam	19	8.70	8.88	9.10	3660	5119	6190	13	77	273	2610	3528	4180
W11	Wambo MIA Box Cut Dam	24	8.09	8.51	9.40	696	812	1010	<5	<5	13	349	446	8110
W12	Homestead Pit	18	8.50	8.85	9.10	2900	4657	12800	13	4149	73400	2080	3054	4710
W13	West Cut Dam	24	8.30	8.79	9.10	1650	4319	6770	<5	21	70	982	2817	4190
W14	Montrose Pit Inflows	24	8.44	8.72	8.97	2150	3485	4380	<5	<5	7	1300	2103	2610
W15	Dam 7	5	7.65	7.82	7.92	379	523	624	<5	<5	14	326	395	532
W16	Dam 15	5	7.12	7.95	8.40	252	510	836	<5	36	101	179	356	649
W17	Wombat Dam	0	No longer a rehabilitation runoff dam. Being used as staging dam for water pumped from Montrose Pit (W14), on the way to U2 (W18).											
W18	U2	12	8.70	9.00	9.16	2720	3767	4810	<5	28	4810	1610	2370	3200
W19	U3	12	8.72	9.02	9.28	3170	4308	5700	<5	149	1500	1880	2792	3540
W20	Montrose ME1 Sed Dam	9	7.17	7.79	8.43	301	504	834	7	22	44	298	389	628
W21	Montrose ME2 Sed Dam	7	7.68	7.85	8.14	274	479	749	8	57	137	259	338	453
W22	Drain 9	0	Dam mined through.											
W23	Plover Dam	4	7.50	8.25	8.82	630	1458	2600	10	39	106	578	1009	1700
W24	MIA Sediment Dam	11	8.53	8.80	9.17	537	1077	1850	24	82	206	352	840	1380
W25	United Pit	7	8.03	8.47	8.87	1420	6289	12800	<5	328	2190	1090	3887	8110
W26	Turkeys Nest Dam	12	8.64	8.95	9.20	1360	2387	4430	19	751	3390	1430	2395	3600

** sample site has trigger Surface Water Management Plan criteria*
***Where TSS were undetectable (<5.00 mg/L), a value of 2.5 mg/L was used to calculate the average*
D Sample site dry during all sampling rounds

Table 7-5 Surface water monitoring results compared to site criteria

Site	Date	Comment	pH Criteria		Field pH	Electrical Conductivity Criteria	Electrical Conductivity	Total Suspended Solids Criteria		Total Suspended Solids	Total Dissolved Solids Criteria	Total Dissolved Solids
			Low	High				Low	High			
			-	-	-	µS/cm	µS/cm	mg/L		mg/L	mg/L	mg/L
NWC03	5/04/2024	Susp fines/seeds	7.30	8	7.40	2350	342	53	1110	474	1270	285
	All other months 2024	Site was dry / stagnant pool / too low to sample during every monthly sampling events and adhoc post rainfall checks.			-		-			-		-
RC01	11/07/2024	-	7.90	8.3	**7.06**	8456	367	26	NC	9	NC	289
	12/09/2024	-			***7.86***		531			6		311
	All other months in 2024	Site was dry / stagnant pool / too low to sample during every monthly sampling events and adhoc post rainfall checks.			-		-			-		-
WB04	31/01/2024	-	6.50	8.5	7.78	2200	1210	50	NC	<5	NC	611
	22/02/2024	-			7.63		1150			6		724
	15/03/2024	-			7.83		1570			8		763
	10/04/2024	-			7.15		349			<5		222
	17/05/2024	-			7.50		289			5		200
	14/06/2024	-			7.20		372			<5		199
	11/07/2024	-			7.79		569			<5		312
	7/08/2024	-			7.87		578			<5		320
	12/09/2024	-			7.68		629			6		330
	10/10/2024	-			7.65		737			10		368
	15/11/2024	-			7.99		752			<5		408
	12/12/2024	-			7.92		781			5		465
WFC01	Jan to Dec 2024	Site was dry / stagnant pool / too low to sample during every monthly sampling events and adhoc post rainfall checks.	7.30	7.9	-	435	-	582	1922	-	646	-

NC No criteria in United Wambo Surface Water Management Plan
Red bold text *Exceedance of criteria*

The long term annual average rainfall for Singleton is 744 mm. The total rainfall measured at the United Wambo meteorologic station during the reporting period was 765 mm.

Wollombi Brook is a major tributary which sustained flow throughout the reporting period (WB02, WB03 and WB04), except for upstream WB01. WB01 was sampled in May and June only, when there was a higher water level and flow through this section of the creek.

North Wambo Creek (NWC01, NWC02, NWC03), Redbank Creek (RC01) and Waterfall Creek (WFC01) are all ephemeral creeks, which is reflected in the number of samples taken during the reporting period.

Four surface water sites at United Wambo have quality criteria: NWC03, RC01, WFC01 and WB04. Comparison of results against criteria are shown in ***Table 7-5.*** As per the SWMP, results exceeding the criteria for three consecutive monitoring rounds require detailed investigation to establish if the cause and whether the mine is causing adverse impacts.

During the reporting period, zero samples were taken at WFC01 due to dry or no flow conditions. WFC01 has been dry since December 2023. WFC01 did not trigger any water quality criteria due to no samples taken.

NWC03 was affected by dry conditions, with only one sample collected in April 2024. The result did not trigger any exceedances of the criteria for pH, electrical conductivity, total suspended solids or total dissolved solids. The sample was taken on a day of high rainfall, with a total of 78.2 mm, as well as 27.40 mm the previous day. This amount of rainfall in a typically dry creek would likely cause disruption of sediment and erosion. The catchment area is made up of agricultural land and bushland, impacted by mild subsidence from other mining operations. The result TSS is not attributed to mining impacts from United Wambo.

RC01 was affected by dry conditions, with only two samples collected in July and October 2024. There were no exceedances triggered for electrical conductivity, total suspended solids, or total dissolved solids. The results for pH in July (7.06) and September (7.86) were below the Redbank Creek historic range and trigger values (7.9 – 8.3). Referring to the long-term trends discussed in ***Section 7.2.2***, the catchment has changed significantly since the commencement of mining in United Pit and results for other water quality parameters have also changed. The results did not drop below neutral and are indicative of rainwater quality parameters, which are typically more acidic than the creek's historic values.

WB04 was sampled 12 times and did not trigger any exceedances of the criteria for pH, electrical conductivity, total dissolved solids or total suspended solids. All pH results were rather neutral and was within the range 7.2 – 7.99, with an average of 7.72. Electrical conductivity was typical for Wollombi Brook, within the range 289 – 1570 µS/cm and an average of 748.83 µS/cm. Most results for total suspended solids were below detectable range (5 mg/L), with a maximum result of 10 mg/L which is rather low and still clear. Total dissolved solids followed a similar trend with a range of 199 - 763 mg/L, with an average of 410.17 mg/L.

Based on surface water quality monitoring data and site observations during various routine inspections throughout the reporting period, there were no indications of offsite impacts to surface waters at United Wambo caused by open cut mining activities.

7.2.1.3 Watercourse Stability Monitoring

Watercourse stability monitoring was completed during the reporting period at Wollombi Brook, Redbank Creek and Waterfall Creek to identify changes in the upstream/downstream conditions. The findings were:

- banks were highly vegetated at all monitoring locations.

- Wollombi Brook site W27 (upstream) had a higher water level that previous year, with a steady flow. W28 (downstream 1) and W29 (downstream 2) had low water levels with no flow, like previous year. Evidence of flooding in previous years was still apparent including debris and sandy deposits.
- Redbank creek sites (W30, W31) and Waterfall Creek (W32, W33) were all dry at the time of inspection

7.2.2 Long Term Trends

United Wambo has long term data from several surface water monitoring locations since 2004. Water quality parameters include pH, electrical conductivity (EC) and Total Suspended Solids (TSS). Results of long-term trends for water quality are shown in ***Figure 7-1, Figure 7-2*** and ***Figure 7-3.***

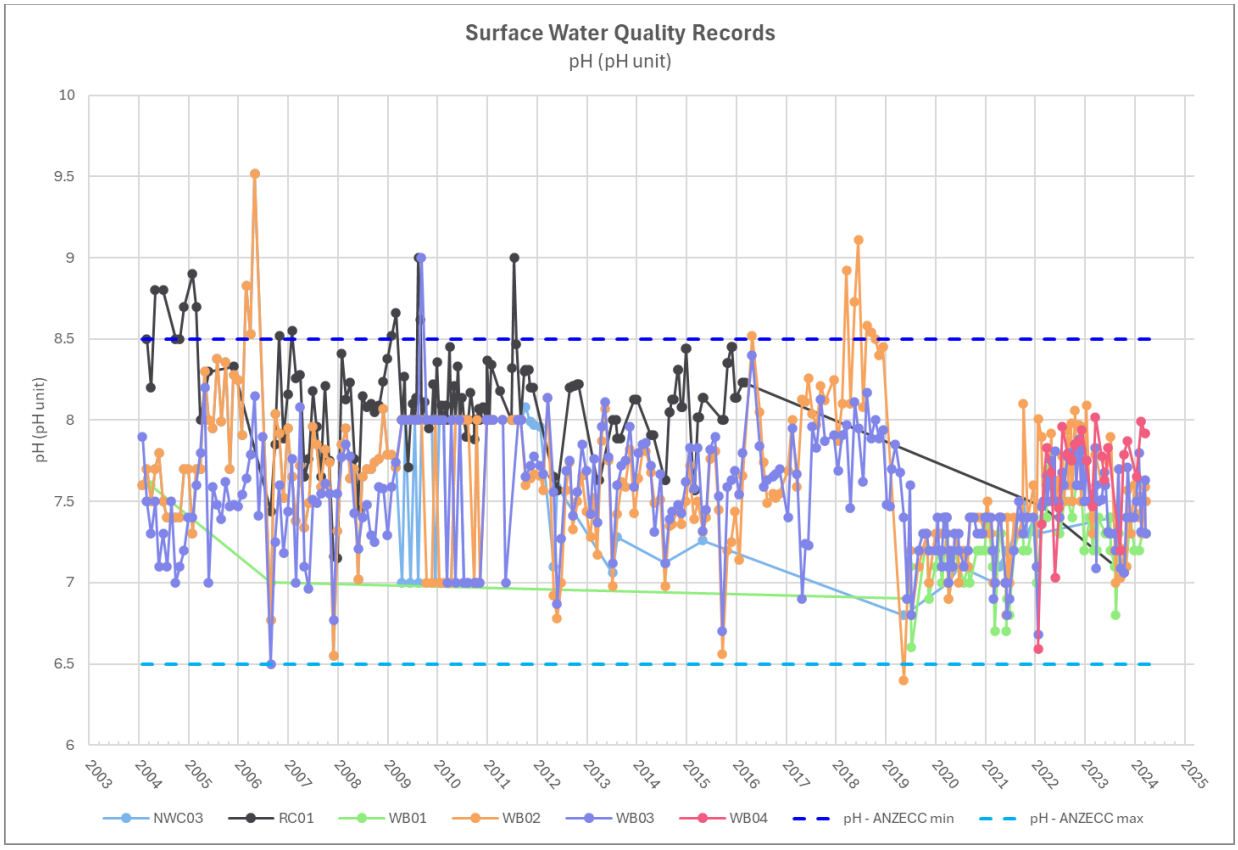

Figure 7-1 Long-term Surface Water Quality Trends for pH at United Wambo

Surface water monitoring results for pH remained within the typical long-term trends during the reporting period, shown in ***Figure 7-1***. Minimum and maximum surface water monitoring results for pH typically remain within the ***ANZECC Guideline*** criteria at all sites since monitoring began, except for some short-term spikes at:

- RC01 in 2004, 2005, 2009, 2010 and 2011
- WB02 in 2005, 2006, 2017, 2018 and 2019

Surface water monitoring results for pH generally remained within the typical long-term trends for the 2024 reporting period.

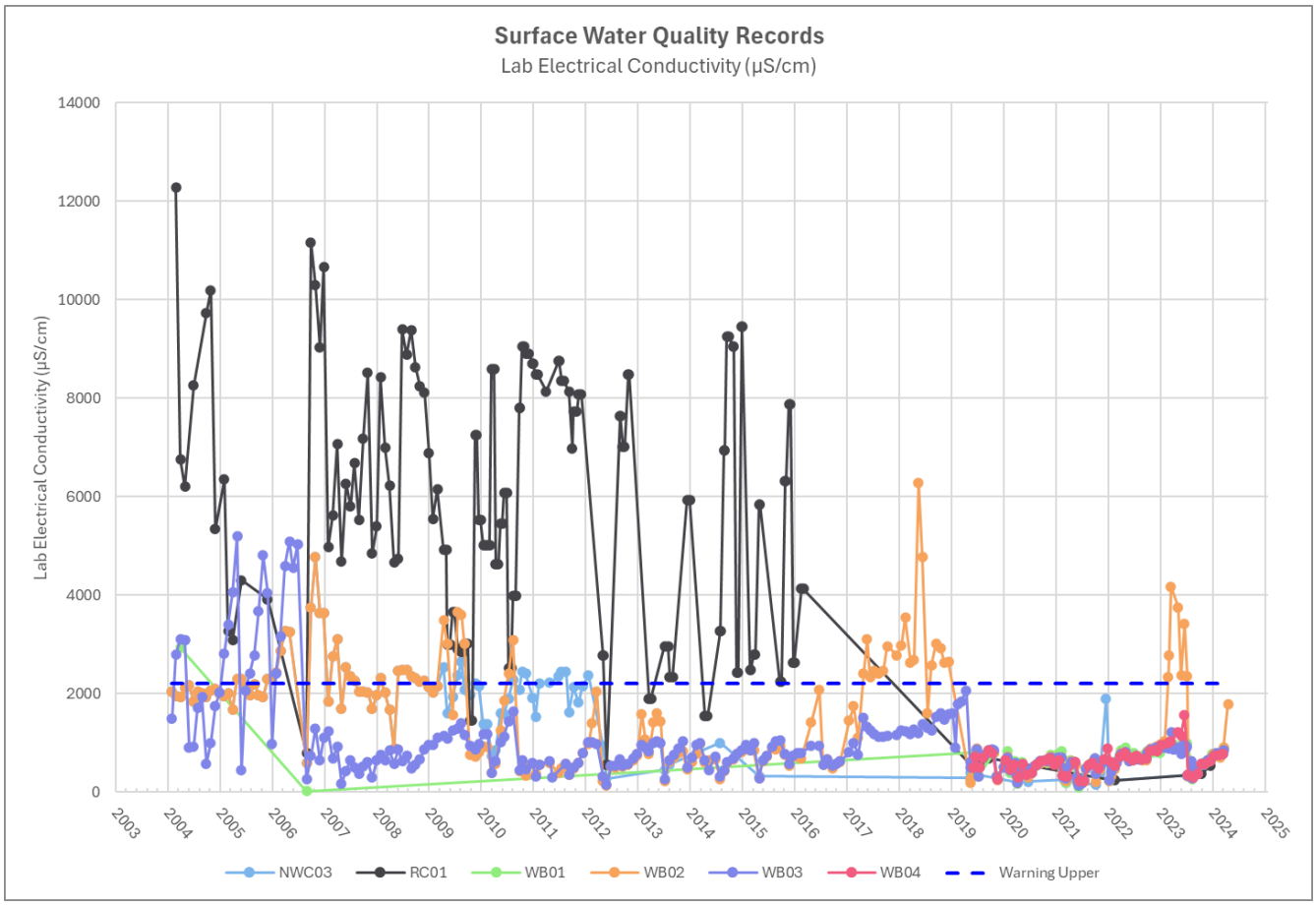

Figure 7-2 Long-term surface water quality trends for electrical conductivity at United Wambo

Figure 7-2 shows electrical conductivity (EC) has remained rather stable over the last 20 years at NWC03, WB01 and WB04. The results were typically below the ANZECC maximum criteria of 2,200 µS/cm. The EC at WB01 (upstream monitoring point) and WB04 (downstream monitoring point) have slowly increased since 2021.

EC at sites WB02, WB03 and RC01 has historically been subject to more fluctuation.

WB02 on Wollombi Brook is upstream of United Wambo, with a catchment area dominated agricultural uses and bushland. WB02 has seen periods of EC on or above the ANZECC maximum criteria for extended periods since 2004, with the most recent being the 2017 – 2019 drought period. WB02 also had high EC values December 2023 and March 2024. After heavy rainfall in March 2024, EC levels dropped below the ANZECC criteria and have stayed consistent since.

WB03 on Wollombi Brook is downstream of United Wambo. In the early years of monitoring, WB03 experienced EC levels up to 4,060 µS/cm from 2004-2006. Since those peaks, it has stabilised within the range of 148 – 2060 µS/cm.

The EC at RC01 has been rather variable throughout monitoring years, however samples are infrequent due to the ephemeral nature of Redbank Creek. Up until the 2017 to 2019 drought, EC results were higher than the ANZECC criteria. From 2020, the results have been close to measured historical minimums (below 700 µS/cm). In December 2020, the catchment was significantly changed (reduced) due to the commencement of mining in United Pit. Results are now typically representative of rainwater.

NWC03 was dry most of the time since 2012, with some samples available in wetter periods of 2020 – 2024.

The period 2020 – 2022 was a particularly wet period commensurate with La Niña climatic conditions. This is reflected in relatively low EC trends for all sites during that period due to the influx of fresh rainfall to the system, typically less than 1 000 µS/cm.

Surface water monitoring results for electrical conductivity remained within the typical long-term trends for the 2024 reporting period.

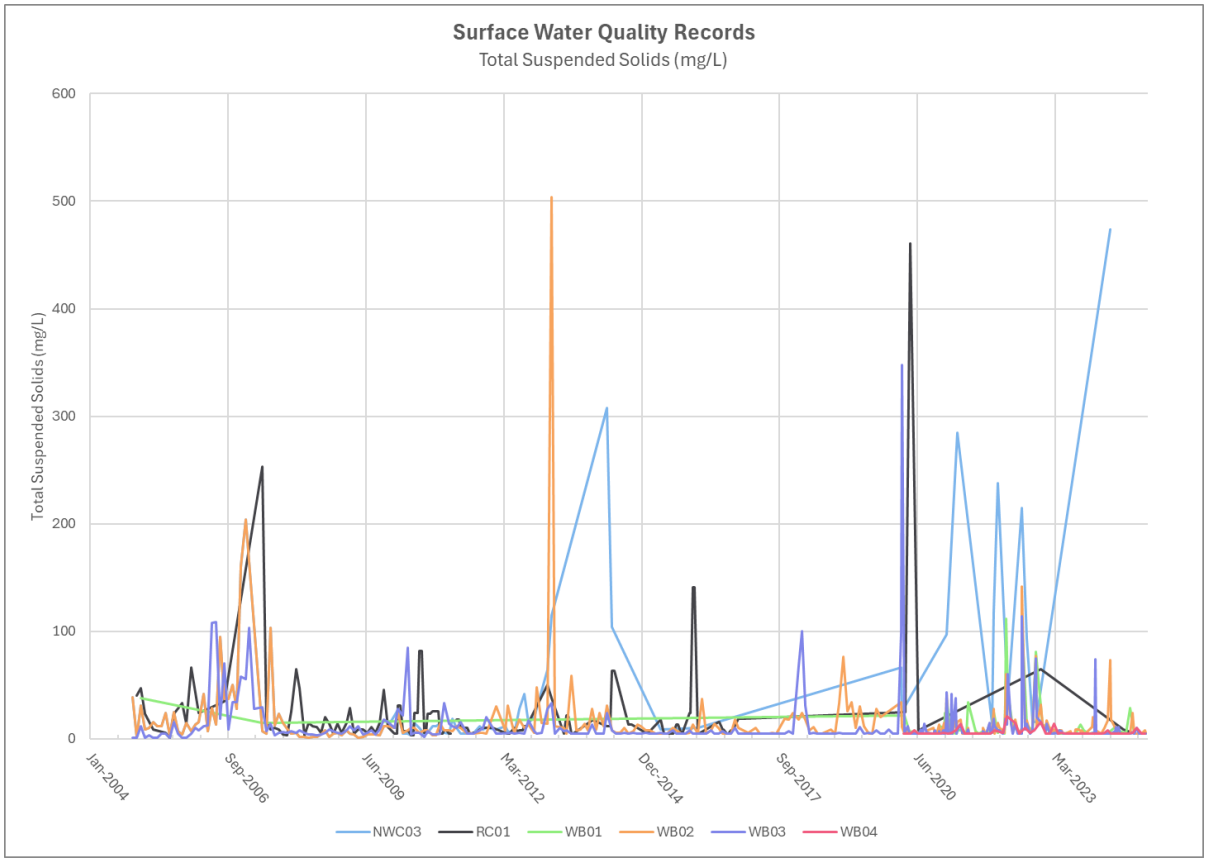

Figure 7-3 Long-term Surface Water Quality Trends for Total Suspended Solids at United Wambo

Figure 7-3*Error! Reference source not found.* shows total suspended solids (TSS) at the long-term monitoring sites vary throughout the historic sampling period (note: outlier results 1500 mg/L for RC01 on 14/3/11 and 1/4/11 removed from graph). It is not unusual for the TSS to spike above the ANZECC maximum criteria, before returning to lower levels. More recent peaks in the datasets correspond to flooding conditions across Hunter River catchments in 2021 - 2022. TSS levels are expected to remain low (typically less than 50 mg/L).

Surface water monitoring results for total suspended solids remained within the typical long-term trends during the 2024 reporting period. RC01 and NWC03 showed spikes in April 2024, which followed a large rainfall event (78 mm).

7.2.3 Water Performance Measures

A comparison of United Wambo compliance with the water performance measures in Condition B49 of SSD 7142 is provided in ***Table 7-6*****.**

Table 7-6 Water Management Performance Measures

Feature	Performance Measure	Compliance Status	Comment
Water management – General	Maintain separation between clean, dirty and mine water Minimise the use of clean and potable water Maximise water recycling, reuse and sharing opportunities Minimise the use of make-up water from external sources Design, install, operate and maintain water management infrastructure in a proper and efficient manner	Compliant	Water types separated in accordance with the ***Water Management Plan***. The majority of United Wambo water usage was for dust suppression, sourced from mine water dams. Raw water is only used for supplying the South MIA. Potable water for the site is sourced from Singleton Council. Water infrastructure used as intended.
Alluvial aquifers (including Wollombi Brook alluvium)	Negligible impacts to the alluvial aquifer beyond those predicted in the document/s listed in condition A2(c), including: negligible change in groundwater levels; and negligible impact to other groundwater users including, maintain appropriate setbacks in accordance with the Aquifer Interference Policy (DPI, 2012)	Compliant	Negligible impacts to alluvial aquifer beyond groundwater model predictions.
Erosion and sediment control works	Design, install and maintain erosion and sediment controls in accordance with the guidance series Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) and 2E Mines and Quarries (DECC, 2008) Design, install and maintain any infrastructure within 40 metres of watercourses in accordance with the guidance series for Controlled Activities on Waterfront Land (DPI Water, 2012) Design, install and maintain any creek crossings generally in accordance with the Fisheries NSW Policy and Guidelines for Fish Habitat Conservation and Management (DPI, 2013) and Why Do Fish Need to Cross The Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries, 2003)	Compliant	Erosion and sediment control measures in line with the ***Erosion and Sediment Control Management Plan***. No works have occurred within 40 metres of existing watercourses, outside of the mining pit footprint. No new creek crossings were installed in the reporting period.
Clean water diversions and storage infrastructure	Design, install and maintain the clean water system to capture and convey the 100-year ARI flood event Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site, except where clean water is captured for use on the site	Compliant	No new clean water diversions, flood levees or water storages were installed in the reporting period. The Northern Clean Water Drain constructed in 2020 remains in place.

Feature	Performance Measure	Compliance Status	Comment
Flood Levees	Design, install and maintain appropriate flood levees to protect mining areas from a 1,000-year ARI flood event and to ensure no adverse effect on roads or privately-owned land	Compliant	No new flood levees constructed in the reporting period. The Wollombi Brook flood levee (constructed to account for 1,000-year ARI flood event) remains in place.
Sediment dams	Design, install and maintain sediment dams in accordance with the guidance series Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) and 2E Mines and Quarries (DECC, 2008) and the requirements under the POEO Act or Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002	Compliant	No new sediment dams were constructed in the reporting period. Existing sediment dams have been maintained to comply with the Blue Book and POEO Act requirements.
Above-ground mine water storages	Design, install and maintain mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water Designed to contain the 100-year ARI storm event and minimise permeability	Compliant	All mine water dams managed by United Wambo spill into the open cut pit rather than discharge offsite. No new mine water storages were constructed in the reporting period. All mine water storages at United Wambo were designed to capture the 100-year ARI.
Tailings storages	Design and maintain tailings storage areas to encapsulate and prevent the release of tailings seepage/leachate	Compliant	Tailings management is undertaken by Wambo on behalf of the United Wambo JV. United Wambo does not manage any active tailings dams.
Overburden emplacements	Design, install and maintain emplacements to encapsulate and prevent migration of tailings, acid forming and potentially acid forming materials, and saline and sodic material Design, install and maintain out-of-pit emplacements to prevent and/or manage long term saline seepage	Compliant	Overburden emplacement areas at United Wambo contain all run off and seepage within dams or open cut voids.
Chemical and hydrocarbon storage	Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard	Compliant	Hydrocarbon storage areas are bunded in accordance with Australian Standards and are subject to regular inspection and management.
Creek diversion and restoration works	Diverted creek lines are hydraulically and geomorphologically stable Incorporate erosion control measures based on vegetation and engineering revetments Incorporate persistent/permanent pools for aquatic habitat Revegetate with suitable native species	Compliant	No creek diversion or restoration works were undertaken during the reporting period.
Aquatic, riparian and groundwater dependent ecosystems	Negligible environmental consequences beyond those predicted in the document/s listed in condition A2(c) Maintain or improve baseline channel stability	Compliant	Negligible impacts to aquatic, riparian and GDEs beyond groundwater model predictions.

Feature	Performance Measure	Compliance Status	Comment
	Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)		

There have been no instances of mine water discharge, sediment dam overflow or tailings spillage affecting downstream water quality in the reporting period.

7.2.4 Water Balance and Salt Balance

The United Wambo Complex water balance and salt balance were updated for the reporting period. The water and salt balance summaries showing annual average volumes of inputs and outputs is shown in ***Table 7-7*** and ***Table 7-8.***

Table 7-7 United Wambo JV Water Balance for the reporting period

Water Balance	Volume (ML)
Water Sources	
Transfer from Wambo Underground	632
Potable supply	6
Rainfall/Runoff	2,143
Open Cut Seepage	319
Total Water Inputs (I)	3,100
Water Usage	
Dust Suppression	994
Transfer to Wambo Underground	1,030
Potable	6
Total Water Usage (U)	2,036
Water Loss	
Evaporation – Mine Water	464
Seepage	0
Total Losses (L)	464
Change in Storage (United Wambo)	
Initial	453
Final	357

Water Balance	Volume (ML)
Change in Storage (S)	-96

Table 7-8 United Wambo JV Salt Balance for the reporting period

Site Salt Balance	Salt (t)
Inputs	
Runoff	3,541
Groundwater (ROM coal)	2,034
Groundwater (Seepage)	2,036
Transfer from Wambo	905
Total	8,516
Outputs	
Dust suppression	994
Transfer to Wambo	1,931
Groundwater (ROM coal)	4,084
Total	7,009
Balance	1,507

7.2.5 Discharge Summary

There were no discharges from United Wambo in the reporting period.

United Wambo is part of the Hunter River Salinity Trading Scheme (HRSTS) however the site does not have any Hunter River Salinity Trading Scheme Credits, and there is no licensed discharge point.

7.2.6 Improvements

No improvements are proposed for the next reporting period.

7.3 Groundwater

7.3.1 Management Measures

United Wambo implements groundwater management measures in accordance with the ***Groundwater Management Plan*** (GWMP, version 6)**.** A summary of management measures include:

- design, install and maintain above-ground mine water storage infrastructure to avoid unlicensed or uncontrolled discharge of mine water to the offsite environment

- above-ground mine water storages designed to contain the 100-year ARI storm event and minimise permeability
- operate underground water storages in a manner that minimises impacts.
- new tailings storage areas will be designed and maintained to encapsulate and prevent the release of tailings seepage/leachate
- design, install and maintain new emplacements to encapsulate and prevent migration of tailings, acid forming and potentially acid forming materials, and saline and sodic material
- design, install and maintain new out-of-pit emplacements to prevent and/or manage long term saline seepage
- chemical and hydrocarbon products is stored in bunded areas in accordance with the relevant Australian Standard
- maintain or improve baseline channel stability
- generic training on the aspects of the GWMP is provided to all employees and contractors through the GCAA Generic Surface Induction and the Site Familiarisation process
- regular workforce communication days and toolbox talks allow for discussion of the objectives and requirements of this and any other relevant plans
- selected site personnel, whose duties directly involve the management of water at United Wambo, undertake specific training with respect to site Operational Procedures which incorporate water management measures.

7.3.2 Groundwater Monitoring

Groundwater monitoring is conducted at United Wambo in accordance with the ***Groundwater Management Plan*** (GWMP, version 6). The purpose of groundwater monitoring at United Wambo is to monitor groundwater quality and levels to detect potential impacts on surrounding groundwater users, consumptive or environmental, and assess the performance of the mine against the performance indicators to ensure that relevant legislative and policy requirements are met.

United Wambo engaged a groundwater specialist to review the annual monitoring results for the reporting period, which is contained in ***Appendix B - Annual Groundwater Review. Table 7-9*** is a summary of groundwater observations extracted from the report.

Table 7-9 Groundwater observations in 2024

Aquifer	Monitoring Bores	2024 Groundwater Observations	Comments
Alluvium Aquifers			
Wambo Creek Alluvium	Upstream GW11 GW02 Downstream P316a, GW37a, P106, P109, P114, P116	Groundwater levels within the Wambo Creek Alluvium have continued to show correlation with periods of above and below average rainfall consistent with pervious monitoring. EC and pH observations at Wambo Creek alluvial monitoring bores have generally remained stable throughout 2024. Groundwater level, EC and pH observations at GW37a are consistent with historical observations at P106, indicating the bore is likely a suitable replacement.	P106, P109, P114 an P116 have been replaced and should be considered for removal from the monitoring network in future updates of the GWMP.
North Wambo Creek Alluvium	Upstream GW16, GW17 Downstream GW08, GW09, GW08.2, GW09.2, GW10.2	2024 groundwater level observations at North Wambo Creek alluvial monitoring locations generally responded to periods of above and below average rainfall consistent with previous years' observations. However, some muted responses to above average rainfall in April 2024 may be observed at upstream North Wambo Creek monitoring locations. pH saw a temporary increase and EC a temporary decrease as a result of the increased rainfall in early 2024 but generally remained stable. It is noted that nearby Wambo (Peabody) South Bates Extension (SBX) underground mine was operating near North Wambo Creek upstream locations. SBX LW23 was completed in late 2023 and SBX LW24 was completed in 2024. Less recovery (lower groundwater levels), and faster rates of groundwater level decline after rainfall/ recharge events compared to pre-mining observations may indicate an effect due to mining at these nearby longwalls. Groundwater responses at upstream monitoring locations should continue to be evaluated for potential mining effects.	GW08 and GW09 are no longer monitored and have been replaced with GW08.2 and GW09.2. A review of the bore logs at GW16 and GW17 (Parsons-Brinkerhoff, 2009) indicate these bores are screened within weathered rock underlying local unconsolidated material. Future updates to the GWMP should reclassify these monitoring locations.
Stony Creek Alluvium	GW12, P301, P315	A clear relationship between groundwater levels and rainfall exists at Stony Creek. Groundwater levels at P315 and P301 declined in late 2024 consistent with previous observations following an increase in levels in response to above average rainfall early in the year. EC and pH were generally stable and consistent with previous year's observations at P315 and P301 in 2024.	GW12 has not been monitored since 2021 due to persistent dry conditions and should be considered for removal from the monitoring network in future GWMP updates. P301 is most likely installed in weathered Permian strata below the Stony Creek alluvium. This bore should be reclassified as a regolith/ shallow Permian bore in future updates to the GWMP.
Wollombi Brook Alluvium	GW13, GW15, P12, P15, P16, P20 ,P407	Groundwater levels within Wollombi Brook alluvial bores in 2024 generally responded to periods of above and below average rainfall consistent with previous observations. Some locations west of Wollombi Brook (P15, P16) may show a combined Glen Munro pit and climate effect following pit extraction in 2017 and below average conditions in 2023. pH has remained stable whilst EC has seen site-specific variability with bores P15 and P20 increasing, GW13 and P16 decreasing and GW15 and P12 remaining stable over the year.	GW15 was developed/ purged in August 2024. Total depth was consistent with the bore log and bore appears to be functioning correctly.
Hunter River Alluvium	P408	Within the Hunter River alluvium, groundwater levels have been steadily declining since a peak in December 2022. Above average conditions from 2020 to 2022 likely drove the elevated groundwater level observations, while below average and average conditions in 2023 and 2024 may be allowing groundwater levels to return to long-term average levels. pH has remained stable and ongoing observations will allow for the evaluation of normal EC conditions at P408.	United Wambo could consider adding P328a and P329a, from the Wambo monitoring network, as Hunter River alluvial bores as part of future GWMP updates.
Regolith – Shallow Weathered Permian			
Wambo Creek	P316b, GW37b	Groundwater elevations in the Wambo Creek regolith monitoring bores are lower than the peak elevations observed in 2021 and 2022, but continue to respond to periods of above and below average rainfall in 2024 EC observations show an inverse relationship to the rainfall trend (low rainfall related to higher EC observations) which is more pronounced at GW37b due to its closer proximity to Wambo Creek. pH observations were generally stable throughout 2024.	GW37b has been installed to target the regolith underlying the Wambo Creek alluvium. This well is intended as a replacement for P109. Observations in 2024 show a clearer EC (conductivity) signature between GW37a and GW37b, consistent with other paired alluvial-weathered monitoring locations at United Wambo, compared to P106 and P109, indicating that GW37b is likely a suitable replacement.

Aquifer	Monitoring Bores	2024 Groundwater Observations	Comments
North Wambo Creek	Downstream GW10.2a	2024 observations at shallow Permian (regolith) monitoring sites downstream of the North Wambo Creek diversion similar responses to periods of above and below average rainfall as observed in the historical dataset. EC observations show somewhat of an inverse relationship to the rainfall trend (low rainfall generally related to higher EC observations), with a drop in EC in following high rainfall in April 2024. pH saw a slight increase at the start of the year but has remained stable since April.	Piezo 28 and Piezo 29 could be considered for monitoring network inclusion in future updates of the GWMP due to their location near North Wambo Creek and long monitoring record (Since 2005).
Permian Coal Measures (bedrock)			
Wambo Creek Catchment	P316c, P202, P206	Groundwater elevations in 2024 at P202 and P316c followed the long-term rainfall trend, consistent with historical observations. Groundwater elevations at P206 declined by ~3m during 2024, continuing an overall declining trend that has been observed since late 2021 (~20 m total) and is not consistent with historical observations, which have previously showed a reasonable correlation with the long-term rainfall trend. Active mining is not occurring near P206, however the decline may be related to changing storage levels in historical underground workings or other site activity. EC and pH observations in 2024 at all sites are consistent with historical observations.	Development of P206 was completed in August 2024. Additional investigation in to well integrity (using a downhole camera) should be completed in 2025.
Wollombi Brook Catchment	GW22, P401, P402	Groundwater levels at GW22 were stable in 2024, but remain elevated compared to pre-2021 observations likely due to above average rainfall from 2020 to 2022. EC and pH at GW22 have remained stabled throughout 2024. P401 and P402 are within 500 m of United Pit, which commenced mining in December 2020. Groundwater levels at P401 in 2024 show some response to the rainfall trend, but are~5m lower than observations from 2020/21 which is likely a United Pit mining effect. Groundwater levels in 2024 declined by ~5m and are ~15m lower than 2021 observations. EC and pH at P401 and P402 have remained stable in 2024.	Access to P401 and P402 was noted as unsafe in 2024 due to gas leaking from P402. As these locations provide valuable information on potential United Pit impacts to the Permian (bedrock) groundwater system near Wollombi Brook, these locations should be considered for replacement or fully remote monitoring in 2025.
North Wambo Creek Catchment	GW21	Location has been dry or near-dry since 2010 and overlies historical underground mining at Wambo. Approved impacts at this location are greater than the depth of GW21 and it is therefore not considered an effective monitoring bore.	Location should be considered for removal from the monitoring network in future GWMP updates.
Waterfall Creek Catchment	P404, P405	These locations have a single observation from December 2024 and will be discussed in further detail once additional data is collected.	

7.3.3 Long Term Groundwater Trends

Long-term hydrographs and time-series data for each monitored bore is provided in ***Appendix B - Annual Groundwater Review.***

7.3.4 Groundwater Monitoring Trigger Levels

Trigger levels specified in the ***GWMP*** are based on statistical analysis of pre-mining baseline monitoring data. The trigger levels are used to initiate investigations into groundwater levels or quality at where there are unexpected changes potentially caused by mining impacts.

A response is triggered for groundwater levels when the depth to groundwater:

- increases above the 90th percentile
- decreases below the 10th percentile
- occurs over three consecutive bi-monthly observations
- is not related to seasonal variability.

Triggers for water quality occur when electrical conductivity (EC) or pH:

- exceed the specified trigger level (90th percentile)
- occurs over three consecutive bimonthly observations (i.e. over a 6-month period).

A summary of trigger exceedances recorded for the site monitoring network during the reporting period are summarised in ***Table 7-10****Error! Reference source not found.*. Further discussion on causes and impacts is detailed in ***Appendix B - Annual Groundwater Review.***

Table 7-10 Summary of groundwater monitoring trigger exceedances in the reporting period

Bore (Aquifer)	Trigger Exceedance				
	Max GW Elevation	Min GW Elevation	EC	pH min	pH max
Alluvial monitoring bores					
GW02	No	No	No	No	No
GW08.2	Triggers to be established once sufficient data is collected.				
GW09.2	Triggers to be established once sufficient data is collected.				
GW11	No	No	No	No	No
GW13	No	Yes (6, Feb to Dec)	Yes (Jun '23 to Apr '24)	No	No
GW15	Yes (6, Feb to Dec)	No	No	No	No
GW16	No	No	No	No	No
GW17	No	No	No	Yes (4, Apr to Oct)	No
P12	No	No	No	Yes (6, Feb to Dec)	No

Bore (Aquifer)	Trigger Exceedance				
	Max GW Elevation	Min GW Elevation	EC	pH min	pH max
P16	No	No	No	No	No
P20	No	No	No	No	No
P106, P109, P114, P116	N/A – bores replaced and no longer monitored				
P407	Triggers to be established once sufficient data is collected.				
Offsite bedrock monitoring bores					
GW21	No	Yes (6, Feb to Dec)	N/A	N/A	N/A
GW22	Yes (6, Feb to Dec)	No	Yes (3, Jun to Oct)	No	No
P11	N/A – bore mined though, to be removed from network.				
P202	Yes (4, Apr to Oct)	No	No	No	No
P206	No	Yes (6, Feb to Dec)	No	No	No
P401, P402, P404, P405	Triggers to be established once sufficient data is collected.				

Notes to table:

Three or more consecutive readings over the reporting period

7.3.5 Stygofauna Monitoring

The project environmental assessment identified small, isolated populations of stygofauna in the shallow alluvial aquifers surrounding the project (Wollombi Brook and North Wambo Creek). The relative consistency of the stygofauna community composition indicated connectivity within the shallow alluvial aquifers and consistency in the environmental conditions of this subterranean ecosystem. The biodiversity of the stygofauna community across the alluvial aquifers was found to be high.

As per the ***United Wambo Groundwater Management Plan***, stygofauna monitoring is required every three years in the alluvial aquifers within predicted drawdown areas. The last round of monitoring was completed in 2022 and the next round scheduled for 2025. Hence no monitoring of stygofauna was completed in 2024.

7.3.6 Reporting Against Groundwater Performance

Assessment of compliance against the ***GWMP*** Groundwater Performance Measures for the reporting period is shown in ***Appendix B - Annual Groundwater Review.***

7.3.7 Recommendations

Proposed recommendations based on the review groundwater monitoring results for the reporting period include:

1. Finalise the ***United Wambo Groundwater Management Plan*** draft version 7 in consultation with the Department of Planning, Housing and Infrastructure and NSW Department of Climate Change, Environment and Water, including changes to:
   - revised water level and quality triggers, including the revision of baseline periods
   - replacement bores
   - removal of bores
   - bore classification updates
2. Consider installing additional bores east of the United Pit, in aquifers that supply water to potential groundwater dependent ecosystems.
3. Conduct bore maintenance and assessment on GW13, GW22 and P206.
4. Conduct ongoing VWP maintenance.

7.3.8 Improvements for the next reporting period

United Wambo have applied to update the status of several Water Supply Works Approvals to "inactive".

United Wambo are working with DCCEEW water licencing to review the miscellaneous works approvals in place and whether they adequately represent passive water take for existing and future scenarios. Note that no exceedance of the Water Access Licence entitlement units have occurred, and this improvement is administrative in nature.

8. Rehabilitation

8.1 Status of mining and rehabilitation

Mining operations continued throughout the reporting year and required some disturbance of natural woodland areas and former rehabilitation (see ***Figure 8-1***). Progressive rehabilitation was also completed and annual targets achieved. Key rehabilitation performance indicators are shown in ***Table 8-1.***

Table 8-1 Rehabilitation Status

Mine Area Type[1]	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
	2023 (ha)	2024 (ha)	2025 (ha)
A. Total Mine Footprint / Surface Disturbance Footprint	2163.2	2,172	2,217
B. Total Active Disturbance	1865.5	1,462	1,413
C. Land Being Prepared for Rehabilitation	39	59	94

Mine Area Type[1]	Previous Reporting Period (Actual)	This Reporting Period (Actual)	Next Reporting Period (Forecast)
D. Land Under Active Rehabilitation	612	651	710
E. Completed Rehabilitation	-	-	-
Other Areas	-	-	-

[1]*Definitions of mine area type as per the NSW Government Annual Review Guideline (2015).*

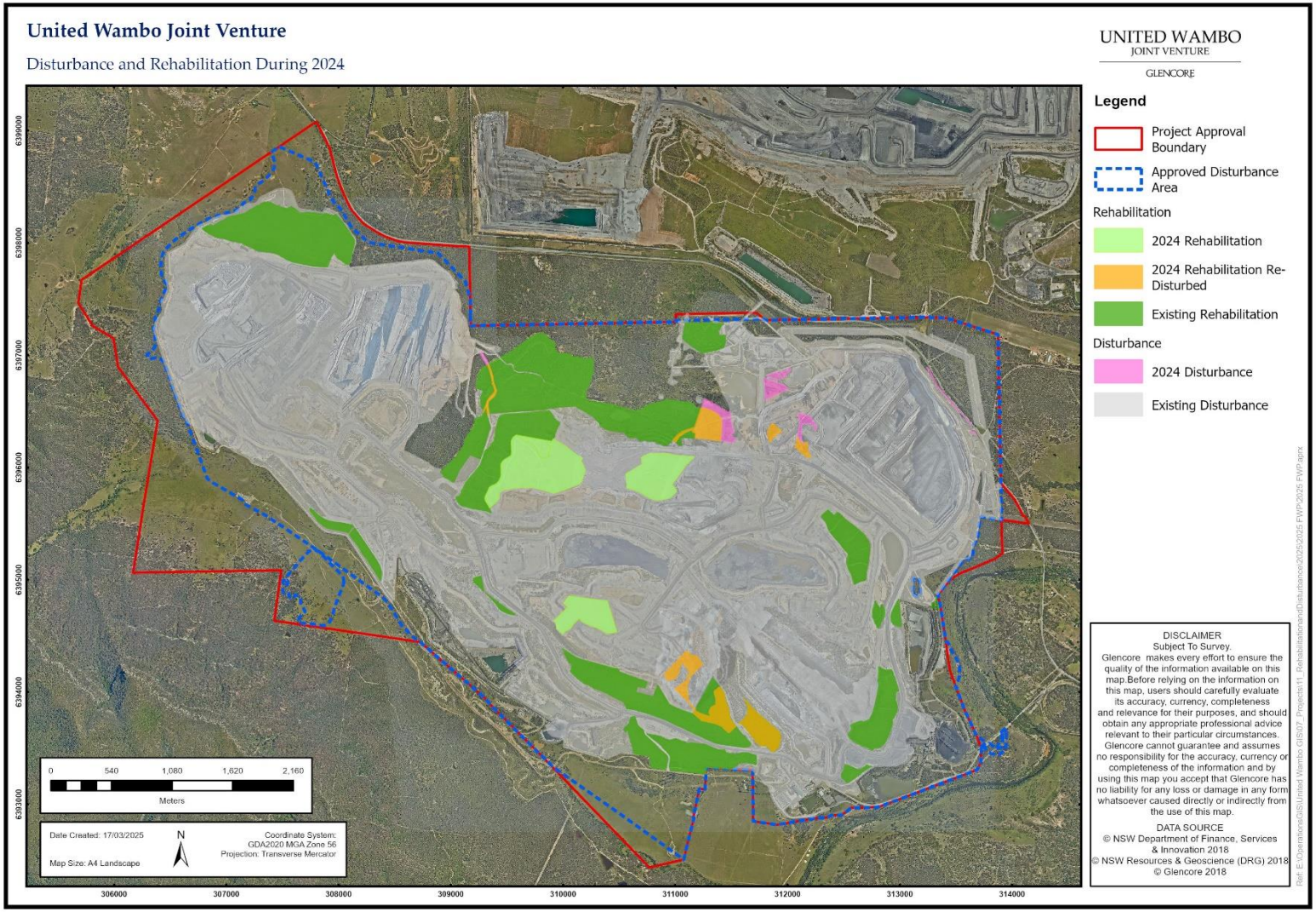

Figure 8-1 Status of Mining and Rehabilitation

8.2 Rehabilitation performance

As shown in ***Table 8-1*** and ***Figure 8-1,*** the site constructed 59 hectares of rehabilitation in the reporting period. The rehabilitation was seeded with native species consistent with the approved final land uses described in the ***Rehabilitation Strategy***:

- PCT 1691 Narrow-leaved Ironbark - Grey Box grassy woodland of the central and upper Hunter
- Open Woodland

No rehabilitation at United Wambo has received sign-off by the Resources Regulator for having successfully met the rehabilitation objectives and completion criteria.

No renovation or removal of buildings was conducted in the reporting period.

No other rehabilitation was conducted on exploration areas, infrastructure, shafts, adits, dams. There was some minor fencing maintenance and construction, however it was completed for the purposes of improved site security rather than rehabilitation preservation.

8.3 Maintenance activities undertaken

Rehabilitation maintenance was undertaken generally in accordance with the site's detailed rehabilitation maintenance plan. Activities undertaken include

- spraying of weeds within the 2009, 2017, 2018, 2021, 2022 and 2023 rehabilitation areas
- slashing and boom spraying of exotic grasses and galenia on the Montrose rehabilitation area in preparation for future re-seeding
- cut and paint for African olive and acacia saligna in mature rehabilitation areas
- infill tube-stock planting within the 2021 rehabilitation area
- topsoil stockpile material management, weed management and seeding
- dog baiting and pig trapping within rehabilitation areas

8.4 Rehabilitation monitoring

As described in the ***Rehabilitation Management Plan***, UWJV undertake long term ecological monitoring and an annual rehabilitation walkover to determine how the rehabilitation is tracking towards the completion criteria. It also identifies the key issues affecting rehabilitation and informs the maintenance strategy.

8.4.1 Native Open Woodland Rehabilitation

Initial establishment monitoring was undertaken on three blocks of native open woodland rehabilitation. All blocks showed satisfactory ground cover establishment, ranging from 83.3% - 98.7%. That is above the minimum benchmark target of 70%. Total species richness recorded in the three blocks was variable and ranged from 35 - 80 species per site, but the average proportion of native species was low and ranged between 28.8% - 54.6%. However, most exotic species recorded consisted of annual broadleaf environmental weeds occurring at low densities which should naturally recede. Active and locally severe gully erosion was identified within one of the blocks, despite good and rapid establishment of ground cover, and will require significant erosion repairs.

Long term establishment monitoring was undertaken on one block of native open woodland. Results showed groundcover protection was excellent across the block with an average of 99.7% cover. However, the cover was mostly from exotic understorey species which led to a native species richness (39%) well below the minimum benchmark of 70%. Consistent with the findings of the last monitoring

event, priority weed levels remained very high at 37.2% cover. The native species that were present however were adequately representative of the target local community (Grey Box – Ironbark Woodland) with 87 – 100% representativeness for all growth form groups.

8.4.2 Ecological Rehabilitation

Initial establishment monitoring was undertaken on one block of ecological rehabilitation. The large block was seeded in 2023, slightly less than 12 months before monitoring. Ground cover vegetation was still only sparsely established; however it is expected to improve rapidly and be within benchmarks by the next monitoring event. Excellent strike rates of native species were achieved (35.3 species per site) and whilst exotic species diversity was also high, it consisted mostly of non-problematic annual weeds which is to be expected and should recede. Establishing tree and shrub densities were also satisfactory with an average of 520 stems per ha. Whilst erosion within monitoring plots was limited, more severe gully erosion has been identified throughout the remainder of the block and requires remediation.

A summary of progress against the rehabilitation criteria is shown in ***Table 8-2 and Figure 8-2.***

Native species germination within *UWJ-NSNV-189*	Exotic pastures, galenia and native shrubs at *UWJ-NSNV-140*
Monitoring Site *UWJ-NSNV-140-1*	Monitoring Site *UWJ-TNV-190-4*

Figure 8-2: Progress against rehabilitation criteria

Table 8-2 Progress against completion criteria (long-term monitoring blocks)

Objective	Completion criteria	Monitoring Block
		UWJ-NSNV-140
Rehabilitation areas contain flora species assemblages characteristic of each growth form for the target native vegetation communities.	≥50% of established tree species are characteristic of target communities	Compliant (maintenance)
	≥50% of established shrub species are characteristic of target communities	Compliant (acceptable)
	≥50% of established grass species are characteristic of target communities	Compliant (maintenance)
	≥50% of established 'other' species are characteristic of target communities	Compliant (acceptable
Adequate tree/shrub establishment and survival	Minimum total tree/shrub densities for seeded areas to be 400 stems/ha[1]	Not compliant[1] (maintenance)
The rehabilitation is self-sustainable	Evidence of flowering and seeds or second-generation juveniles for trees and shrubs or likely to be.	Trending (monitor)
Habitat features incorporated	Habitat features (e.g. logs, rocks and nest boxes), are incorporated into rehabilitation areas at required densities	Not compliant (maintenance)
	Native rehabilitation areas provide a range of structural features (e.g. trees, shrubs, ground cover, developing litter layer etc.).	Not compliant (maintenance)
Connectivity established	Habitat corridors are established and consistent with target vegetation community compositions.	Not applicable[2]
Target fauna assemblages and habitat in rehabilitation areas	Monitoring confirms target native fauna species are recorded utilising rehabilitation areas.	Not applicable[2]

[1] Criteria only assessed against tree densities (i.e. excluding shrubs).
[2]Criteria not assessed under the scope of the annual monitoring program.

Based on the rehabilitation monitoring, key issues affecting rehabilitation on site include:

i. Topsoil management

Topsoil management is likely a key source of weed issues observed in rehabilitation areas at United Wambo. It is evident that topsoil quality and type plays an important role in the resulting rehabilitation.

ii. Weed presence

The key threatening weeds that were identified throughout the rehabilitation blocks with a woodland final land use are:

- Galenia (*Galenia pubescens*)
- exotic pasture grasses such as Rhodes Grass (*Chloris gayana*) and Green Panic (*Panicum maximum*).

Ongoing control and management of Galenia is required across site the site to ensure it does no outcompete early-stage natives

iii. Erosion

Erosion over maintenance blocks had increased over the last 12 months and requires effective control.

iv. Changed land use requirements for legacy rehabilitation areas

Another challenge to achieve rehabilitation success for the site is the change of target vegetation in some legacy rehabilitation areas, approved under SSD7142. In most cases the rehabilitation blocks were initially seeded with exotic pasture species, for a target land use of pasture and grazing. The revised target land use is now native woodland, and the areas will require rework. This approach will be revised during the ***Rehabilitation Strategy*** update due in 2025.

Treatment and remediation of the key issues are incorporated into the site's rehabilitation maintenance program.

8.5 Trials, research and other initiatives

No trials, research or other initiatives were undertaken during the reporting period.

8.6 Actions for next reporting period

United Wambo have set an annual target of 94 hectares of woodland rehabilitation in the next reporting period. The rehabilitation maintenance schedule for the next reporting period includes:

- continued spot spraying for weeds in woodland areas
- continued boom spraying for weeds in pasture areas
- slumping repairs in 2021 rehabilitation block
- erosion repairs in 2022 and 2023 rehabilitation blocks
- cut and paint African olive and acacia saligna in mature rehabilitation blocks
- pest control program

9. Community

9.1 Community Engagement Activities

The following community engagements were undertaken in 2024. During these engagements feedback is received either verbally or formally through surveys which is used to evaluate United Wambo's social performance.

- Voluntary Planning Agreement (VPA) committee was established with Singleton Council and community members. Meetings were held 15 February, 2 May, 1 August and 14 November 2024
- United Wambo operates a Community Consultative Committee (CCC) in accordance with Schedule 2, Condition A19 of the United Wambo SSD 7142. During 2024, United Wambo provided information to the community through the United Wambo CCC to provide updates on the operation. The United Wambo CCC will also be provided the completed 2024 Annual Review. CCC meetings were held 6 February, 7 May, 13 July and 12 November 2024
- Community Newsletters were distributed 14 July and 23 December 2024
- Community Information Nights were held 17 April and 10 October 2024. Community Information Nights were well received
- tank cleaning and inspection program for residents
- air conditioning maintenance program for residents

Various consultation meetings with nearby residents regarding mitigation works at their properties, exploration, structural assessment and locations of noise monitors.

9.2 Community Contributions

Community contributions for 2024 are provided in ***Table 9-1.***

Table 9-1: Community contributions for 2024

Organisation	Purpose
Parkrun Singleton	Food for 10th year celebrations
Singleton Family Support	Reclaim My Place and Create My Place Art Therapy Programs
Carrie's Place	Whitegoods for setting up of transition homes for women escaping from domestic violence
Singleton Neighbourhood Centre	Community Garden
Rotary Club of Singleton on Hunter	Singleton Art Prize
Hunter Valley Clay Target Club	Upgrade of Security Monitoring
Business Singleton	Small Business Workshops
Singleton Heights Pre-school	All weather blinds to outdoor learning area
Taskforce Veteran	Veteran and serving Defence Family morning teas
Whittingham Hall	Floor Refurbishment

Organisation	Purpose
Singleton Motorcycle Club	New Generator for running of bathroom and canteen facilities

9.3 Complaints

Five complaints were received during the reporting period (see ***Figure 9-1***). The largest complaint category for 2024 was noise, with a total of three, there were no complaints regarding lighting impacts as compared to six in 2023. Over the course of the year, United Wambo have been implementing targeted management measures to prevent impacts. A detailed summary of the United Wambo complaints for 2024 can be found in ***Appendix D - Summary of Complaints***.

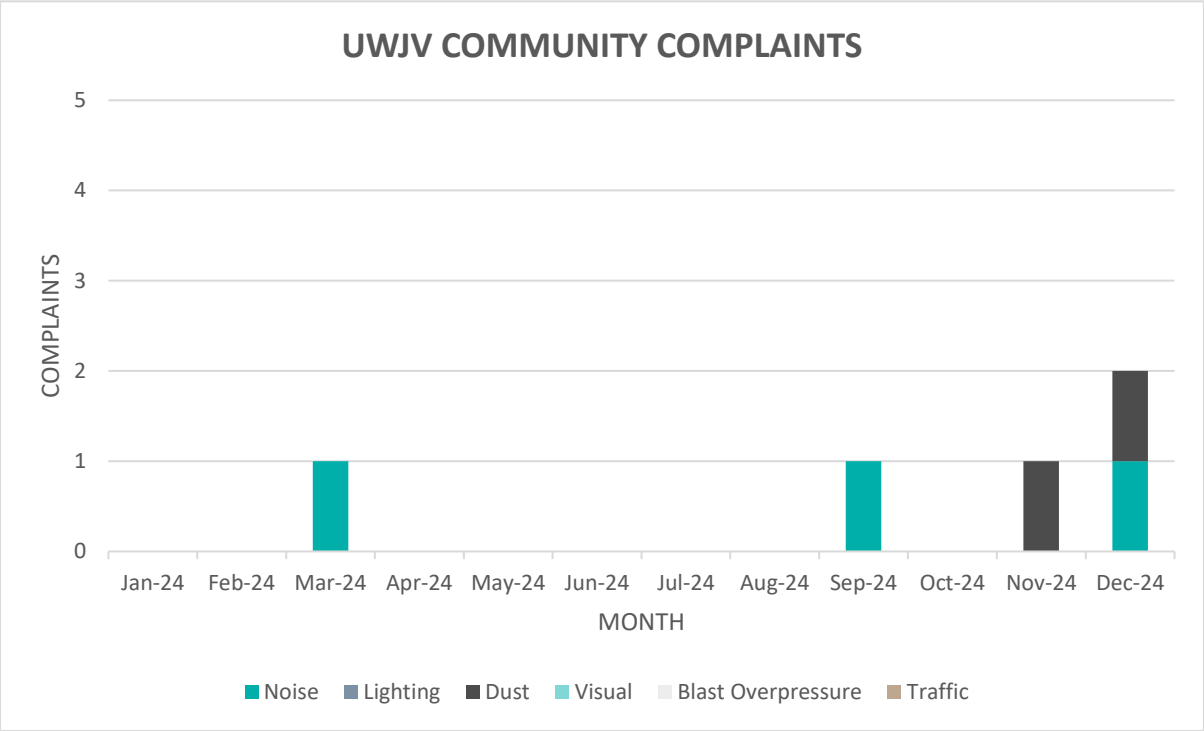

Figure 9-1 Chart of Community Complaints

All complaints were addressed with the appropriate actions including modifying operations where required.

United Wambo received 7 complaints in 2023, 16 complaints in 2022, 48 complaints in 2021, 3 complaints in 2020.

United Wambo will continue to monitor complaint trends. United Wambo operates a 24-hour Community Complaints and Enquiries Hotline to ensure that any community concerns can be recorded and responded to as soon as possible.

The community information line number is 1800 801 440.

The number is advertised in community newsletters, in the local newspaper and on the United Wambo website at *https://www.glencore.com.au/operations-and-projects/coal/current-operations/united-wambo-open-cut.*

10. Independent Environmental Audit

An Independent Environmental Audit was last undertaken in 2023 in accordance with Schedule 2, Part E, Condition E12 of SSD 7142. For a summary of the audit findings, refer to the United Wambo 2023 Annual Review.

11. Incidents and Non-Compliances Within the Reporting Period

11.1 Summary of Incidents

There were no significant or reportable incidents in 2024.

11.2 Summary of Non-Compliances

Table 11-1 below details the non-compliances of the reporting period due to missing data.

Table 11-1 Summary of missing air quality data for the reporting period

Monitor	Date(s)	Cause
AQ01 PM10	20/02/2024-21/02/2024	Annual calibration 12-hour period run overnight.
AQ02 PM10	4/01/2024-5/01/2024	Unexplained power outage 3:45pm then came back online at 10:00am the following morning (result unvalidated)
	18/04/2024	Stopped 10:30pm on 17/4/2025 due to dislodged transformer, fixed by Ausgrid.
	23/07/2024-24/07/2024	Maintenance and calibration with zero filter overnight.
AQ03 PM10	05/01/2024	Unexplained power outage at 8:30am.
	03/02/2024-05/02/2024	Unit stopped 6:25pm
	21/02/2024 - 23/02/2024	Cooler issues. Installed zero filter 1:00pm, zero filter installed 1:00pm on 22/02/2024. Calibration – removed zero noise filter on 23/02/2024.
	15/10/2024/-16/10/2024	Maintenance and calibration, zero noise filter overnight.

Monitor	Date(s)	Cause
AQ04 PM10	28/05/2024-29/05/2024	Calibration, zero noise filter overnight (results for unvalidated data)
HVAS02	13/11/2024	Suspected power outage. HVO operates the Kilburnie South PM10 and TSP High Volume Air Samplers (HVAS) as required by the HVO Air Quality and Greenhouse Gas Management Plan and Schedule 3, Condition 19 of the HVO South Approval (PA 06_0261). HVO were notified by the environmental monitoring contractor that the Kilburnie South PM10 and TSP HVAS units failed to run for the full monitoring period on 13 November 2024 due to a suspected power outage. The monitoring contractor collecting the filter papers following the run day noted that the units were without power upon their arrival. The monitoring contractor noted that the filter papers were discoloured suggesting both units had run. An inspection of the unit's power supply was completed by an electrician on 18 November and found that the residual current device (RCD) switch had tripped at the mains distribution board. Power was subsequently restored, and an inspection of the unit set up, power supply and further testing was completed with no issues being detected. It is noted that the HVAS PM2.5 unit at that location was not affected as it is connected to a different power supply. The HVAS monitor programmes indicated that the PM10 and TSP units had run for 990 minutes (68.75%) and 991 minutes (68.82%) respectively of the total required run time. The units were subsequently reset and ran successfully on their next scheduled run day. This data mis-capture will be noted in the 2024 HVO Annual Review. This report constitutes the detailed report to be provided within seven (7) days as required by Schedule 5, Condition 3 of PA 06_0261. Management plans were reviewed following this event as required by Schedule 5 Condition 4A of PA 06_0261. No update to plans are required as part of this event.

Real Time Monitoring - <75% daily data collection

The dates specified for AQ01, AQ02, AQ03 and AQ04, TEOMs failed to obtain a valid sample for varying lengths of time. The failure to obtain the samples was a result of varying causes, including unplanned power outages, mechanical and software issues, and planned maintenance. As a result of the missing data, a sample capture percentage of <75% for the day occurred on each of the dates identified, therefore a valid 24-hour average could not be calculated.

12. Activities to be Completed in Next Reporting Period

Table 12-1 outlines the key proposed activities during 2025.

Table 12-1 Proposed Actions for 2025

Proposed Action	Timeline	Comments
Dust Management	2025	Commissioning of four new Komatsu 785 water carts.
Waste	2025	Removal of legacy waste at United Wambo, including commencement of demolition at the North MIA.
Water Management	2025	Stage 3 Water Management construction commencement, allowing mining further to the west.
		Update of the groundwater model commenced in 2024 and is scheduled to be completed in 2025.
Approvals	2025	Retire biodiversity credits for Stage 2 and 3.
Rehabilitation	2025	94 hectares of rehabilitation will be undertaken.
		Targeted weed control onsite and offset properties.
		Update of the UWJV Rehabilitation Strategy.

13. References

The United Wambo Open Cut Coal Mine Project EIS and Assessment documentation is available on the United Wambo public website. All United Wambo and Wambo Mine Environmental Management System documents including Management Plans are available on the public website of each company:

United Wambo Joint Venture Open Cut (glencore.com.au)

https://www.glencore.com.au/operations-and-projects/coal/current-operations/united-wambo-open-cut

Peabody - Wambo Underground Mine (peabodyenergy.com)

https://www.peabodyenergy.com/Operations/Australia-Mining/New-South-Wales-Mining/Wambo-Underground-Mine

Appendix A - EPBC 2015 – 7600 Compliance Report

UNITED WAMBO
JOINT VENTURE

GLENCORE

EPBC 2015/7600 Compliance Report 2024

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1. Purpose

This compliance report was prepared to satisfy the requirements of Condition 10 of the United and Wambo Open Cut Coal Mine Project *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) Approval 2015/7600 held by United Collieries Pty Ltd, effective until 31 December 2052 (**EPBC 2015/7600**).

Condition 10 of EPBC 2015/7600 states:

> *10. The approval holder must prepare a compliance report addressing compliance with each of the conditions of this approval, including implementation of any management plans and strategies from the State development consent that are referred to in this approval, for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must:*
>
> *a. publish each compliance report on a website within 60 business days following the relevant 12-month period,*
>
> *b. notify the Department by email that a compliance report has been published on the website and provide the website's link for the compliance report within five business days of the date of publication,*
>
> *c. keep all compliance reports publicly available on the website until this approval expires,*
>
> *d. exclude or redact sensitive ecological data from compliance reports published on the website, and*
>
> *e. where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.*

2. Notification of Commencement

Notification was made to the former Department of Environment and Energy on 10 January 2020 that the United Wambo Open Cut Coal Mine Project commenced on 6 January 2020 (date of commencement of the action).

3. Reporting Period

The 12-month reporting period for this compliance report (based on the date of commencement of the action) is **6 January 2024** to **5 January 2025**.

4. Compliance Assessment

An assessment of compliance with the conditions of EPBC 2015/7600 is provided in ***Table 1***.

Table 1 - Compliance Assessment

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
1	The approval holder must comply with State development consent conditions B39, B40, B46, B49, B51, B52, B53 and B54.	Non-compliant	Condition B39 – Compliant	Sufficient water supply available for the operation during the reporting period.
			Condition B40 – Compliant	Water take was reported in 2023 Annual Review (Tables 7-13 and 7-14), submitted to NSW Department of Planning, Housing and Infrastructure on 28 March 2024.
			Condition B46 – Compliant	No unplanned surface discharges from site. All surface water discharges during the reporting period were compliant with the *Protection of the Environment Operations (Hunter River Salinity Trading Scheme) Regulation 2002*."
			Condition B49 – Compliant	The development complies with the Table 4 Water management performance measures set out in condition B49 during the reporting period.
			Condition B51 – Compliant	Not appliable during the reporting period, the GDE study was commenced in 2020, and report finalised January 2021. The performance criteria in the Groundwater Management Plan (v6) include performance measure triggers related to aquatic, riparian and GDE impacts.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
			Condition B52 – Not triggered	Most recent *Water Management Plan v6*, prepared in accordance with condition B52, was approved by Department of Planning, Industry and Environment on 22 March 2023. There have been no changes to this plan during the reporting period.
			Condition B53 – Not triggered	*Water Management Plan* v1 relating to Phase 1A was approved by Department of Planning, Industry and Environment 13 July 2020. The requirements of condition B53 have been met.
			Condition B54 – Non-compliant	*The approval holder has not complied with State Development Consent condition B54, which requires the approval holder to implement the project's Water Management Plan (WMP) as approved by DPHI.*
2	Within the area shown at Annexure 1, the approval holder must not clear more than: a. 203.7 hectares of Regent Honeyeater (*Anthochaera phrygia*) habitat, b. 203. 7 hectares of Swift Parrot (*Lathamus discolor*) habitat, c. 352.9 hectares of Spotted-tail quoII (*Dasyurus maculatus maculatus*) habitat,	Compliant	Clearing limits of listed species remains below prescribed limits.	UWJV record cleared areas of Matter of National Environmental Significance (MNES), compared to the EPBC baseline dataset for the United Pit. As of the end of the reporting period, being 5 January 2025, disturbance totals included:

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	d. 246.8 hectares of the Central Hunter Valley Eucalypt Forest and Woodland ecological community.			a. 102.9 hectares of Regent Honeyeater (*Anthochaera phrygia*) habitat b. 102.9 hectares of Swift Parrot (*Lathamus discolor*) habitat c. 135.7 hectares of Spotted-tail quoll (*Dasyurus maculatus maculatus*) habitat d. 236.7 hectares of the Central Hunter Valley Eucalypt Forest and Woodland ecological community
3	The approval holder must comply with the State development consent conditions B55, B56, B57, B58, B59, B60, B61, B62, B69, B71, B72 and B73.	Non-compliant	Condition B55 – Non-compliant Condition B56 – Non-compliant.	Condition B55 and B56 requires the retirement of Stage 1 credits within 12 months of commencing Phase 1A (or other timeframe agreed by the Planning Secretary). Stage 1 commenced on 6 January 2020; therefore the due date was 6 January 2021. An extension for an additional 12 months to 6 January 2022 was granted by DPIE on 22 October 2020, a further extension was sought in 2021 but was denied by DPHI. Since commencement of operations, UWJV worked with the former NSW Biodiversity Conservation Trust (BCT), now the Credit Supply Taskforce (CST), to establish

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
				Biodiversity Stewardship Agreements for the retirement of Stage 1 credits. Stage 1 Biodiversity Credit Retirement was completed on 8 November 2024. Notification was sent to Federal DCCEEW on 11 November 2024.
			Condition B57 – Compliant	No disturbance has occurred in Stage 2 or Stage 3 areas during the reporting period. No proposal to use Ecological Mine Rehabilitation to satisfy Stage 2 or 3 credit requirements.
			Condition B58 – Not triggered	No proposed changes to staging of surface disturbance.
			Condition B59 – Compliant	Letter regarding use of surplus credits submitted to the Planning Secretary on 6 December 2024. Proposal approved by DPHI on 17 March 2025.
			Condition B60 – Not triggered	No changes to approved credit obligations made within the reporting period.
			Condition B61 – Not triggered	Stage 2 and 3 credit are not yet retired.
			Condition B62 – Not triggered	The action is not within 10 years of cessation of mining.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
			Condition B69 – Compliant	Planned Open Woodland Revegetation hectare requirements don't overlap planned Ecological Mine Rehabilitation hectares.
			Condition B71 – Compliant	*Biodiversity Management Plan* v1, prepared in accordance with condition B71 was approved by Department of Planning, Industry and Environment on 11 November 2019.
			Condition B72 – Not triggered	Prior to Phase 1A commencement the *Biodiversity Management Plan* v2 approved by Department of Planning, Industry and Environment on 13 July 2020.
			Condition B73 – Compliant	Most recent *Biodiversity Management Plan v6* approved by Department of Planning, Industry and Environment on 22 March 2023.
	a) To compensate for the loss of the listed threatened species and ecological community habitat identified at condition 2, the approval holder must submit the Biodiversity Offset Strategy plan (specified at condition B71(e) of the State development consent) to the Minister for approval. i. The approval holder must not commence Phase 1A until the Biodiversity Offset		Condition (a)i – Compliant Condition (a)ii – Non-compliant	(a)i - The Biodiversity Offset Strategy is contained within the United Wambo Biodiversity Management Plan, approved by the Minister's Delegate on 19 December 2019. (a)ii - The Biodiversity Offset Strategy was implemented as approved, except for compliance with condition B55 and B56.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	Strategy plan has been approved by the Minister. ii. The approval holder must implement the Biodiversity Offset Strategy plan as approved by the Minister.			As described in Condition 1 (B55 and B56), biodiversity credits were not retired within the prescribed timeframe. Stage 1 Biodiversity Credit Retirement was completed on 8 November 2024. Notification was sent to Federal DCCEEW on 11 November 2024.
4	The approval holder must comply with the State development consent conditions B97, B98, B100, B101, B102, B103, B104 and B105.	Compliant	Condition B97 – Compliant	The site is progressing towards the rehabilitation objectives presented in *SSD 7142 Table 6*. The site completed 59 ha of rehabilitation in the 2024 calendar year.
			Condition B98 – Compliant	Rehabilitation objectives apply to the entire site.
			Condition B100 – Compliant	The *Rehabilitation Strategy* addresses required items.
			Condition B101 – Not triggered	*Rehabilitation Strategy v1.2* was approved in November 2020. Phase 2 of operations commenced 1 December 2020.
			Condition B102 – Compliant	The site implemented the *Rehabilitation Strategy* throughout the reporting period.
			Condition B103 – Compliant	The *Rehabilitation Management Plan v1* addresses required items.
			Condition B104 & B105 – Not applicable	Conditions deleted in SSD 7142 Mod 1.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
5	The approval holder must notify the Department in writing of the date of commencement of the action within 10 business days after the date of commencement of the action.	Not triggered	Not applicable for the reporting period.	The United Wambo Open Cut Coal Mine Project commenced on 6 January 2020. The Department was notified in writing on 10 January 2020.
6	If the commencement of the action does not occur within 5 years from the date of this approval, then the approval holder must not commence the action without the prior written agreement of the Minister.	Not triggered	Not applicable for the reporting period.	-
7	The approval holder must maintain accurate and complete compliance records.	Compliant	Compliance records maintained.	
8	If the Department makes a request in writing, the approval holder must provide electronic copies of compliance records to the Department within the timeframe specified in the request.	Compliant	Response to requests for information were provided to DCCEEW in the required timeframes.	-
9	The approval holder must: a. Submit the Biodiversity Offset Strategy plan at condition 3a electronically to the Department for approval by the Minister, b. publish the Biodiversity Offset Strategy plan on the website within 20 business days of the date the Biodiversity Offset Strategy plan is approved by the Minister or of the date a revised Biodiversity Offset Strategy plan is submitted to the Minister or the Department, unless	Compliant	All requirements of Condition 9 have been met.	a. The Biodiversity Offset Strategy is contained within the United Wambo Biodiversity Management Plan and was approved by the Minister on 19 December 2019. b. The United Wambo Biodiversity Management Plan has been published on the United Wambo website within 20 business days of approval.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	otherwise agreed to in writing by the Minister, c. exclude or redact sensitive ecological data from the Biodiversity Offset Strategy plan published on the website or provided to a member of the public, and d. keep the Biodiversity Offset Strategy plan published on the website until the end date of this approval.			c. No sensitive ecological data is contained within the Biodiversity Offset Strategy d. The United Wambo Biodiversity Management Plan is published on the United Wambo website at this *link*.
10	The approval holder must prepare a compliance report addressing compliance with each of the conditions of this approval, including implementation of any management plans and strategies from the State development consent that are referred to in this approval, for each 12 month period following the date of commencement of the action, or otherwise in accordance with an annual date that has been agreed to in writing by the Minister. The approval holder must: a. publish each compliance report on a website within 60 business days following the relevant 12 month period, b. notify the Department by email that a compliance report has been published on the website and provide the website's	Non-compliant	*United Wambo did not prepare the compliance report to meet the definition stated in the approval for the 2023-24 reporting period as the report provided to the department to satisfy the condition for the reporting period contained inaccurate or incomplete details of compliance with the conditions of approval.* As per correspondence regarding the Notice to Show Cause issued by DCCEEW on 18 September 2024.	a. The 2023 Annual Compliance Report was published on the UWJV website on 24 January 2024 (13 business days following the reporting period). Reports can be viewed at this *link*. b. The Department was notified by email on 24 January 2024. c. The compliance reports remain on the website. d. No sensitive ecological data is provided in the reports. e. No sensitive ecological data is provided in the reports, therefore no additional report submitted to DCCEEW.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	link for the compliance report within five business days of the date of publication, c. keep all compliance reports publicly available on the website until this approval expires, d. exclude or redact sensitive ecological data from compliance reports published on the website, and e. where any sensitive ecological data has been excluded from the version published, submit the full compliance report to the Department within 5 business days of publication.		The reporting requirements of a-e have been met.	
11	The approval holder must notify the Department in writing of any: incident, or non-compliance with the conditions, or non-compliance with the commitments made in plans. The notification must be given as soon as practicable, and no later than two business days after becoming aware of the incident or non-compliance. The notification must specify: a. any condition which is in breach, b. a short description of the incident and/or non-compliance, and c. the location (including co-ordinates), date, and time of the incident and/or non-compliance. In the event the exact	Compliant	No new incidents or non-compliances occurred during the reporting period.	The site consulted with Federal DCCEEW during the reporting period, regarding non-compliances notified on 4 October 2023 (previous reporting period).

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	information cannot be provided, provide the best information available.			
12	The approval holder must provide to the Department the details of any incident or non-compliance with the conditions or commitments made in plans as soon as practicable and no later than 10 business days after becoming aware of the incident or non-compliance, specifying: a. any corrective action or investigation which the approval holder has already taken or intends to take in the immediate future, b. the potential impacts of the incident or non-compliance, and c. the method and timing of any remedial action that will be undertaken by the approval holder.	Compliant	No new incidents or non-compliances occurred during the reporting period.	The site consulted with Federal DCCEEW during the reporting period, regarding non-compliances notified on 4 October 2023 (previous reporting period).
13	The approval holder must ensure that independent audits of compliance with the conditions are conducted as requested in writing by the Minister.	Not triggered	No request has been received by the Minister during the reporting period.	-
14	For each independent audit, the approval holder must: a. provide the name and qualifications of the independent auditor and the	Not triggered	No request has been received by the Minister during the reporting period.	-

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	draft audit criteria to the Department, b. only commence the independent audit once the audit criteria have been approved in writing by the Department, and a. submit an audit report to the Department within the timeframe specified in the approved audit criteria.			
15	The approval holder must publish the audit report on the website within 10 business days of receiving the Department's approval of the audit report and keep the audit report published on the website until the end date of this approval.	Not triggered	No request has been received by the Minister during the reporting period.	-
16	The approval holder must comply with the State development consent condition A9.	Compliant	Condition A9 allows for mining up until 31 August 2042.	-
17	Within 30 days after the completion of the action, the approval holder must notify the Department in writing and provide completion data.	Not triggered	The action has not been required during the reporting period, i.e. mining not yet completed.	-
18	The approval holder must notify the Department in writing of any proposed change to the State development consent conditions referred to in these conditions within 10 business days of	Not triggered	There were no proposed changes to the State development consent within the reporting period.	

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	formally proposing a change or becoming aware of any proposed change.			
19	The approval holder must notify the Department in writing of any change to the conditions of the State development consent referred to in these conditions, within 10 business days of a change to conditions being finalised.	Not triggered	There were no changes to the State development consent within the reporting period.	The most recent change (Modification 1) was in November 2021.
20	The approval holder may, at any time, apply to the Minister for a variation to an action management plan approved by the Minister under condition 3.a, or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous action management plan.	Compliant	No applications were made to vary an action management plan during the reporting period.	The action management plan is contained within the *Biodiversity Management Plan* (BMP). A revised BMP was submitted to DPHI on 16 August 2024. Approval for the change was not received during this reporting period.
21	The approval holder may choose to revise an action management plan approved by the Minister under condition 3.a, or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the EPBC Act, if the taking of the action in accordance with the RAMP would not be likely to have a new or increased impact.	Compliant	There were no approved revisions to the action management plan during the reporting period.	-

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
22	If the approval holder makes the choice under condition 21 to revise an action management plan without submitting it for approval, the approval holder must: a. notify the Department in writing that the approved action management plan has been revised and provide the Department with: i. an electronic copy of the RAMP, ii. an electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP, iii. an explanation of the differences between the approved action management plan and the RAMP, iv. the reasons the approval holder considers that taking the action in accordance with the RAMP would not be likely to have a new or increased impact, and v. written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at	Compliant	There were no approved revisions to the action management plan during the reporting period.	The action management plan is contained within the *Biodiversity Management Plan* (BMP). A revised BMP was submitted to DPHI on 16/8/24. Approval for the change was not received during this reporting period. Once the BMP is approved by DPHI, notification in accordance with Condition 22(a) will be made to DCCEEW.

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
	least 20 business days after the date of providing notice of the revision of the action management plan, or a date agreed to in writing with the Department. b. subject to condition 24, implement the RAMP from the RAMP implementation date.			
23	The approval holder may revoke their choice to implement a RAMP under condition 21 at any time by giving written notice to the Department. If the approval holder revokes the choice under condition 21, the approval holder must implement the action management plan in force immediately prior to the revision undertaken under condition 21.	Not triggered	RAMP not revoked during reporting period.	-
24	If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of the action in accordance with the RAMP would be likely to have a new or increased impact, then: a. condition 21 does not apply, or ceases to apply, in relation to the RAMP; and b. the approval holder must implement the action management plan specified by the Minister in the notice.	Not triggered	Condition 23 not triggered during reporting period.	-

Condition	Requirement	Compliance Status	Compliance Finding	Additional Information
25	At the time of giving the notice under condition 24, the Minister may also notify that for a specified period of time, condition 21 does not apply for one or more specified action management plans.	Not triggered	Condition 24 not triggered during reporting period.	-

Appendix B - Annual Groundwater Review

2024 Annual Review - Groundwater

United Wambo

United Wambo Joint Venture

300 Watt Street, Warkworth, NSW 2330

Prepared by:

SLR Consulting Australia

SLR Project No.: 660.v30030.00404

28 March 2025

Revision: 2.0

Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
1.0	19 March 2025	R. Davies	A. Skorulis	D. Western
2.0	28 March 2025	R. Davies and A. Skorulis	A. Skorulis	D. Western

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 United Wambo Joint Venture (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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1.0 Introduction

The United Wambo Joint Venture (United Wambo) is located approximately 16 km north-west of Singleton, New South Wales (NSW). United Wambo comprises open cut mining approved under Development Consent SSD 7142 in August 2019. This includes the United Pit and the Montrose Pit (former Wambo pit) to be mined to the Vaux and Warkworth Seams of the Wittingham Coal Measures respectively.

The United Wambo Groundwater Management Plan (GWMP) (Version 6, document number UWOC-1689771511-370) covers open cut operations associated with United Wambo. As part of compliance with mine approval conditions, routine groundwater monitoring is conducted across United Wambo, and the data reviewed and analysed as dictated by the GWMP (Table 1).

Table 1 UWJV Reporting Requirements

Schedule	Requirements	Recipient
Bi-Monthly	Review of the groundwater monitoring results and associated trends in groundwater quality against performance criteria.	United Wambo E&C Department
Annually	Review of groundwater monitoring results (including all water level, water quality and mine water seepage data). Comparison of groundwater data trends with those of previous years highlighting any results that are inconsistent with trends in baseline data. Comparison of groundwater data against specified trigger levels.	Government agencies (DPE, DPE Water, EPA) and the Community Consultative Committee

This report presents the annual groundwater review for United Wambo for the calendar year 2024, developed in accordance with the approval conditions and requirements outlined within the GWMP (Glencore, 2024).

1.1.1 United Wambo Mining Complex

The United Wambo Joint Venture is owned by United Collieries Pty Ltd (Glencore and CFMEU) and Wambo Coal Pty Ltd (Peabody). United Wambo open cut operations are also located adjacent to Wambo underground operations (Wambo Coal Pty Ltd – Peabody), with both operations utilising the Coal Handling and Preparation Plant (CHPP) and rail load-out facility which are administered by Wambo under DA 305-7-2003.

United Wambo (open cut) and Wambo (underground) share water licences as well as several groundwater monitoring locations within their respective monitoring networks. It is therefore useful to consider cumulative impacts from both open cut and underground operations when assessing compliance with licenced take of groundwater and surface water.

The term ‘Wambo Mining Complex’ has been developed for use when cumulative impacts from both United Wambo and Wambo mining operations are being considered as part of this annual review.

1.2 Scope

This annual review covers the period January 2024 to December 2024, inclusive. The scope of works are detailed as follows;

Review of site background, including (but not limited to):

- Legislative requirements and conditions relevant to groundwater (**Section 2.0**);
- Mine activities over the reporting period (at site and surrounding operations) (**Section 2.1**);
- Hydrogeological regime (**Section 3.0**);
- Groundwater monitoring network and monitoring program (**Section 4.0**)

Data review:

- Review of groundwater monitoring results (including all water level, water quality and mine water seepage data) from the monitored infrastructure outlined in Section 5.4.1 of the GWMP (**Section 5.0**).
- Hydrographs displaying groundwater quality trends, including field physio-chemical parameters (pH, EC) (**Appendix A**).
- Review and produce hydrographs for relevant groundwater monitoring bores / VWPs and conduct a cause-and-effect analysis to determine whether trends are due to climatic changes or mining-related activities. This includes a comparison of monitored groundwater levels to model predictions (**Section 5.0**, **Section 6.0** and **Appendix B**).
- Assess groundwater data for compliance with the groundwater level and water quality triggers and natural trends (i.e. surface water levels and rainfall) (**Section 5.3**).
- Comparison of groundwater level and quality trends with previous years, highlighting any results which are inconsistent with trends in baseline data (**Section 5.2**).
- Review of Stygofauna monitoring requirements for compliance (**Section 4.5**)
- Review of GDE monitoring requirements for compliance (**Section 4.4** and **5.4**)
- Assess compliance with water licences (**Sections 7.0**).
- Discuss groundwater impacts and compliance over the reporting period and provide recommendations (if required) for the existing monitoring network (**Sections 8.0 (**compliance with performance criteria) and **10.0** (recommendations)).

2.0 Site Background

The following section provides a description of the United Wambo and operation activity that occurred in 2024 relevant to this annual groundwater review. The general site layout is presented in **Figure 1**.

2.1 Mine Operations

The United Wambo open-cut mine commenced operation in January 2020. The mine integrates existing open-cut operations at the Wambo coal mine with a new open-cut mine at the adjacent United coal mine. The new combined open-cut mine is forecast to produce 10 million tonnes of thermal and metallurgical coal annually until projected closure in 2042.

Table 2 presents a summary of mining activities across the Site, approved mining timeframes and activities conducted during 2024. **Table 3** provides a summary of nearby mining activities around United Wambo, including the adjacent Wambo mine.

Table 2 Summary of United Wambo Activities

Site	Type	Status 2024	Comment
Montrose Pit (former Wambo Open-Cut)	Open-cut	Active	To be mined in 2021 to 2039, down to the Warkworth Seam
United Open-Cut	Open-cut	Active	To be mined in 2021 to 2039, down to the Vaux Seam
Historical Open-Cut Pits	Open-cut	Inactive	Includes Hunter Pit, Wombat Pit, Homestead Pit, South Bates Pit, Eastern Pit, Western Pit, North Bates Pit, Ridge Pit, North East Pit, Whynot Pit, Wollemi Boxcut, Wambo Pit and Montrose Pit. Mined from 1969 to 2020 targeting the Whynot, Whybrow and Wambo Seams
United Colliery Underground	Underground	Inactive	Mined the Arrowfield Seam and Woodlands Hill Seam from 1992 to 2010
Tailings Dam 1 (Hunter Pit)	Tailings Storage	Inactive	Previously used for tailings deposition from 2003. Capping works commenced in 2020 and were completed in 2022 and fully incorporated into the overburden dump system in 2023.
Tailings Dam 2	Tailings Storage	Inactive	Previously used for tailings deposition from 2003. Capping works commenced in 2020 and were completed in 2022 and fully incorporated into the overburden dump system in 2023.
Homestead Inpit TSF	Tailings Storage	Active	Commenced from 2021 and in use in 2024.
North East Tailings Dam	Tailings Storage	Inactive	Wambo storage
North Wambo UG Old InPit	Tailings Storage	Inactive	Wambo Storage
Montrose Water Storage	Mine Water Dam	Inactive	Approved but not yet constructed

Site	Type	Status 2024	Comment
South Wambo Dam	Mine Water Dam	Active	Wambo mine water storage. Recommissioning construction commenced in 2023 and recommenced use as an operational water storage in May 2024.
West Cut Water Dam	Mine Water Dam	Active	Wambo Storage. Decant water from Homestead Pit transferred to West Cut Water Dam.
Eagles Nest Dam	Process Water Dam	Active	Wambo storage.
Gordon Below Franklin	CHPP Dams	Active	Wambo storages. 4x dams
South Bates Open-Cut	Dam	Active	Wambo storage. South Bates Underground mine sump.
Tailings Storage	Tailings Storage	Active	Wambo storage. Located next to Wollombi Brook. Chitter Dam had a capacity of 980 ML mine water and tailings sump water (Hunter and Northeast Tailings) and operated from 2010 to 2016. Was mined out as Glen Munro Pit in 2017 to access South Wambo Underground.

Table 3 Summary of Surrounding Mines Activities

Site	Type	Comment
North Wambo Underground (NWU)	Underground	Complete - Longwall mining at south-east end of the site, active from 2007 to 2015 and mined the Wambo Seam.
South Bates Underground (SBU)	Underground	Complete - Longwall mining at south end of site, active from 2016 to 2018 and mined in the Wambo and Whybrow Seams.
South Bates Underground Extension (SBX)	Underground	Longwall mining at south end of site near North Wambo Creek. Active from 2018 through 2024 and mining the Whybrow Seam. The following SBX mining occurred in 2024. LW24a – January to June 2024 LW24b – July to October 2024 LW25 – commenced November 2024.
Wambo	Open-cut and Underground	Historical - Within site area, underground longwall workings on the eastern and southern side of the site.
Hunter Valley Operations (HVO)	Open-cut and historical underground	Historical Lemington Underground immediately east of site, included board and pillar mining of the Bowfield Seam, as well as open-cut mining immediately north of site.
Mt Thorley Warkworth (MTW)	Open-cut	Open-cut operations located on the eastern side of Wollombi Brook.

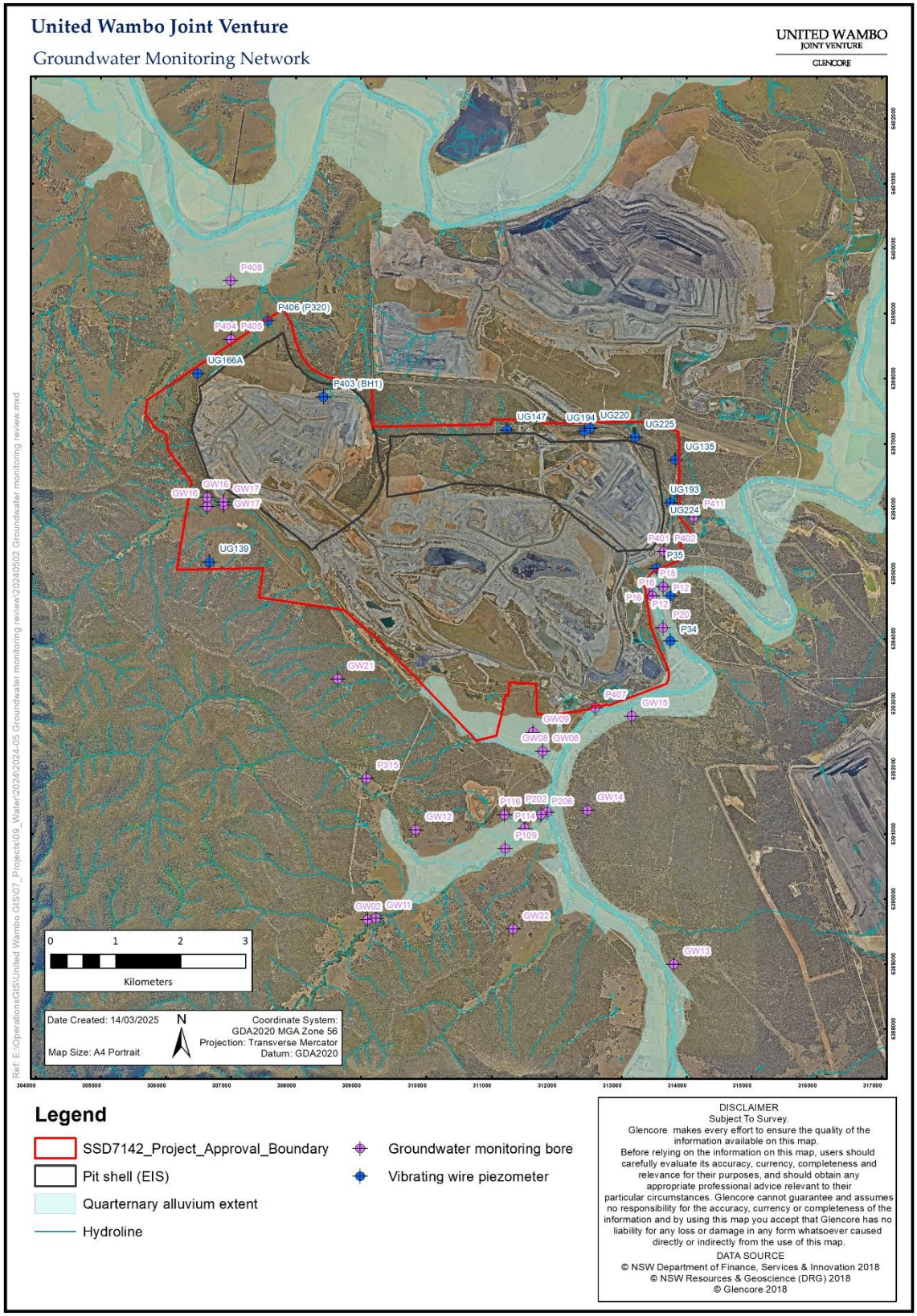


Figure 1 Groundwater monitoring network and site layout

2.2 Site Groundwater Activity

Table 4 provides a summary of groundwater related site work undertaken at United Wambo during 2024.

Table 4 2024 Groundwater Monitoring Network Updates and Maintenance

Description	Date	Detail of works completed
Standpipe and VWP groundwater monitoring installations	Throughout 2024	• Installation of P411 within the alluvium to monitor impacts to nearby Groundwater Dependent Ecosystem (GDE1). • Installation of P404 within the overburden to monitor impacts to the Hunter River alluvium and private bores • Installation of P405 within the Arrowfield Coal Seam to monitor impacts to the Hunter River alluvium and private bores • Installation of P407 within the alluvium to monitor impacts to the Wollombi Brook alluvium and potential contamination / seepage from mine water storages • Installation of P403 (VWP) with sensors in the overburden, Arrowfield Seam, Warkworth Seam and Vaux Seam.
Connection of VWPs to telemetry system	2021 through 2024	Most VWPs in the United-Wambo monitoring network are now connected to a telemetry system administered by Ontoto. This facilitates the remote download and processing of data and enables VWP sensor health to be diagnosed in real-time.
Monitoring network maintenance	15th + 16th August	Several wells in the combined United Wambo and Wambo monitoring network near Wollombi Brook and Wambo Creek were checked for obvious damage and re-developed/ purged. These include: P106, P109, P206, BH3, GW15.
Commencement of monitoring at replacement bores.	Throughout 2024	Monitoring commenced at GW37a and GW37b which were installed in late 2023 as replacement monitoring bores for P106 and P109 which are installed / screened across alluvial and Permian aquifers.

2.3 Water Licencing

Under the *Water Act 1912* and *Water Management Act 2000*, adequate water licences are required for approval of the mine developments. Groundwater licenses held for the Wambo Mining Complex, consisting of Wambo Underground and United Wambo Open Cut are detailed in **Table 5**.

Table 5 Water Entitlements and Licenses

License No.	Holder	Entitlement*
Groundwater: Lower Wollombi Brook Water Source – Hunter Unregulated and Alluvial Water Source		
WAL23897	Wambo	70 unit shares
WAL18437	Wambo	366.9 unit shares
WAL18549	United	100 unit shares
WAL18445	United	200 unit shares
Groundwater: North Coast Fractured and Porous Rock Groundwater Source		
WAL42373	Wambo	1549 unit shares
WAL41532	Wambo	98 unit shares
WAL41510	United	300 unit shares
Hunter Regulated Water Sharing Plan		
WAL718	Wambo	1000 unit shares
WAL8599	Wambo	6 unit shares
WAL8600	Wambo	868 unit shares
WAL8604	Wambo	240 unit shares
WAL10541	United	300 unit shares

3.0 Hydrogeological Setting

This section presents a brief summary of the hydrogeological setting for United Wambo. This includes discussion on climate, terrain, drainage, geology, and groundwater bearing units.

3.1 Climate, Terrain and Drainage

3.1.1 Climate

The climate of the Wambo region is temperate and characterised by hot summers and mild dry winters. Rainfall data is available from the Bureau of Meteorology (BoM), Bulga-South Wambo Station (Station: 061191) which has been collecting data since 1959 and provides a useful dataset for assessing long term rainfall trends. **Table 6** provides the long term historical monthly average rainfall from the Bulga- South Wambo dataset and 2024 monthly rainfall observations, the long-term average annual rainfall is 675.8 mm. In 2024, the total rainfall was 699.4 mm indicating that the year experienced near average rainfall.

Table 6 Long Term Average and 2024 Climate Data

Rainfall (mm)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Average Historical[1]	85.9	85.8	75.0	47.1	39.7	43.5	33.0	34.8	38.4	55.8	64.5	72.3	675.8
2024 Rainfall	56.8	91.2	30.4	158.4	79.4	59.4	37.2	42.4	35.9	47.9	44.4	16	699.4
Excess/deficit	-29.1	5.4	-44.6	111.3	39.7	15.9	4.2	7.6	-2.5	-7.9	-20.1	-56.3	23.6

[1] Based on Bulga South Wambo dataset August 1959 to December 2024

The cumulative rainfall departure (CRD) (**Figure 2**) graphically shows the rainfall trend relative to the long-term average. A positive (upward) slope in the CRD indicates periods of above average rainfall, while a negative (downward) slope indicates periods of below average rainfall. The CRD shows that early 2024 experienced a period of above average rainfall, followed by average and then below-average conditions to the end of the year.

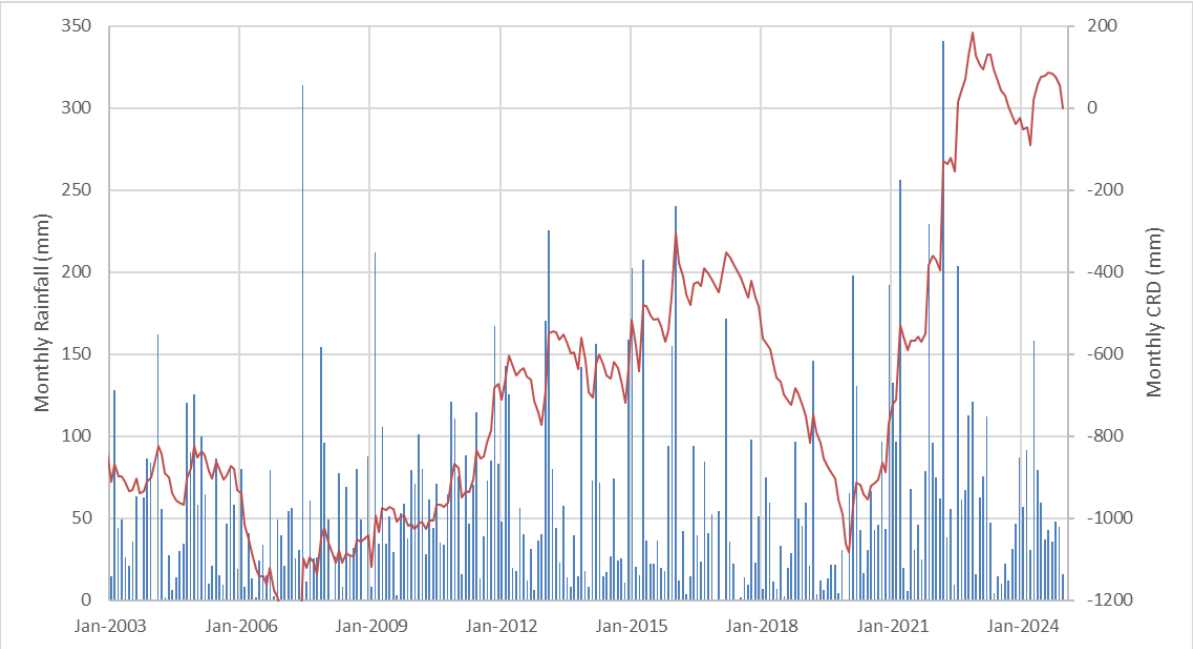


Figure 2 Monthly Rainfall and CRD

3.1.2 Terrain and Drainage

United Wambo is located in the Upper Hunter Valley region where landforms are characterised by gently sloping floodplains associated with the Hunter River and the undulating foothills, ridges and escarpments of the Mount Royal Range and Great Dividing Range. Elevations in the vicinity of United Wambo range from approximately 60 metres Australian Height Datum (mAHD) at Wollombi Brook to approximately 400 mAHD on the nearest ridges of the hills immediately to the southwest of United Wambo.

Wollombi Brook, situated immediately south-west of United Wambo, flows north-east to its confluence with the Hunter River (**Figure 1**). Wollombi Brook drains an area of approximately 1,950 square kilometres (km^2) and joins the Hunter River some 4 km east of Wambo. The Wollombi Brook sub-catchment is bound by the Myall Range to the south-east, Doyles Range to the west, the Hunter Range to the south-west and Broken Back Range to the north-east (Hunter Catchment Management Trust, 2002).

The majority of lands within Wambo Complex mining tenements drain via Wambo, Stony, North Wambo and Redbank Creeks to Wollombi Brook, while Waterfall Creek drains to the north-east directly to the Hunter River. These watercourses are generally characterised by ephemeral and semi-perennial flow regimes (Gilbert and Associates, 2003).

3.2 Geology

Regionally, the predominant geological feature is the Sydney Basin, formed via igneous rifting and crustal thinning resulting in the deposition of Permian and Triassic aged sedimentary sequences. Within the UWJV Project area Permian sediments form the Wittingham Coal Measures of the Hunter Coalfields. The coal measures generally plunge in a west to south-westerly direction and outcrop to the east of the Project area near the Hunter River.

The Wittingham Coal Measures comprise the economic coal seams interspersed with overburden and interburden consisting of sandstone, siltstone, tuffaceous mudstone and conglomerate. Quaternary alluvial deposits unconformably top the Permian sediments. These deposits consist of silt, sand and gravel in the alluvial floodplain of the Wollombi Brook. To the east of the Wollombi Brook is a sequence of aeolian sands, known as the Warkworth Sands Formation, that form a thin capping on the underlying Permian bedrock Additionally, the Triassic Narrabeen Group also unconformably overlie the Permian sediments. The Narrabeen Group, which formed from uplift during the Triassic, comprises fluviatile deposits that form the ridges and a high plateau within the Wollemi National Park, west of the Project Area. Surficial weathering, typically present as a thin heterogeneous layer of unconsolidated material overlying fresh bedrock occurs across the project area. **Table 7** provides a summary of the regional stratigraphy.

Table 7 Regional Stratigraphy

Age	Stratigraphic Unit		Description
Cainozoic	Quaternary sediments - alluvium (Qa)	Surficial alluvium (Qhb)	Shallow sequences of clay, silty sand and sand.
		Productive basal sands/gravel (Qha)	Basal sands and gravels overlying surficial alluvium along major watercourses (i.e. Hunter River and Wollombi Brook).
	Silicified weathering profile (Czas)		Silcrete
	Alluvial terraces (Cza)		Silt, sand and gravel

Age	Stratigraphic Unit		Description
Jurassic	Volcanics (Jv)		Flows, sills and dykes
Triassic	Narrabeen Group (Rn)		Sandstone, interbedded sandstone and siltstone, claystone (localised at Wollemi National Park)
Permian	Whittingham Coal Measures	Jerrys Plains Sub-group (Pswj)	Coal bearing sequences interbedded with sandstone and siltstone. Coal seams (youngest to oldest) include Whybrow Seam, Redbank Creek Seam, Wambo Seam, Whynot Seam, Blakefield Seam, Glen Munro Seam, Woodlands Hill Seam, Arrowfield Seam, Bowfield Seam, Warkworth Seam, Mt Arthur Seam, Piercefield Seam, Vaux Seam, Broonie Seam and Bayswater Seam.

3.3 Hydrogeology

The hydrogeological regime of the United Wambo area and surrounds comprises two main systems:

- Quaternary alluvial aquifers associated with Wollombi Brook, NWC, Wambo Creek, and Stony Creek; and
- Underlying Permian strata of generally low permeability and very low yielding sandstone and lesser siltstone, with low to moderately permeable coal seams which are the prime water-bearing strata within the Permian coal measures. Triassic strata, namely the Narrabeen Group, are present to the south-west of the North Wambo Underground Mine and underlie some areas of alluvium.

3.3.1 Alluvium

Groundwater within the Wollombi Brook alluvium reflects topography flowing in a north to north-easterly direction towards the Hunter River, which flows in an easterly direction.

The Quaternary alluvium is an unconfined groundwater system that is recharged by rainfall infiltration, streamflow and upward leakage from the underlying stratigraphy, particularly along Wollombi Brook.

3.3.2 Permian Coal Measures

The Wittingham Coal Measures outcrop approximately 8km to the north and east of the Project area where recharge via rainfall infiltration occurs. The coal seams also subcrop in localised zones along the Hunter River and Wollombi Brook, where they are recharged by the overlying alluvium. Recharge also occurs via leakage from the overlying Triassic Narrabeen Group. The coal measures form unconfined groundwater systems at outcrop, becoming confined as they dip towards the south-west

The direction of groundwater flow for the Wittingham Coal Measures is influenced by the local geomorphology and structural geology, as well as the long history of mining within the region. The laminated fabric of the interbedded sandstone/siltstone/mudstone strata suggests that vertical hydraulic conductivities are significantly lower than horizontal hydraulic conductivities. Due to the laminar nature of the coal measures, groundwater flow generally occurs within or along the boundaries between stratigraphic layers. The coal seams are generally more brittle and therefore more densely fractured than the overburden and

interburden strata, which causes the higher permeability. Within the coal seams, groundwater flows predominantly through cleat fractures, although there is some evidence of structure-related fracturing, and this may play an important role in groundwater flow paths.

4.0 Groundwater Monitoring

4.1 Groundwater Monitoring Program

Groundwater monitoring at United Wambo is conducted in accordance with the GWMP (Glencore, 2024). The GWMP aims to monitor and manage groundwater quality and levels to detect potential impacts on surrounding groundwater users, assess the mine's performance against performance indicators, and ensure compliance with relevant legislative and policy requirements. The United Wambo monitoring network includes:

- 27 groundwater monitoring bores
- 11 vibrating wire piezometers (VWPs) with 55 sensors

Full details of the United Wambo monitoring network are provided in Appendix D and the GWMP (table 7-1 - Glencore, 2024) shown in **Figure 3**.

As per the GWMP, groundwater monitoring at United Wambo occurs bi-monthly, which includes groundwater levels, pH and EC. A comprehensive analysis of major ions is conducted at each standpipe on an annual basis which includes:

- **Major ions**: calcium, fluoride, magnesium, potassium, sodium, chloride, sulphate.
- **Total alkalinity**: CaCO3, HCO3, CO3.
- **Dissolved and total metals**: aluminium, arsenic, barium, boron, beryllium, cadmium, chromium, cobalt, copper, iron, lead, manganese, mercury, molybdenum, nickel, selenium, strontium, silver, vanadium, and zinc.

Groundwater monitoring at United Wambo follows the procedures outlined in the United Wambo Environmental Management Strategy. The monitoring methodology includes:

- **Assessment of groundwater levels**: This involves manual measurements and datalogger downloads before purging and sampling.
- **Groundwater sampling**: This is done after purging or through low-flow sampling techniques.
- **Quality control plan implementation**: This includes maintaining a proper chain-of-custody for laboratory analysis and providing the necessary documentation.

Qualified and experienced personnel oversee groundwater monitoring, with field sampling conducted by trained staff using appropriate personal protective equipment (PPE) and approved sampling procedures. For more details, refer to Section 8 of the Groundwater Management Plan (GWMP).

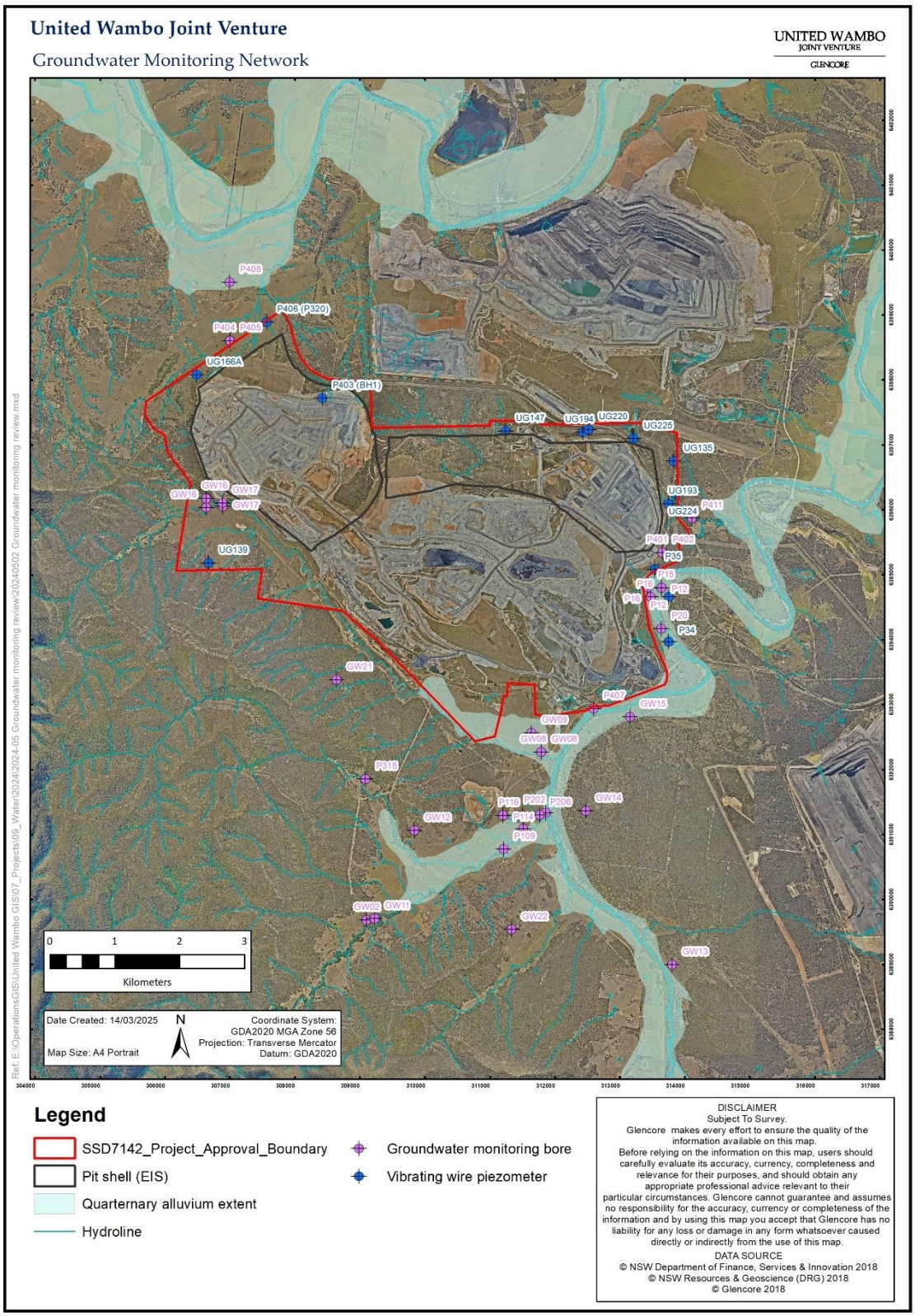


Figure 3 Groundwater monitoring network

4.2 Groundwater Triggers

Trigger levels are used to initiate investigations into shallow groundwater levels or groundwater quality at United Wambo when they stray beyond anticipated bounds. The trigger levels specified in the GWMP (Glencore, 2024), are based on statistical analysis of historical monitoring data (2008 to 2018).

Trigger levels for groundwater level, EC and pH are presented in **Table 8**. The trigger for groundwater levels and pH occurs when three consecutive bi-monthly observations exceed or fall below the maximum / minimum trigger levels. As per the GWMP, if a bore is reported as dry, the groundwater level is to be taken as the base of the bore for the purpose of trigger comparison. Triggers for EC occur when three consecutive bi-monthly observations (a 6-month period) exceed the specified trigger value. Trigger exceedances and analysis for the 2024 monitoring period are presented in **Section 5.3**.

Table 8 Groundwater Level and Groundwater Quality Trigger Levels (Glencore, 2024)

Bore	Targeted Unit	Depth to GW (mbToC[1])		EC	pH	
		Minimum (10th Percentile)	Maximum (90th Percentile)	Maximum (90th Percentile)	Minimum (10th Percentile)	Maximum (90th Percentile)
Alluvial monitoring bores						
GW02	Wambo Ck Alluv	5.7	8.4	657	6.7	7.4
GW08.2[2]	North Wambo Ck Alluv	ND	ND	ND	ND	ND
GW09.2[2]	North Wambo Ck Alluv	ND	ND	ND	ND	ND
GW11	Wambo Ck Alluv	4	6.7	626	6.8	7.5
GW13	Wollombi Bk Alluv	4.9	6.3	4,447	6.9	7.1
GW15	Wollombi Bk (east) Alluv	10.2	11.4	726	6.7	7.2
GW16[3]	North Wambo Ck Alluv	5	10.9	1,145	7.2	11.2
GW17[3]	North Wambo Ck Alluv	8.2	12.1	5,542	7	7.2
P12	Wollombi Bk (east) Alluv	6.3	7.7	1,002	7.3	7.7
P16	Wollombi Bk (west) Alluv	7	8.6	10,510	7	7.7
P20	Wollombi Bk (west) Alluv	7.2	8.3	10,364	7	7.6
P106	Wambo Ck Alluv	6.6	9.6	674	6.7	7.9
P109	Wambo Ck Alluv	4.4	6.2	801	6.5	7.9
P114	Wambo Ck Alluv	5.4	7.3	7,096	6.5	7.8
P116	Wambo Ck Alluv	4.8	6.8	2,076	6.6	7.4
P407[2]	Wollombi Bk (west) Alluv	ND	ND	ND	ND	ND
Offsite bedrock monitoring bores						
GW21[2]	Overburden	36.3	36.6	ND	ND	ND
GW22	Overburden	34.9	36.7	7,028	8.2	8.4
P11[2]	Interburden	30.4	32	ND	ND	ND

Bore	Targeted Unit	Depth to GW (mbToC[1])		EC	pH	
		Minimum (10th Percentile)	Maximum (90th Percentile)	Maximum (90th Percentile)	Minimum (10th Percentile)	Maximum (90th Percentile)
P202	Overburden	7.6	9	8,368	6.7	7.7
P206	Overburden	15.8	20.6	2,372	7.3	8.1
P401[2]	Overburden	ND	ND	ND	ND	ND
P402[2]	Arrowfield Seam	ND	ND	ND	ND	ND
P404[2]	Overburden	ND	ND	ND	ND	ND
P405[2]	Arrowfield Seam	ND	ND	ND	ND	ND

1 mbtoc = metres below top of casing
2 Trigger will be developed as soon as there is sufficient data (ND – no historical data)
3 To obtain trigger value add one metre to the 90th percentile depth to groundwater value

4.3 Groundwater Performance Criteria

The groundwater performance criteria for alluvial and bedrock aquifers, as well as seepage/leachate and groundwater inflows to mining pits as outlined within the GWMP is provided in **Table 9**.

Additional recommended groundwater performance criteria specific to groundwater dependent ecosystems (GDEs) are discussed within **Section 4.4**.

Table 9 Groundwater Performance Measures (Glencore, 2024)

Aspect	Performance Measures	Performance Indicator/Trigger	Response
Alluvial aquifers	Negligible change in groundwater level (compared to predicted impacts[1])	90th percentile (and not related to seasonal variability) over three consecutive months.	TARP – Groundwater Level
	Negligible change in groundwater quality	Groundwater quality concentrations outside of adopted trigger values (**Table 8**) for at least one parameter for more than three consecutive months.	TARP – Groundwater Quality
Bedrock aquifers	Negligible change in groundwater level (compared to predicted impacts[1])	90th percentile (and not related to seasonal variability) over three consecutive months. No trigger adopted for monitoring sites within the project area.	TARP – Groundwater Level
	Negligible change in groundwater quality	pH of 6.5 to 8.5 EC < 17,500 µS/cm[2]	TARP – Groundwater Quality
Groundwater inflows to mining pits	Groundwater inflows to mining pits consistent with groundwater model predictions and all take is covered by relevant licenses	Groundwater inflows to mining pits is >10% higher than predicted for three consecutive months, without logical reason (i.e. changes to mine plan or wetter than average climate conditions).	TARP – Groundwater Inflows
Seepage/ leachate	Negligible seepage/leachate from water storages	Visual inspections of water storages (as per the United Wambo Erosion and Sediment Control Plan Checklists) shows seepage zones, and reporting water balance indicates seepage is greater than negligible (i.e. >5% of inflows to water storage)	The water storage integrity will be reviewed by a specialist. Other actions as per Unforeseen Impacts Protocol (Section 9.10 of GMMP)
	All seepage/leachate from emplacement areas is captured in water management system	Visual inspections (as per the United Wambo's Erosion and Sediment Control Plan Checklists) indicates seepage areas and confirms location of drainage pathways outside of water management system	Seepage/leachate area to be investigated, including water quality, source of seepage. Works to be undertaken to determine any potential downstream impacts and to ensure seepage is ceased or diverted to water management system Other actions as Unforeseen Impacts Protocol (Section 9.10 of GMMP)
	Negligible impacts of seepage/leachate impacts from backfilled voids on regional groundwater quality	No increasing trends in water quality parameters in monitoring bores downdip of backfilled voids. An increasing trend would be indicated by three consecutive water quality readings showing continual increases in analyte concentrations.	Other actions as per Unforeseen Impacts Protocol (Section 9.10 of GMMP)
	Seepage/leachate impacts from final voids are consistent with predictions in relevant environmental impact statements for the two approved final voids (United and Wambo Open Cuts)	Measures to be development as part of United Wambo Closure Plan (at least 5 years prior to completion mining)	TBA as part of United Wambo Closure Plan

1 Predicted impacts as determined in the numerical groundwater model (AGE 2016)

2 Groundwater quality trigger levels for bedrock monitoring bores, based on 90th percentiles from baseline data, are all within Performance Indicator water quality limits. The evaluation of compliance will consider whether bedrock bores are exceeding water quality trigger levels based on 90th percentiles.

4.4 GDE Monitoring and Performance Assessment

There are two areas of identified potential groundwater dependent ecosystems (GDEs) which fall within the predicted alluvial drawdown extent of the initial groundwater modelling (AGE, 2016), referred to as GDE1 and GDE2. GDE triggers and groundwater performance criteria were proposed by Umwelt (2021) in accordance with Condition B51 of SSD 7142 and are provided as **Table 10** and **Table 11** respectively.

Groundwater level trigger values are based on the recorded 90th percentile monitoring records, allowing for a 1 m seasonal variation consistent with the GWMP. Groundwater quality triggers were similarly developed using the 90th percentile of baseline data (to 2018) for EC and 10th and 90th percentile for pH. Umwelt (2021) also proposed to incorporate a 90th percentile trigger for sulphate, to help identify any potential mining related impacts. Groundwater level and quality triggers were not able to be developed for all GDE monitoring bores due to insufficient monitoring events to form a baseline dataset, marked as TBC (**Table 10**).

Table 10 Proposed GDE Triggers (Umwelt, 2021)

Bore	Geology	Frequency	Depth of Groundwater 90th percentile (mbtoc)	EC 90th Percentile (us/cm)	pH 10th Percentile to 90th Percentile	Sulphate 90th Percentile (mg/L)
P12	Alluvium	SWL and WQ bi-monthly Full suite 6 monthly	7.7 + 1m	1,002	6.3 – 7.7	48
P15	Colluvium	SWL and WQ bi-monthly Full suite 6 monthly	7.8 + 1m	10.880	7.2 – 7.9	1,456
P16	Colluvium	SWL and WQ bi-monthly Full suite 6 monthly	8.6 + 1m	10,510	7.0 – 7.7	1,350
BH1	Tertiary alluvium	SWL and WQ bi-monthly Full suite quarterly	TBC	TBC	TBC	TBC
P401	Shallow Overburden	SWL and WQ bi-monthly Full suite quarterly	TBC	12,750	7.0	TBC
P402	Arrowfield Seam	SWL and WQ bi-monthly Full suite quarterly	TBC	11,810	7.6	TBC

Table 11 GDE Groundwater Performance Criteria (Umwelt, 2021)

Aspect	Performance Measure	Performance Indicator / Trigger	Response
Alluvial Aquifer	Negligible change in groundwater level (compared to predicted impacts)	90th percentile (and not related to seasonal variability) over three consecutive months	TARP – Groundwater Level
	Negligible change in groundwater quality	90th percentile for EC, 10th to 90th percentile for pH, 90th percentile for sulphate, For at least one parameter for more than three consecutive months	TARP – Groundwater Quality

4.5 Stygofauna Monitoring

United Wambo commits to monitoring stygofauna in the alluvial aquifers within (or near to subject to bore suitability) the predicted alluvial drawdown areas every three years (GWMP – Glencore, 2023). If groundwater monitoring indicates that impacts are greater than predicted within the shallow alluvial aquifers surrounding site, more regular monitoring for stygofauna would be triggered. Monitoring for stygofauna is undertaken at the following bores:

- Wollombi Brook Alluvium: P12, P16, P407.
- North Wambo Creek Alluvium: GW08, GW16, GW17.
- Hunter River Alluvium: P408 (once installed).
- Wambo Creek Alluvium/Permian: P116.

Stygofauna monitoring was last completed in 2022 (StygoEcologia, 2022) and is scheduled to be undertaken in 2025. It is recommended that the following replacements / additions are made for stygofauna monitoring bores considering the contemporary monitoring network.

- Wollombi Brook Alluvium: no change.
- North Wambo Creek Alluvium: ~~GW08~~ (has been replaced), GW16, ~~GW17~~ (not screened in alluvium). Update to include GW08.2, GW36b, GW23.
- Hunter River Alluvium: Update to include P408 (data collected since 2021)
- Wambo Creek Alluvium/Permian: ~~P116.~~ (has been replaced). Update to include P316a and GW37a.

Construction information and locations of the selected monitoring wells should be shared with the stygofauna monitoring consultant to confirm that the wells are appropriate for stygofauna monitoring purposes.

5.0 Monitoring Results

5.1 Data Collection Review

As outlined within the GWMP, monitoring of the bores is conducted bi-monthly (every two months) to assess groundwater levels and quality, including pH and electrical conductivity (EC). Additionally, a comprehensive water quality analysis is performed annually.

A review of the monitoring data shows that most bores were monitored as specified in the GWMP in terms of location, frequency, and analytes. Exceptions to this, and comments regarding new/ replacement bores are outlined within **Table 12**.

Table 12 Groundwater Monitoring Data Availability

Bore ID	Data availability	Comment
GW08	No data for 2024	Last data received 2022, replaced with GW08.2
GW09	No data for 2024	Last data received 2017, replaced with GW09.2
P106	2005-2024	Location replaced by GW37a – no longer monitored.
P109	2005-2024	Location replaced by GW37a – no longer monitored.
P114, P116	2005-2024	Bores recommended to be removed from network due to being screened across two aquifers Replaced with bores P316a, P316b and P316c
GW21	2010-2024	Bore consistently dry since 2011 and approved impact predictions greater than the depth of the bore – recommend removing from monitoring network and decommission.
P404	2024	Newly installed bore, single observation in Dec 2024
P405	2024	Newly installed bore, single observation in Dec 2024
P407	2024	Newly installed bore, single observation in Dec 2024
P316a, P316b, P316c	2021-2024	New monitoring bores – replacement for P114 and P116
GW37a	2023-2024	Replacement for P106
GW37b	2023-2024	Replacement for P109
GW8.2	2021-2024	Replacement for GW08
GW9.2	2021-2024	Replacement for GW09

5.2 Groundwater Trends

A summary of groundwater level data for each of the water bearing units is provided below together with a review of electrical conductivity (EC) and pH in **Table 13** to **Table 15**. Hydrographs for each bore are provided as **Appendix A.**

5.2.1 Alluvium

Table 13 summarises groundwater level and quality trends for United Wambo alluvial monitoring locations.

Table 13 2024 groundwater trends at alluvial monitoring locations

Alluvium Aquifer	Monitoring Bores	2024 Groundwater Observations and Likely Causes	Comments
Wambo Creek Alluvium	*Upstream* GW11 GW02 *Downstream* P316a, GW37a, P106, P109, P114, P116	Groundwater levels within the Wambo Creek Alluvium have continued to show correlation with periods of above and below average rainfall consistent with pervious monitoring. EC and pH observations at Wambo Creek alluvial monitoring bores have generally remained stable throughout 2024. Groundwater level, EC and pH observations at GW37a are consistent with historical observations at P106, indicating the bore is likely a suitable replacement.	P106, P109, P114 an P116 have been replaced (**Table 4)** and should be considered for removal from the monitoring network in future updates of the GWMP.
North Wambo Creek Alluvium	*Upstream* GW16, GW17 *Downstream* GW08, GW09, GW08.2, GW09.2, GW10.2	2024 groundwater level observations at North Wambo Creek alluvial monitoring locations generally responded to periods of above and below average rainfall consistent with previous years' observations. However, some muted responses to above average rainfall in April 2024 may be observed at upstream North Wambo Creek monitoring locations. pH saw a temporary increase and EC a temporary decrease as a result of the increased rainfall in early 2024, but generally remain stable. It is noted that nearby Wambo (Peabody) South Bates Extension (SBX) underground mine was operating near North Wambo Creek upstream locations. SBX LW23 was completed in late 2023 and SBX LW24 was completed in 2024. Less recovery (lower groundwater levels), and faster rates of groundwater level decline after rainfall/ recharge events compared to pre-mining observations may indicate an effect due to mining at these nearby longwalls. Groundwater responses at upstream monitoring locations should continue to be evaluated for potential mining effects.	GW08 and GW09 are no longer monitored and have been replaced with GW08.2 and GW09.2. A review of the bore logs at GW16 and GW17 (Parsons-Brinkerhoff, 2009) indicate these bores are screened within weathered rock underlying local unconsolidated material. Future updates to the GWMP should reclassify these monitoring locations.
Stony Creek Alluvium	GW12, P301, P315	A clear relationship between groundwater levels and rainfall exists at Stony Creek. Groundwater levels at P315 and P301 declined in late 2024 consistent with previous observations following an increase in levels in response to above average rainfall early in the year. EC and pH were generally stable and consistent with previous year's observations at P315 and P301 in 2024.	GW12 has not been monitored since 2021 due to persistent dry conditions and should be considered for removal from the monitoring network in future GWMP updates. P301 is most likely installed in weathered Permian strata below the Stony Creek alluvium. This bore should be reclassified as a regolith/ shallow Permian bore in future updates to the GWMP.
Wollombi Brook Alluvium	GW13, GW15, P12, P15, P16, P20, P407	Groundwater levels within Wollombi Brook alluvial bores in 2024 generally responded to periods of above and below average rainfall consistent with previous observations. Some locations west of Wollombi Brook (P15, P16) may show a combined Glen Munro pit and climate effect following pit extraction in 2017 and below average conditions in 2023. pH has remained stable whilst EC has seen site-specific variability with bores P15 and P20 increasing, GW13 and P16 decreasing and GW15 and P12 remaining stable over the year.	GW15 was developed/ purged in August 2024. Total depth was consistent with the bore log and bore appears to be functioning correctly.
Hunter River Alluvium	P408	Within the Hunter River alluvium, groundwater levels have been steadily declining since a peak in December 2022. Above average conditions from 2020 to 2022 likely drove the elevated groundwater level observations, while below average and average conditions in 2023 and 2024 may be allowing groundwater levels to return to long-term average levels. pH has remained stable and ongoing observations will allow for the evaluation of normal EC conditions at P408.	United Wambo could consider adding P328a and P329a, from the Wambo monitoring network, as Hunter River alluvial bores as part of future GWMP updates.

5.2.3 Regolith – Shallow Weathered Permian

Several monitoring wells near United Wambo and Wambo mining operations have been installed in shallow, weathered rock outside of areas of mapped alluvium, or beneath alluvium, above the depth of weathering. Table 14 summarises groundwater level and quality trends for United Wambo and Wambo regolith monitoring locations.

Table 14 2024 groundwater trends at regolith monitoring locations

Regolith Aquifer	Monitoring Bores	2024 Groundwater Observations and Likely Causes	Comments
Wambo Creek	P316b, GW37b	Groundwater elevations in the Wambo Creek regolith monitoring bores are lower than the peak elevations observed in 2021 and 2022 but continue to respond to periods of above and below average rainfall in 2024. EC observations show an inverse relationship to the rainfall trend (low rainfall related to higher EC observations) which is more pronounced at GW37b due to its closer proximity to Wambo Creek. pH observations were generally stable throughout 2024.	GW37b has been installed to target the regolith underlying the Wambo Creek alluvium. This well is intended as a replacement for P109. Observations in 2024 show a clearer EC (conductivity) signature between GW37a and GW37b, consistent with other paired alluvial-weathered monitoring locations at United Wambo, compared to P106 and P109, indicating that GW37b is likely a suitable replacement.
North Wambo Creek	*Downstream* GW10.2a	2024 observations at shallow Permian (regolith) monitoring sites downstream of the North Wambo Creek diversion similar responses to periods of above and below average rainfall as observed in the historical dataset. EC observations show somewhat of an inverse relationship to the rainfall trend (low rainfall generally related to higher EC observations), with a drop in EC in following high rainfall in April 2024. pH saw a slight increase at the start of the year but has remained stable since April.	Piezo 28 and Piezo 29 could be considered for monitoring network inclusion in future updates of the GWMP due to their location near North Wambo Creek and long monitoring record (Since 2005).

5.2.4 Permian Coal Measures (bedrock)

Table 15 summarises groundwater level and quality trends for United Wambo monitoring locations within Permian coal measures (bedrock).

Table 15 2024 Groundwater trends in bedrock (Permian coal measures)

Permian Coal Measures Aquifer	Monitoring Bores	2024 Groundwater Observations and Likely Causes	Comments
Wambo Creek Catchment	P316c, P202, P206	Groundwater elevations in 2024 at P202 and P316c followed the long-term rainfall trend, consistent with historical observations. Groundwater elevations at P206 declined by ~3m during 2024, continuing an overall declining trend that has been observed since late 2021 (~20 m total) and is not consistent with historical observations, which have previously showed a reasonable correlation with the long-term rainfall trend. Active mining is not occurring near P206; however, the decline may be related to changing storage levels in historical underground workings or other site activity. EC and pH observations in 2024 at all sites are consistent with historical observations.	Development of P206 was completed in August 2024. Additional investigation in to well integrity (using a downhole camera) should be completed in 2025.
Wollombi Brook Catchment	GW22, P401, P402	Groundwater levels at GW22 were stable in 2024 but remain elevated compared to pre-2021 observations likely due to above average rainfall from 2020 to 2022. EC and pH at GW22 have remained stabled throughout 2024. P401 and P402 are within 500 m of United Pit, which commenced mining in December 2020. Groundwater levels at P401 in 2024 show some response to the rainfall trend but are~5m lower than observations from 2020/21 which is likely a United Pit mining effect. Groundwater levels in 2024 declined by ~5m and are ~15m lower than 2021 observations. EC and pH at P401 and P402 have remained stable in 2024.	Access to P401 and P402 was noted as unsafe in 2024 due to gas leaking from P402. As these locations provide valuable information on potential United Pit impacts to the Permian (bedrock) groundwater system near Wollombi Brook, these locations should be considered for replacement or fully remote monitoring in 2025.
North Wambo Creek Catchment	GW21	Location has been dry or near-dry since 2010 and overlies historical underground mining at Wambo. Approved impacts at this location are greater than the depth of GW21 and it is therefore not considered an effective monitoring bore.	Location should be considered for removal from the monitoring network in future GWMP updates.
Waterfall Creek Catchment	P404, P405	These locations have a single observation from December 2024 and will be discussed in further detail once additional data is collected.	

5.2.5 Vibrating Wire Piezometer Data Review

VWP data has been collected at United Wambo in 2024 in accordance with GWMP requirements (Section 7.1 – Glencore, 2023). As was noted in **Section 2.2**, United Wambo VWPs are now largely connected to a telemetry system administered by Ontoto. This facilitates the remote download and processing of data and enables VWP sensor health to be diagnosed in real-time. Graphs of the United Wambo VWPs are provided in **Appendix C**.

There are 16 VWPs listed in the GWMP. The following points identify VWP sensors or whole monitoring locations that are missing or displaying potentially erroneous data. These sensors/ locations should be investigated and repaired or decommissioned (if required).

A proposed GWMP update (v7 draft) was submitted to DPHI for approval in 2024 and included some changes to the VWP network. UWJV will provide NSW DCCEEW with a discussion paper with additional supporting information shortly after the groundwater model update is completed (Q2 2025). A summary of the proposed changes to the monitoring network is included below.

- P33 and P34 – no data collected since mid-2022. Temporarily substituted with data from site VWPs (NM1, SM1). Replacement bore to be drilled in 2025.
- UG134 - Installed in 2012. Removed as part of project construction in 2020. Temporarily substituted with data from site VWPs (UG193, UG224). Permanent substitution to be considered.
- UG135 – Installed in 2012. Sensor 3 and Sensor 5 data may be unreliable in 2024 – location should be inspected in 2025.
- UG139 – no data updates since March 2023 when mined through by Wambo Underground’s South Bates Extension. No substitution or redrill proposed.
- UG166A – Installed 2010. No data collected. Temporarily substituted with data from Wambo VWPs (P320, P321, P329). Permanent substitution proposed with detail to be included in monitoring program discussion paper to NSW DCCEEW, following the groundwater model update in 2025.
- UG220 – Installed in 2012. Sensors 1,2,4,5 may be providing erroneous data.

It is also recommended that a review of the calculations used to convert VWP frequency and temperature to pore pressure and groundwater level be undertaken in 2025. Several VWPs have a longer period of monitoring than has been captured by the Ontoto telemetry system and checking for consistency between historical and newer datasets may allow for collation of both monitoring records. This could help better understand pre-mining conditions, and any groundwater level impacts caused by United Wambo mining.

5.3 Trigger Level Exceedances

The trigger level exceedances for groundwater level and groundwater quality at United Wambo in 2024 are shown in **Table 16**.

Triggers for pH and EC occur when three consecutive bi-monthly observations (a 6-month period) exceed the specified trigger level (**Table 8**).Triggers for groundwater level occur when three consecutive bi-monthly observations (a 6-month period) exceed or fall below the specified trigger level (Glencore, 2024).

Bore GW15, GW22 and P202 exceeded the maximum groundwater elevation trigger, bores GW13, GW17, GW21 and P206 exceeded the minimum groundwater elevation trigger. Bores GW17 and GW22 exceeded the maximum pH value trigger while P12 exceeded the minimum pH trigger. GW22 was the only bore to exceed the maximum EC trigger value.

Table 16 2024 Groundwater Trigger Level Exceedances

Bore (Aquifer)	Trigger Exceedance				
	Max GW Elevation	Min GW Elevation	EC	pH min	pH max
Alluvial monitoring bores					
GW02	No	No	No	No	No
GW08.2	Triggers to be established once sufficient data is collected.				
GW09.2	Triggers to be established once sufficient data is collected.				
GW11	No	No	No	No	No
GW13	No	Yes (6, Feb to Dec)	Yes (Jun '23 to Apr '24)	No	No
GW15	Yes (6, Feb to Dec)	No	No	No	No
GW16	No	No	No	No	No
GW17	No	No	No	Yes (4, Apr to Oct)	No
P12	No	No	No	Yes (6, Feb to Dec)	No
P16	No	No	No	No	No
P20	No	No	No	No	No
P106, P109, P114, P116	N/A – bores replaced and no longer monitored				
P407	Triggers to be established once sufficient data is collected.				
Offsite bedrock monitoring bores					
GW21	No	Yes (6, Feb to Dec)	N/A	N/A	N/A
GW22	Yes (6, Feb to Dec)	No	Yes (3, Jun to Oct)	No	No
P11	N/A – bore mined though, to be removed from network.				
P202	Yes (4, Apr to Oct)	No	No	No	No
P206	No	Yes (6, Feb to Dec)	No	No	No
P401, P402, P404, P405	Triggers to be established once sufficient data is collected.				

5.3.1 P12 – Wollombi Brook (East) Alluvium – Minimum pH

A minimum pH trigger exceedance at P12 has persisted since 2018, with values fluctuating between pH 6.2 and pH 6.7 during 2024, below the minimum trigger value (pH 7.3).

The following points provide a brief discussion of the exceedance at P12:

- P12 is located on the opposite (eastern) side of Wollombi Brook with respect to United Wambo operations. There are currently no operational usages of the area that are likely to influence groundwater quality near P12.
- The baseline period (2008-2018) used to define the trigger levels does not capture the lower pH observations from 2005-2008 that are similar to values observed in 2024.
- Monitoring bore P13 is similarly located on the eastern side of Wollombi Brook and has had consistently lower pH than P12 for the entire period of monitoring. There is no change to relationship between P12 and P13 in the current exceedance of the P12 trigger.
- It is unlikely the pH exceedance is related to a United Wambo mining effect. Current pH observations are likely representative of normal variation at this location.
- Trigger levels should be updated at P12 so that trigger exceedances are more likely to occur in response to observations outside of normal variation.

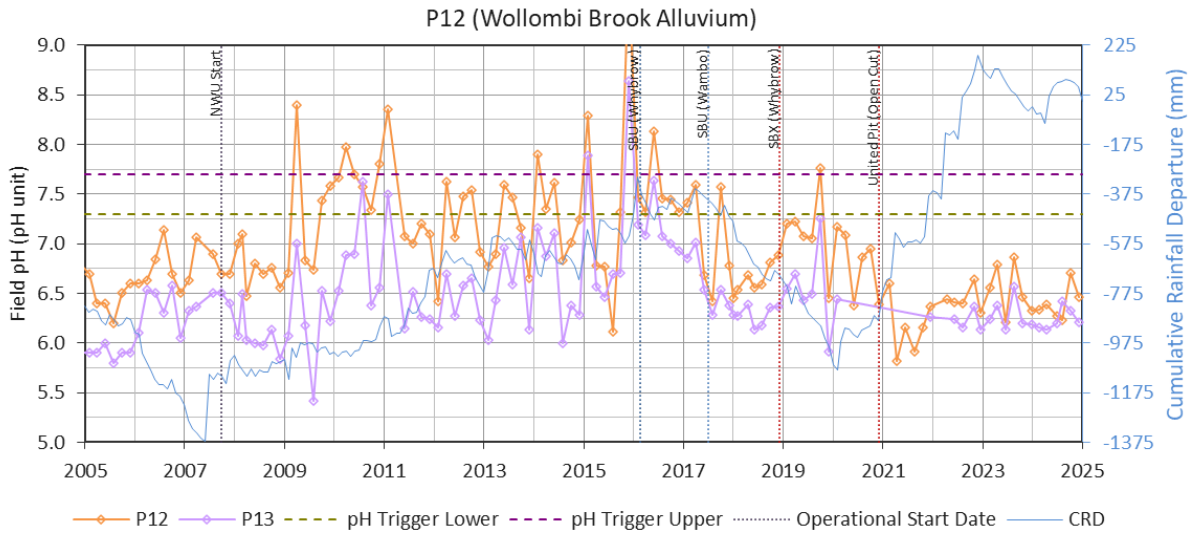


Figure 4 Groundwater pH observations at P12 and P13

5.3.2 P202 – Overburden – Maximum Water Level

Bore P202 intersects shallow Permian coal measures near the confluence of Wambo Creek and Wollombi Brook and is located approximately 1.5 km south of the United Wambo project area (**Figure 3**). The groundwater elevation was above the elevation trigger level for four observations (April-October) in 2024 (**Figure 5**).

The following points provide a brief discussion of the exceedance at P202:

- Groundwater has been somewhat elevated at this location in comparison to historical observations since the period of above average rainfall that occurred from 2020 to late 2022.
- The period where the trigger level was exceeded in 2024 occurred during above average rainfall conditions (April-July). The December 2024 observation was within the trigger bounds
- South Wambo Dam was recommissioned and recommenced use as an operational water storage in May 2024. Groundwater levels were exceeding the trigger in April 2024, prior to the use of recommissioned South Wambo Dam. Monitoring bores within United Wambo and Wambo monitoring networks between South Wambo Dam and P202 (GW39a, P316a) do not show elevated groundwater levels which could indicate potential dam leakage.
- Elevated groundwater observations at P202 are likely related to above average rainfall in 2024 and antecedent high rainfall conditions from 2020 to 2022. Groundwater recovery following Homestead-Wollemi and North Wambo underground mining may also be occurring.
- As the maximum groundwater trigger exceedance is unlikely related to United Wambo mining no further investigation is recommended.

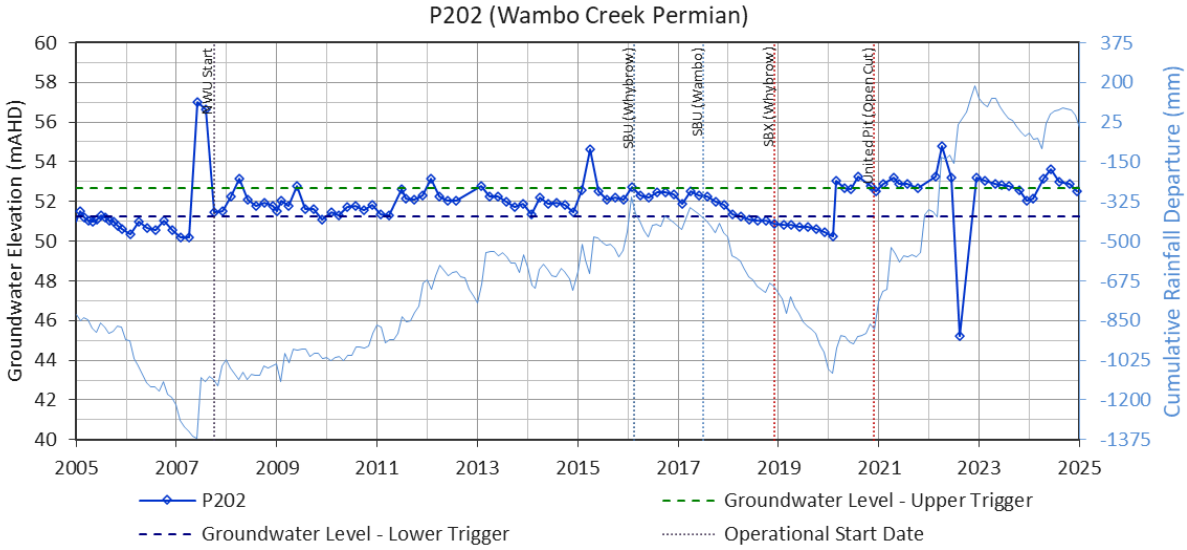


Figure 5 P202 Groundwater Elevation Hydrograph

5.3.3 P206 – Overburden – Minimum Water Level

Bore P206 intersects Permian coal measures to a depth of ~50 m near the confluence of Wambo Creek and Wollombi Brook, 750 m east of South Wambo Dam and near historical multi-seam underground mining operations (Homestead-Wollemi and North Wambo Underground). Since 2022, groundwater levels at P206 have been declining (**Figure 6**) and were below the minimum groundwater elevation trigger for all 2024 observations.

The following points provide a brief discussion of the exceedance at P206:

- The declining trend at P206 is not consistent with historical observations, which generally followed the long-term rainfall trend.
- No active mining operations are occurring near P206 in 2024. North Wambo Underground mining was completed in 2015.
- The declining trend is not observed in nearby bores screened in shallower Permian strata (P202, P316c, P316b), or Wambo Creek alluvium (P316a, GW37a).
- Results from well purging/ development in August 2024 indicated that P206 was slow to recharge and produced water that was described as black/ coaly.
- The declining groundwater trend may be related to changing water storage levels in historical underground workings or other site activity. The declining trend may also be related to the integrity of bore P206 which may have been affected by subsidence from historical mining or may have been damaged in flooding during 2022.
- It is recommended that a downhole camera investigation be completed of P206 to evaluate the integrity of its construction.

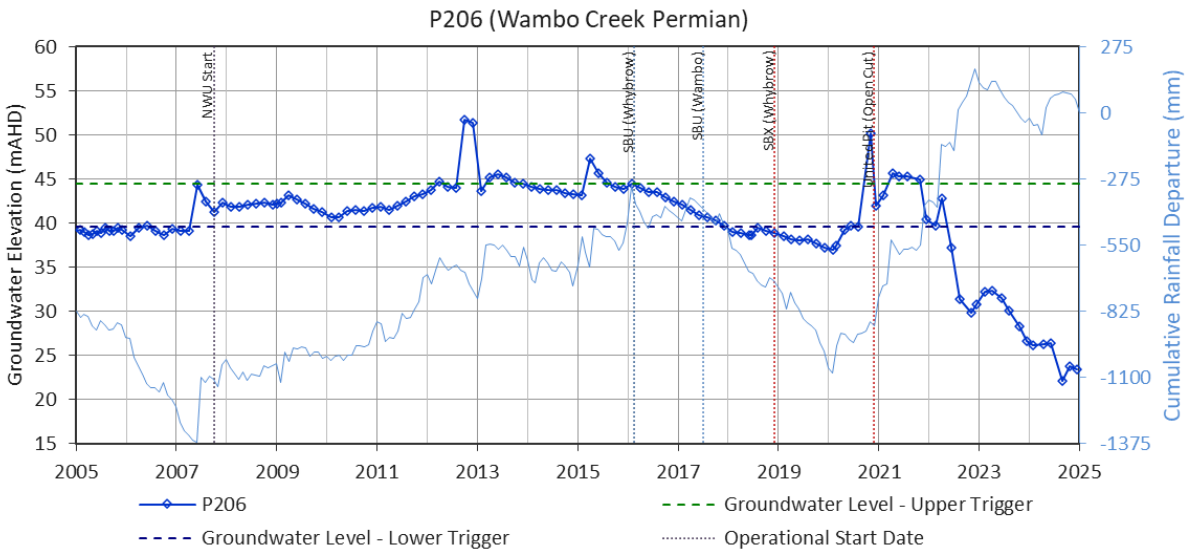


Figure 6 P206 Groundwater Elevation Hydrograph

5.3.4 GW13 – Wollombi Brook alluvium – Minimum Water Level and EC

GW13 is classified as a Wollombi Brook alluvium bore in the GWMP (Glencore,2023). This site was unable to be accessed from early 2022 to mid-2023 due to high rainfall and damage to the access track. GW13 exceeded the minimum groundwater elevation trigger in all 2024 observations (**Figure 7**) and also exceeded the EC trigger in late 2023 and early 2024 (**Figure 8**).

A review of the GW13 construction log (Parsons-Brinkerhoff, 2009) shows GW13 is screened in rock below 1.8 m of unconsolidated material and intersects a number of minor coal seams. Future versions of the GWMP should re-classify GW13 as a shallow Permian coal measures monitoring bore as groundwater results are not representative of Wollombi Brook alluvium.

GW13 is located on the east side of Wollombi Brook, about 4.5 km from site activities at United Wambo and outside the extent of predicted drawdown due to cumulative United-Wambo and Wambo open cut and underground operations (SLR, 2022). It is unlikely that groundwater level and quality trends at GW13 are related to United-Wambo operations.

Due to the age of GW13 (~15 years) and the possibility that it was flooded in high rain events in 2022, it is recommended that GW13 be purged/ developed in 2025 and also inspected using a downhole camera. Monitoring results following purging should be used in conjunction with findings from the downhole camera survey to assess whether GW13 is providing reliable groundwater information.

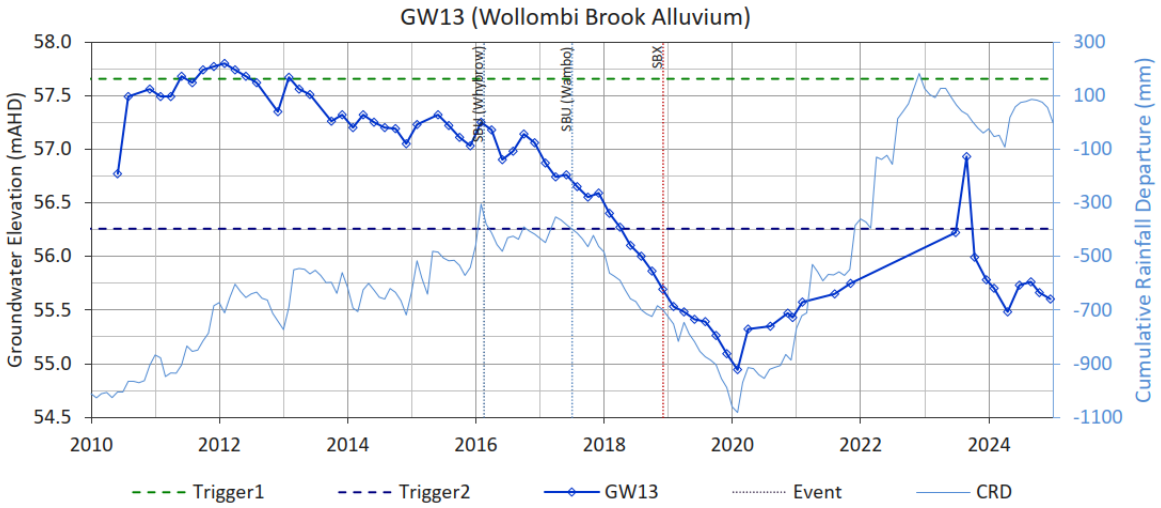


Figure 7 GW13 Groundwater Elevation Hydrograph

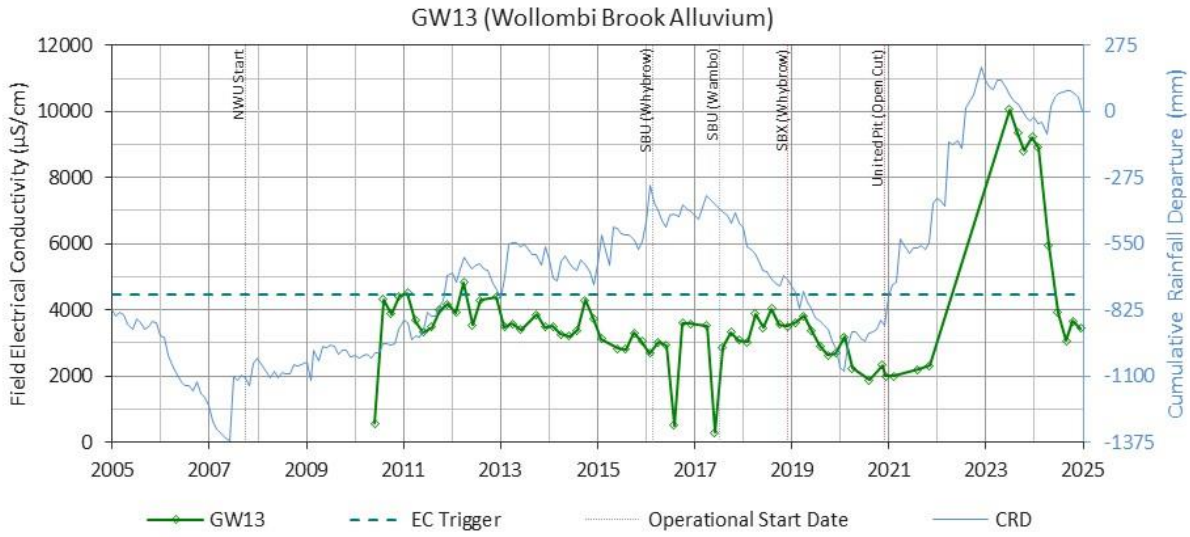


Figure 8 GW13 Groundwater EC Hydrograph

5.3.5 GW15 – Wollombi Brook (East) Alluvium – Maximum Water Level

GW15 is located 275 m east of Wollombi Brook and 1 km southeast of United Pit. Historical observations show a consistent correlation between the long-term rainfall trend and groundwater level at GW15. Groundwater levels were above the minimum depth to water (max groundwater elevation) trigger level of 52.2 mAHD for the entirety of 2024 despite a decline of ~3 m throughout 2023 due to below average rainfall (**Figure 9**).

The following points provide a brief discussion of the exceedance at GW15:

- GW15 is located on the opposite (eastern) side of Wollombi Brook with respect to United Wambo operations. There are currently no operational usages of the area near GW15.
- GW15 was re-developed/ purged in August 2024 consistent with recommendations from the 2023 Annual Review for Wambo underground (SLR, 2024a). No significant thickness of sediment was removed during purging, the measured total depth of GW15 is consistent with its bore log (Parsons-Brinkerhoff, 2009), and depth to water observations in the monitoring rounds before, during, and after purging are also consistent. This indicates the GW15 has not been silted up by flooding in 2022 and is likely functioning normally.
- There is no evidence to suggest that groundwater observations above the maximum elevation trigger level in 2024 are related to United Wambo operations. It is most likely that ongoing elevated groundwater levels are associated with the period of above average rainfall that occurred from 2020 to 2022. No further investigation is recommended.

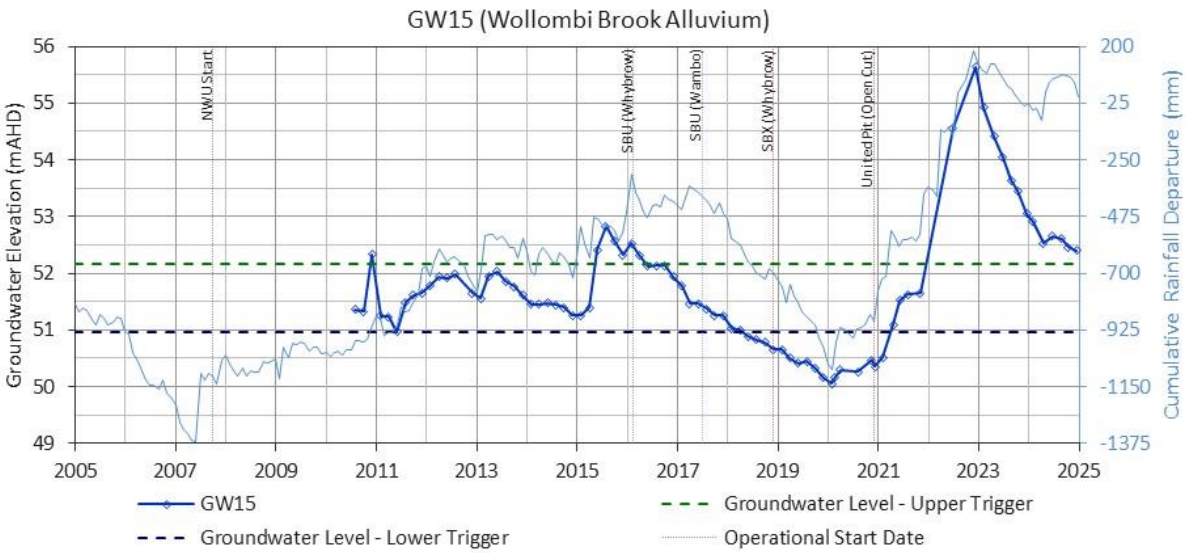


Figure 9 GW15 Groundwater Elevation Hydrograph

5.3.6 GW17 – North Wambo Creek Alluvium – Maximum pH

GW17 is classified as a North Wambo Creek alluvium bore in the GWMP (Glencore,2023). Four consecutive observations of pH 7.3 were recorded from April to October 2024 which are above the upper trigger level of pH 7.2. pH at the end of 2024 had decreased to pH 7.2, no longer exceeding the trigger.

The following points provide a brief discussion of the exceedance at GW17:

- pH 7.3 is near-neutral and within the limits of historical observations (pH 6.9-7.6).
- GW16 is located close to GW17 and has consistently had higher pH comparted to GW17 for the entire period of monitoring. There is no change to relationship between pH at GW17 and GW16 in the 2024 exceedance of the GW17 trigger.
- There are currently no operational usages of the area near GW17 that are likely to influence groundwater quality.

No further investigation into the trigger exceedance is recommended and an update to the trigger level could be considered as part of future GWMP updates.

It is noted from a review of the construction log (Parsons-Brinkerhoff, 2009) that GW17 is screened in rock below ~1 m of unconsolidated material. Future updates of the GWMP should reclassify GW17 as observed groundwater conditions will not be representative of North Wambo Creek Alluvium.

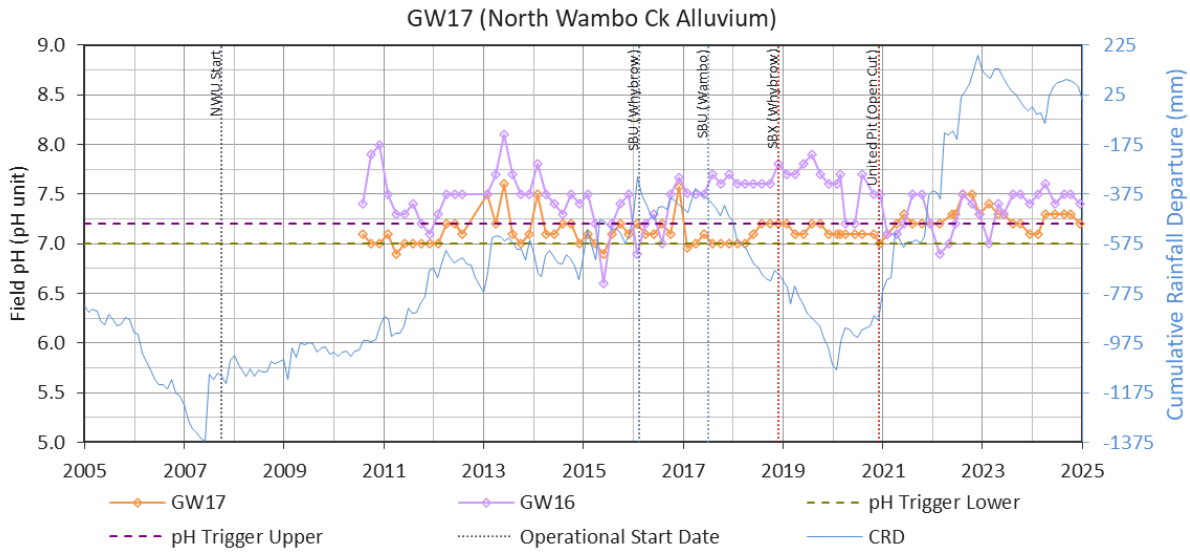


Figure 10 GW17 pH Hydrograph

5.3.7 GW21 – Overburden – Minimum Water Level

GW21 is installed in Permian aged coal measures to a depth of 36 mbgl. Since monitoring commenced in October 2010:

- two sampling events (Oct 2010 and Aug 2011) have contained sufficient water to sample field groundwater quality parameters:
- 16 events have measured a depth to water above the base of the GW21 but with insufficient volume to collect a sample: and
- 54 observations have been dry.

GW21 has been dry in all observations since February 2019 and has therefore exceeded the groundwater elevation trigger level for all observations in 2024.

The following points provide a brief discussion of the exceedance at GW21:

- No pre-mining groundwater level observations exist for GW21.
- Groundwater levels within the Permian coal measures at GW21 were likely impacted by longwall extraction within North Wambo Underground mine (from 2007) prior to well installation (Oct 2009) and may have been subsequently impacted by Whybrow (from 2016) and Wambo (from 2017) seam extraction as part of South Bates Underground mining operations.
- As nearby mining commenced near GW21 prior to well installation it is difficult to evaluate the magnitude of any mining related drawdown. However, predictions from recent numerical modelling (SLR, 2022) indicate >10 m cumulative drawdown at the water-table near GW21 associated with approved United Wambo open cut and Wambo underground mining.

Due to persistent dry conditions and a lack of pre-mining data, GW21 is not an effective monitoring location within the Permian coal measures near historical and approved future underground mining at Wambo. As mining related drawdown is predicted as part of approved mining operations, no further investigation into this trigger exceedance is recommended.

GW21 could be considered for decommissioning and removal from the network as part of future site works and updates to the GWMP.

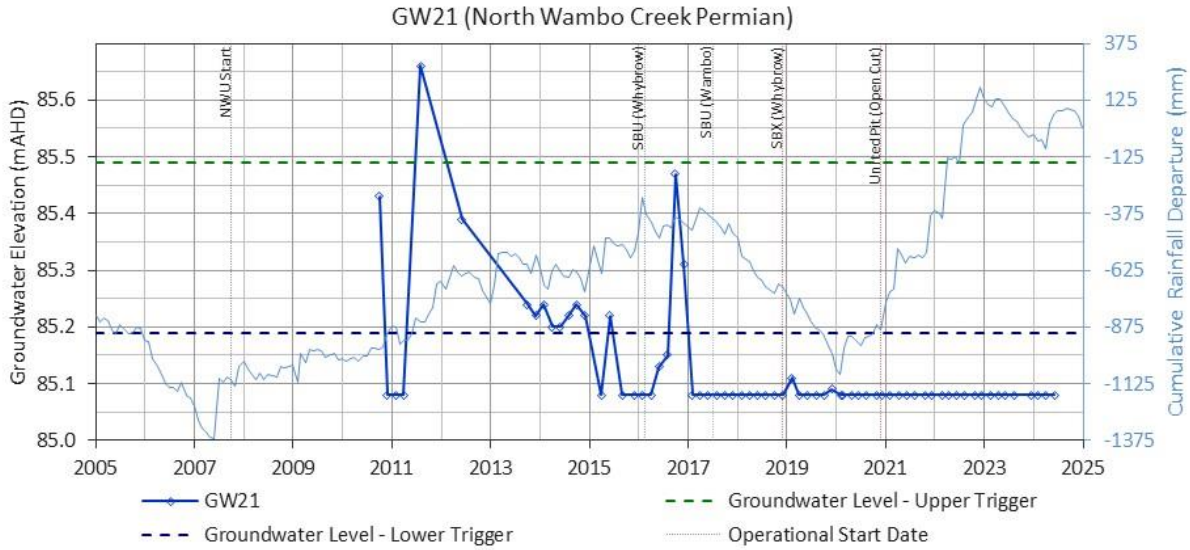


Figure 11 GW21 Groundwater Elevation Hydrograph

5.3.8 GW22 – Overburden – Maximum Water Level and EC

GW22 is located ~5 km south of United Wambo open cut operations and 1 km southwest of Wollombi Brook (**Figure 3**). Groundwater levels at GW22 increased by 2.5 m from 2021 to 2023 and have remained elevated compared to 2011-2019 observations, with stable to slightly declining groundwater levels in 2023 and 2024. All 2024 groundwater level observations at GW22 exceed the maximum groundwater elevation trigger.

The following points provide a brief discussion of the groundwater elevation exceedance at GW22:

- Groundwater elevation trends at GW21 continue to follow the long-term rainfall trend, with the 2020-2022 period being the longest period of above average rainfall in the monitoring record.
- There are no United-Wambo operational activities near GW22, and none that are likely to influence groundwater elevation.
- Groundwater elevations exceeding the trigger level at GW22 are most likely caused by normal responses to a period of above average rainfall. Future updates to the GWMP should consider revising the baseline period for groundwater level triggers to include all observation data (2010-2024).

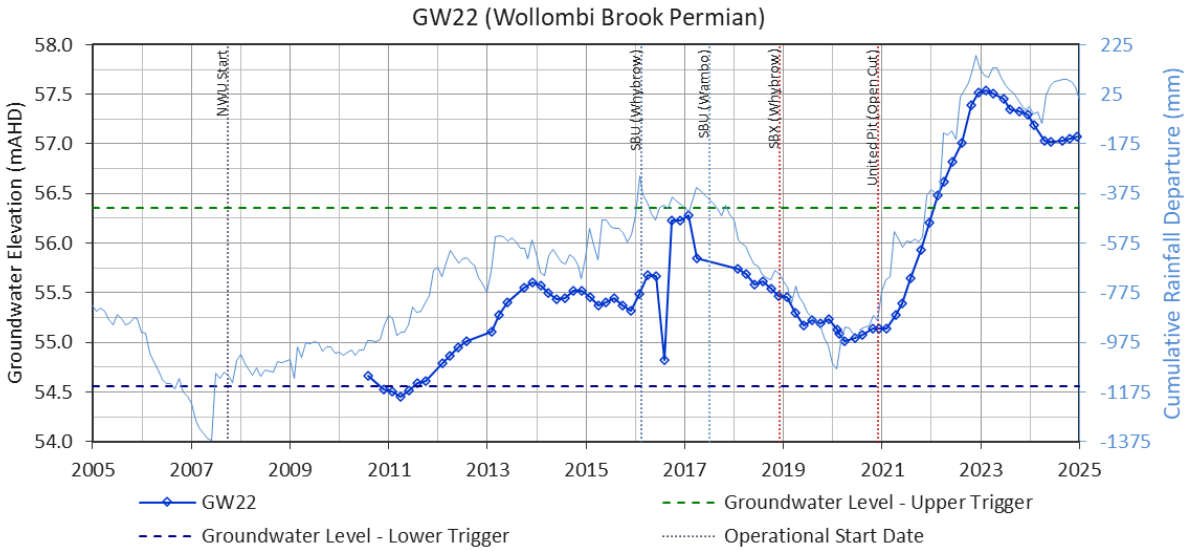


Figure 12 GW22 Groundwater Elevation Hydrograph

EC observations at GW22 have shown a gradual increase from ~6,500 µS/cm in 2011 to ~7,000 µS/cm in more recent observations. EC was observed above the trigger level (7,028 µS/cm) in three consecutive observations from June to October 2024 which is an exceedance of this trigger level.

The following points provide a brief discussion of the groundwater EC exceedance at GW22:

- There are no United-Wambo operational activities near GW22, and none that are likely to influence groundwater EC. It is not likely that the gradual increase in EC and trigger exceedance is related to United Wambo activity.
- The increase in EC could be part of natural long-term variation or may indicate the well is not being adequately purged during sampling events.

- GW22 could be developed/ purged in 2025 to confirm that EC observations are representative of aquifer conditions and not related to the sampling of stagnant water in the well.
- Future updates to the GWMP should consider revising the baseline period for groundwater quality triggers to include all observation data (2010-2024).

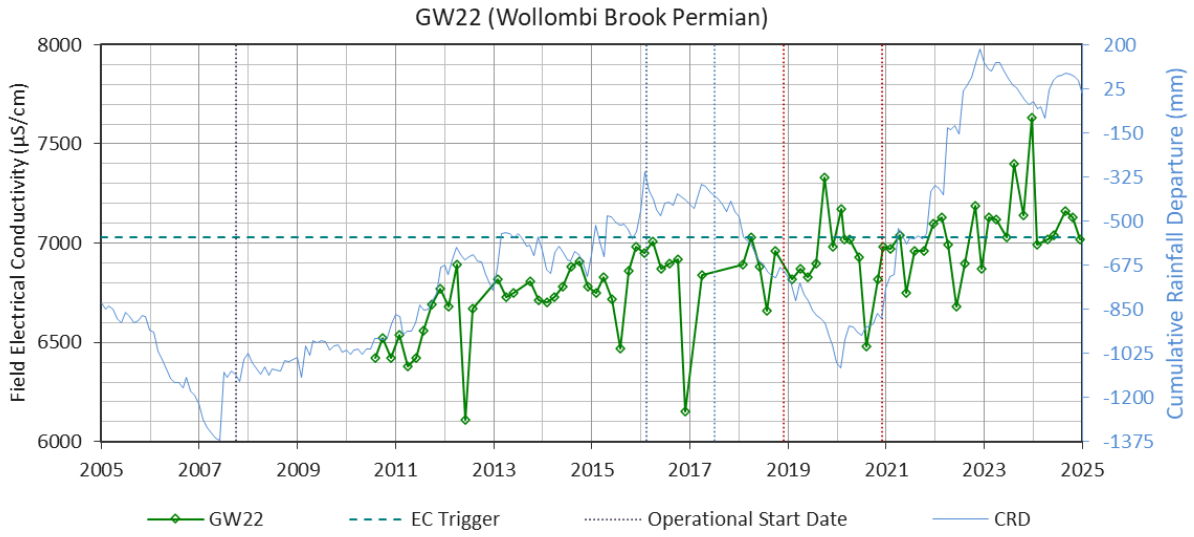


Figure 13 GW22 EC Hydrograph

5.4 GDE Monitoring and Compliance

2024 groundwater monitoring results at United Wambo have been evaluated against the GDE performance criteria and trigger levels proposed by Umwelt (2021), see **Section 4.4.** Table 17 provides an overall assessment against GDE Performance Indicators, while Table 18 provides detail against individual trigger levels.

Table 17 2024 GDE Performance Assessment

Aspect	Performance Measure	Performance Indicator / Trigger	Compliance
Alluvial Aquifer	Negligible change in groundwater level (compared to predicted impacts)	All groundwater elevations remain within proposed triggers	**Compliant**
	Negligible change in groundwater quality	All water quality parameters remain within proposed trigger values	**Compliant**

P401 and P402 are new bores near the mapped GDEs on Wollombi Brook. However, their construction to depths of 40 m and 120 m do not target groundwater systems that are likely to provide water to groundwater dependent vegetation. Shallower bores near to P401 and P402 that target unconsolidated/ surficial strata may provide complementary data that would help with the assessment of potential impacts to GDEs.

Table 18 Proposed GDE Triggers (Umwelt, 2021) and assessment of compliance.

Bore	Geology	Frequency		Depth of Groundwater 90th percentile (mbtoc)		EC 90th Percentile (us/cm)		pH 10th Percentile to 90th Percentile		Sulfate 90th Percentile (mg/L)	
		Criteria	Compliant	Criteria	Compliant	Criteria	Compliant	Criteria	Compliant	Criteria	Compliant
P12	Alluvium	SWL + WQ bi-monthly	Y	7.7 + 1m	Y – max DTW 7.48 m	1,002	Y – max EC 196.5 µS/cm	6.3 – 7.7	Y – no consecutive obs <6.3	48	Y – max 18 mg/L
P15	Colluvium	Full suite 6 monthly	Y	7.8 + 1m	Y – max DTW 8.14 m	10.880	Y – max EC 7,860 µS/cm	7.2 – 7.9	Y – no consecutive obs <7.2	1,456	Y – max 1,110 mg/L
P16	Colluvium		Y	8.6 + 1m	Y – max DTW 8.8 m	10,510	Y – max EC 3,280 µS/cm	7.0 – 7.7	Y – no consecutive obs <7.0	1,350	Y – max 133 mg/L
BH1	Tertiary alluvium		Dry	TBC	Dry	TBC	Dry	TBC	Dry	TBC	Dry
P401	Shallow Overburden		Y	TBC	N/A – max DTW 29.83m	12,750	Y – max EC 9,190 µS/cm	7.0	N/A – assessed once upper and lower bounds are developed.	TBC	N/A – assessed once upper and lower bounds are developed.
P402	Arrowfield Seam		Y	TBC	N/A – max DTW 89.2 m	11,810	Y – max EC 9,720 µS/cm	7.6		TBC	

6.0 Model Verification

The most recent rebuild and recalibration of the Wambo Complex numerical groundwater model (including United Wambo Open Cut and Wambo Underground mining) was undertaken for Wambo as part of a Groundwater Assessment in support of the South Bates Extension LW24-26 Modification (Mod19) (SLR, 2022). This model is calibrated to observed groundwater levels to the end of December 2020 and underwent peer review (Appendix E of SLR, 2022 – HydroAlgorithmics, 2022) as part of the approvals process for MOD19. The peer review (HydroAlgorithmics, 2022) found the model to be *fit for purpose* where the model's purpose was defined by the objectives stated in SLR (2022):

- *"assess the groundwater inflow to the mine workings as a function of mine position and timing;*
- *simulate and predict the extent of dewatering due to the Project and the level and rate of drawdown at specific locations;*
- *identify areas of potential risk, where groundwater impact mitigation/control measures may be necessary;*
- *estimate direct and indirect water take; and*
- *estimate post-mining recovery conditions."*

Detailed discussion of the revised model's performance (ability to represent groundwater level observations) is included in the Groundwater Modelling Technical Report (Appendix D of SLR, 2022) completed for the MOD19 Groundwater Assessment.

Hydrographs presenting the modelled groundwater levels versus observed groundwater levels to the end of 2024 at Wambo monitoring sites are presented in **Appendix B**.

6.1 Numerical Model Updates

It was identified in 2023 that there are differences between simulated and actual/planned mining progression in the United Wambo Open Cut (UWOC). The SLR (2022) numerical model simulates the extent and depth of UWOC open cut progression as digitised in the AGE (2016) United Wambo Joint Venture EIS Groundwater Assessment, while actual recent and planned future forecast open cut progression will target a slightly smaller footprint with different timing to that indicated in AGE (2016).

Detailed pit progression files have been provided by UWOC and the following key differences are summarised in **Table 19.**

Table 19 Open Cut Mining Updates

Mine Area	Approved Mining - AGE (2016)	Actual/ Proposed Mining
Montrose Pit	Mining to Warkworth Seam across entire Montrose Pit footprint. This mining commenced at the start of the UWOC Project (2021)	Current mining to Whynot Seam (to the end of 2023) which is ~200m shallower than the Warkworth Seam. Future mining to Bowfield Seam ~15m shallower than Warkworth Seam, focussing on the north-eastern area of the Montrose pit. Much of the current Montrose pit footprint will not be deepened.
United Pit	Mining to Vaux Seam across entire footprint	Future mining to target Vaux Seam in central area of United Pit. Proposed footprint does not extend as far west as previously modelled footprint.

Use of the approved mine plan (as per AGE, 2016) in the SLR (2022) groundwater assessment for Longwalls 24-26 was suitable for providing a conservative prediction of cumulative groundwater impacts due to approved underground and open cut mining at the Wambo Complex (Wambo Underground and United Wambo Open Cut). However, updating the model to include a more accurate representation of mining will help calibrate future models to actual stresses on the groundwater system, and will likely provide more representative values of groundwater interception for the ongoing assessment of compliance with water licences.

The updated open cut progression replaced the approved mine plan (AGE, 2016) in the numerical groundwater model with no other changes. Key outcomes from this updated modelling are provided in the points below:

- Transient calibration statistics are consistent between the SLR (2022), and updated model runs, with no change to the scaled root mean square error (6.0%), which is within the acceptable limits (i.e. 10%) recommended by the Australian groundwater modelling guidelines (Barnett et al., 2012).
- Due to the consistency in calibration statistics, and minor updates to the UWOC progression during the calibration period, groundwater level outputs from the SLR (2022) model will continue to be used for comparison with observation data (see Appendix D of SLR, 2022).
- The assessment of licence compliance for underground and open cut workings (**Section 7.0)** will be informed by the updated model.

6.2 Modelling Considerations

A key consideration for assessing modelled and observed groundwater levels during 2024 is that the transient historical period for the SLR (2022) and updated (**Section 6.1**) groundwater modelling ended in December 2020. This means that above average rainfall conditions experienced in 2021 and 2022, the below average rainfall in 2023, and average conditions in 2024, will not be included and responses in predicted groundwater levels to recent climatic conditions are not expected.

The UWOC GWMP (Glencore, 2023 – Section 9.9) commits to an independent review of the groundwater model every three years to determine the validity of the groundwater model predictions and will include a comparison of monitoring results with modelled predictions. If the data indicates significant divergence from the model predictions, an updated groundwater model will be constructed for simulating future mining.

This review is currently being undertaken and will be scheduled for completion in 2025. Updates of the model will include recent climatic conditions, contemporary groundwater level and flow observations, and updated mine progression (where relevant), to enable further assessment of model performance.

7.0 Groundwater Licencing

Table 20 shows the predicted annual groundwater volumes required to be licensed for open cut and underground mining at United Wambo, for both alluvial and porous/fractured rock groundwater sources. These values are from for the groundwater model updated to incorporate as-mined and proposed future United Wambo mining (see **Section 6.0**).

The component of flow between alluvium and underlying rock to be considered for alluvial groundwater licensing is an increased leakage from alluvium to Permian induced by United Wambo operations. Reduction in groundwater flow from Permian strata to alluvium has not been considered a component of alluvial licensing, as this reduction in Permian flow is considered licensable take from the North Coast Fractured and Porous Rock Groundwater Sources and is accounted for in predicted groundwater inflow to United Wambo mining operations.

Table 20 Complex Groundwater licensing summary

Water Sharing Plan	Management Zone/ Groundwater Source	Licensed Entitlement (ML/ year)	Predicted annual groundwater inflow volumes requiring Licensing (ML/year)
Hunter Unregulated and Alluvial Water Sources Water Sharing Plan 2009	**Lower Wollombi Brook Water Source**	736.9[1]	Av. 135 Max. 209 2024. 0[3]
	Jerrys Water Source	-	0
North Coast Fractured and Porous Rock Groundwater Sources ^^	**Porous Rock**	1,947[2]	Av. 714 Max. 1,110 2024. 636

^^ Porous Rock is the Sydney Basin - North Coast Groundwater Source, as defined in the *WSP for the North Coast Fractured and Porous Rock Groundwater Sources*, released 1 July 2016.

[1]Licence No. WAL23897, WAL18437, WAL18455, WAL18549.

[2]Licence No. WAL42373, WAL41532, WAL41510.

[3]It is noted that predicted take from the Lower Wollombi Brook Water Source in the updated model does not exceed 70 ML (provided in WAL23897) until after 2028.

7.1 Open Cut Inflows

Following Modification 16 (determined 28 August 2019) operations at Wambo underground mine include underground mining and coal processing and handling activities. Open cut mining activities have been managed by the United Wambo Open Cut Project since 1 December 2020.

Inflows to United Wambo Open Cut pits are currently based on predictions from the groundwater model updated to incorporate as-mined and proposed future UWOC mining (SLR,2024 - see **Section 6.1**). This modelling predicted up to 337 ML/year inflow into the UWOC pits for 2024.

8.0 Compliance with Groundwater Performance Criteria

The 2024 groundwater monitoring at United Wambo has been evaluated against the performance criteria defined within the GWMP (Section 7.3 - Glencore, 2023), shown in **Table 21**.

The evaluation of compliance with performance criteria considers monitoring locations where trigger levels have been exceeded. A location where a trigger level has been exceeded but the cause is unlikely to be related to United Wambo will not result in a non-compliance.

Table 21 Groundwater Performance Measure Compliance

Aspect	Performance Indicator/ Trigger	2024 Performance Indicator Observations	Overall Compliance
Alluvial aquifers	Negligible change in groundwater level (compared to predicted impacts[1])	Exceedances of the upper groundwater elevation (minimum depth to groundwater) trigger level at GW15, is most likely related to antecedent above average rainfall conditions from 2020 to early 2023 and not a United Wambo mining effect. See **Sections 5.3.5.** Exceedances of the lower groundwater elevation (maximum depth to groundwater) trigger levels at GW13 are not likely to be related to United Wambo mining impacts. See **Sections 5.3.4**. It is recommended that GW13 is re-developed/ purged or inspected with a downhole camera in 2025 to confirm that groundwater observations are representative of adjacent aquifer conditions and that the well is functioning correctly. Future updates to the GWMP should reclassify GW13 as a bedrock monitoring well consistent with the construction log (Parsons-Brinkerhoff, 2009).	**Compliant**
	Negligible change in groundwater quality	Exceedance of the minimum pH trigger level at P12 is not likely to be related to a United Wambo mining impact and most likely representative of normal variation at this location. See **Section 5.3.1**. Exceedance of the maximum pH at GW17 is likely related to normal variation at this location and no indicative of United Wambo mining effect. **Section 5.3.6**. Due to the distance from United Wambo operations, the EC trigger exceedance in 2024 at GW13 is not likely related to a United Wambo mining effect. See **Section 5.3.4.** As a United Wambo mining effect was not identified for wells with water quality trigger exceedances, future GWMP updates could consider revising the baseline period for the water quality triggers at these locations to include all observations. This may help limit the instances when trigger levels are exceeded due to natural variation. Future updates to the GWMP should reclassify GW13 and GW17 as a bedrock monitoring wells consistent with their construction log (Parsons-Brinkerhoff, 2009).	**Compliant**
Bedrock aquifers	Negligible change in groundwater level (compared to predicted impacts[1])	Exceedances of the upper groundwater elevation (minimum depth to groundwater) trigger levels at P202 and GW22 are most likely related to antecedent above average rainfall conditions from 2020 to early 2023 and not a United Wambo mining effect. See **Sections 5.3.2**, and **5.3.8**. Exceedances of the lower groundwater elevation (maximum depth to groundwater) trigger levels at GW13, P206, and GW21 are not likely to be related to United Wambo mining impacts in 2024. See **Sections 5.3.4, 5.3.3, 5.3.7**. It is recommended that GW22, and P206 are re-developed or inspected with a downhole camera in 2025 to confirm that groundwater observations are representative of adjacent aquifer conditions and that the wells are functioning correctly. It is recommended that GW21 be decommissioned and removed from the monitoring network as it is not providing meaningful groundwater information.	**Compliant**
	Negligible change in groundwater quality	Due to the distance from United Wambo operations, the EC trigger exceedance in 2024 at GW22 is not likely related to a United Wambo mining effect. See **Section 5.3.4.** As a United Wambo mining effect was not identified for the GW22 water quality trigger exceedance, future GWMP updates could consider revising the baseline period for the water quality trigger at GW22 to include all observations. This may help limit the instances when trigger levels are exceeded due to natural variation.	**Compliant**
Groundwater inflows to mining pits	Groundwater inflows to mining pits consistent with groundwater model predictions and all take is covered by relevant licenses	The groundwater model (SLR, 2024) estimates that groundwater inflows to Wambo Complex mine workings for 2024 was 636 ML from the North Coast Fractured and Porous Rock Groundwater Source. The site water balance model simulated: • 2.1 GL rainfall and runoff reporting to water storages.	**Compliant**

Aspect	Performance Indicator/ Trigger	2024 Performance Indicator Observations	Overall Compliance
		• 0.5 GL evaporated from water storages. • Groundwater inflows 0.3 GL (input from groundwater model) • During 2024, the site transferred water volumes from the pit voids to water storages: • 0.7 GL from Montrose Pit to mine water storages • 0.7 GL from United Pit to mine water storages The end of year pit void storages were 0 ML in Untied Pit and 27 ML inn Montrose Pit. From an overall water balance perspective, pit dewatering trends did not flag that groundwater inflows were outside of the expected range from model predictions. Bi-monthly review of water quality results in voids and operational storages do not indicate large freshwater volumes entering the pit from alluvial aquifers. Water quality results indicate pit water is made up of groundwater inflows from Permian groundwater sources and rainwater runoff affected by overburden and coal measures.	
Seepage/ leachate	Negligible seepage/leachate from water storages	Mine water storages are inspected monthly. No seepage from mine waters storages was identified in the reporting year. Surveyed volume trends do not indicate unexpected losses.	**Compliant**
	All seepage/leachate from emplacement areas is captured in water management system	General seepage from overburden emplacements across the mining footprint is inspected monthly. Seepage monitored during the reporting period was minor in nature and captured within the mine water system. No downstream impacts from seepage or leachate were identified	**Compliant**
	Negligible impacts of seepage/leachate from backfilled voids on regional groundwater quality	United Wambo monitoring wells do not show water quality changes that indicate an effect from seepage/ leachate from backfilled voids in 2024.	**Compliant**
	Seepage/leachate impacts from final voids are consistent with predictions in relevant environmental impact statements for the two approved final voids (United and Wambo Open Cuts)	Measures to be developed as part of United Wambo Closure Plan (at least 5 years prior to completion mining)	Not applicable to the reporting period. The final voids are not yet mined.

9.0 Summary

A summary of key findings from the review and analysis of United Wambo groundwater data collected during 2024 is presented below:

- 2024 saw overall average rainfall conditions at United Wambo which included a period of above average rainfall from April-June followed by below average conditions from October-December. This resulted in recharge (increasing groundwater levels) across shallow groundwater systems in early 2024 before declines are observed to the end of 2024 (**Section 3.1** and **Section 5.2**).
- Groundwater data has been collected from the United Wambo monitoring network in 2024 consistent with the requirements of the GWMP (Section 8 - Glencore, 2023) and is suitable for the purposes of this annual review.
- United Pit mining is currently occurring near Wollombi Brook and nearby mapped GDEs. Groundwater responses at nearby monitoring locations should be the focus for ongoing evaluation of potential mining effects.
- Eight monitoring locations exceeded groundwater level or quality triggers in 2024. None of these exceedances were clearly attributable to a mining or operational effect from United Wambo. Trigger level updates, monitoring well inspections and maintenance, and geology reclassifications were recommended as part this report's trigger exceedance evaluations (**Sections 5.3** and **10.0**)
- Groundwater model performance (calibration statistics), for the model version updated in early 2024 to incorporate as-mined and proposed future UWOC mining (see **Section 6.1**) is consistent with the SLR (2022c) modelling for the Wambo underground Modification 19 groundwater assessment which was assessed to be fit-for-purpose by the peer reviewer.
- The United Wambo GWMP (Glencore, 2023 – Section 9.9) commits to periodic recalibration and independent peer review of the groundwater model every three years. This is scheduled for completion in 2025. Future updates of the model will include recent climatic conditions, contemporary groundwater level and flow observations, and updated mine progression (where relevant), to enable further assessment of model performance.
- Predicted inflow volumes for United Wambo open cut mine areas are 337 ML for 2024, (**Section 7.1**).
- Predictions of take from alluvial and porous/ fractured rock water sources are within the limits of applicable licences (**Section 7.0**).

10.0 Recommendations

Following the 2024 annual review of groundwater data, the following recommendations have been made:

- Alternate monitoring locations or fully remote monitoring could be considered for P401 and P402 as they collect valuable data between United Pit and Wollombi Brook.
- The construction to depths of P401 and P402 do not target groundwater systems that are likely to provide water to groundwater dependent vegetation. Shallower bores near to P401 and P402 that target unconsolidated/ surficial strata could be considered to complement data collected at/ near P401 and P402 that would help with the assessment of potential impacts to GDEs.
- It is recommended that GW13, GW22, and P206 are re-developed or inspected with a downhole camera in 2025 to confirm that groundwater observations are representative of adjacent aquifer conditions and that the wells are functioning correctly.
- It is recommended that GW21 be decommissioned and removed from the monitoring network as it is not providing meaningful groundwater information.
- As a United Wambo mining effect was not identified for wells with water quality trigger exceedances, future GWMP updates could consider revising the baseline period for the water quality triggers at these locations to include all observations. This may help limit the instances when trigger levels are exceeded due to natural variation.
- Future updates to the GWMP should reclassify P301, GW13 and GW17 as a bedrock monitoring wells consistent with their construction logs.
- Future updates to the GWMP should include the Umwelt (2021) recommended GDE compliance triggers. Trigger levels at other operationally relevant or replacement monitoring locations (GW08.2, GW09.2, GW37a etc.) could also be established.
- Future updates to the GWMP should consider revising the performance indicator for bedrock aquifer groundwater quality to relate to site specific water quality information.
- VWP locations or sensors where potentially erroneous data is identified should be inspected and repaired where possible.
- It is also recommended that a review of the calculations used to convert VWP frequency and temperature to pore pressure and groundwater level be undertaken in 2025. This could help collate historical and current datasets at locations with longer monitoring records to help better understand pre-mining conditions, and any groundwater level impacts caused by United Wambo mining.

11.0 References

Australasian Groundwater and Environmental Consultants (2016). *Groundwater Impact Assessment. Report on United Wambo Open-Cut Coal Mine Project.* Prepared for Umwelt Australia Pty Ltd in July 2016.

Glencore (2023). *United Wambo Joint Venture Groundwater Management Plan.* Document No. UWOC-1689771511-370. prepared by Glencore in September 2022.

HydroAlgorithmics (2022) *Wambo Longwalls 24-26 Modification – Groundwater Peer Review* Report HA2022/11a for Wambo Coal Pty Ltd. 30 July 2022.

Parsons-Brinkerhoff (2009) *Piezometer Installation for Groundwater Monitoring, Wambo Coal Mine.* Report PR_9422 Piezo installation, December 2009.

SLR (2022) *Wambo Coal Mine Longwalls 24-26 Modification, Groundwater Modelling Technical Report,* prepared for Wambo Coal Pty Ltd, July 2022.

SLR (2024) *United Wambo Joint Venture – Annual Review 2023: Numerical groundwater modelling reporting*. Report 665.30030.00402v1.0, March 2024.

StygoEcologia (2022) United Wambo Open Cut Coal Mine Project Stygofauna Assessment 4, September 2022.

Umwelt (2021) *United Wambo Groundwater Dependent Ecosystem Study*. Report 21033/R01, January 2021.

Umwelt (2022) *United Wambo Annual Groundwater Review*. Report 21033/R07, March 2024.

Appendix A Groundwater Level and Quality Hydrographs

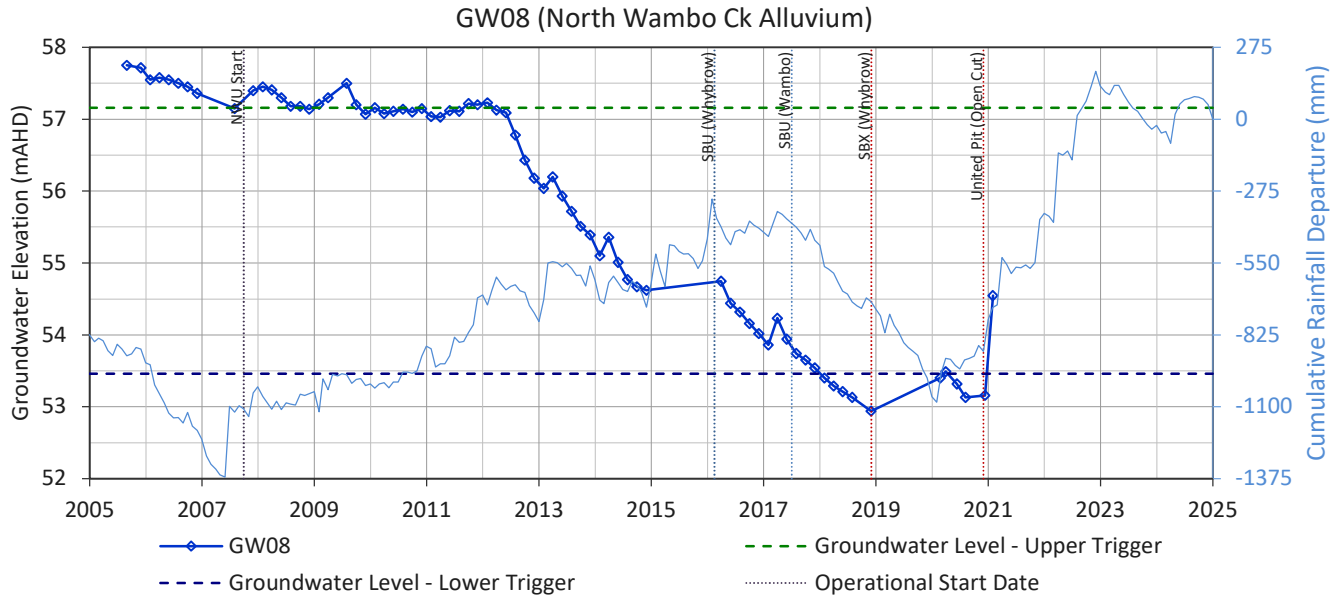
2024 Annual Review - Groundwater

United Wambo

United Wambo Joint Venture

SLR Project No.: 660.v30030.00404

28 March 2025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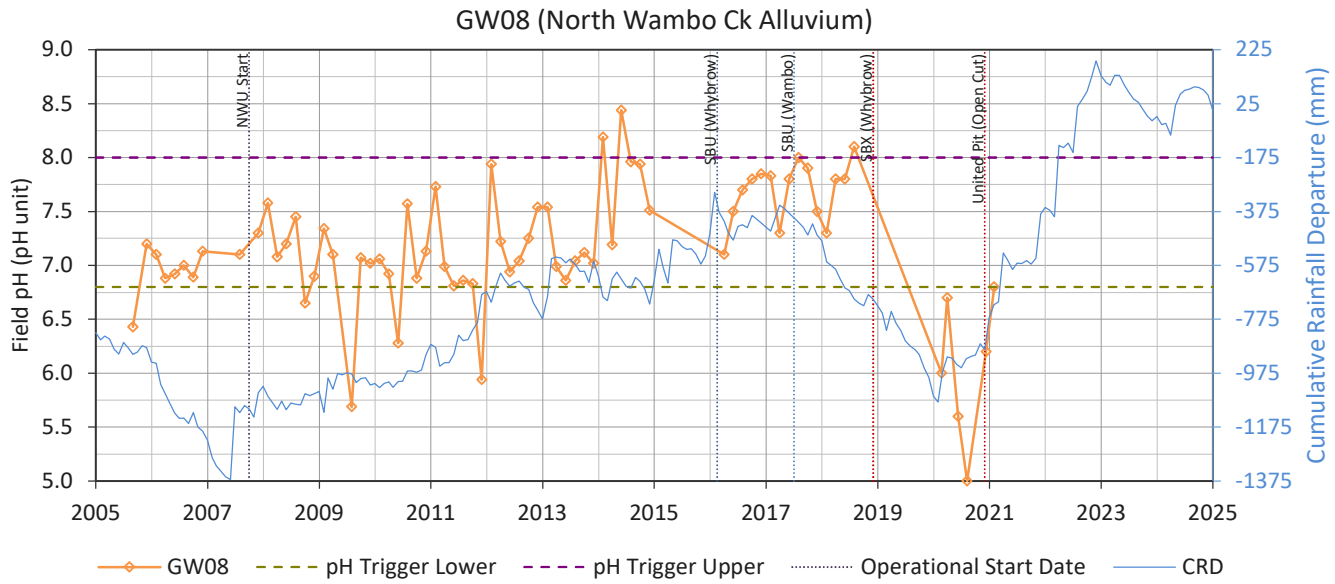
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW08
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date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Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
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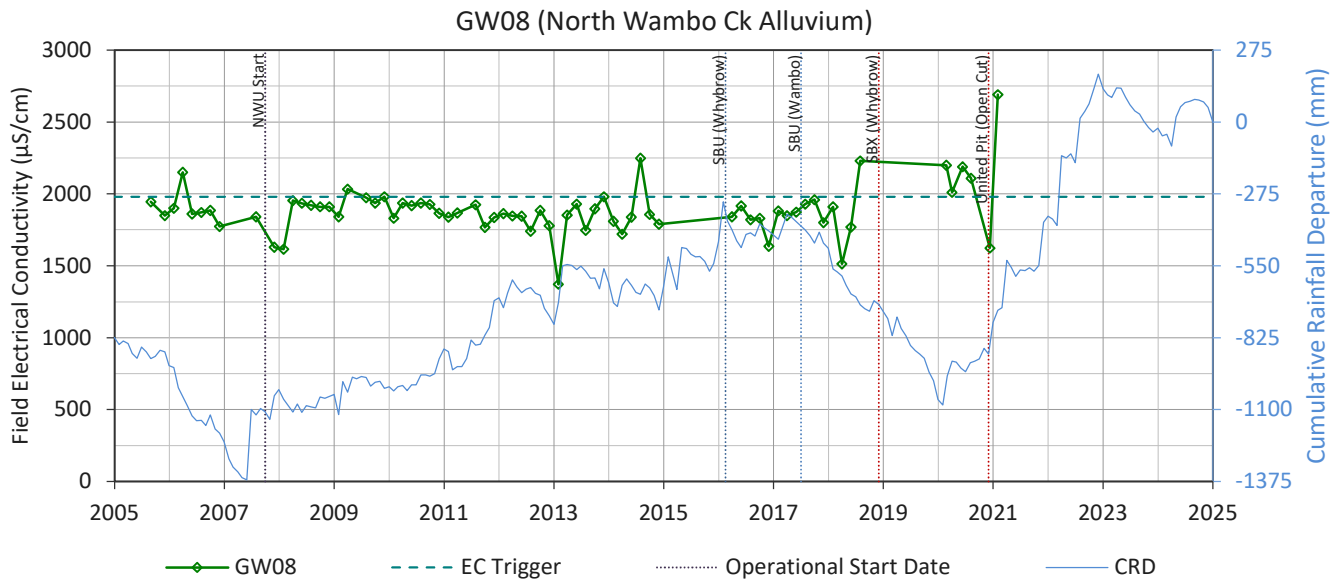
SBX (Whybrow)
United Pit (Open Cut)
GW08
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD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Cumulative Rainfall Departure (mm)
NWU Start
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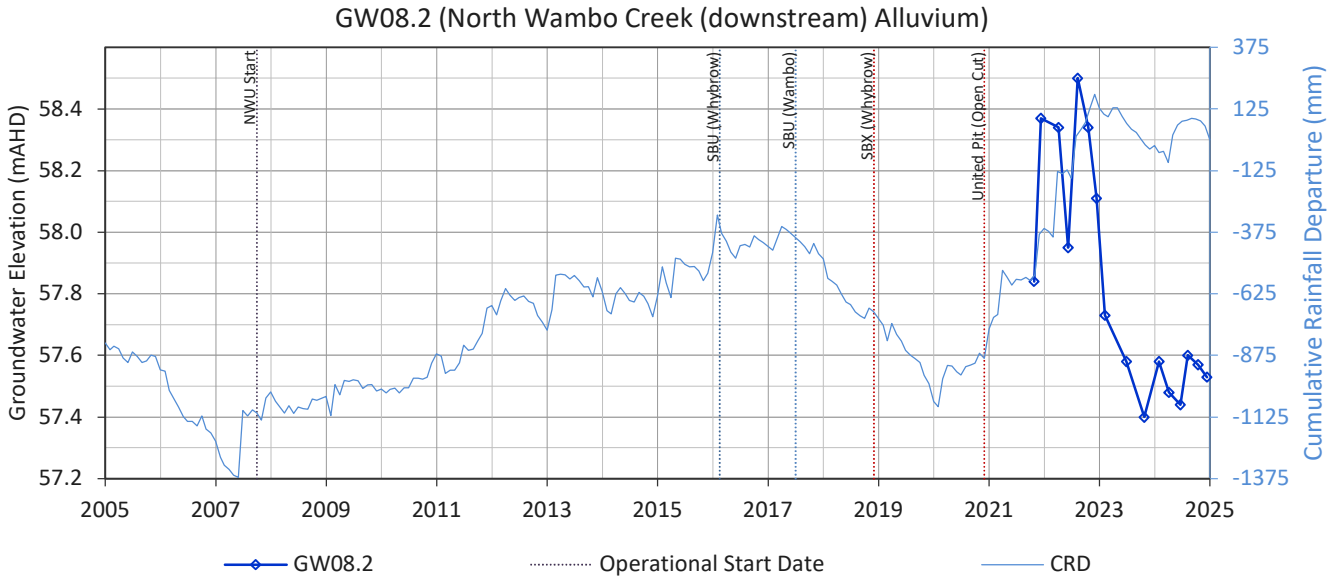
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW08
EC Trigger
Operational Start Date
CRD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Cumulative Rainfall Departure (mm)
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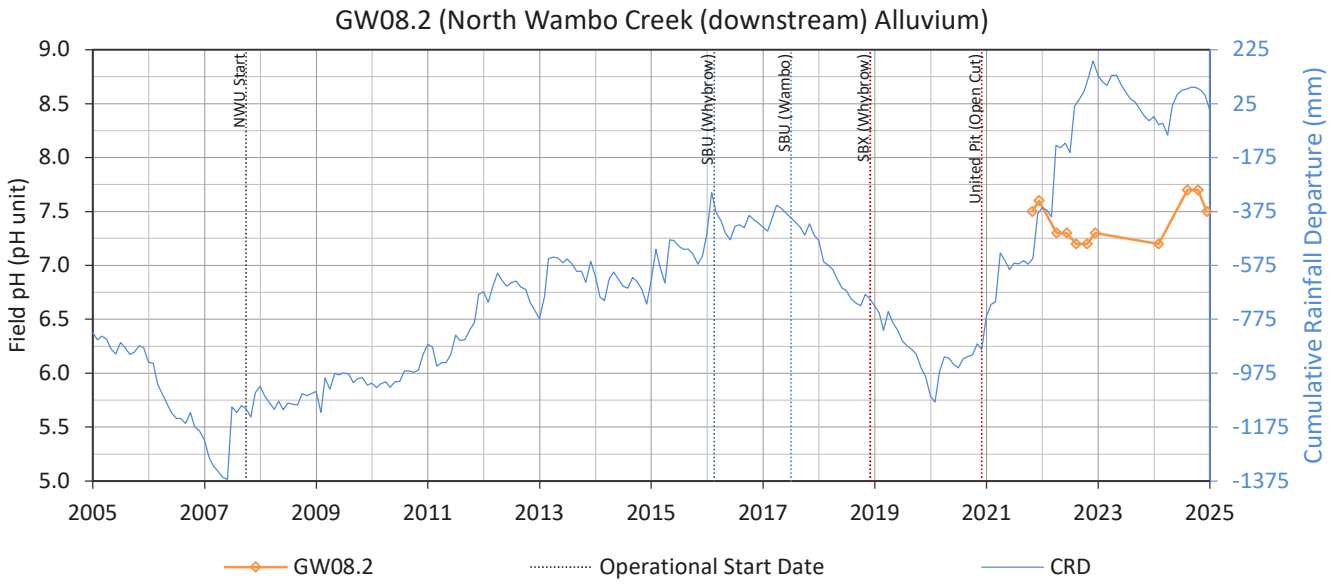
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW08.2
Operational Start Date
CRD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Field pH (pH unit)
Cumulative Rainfall Departure (mm)
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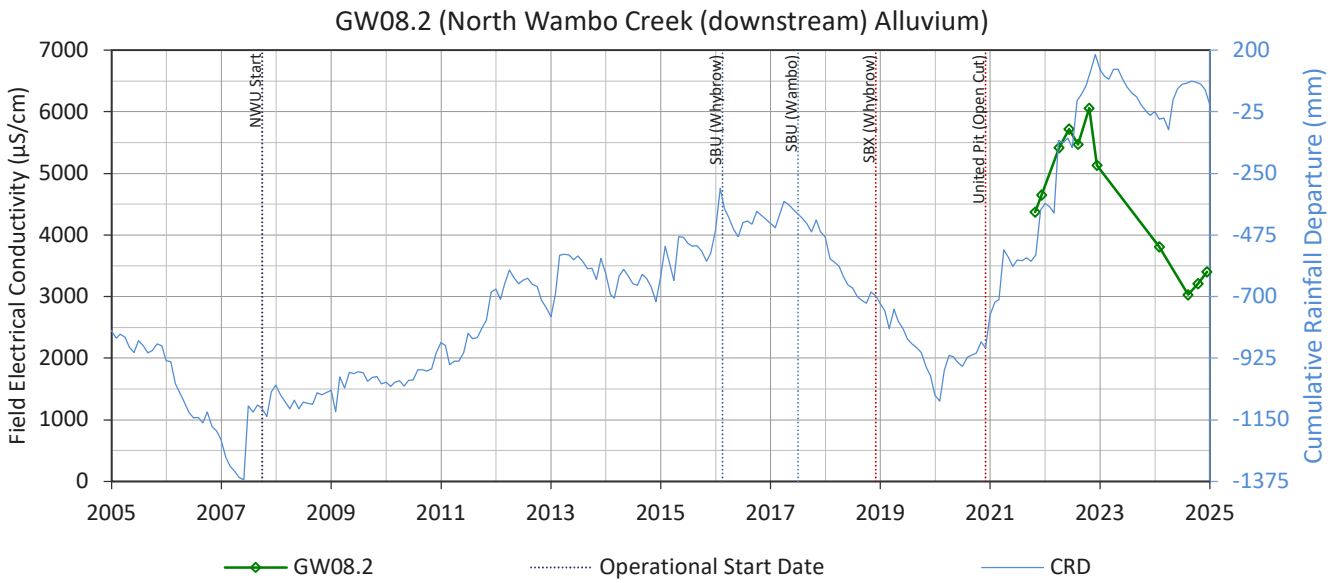
SBX (Whybrow)
United Pit (Open Cut)
GW08.2
Operational Start Date
CRD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SBX (Whybrow)
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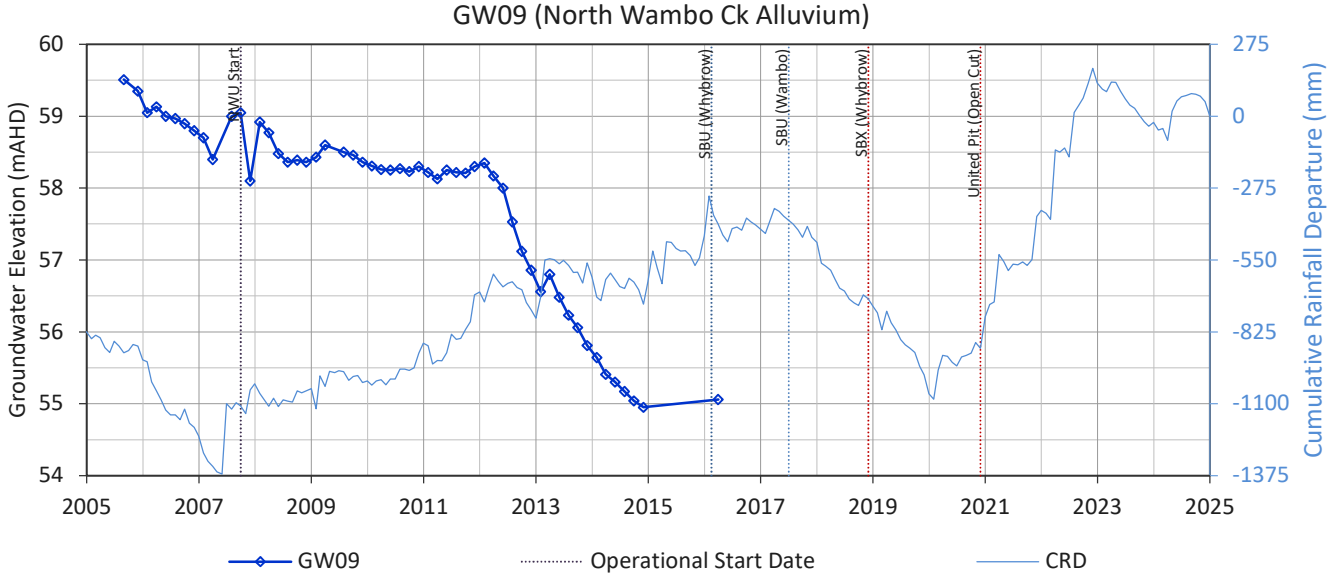
GW08.2
Operational Start Date
CRD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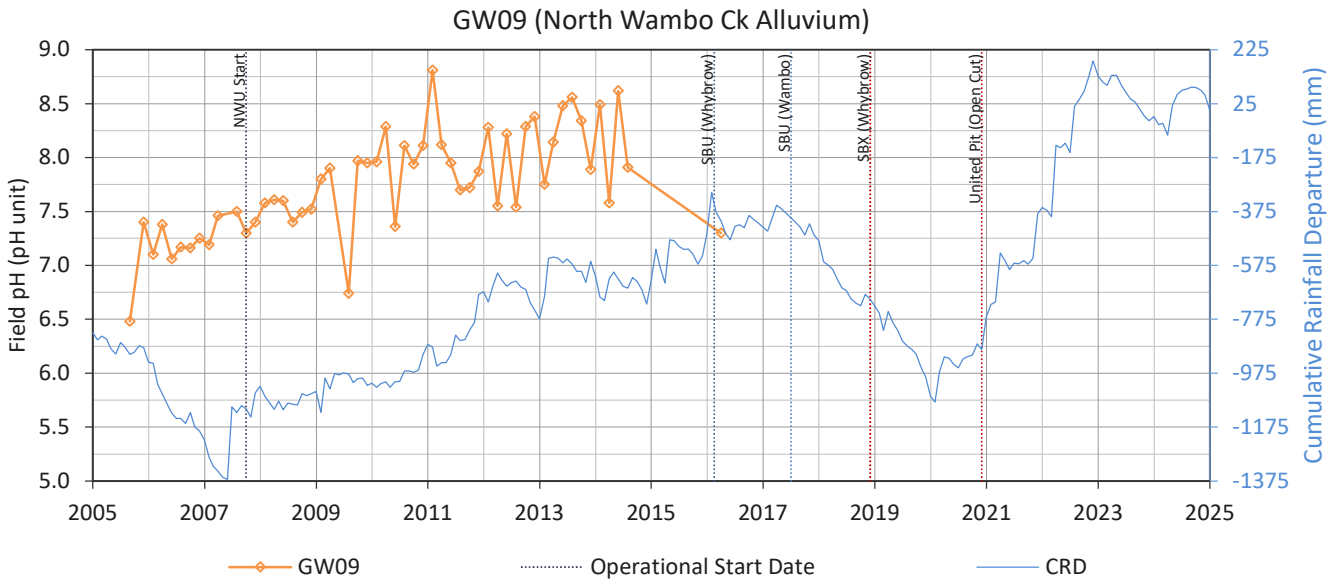
SBX (Whybrow)
United Pit (Open Cut)
GW09
Operational Start Date
CRD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Field pH (pH unit)
Cumulative Rainfall Departure (mm)
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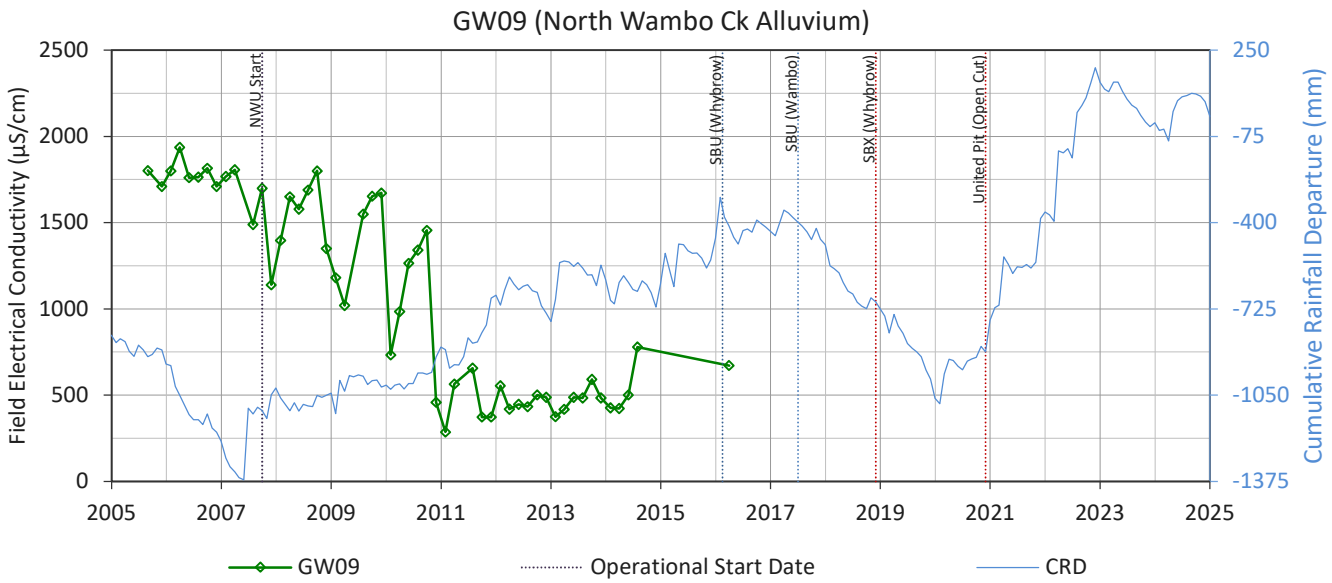
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW09
Operational Start Date
CRD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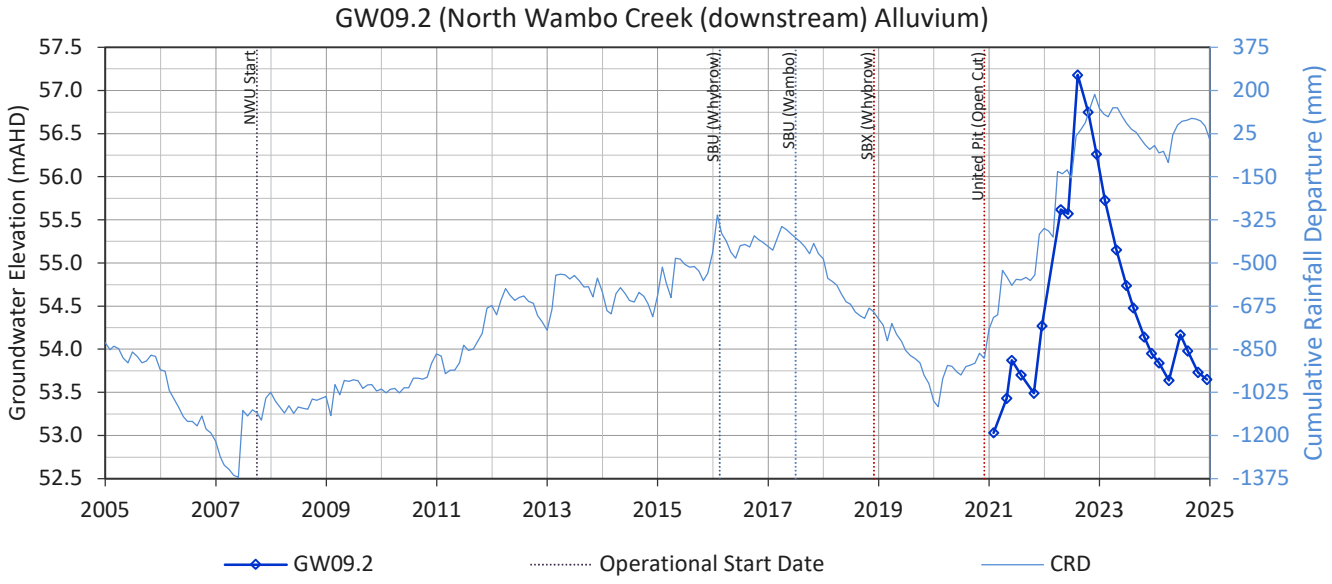
SBX (Whybrow)
United Pit (Open Cut)
GW09
Operational Start Date
CRD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Cumulative Rainfall Departure (mm)
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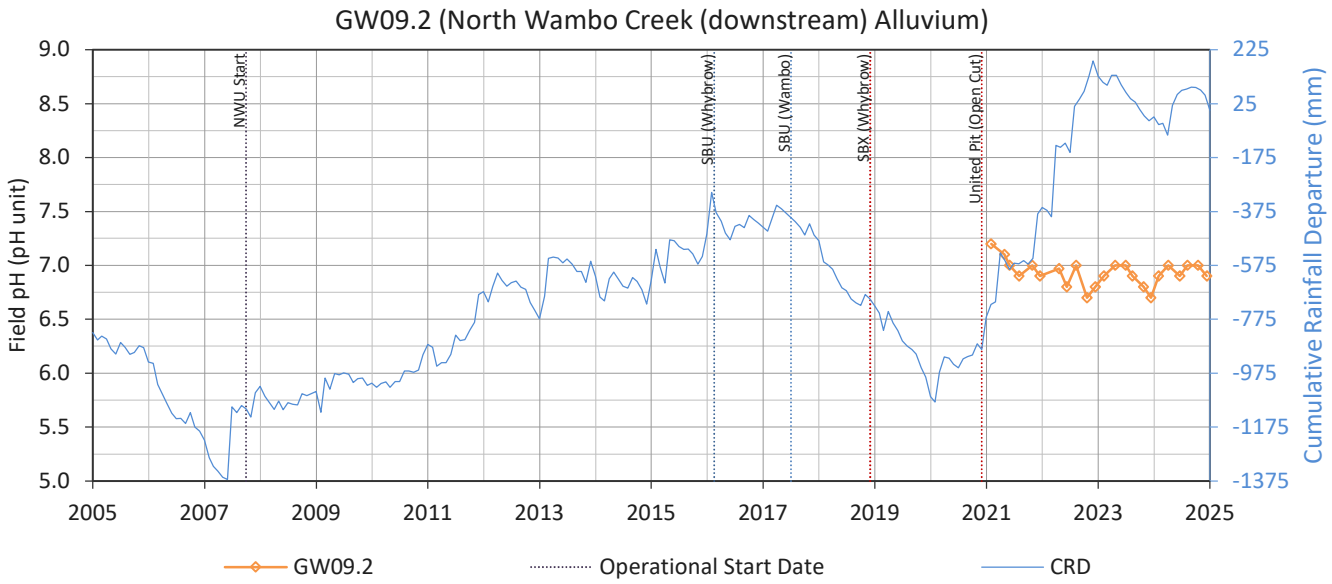
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW09.2
Operational Start Date
CRD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Cumulative Rainfall Departure (mm)
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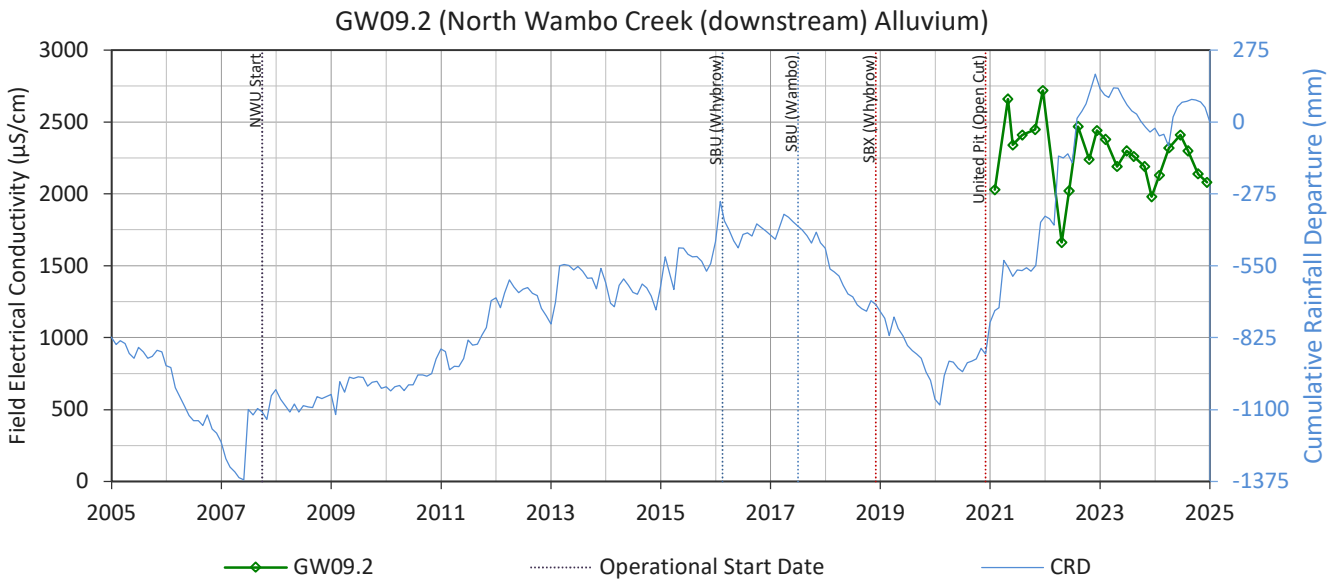
SBX (Whybrow)
United Pit (Open Cut)
GW09.2
Operational Start Date
CRD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Cumulative Rainfall Departure (mm)
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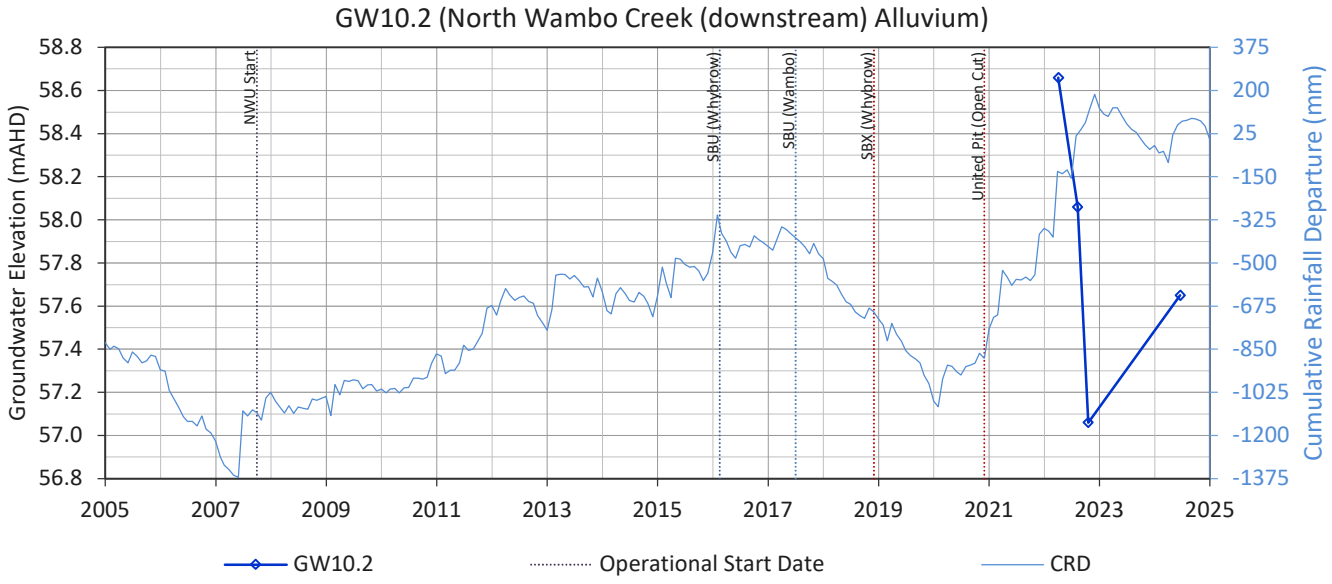
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW09.2
Operational Start Date
CRD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Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
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SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
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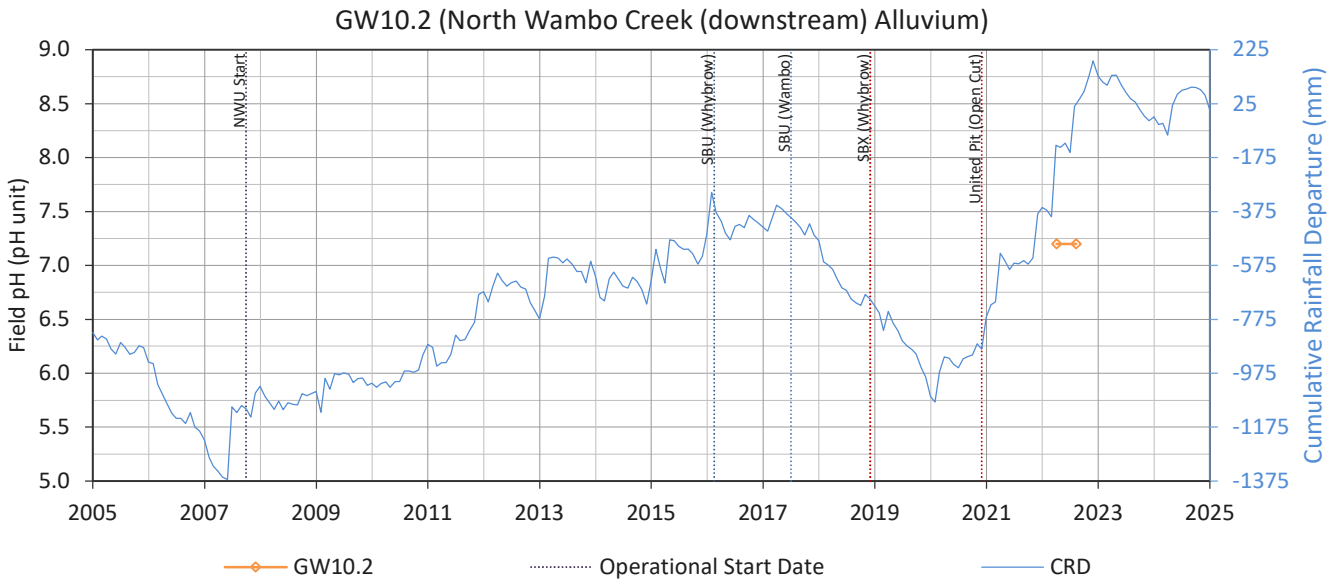
Operational Start Date
CRD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Field pH (pH unit)
Cumulative Rainfall Departure (mm)
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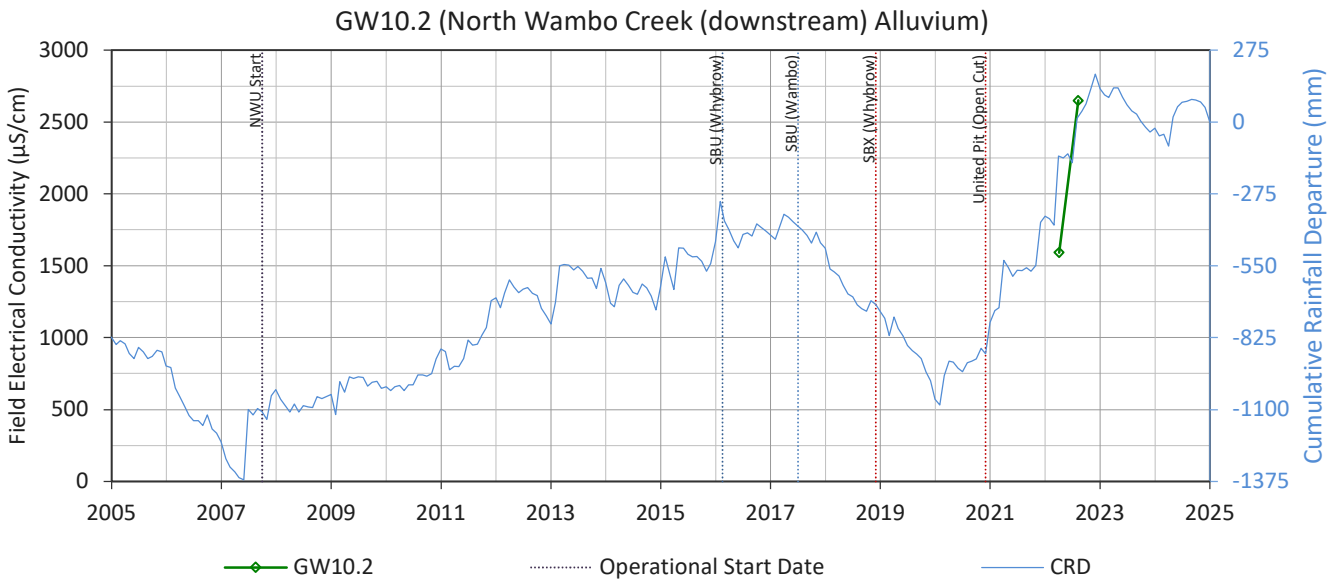
SBX (Whybrow)
United Pit (Open Cut)
GW10.2
Operational Start Date
CRD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Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
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SBX (Whybrow)
United Pit (Open Cut)
GW10.2
Operational Start Date
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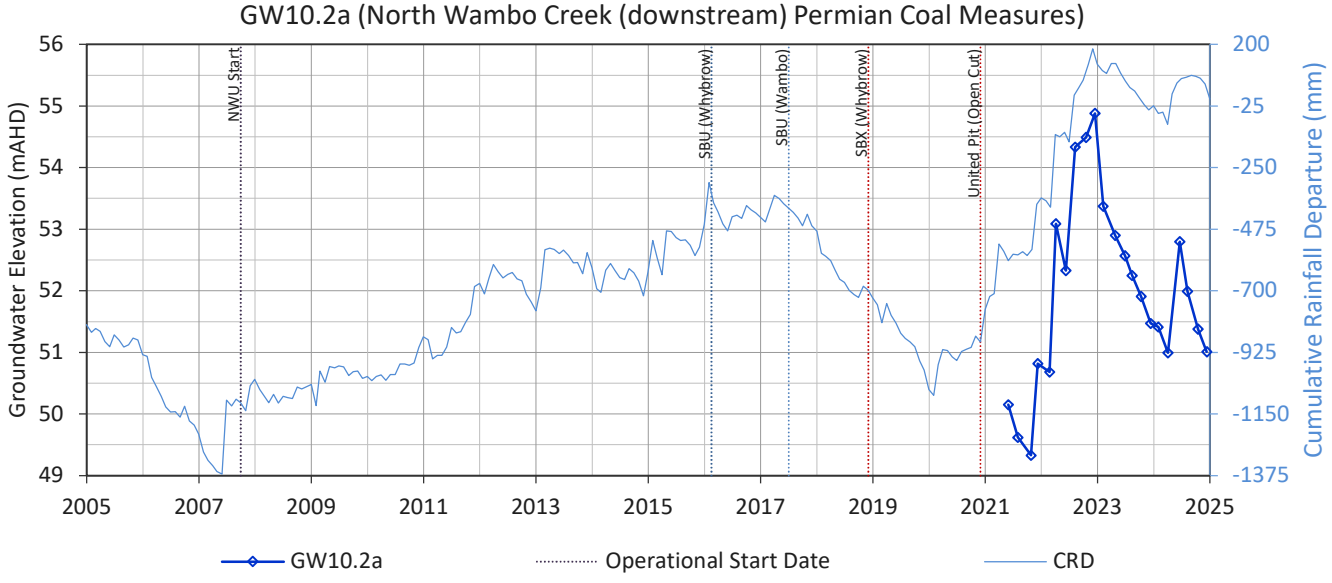
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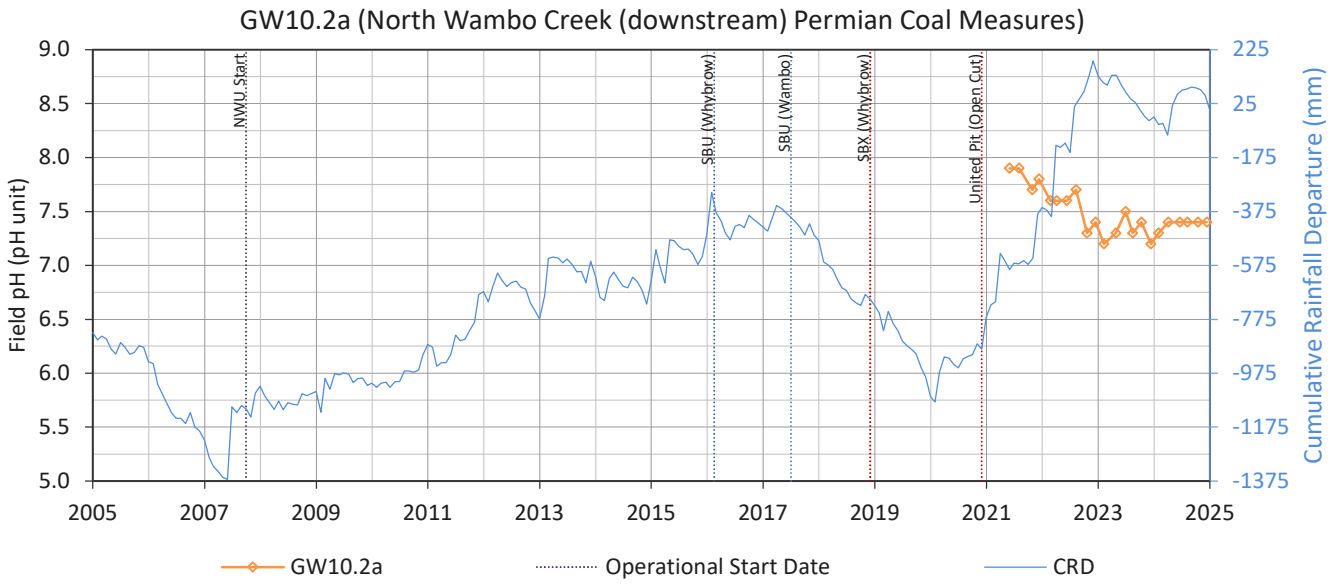
SBX (Whybrow)
United Pit (Open Cut)
GW10.2a
Operational Start Date
CRD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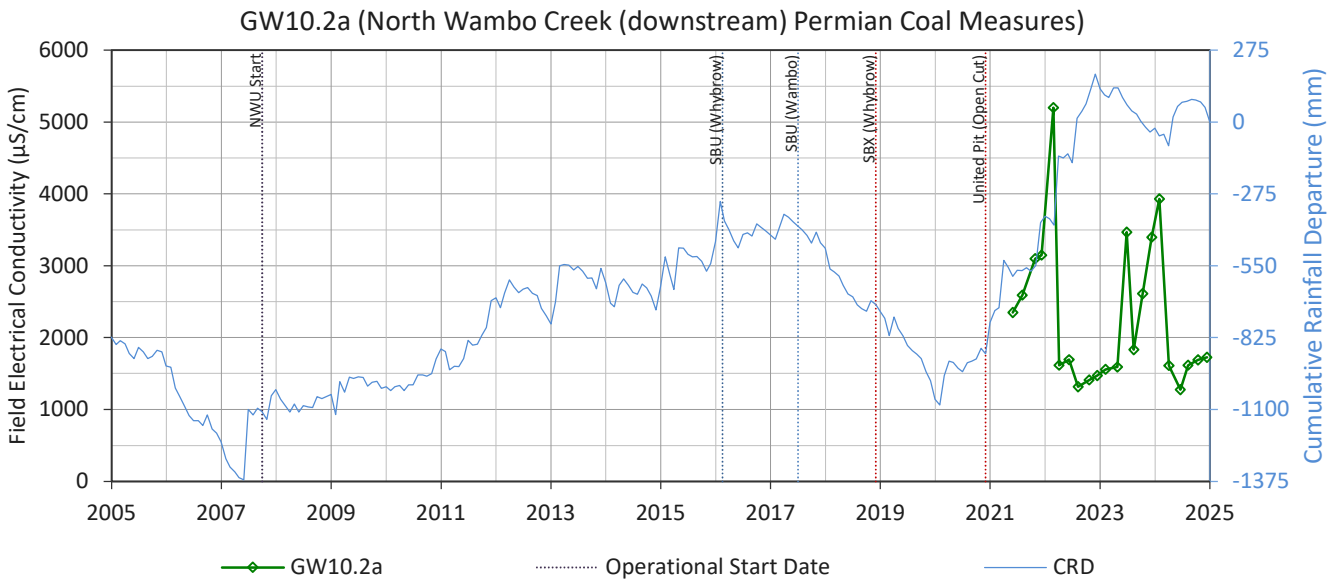
SBX (Whybrow)
United Pit (Open Cut)
GW10.2a
Operational Start Date
CRD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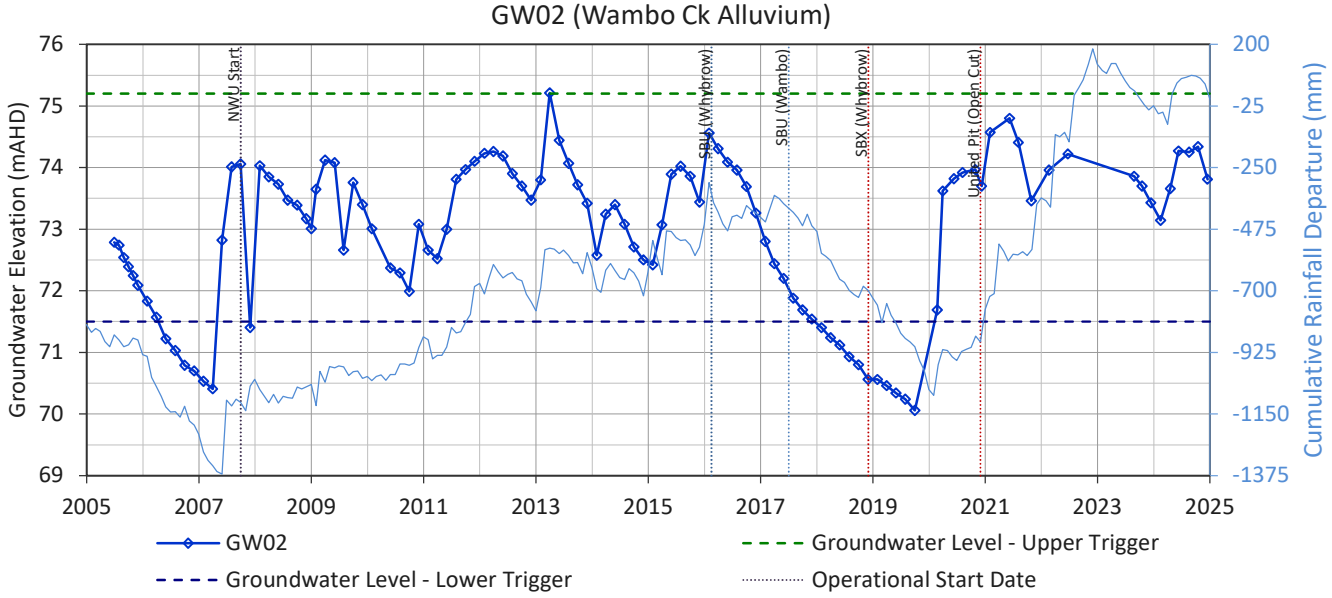
GW10.2a
Operational Start Date
CRD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Cumulative Rainfall Departure (mm)
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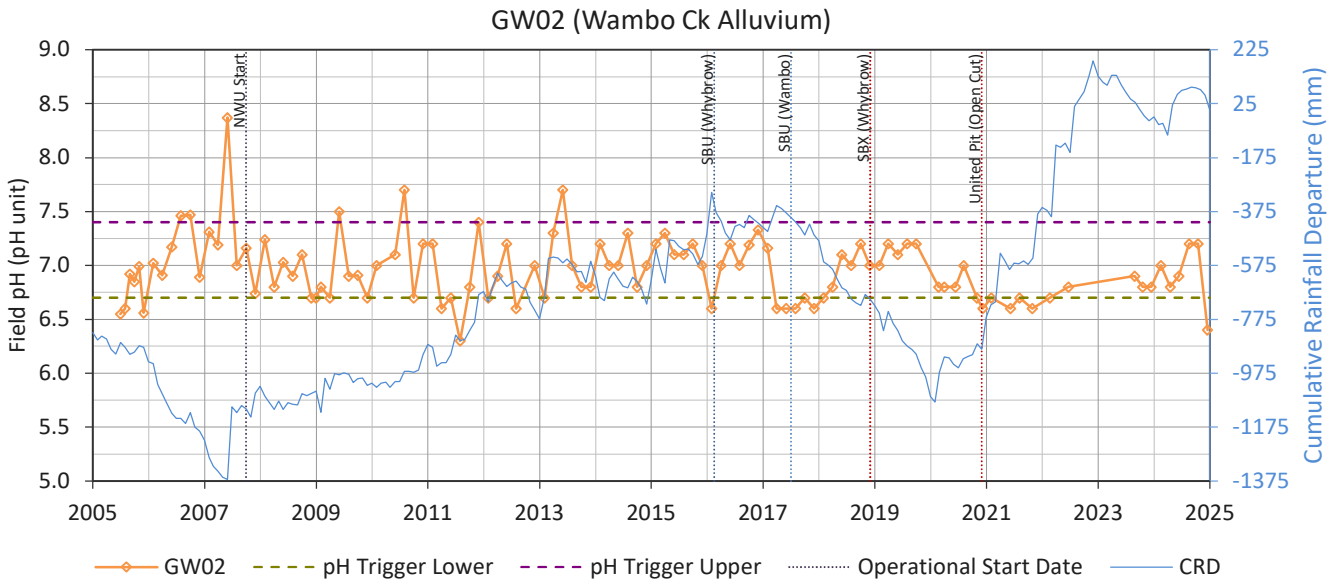
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW02
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date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Cumulative Rainfall Departure (mm)
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SBX (Whybrow)
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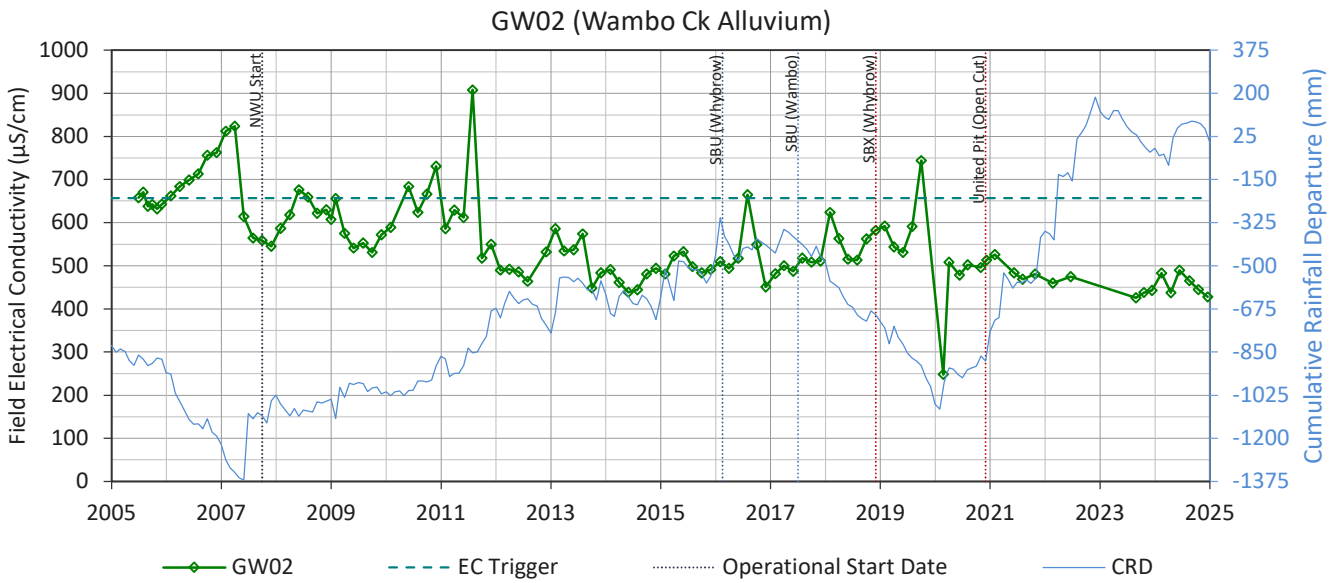
GW02
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD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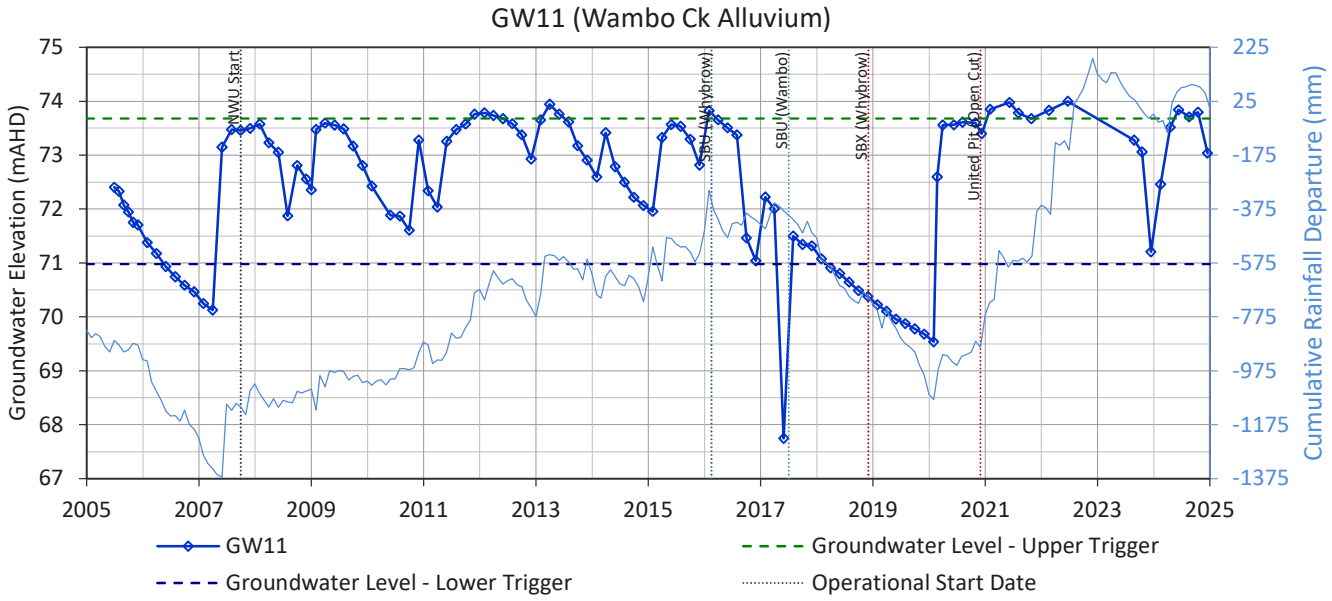
SBX (Whybrow)
United Pit (Open Cut)
GW02
EC Trigger
Operational Start Date
CRD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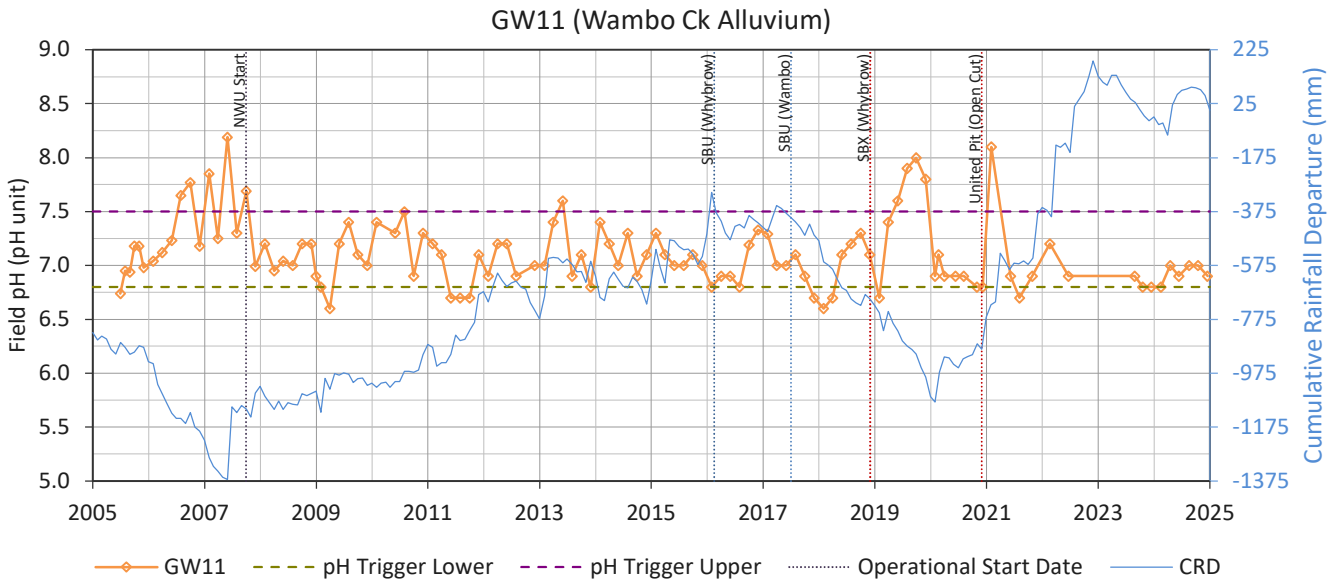
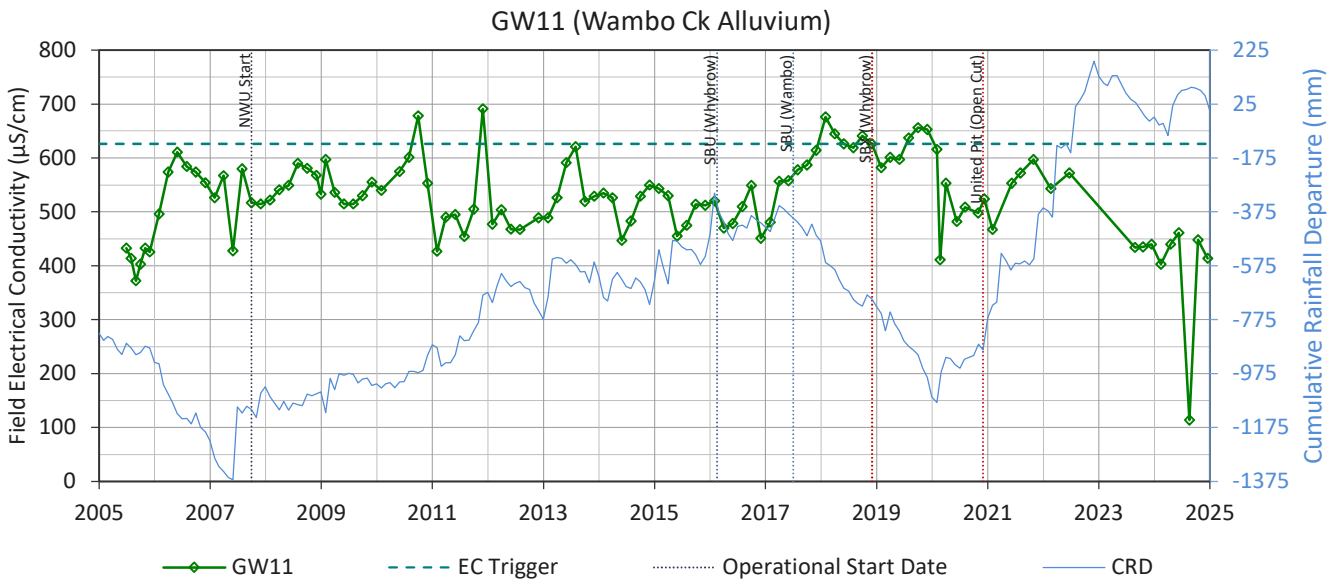
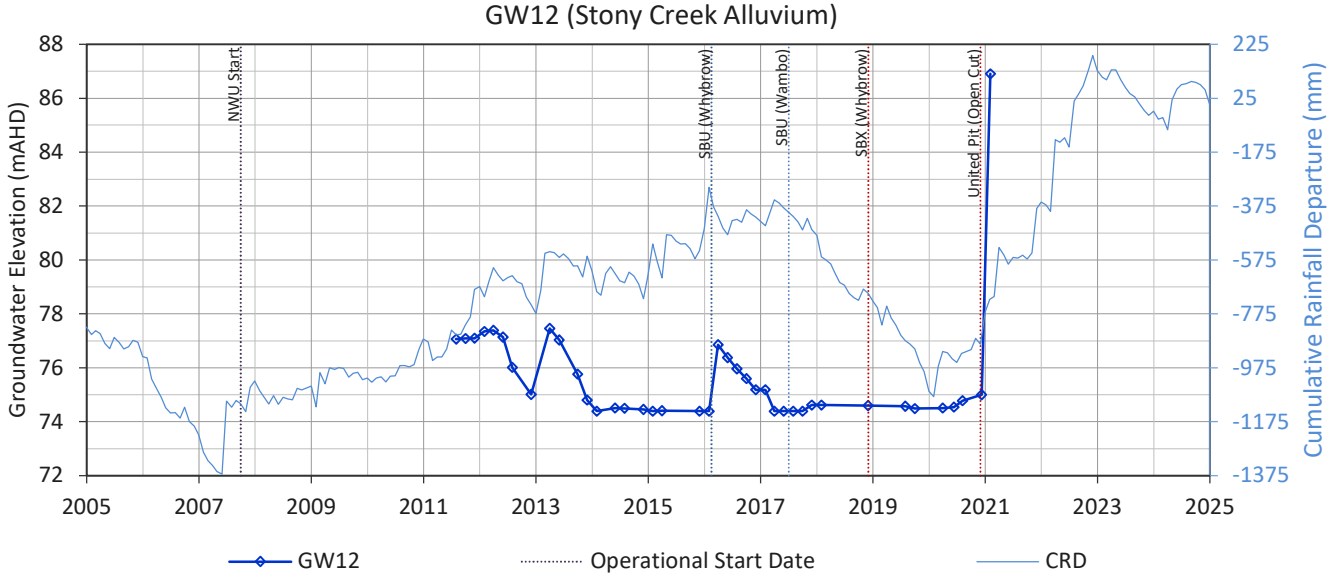
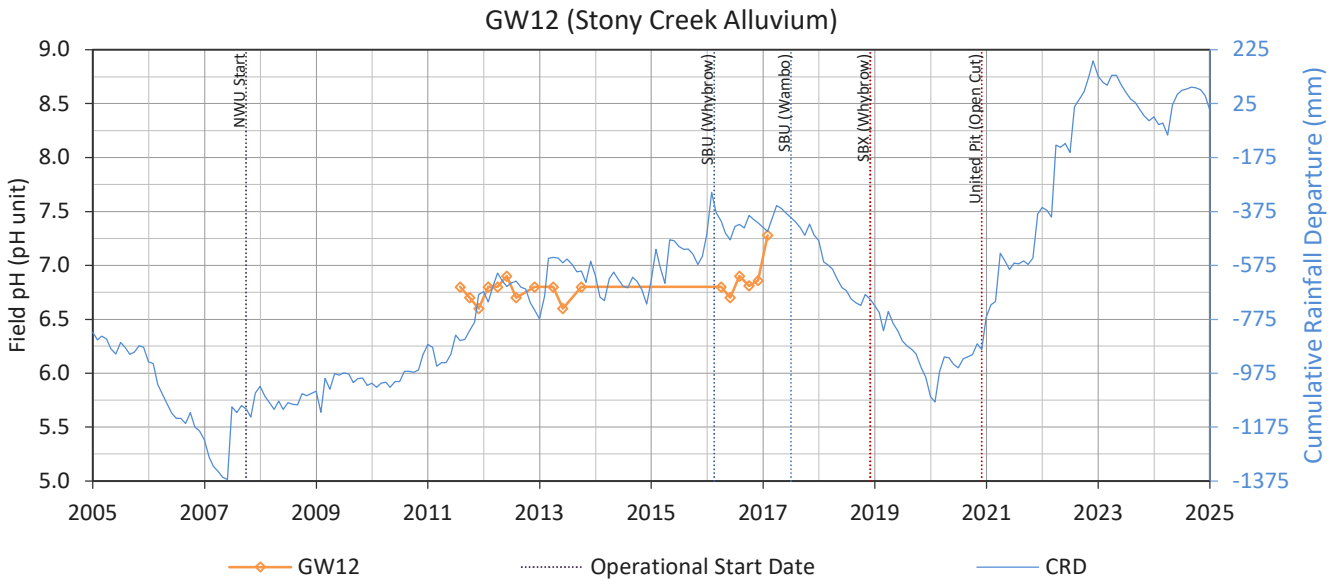
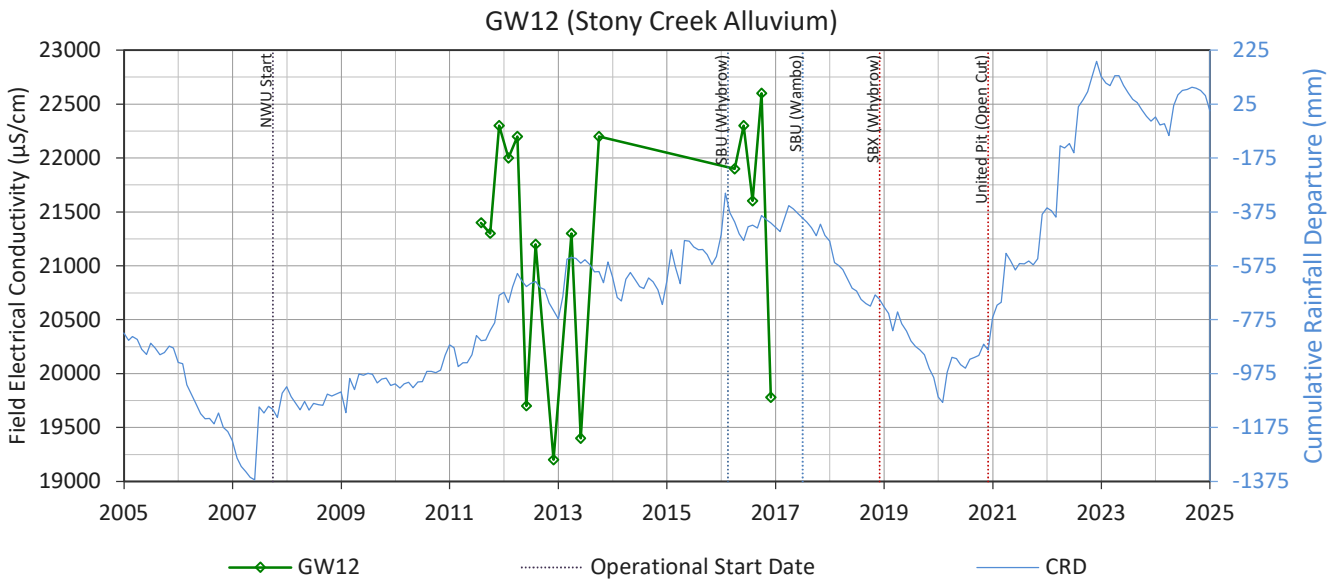
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW11
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

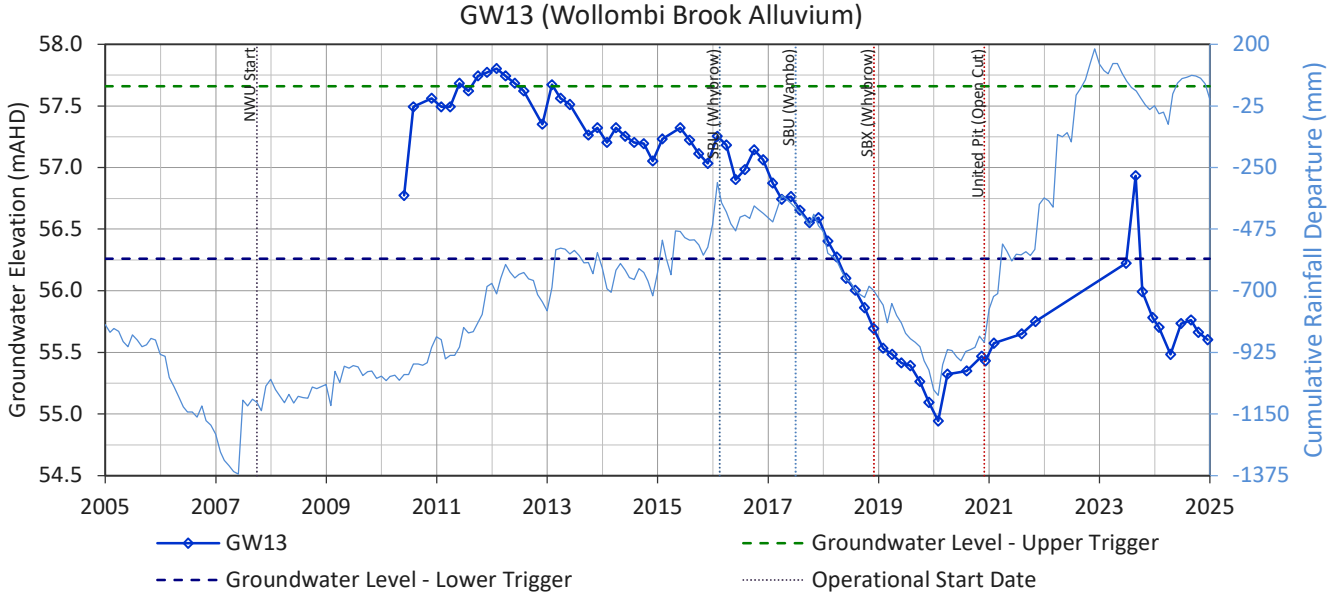

GW11 (Wambo Ck Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW11
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

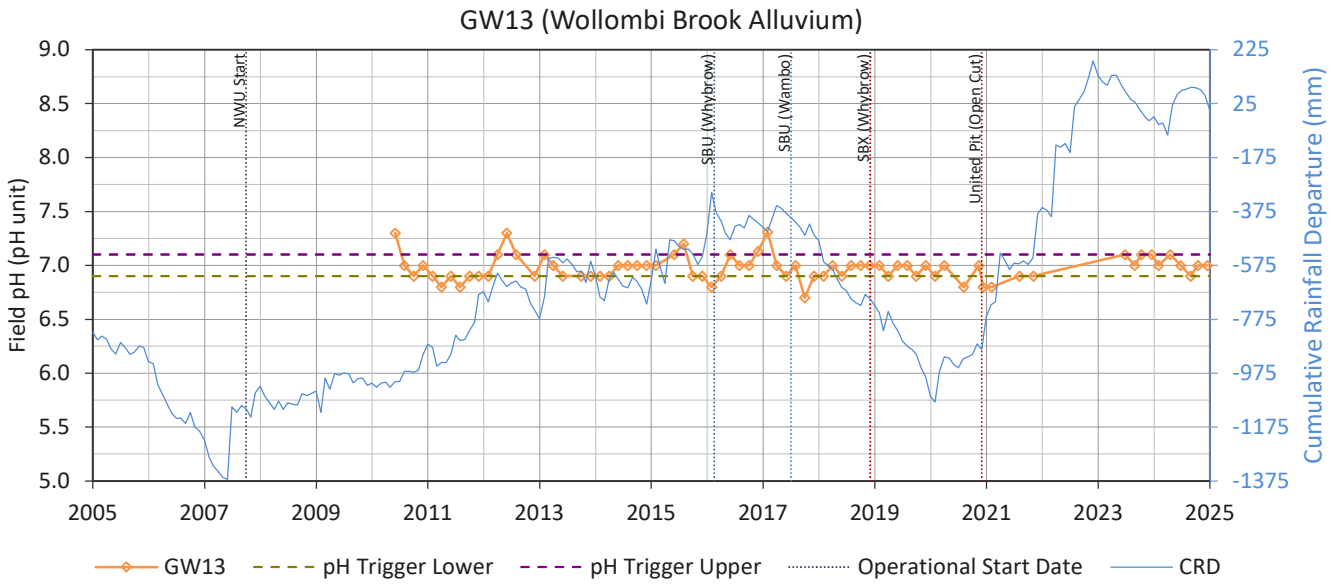

GW11 (Wambo Ck Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW11
EC Trigger
Operational Start Date
CRD

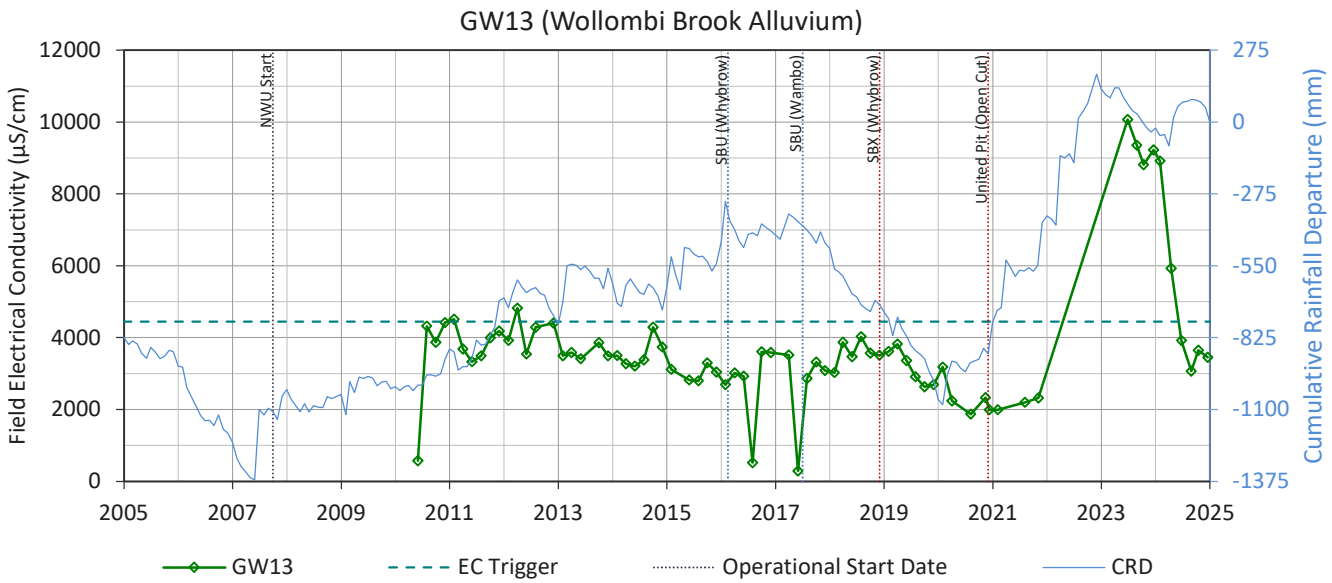

GW12 (Stony Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW12
Operational Start Date
CRD

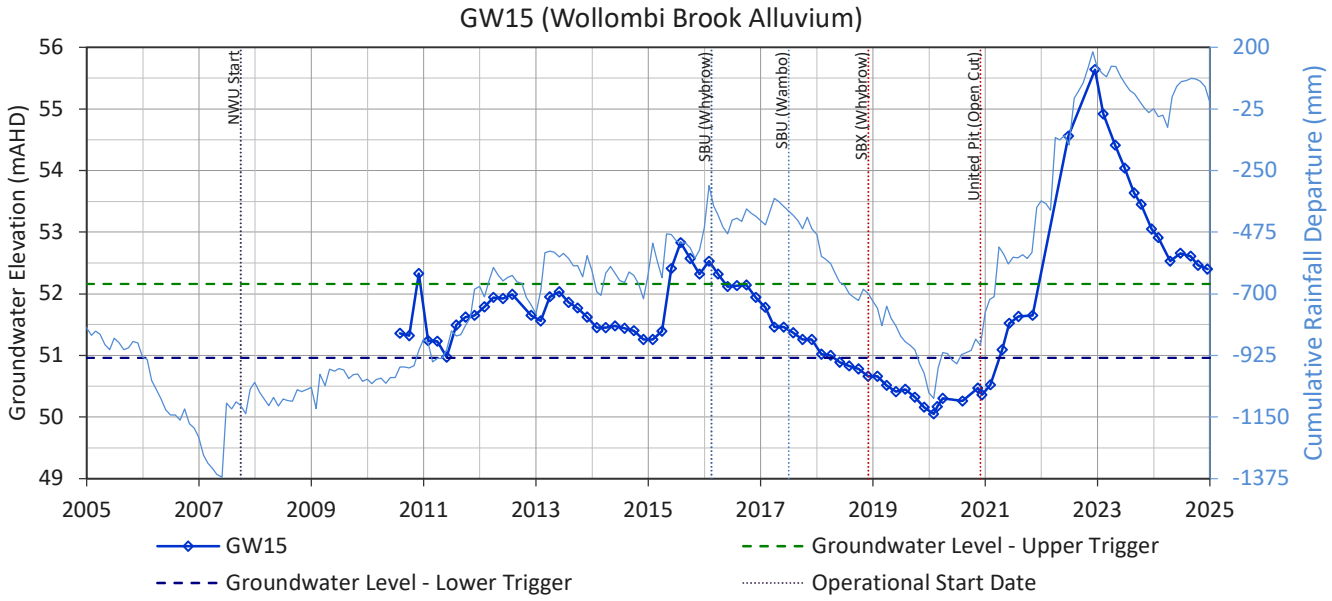

GW12 (Stony Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW12
Operational Start Date
CRD

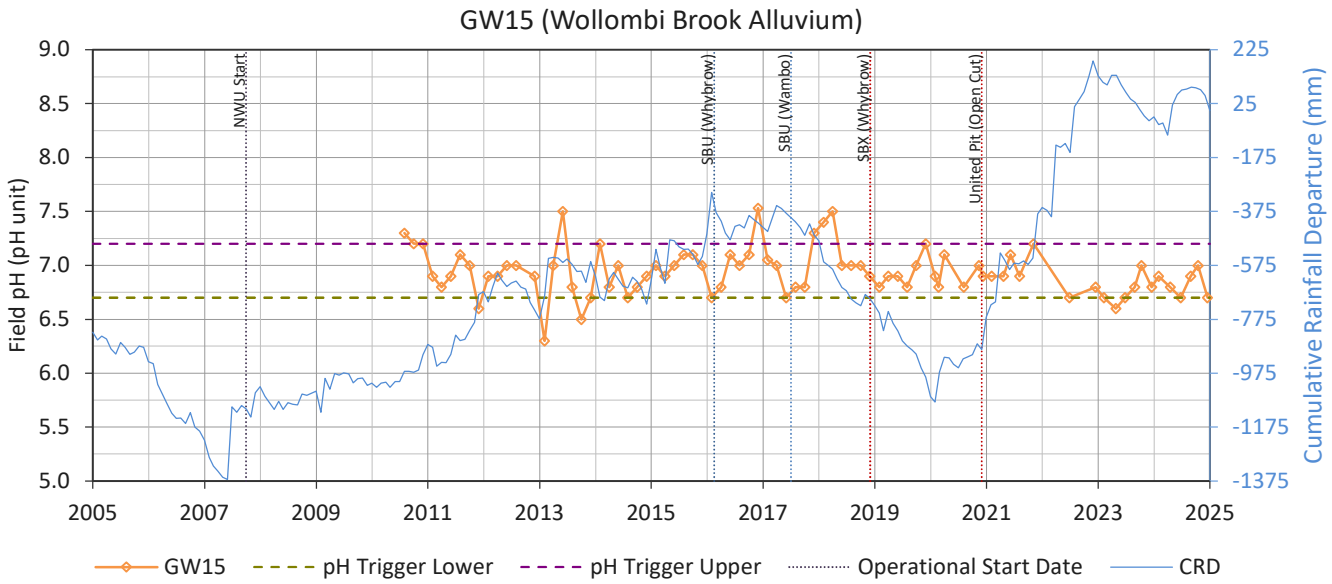

GW12 (Stony Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW12
Operational Start Date
CRD

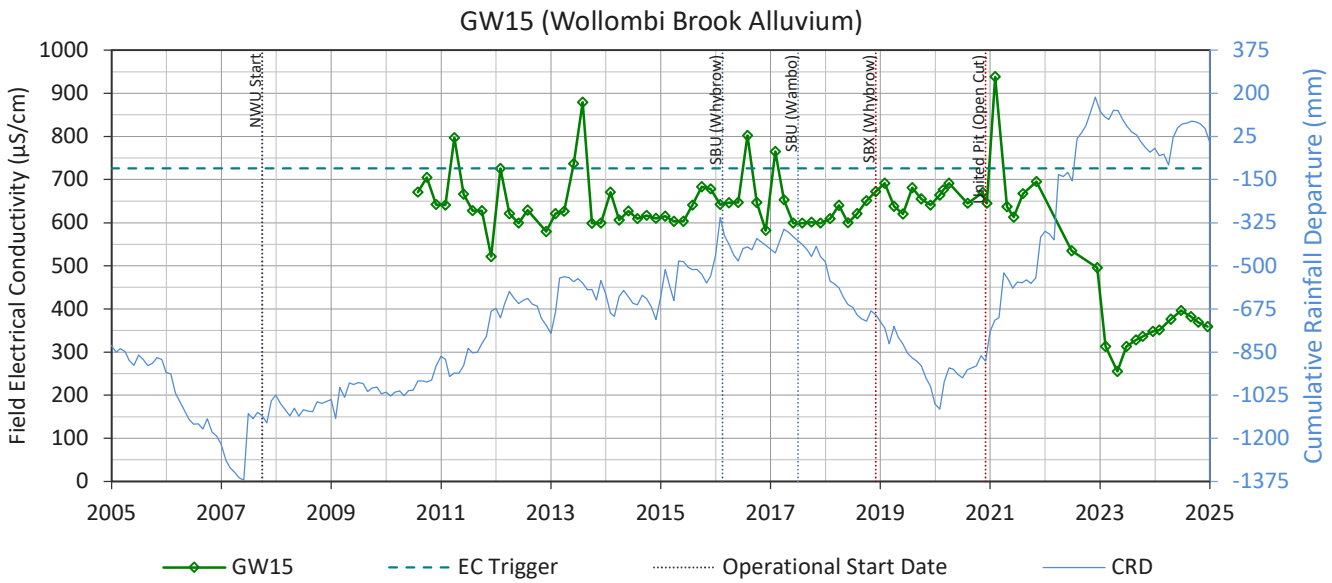

GW13 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW13
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

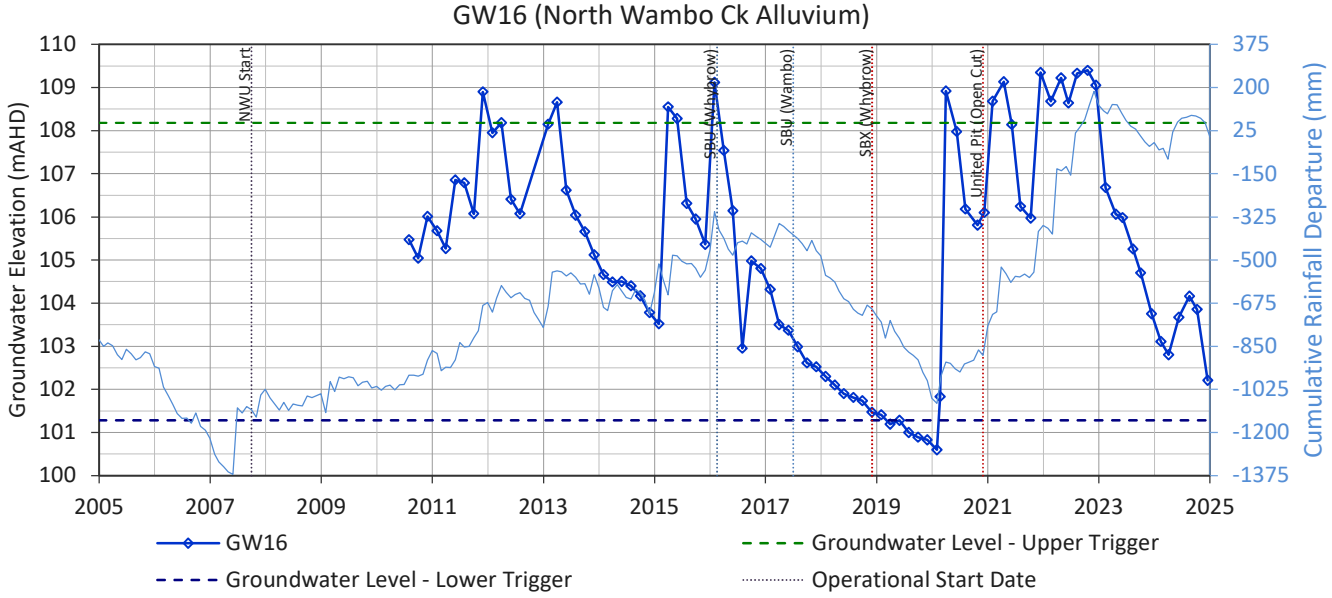

GW13 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW13
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

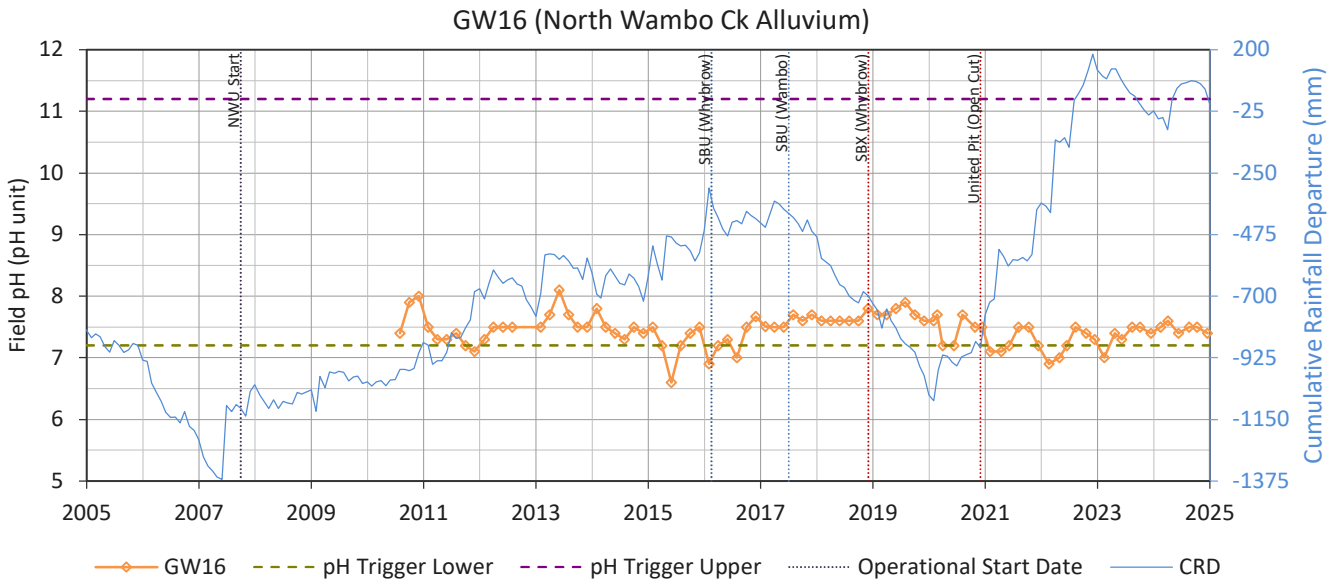

GW13 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW13
EC Trigger
Operational Start Date
CRD

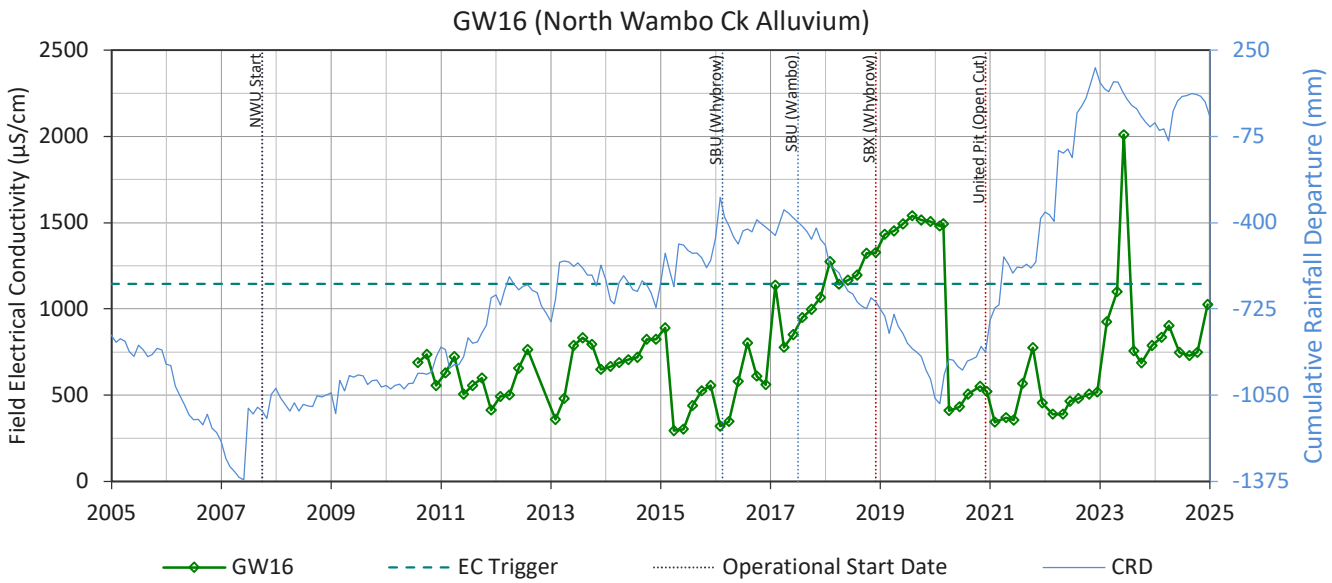

GW15 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW15
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

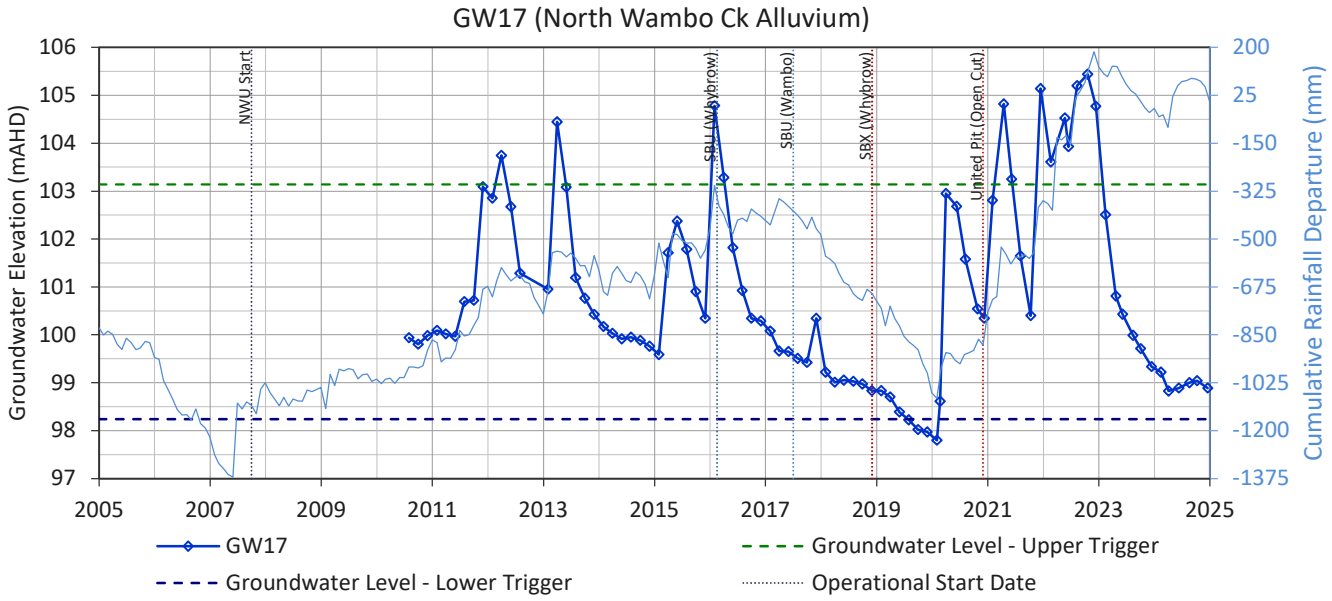

GW15 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW15
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

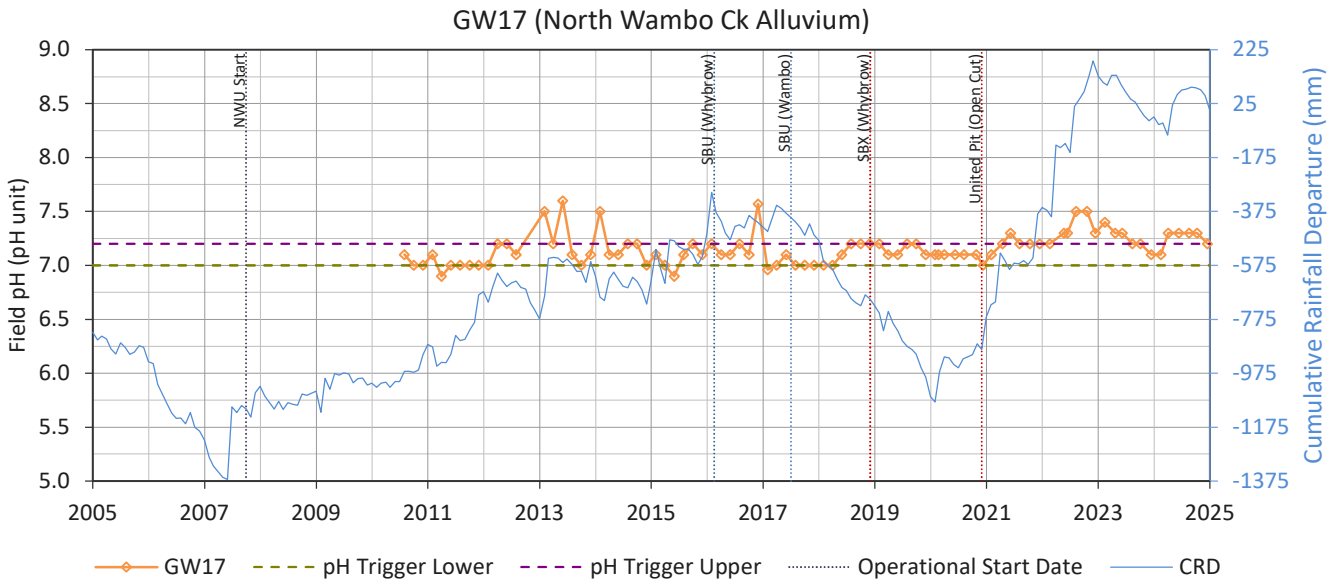

GW15 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW15
EC Trigger
Operational Start Date
CRD

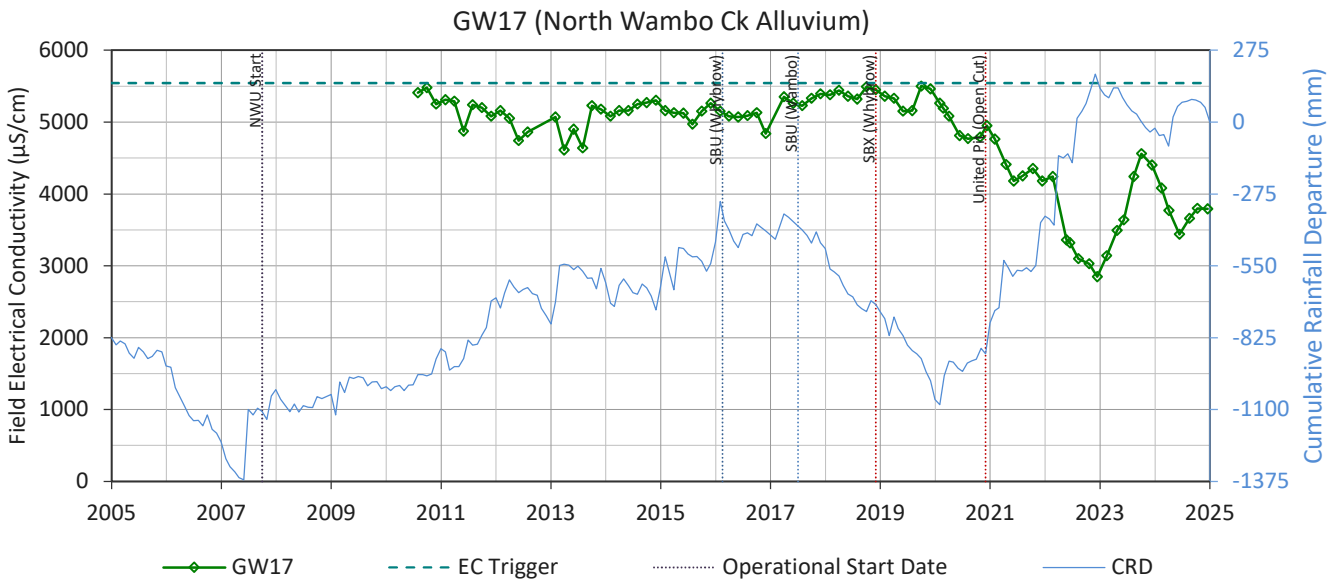

GW16 (North Wambo Ck Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW16
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

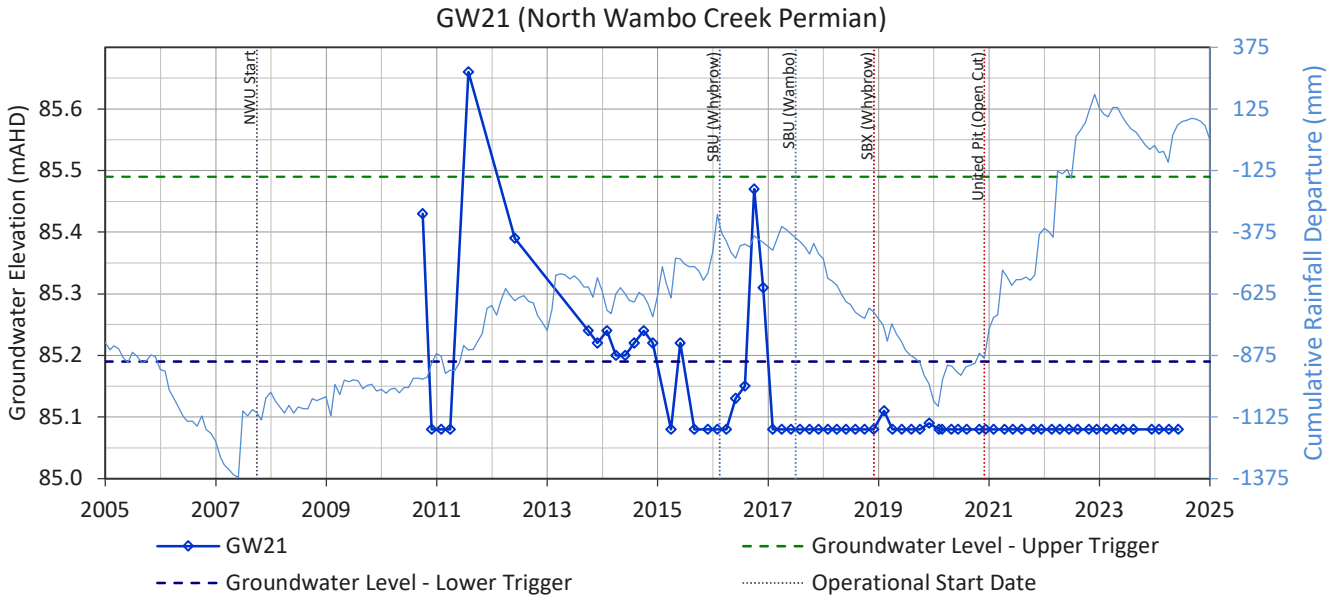

GW16 (North Wambo Ck Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW16
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

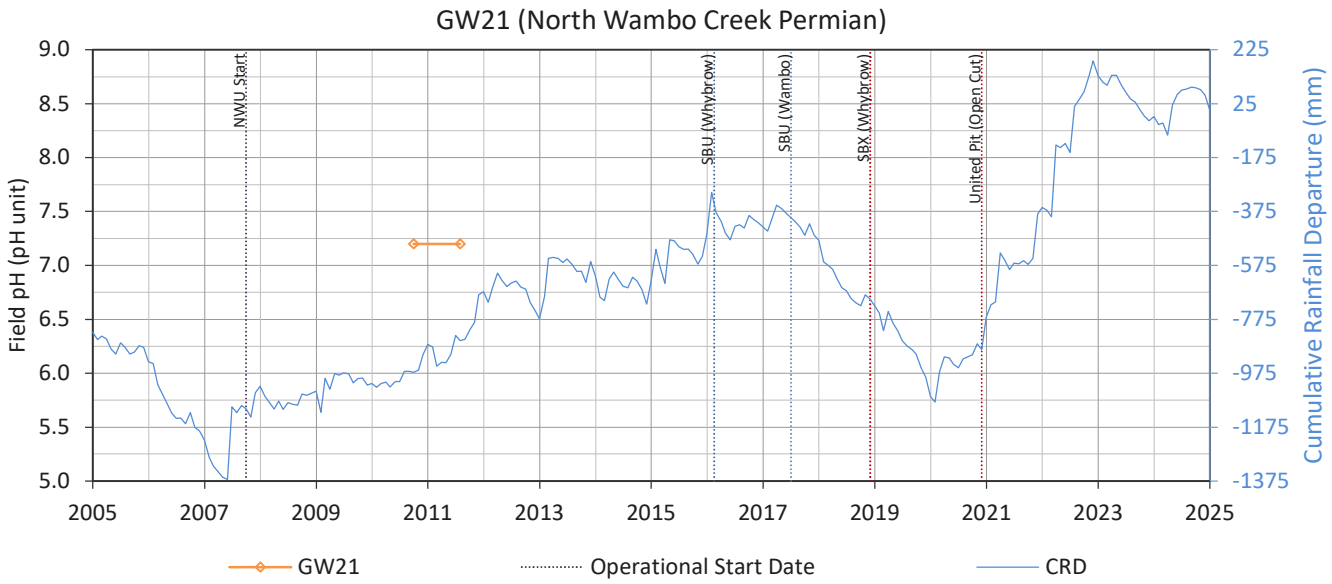

GW16 (North Wambo Ck Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW16
EC Trigger
Operational Start Date
CRD

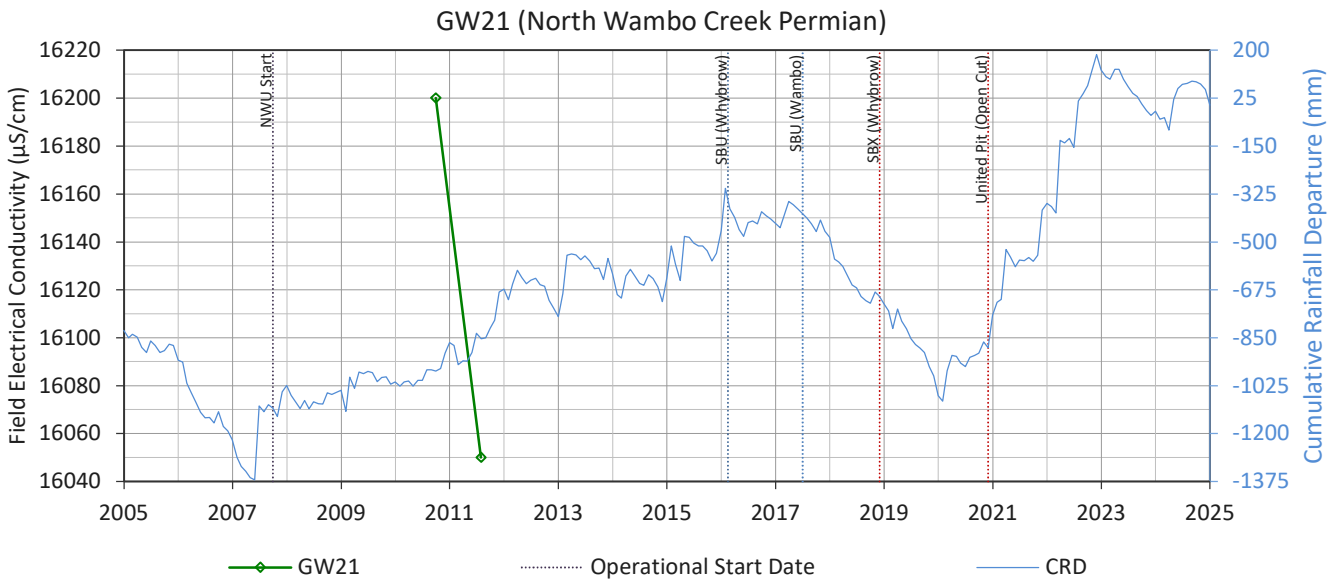

GW17 (North Wambo Ck Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW17
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

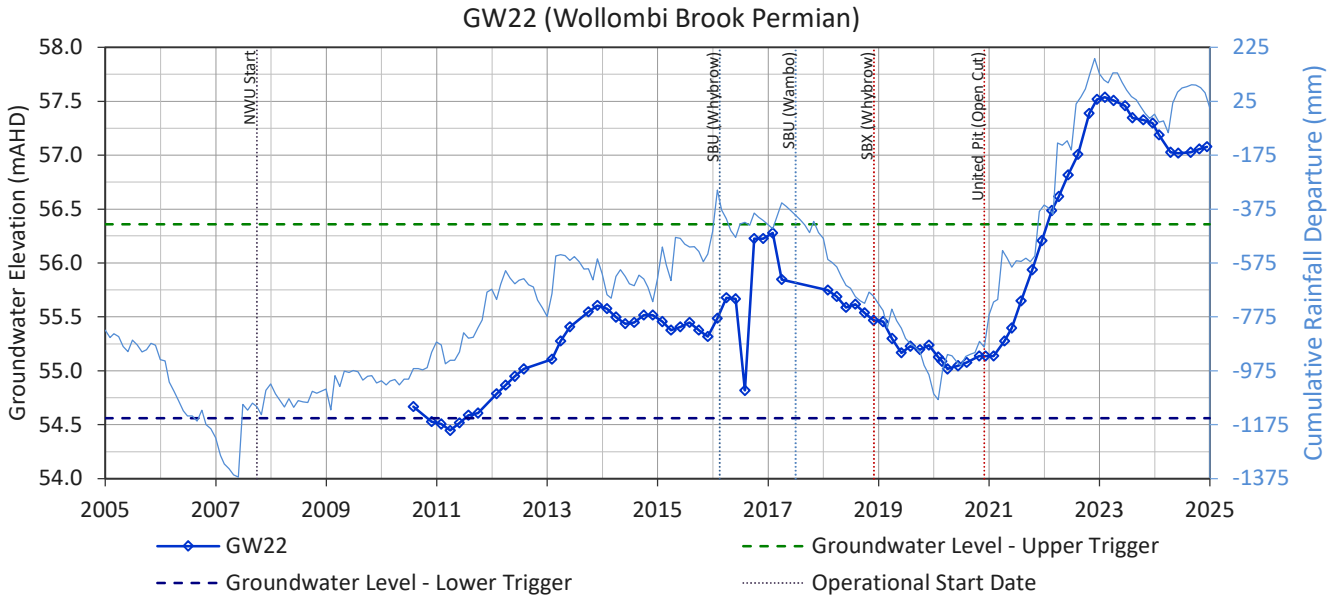

GW17 (North Wambo Ck Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW17
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

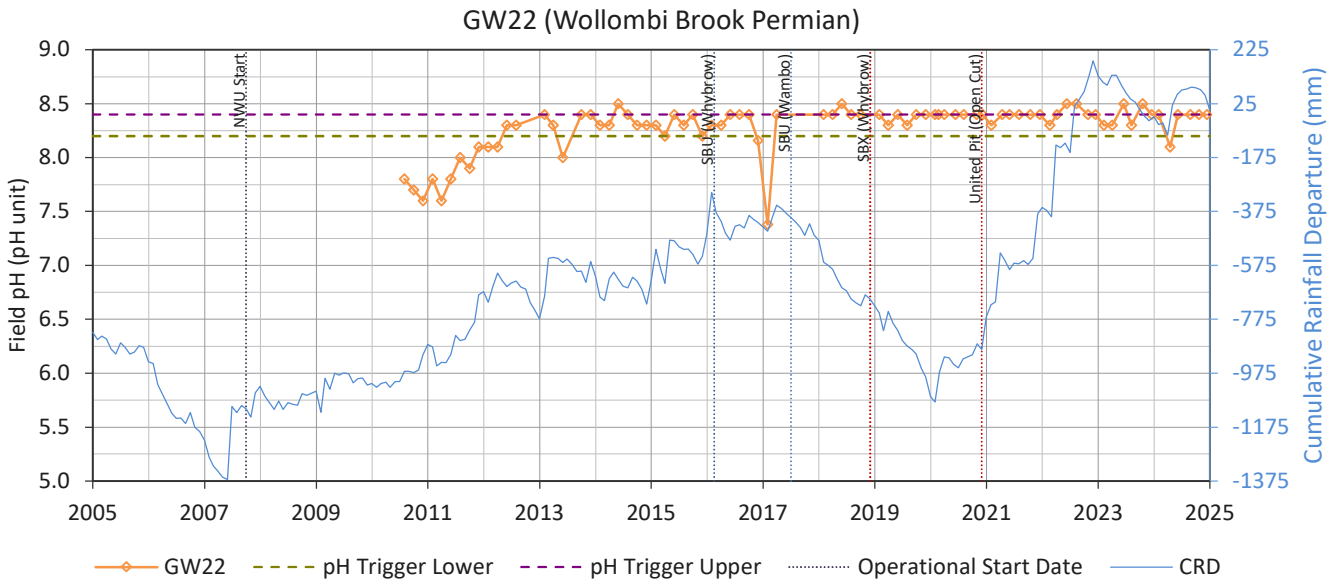

GW17 (North Wambo Ck Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW17
EC Trigger
Operational Start Date
CRD

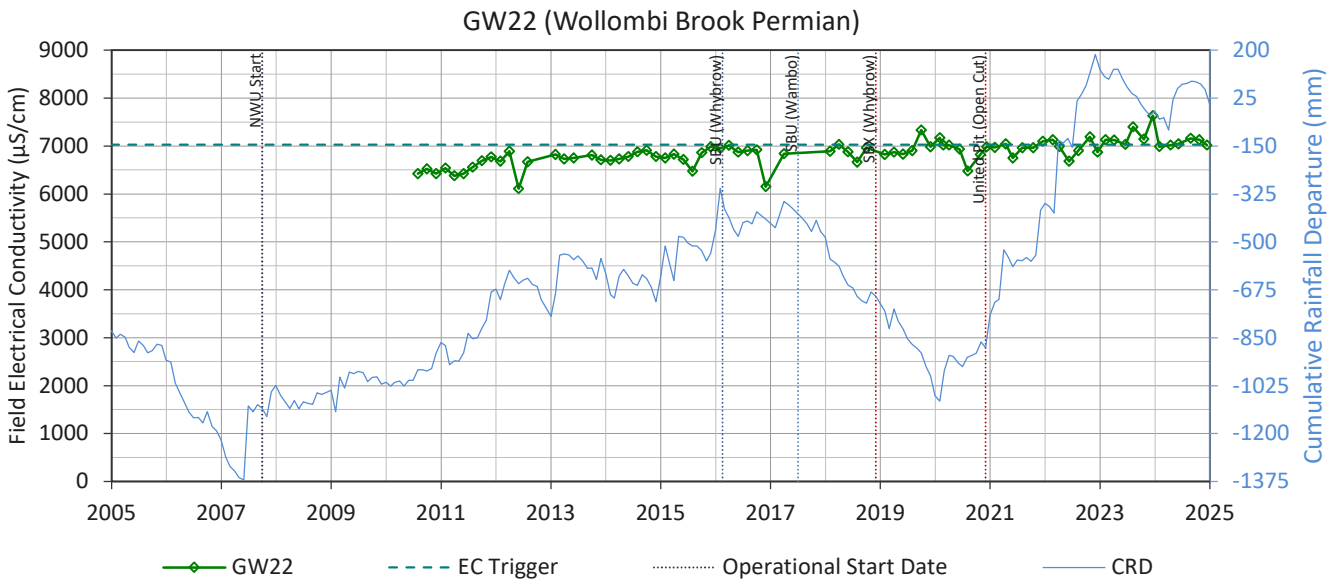

GW21 (North Wambo Creek Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW21
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

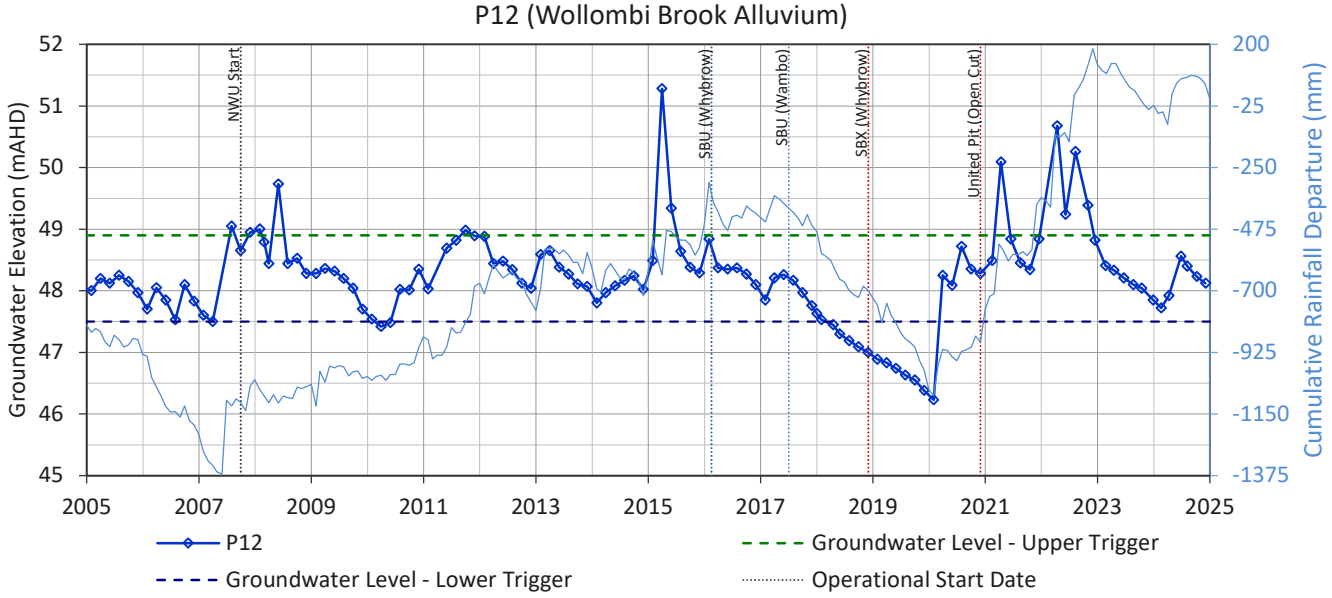

GW21 (North Wambo Creek Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW21
Operational Start Date
CRD

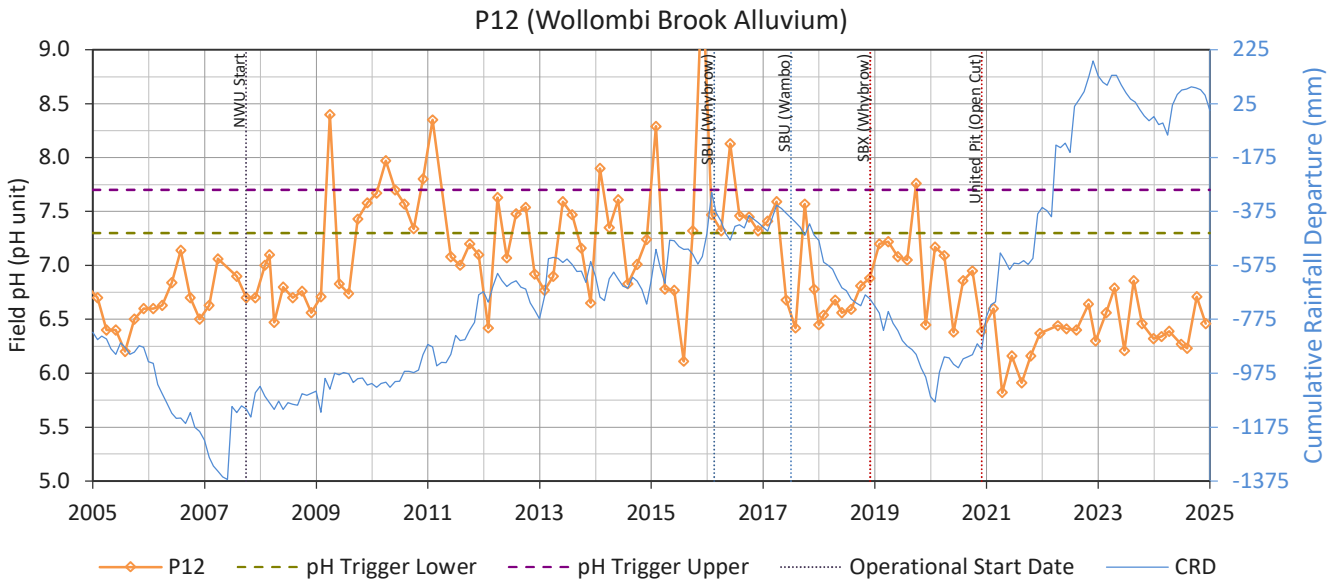

GW21 (North Wambo Creek Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW21
Operational Start Date
CRD

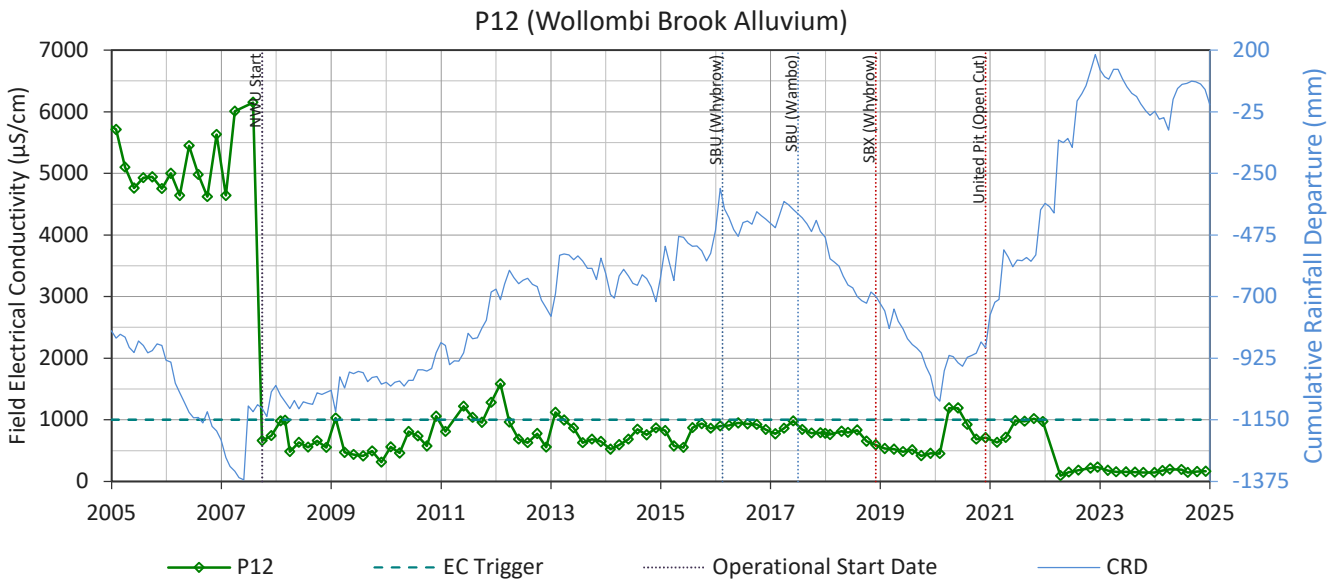

GW22 (Wollombi Brook Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW22
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

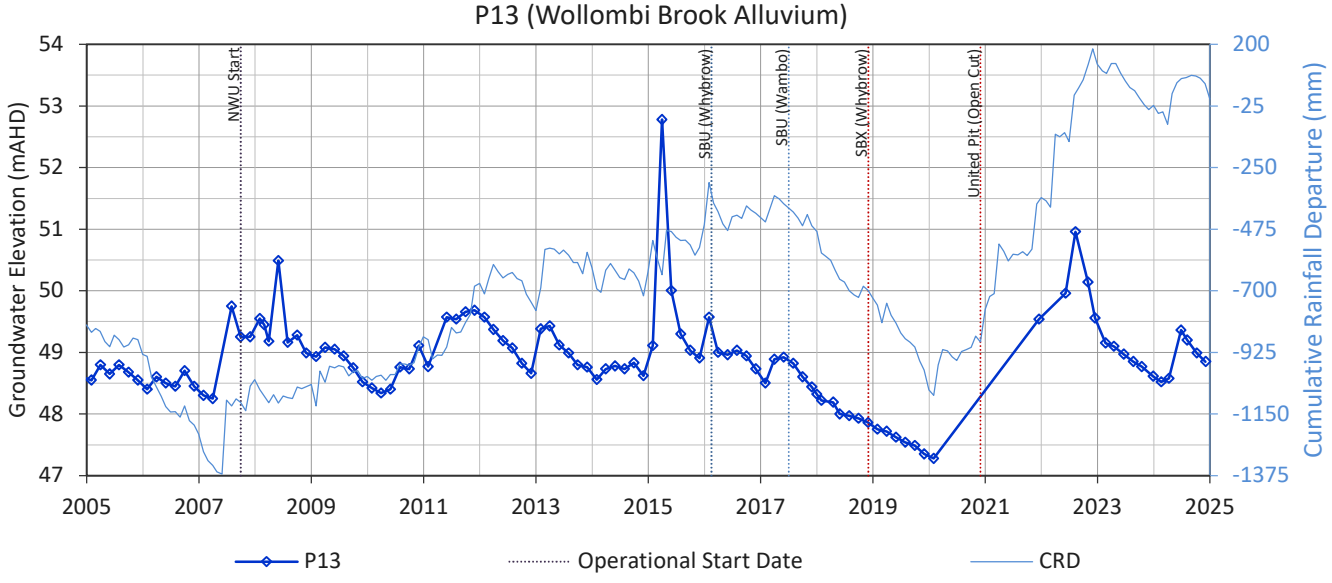

GW22 (Wollombi Brook Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW22
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

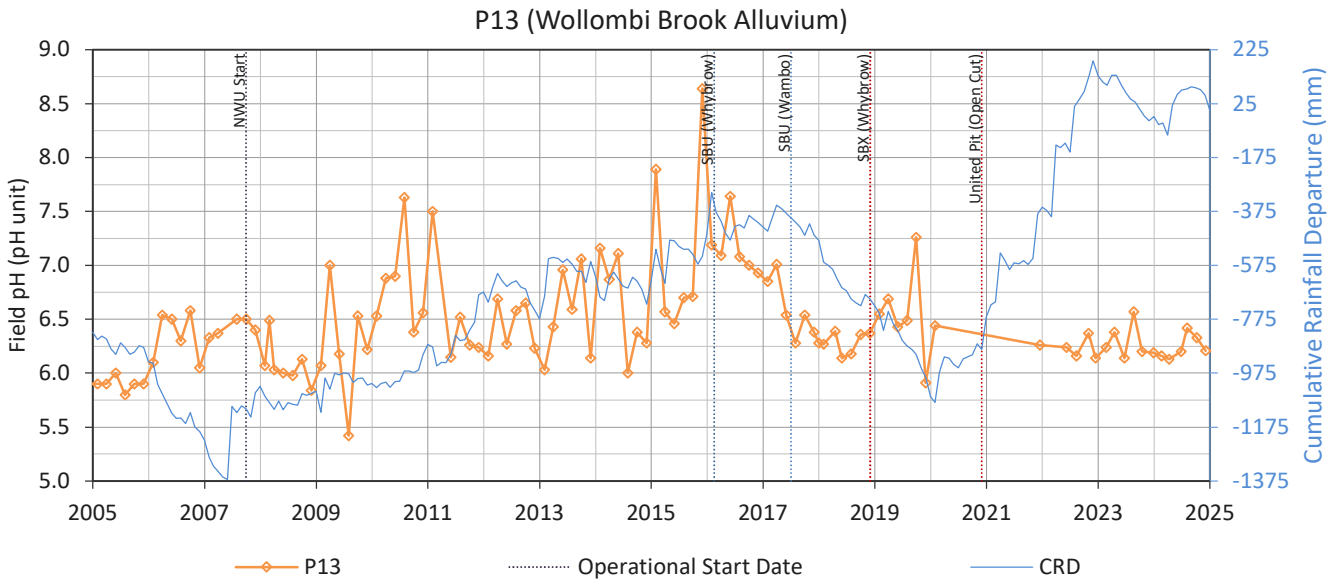

GW22 (Wollombi Brook Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW22
EC Trigger
Operational Start Date
CRD

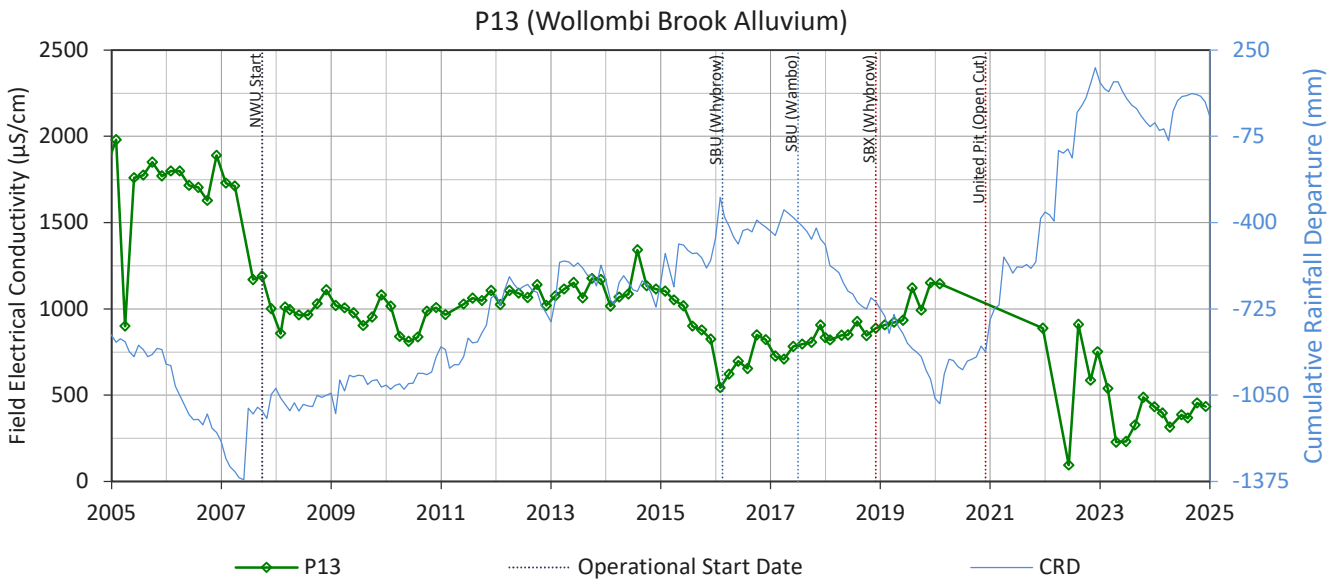

P12 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P12
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

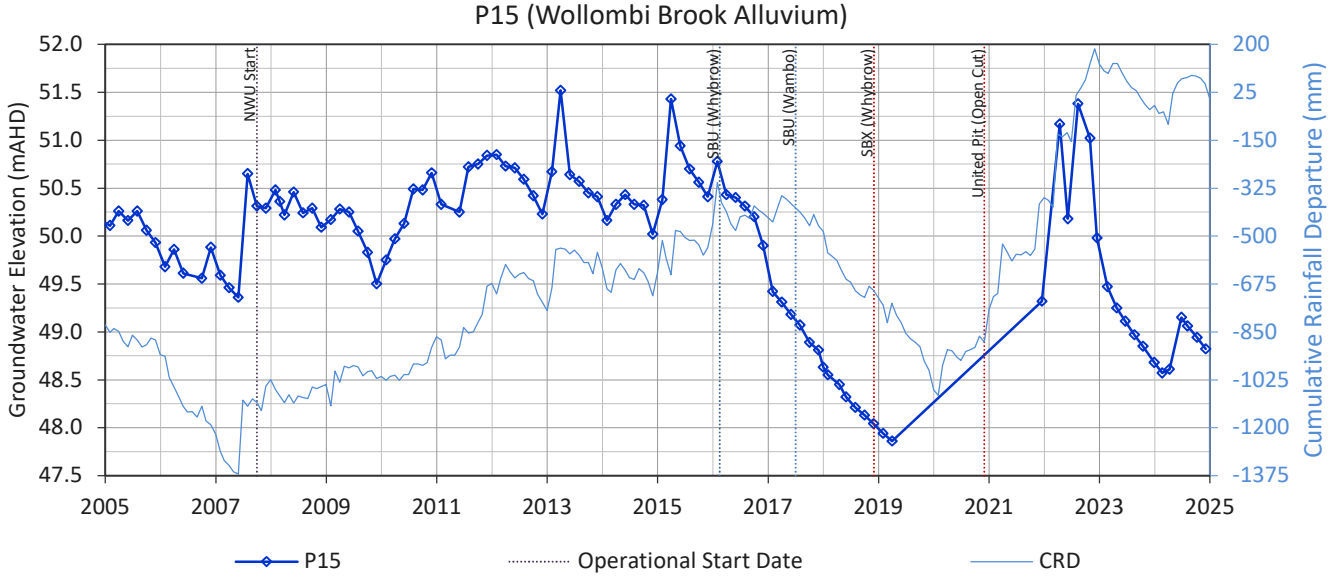

P12 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P12
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

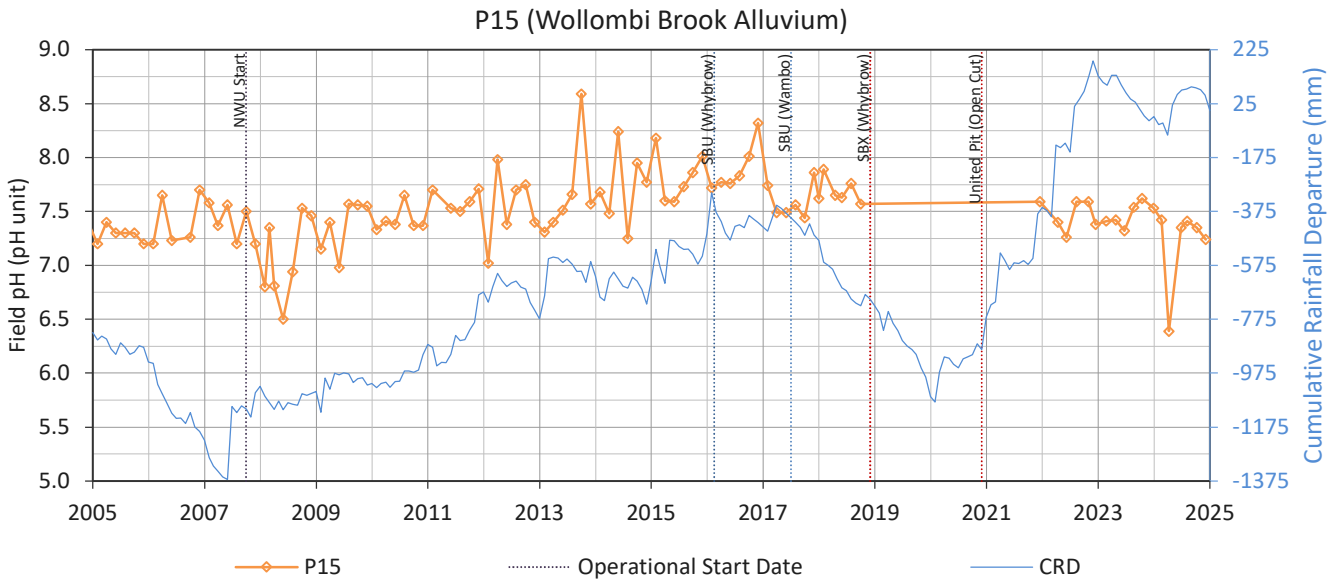

P12 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P12
EC Trigger
Operational Start Date
CRD

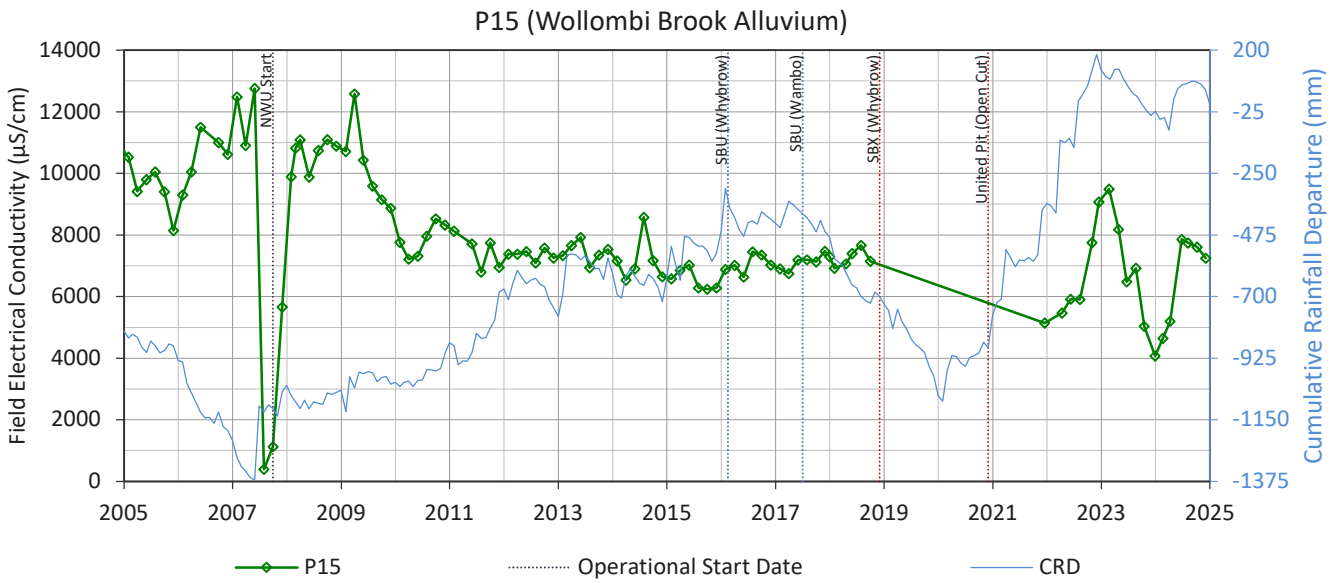

P13 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P13
Operational Start Date
CRD

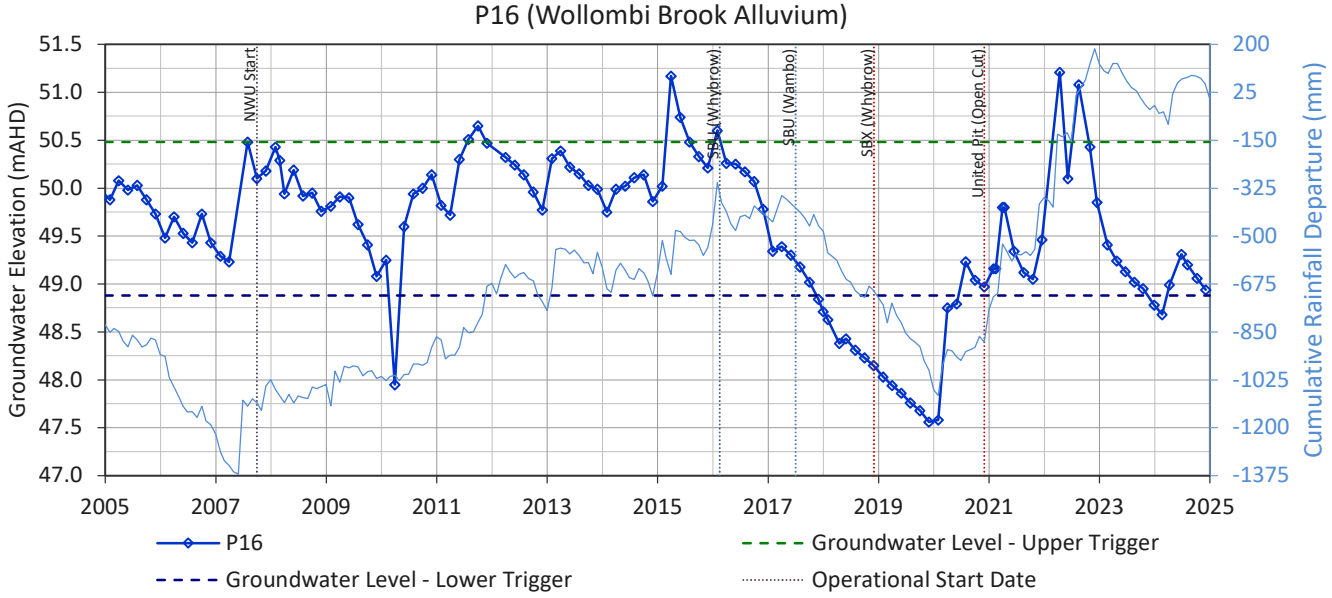

P13 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P13
Operational Start Date
CRD

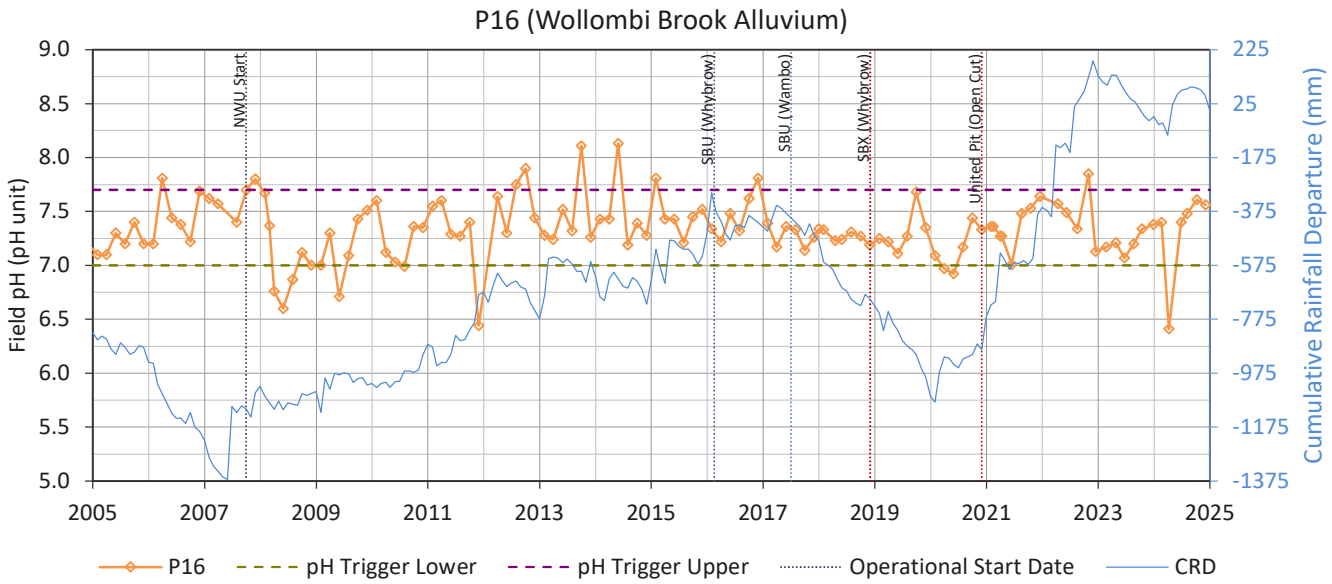

P13 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P13
Operational Start Date
CRD

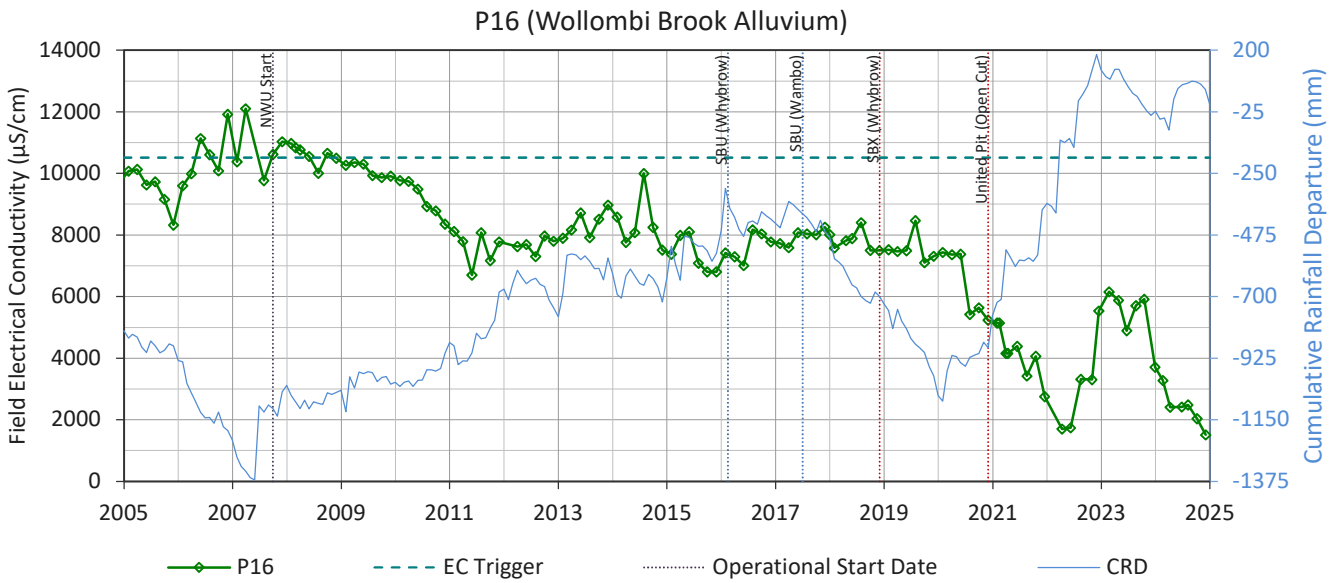

P15 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P15
Operational Start Date
CRD

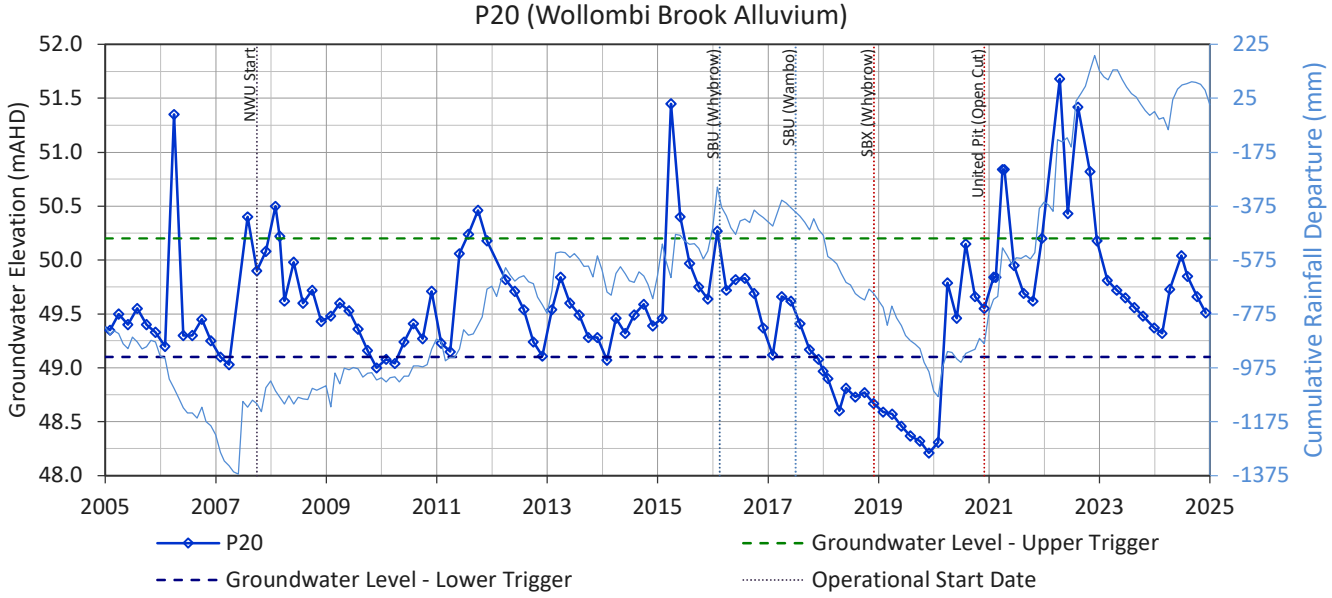

P15 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P15
Operational Start Date
CRD

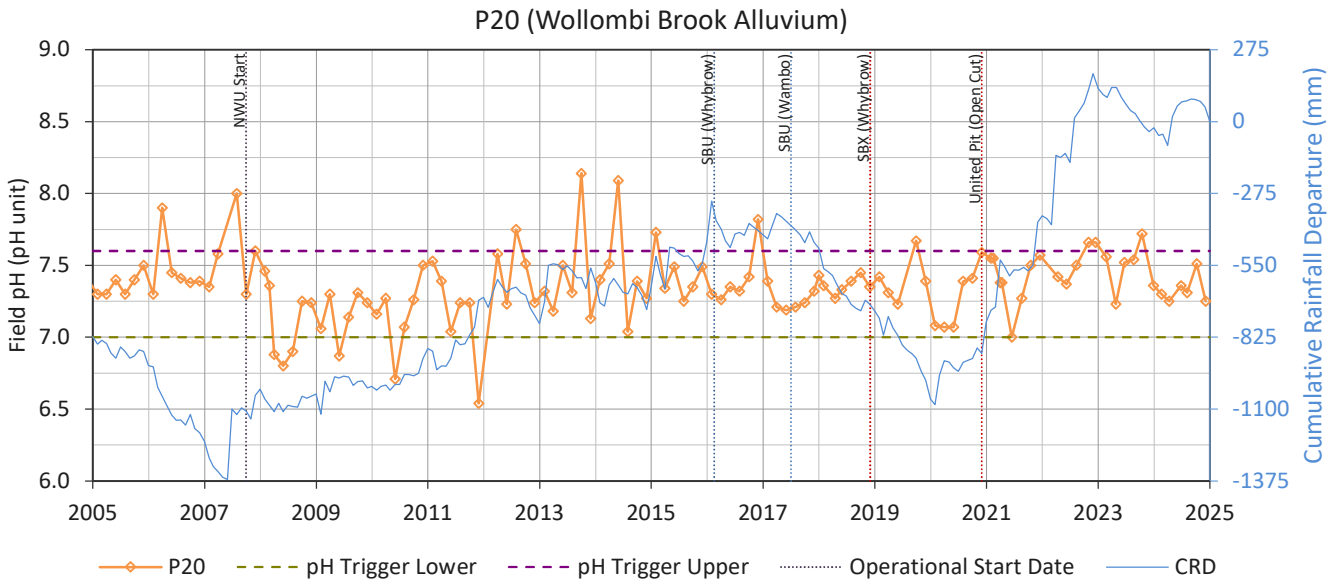

P15 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P15
Operational Start Date
CRD

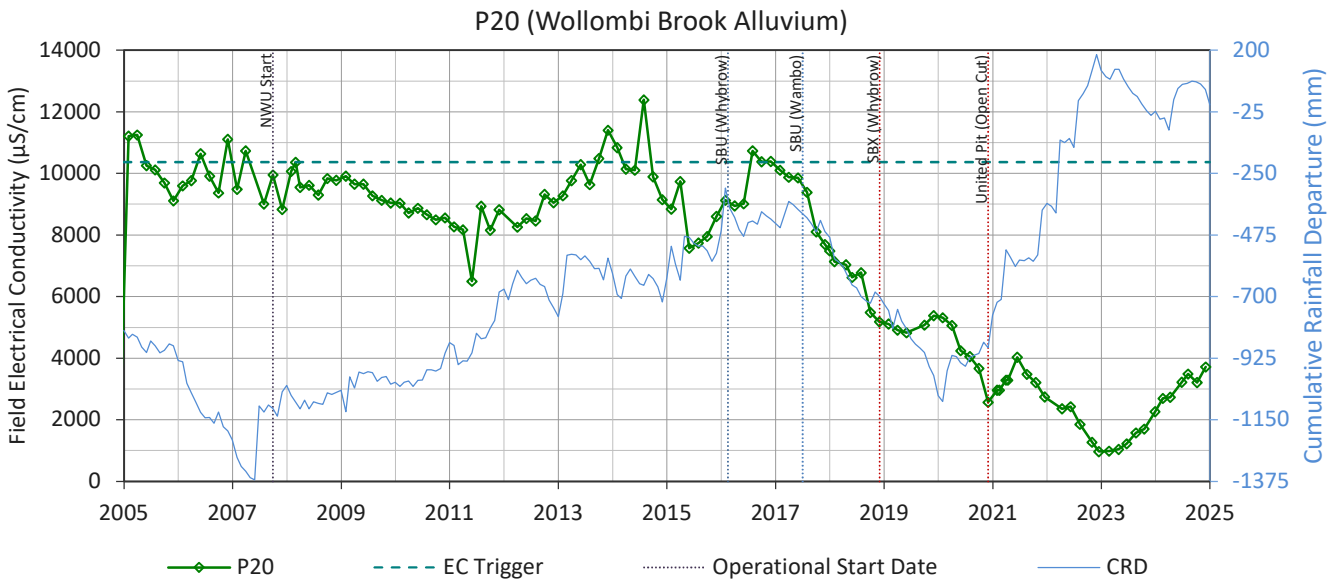

P16 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P16
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

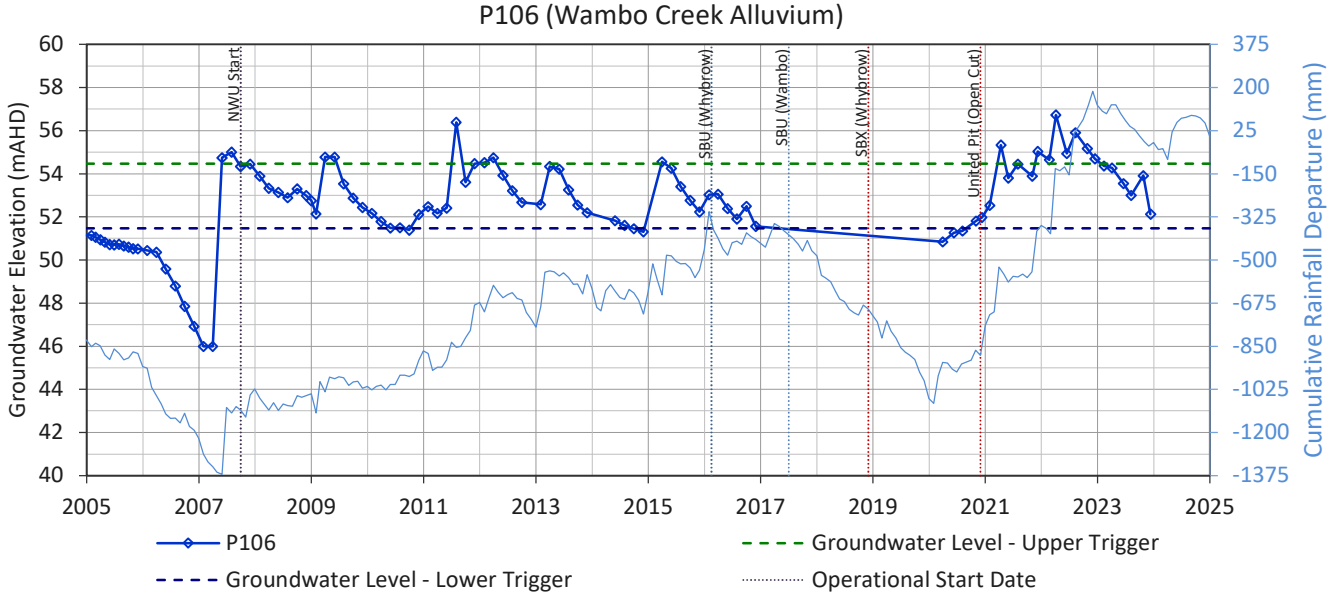

P16 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P16
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

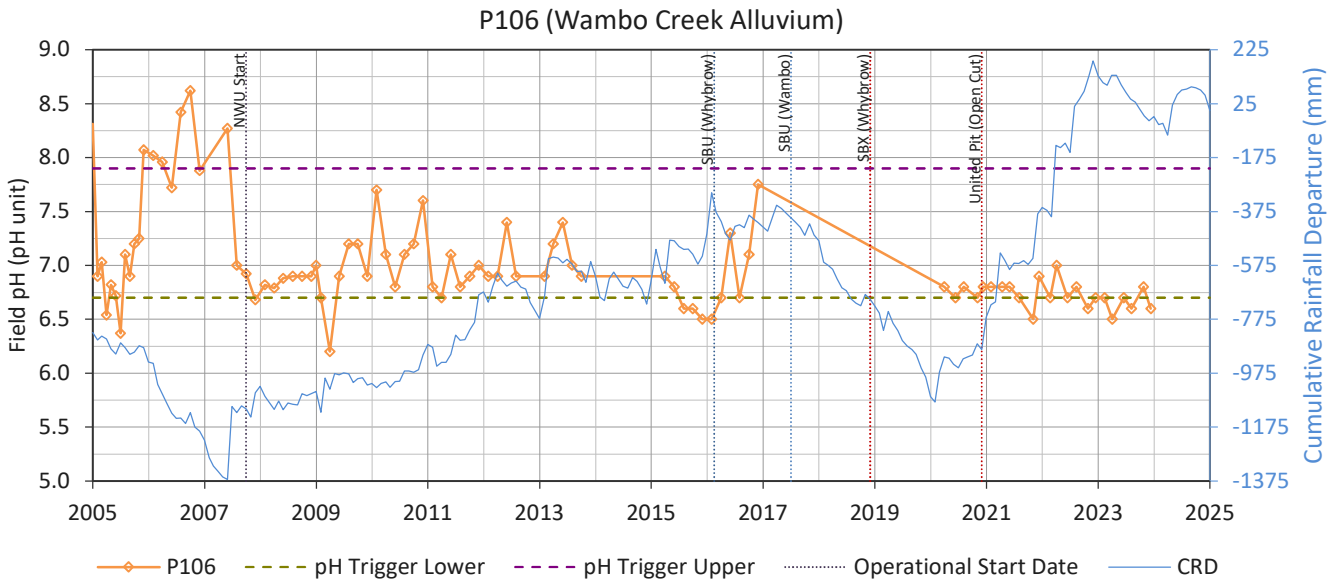

P16 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P16
EC Trigger
Operational Start Date
CRD

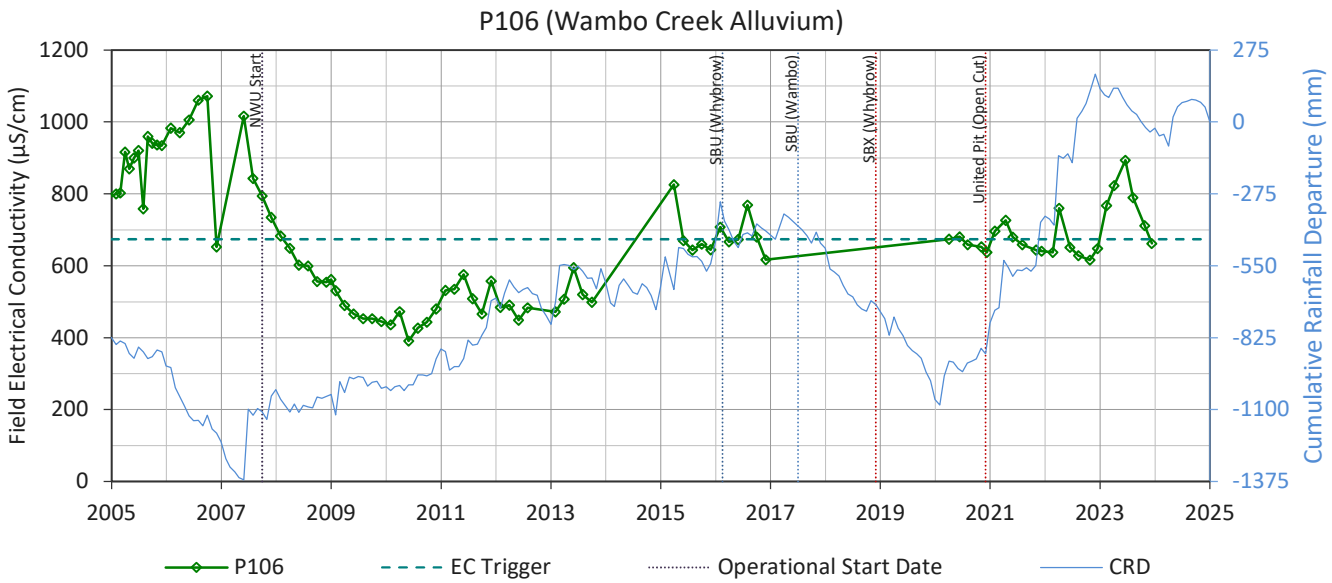

P20 (Wollombi Brook Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P20
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

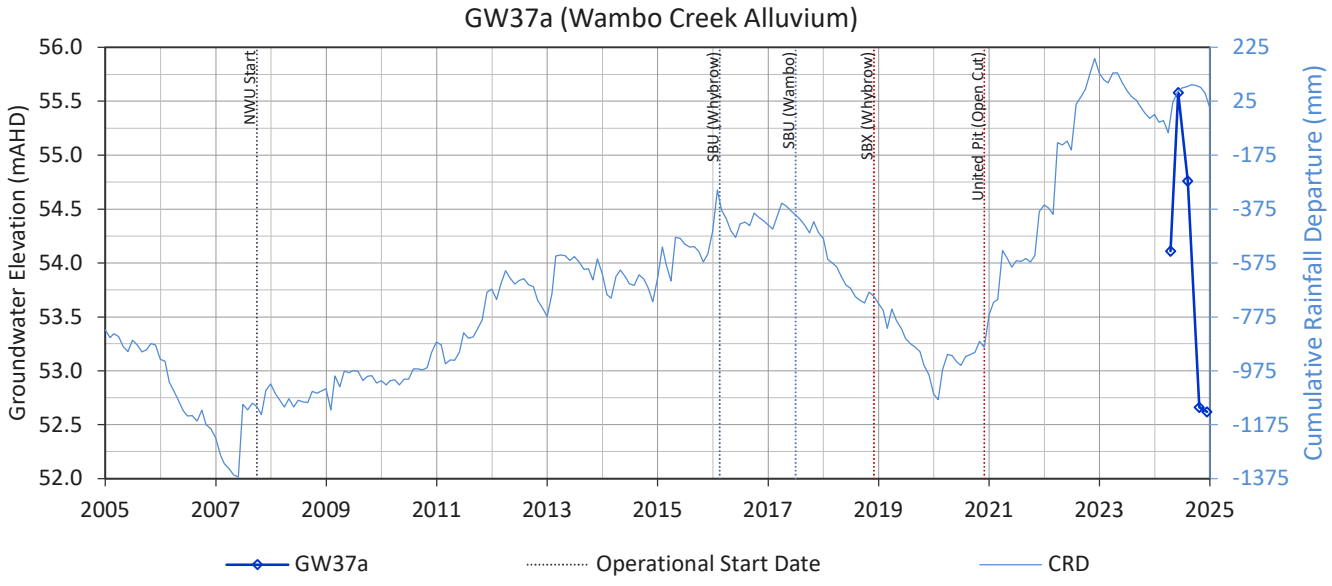

P20 (Wollombi Brook Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P20
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

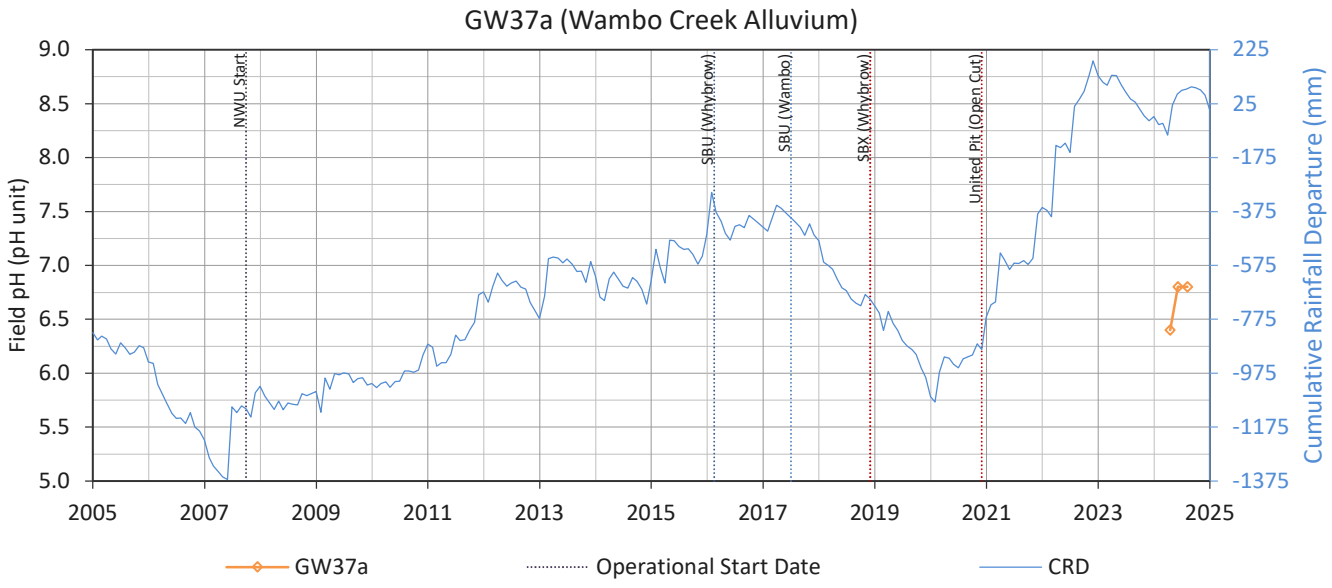

P20 (Wollombi Brook Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P20
EC Trigger
Operational Start Date
CRD

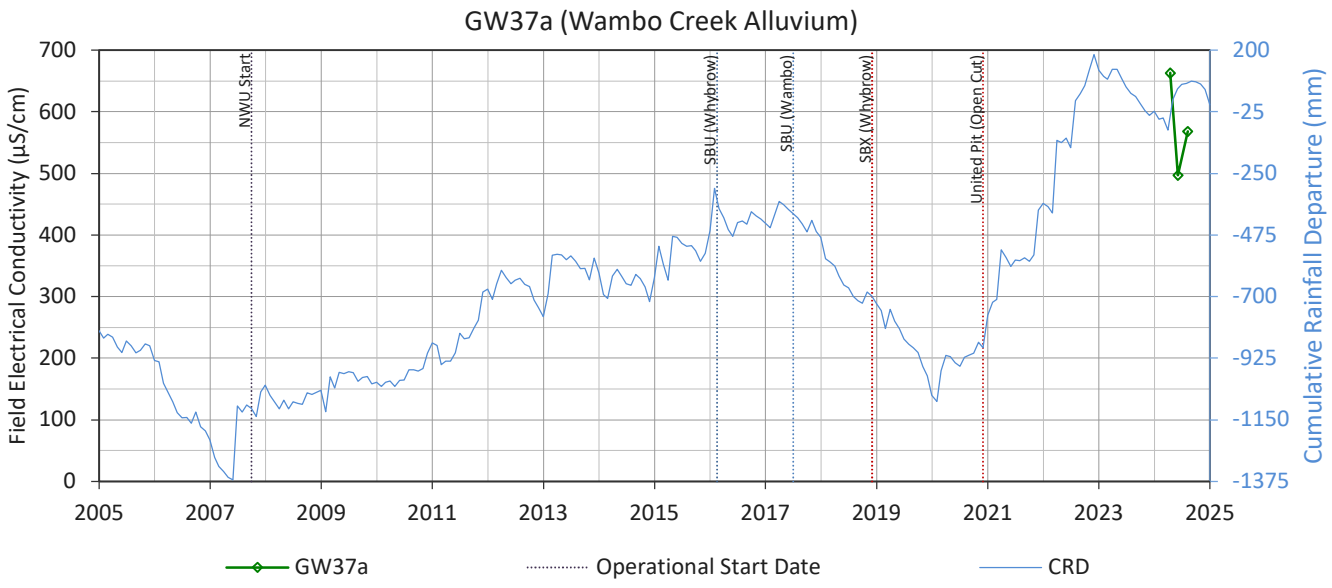

P106 (Wambo Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P106
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

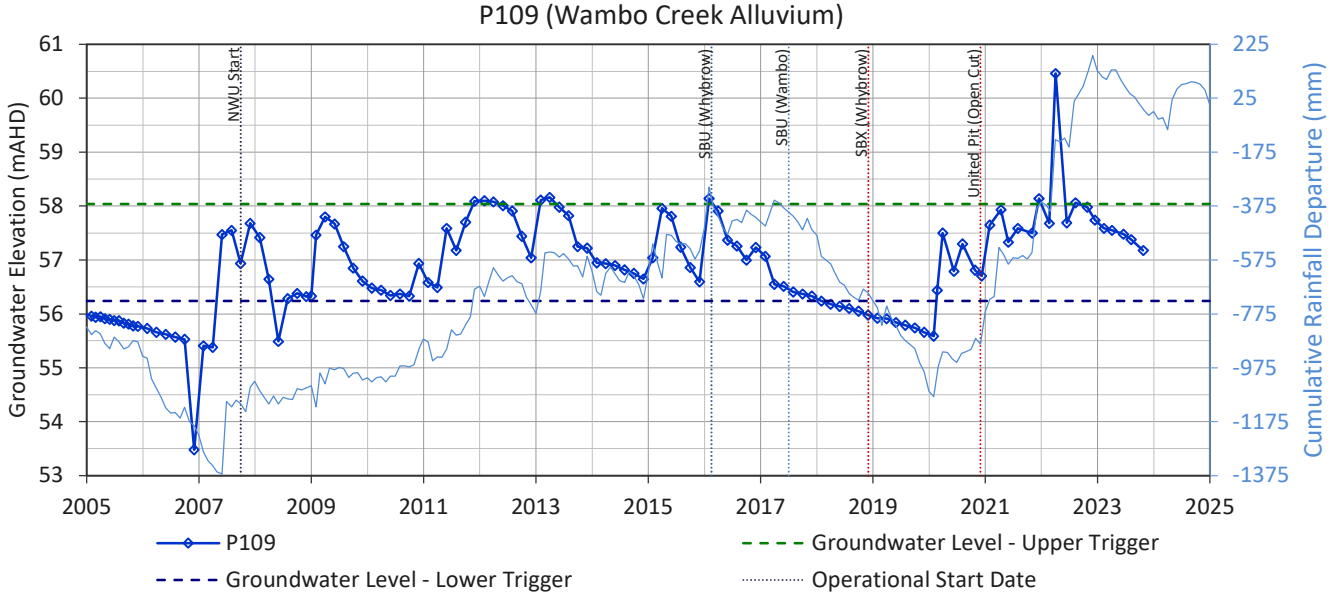

P106 (Wambo Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P106
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

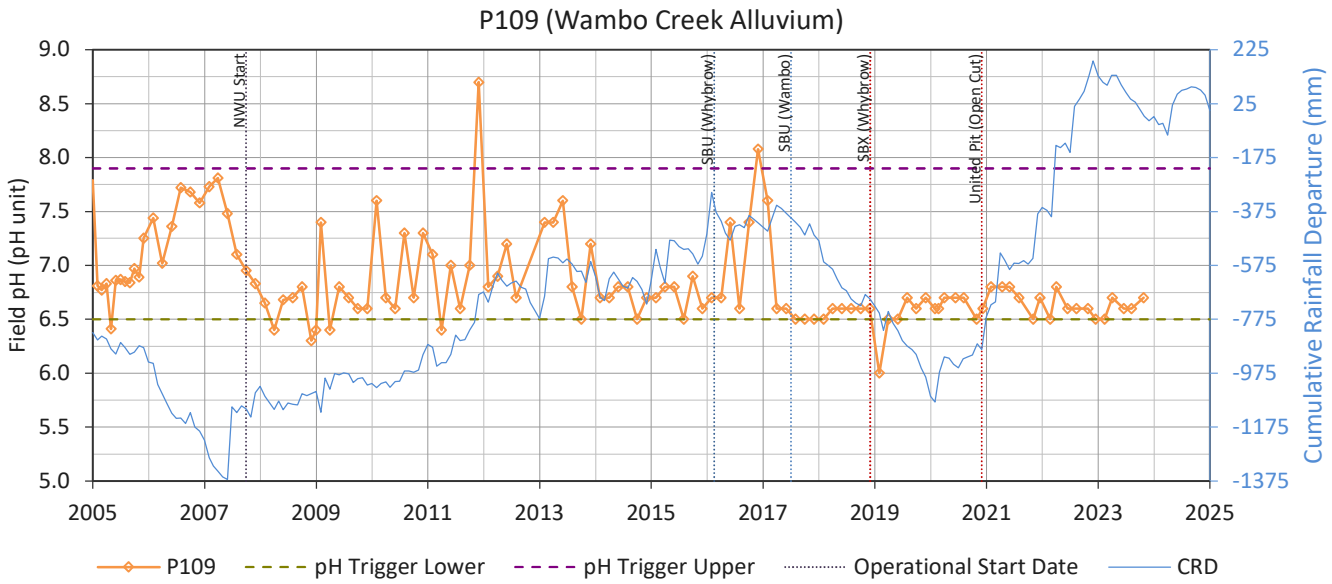

P106 (Wambo Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P106
EC Trigger
Operational Start Date
CRD

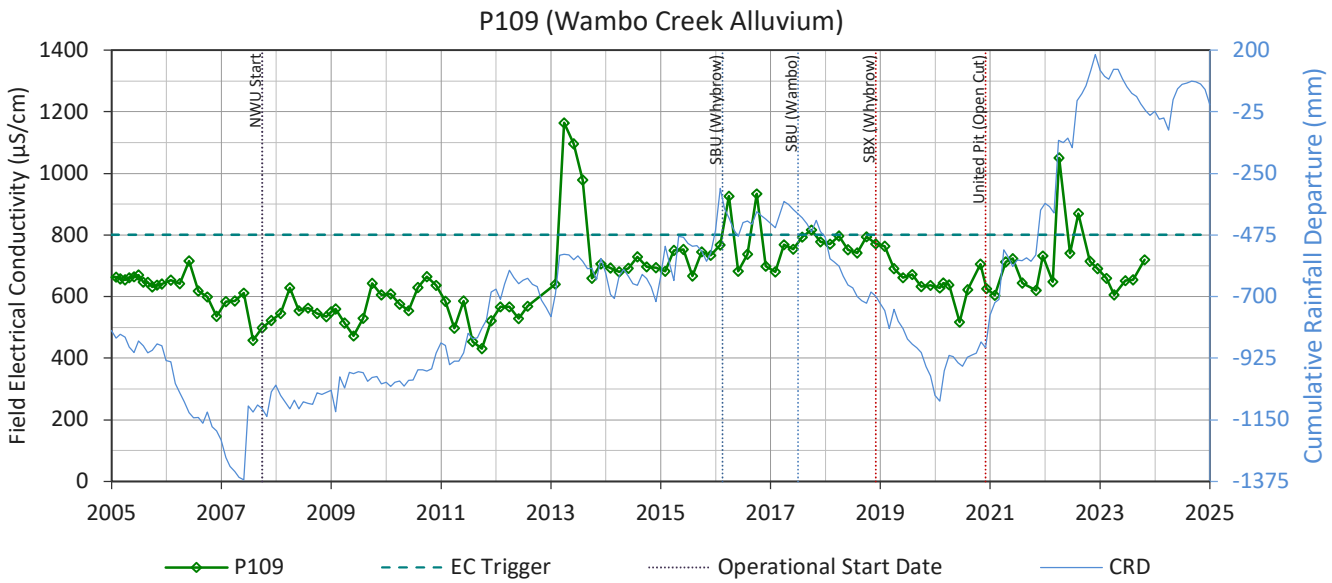

GW37a (Wambo Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW37a
Operational Start Date
CRD

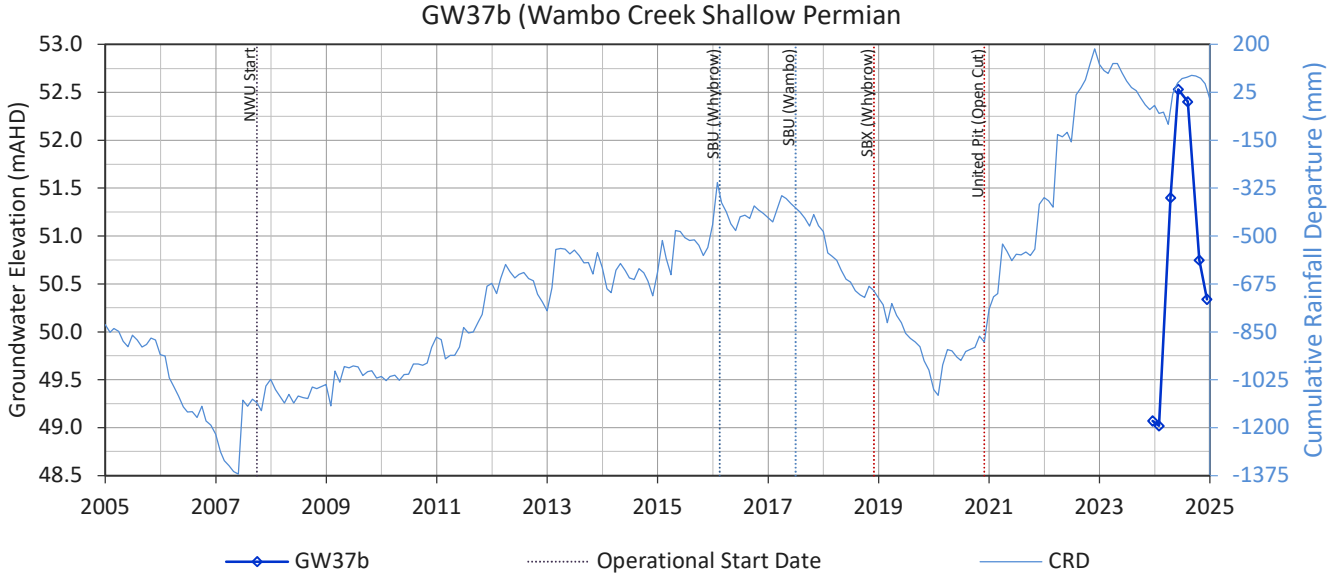

GW37a (Wambo Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW37a
Operational Start Date
CRD

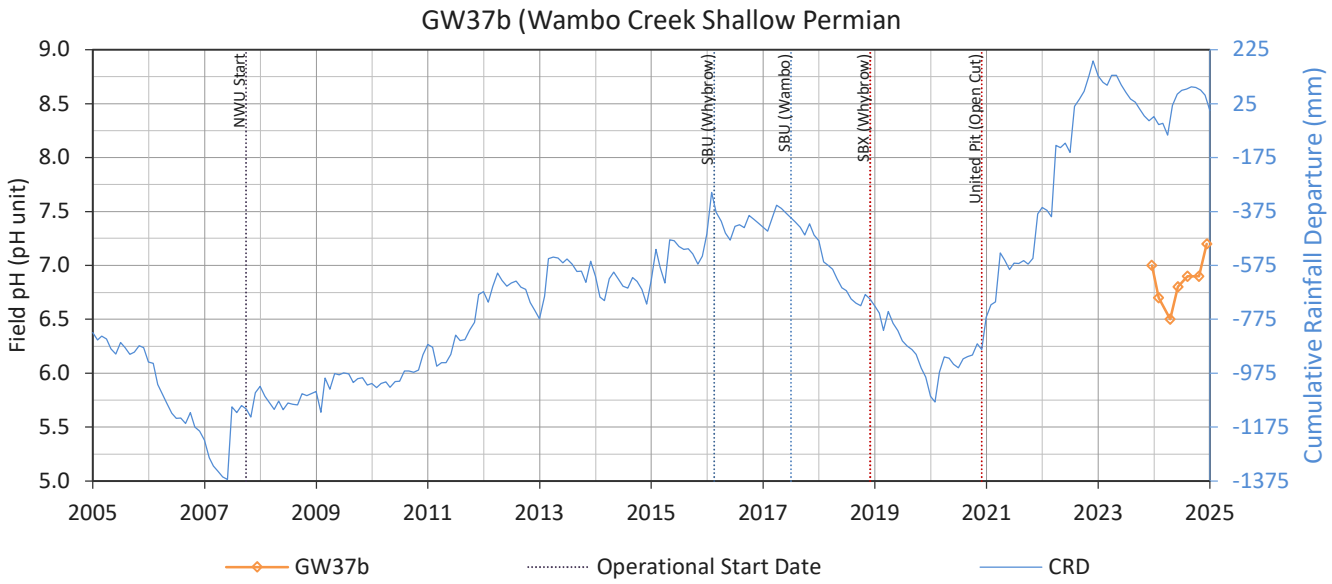

GW37a (Wambo Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW37a
Operational Start Date
CRD

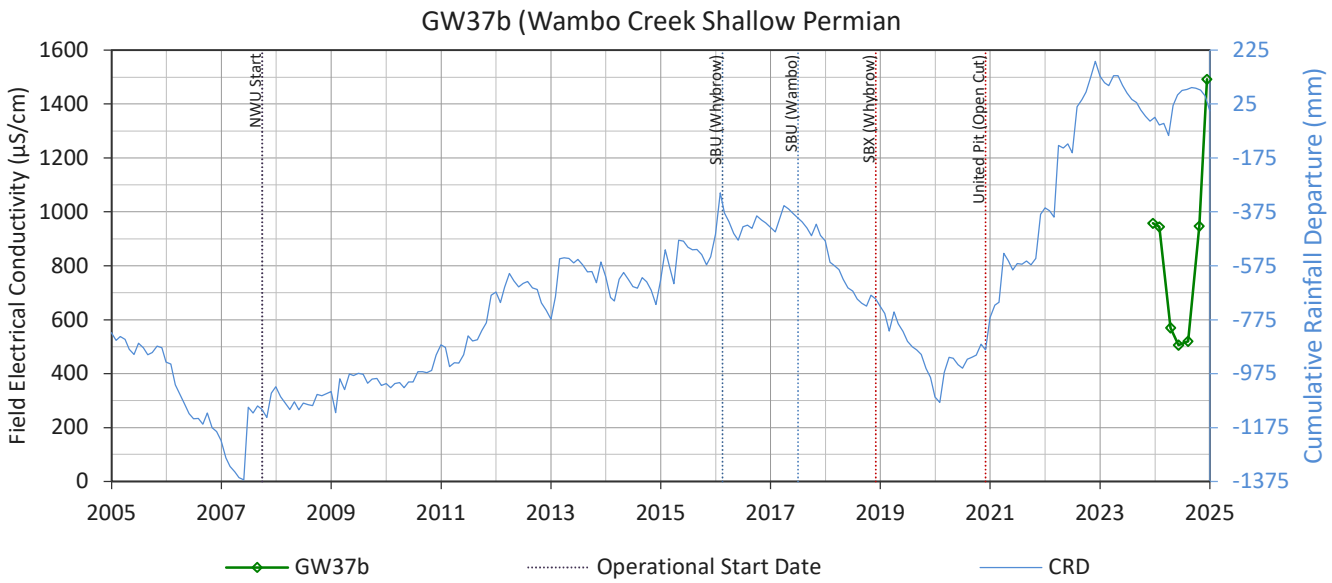

P109 (Wambo Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P109
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

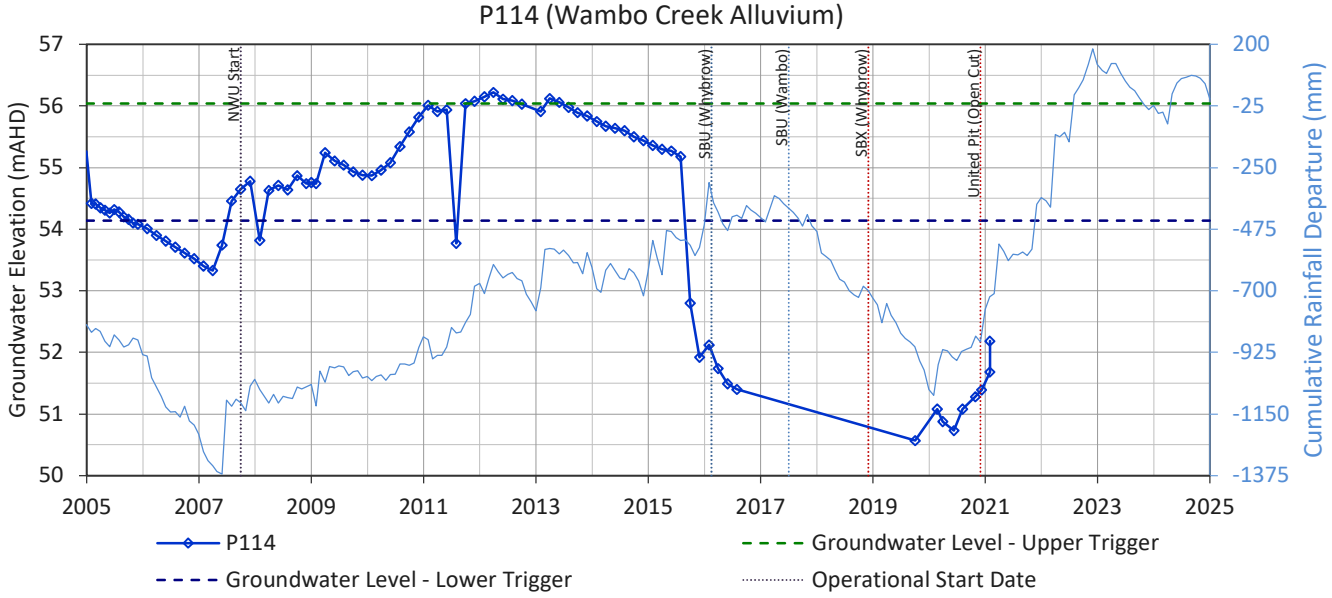

P109 (Wambo Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P109
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

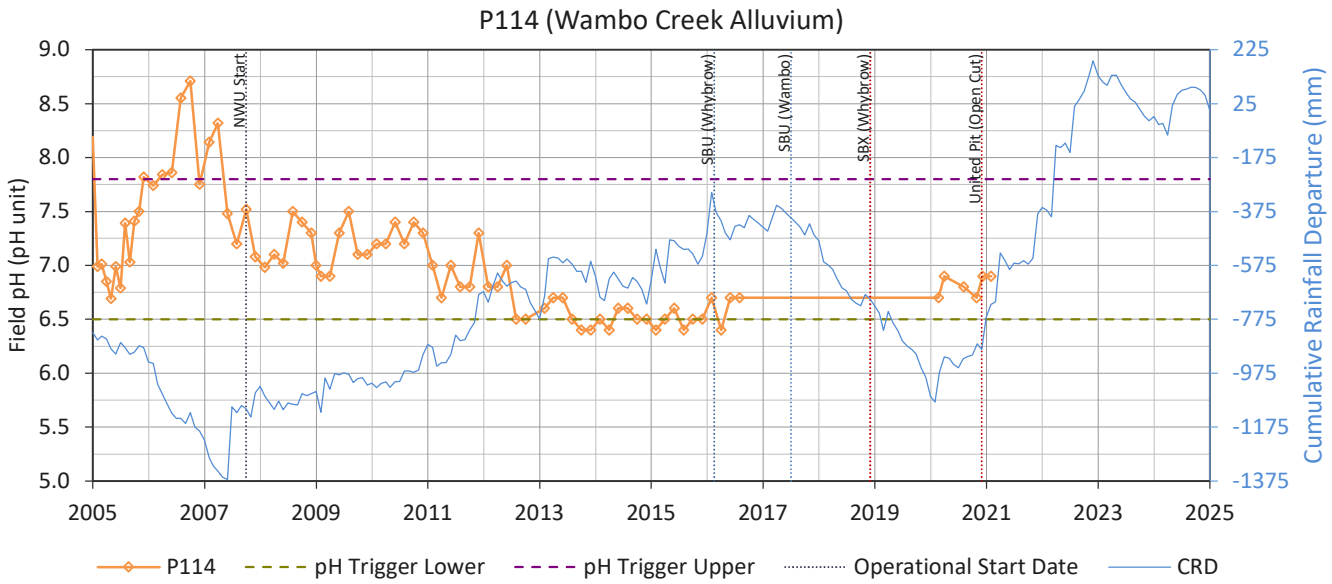

P109 (Wambo Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P109
EC Trigger
Operational Start Date
CRD

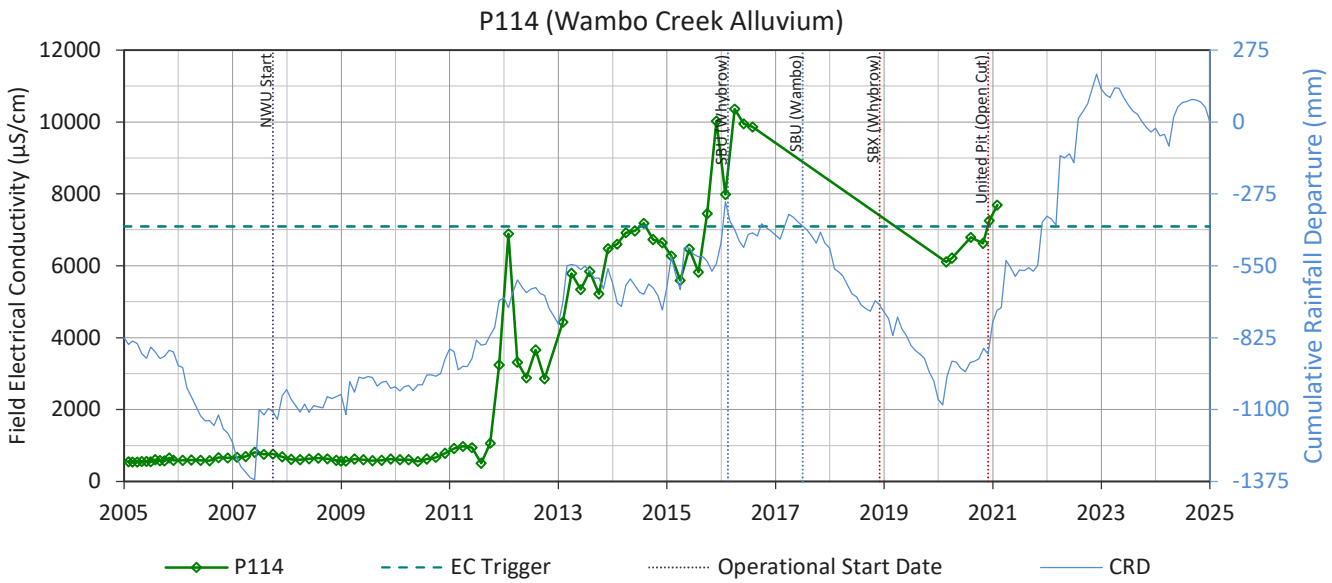

GW37b (Wambo Creek Shallow Permian
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW37b
Operational Start Date
CRD

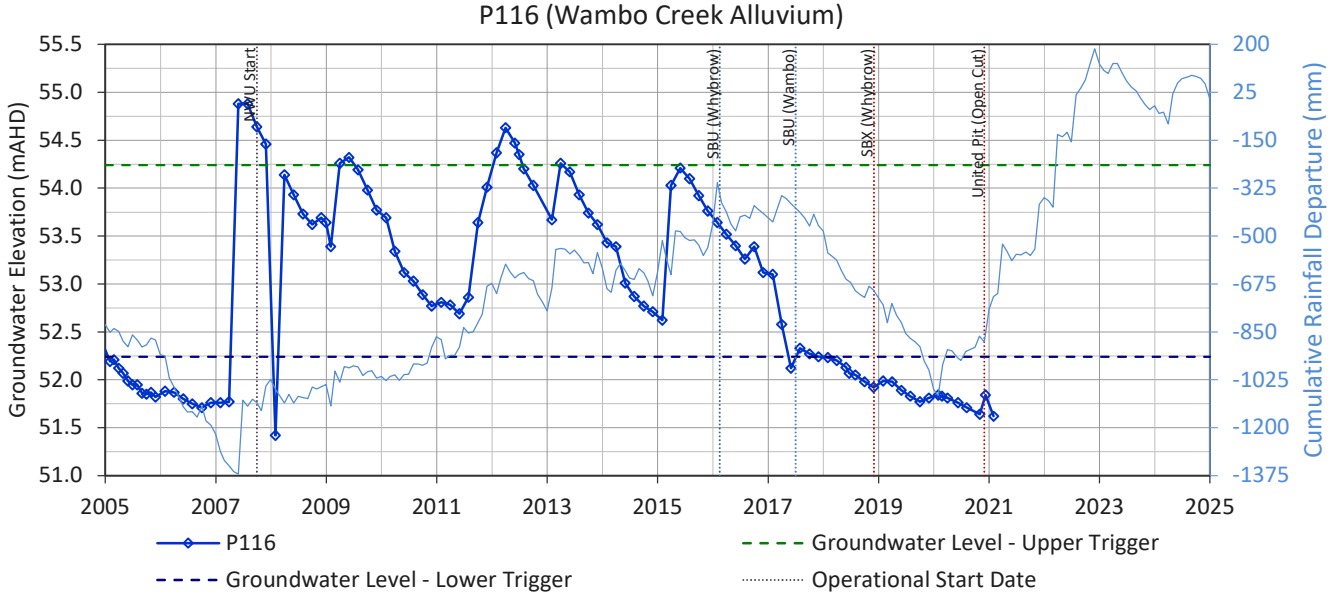

GW37b (Wambo Creek Shallow Permian
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW37b
Operational Start Date
CRD

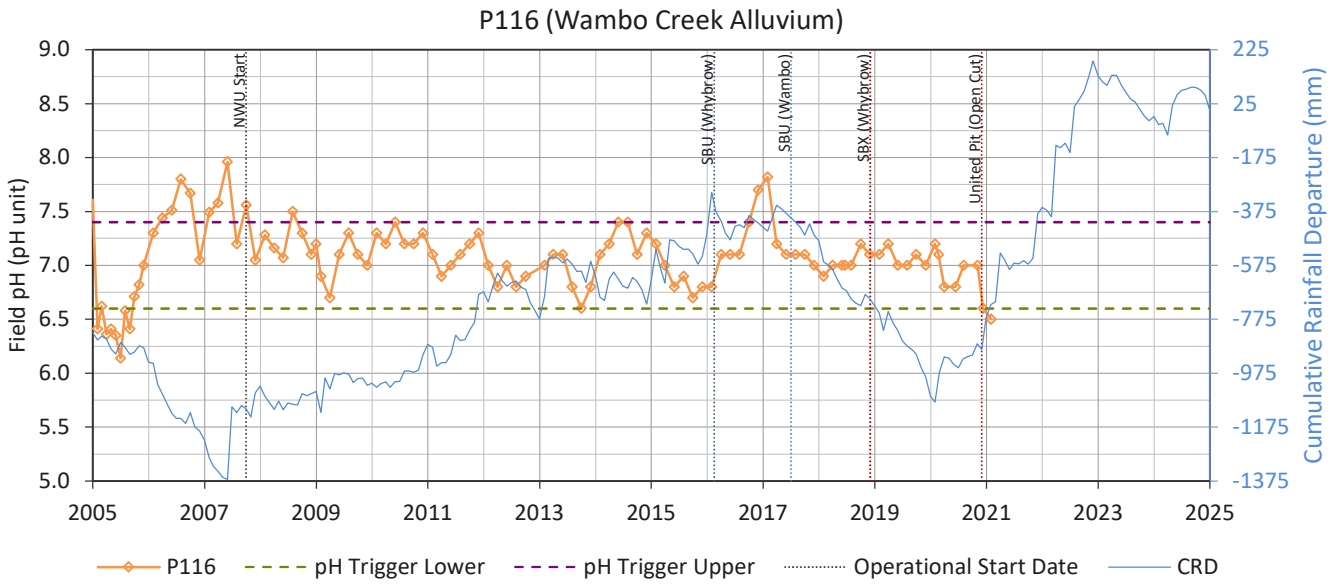

GW37b (Wambo Creek Shallow Permian
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW37b
Operational Start Date
CRD

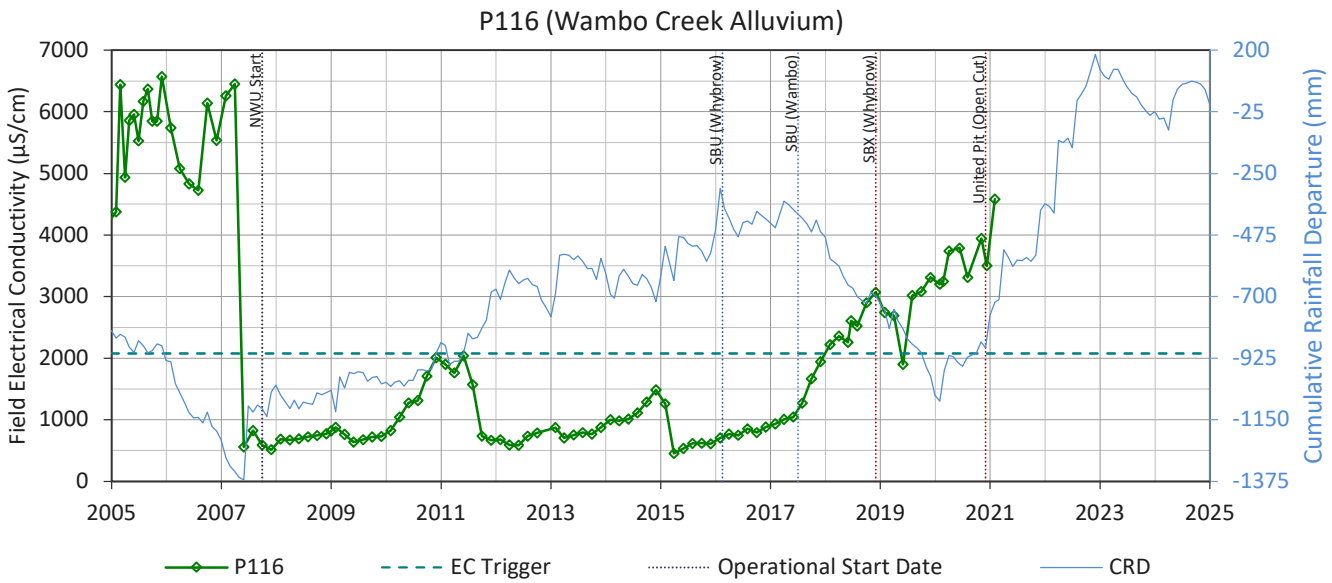

P114 (Wambo Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P114
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

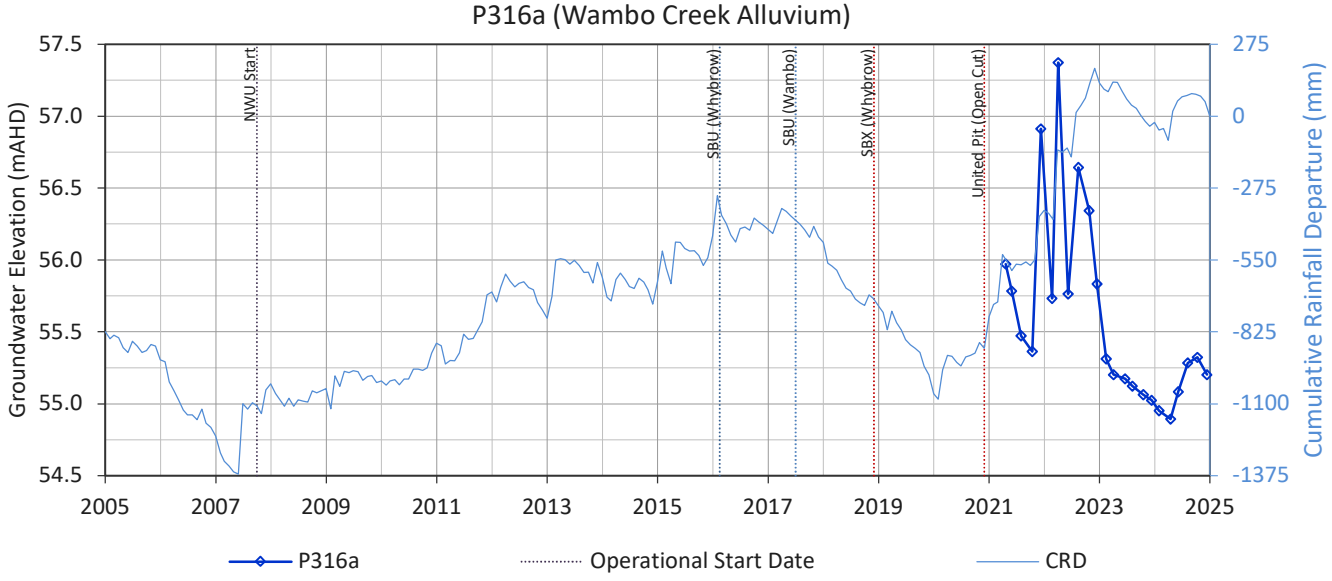

P114 (Wambo Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P114
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

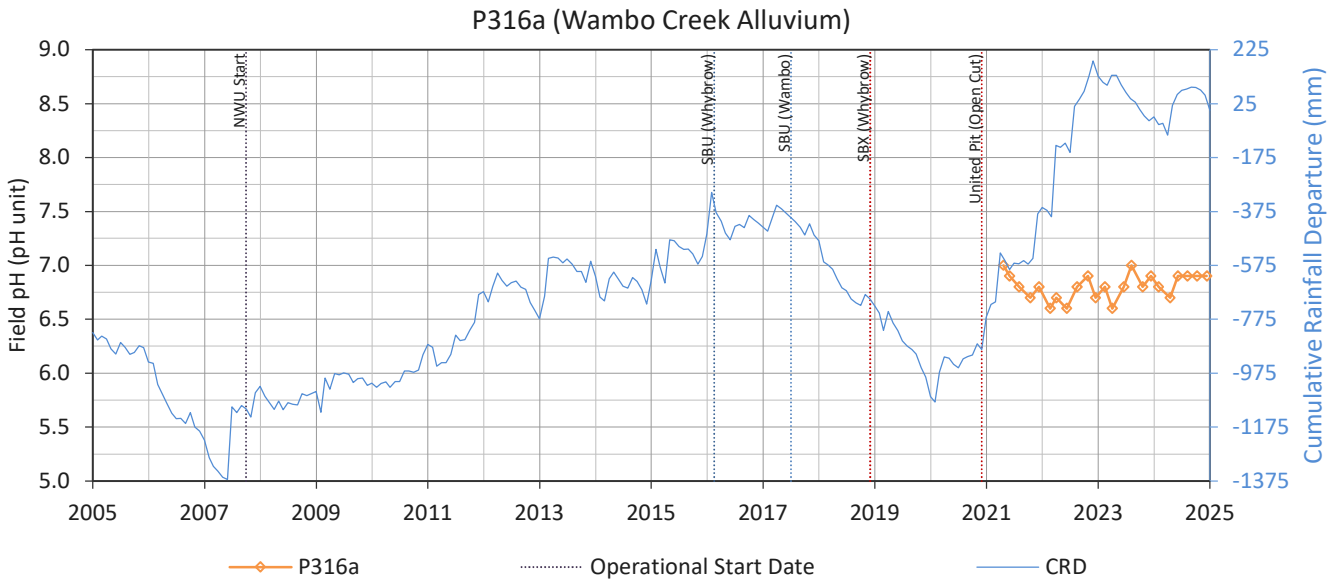

P114 (Wambo Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P114
EC Trigger
Operational Start Date
CRD

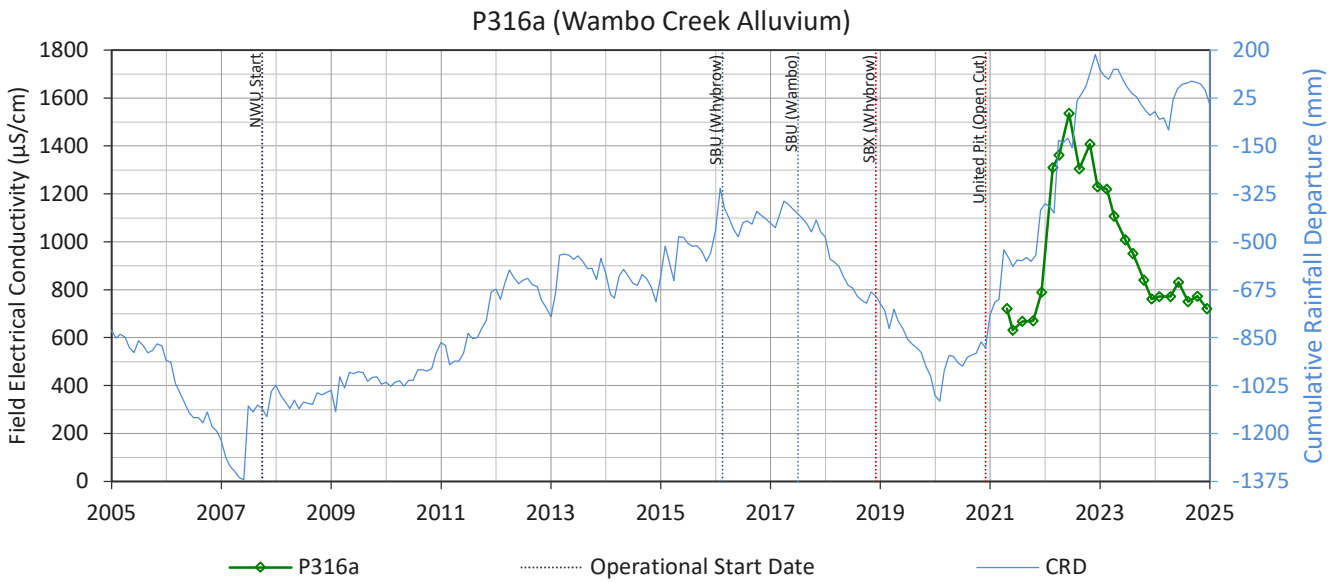

P116 (Wambo Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P116
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

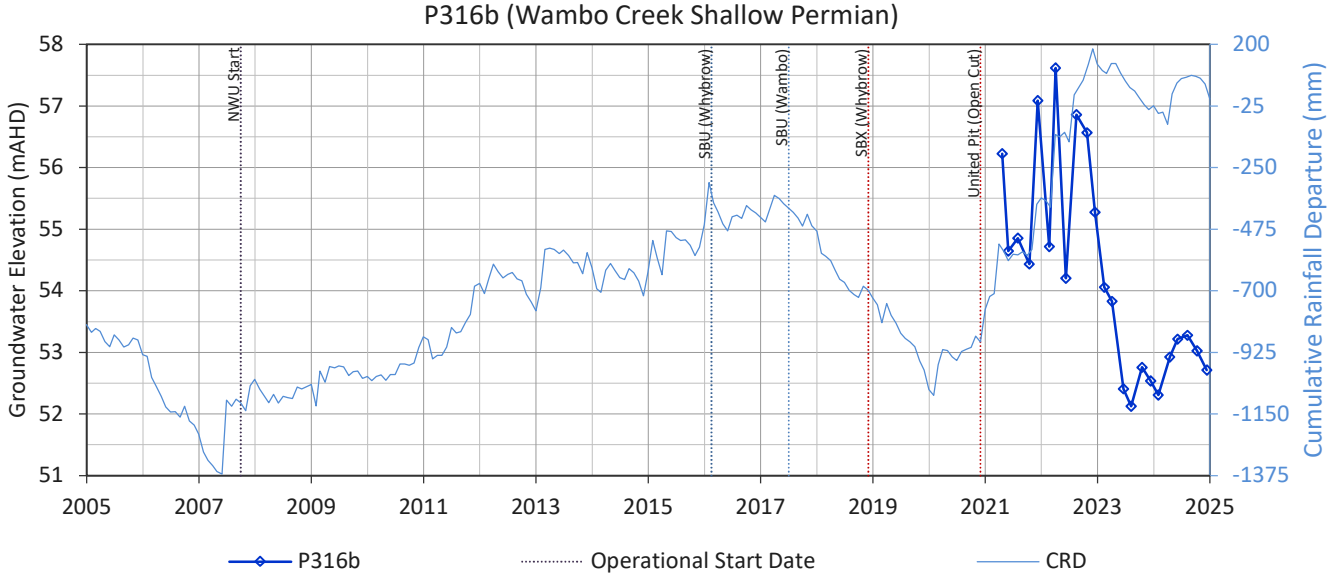

P116 (Wambo Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P116
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

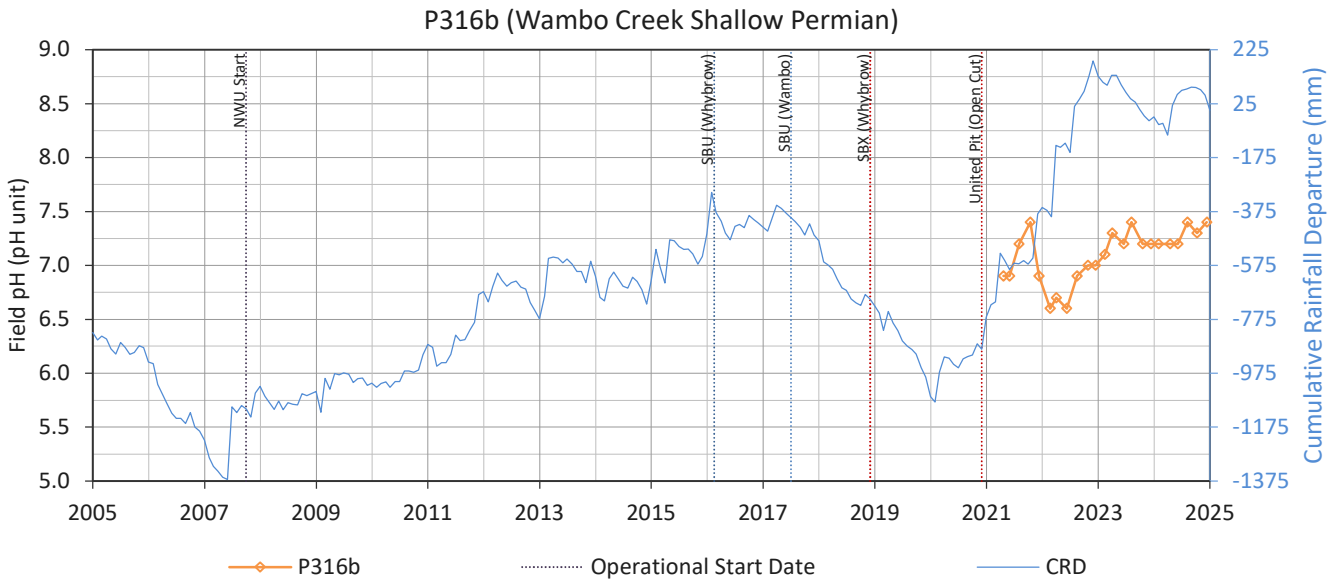

P116 (Wambo Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P116
EC Trigger
Operational Start Date
CRD

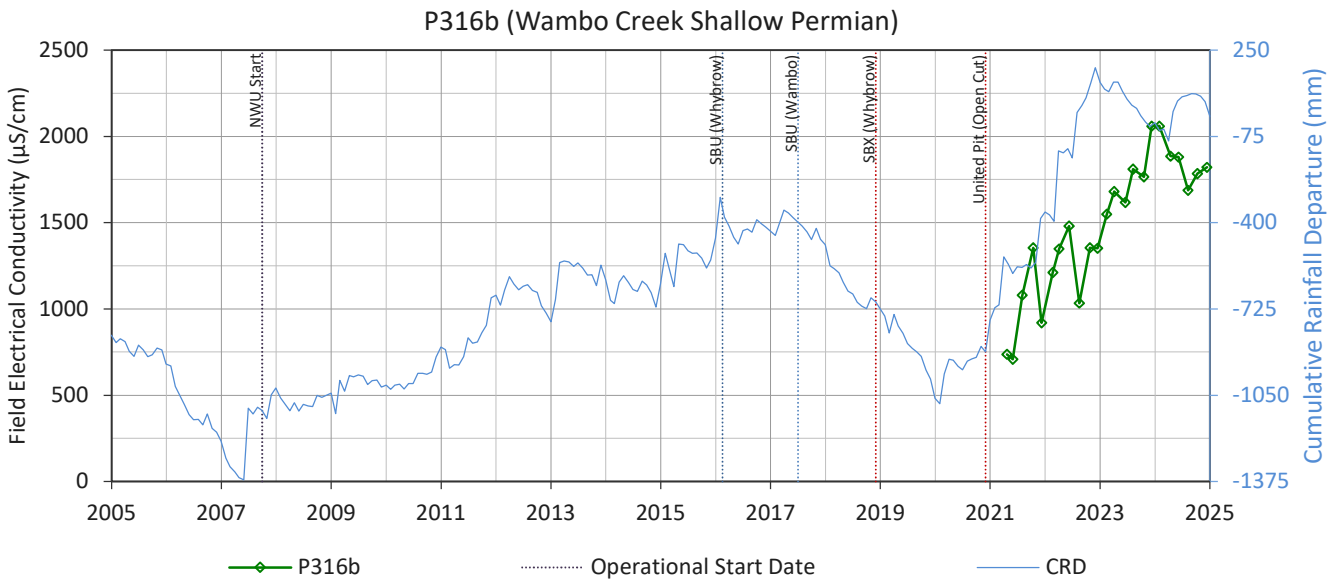

P316a (Wambo Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316a
Operational Start Date
CRD

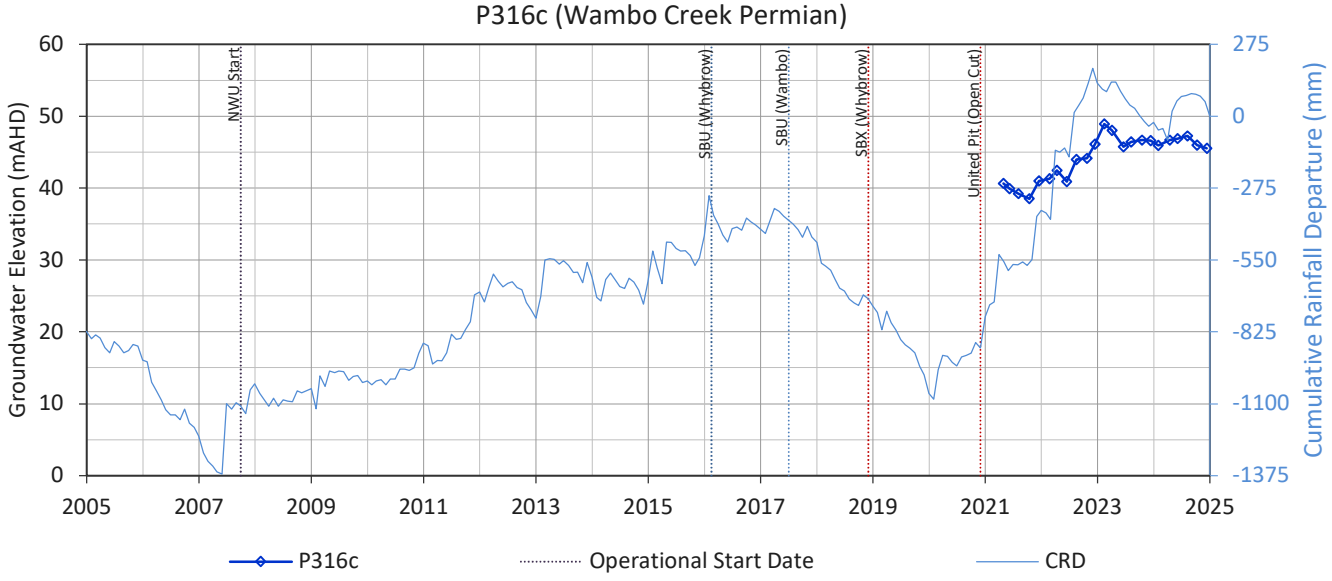

P316a (Wambo Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316a
Operational Start Date
CRD

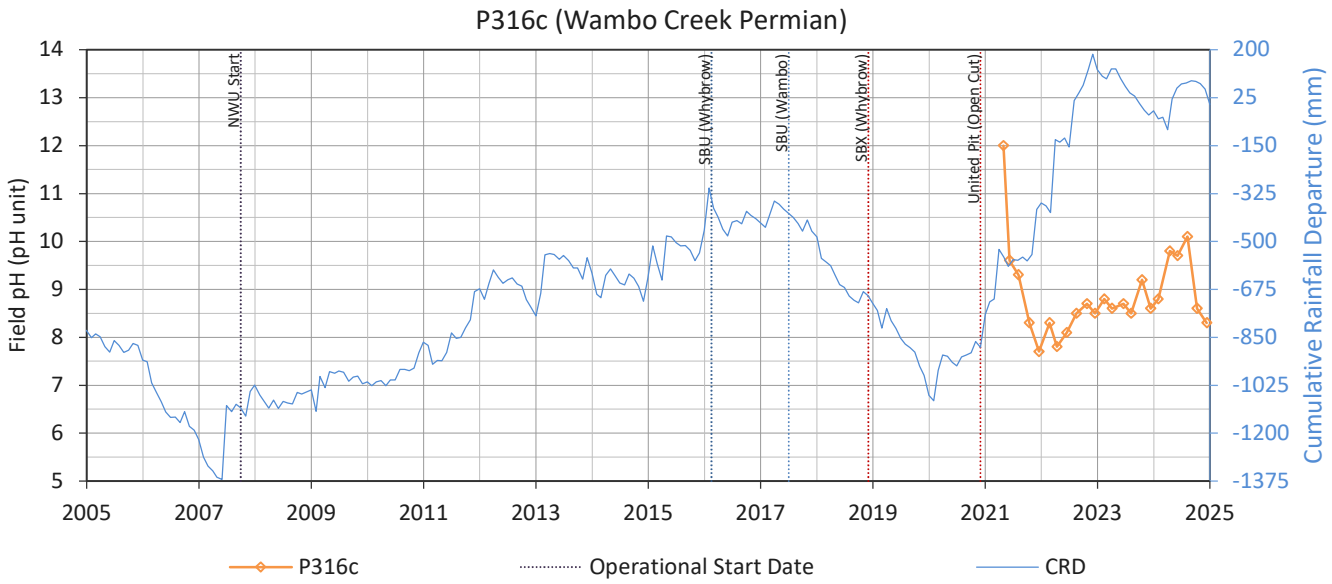

P316a (Wambo Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316a
Operational Start Date
CRD

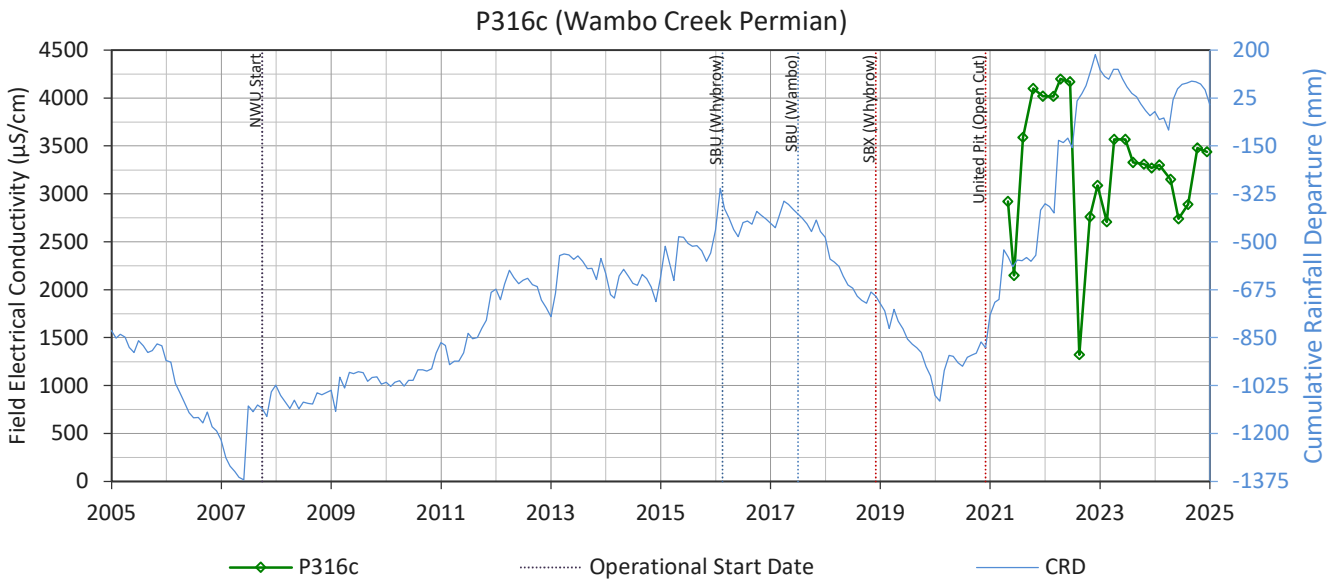

P316b (Wambo Creek Shallow Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316b
Operational Start Date
CRD

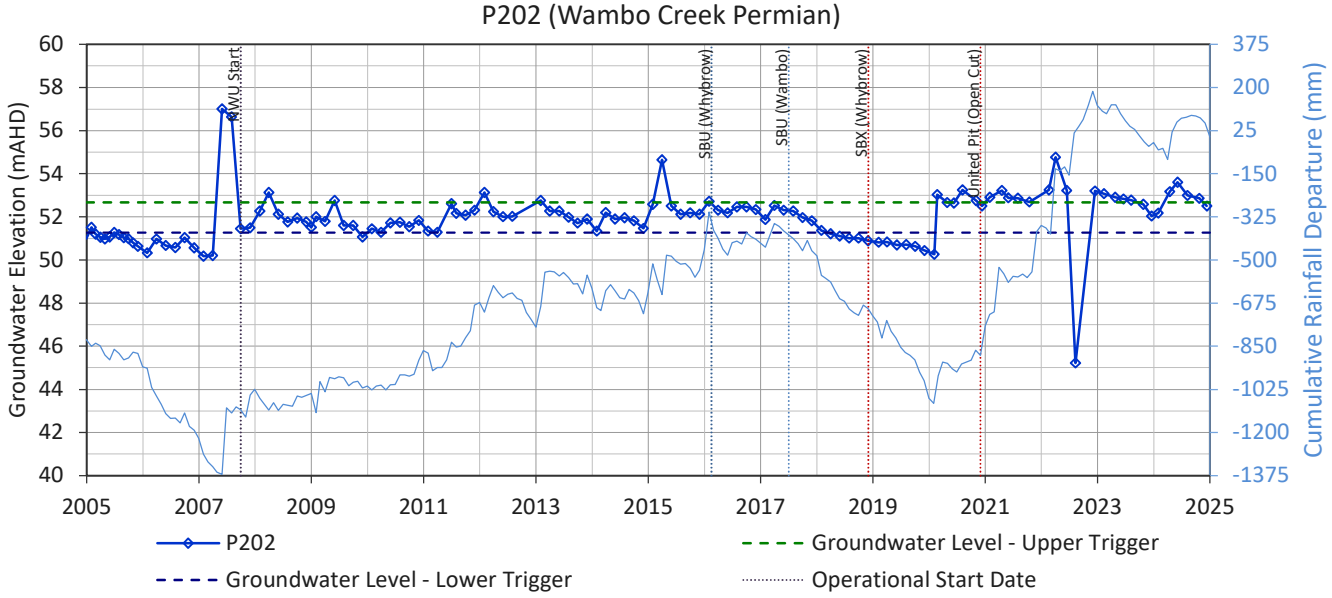

P316b (Wambo Creek Shallow Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316b
Operational Start Date
CRD

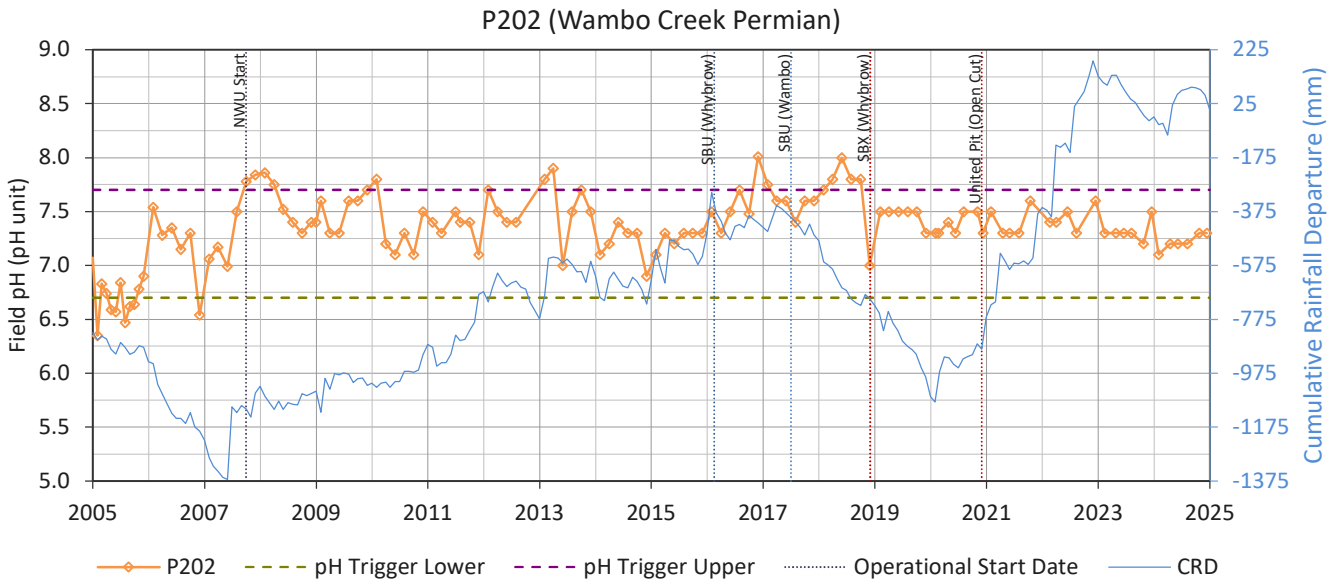

P316b (Wambo Creek Shallow Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316b
Operational Start Date
CRD

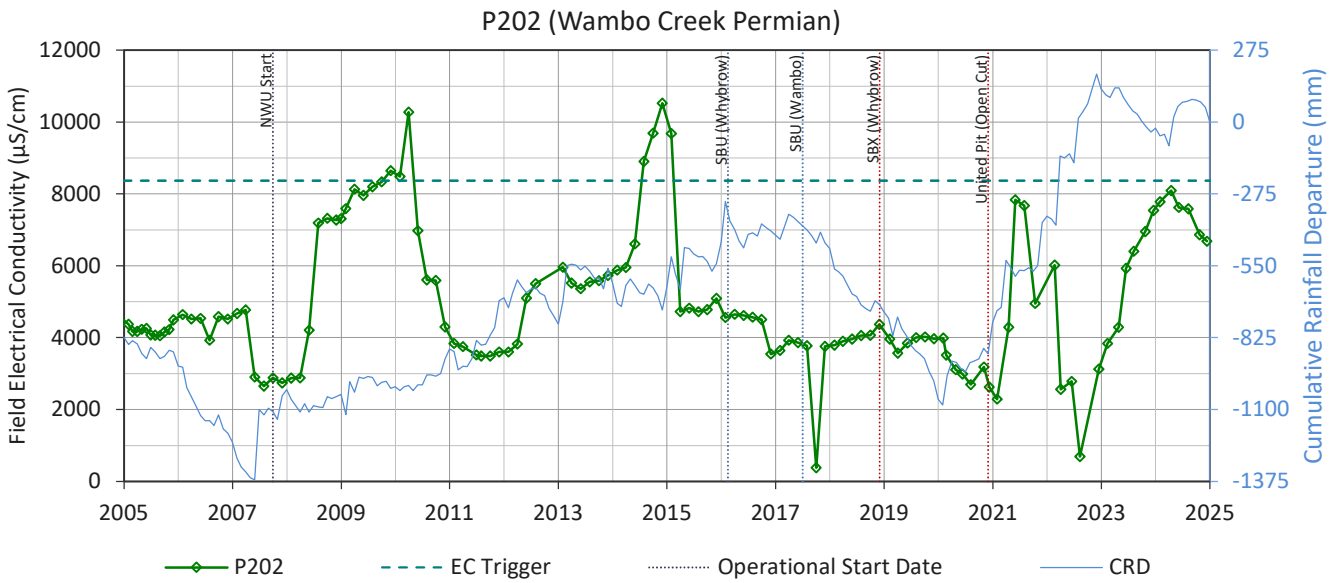

P316c (Wambo Creek Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316c
Operational Start Date
CRD

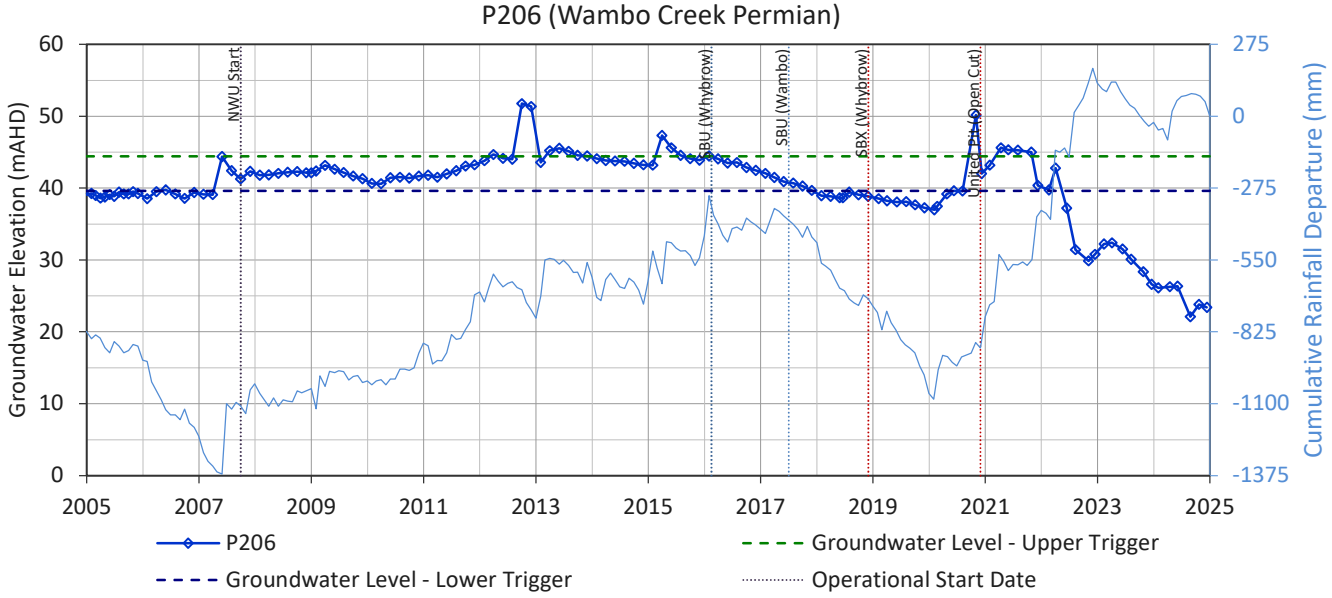

P316c (Wambo Creek Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316c
Operational Start Date
CRD

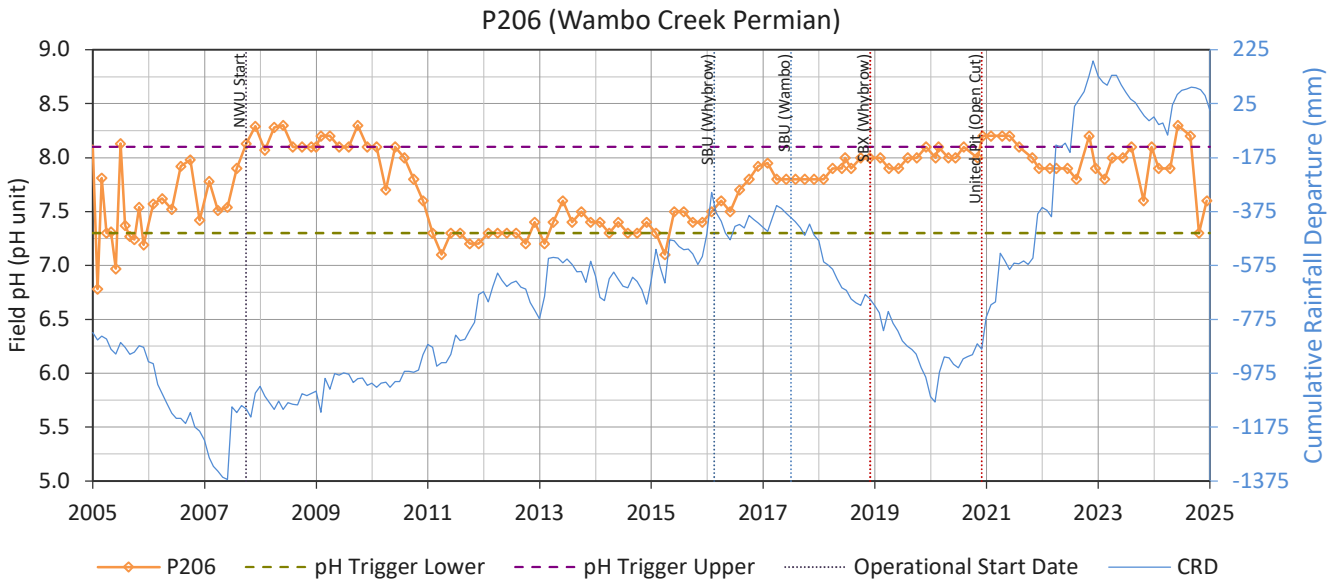

P316c (Wambo Creek Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P316c
Operational Start Date
CRD

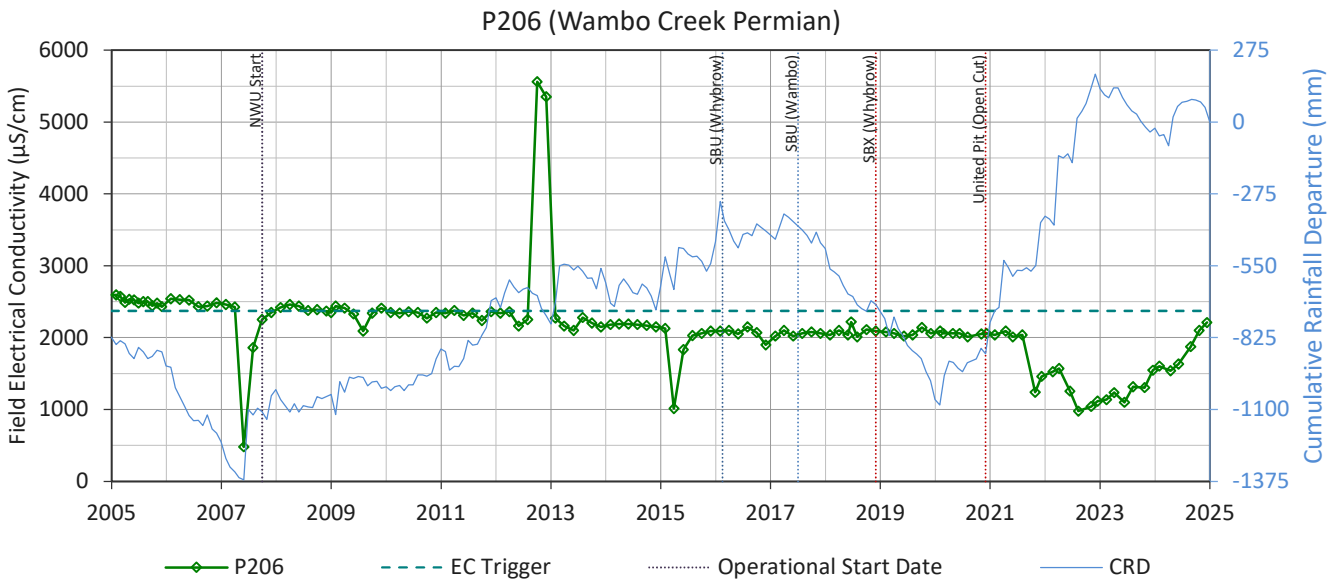

P202 (Wambo Creek Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P202
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

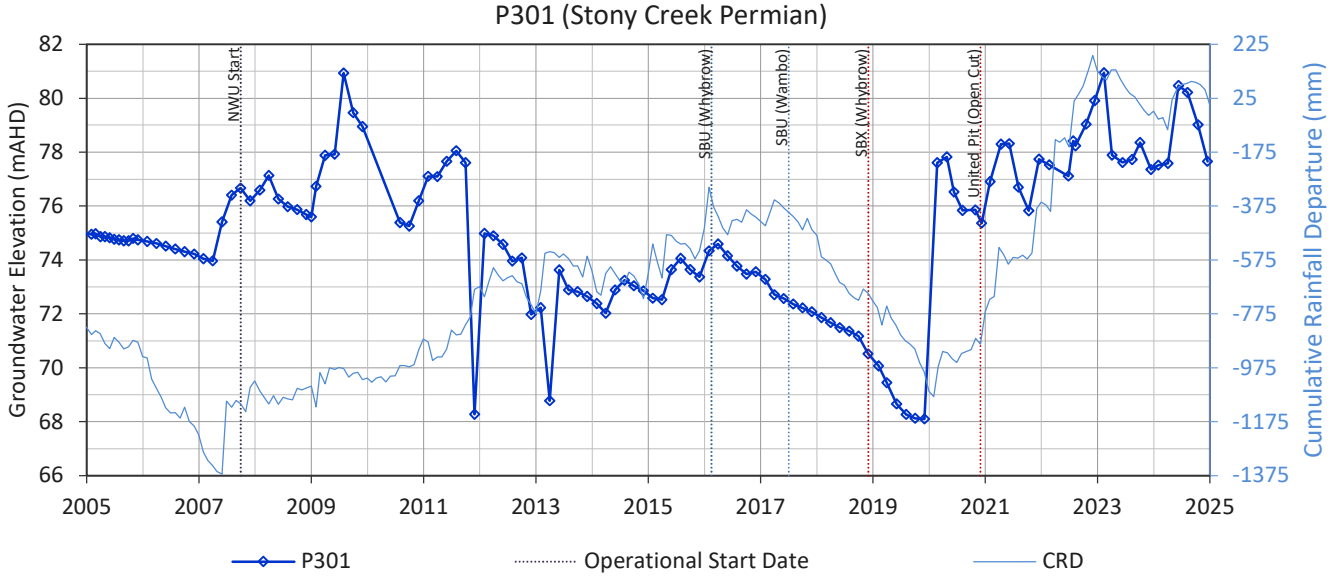

P202 (Wambo Creek Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P202
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

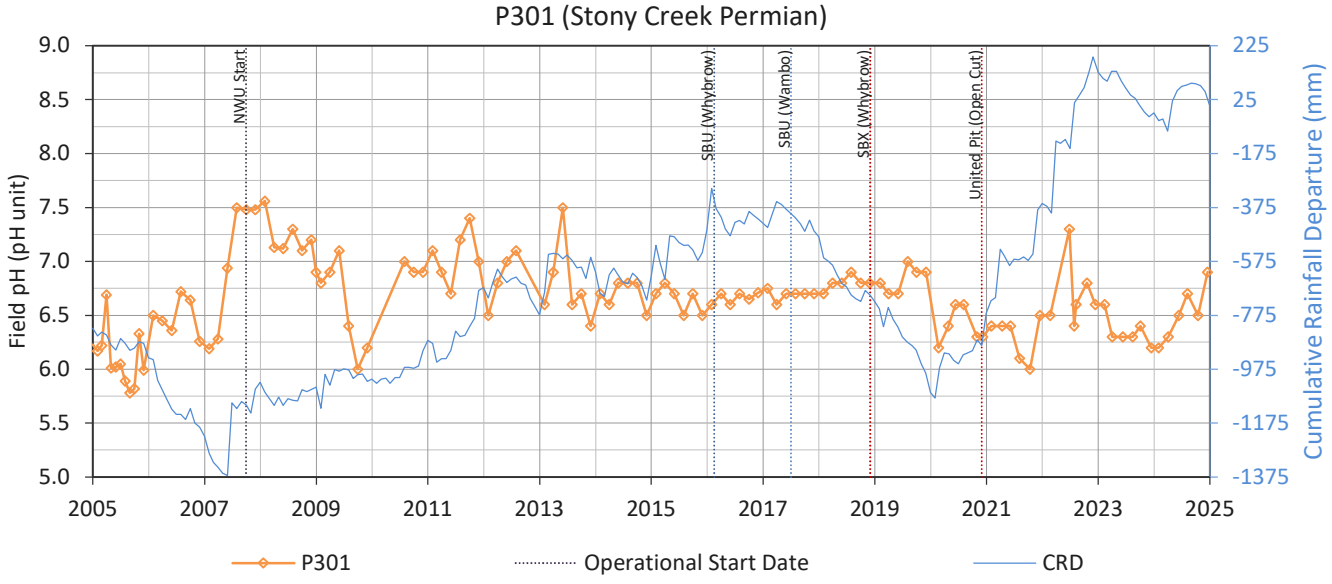

P202 (Wambo Creek Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P202
EC Trigger
Operational Start Date
CRD

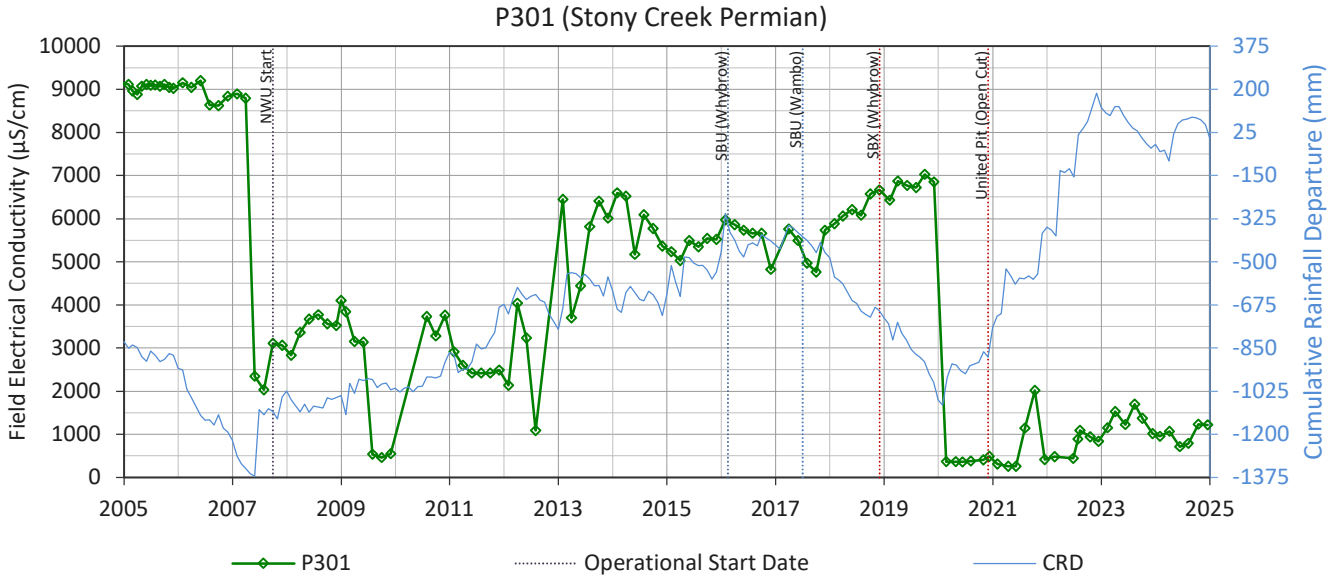

P206 (Wambo Creek Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P206
Groundwater Level - Upper Trigger
Groundwater Level - Lower Trigger
Operational Start Date

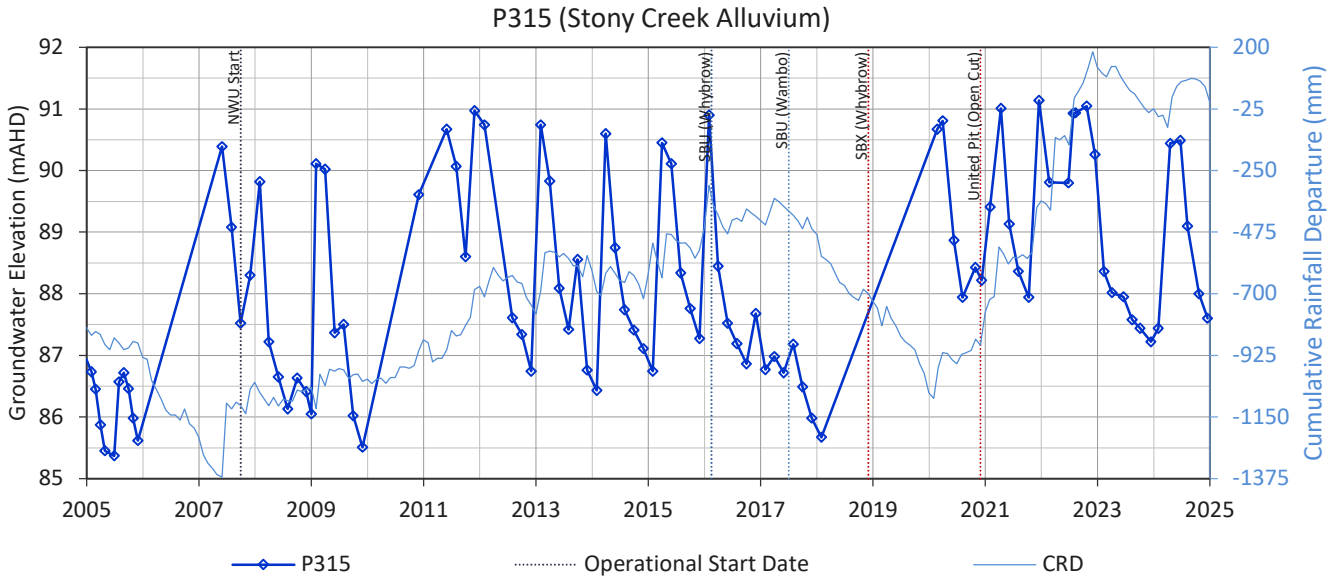

P206 (Wambo Creek Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P206
pH Trigger Lower
pH Trigger Upper
Operational Start Date
CRD

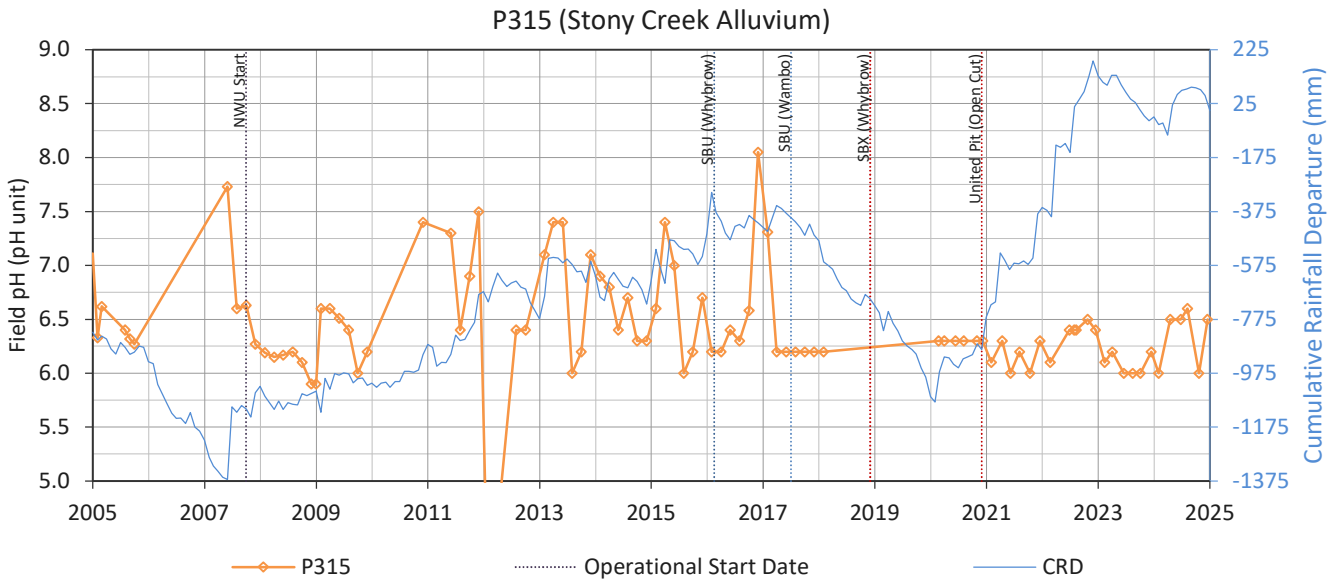

P206 (Wambo Creek Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P206
EC Trigger
Operational Start Date
CRD

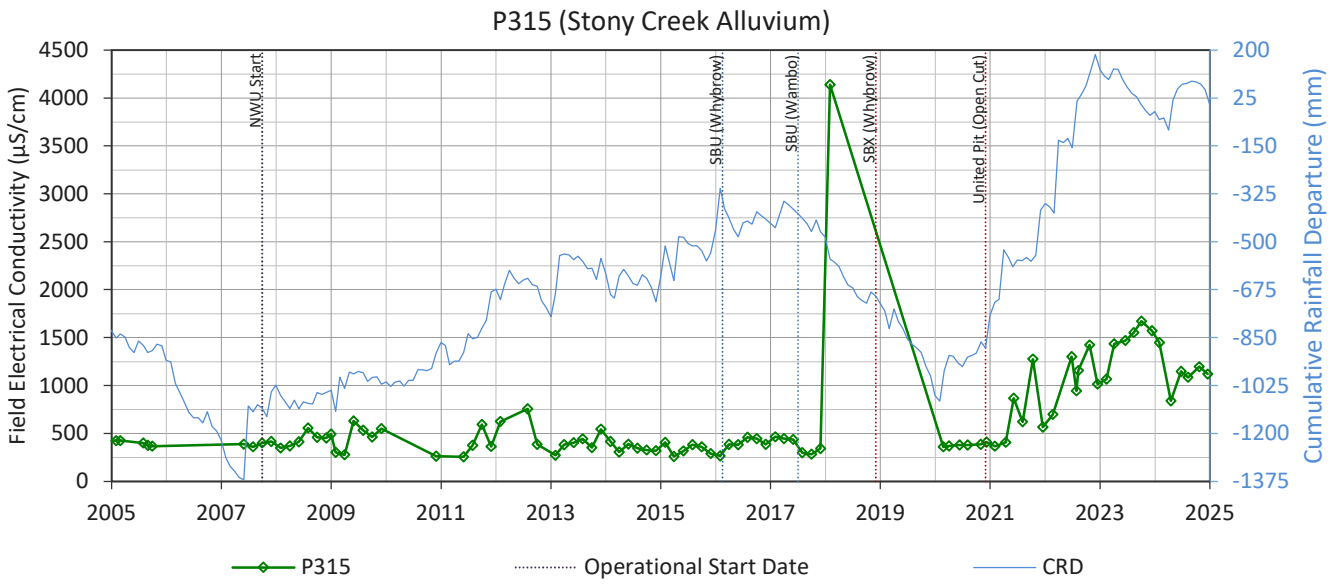

P301 (Stony Creek Permian)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P301
Operational Start Date
CRD

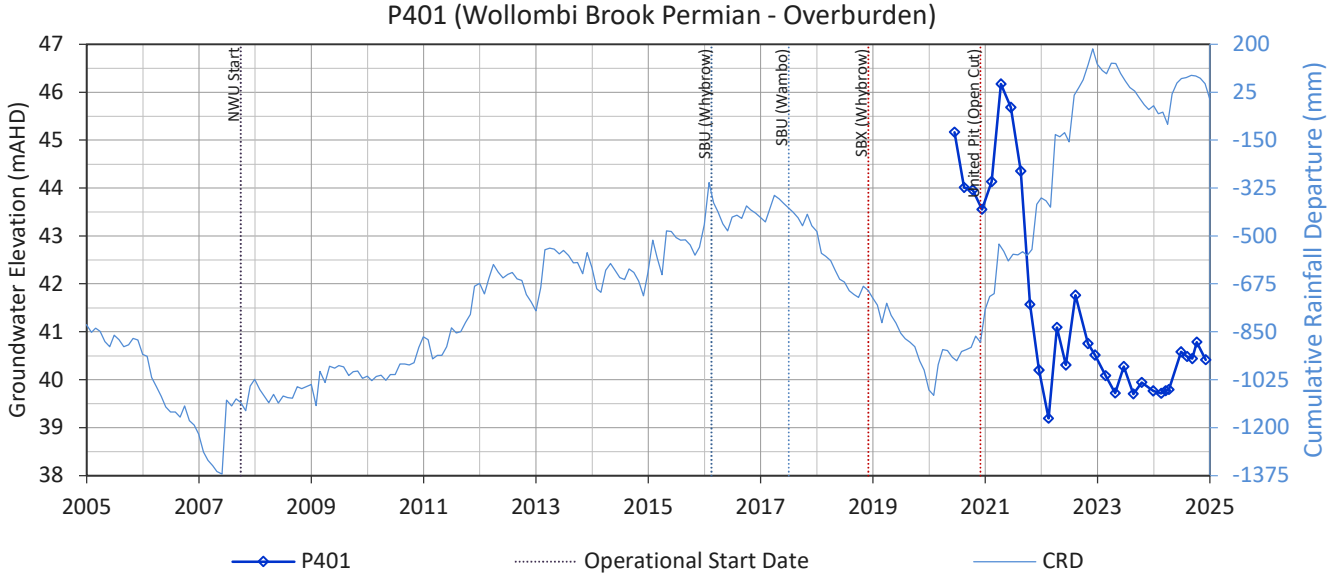

P301 (Stony Creek Permian)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P301
Operational Start Date
CRD

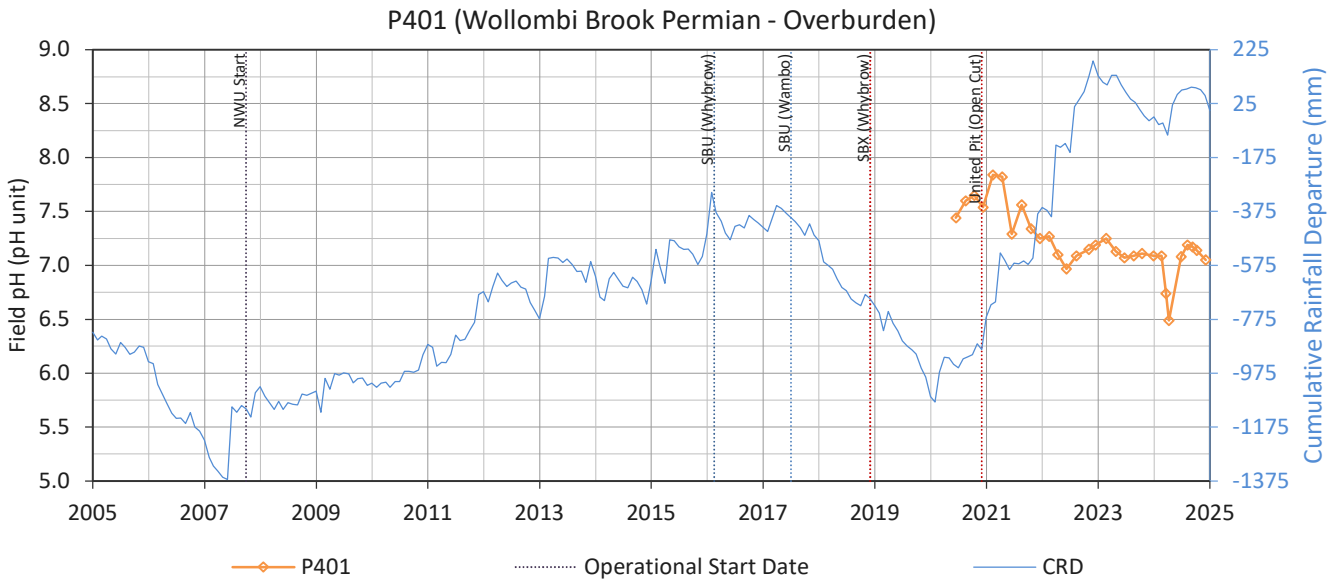

P301 (Stony Creek Permian)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P301
Operational Start Date
CRD

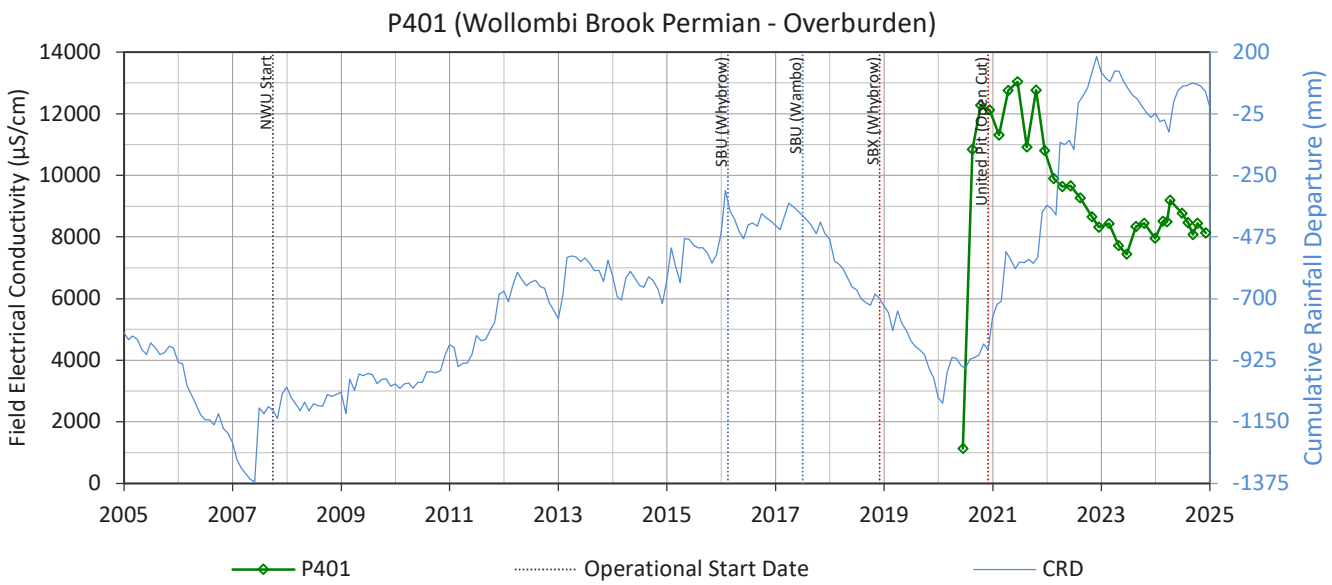

P315 (Stony Creek Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P315
Operational Start Date
CRD

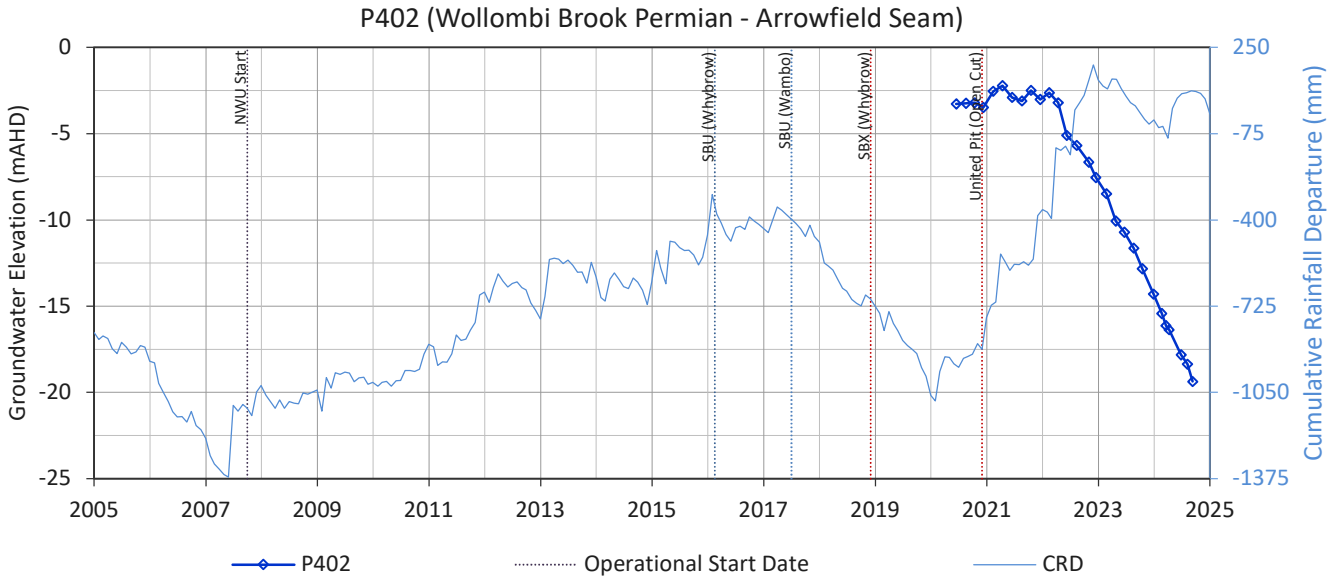

P315 (Stony Creek Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P315
Operational Start Date
CRD

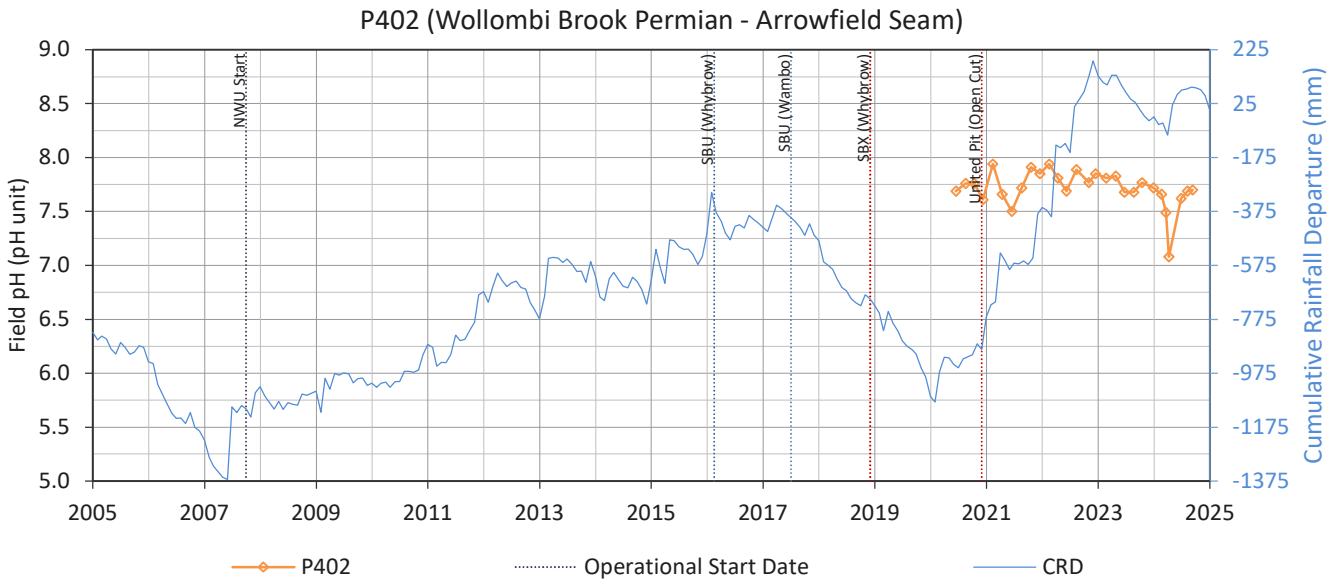

P315 (Stony Creek Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P315
Operational Start Date
CRD

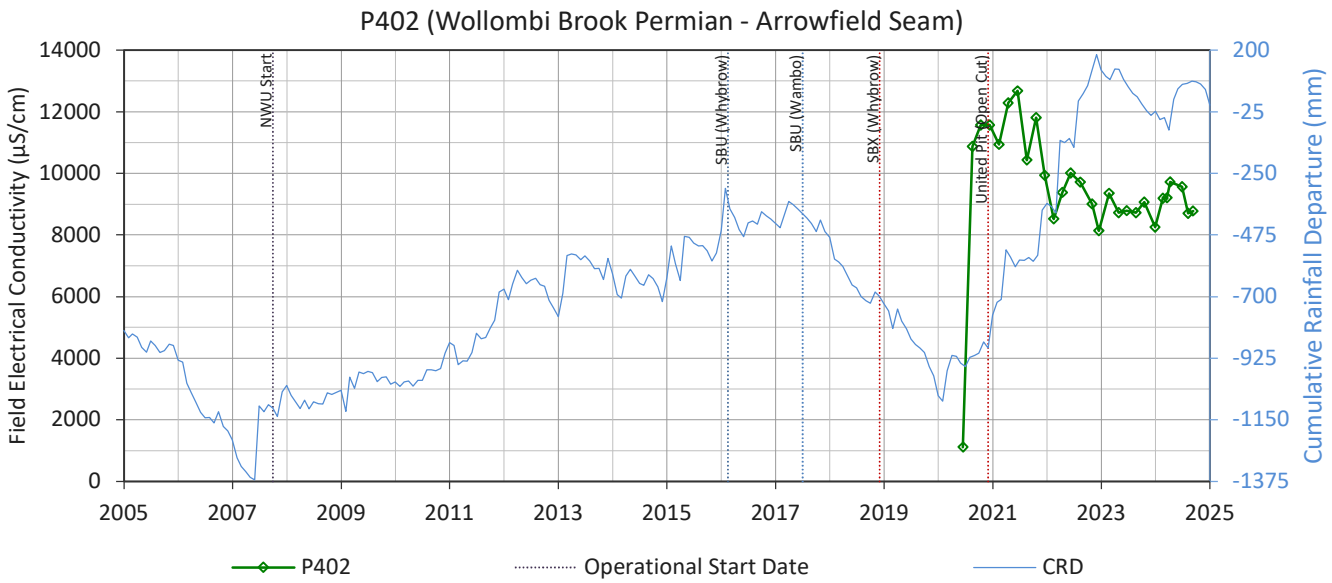

P401 (Wollombi Brook Permian - Overburden)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P401
Operational Start Date
CRD

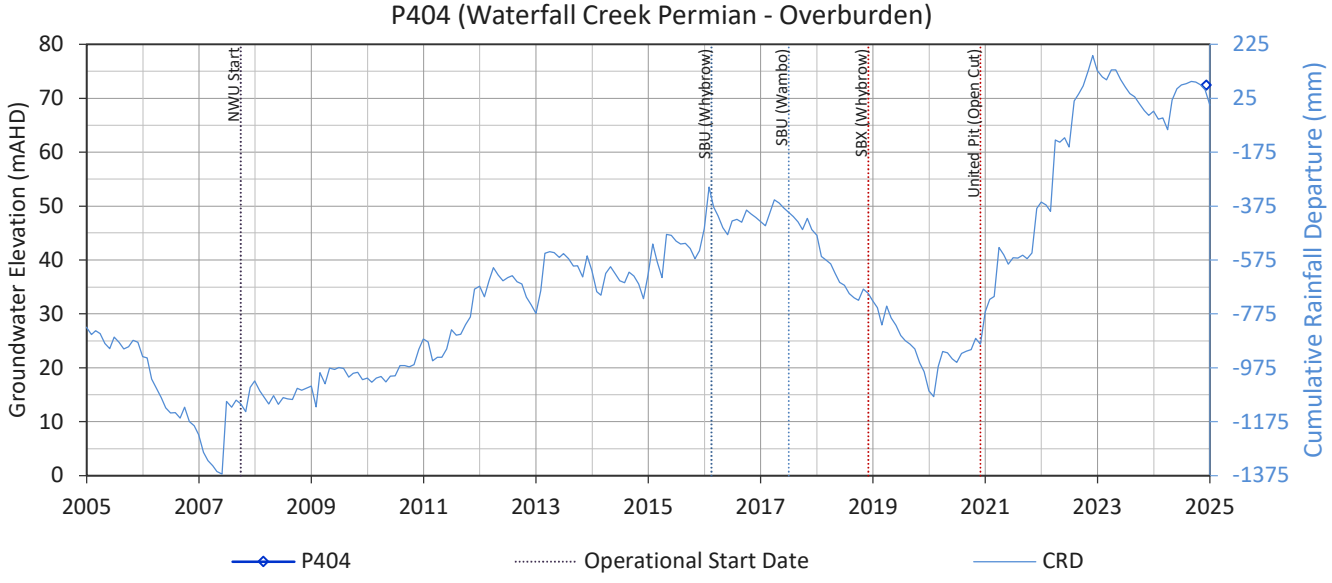

P401 (Wollombi Brook Permian - Overburden)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P401
Operational Start Date
CRD

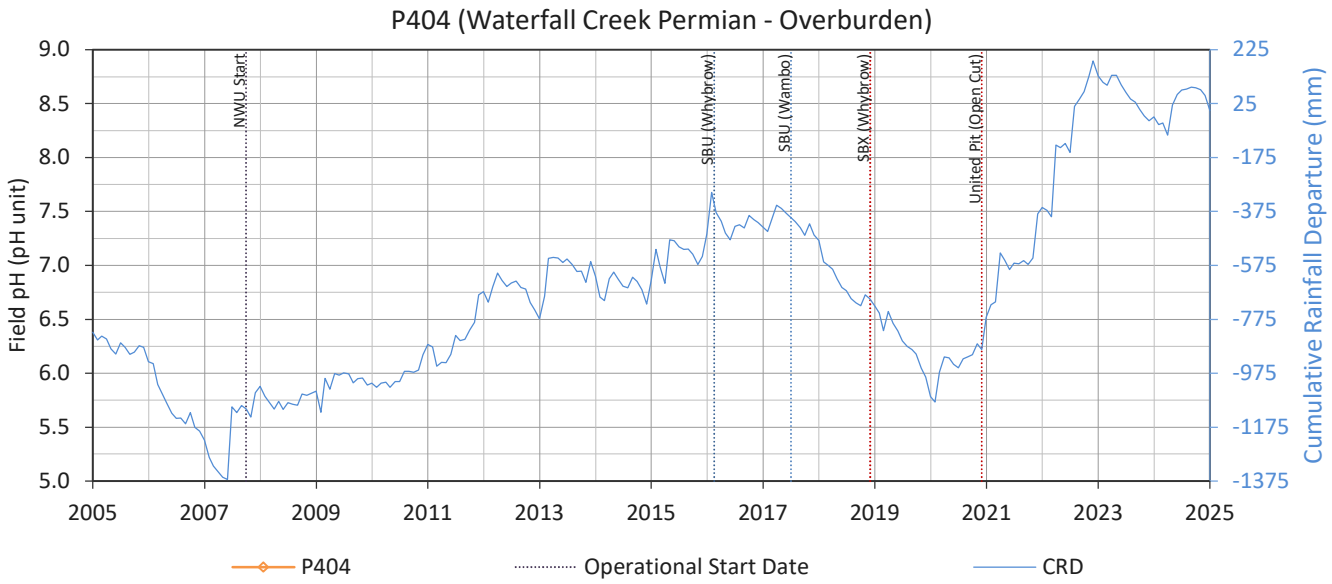

P401 (Wollombi Brook Permian - Overburden)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P401
Operational Start Date
CRD

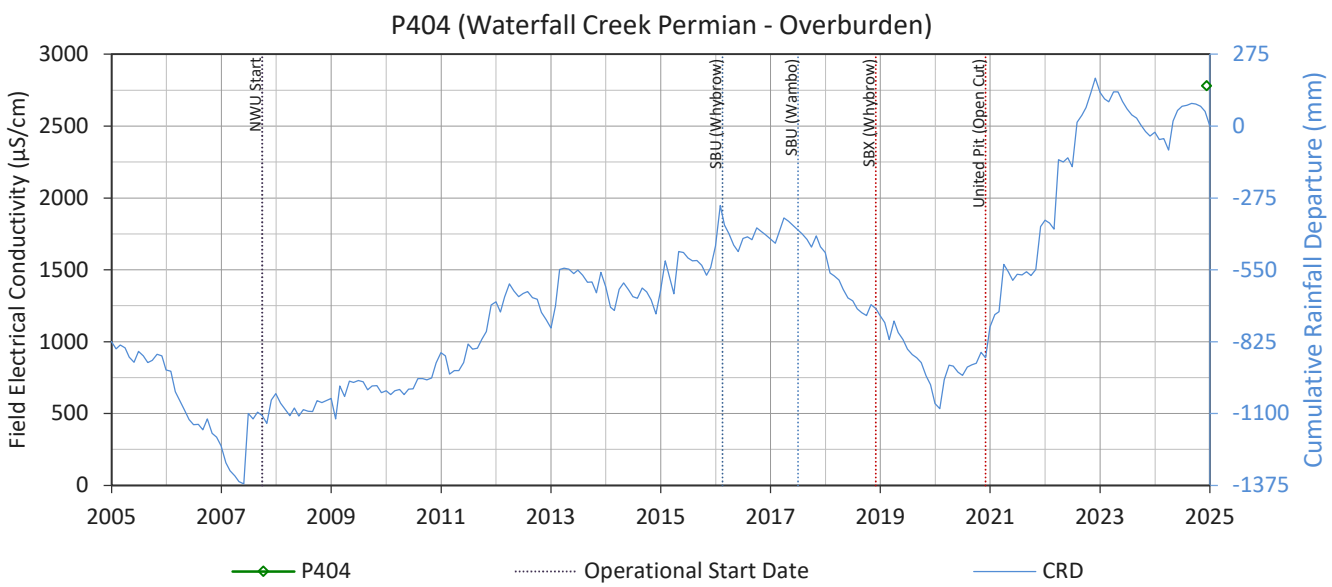

P402 (Wollombi Brook Permian - Arrowfield Seam)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P402
Operational Start Date
CRD

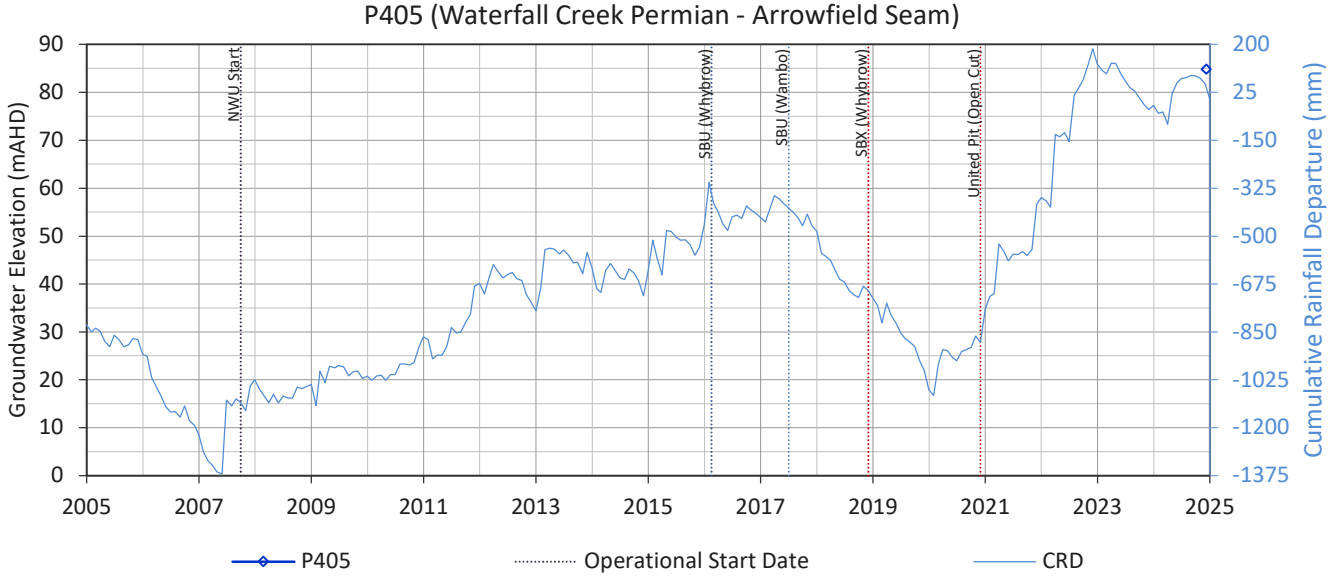

P402 (Wollombi Brook Permian - Arrowfield Seam)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P402
Operational Start Date
CRD

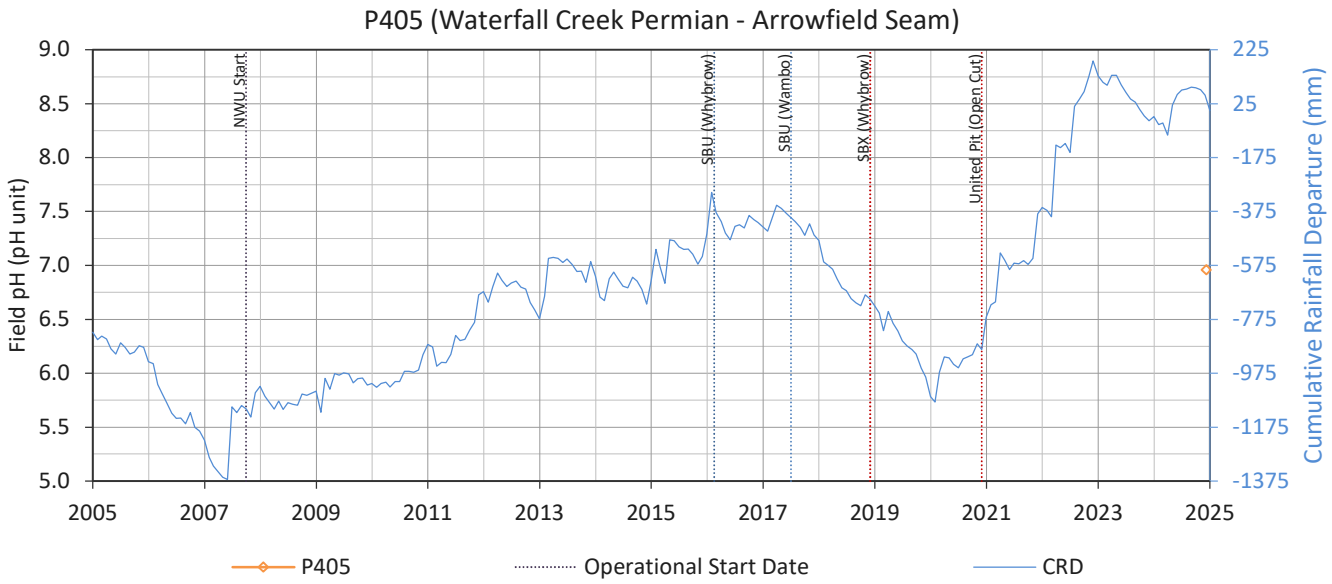

P402 (Wollombi Brook Permian - Arrowfield Seam)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P402
Operational Start Date
CRD

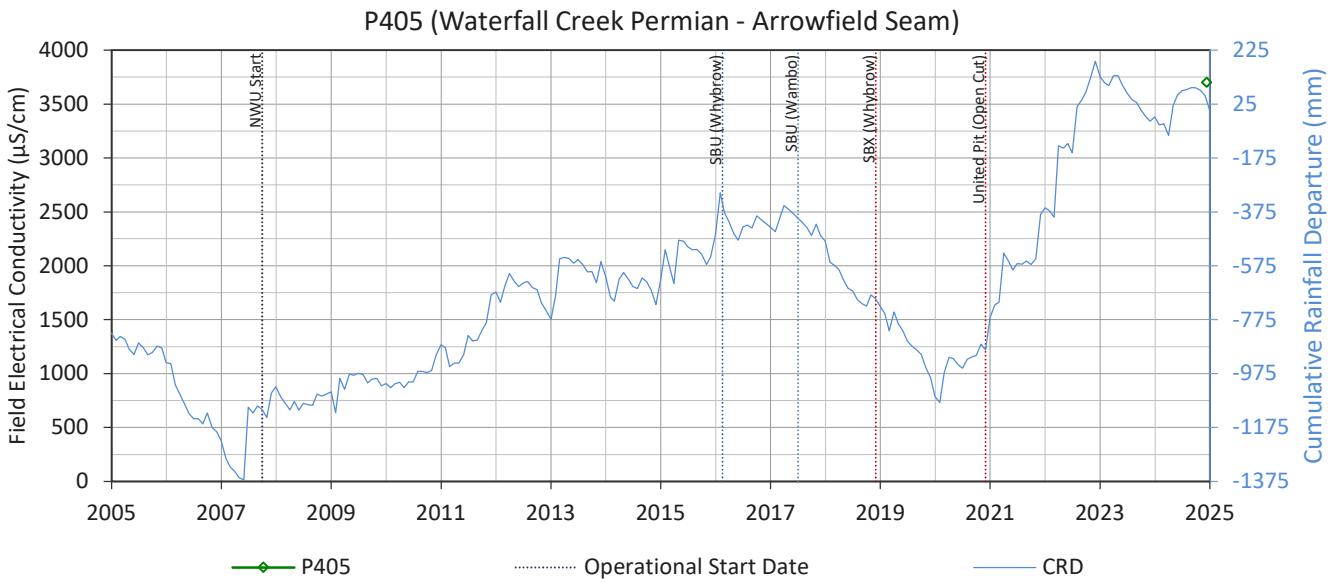

P404 (Waterfall Creek Permian - Overburden)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P404
Operational Start Date
CRD

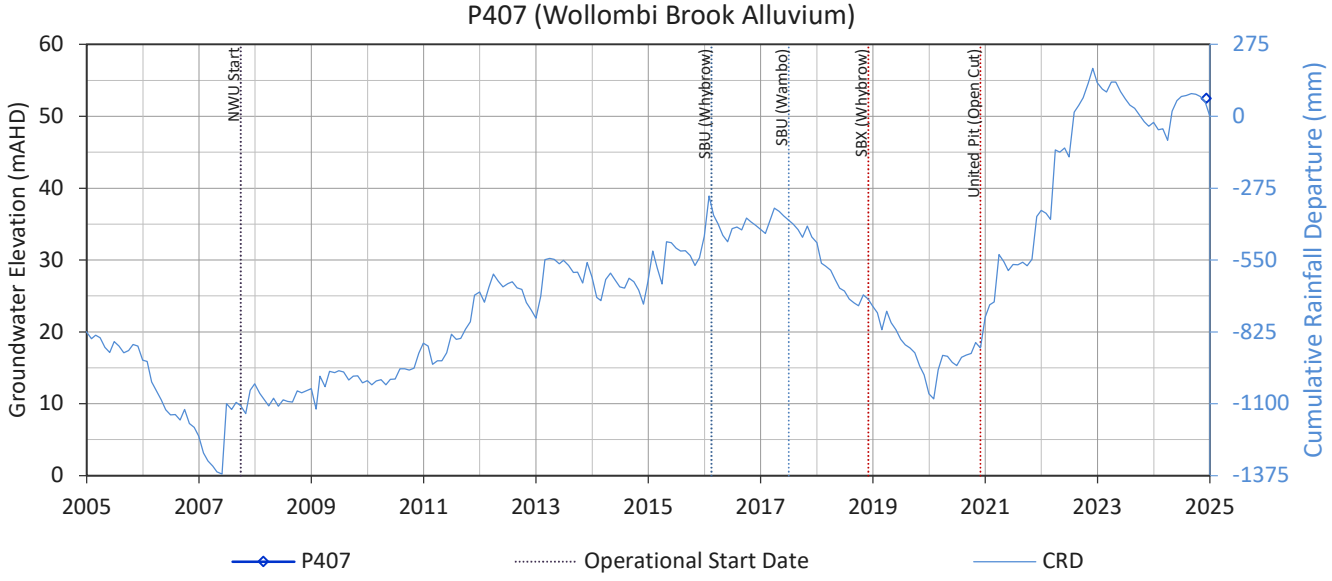

P404 (Waterfall Creek Permian - Overburden)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P404
Operational Start Date
CRD


P404 (Waterfall Creek Permian - Overburden)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P404
Operational Start Date
CRD


P405 (Waterfall Creek Permian - Arrowfield Seam)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P405
Operational Start Date
CRD


P405 (Waterfall Creek Permian - Arrowfield Seam)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P405
Operational Start Date
CRD

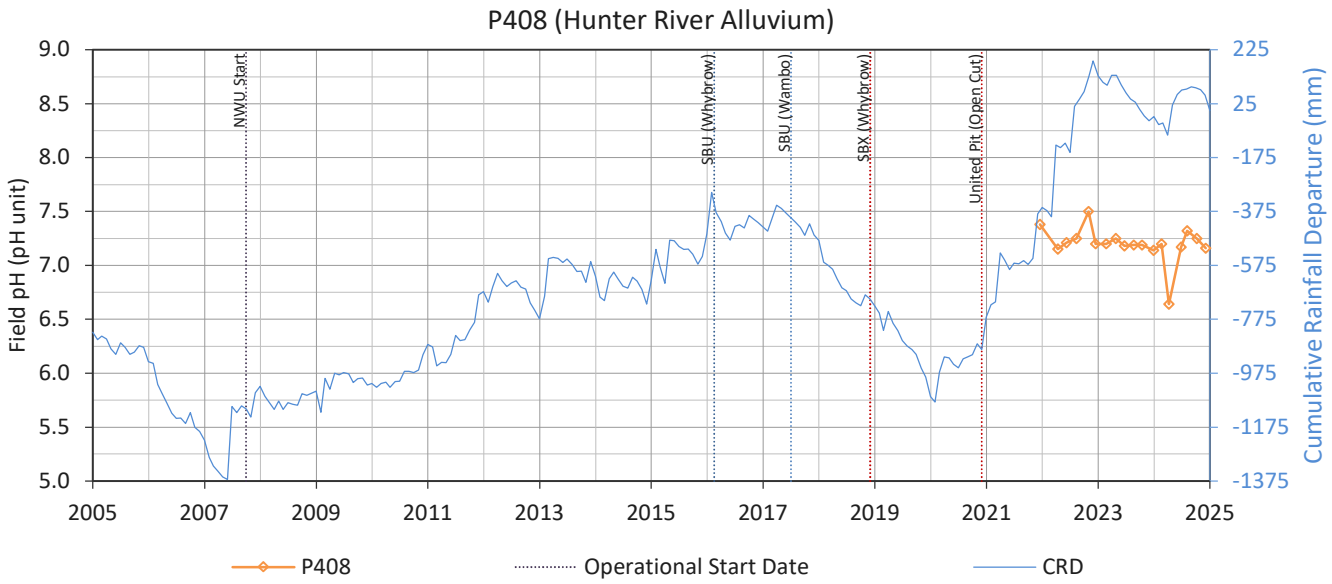

P405 (Waterfall Creek Permian - Arrowfield Seam)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P405
Operational Start Date
CRD

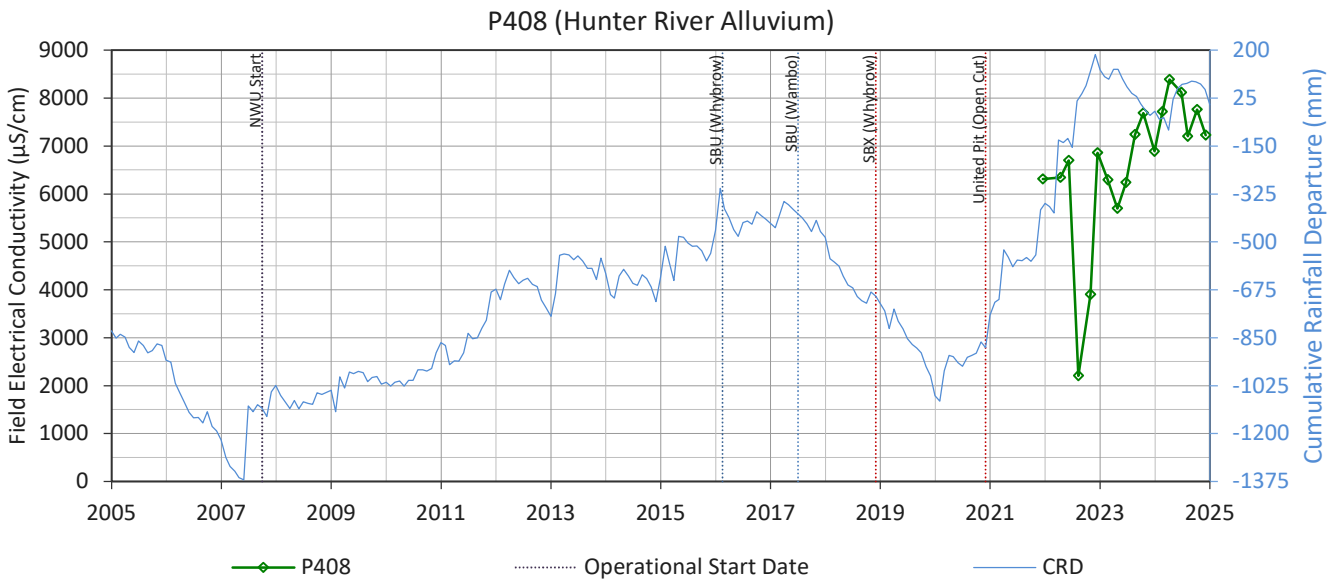


No Data Available for Field pH (pH unit)

No Data Available for Field Electrical Conductivity (µS/cm)

P408 (Hunter River Alluvium)
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P408
Operational Start Date
CRD


P408 (Hunter River Alluvium)
Field pH (pH unit)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P408
Operational Start Date
CRD


P408 (Hunter River Alluvium)
Field Electrical Conductivity (µS/cm)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P408
Operational Start Date
CRD

Appendix B Model Performance Hydrographs

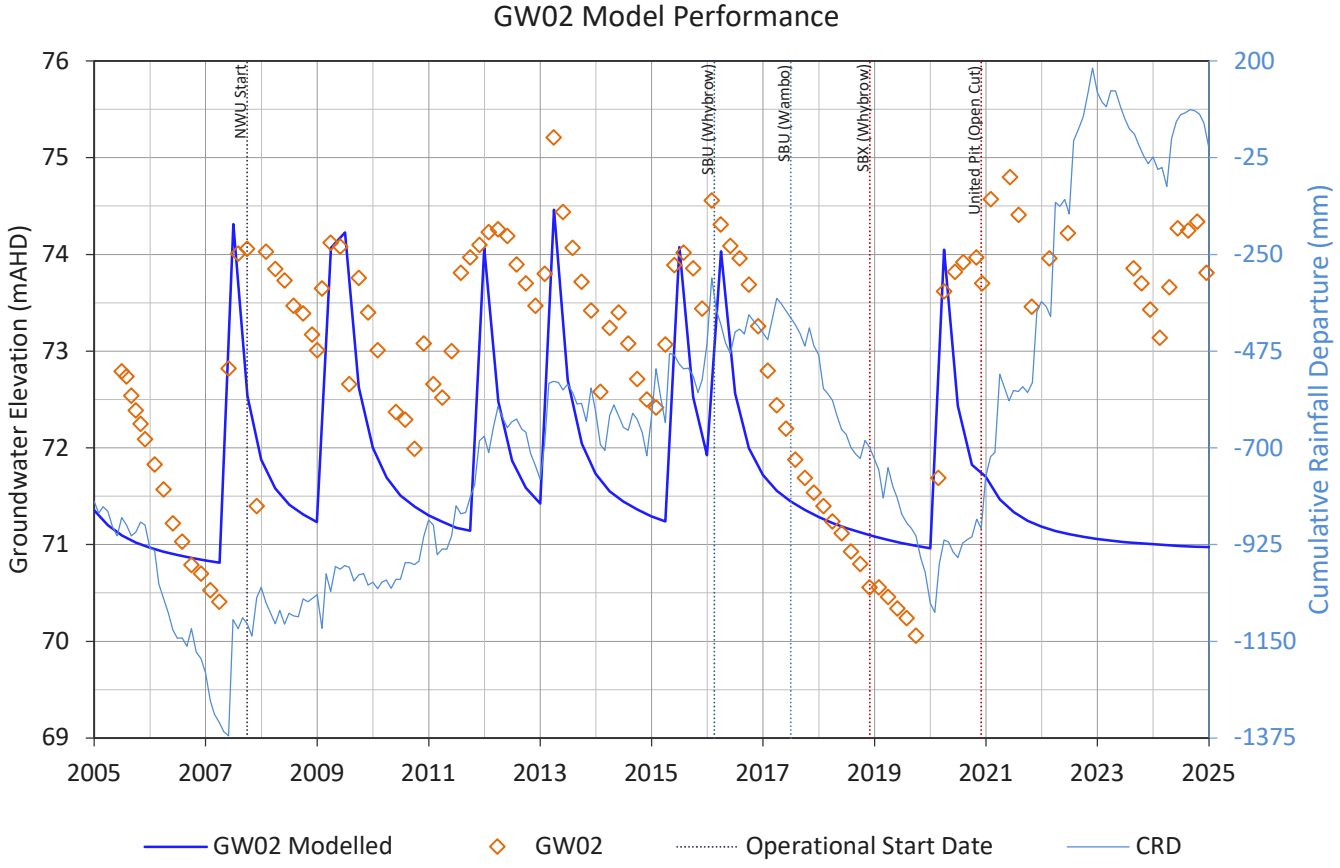
2024 Annual Review - Groundwater

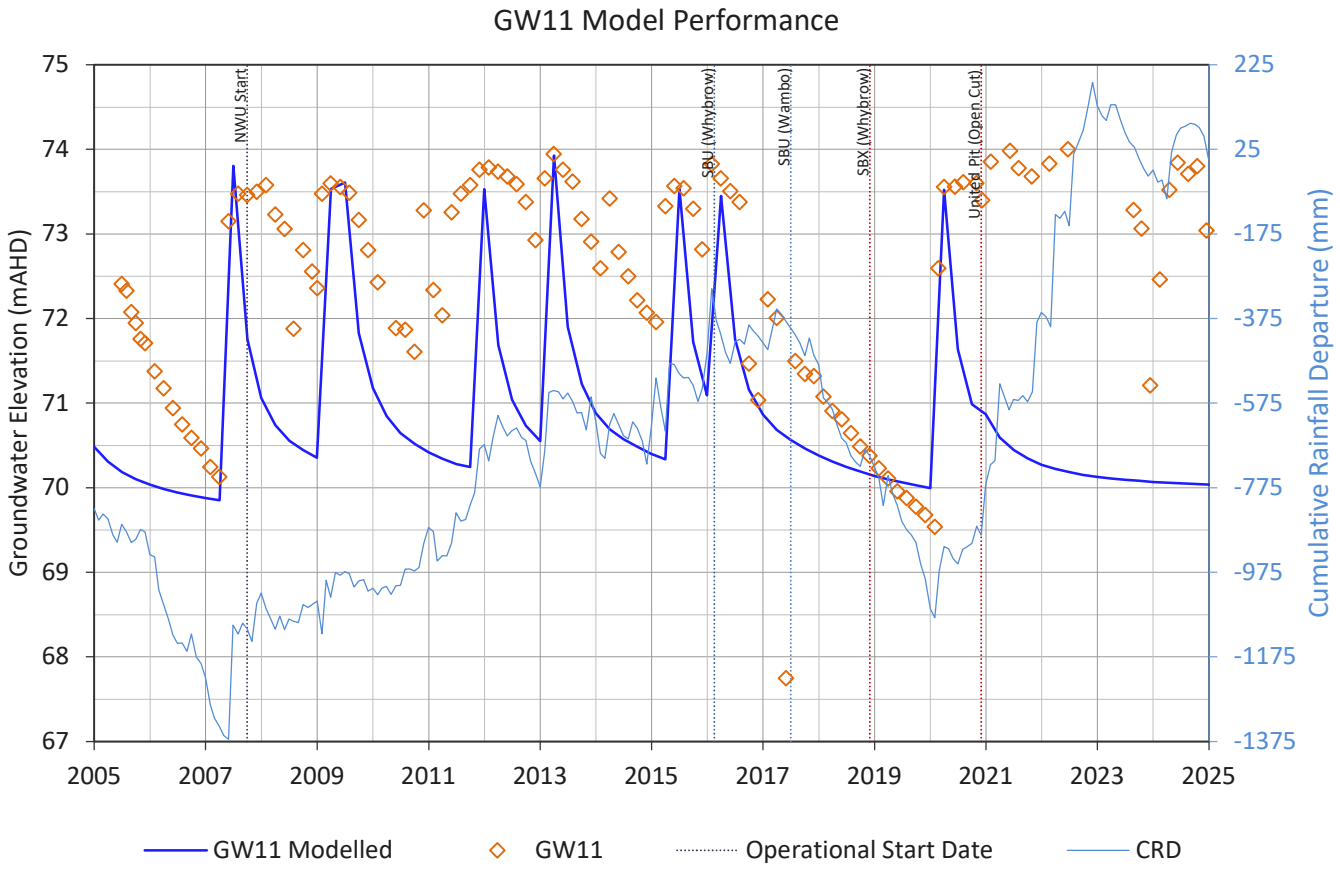
United Wambo

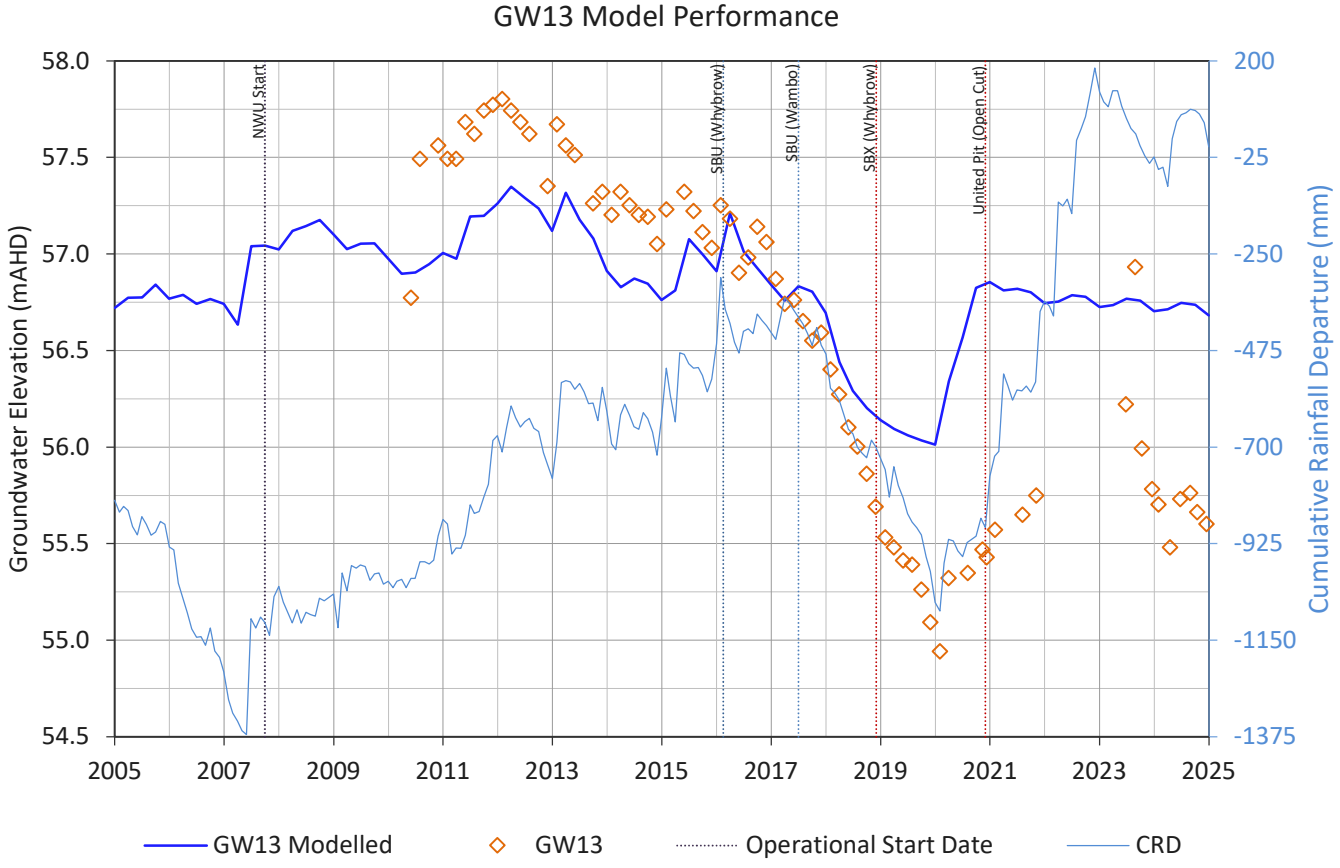
United Wambo Joint Venture

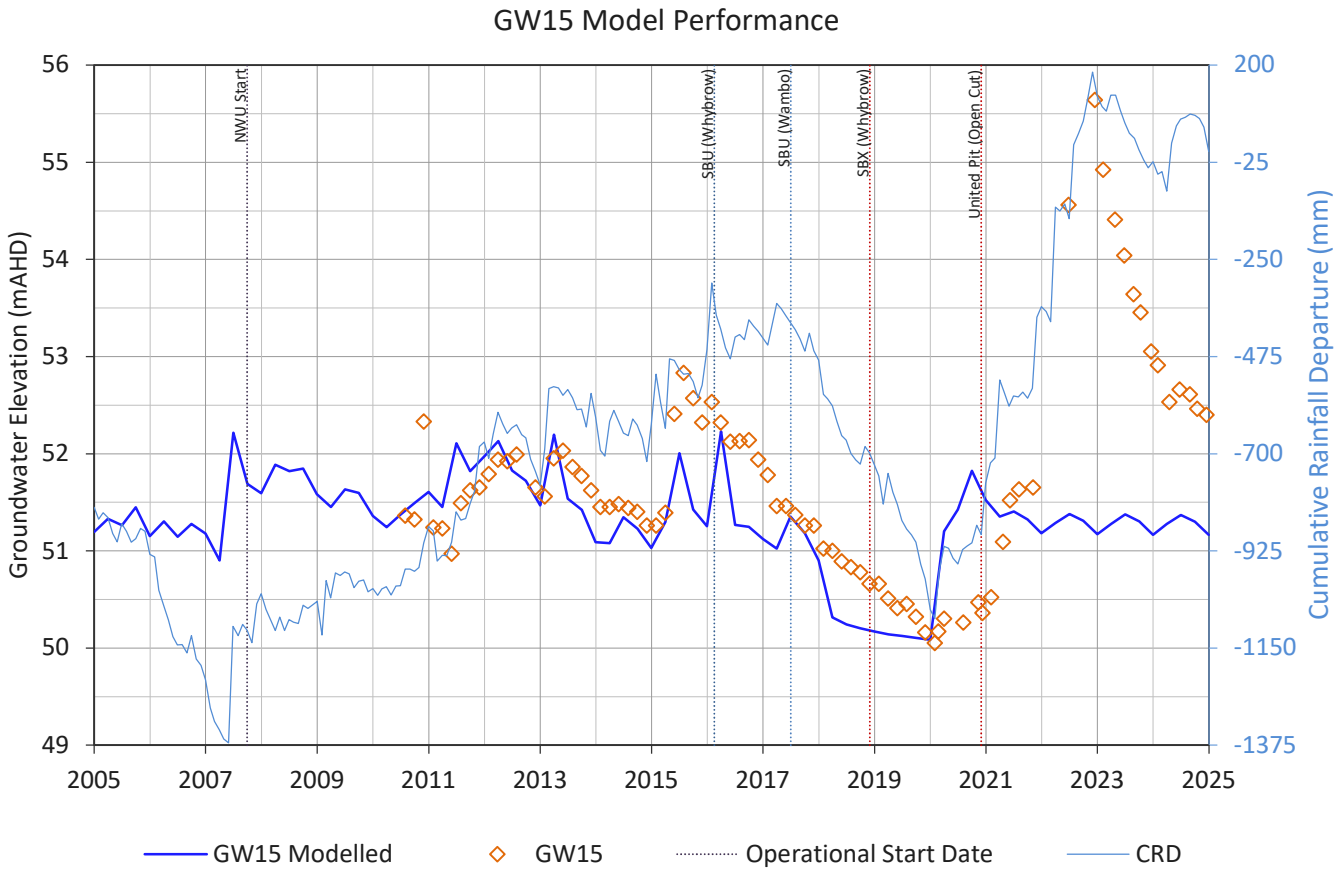
SLR Project No.: 660.v30030.00404

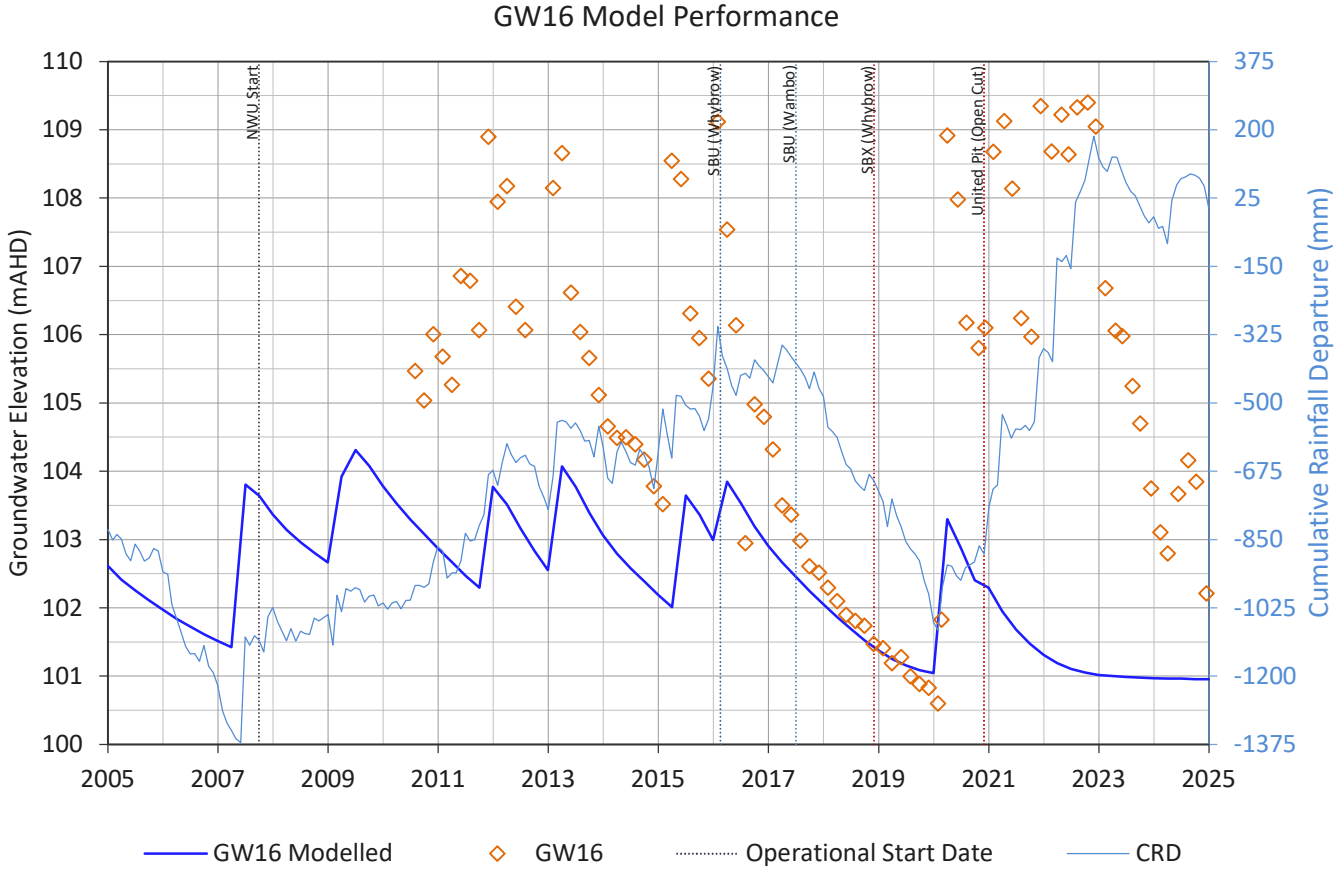
28 March 2025

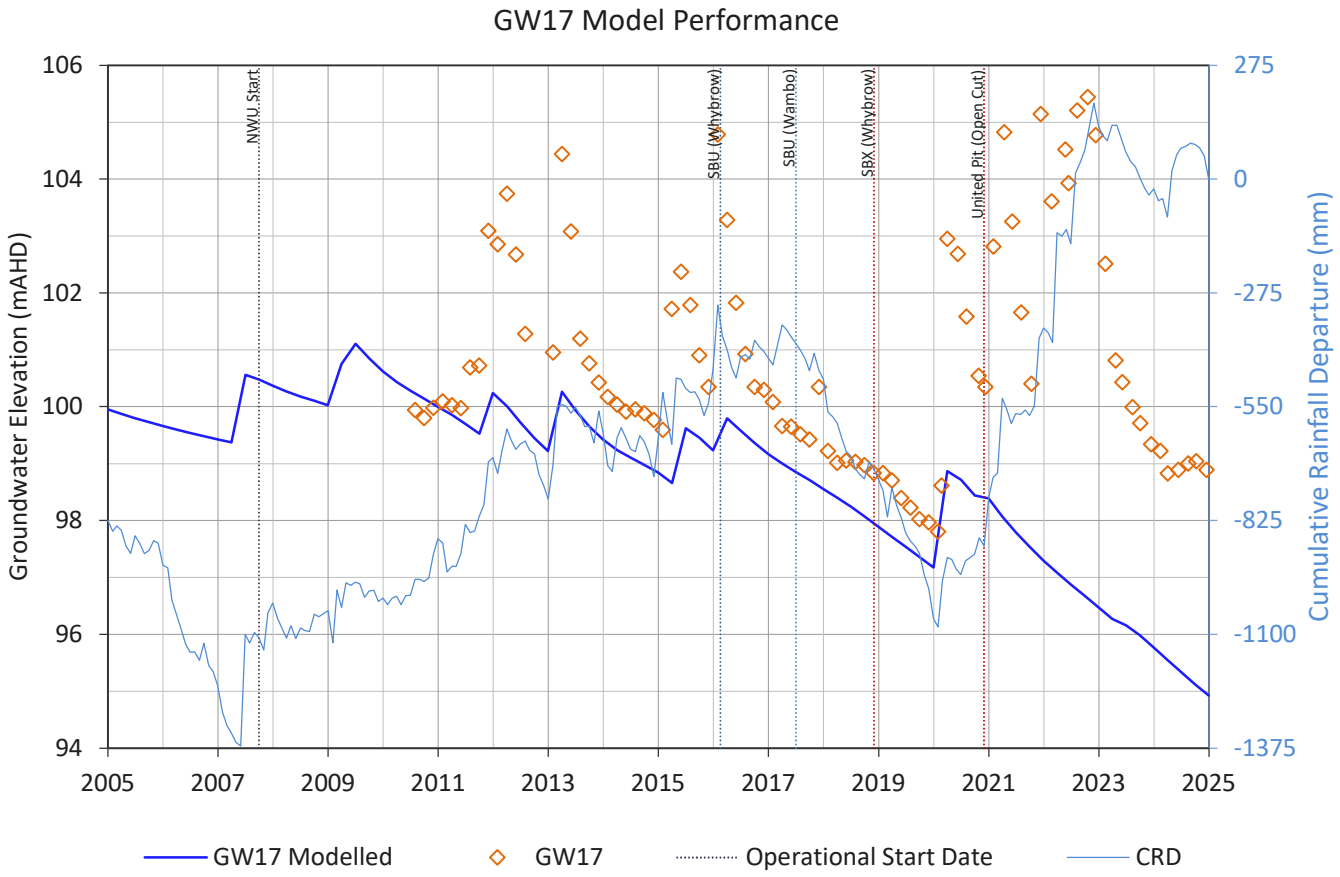

GW02 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW02 Modelled
GW02
Operational Start Date
CRD

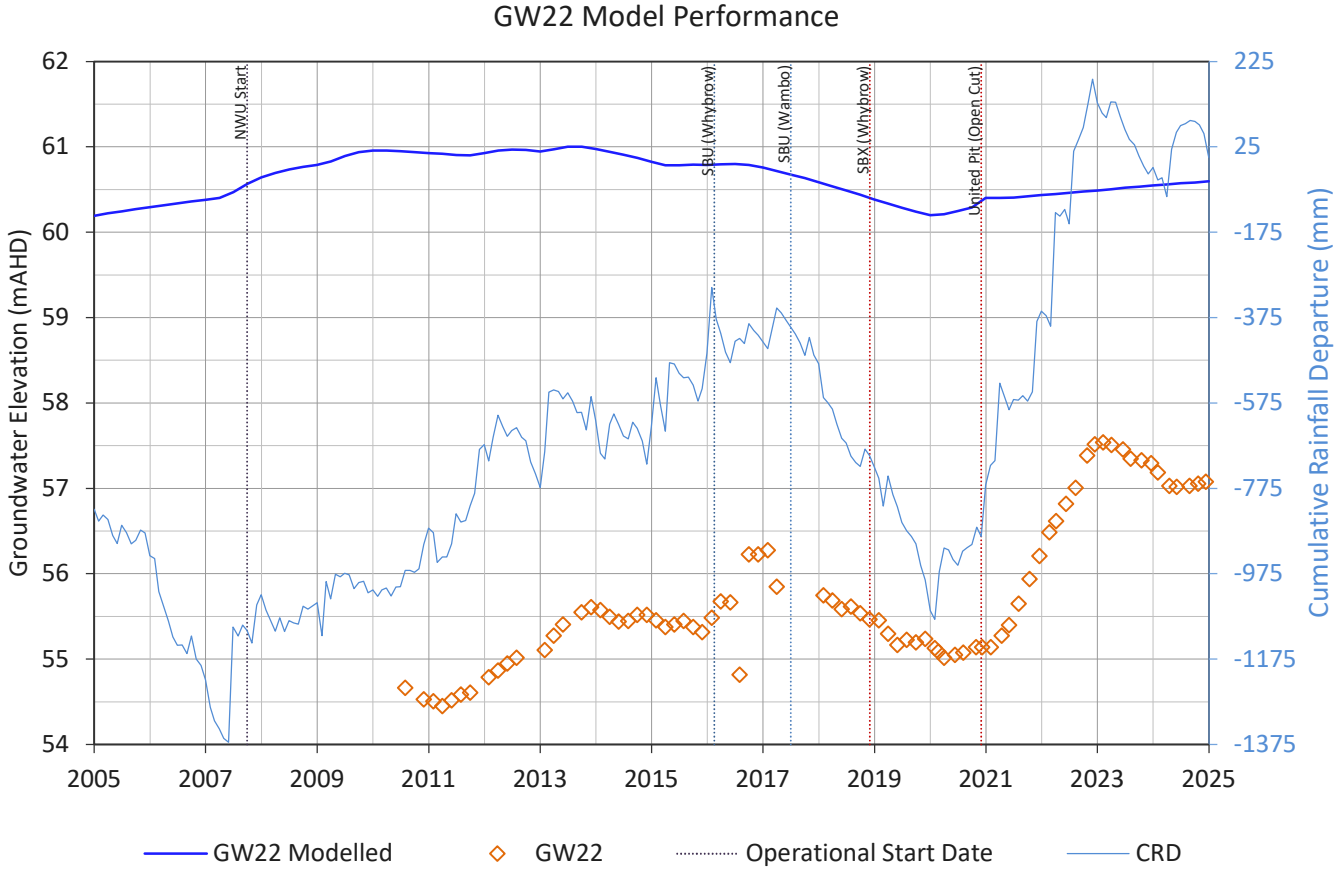

GW11 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW11 Modelled
GW11
Operational Start Date
CRD

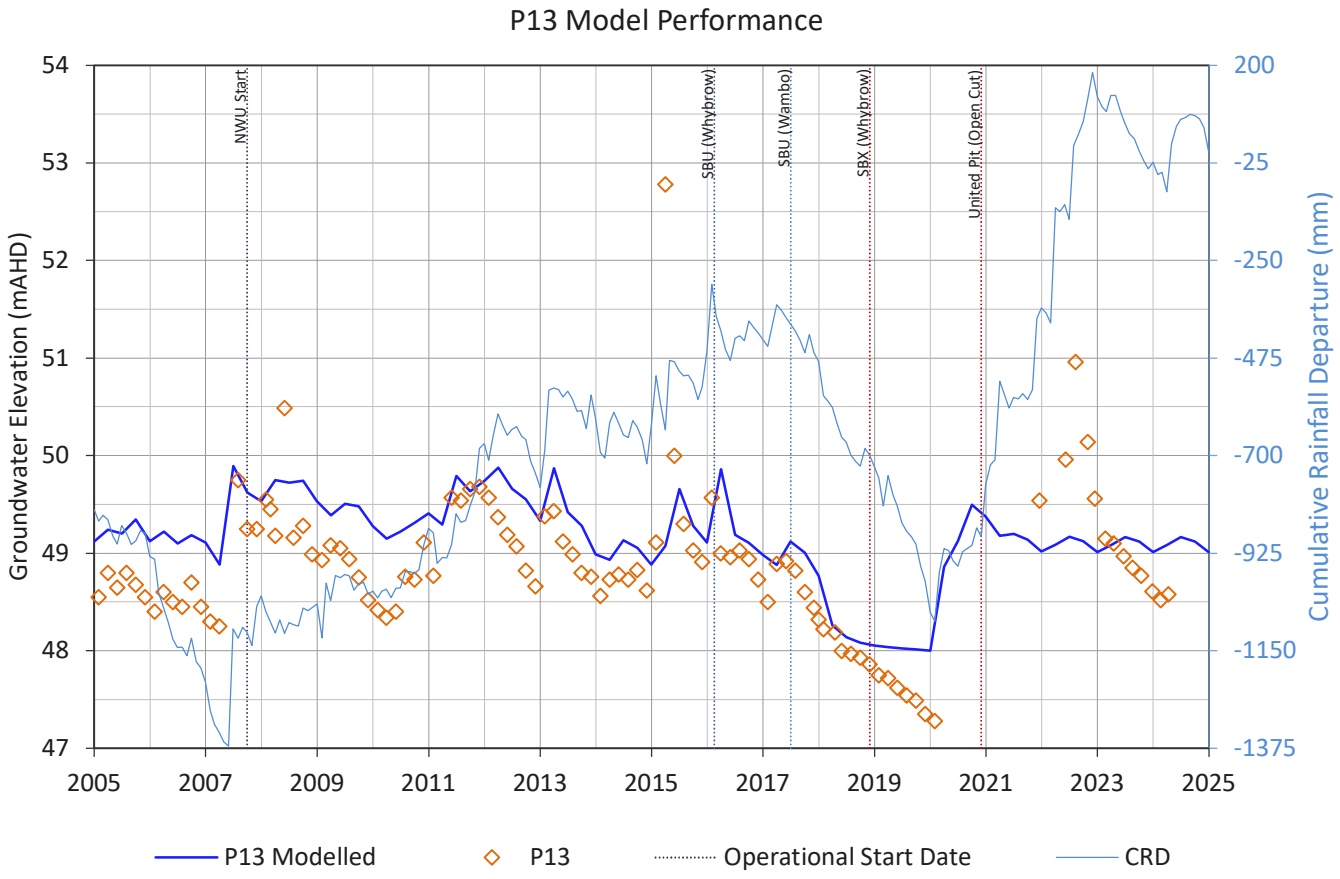

GW13 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
58.0
57.5
57.0
56.5
56.0
55.5
55.0
54.5
200
-25
-250
-475
-700
-925
-1150
-1375
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
GW13 Modelled
GW13
Operational Start Date
CRD

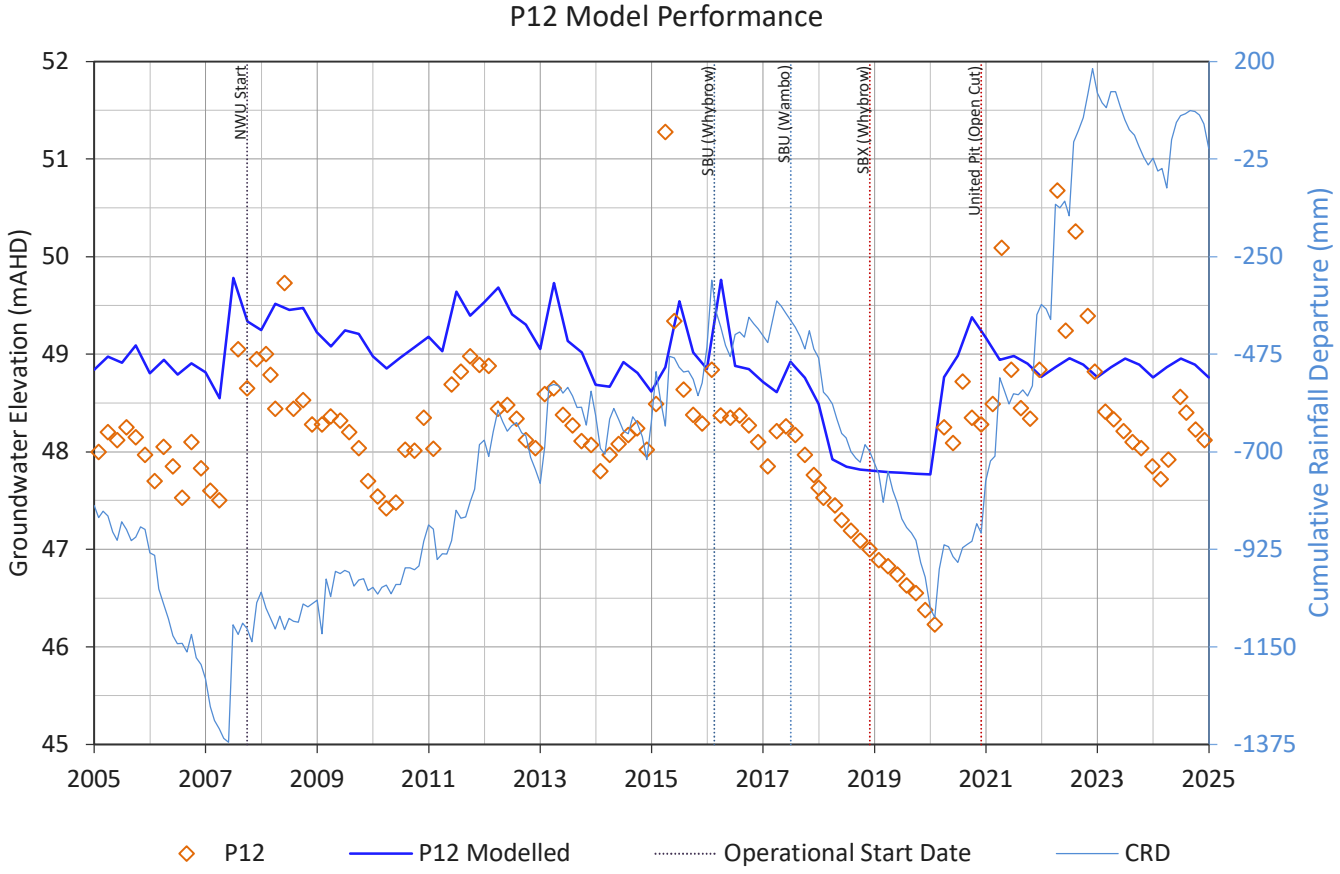

GW15 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
56
55
54
53
52
51
50
49
200
-25
-250
-475
-700
-925
-1150
-1375
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
GW15 Modelled
GW15
Operational Start Date
CRD

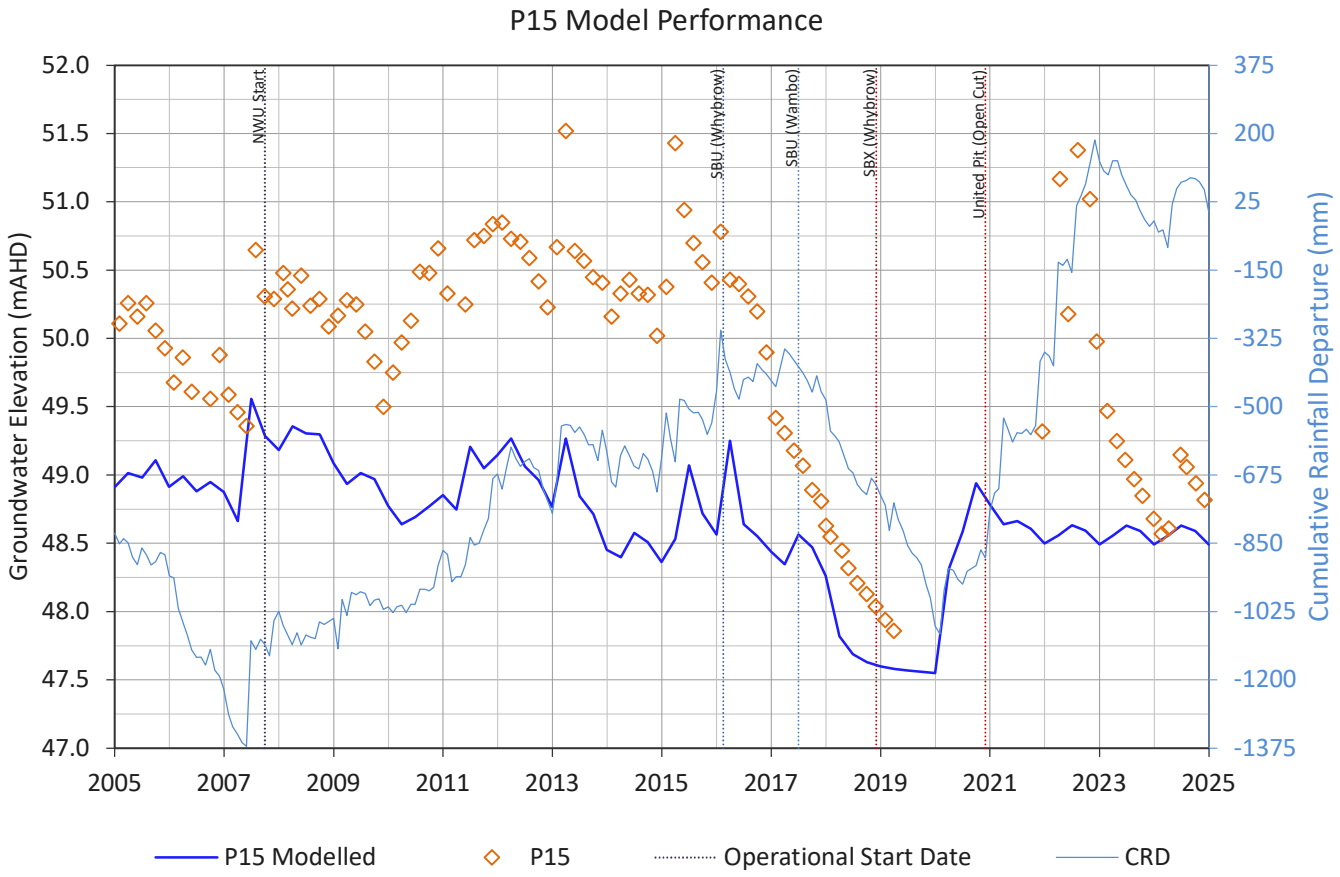

GW16 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW16 Modelled
GW16
Operational Start Date
CRD

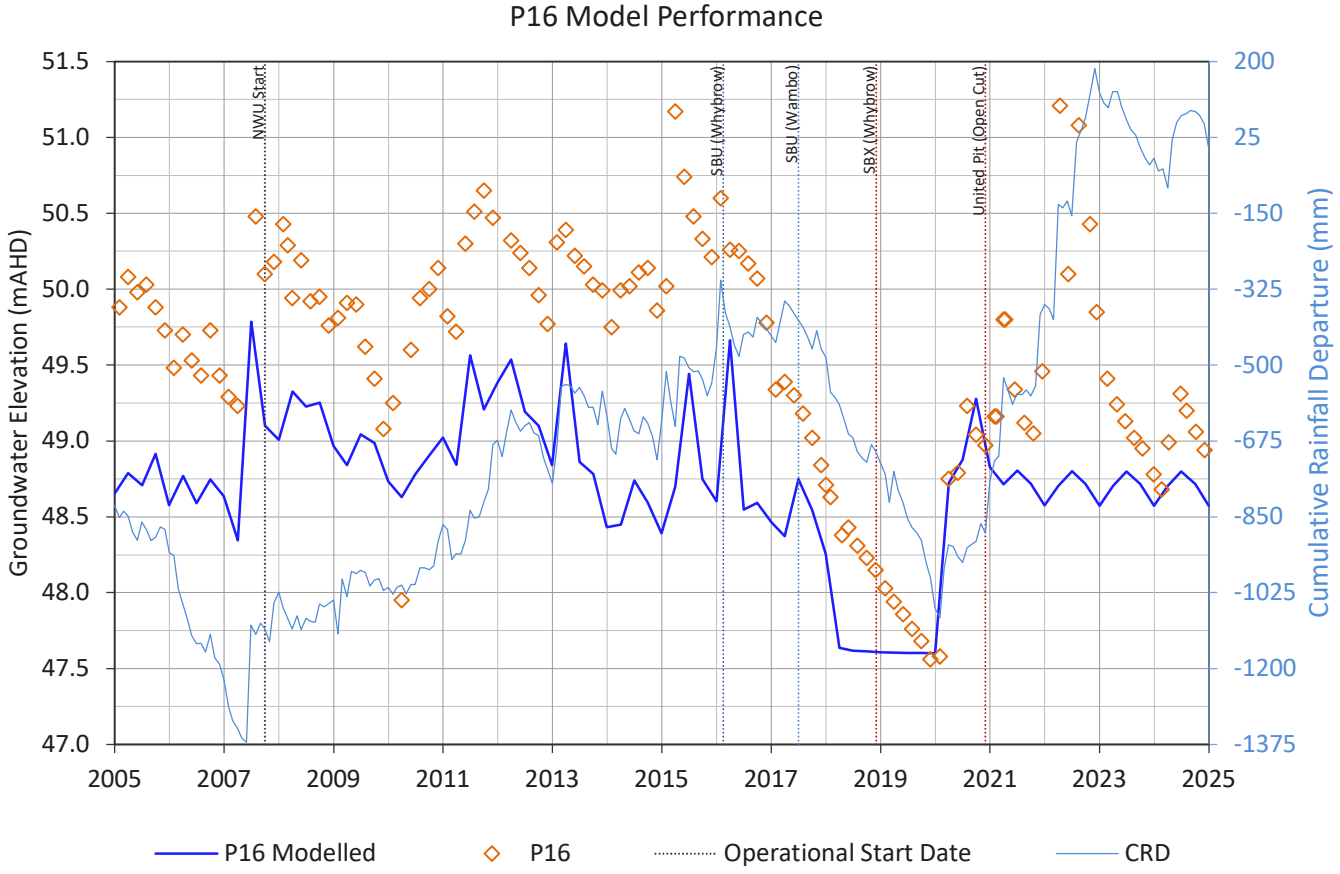

GW17 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW17 Modelled
GW17
Operational Start Date
CRD

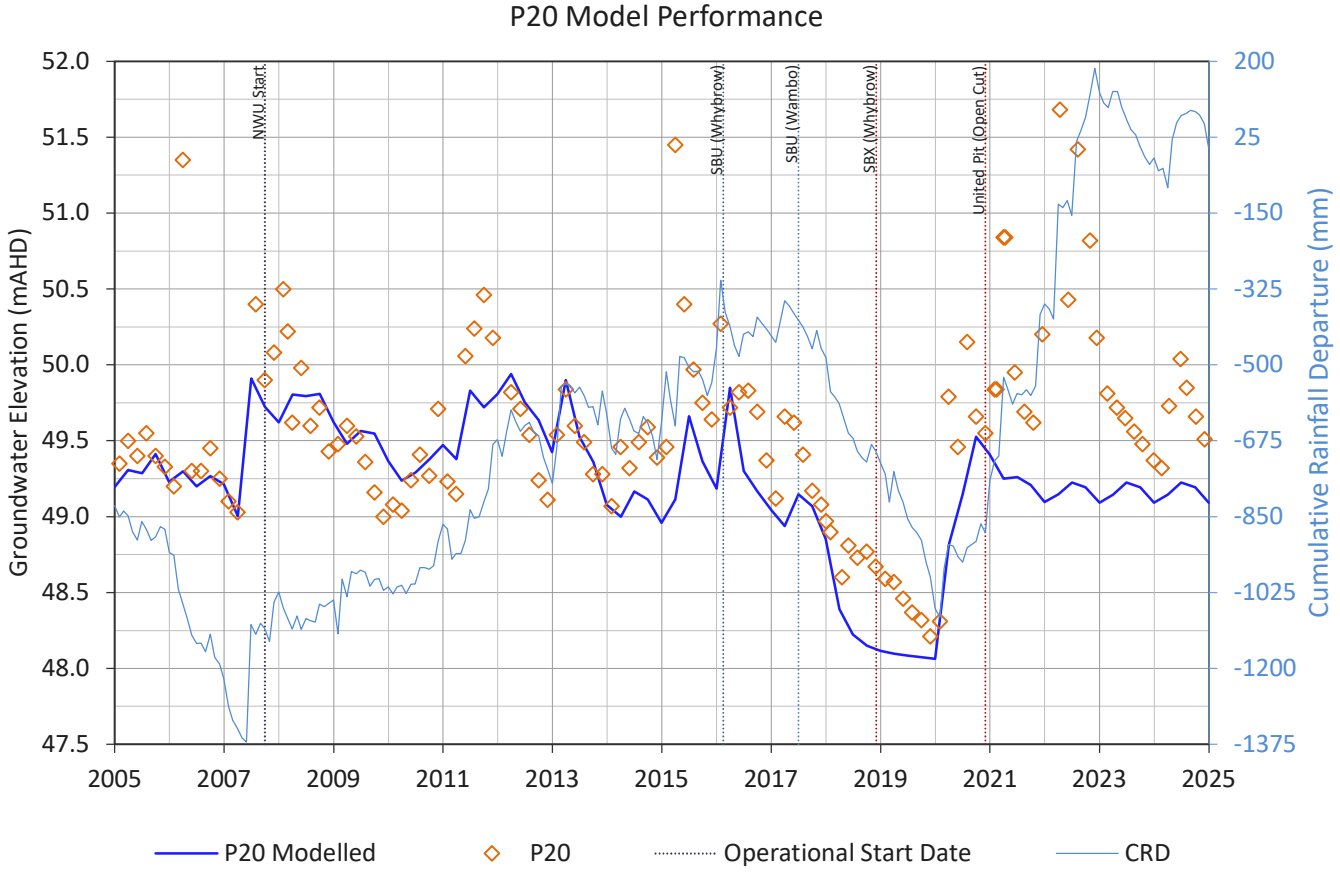

GW22 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
GW22 Modelled
GW22
Operational Start Date
CRD

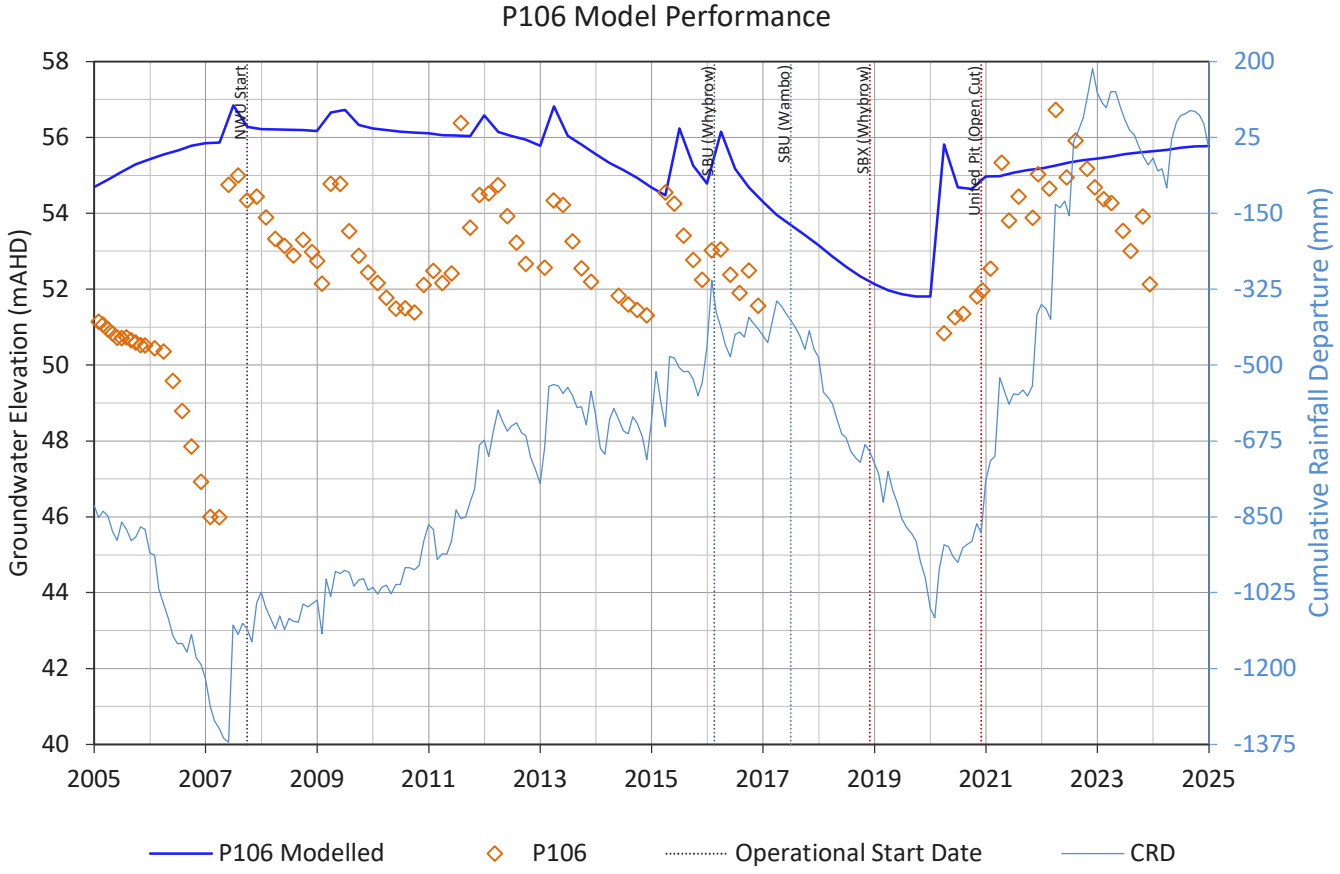

P13 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P13 Modelled
P13
Operational Start Date
CRD

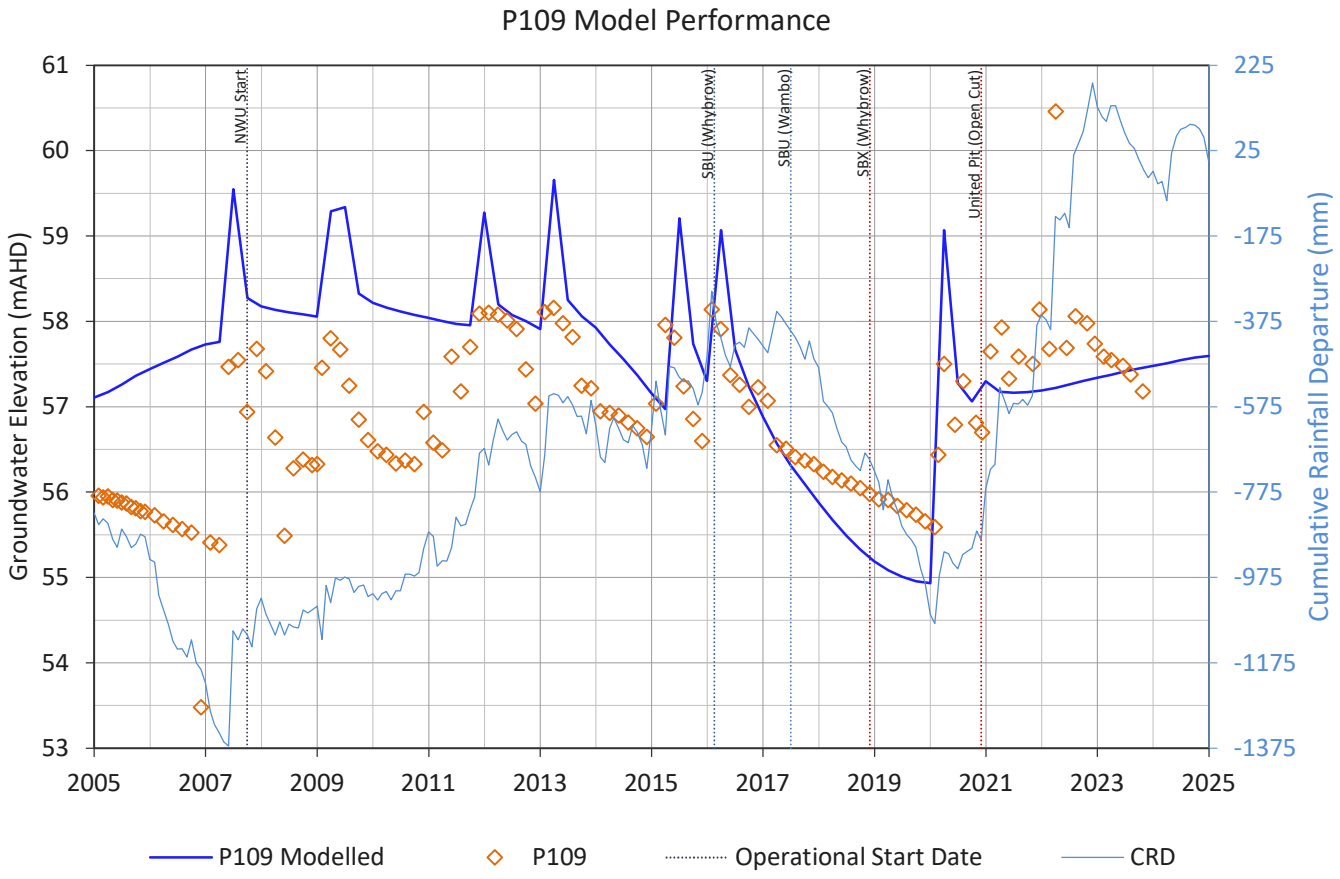

P12 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
52
51
50
49
48
47
46
45
200
-25
-250
-475
-700
-925
-1150
-1375
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
P12
P12 Modelled
Operational Start Date
CRD

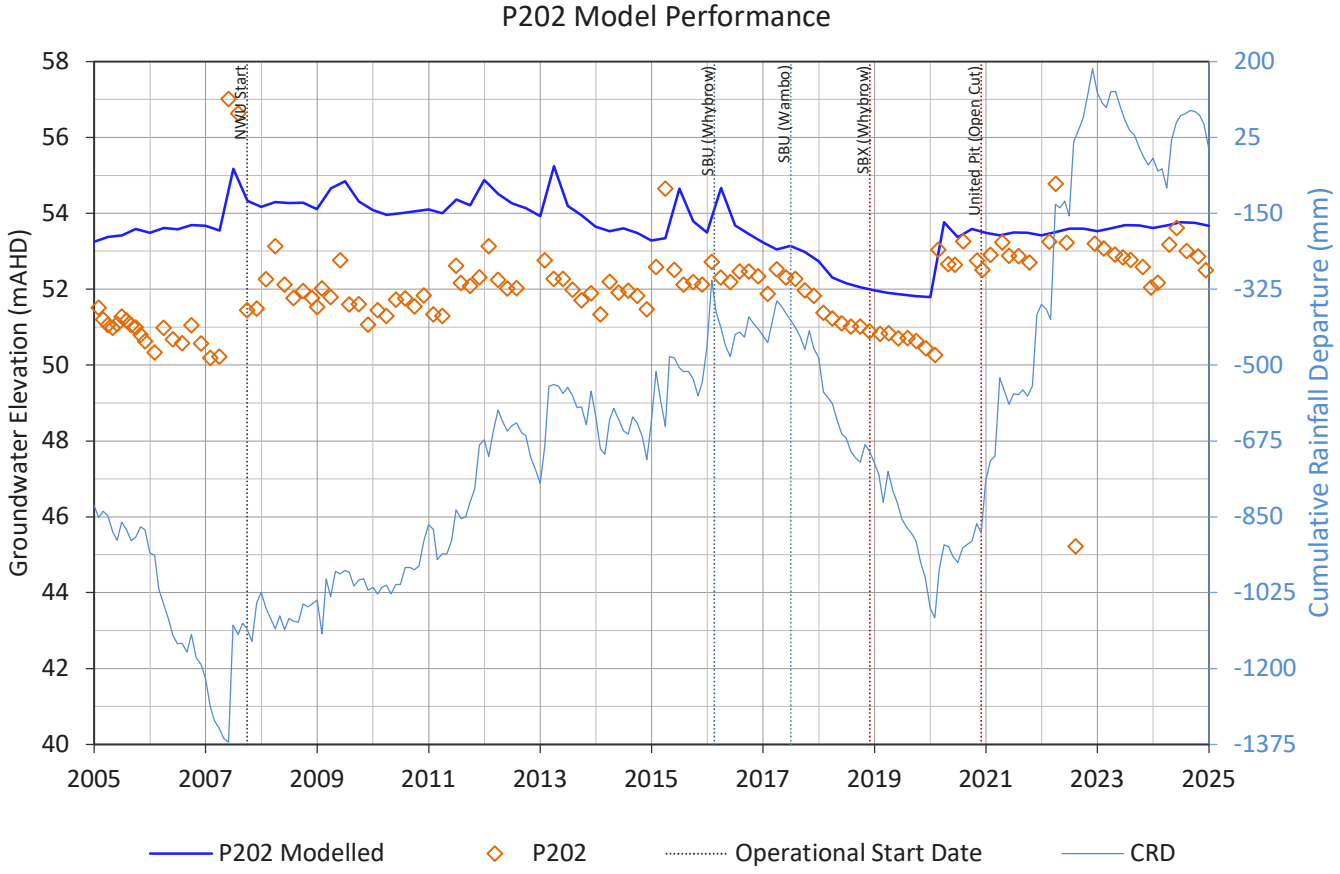

P15 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
52.0
51.5
51.0
50.5
50.0
49.5
49.0
48.5
48.0
47.5
47.0
375
200
25
-150
-325
-500
-675
-850
-1025
-1200
-1375
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
P15 Modelled
P15
Operational Start Date
CRD

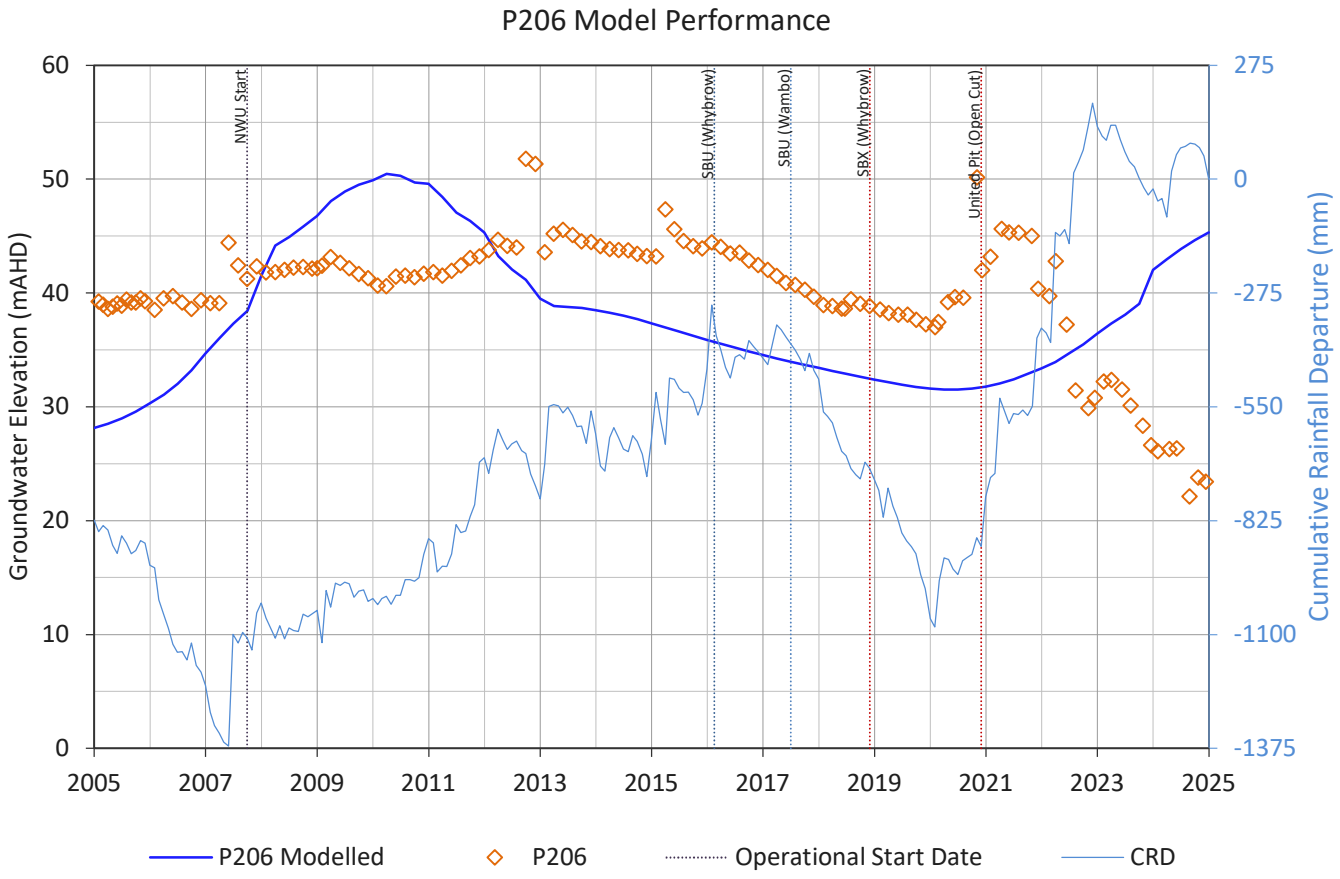

P16 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P16 Modelled
P16
Operational Start Date
CRD

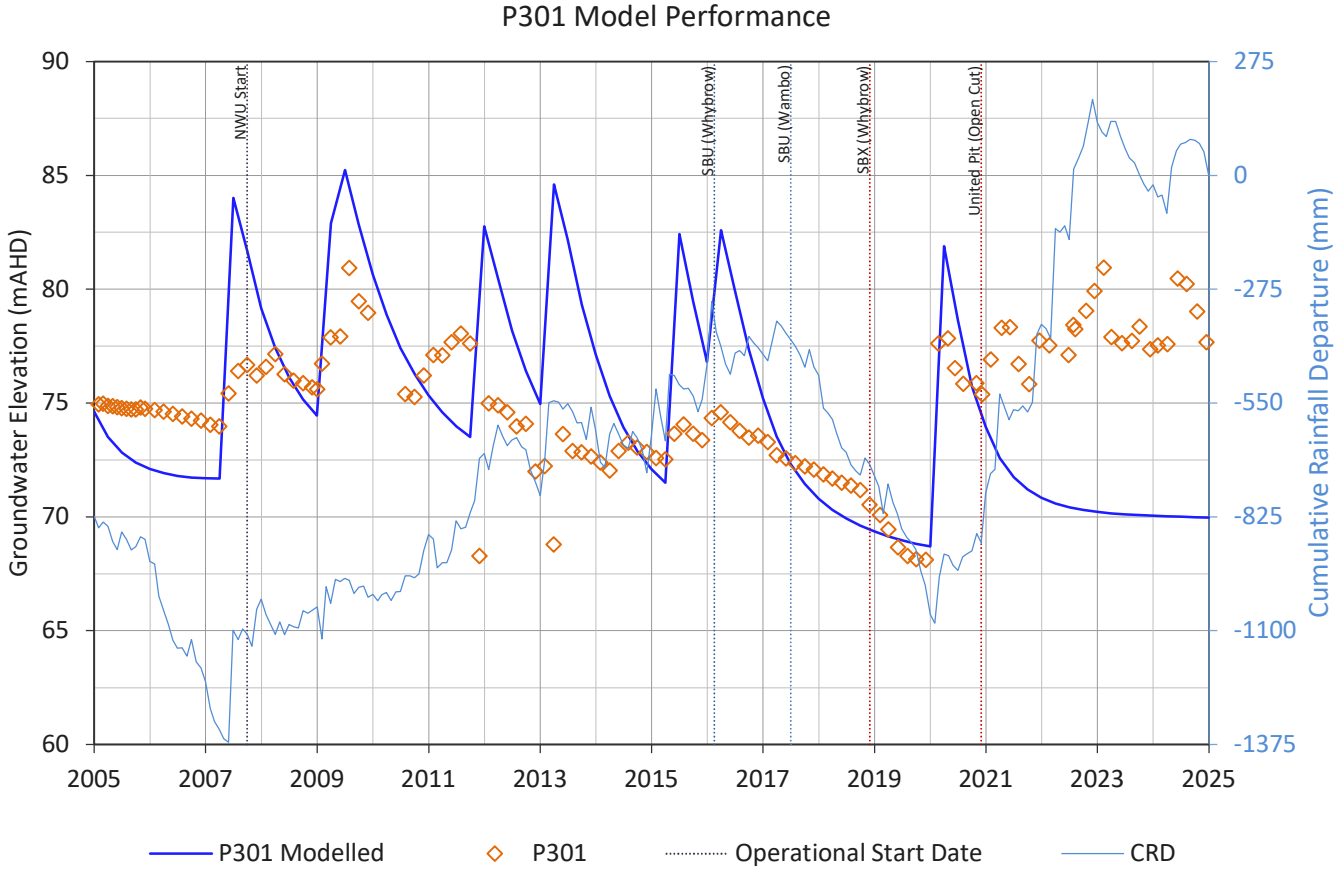

P20 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P20 Modelled
P20
Operational Start Date
CRD

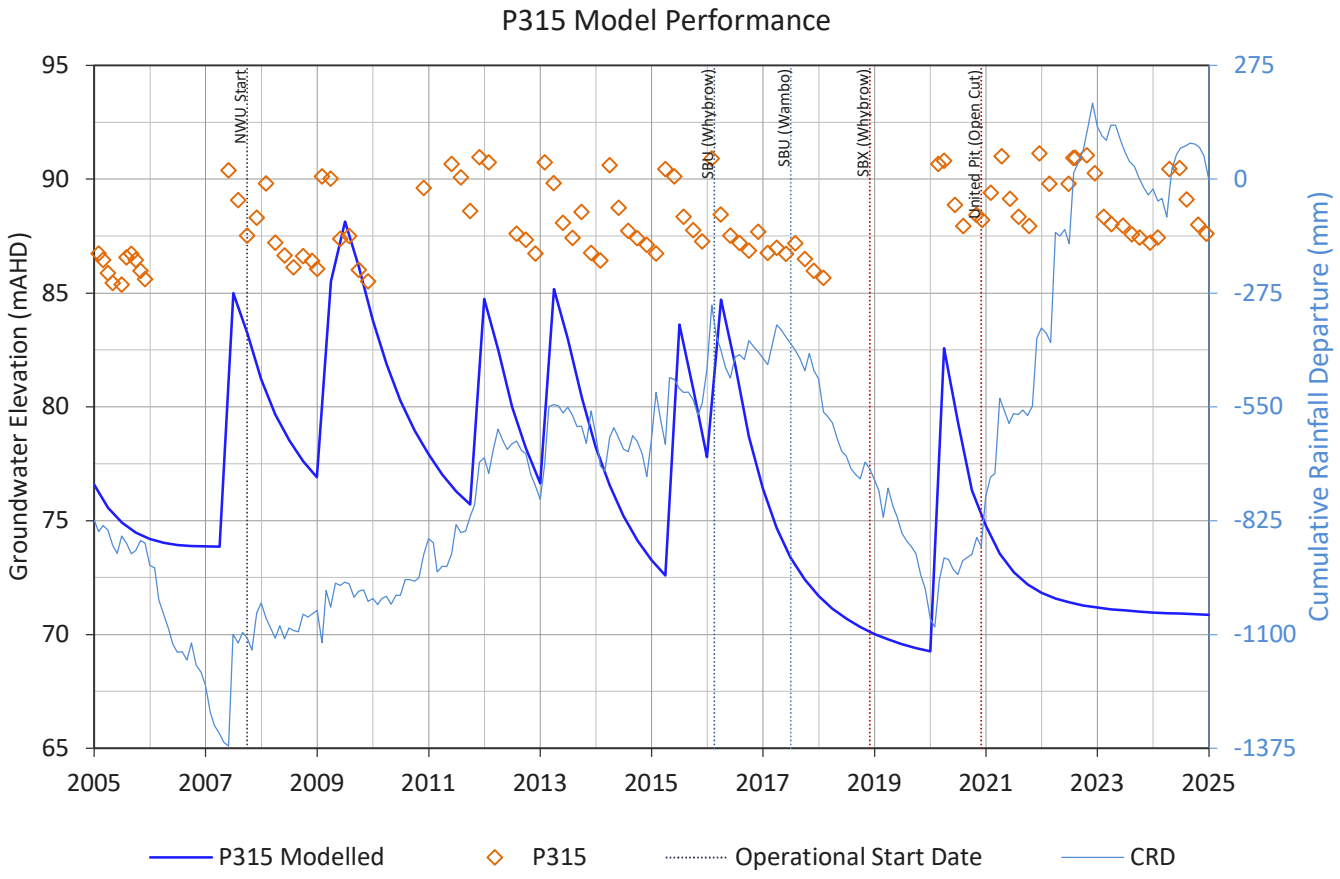

P106 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P106 Modelled
P106
Operational Start Date
CRD


P109 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P109 Modelled
P109
Operational Start Date
CRD


P202 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P202 Modelled
P202
Operational Start Date
CRD


P206 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P206 Modelled
P206
Operational Start Date
CRD


P301 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
90
85
80
75
70
65
60
275
0
-275
-550
-825
-1100
-1375
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P301 Modelled
P301
Operational Start Date
CRD


P315 Model Performance
Groundwater Elevation (mAHD)
Cumulative Rainfall Departure (mm)
95
90
85
80
75
70
65
275
0
-275
-550
-825
-1100
-1375
2005
2007
2009
2011
2013
2015
2017
2019
2021
2023
2025
NWU Start
SBU (Whybrow)
SBU (Wambo)
SBX (Whybrow)
United Pit (Open Cut)
P315 Modelled
P315
Operational Start Date
CRD

Appendix C Vibrating Wire Piezometer Hydrographs

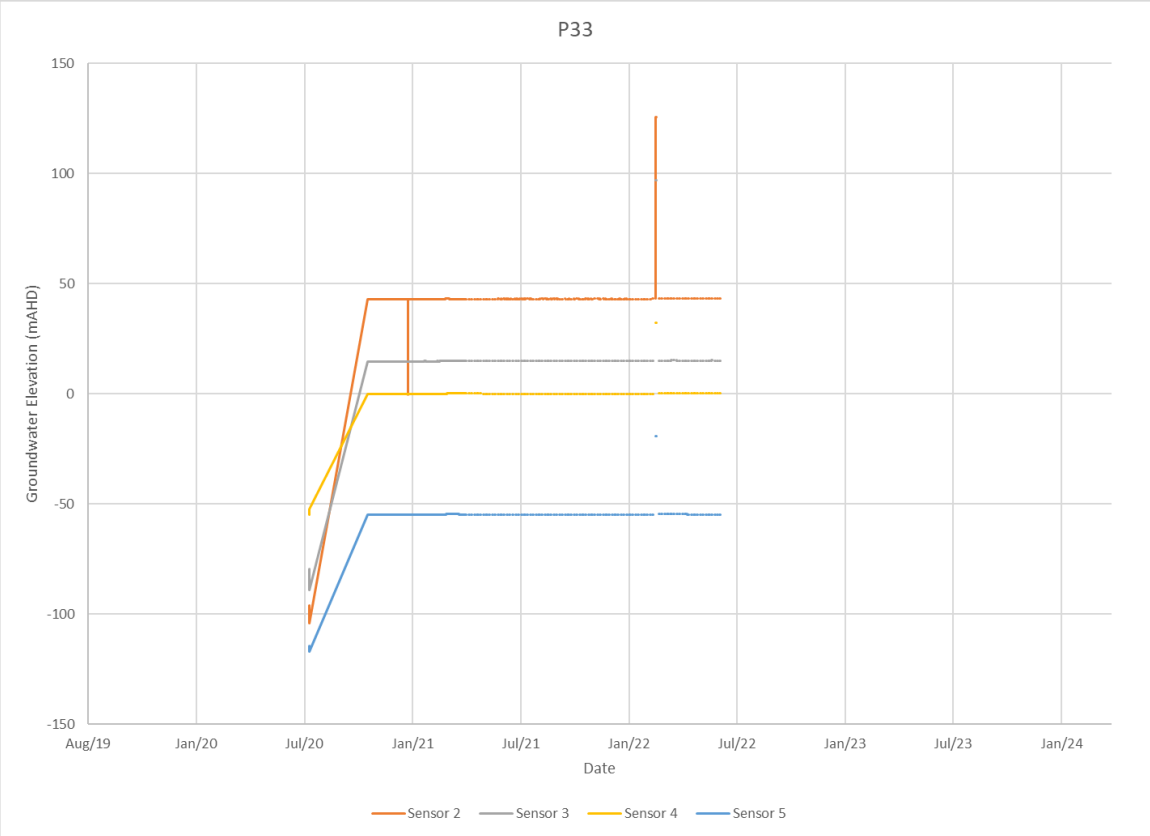
2024 Annual Review - Groundwater

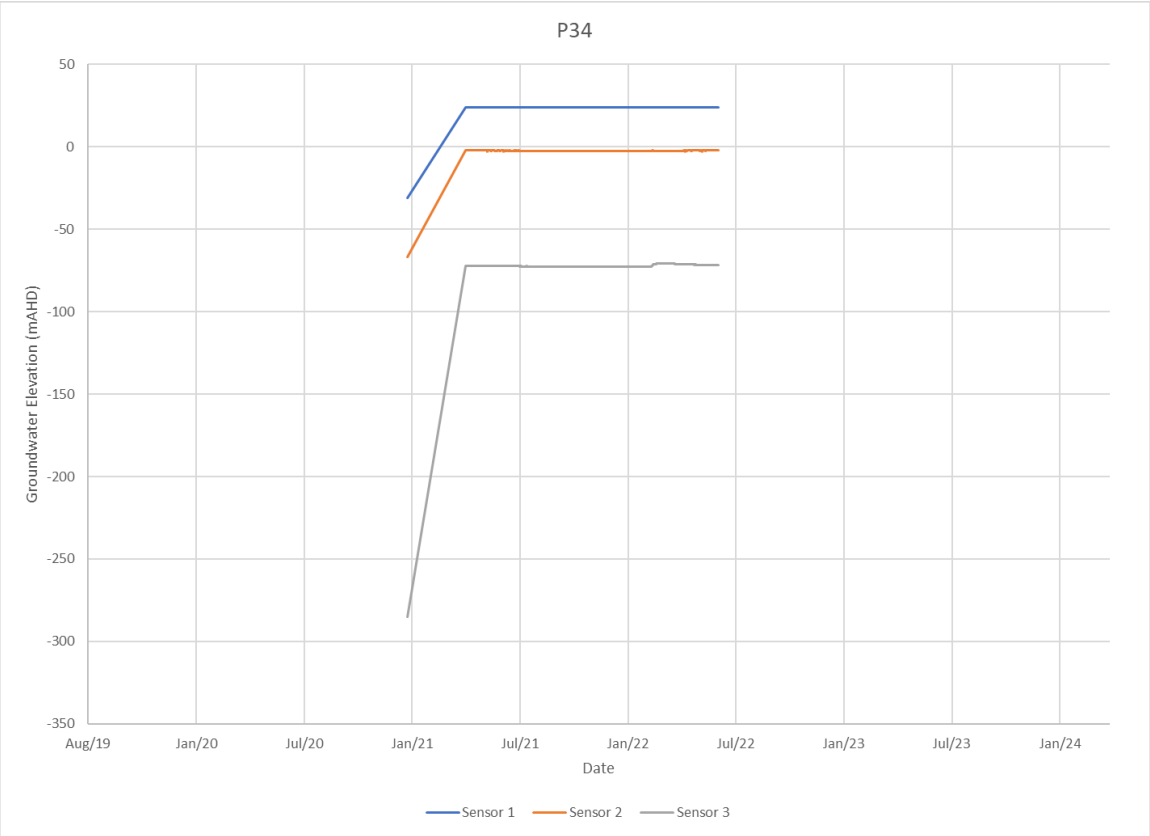
United Wambo

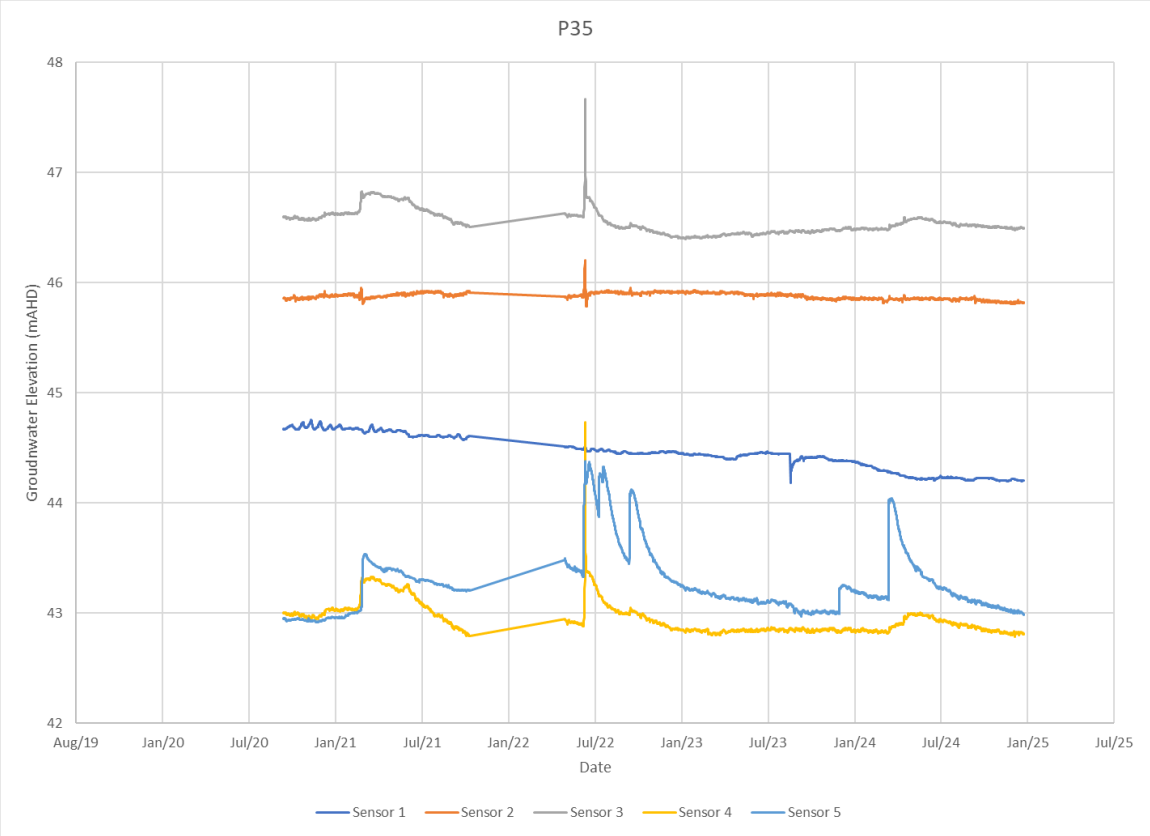
United Wambo Joint Venture

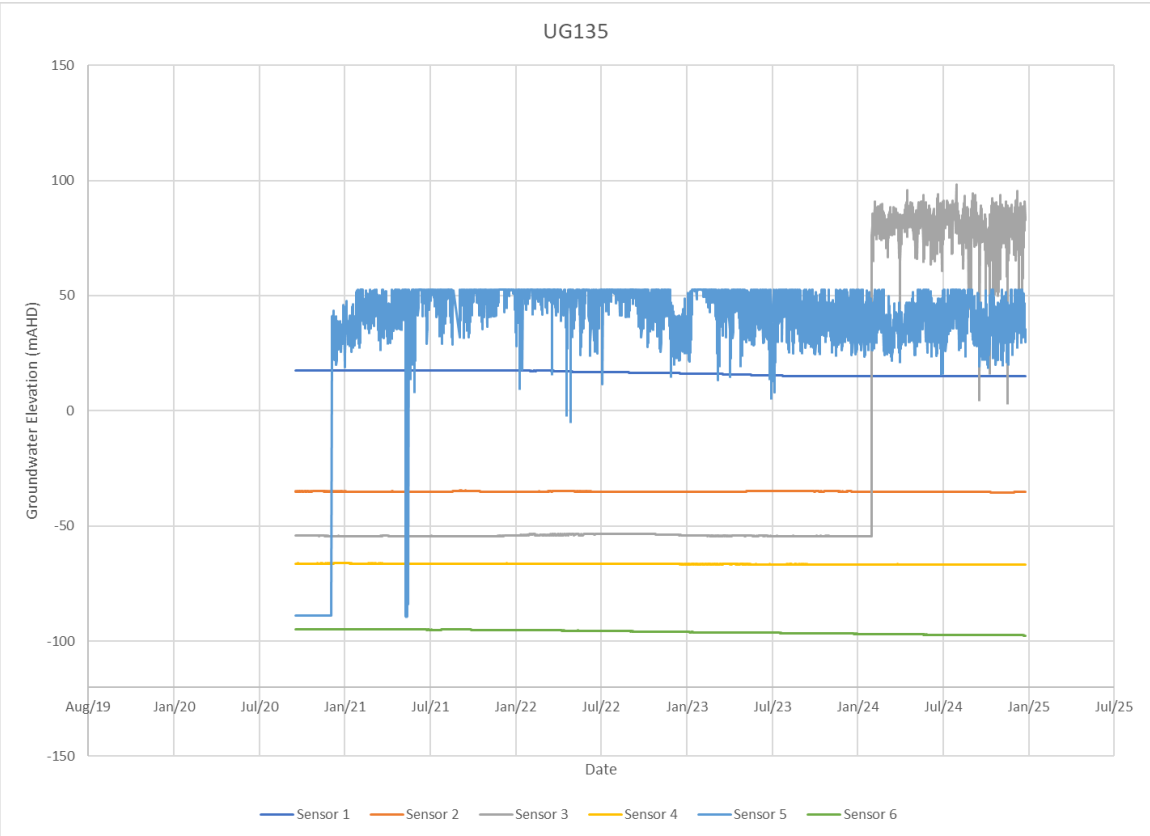
SLR Project No.: 660.v30030.00404

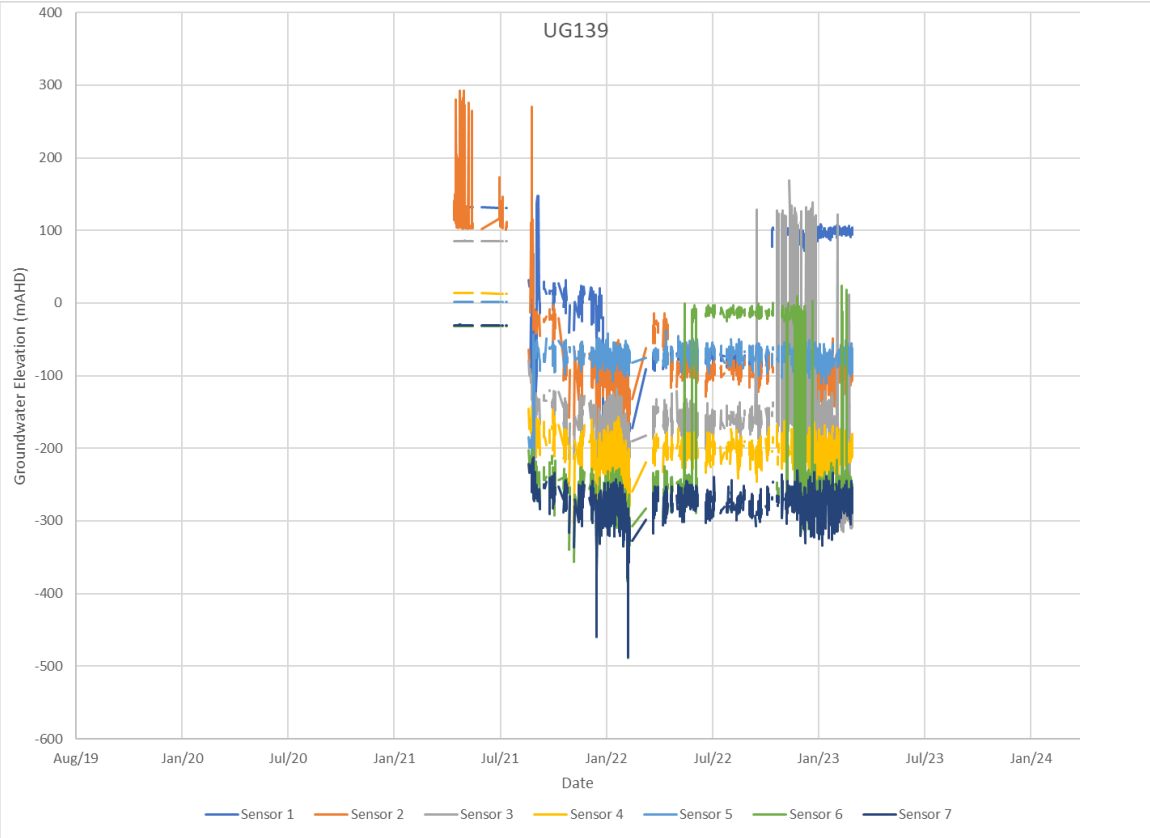
28 March 2025

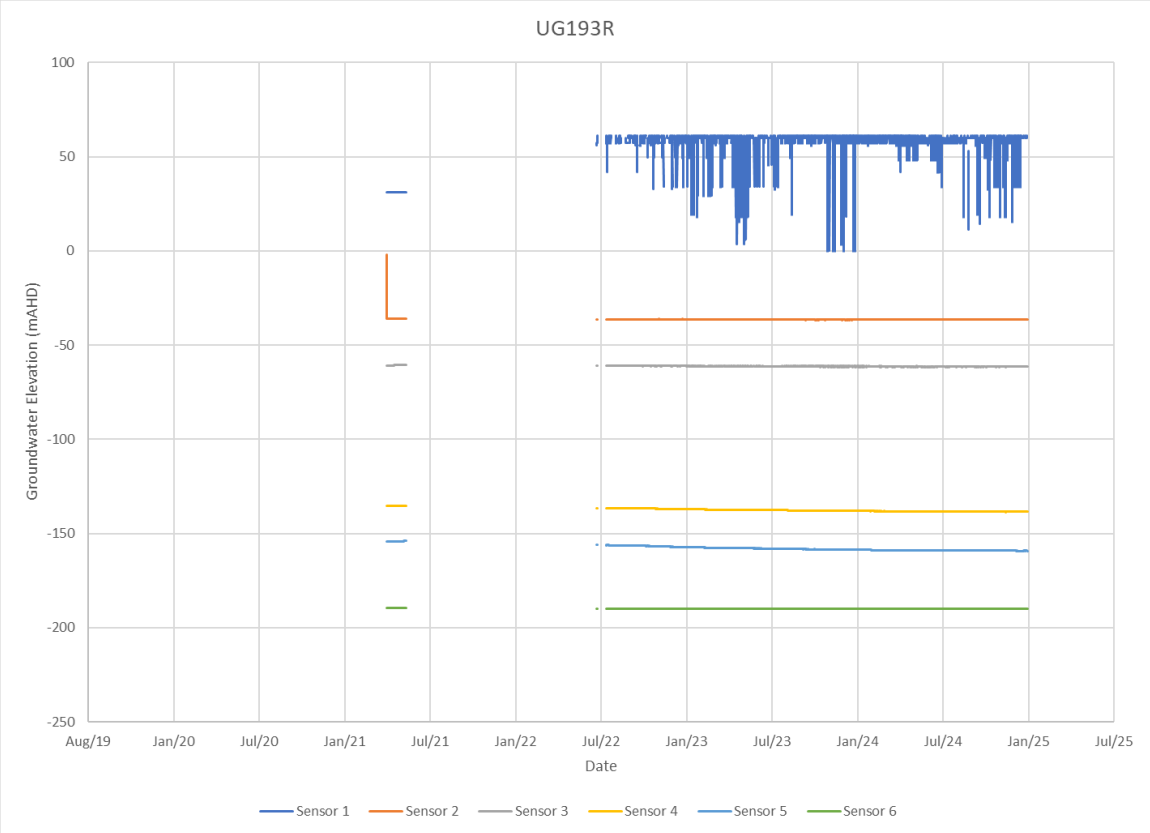

P33
150
100
50
0
-50
-100
-150
Groundwater Elevation (mAHD)
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date
Sensor 2
Sensor 3
Sensor 4
Sensor 5

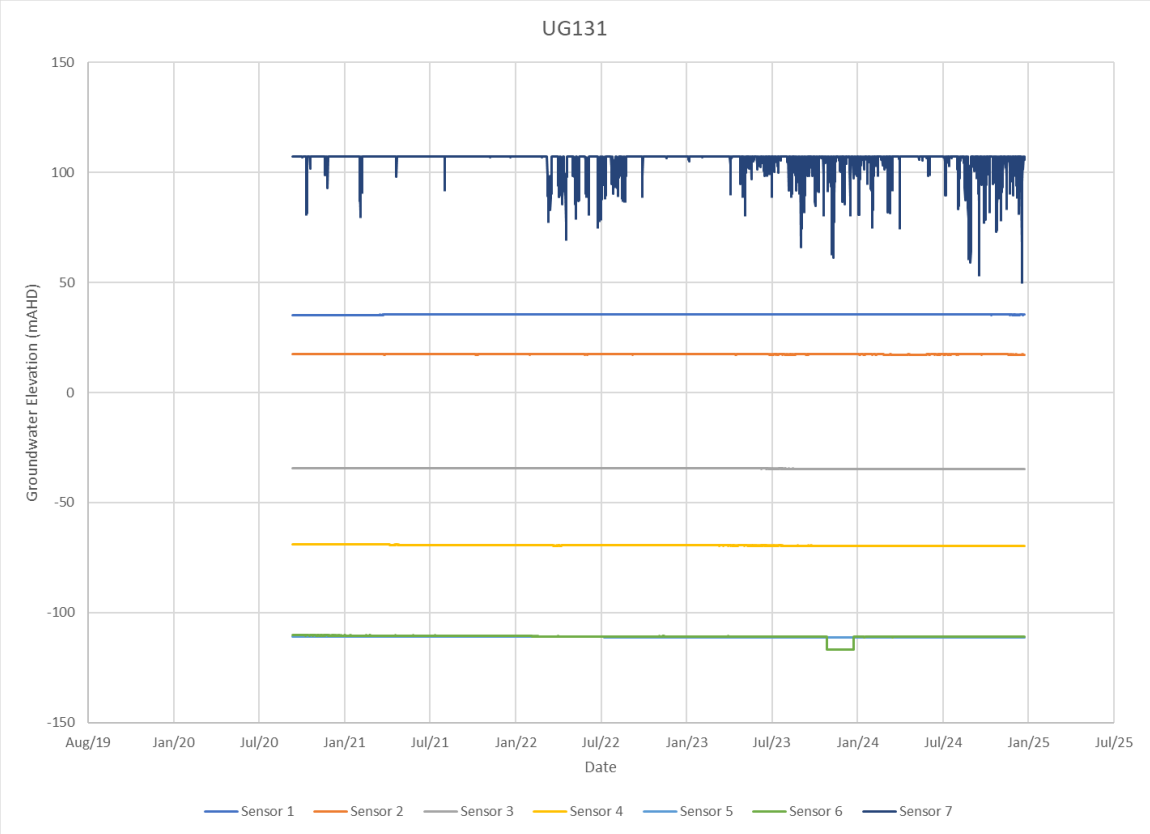

P34
50
0
-50
-100
-150
-200
-250
-300
-350
Groundwater Elevation (mAHD)
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date
Sensor 1
Sensor 2
Sensor 3

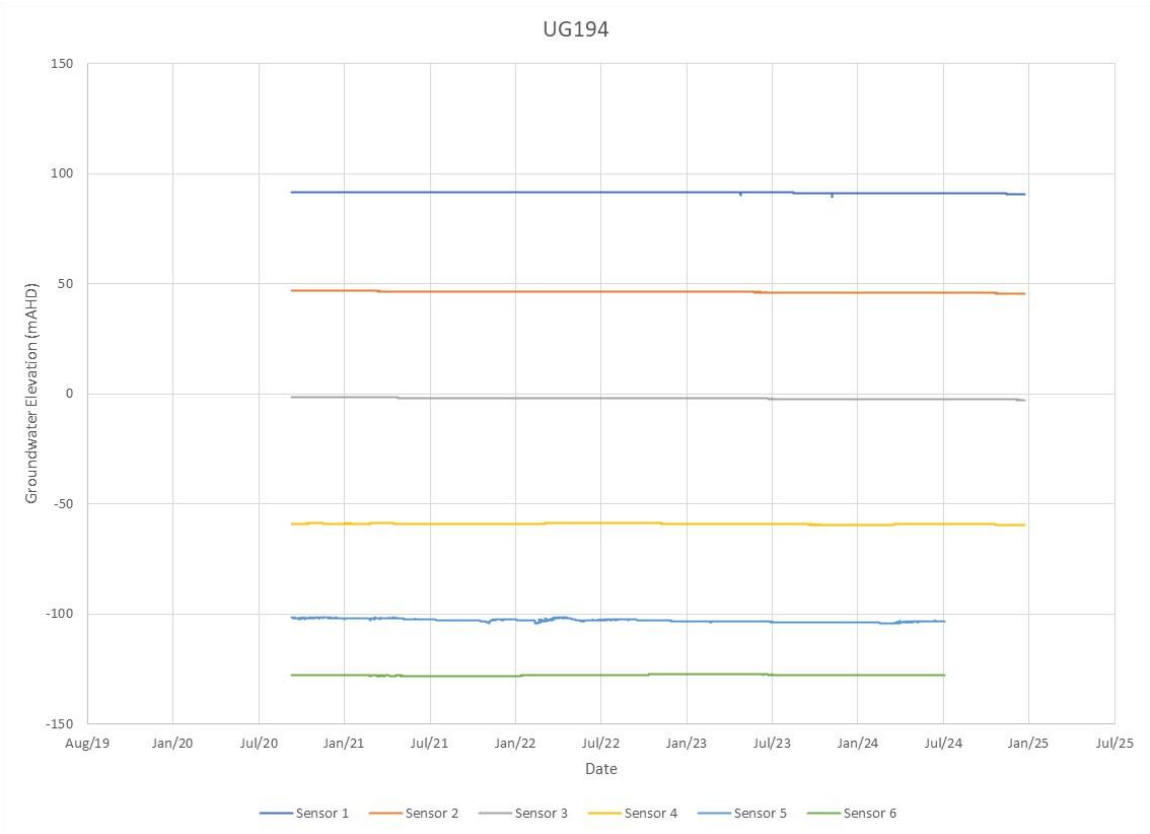

P35
Groundwater Elevation (mAHD)
48
47
46
45
44
43
42
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5

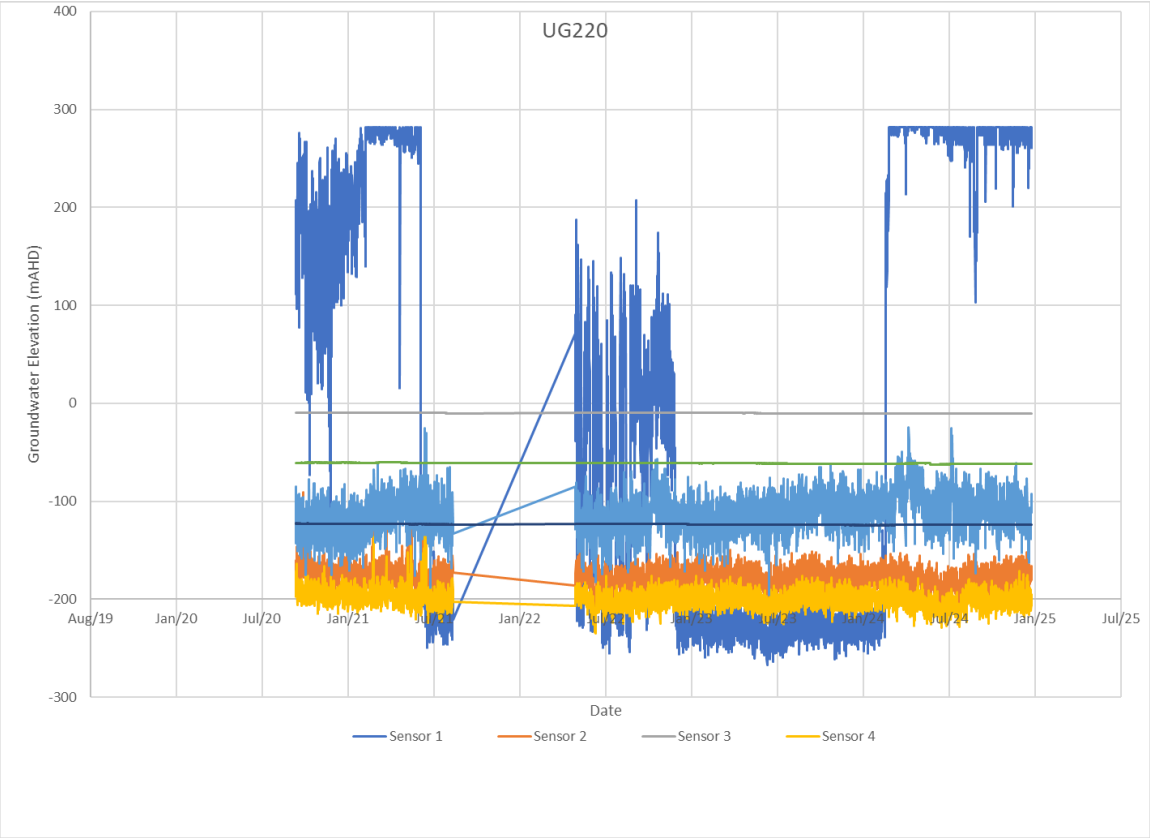

UG135
Groundwater Elevation (mAHD)
150
100
50
0
-50
-100
-150
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6

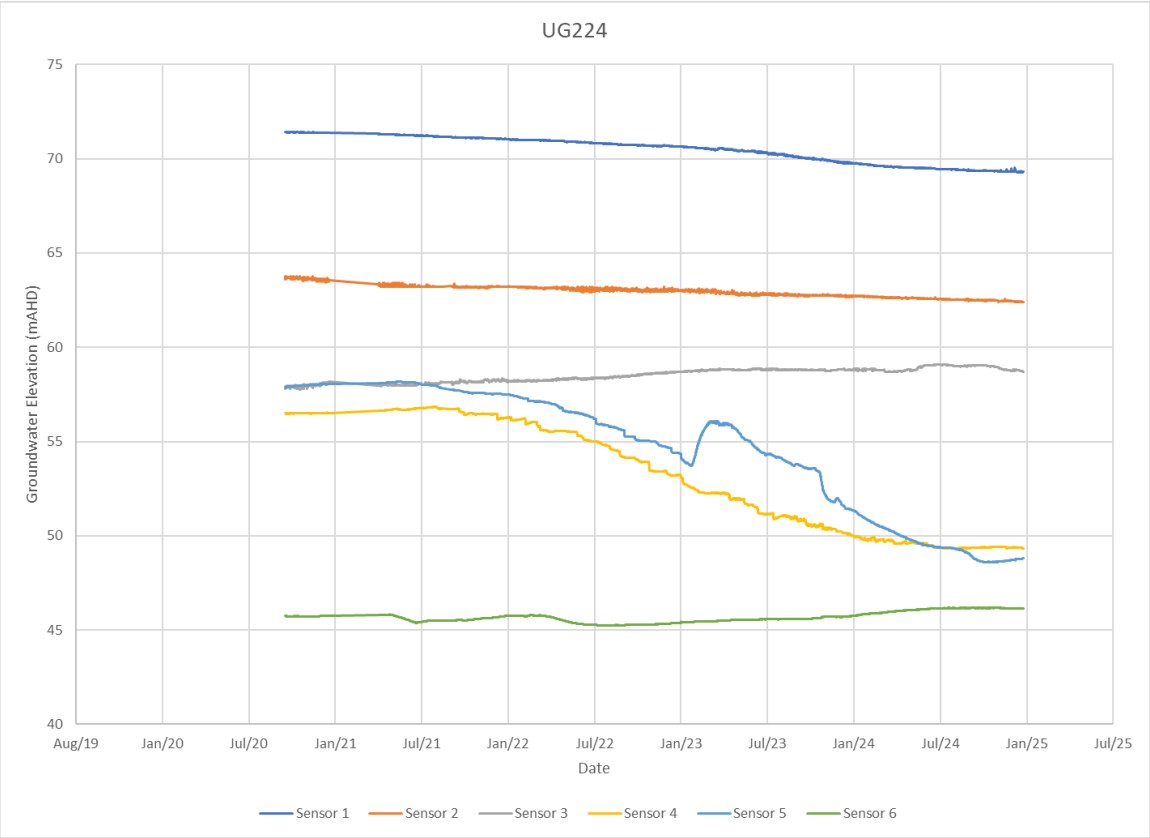

UG139
Groundwater Elevation (mAHD)
400
300
200
100
0
-100
-200
-300
-400
-500
-600
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7

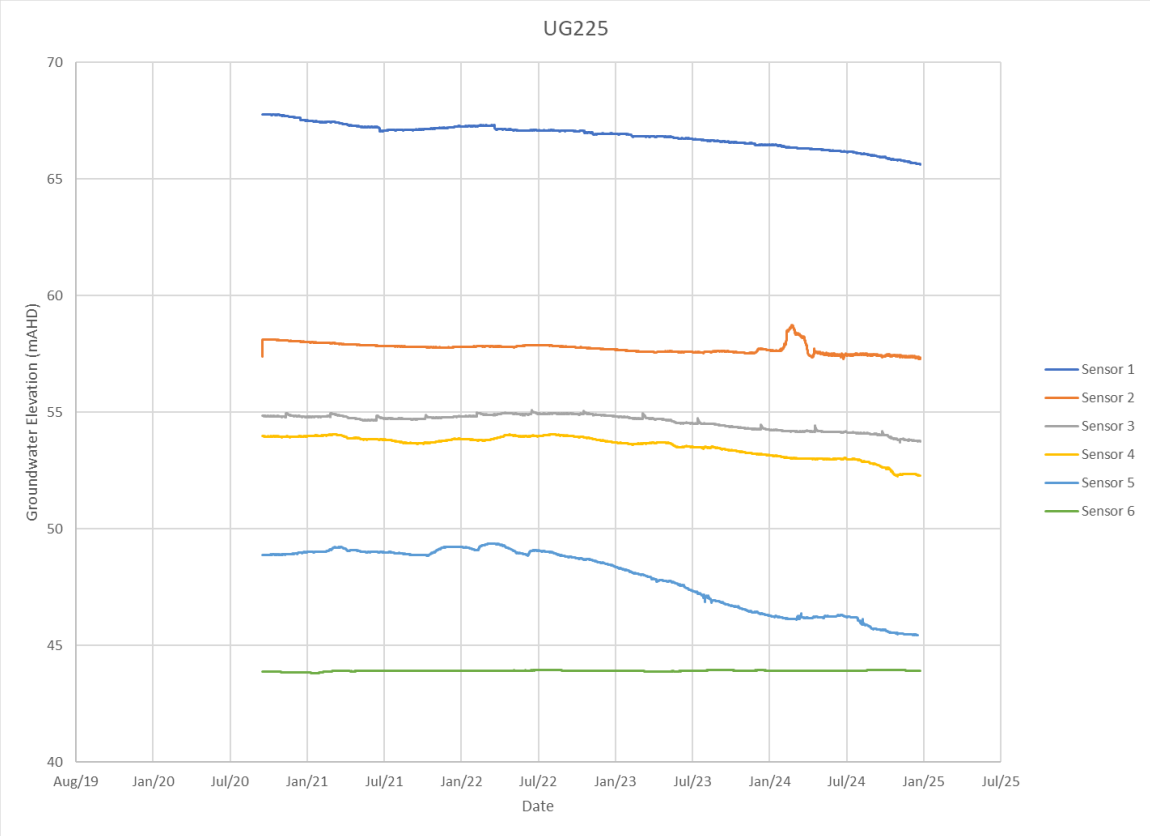

UG193R
Groundwater Elevation (mAHD)
100
50
0
-50
-100
-150
-200
-250
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6

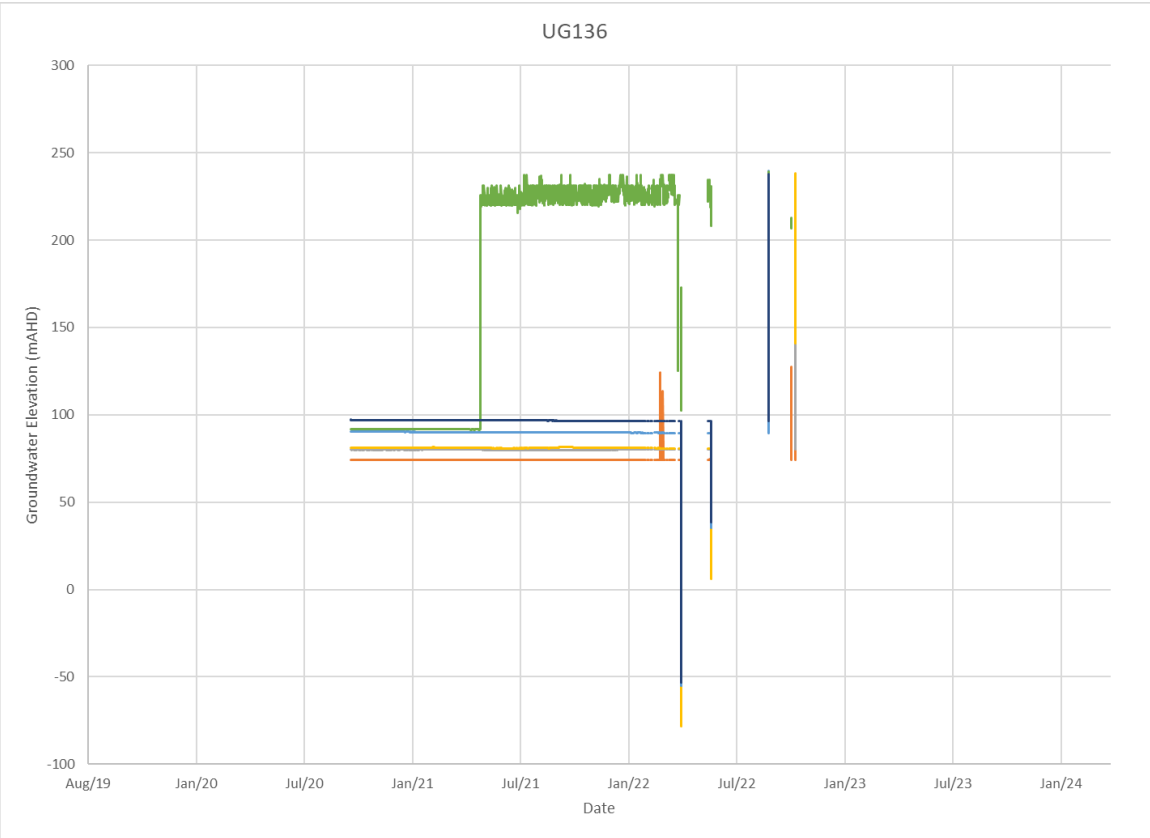

UG131
150
100
50
0
-50
-100
-150
Groundwater Elevation (mAHD)
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6
Sensor 7

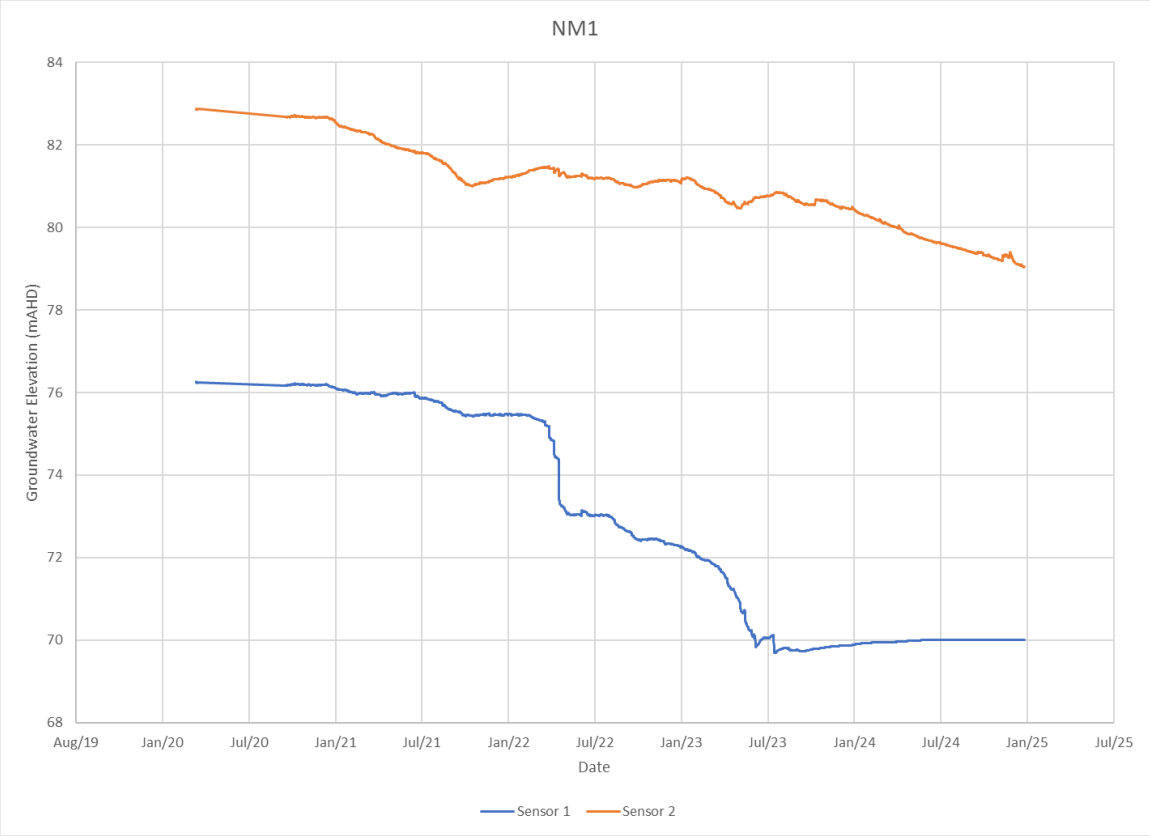

UG194
150
100
50
0
-50
-100
-150
Groundwater Elevation (mAHD)
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6

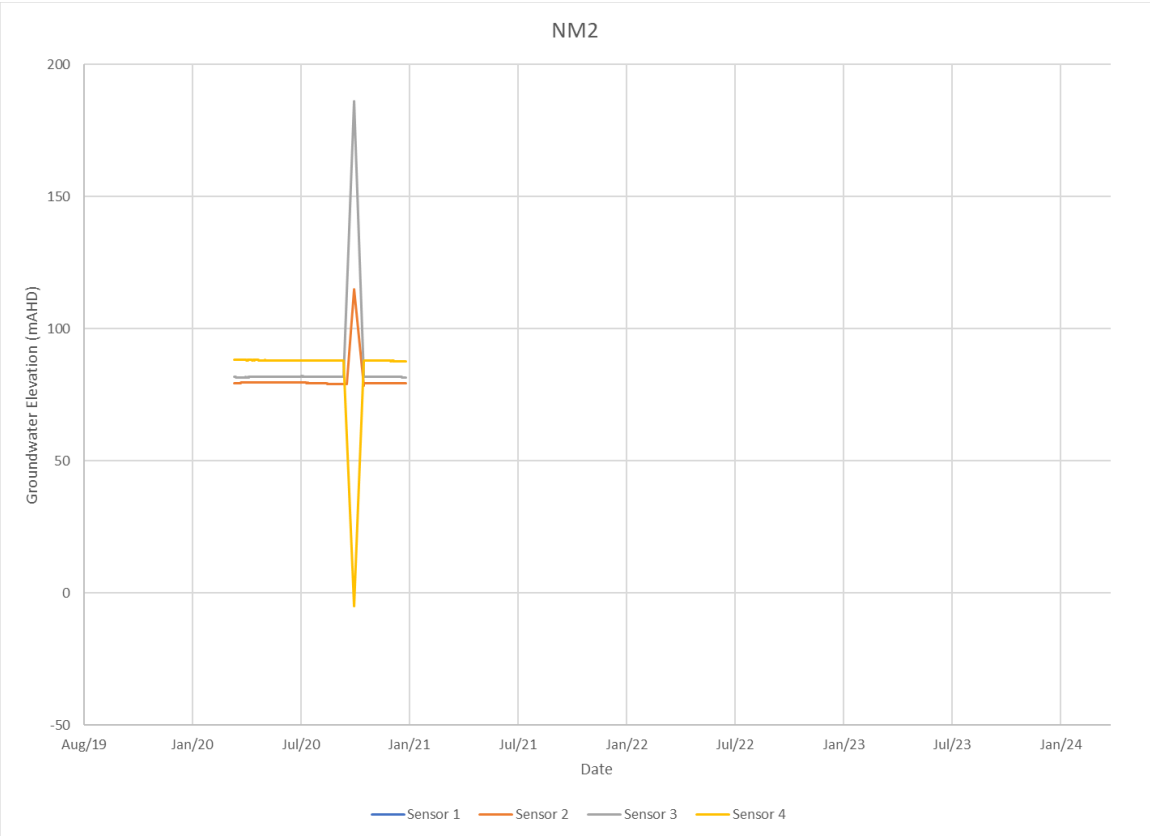

UG220
Groundwater Elevation (mAHD)
400
300
200
100
0
-100
-200
-300
Aug/19
Jan/20
Jul/20
Jan/21
Jan/22
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4

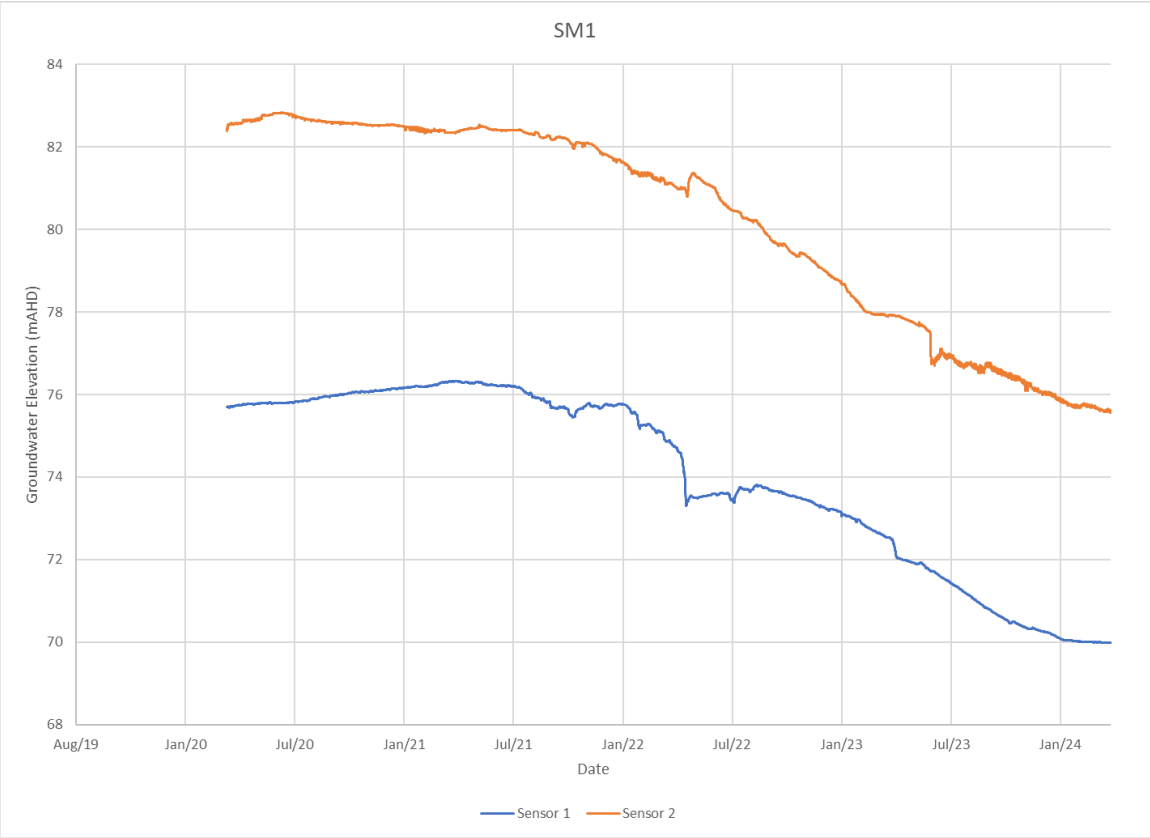

UG224
Groundwater Elevation (mAHD)
75
70
65
60
55
50
45
40
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6

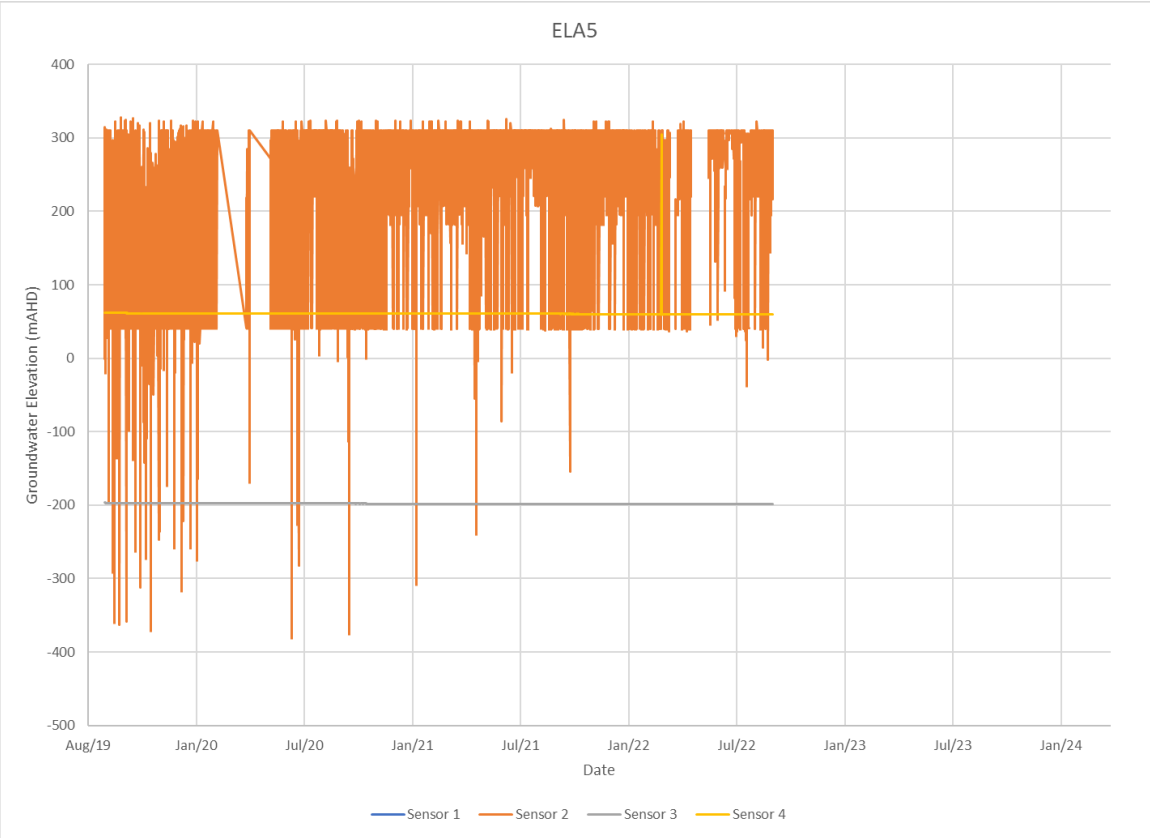

UG225
Groundwater Elevation (mAHD)
70
65
60
55
50
45
40
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4
Sensor 5
Sensor 6


UG136
Groundwater Elevation (mAHD)
300
250
200
150
100
50
0
-50
-100
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date


NM1
Groundwater Elevation (mAHD)
84
82
80
78
76
74
72
70
68
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Jul/24
Jan/25
Jul/25
Date
Sensor 1
Sensor 2


NM2
Groundwater Elevation (mAHD)
200
150
100
50
0
-50
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4


SM1
Groundwater Elevation (mAHD)
84
82
80
78
76
74
72
70
68
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date
Sensor 1
Sensor 2


ELA5
Groundwater Elevation (mAHD)
400
300
200
100
0
-100
-200
-300
-400
-500
Aug/19
Jan/20
Jul/20
Jan/21
Jul/21
Jan/22
Jul/22
Jan/23
Jul/23
Jan/24
Date
Sensor 1
Sensor 2
Sensor 3
Sensor 4

Appendix D Groundwater Monitoring Network

2024 Annual Review - Groundwater

United Wambo

United Wambo Joint Venture

SLR Project No.: 660.v30030.00404

28 March 2025

Bore ID	Bore type	Status	Easting	Northing	Surface (mAHD)	Bore depth (mbgl)	Targeted unit
GW08	MB	A	311793	6392266	61	6.3	North Wambo Creek Alluvium
GW08.2	MB	B	311868	6392328	59.998	3	North Wambo Creek Alluvium
GW09.2	MB	B	311742	6392330	60.835	7.4	North Wambo Creek Alluvium
GW15	MB	A, B	313164	6392807	61	17.4	Wollombi Brook (east) Alluvium
GW16	MB	A, B	306639	6396172	112.4	12.15	North Wambo Creek Alluvium
GW17	MB	A, B	306888	6396099	110.6	14.0	North Wambo Creek Alluvium
GW21	MB	A, B	308647	6393378	119	36.0	Overburden
BH1	MB	A	313226	6394805	58	TBC	Wollombi Brook (east) Alluvium
P12	MB	A, B	313644	6394797	55	15.0	Wollombi Brook (east) Alluvium
P15	MB	B	313431	6394803	TBC	TBC	Wollombi Brook (west) Alluvium
P16	MB	A, B	313480	6394655	58	11.5	Wollombi Brook (west) Alluvium
P20	MB	A, B	313639	6394166	57	10.6	Wollombi Brook (west) Alluvium
P106	MB	A, B	311518	6391084	60	-	Wambo Creek Alluvium
P109	MB	A, B	311215	6390768	62	-	Wambo Creek Alluvium
P116	MB	A	311057	6391293	64	-	Wambo Creek Alluvium
P315	MB	A, B	309088	6391853	91.5	-	Stony Creek Alluvium/Regolith
P316a	MB	C	311255	6391096	60.83	7	Wambo Creek Alluvium
P316b	MB	C	311252	6391090	60.91	13	Weathered Permian
P316c	MB	C	311249	6391083	61.05	26	Permian
P202	MB	A, B	311851	6391259	60.2	-	Overburden
P206	MB	A, B	311772	6391293	59	-	Overburden

Bore ID	Bore type	Status	Easting	Northing	Surface (mAHD)	Bore depth (mbgl)	Targeted unit
P401	MB	B	313625	6395338	68	40.0	Overburden
P402	MB	C	313629	6395340	68	120.0	Arrowfield Seam
P404	MB	Prop	307023	6398634	97	40.0	Overburden
P405	MB	EX	307025	6398634	97	110.0	Arrowfield Seam
P406	VWP	EX	307681	6398872	88	30.0	Overburden
P407	MB	EX	312599	6392933	62	12.0	Wollombi Brook (west) Alluvium
P408	MB	Prop	307282	6399576	74	15.0	Hunter River Alluvium
P411	MB	EX	313831	6396110	58	14	Weathered Permian (Sandstone)
P35	VWP	EX	313611	6395196	59	16.0	Interburden
						19.0	Interburden
						51.0	Blakefield Seam
						60.0	Blakefield Seam
						112.0	Arrowfield Seam
P403	VWP	Prop	308565	6397958	133	30.0	Overburden
						125.0	Arrowfield Seam
						205.0	Warkworth Seam
						260.0	Vaux Seam
UG135	VWP	EX	313831	6396748	65	50.0	Interburden
						110.0	Warkworth Seam
						129.0	Mt. Arthur Seam
						146.0	Piercefield Seam

Bore ID	Bore type	Status	Easting	Northing	Surface (mAHD)	Bore depth (mbgl)	Targeted unit
						176.0	Vaux Seam
						186.0	Broonie Seam
UG147	VWP	EX	311245	6397207	108	90.0	Glen Munro Seam
						157.0	Interburden
						209.0	Mt Arthur Seam
						242.0	Piercefield Seam??
						249.0	Vaux Seam??
						260.0	Broonie Seam??
UG193	VWP	EX	313757	6396090	58	27.0	Glen Munro Seam
						61.0	Arrowfield Seam
						85.0	Bowfield Seam
						160.0	Warkworth Seam
						179.5	Piercefield Seam
						210.0	Broonie Seam
UG194	VWP	EX	312436	6397191	82	20.0	Blakefield Seam
						60.0	Interburden
						100.0	Blakefield Seam
						150.0	Interburden
						190.0	Interburden
						210.0	Vaux Seam
UG220	VWP	EX	312522	6397233	82	52.5	Overburden

Bore ID	Bore type	Status	Easting	Northing	Surface (mAHD)	Bore depth (mbgl)	Targeted unit
						77.0	Arrowfield Seam
						106.0	Interburden
						110.0	Interburden
						136.0	Warkworth Seam
						152.0	Mt. Arthur Seam
						207.0	Vaux Seam
UG224	VWP	EX	313860	6396243	59	163.0	Piercefield Seam
						172.0	Interburden
						191.0	Vaux Seam
UG225	VWP	EX	313214	6397095	69	23.0	Overburden
						58.5	Arrowfield Seam
						93.2	Bowfield Seam
						100.5	Interburden
						128.0	Mt. Arthur Seam
						178.0	Vaux Seam
						110.0	Arrowfield Seam
						135.0	Warkworth Seam
						200.0	Vaux Seam

Making Sustainability Happen

Appendix C - DPHI Feedback

This section may be updated with feedback from the *NSW Department of Planning, Housing and Infrastructure* upon their review of the United Wambo Joint Venture 2023 Annual Review.

Department of Planning, Housing and Infrastructure

NSW GOVERNMENT

NSW Planning ref: SSD-7142-PA-148

Aislinn Farnon
Environment & Community Manager
UNITED COLLIERIES PTY LTD
Wonnarua Country
300 Watt Street
WARKWORTH NSW 2330
05/08/2025

Sent via the Major Projects Portal only

Subject: United Wambo Coal Mine – 2024 Annual Review

Dear Ms Farnon

I refer to the Annual Review for the period 1 January 2024 to 31 December 2024 (2024 Annual Review), submitted as required by Schedule 2, Condition E11 of development consent SSD-7142 as modified (the consent) to the NSW Department of Planning, Housing and Infrastructure (NSW Planning) on 28 March 2025.

NSW Planning has reviewed the Annual Review and considers it to generally satisfy the reporting requirements of the consent and the NSW Planning Annual Review Guideline (October 2015). Please make publicly available a copy of the 2024 Annual Review on the company's website within 30 days.

Please note that the NSW Planning's acceptance of this Annual Review is not an endorsement of the compliance status of the project.

Non-compliances identified in the Annual Review have been assessed by NSW Planning in accordance with its Compliance Policy, with NSW Planning on this occasion determining to record the breaches with no further enforcement action proposed. However, please note that recording the breach does not preclude NSW Planning from taking an alternative enforcement action, should it become apparent that an alternative response is more appropriate.

Should you wish to discuss the matter further, please contact Ann Hagerthy, Senior Compliance Officer on 02 65753407 or email compliance@planning.nsw.gov.au

Yours sincerely

Heidi Watters
Team Leader
Compliance

As nominee of the Planning Secretary

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Appendix D - Summary of Complaints

Date	Time	Nature of Complaint	Description & Response
21/03/2024	8:29 PM	Noise	• Complaint received via Community Information Line. The complaint was in relation to a use of audible horns and track noise from operating equipment. The complainant requested a call back. • The weather was overcast with met conditions 1.9m/s and wind direction of 133degrees. No alarms were generated. • Mining Supervisor changed the dump location and advised all operators not to use audible horns. Following changes, no horns were audible. • The E&C Manager called the complainant back and advised of the changes implemented by operations.
17/09/2024	5:30 AM	Noise	• Complaint received via voice message left at 5.30am. The complaint was in relation to mining noise, particularly dozer noise. The complainant requested a call back. • Real-time data was reviewed at the time of complaint - 1.4m/s and wind direction of 244 degrees, noise levels were elevated, resulting in alarms at the time of the complaint. • The Mining Supervisor modified operations, and following changes, noise levels returned to below criteria. Mining supervisors continued to monitor noise levels. • The E&C Manager called the complainant back and advised of the changes implemented by operations.
2/11/2024	3:43 PM	Dust	• Complaint received via community hotline at 3.43pm. The complaint was in relation to dust generated onsite. The complainant requested a call back. • Real-time data was reviewed for the time of complaint – 2.9m/s and wind direction of 100 degrees; dust levels were elevated in the period leading up to the complaint. • The Mining Supervisor modified operations prior to the complaint to allow watercarts time to manage dust levels. • The Mining Supervisor called the complainant back and advised them of the changes implemented.

Date	Time	Nature of Complaint	Description & Response
7/12/2024	05:09pm	Dust	• Complaint received from the EPA via email at 5:09pm on 10/12/2024 regarding dust emissions on 7/12/2024. The EPA requested further information. • Data was reviewed for the time indicated by the EPA– wind speed of 6.6m/s, wind gusts of 13.7m/s and wind direction of 278 degrees; dust levels were elevated in the period leading up to time of the complaint. • The Mining Supervisor modified operations on the day to manage dust. • Environment and Community Manager responded to the EPA with information regarding weather conditions and dust levels during the period of complaint and advised the EPA of dust management measures completed for the day of complaint.
29/12/2024	10:45am	Noise	• Complaint received via community hotline at 10:45am. The complaint was in relation to noise generated onsite at around 8am. The complainant requested a call back. • Data was reviewed for the time indicated for the complaint – noise levels at continuous monitors were within limits, wind speed was 1.9m/s and wind direction was 299 degrees and there were no noise alarms during this period. • No operational modifications could be made as the complaint was made after the complaint period. • The Mining Supervisor called the complainant back and the complainant stated that noise levels at time of call were at an acceptable level.

Appendix E - Waste Performance

Offsite waste disposal performance comparison at United Wambo for past three years including variance (%)

Waste Type	2022	2023	2024	Variance %
Recycled Hazardous				
Lead Batteries	14,985.00	14,990.00	18,536.00	23.66%
Nicad Batteries	-	24.48	288.00	1076.47%
Waste Oil	893,420.00	1,094,828.00	1,025,686.00	-6.32%
Oily Water	49,649.00	25,969.00	18,629.00	-28.26%
Waste Coolant	25,032.00	22,700.00	33,940.00	49.52%
Oil Filters	34,566.00	37,677.00	38,334.00	1.74%
Chemicals	7,510.00	-	-	-
Waste Grease	7,584.00	7,640.00	5,647.00	-26.09%
Empty Drums	9,760.00	10,482.00	8,044.00	-23.26%
Contaminated Sludge	19,628.00	10,396.00	1,596.00	-84.65%
eWaste	-	-	108.00	-
Total Recycled Hazardous	1,062,134.00	1,224,706.48	1,150,808.00	-6.03%
Recycled Non-Hazardous				
Paper & Cardboard	15,664.00	14,700.00	18,580.00	26.39%
Scrap Steel	396,270.00	335,570.00	290,740.00	-13.36%
Timber	21,820.00	46,280.00	71,060.00	53.54%
Confidential Documents	843.00	1,444.00	1,035.00	-28.32%
Effluent	573,870.00	598,700.00	618,100.00	3.24%
Plastics	-	5,720.00	6,460.00	12.94%
Concrete	5,300.00	-	-	-
Drilling Mud	17,500.00	-	-	-
Total Recycled Non-Hazardous	1,031,267.00	1,002,414.00	1,005,975.00	0.36%
Disposed Hazardous				

Waste Type	2022	2023	2024	Variance %
Oily Rags / Absorbents	10,210.00	16,554.00	14,837.00	-10.37%
Chemicals	290.00	78.00	108.00	38.46%
Medical & Sanitary Waste	105.00	40.00	145.00	262.50%
Hydraulic Hoses	13,178.00	22,826.00	20,701.00	-9.31%
Total Disposed Hazardous	23,783.00	39,498.00	35,791.00	-9.39%
Disposed Non-Hazardous				
Mixed Solid Waste	247,946.00	317,423.00	309,610.00	-2.46%
Total Disposed Non-Hazardous	247,946.00	317,423.00	309,610.00	-2.46%
Annual Totals				
Total Offsite Waste (kg)	2,365,130.00	2,584,041.48	2,502,184.00	-3.17%
Total Offsite Waste Disposed (kg)	271,729.00	356,921.00	345,401.00	-3.23%
Total Offsite Waste Recycling (kg)	2,093,401.00	2,227,120.48	2,156,783.00	-3.16%

Note: Waste types with no volume registered across all 3 years – Acids, Adhesives / Resins, Solvents, Paints, Degreaser, Fluorescent Tubes, Toner Cartridges, Aerosol Cans, Commingled, Pallets, Green Waste, Tyres, Glass, Conveyor Belt, Asbestos, Contaminated Soil, Chemical Anchors, Radioactive Material, Diesel Particulate Filters, Conveyor Belt