HUNTER VALLEY
OPERATIONS

2024 ANNUAL REVIEW

DOCUMENT NUMBER
HVOOC-1061437028-2251

STATUS
Approved

VERSION
1.0

EFFECTIVE
15/05/2025

REVIEW
[Planned Review Date]

OWNER
Superintendent - Environment and Community

TITLE BLOCK

Name of Operations	Hunter Valley Operations
Name of Operator	HV Operations Pty Ltd
Development Consent / Project Approval	DA 450-10-2003 / PA 06_0261
Name of holder of development consent/project approval	HV Operations Pty Ltd
Mining Lease Number	Contained within Table 3-2 of this report
Name of Mining Lease Holder	Contained within Table 3-2 of this report
Water Licence Number	Contained within Table 3-4 of this report
Name of Water Licence Holder	Contained within Table 3-4 of this report

I, David Foster, certify that this audit report is a true and accurate record of the compliance status of Hunter Valley Operations for the period 01/01/2024 to 31/12/2024 and that I am authorised to make this statement on behalf of Hunter Valley Operations.

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	David Foster
Title of Authorised Reporting Officer	General Manager
Signature of Authorised Reporting Officer	
Date	31/03/2025

FIGURES

TABLES

1 | STATEMENT OF COMPLIANCE

Table 1-1 is a Statement of Compliance against the relevant approvals. **Table 1-2** provides a brief summary of the non-compliances against development consents and a reference to where these are addressed within this Annual Review. **Table 1-3** shows the compliance status descriptions relating to **Table 1-2**.

Table 1-1: Statement of Compliance

Were all conditions of the relevant approvals complied with?	
PA 06_0261 (HVO South)	No
DA 450-10-2003 (HVO North)	No

Table 1-2: Non-Compliances

Relevant Approval	Condition Number	Condition Description	Compliance Status	Where Addressed in Annual Review
DA 450-10-2003	Schedule 3 Condition 4A	Cheshunt East PM_{10} Exceedance 5 February 2024	Non-compliant (low)	Section 11
DA 450-10-2003	Schedule 3 Condition 4A	Jerrys Plains PM_{10} Exceedance 13 March 2024	Non-compliant (low)	Section 11
PA 06_0261	Schedule 3, Condition 18	Level 4B Blast Fume Event 4 June 2024	Non-compliant (low)	Section 11
EPL 640	E1.1	Dam 17N Pumping Incident 22 June 2024	Non-compliant (low)	Section 11
DA 450-10-2003	Schedule 3 Condition 4A	Jerrys Plains PM_{10} Exceedance 4 November 2024	Non-compliant (low)	Section 11
DA 450-10-2003	Schedule 3 Condition 4A	Cheshunt East PM_{10} Exceedance 7 November 2024	Non-compliant (low)	Section 11
DA 450-10-2003	Schedule 3, Condition 17	Level 4B Blast Fume Event 22 November 2024	Non-compliant (low)	Section 11
DA 450-10-2003	Schedule 3 Condition 4A	Jerrys Plains PM_{10} Exceedance 14 December 2024	Non-compliant (low)	Section 11
DA 450-10-2003	Schedule 3, Condition 4A	DL30 Depositional Dust Annual Exceedance	Non-compliant (low)	Section 11
PA 06_0261	Schedule 3 Condition 19	Warkworth TSP Annual Average Exceedance	Non-compliant (low)	Section 11

Table 1-3: Compliance Status Key for Table 1-2

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 unlikely to occu
Low	Non-compliant	Non-compliance with: Potential for moderate environmental consequences, but is unlikely to occur or Potential for low environmental consequences, but is unlikely to occur
Administrative Non-Compliance	Non-compliant	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g., submitting a report to government later than required under approval conditions)

2 | INTRODUCTION

2.1 | DOCUMENT PURPOSE

This Annual Review is written to satisfy the requirements of the Development Consents and conditions of mining leases held by Hunter Valley Operations (HVO) for events which occurred during the 2024 calendar year (the reporting period). The Annual Review has been written in accordance with the *Post-approval requirements for State significant mining developments – Annual Review Guideline* (NSW Government, October 2015).

This report is distributed to:

- NSW Department of Planning, Housing and Infrastructure (DPHI);
- NSW Resource Regulator (RR);
- NSW Environment Protection Authority (EPA);
- Department of Climate Change, Energy, the Environment and Water—Water (DCCEEW – Water);
- Singleton Council;
- Muswellbrook Shire Council; and
- HVO Community Consultative Committee (CCC).

2.2 | BACKGROUND

HVO is situated in the Upper Hunter Valley between Singleton and Muswellbrook, approximately 24 km northwest of Singleton, and approximately 100 km northwest of Newcastle. The Hunter River geographically divides HVO into HVO North (DA 450-10-2003) and HVO South (PA 06_0261), however they are integrated operationally with personnel, equipment and materials utilised as required. This improves operational efficiency, rationalisation of infrastructure and resource utilisation.

HVO is owned through a Joint Venture (JV) between Glencore (49%) and Yancoal (51%).

The regional context and layout of the HVO pits and facilities are shown in **Figure 2-1** and **Figure 2-2** respectively.

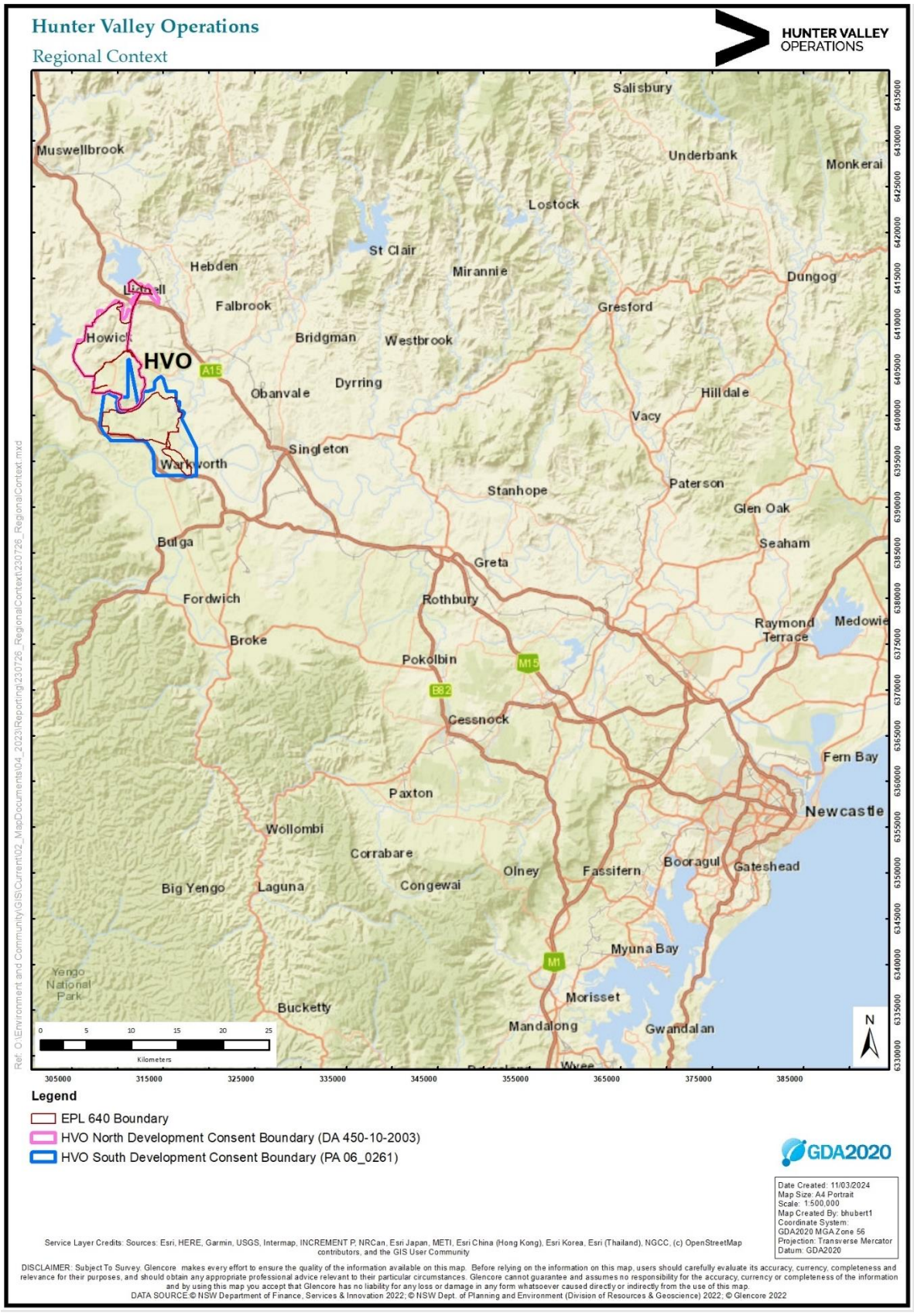

Figure 2-1: Regional Context

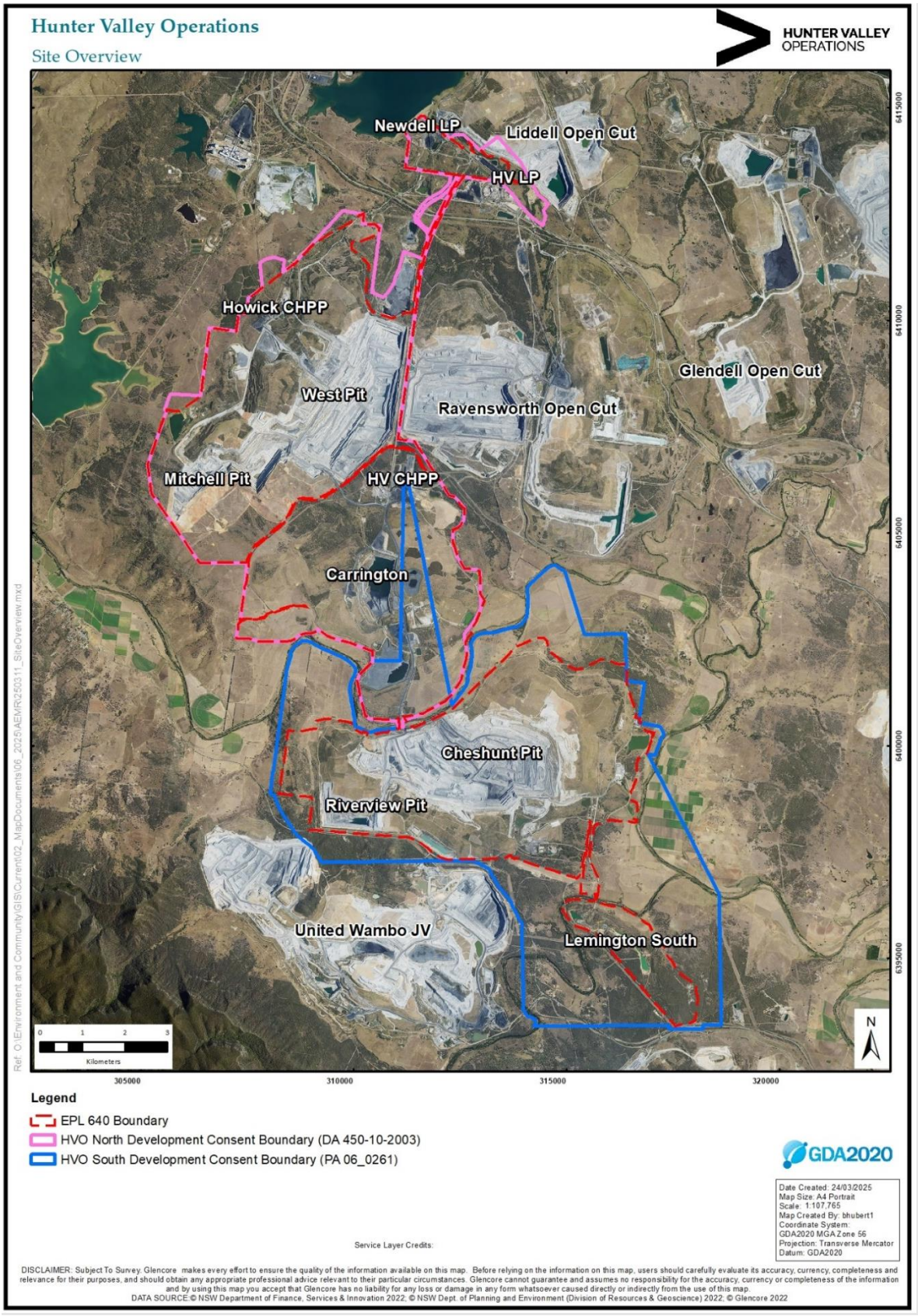

Figure 2-2: Hunter Valley Operations Site Overview

2.3 | MINE CONTACTS

Key mine contacts are listed in **Table 2-1**.

Table 2-1: Mine Contacts

Contact	Role	Phone	Email
David Foster	General Manager	1800 888 733	david.foster@hvo.com.au
Ben de Somer	Environment and Community Manager		ben.desomer@hvo.com.au

3 | OBJECTIVES

3.1 | APPROVALS, LEASES AND LICENCES

3.1.1 | CURRENT APPROVALS

The status of HVO development consents, licences and relevant approvals are listed in:

Table 3-1: HVO Major Approvals

Table 3-1: HVO Major Approvals

Approval Number	Description	Issue Date	Expiry Date
HVO North DA 450-10-2003 MOD 7	HVO West Pit Extension and Minor Modifications (2003); and associated modifications. MOD 7 approved July 2017. Covers West Pit (approved production limit of 12 Mtpa), Carrington Pit (approved production limit of 10 Mtpa), HVCPP (approved processing limit of 20 Mtpa) and Howick CHPP (approved processing limit of 6 Mtpa). An application to modify the HVO North approval (MOD 8) for an extension of time for mining operations through to 31 December 2026 was submitted in November 2024. The Modification Report was placed on public exhibition from 27 November 2024 through to 10 December 2024.	28/07/2017	12/06/2025
HVO South PA 06_0261 MOD 8	Hunter Valley Operations – South Coal Project and associated modifications. MOD 8 Approved 6 February 2023. Covers Riverview and Cheshunt Pits (approved production limit of 20 Mtpa) and processing rate of 20 Mtpa across HVO coal preparation plants.	06/02/2023	24/03/2030
EPBC 2016/7640	Hunter Valley Operations – State approved mining Hunter Valley NSW	10/10/2016	31/12/2030

Table 3-2: Summary of Mining Tenements

Title	Mining Tenement	Titleholder	Purpose	Grant Date	Expiry Date	Status
AL 32	Assessment Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	04/11/2020	03/11/2026	Granted
AL 33	Assessment Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	04/11/2020	03/11/2026	Granted
AL 34	Assessment Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	04/11/2020	03/11/2026	Granted
AUTH 72	Authorisation	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	08/03/1977	08/03/2027	Granted
EL 5291	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	28/04/1997	28/04/2029	Granted
EL 5292	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	28/04/1997	27/04/2028	Granted
EL 5417	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	23/12/1997	23/12/2027	Granted
EL 5418	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	23/12/1997	23/12/2028	Granted
EL 5606	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	11/08/1999	11/08/2029	Granted
EL 8175	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	23/09/2013	23/09/2026	Granted
EL 8821	Exploration Licence	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	13/02/2019	13/02/2025	Renewal Pending
(Part) CCL 708	Various Sub leases	Liddell Tenements Pty Ltd	Prospecting and Mining Coal	17/05/1990	17/05/2044	Granted
CCL 714	Consolidated Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	23/05/1990	30/08/2030	Granted
CCL 755	Consolidated Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	24/01/1990	05/03/2030	Granted
CL 327	Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	06/03/1989	06/03/2031	Granted
CL 359	Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	21/05/1990	21/05/2032	Granted

Title	Mining Tenement	Titleholder	Purpose	Grant Date	Expiry Date	Status
CL 360	Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	29/05/1990	29/05/2032	Granted
CL 398	Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	04/06/1992	04/06/2034	Granted
CL 584	Coal Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	01/01/1982	31/12/2044	Granted
CML 4	Consolidated Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	02/03/1993	03/06/2033	Granted
ML 1324	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	19/08/1993	19/08/2035	Granted
ML 1337	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	01/02/1994	01/02/2034	Granted
ML 1359	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	01/11/1994	1/11/2036	Granted
ML 1406	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	27/02/1997	10/02/2027	Granted
ML 1428	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	15/04/1998	14/04/2040	Granted
ML 1465	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	21/02/2000	21/02/2042	Granted
ML 1474	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	24/11/2000	23/11/2042	Granted
ML 1482	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	19/03/2001	19/03/2040	Granted
ML 1500	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	21/12/2001	20/12/2043	Granted
ML 1526	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	03/12/2002	02/12/2044	Granted
ML 1560	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	28/01/2005	27/01/2026	Renewal Pending
ML 1589	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	02/11/2006	01/11/2027	Granted

Title	Mining Tenement	Titleholder	Purpose	Grant Date	Expiry Date	Status
ML 1622	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	22/10/2010	10/03/2027	Granted
ML 1634	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	31/07/2009	31/07/2030	Granted
ML 1682	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	16/12/2012	15/12/2033	Granted
ML 1704	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	05/12/2014	05/12/2035	Granted
ML 1705	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	17/12/2014	17/12/2035	Granted
ML 1706	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	09/12/2014	09/12/2035	Granted
ML 1707	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	09/12/2014	09/12/2035	Granted
ML 1710	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting and Mining Coal	22/12/2016	10/03/2027	Granted
ML 1732	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	06/04/2016	06/04/2037	Granted
ML 1734	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	06/04/2016	06/04/2037	Granted
ML 1748	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	05/12/2016	04/12/2037	Granted
ML 1753	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	19/04/2017	19/04/2038	Granted
ML 1810	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	04/11/2020	04/11/2041	Granted
ML 1811	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	04/11/2020	04/11/2041	Granted
ML 1840	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	03/11/2022	03/11/2043	Granted
ML 1841	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	3/11/2022	03/11/2043	Granted

Title	Mining Tenement	Titleholder	Purpose	Grant Date	Expiry Date	Status
ML 1849	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	16/05/2023	16/05/2044	Granted
ML 1867	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	16/11/2023	16/11/2044	Granted
ML 1869	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	15/12/2023	15/12/2044	Granted
ML 1870	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities (Mining Purposes)	15/12/2023	15/12/2044	Granted
ML 1871	Mining Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Ancillary Mining Activities	15/12/2023	15/12/2044	Granted
AL 32	Assessment Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	04/11/2020	03/11/2026	Granted
AL 33	Assessment Lease	Coal & Allied Pty Ltd and Anotero Pty Ltd	Prospecting	04/11/2020	03/11/2026	Granted

Table 3-3: HVO Licences and Permits

Type	Licence Number	Description	Authority	Expiry Date
Environment Protection Licence	EPL640	Environment Protection Licence	EPA	N/A
Licence to Store Explosives	XSTR200117	Licence to Store	SafeWork	02/05/2026
Radiation Licence	RML5085293	Radiation Management Licence	EPA	14/11/2025
Aboriginal Heritage Permit	C0001890	Care Agreement	NSW DCCEEW	03/06/2036
	C0002193	Aboriginal Heritage Impact Permit	NSW DCCEEW	06/12/2026
	5219	Aboriginal Heritage Impact Permit	NSW DCCEEW	12/06/2025
Road Closure Permit	2269820	Road Occupancy Licenses– Golden Highway	RMS	31/12/2024
	N/A	Road Closure Approval - Lemington Road	Singleton Council	30/06/2025

Table 3-4: Water Related Approvals

Licence Number	Type of Licence	Purpose	Legislation	Description	Expiry Date
20BL030566	Bore	Well	Part 5 Water Act 1912	East Open Cut	Perpetuity
20BL141584	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – Carrington Work Licence	Perpetuity
20BL166637	Bore	Monitoring Bore	Part 5 Water Act 1912	No Current Bores	Perpetuity
20BL168820	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – Bores: CGW39, CGW45a, CGW46, CGW47, CGW47a, CGW48, CGW49, P50/38.5, CGW56, 4036C, 4035P, 4032P, 4034P, 4033P, 4053P, 4052P, 4051C, 4040P, 4038C, 4037P Destroyed: CGW7, CGW50, CGW57, CGW58, CGW59, CGW60, CGW61, CGW62, CGW63	Perpetuity
20BL169241	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – Bores: DM1, HF3, HF7 Destroyed: DM2	Perpetuity
20BL169641	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – Bores: CGW5, CGW51A, CGW52, CGW53, CGW54, CGW55A, CGW53A, CGW52A, CGW54A, CGW6, CFW55, CFW57, CFW57A, CFW59, and CFW55R. Destroyed: CGW1, CGW2, CGW3, CGW5, CGW8, CGW9, CGW10, CGW12, CGW13, CGW14, CGW30, CGW33, CGW34, CGW35, CGW36, CGW37, CGW38, CGW40, CGW41, CGW42, CGW43, CGW44, CFW56, CFW56A, CFW58	Perpetuity

Licence Number	Type of Licence	Purpose	Legislation	Description	Expiry Date
20BL170496	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: BZ10 (CHPZ 2A), BZ11 (CHPZ 3A), BZ18 (CHPZ 10A), BZ20 (CHPZ 12A), BZ21 (CHPZ 13D), BZ21A (CHPZ 13A), BZ20A (CHPZ 12D), BZ11A (CHPZ 3D) Destroyed: AP50/47.5, AQ52, AV50/56.5, AS50/62.5, AR55, Bunc 3, BZ25 (Bunc 12), BZ23 (Bunc 14), BZ24 (Bunc 13),	Perpetuity
20BL170497	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: BZ15 (CHPZ 7A), BZ16 (CHPZ 8D), BZ17 (CHPZ 9A), BZ19 (CHPZ 11A), BZ16A (CHPZ 8A), Bunc 46D Destroyed: Bunc 39 (Shallow & Deep), Bunc 44D	Perpetuity
20BL170498	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: BZ12 (CHPZ 4A), BZ13 (CHPZ 5A), BZ14, BZ9 (CHPZ 1A), BC1, BC1a, BZ8-1, BZ8-2, BZ8-3, HG1, HG2, HG2a, HG3, S4, S6, BZ22 (CHPZ14D), BZ22A (CHPZ 14A), BZ5-1, BZ5-2 Destroyed: S2, S3, S9, S11	Perpetuity
20BL171423	Bore	Monitoring Bore	Part 5 Water Act 1912	E1.5	Perpetuity
20BL171424	Bore	Monitoring Bore	Part 5 Water Act 1912	Destroyed: GW9711	Perpetuity
20BL171425	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: GW9701, GW9710	Perpetuity
20BL171426	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: GW9702 Destroyed: D2(WH236)	Perpetuity
20BL171427	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: C335, C630 (BFS)	Perpetuity
20BL171428	Bore	Monitoring Bore	Part 5 Water Act 1912	D807	Perpetuity
20BL171429	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: B925 (BFS), C122 (BFS), C122 (WDH)	Perpetuity
20BL171430	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: C613 (BFS), C809 (GM/WDH)	Perpetuity
20BL171431	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: B631 (BFS), B631 (WDH)	Perpetuity
20BL171432	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: C130 (AFSH1), C130 (ALL), C130(BFS), C130 (WDH)	Perpetuity
20BL171433	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bore B334 (BFS)	Perpetuity
20BL171434	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: C317 (BFS), C317 (WDH)	Perpetuity
20BL171435	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: BZ3-1, BZ3-2, BZ3-3	Perpetuity

Licence Number	Type of Licence	Purpose	Legislation	Description	Expiry Date
20BL171436	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: BZ4A(1), BZ4A(2), BZ4B	Perpetuity
20BL171437	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: WG1, WG2, WG3	Perpetuity
20BL171439	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: BRN, E012	Perpetuity
20BL171492	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: C1(WJ039), GW9704, North, GWAR981	Perpetuity
20BL171681	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: Bunc 45A, Bunc 45D	Perpetuity
20BL171725	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: B425 (WDH), BRS, C621 (BFS), C919 (ALL), D317 (BFS), D317(ALL), D317(WDH) Destroyed: D420, D425, D621, PB02	Perpetuity
20BL171726	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: SR002, SR003, SR004, SR005, SR006, SR007	Perpetuity
20BL171727	Bore	Monitoring Bore	Part 5 Water Act 1912	SR001	Perpetuity
20BL171728	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: BZ2B, BZ1-1, BZ1-2, BZ1-3, BZ2-1, BZ2-2	Perpetuity
20BL171762	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO South – Bores: C817, D010 (BFS), D214 (BFS), D406 (BFS) (AFS), D510 (BFS), PB01 (ALL), D510 (AFS), D010 (GM), D010 (WDH), D406 (BFS) (AFS), D612 (AFS), D612 (BFS)	Perpetuity
20BL171851	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North/South – Bores: HV2, PZ1CH200, PZ2CH400, PZ3CH800, 4118P, 4119P	Perpetuity
20BL171852	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – PZ4CH1380	Perpetuity
20BL171853	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – DM3	Perpetuity
20BL171854	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – Bores: DM5, PZ6CH2450	Perpetuity
20BL171855	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – PZ5CH1800	Perpetuity
20BL171856	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – Bores: HV6, HV3, DM6, HV2 (2), 4113P, 4114P. 4116P, 4117P	Perpetuity
20BL171857	Bore	Monitoring Bore	Part 5 Water Act 1912	Bores: HV4, HV4 (2) (GA3), GA3,	Perpetuity
20BL171858	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO North – DM4	Perpetuity
20BL171895	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO West – Destroyed: NPZ4	Perpetuity

Licence Number	Type of Licence	Purpose	Legislation	Description	Expiry Date
20BL171896	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO West – NPZ2	Perpetuity
20BL171897	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO West – Bores: NPZ1 Destroyed: NPZ5	Perpetuity
20BL171898	Bore	Monitoring Bore	Part 5 Water Act 1912	HVO West – NPZ3	Perpetuity
20BL173062	Bore	Monitoring Bore	Part 5 Water Act 1912	RC14	Perpetuity
20BL173065	Bore	Monitoring Bore	Part 5 Water Act 1912	HQ11	Perpetuity
20BL173063	Bore	Monitoring Bore	Part 5 Water Act 1912	RC07, RC08	Perpetuity
20BL173064	Bore	Monitoring Bore	Part 5 Water Act 1912	RC06	Perpetuity
20BL173069	Bore	Monitoring Bore	Part 5 Water Act 1912	RC11	Perpetuity
20CA201247	Works Approval	Pumping Plant	Water Management Act 2000	Associated with WAL965	Perpetuity
20CA212713	Works Approval	Pumping Plant	Water Management Act 2000	Associated with WAL36190	30/06/2025
20FW213280	Flood Work Approval	Levee	Water Management Act 2000	HVO North Carrington Levee 5	21/09/2027
20FW213281 Formerly 20CW802613	Flood Work Approval	Levee	Water Management Act 2000	HVO South – Barry Levee	21/09/2027
20FW213277 Formerly 20CW802603	Flood Work Approval	Block Dam	Water Management Act 2000	HVO South – Hobden Gully Levee	21/09/2027
20FW213278 Formerly 20CW802604	Flood Work Approval	Levee	Water Management Act 2000	HVO North – North Pit Levee 3	21/09/2027
20WA210991 (see WAL 18307) Formerly 20SL050903	Stream Diversion	Stream Diversion	Water Management Act 2000	HVO West – Parnells Creek Dam	09/01/2033
20WA211427 Formerly 20SL061290	Stream Diversion	Cutting (Diversion Drain)	Section 10 Water Act 1912	Pikes Gully Creek Stream Diversion	07/09/2033

Licence Number	Type of Licence	Purpose	Legislation	Description	Expiry Date
20WA210985 (see WAL 18327) 20SL042746	Diversion Works	Industrial	Water Management Act 2000	HV Loading Point Pump Bayswater Creek	08/09/2032
20WA211428 20SL061594	Stream Diversion	Cutting (Diversion Drain)	Water Management Act 2000	HVO North – Carrington Stream Diversion	31/07/2032
20WA201238 (see WAL 962)	Diversion Works	Pumping Plant	Water Management Act 2000	HVCPP River Pump	16/03/2028
20WA201257 (see WAL 970)	Diversion Works	Pumping Plant	Water Management Act 2000	HVO South – LCPP River Pump	Perpetuity
20WA201338 (see WAL 1006)	Diversion Works	Pumping Plant	Water Management Act 2000	HVO South – LCPP River Pump	Perpetuity
20WA201501 (see WAL 1070)	Diversion Works	Pumping Plant	Water Management Act 2000	HVO South – LCPP River Pump	Perpetuity
20WA201685 (see WAL 13387)	Diversion Works	Pumping Plant	Water Management Act 2000	HVO West – "Lake Liddell" Licence	Perpetuity
20FW213274	Flood Work Approval	Levee	Water Management Act 2000	Riverview	26/10/2028

Table 3-5: Surface Water Access Licences 2023/24 Water Year

Licence Number	Description	Water Source	Water Sharing Plan	Water Source Management Zone	Entitlement (ML)	Passive Take / Inflows (ML)	Active Pumping (ML)	Total Take (ML)
WAL 867	Comleroi, farming & irrigation	Hunter River	Hunter Regulated River WSP	Zone 2a (Hunter River From Glennies Creek Junction To Wollombi Brook Junction)	486	0	446.5	446.5
WAL 962	HVO North – HVCPP River Pump – Water Access Licence	Hunter River	Hunter Regulated River WSP	Zone 1b (Hunter River From Goulburn River Junction To Glennies Creek Junction)	3,165	0	0	0
WAL 969	HVO South – Former Riverview pump	Hunter River	Hunter Regulated River WSP	Zone 1b (Hunter River From Goulburn River Junction To Glennies Creek Junction)	39	0	0	0

Licence Number	Description	Water Source	Water Sharing Plan	Water Source Management Zone	Entitlement (ML)	Passive Take / Inflows (ML)	Active Pumping (ML)	Total Take (ML)
WAL 970	HVO South – LCPP River Pump – Water Access Licence	Hunter River	Hunter Regulated River WSP	Zone 2a (Hunter River From Glennies Creek Junction To Wollombi Brook Junction)	500	0	0	0
WAL 1006	HVO South – LCPP River Pump – Water Access Licence	Hunter River	Hunter Regulated River WSP	Zone 2a (Hunter River From Glennies Creek Junction To Wollombi Brook Junction)	500	27	0	27
WAL 1070	HVO South - LCPP River Pump – Water Access Licence	Hunter River	Hunter Regulated River WSP	Zone 2a (Hunter River From Glennies Creek Junction To Wollombi Brook Junction)	500	0	0	0
WAL 13387	Macquarie Generation Hunter River Pump Station	Hunter River	Hunter Regulated River WSP	Zone 1b (Hunter River From Goulburn River Junction To Glennies Creek Junction)	20	0	0	0
WAL 13391	HVO North – Alluvial Rehabilitation Irrigation.	Hunter River	Hunter Regulated River WSP	Zone 1b (Hunter River From Goulburn River Junction To Glennies Creek Junction	420 (525 ML with transfers)	0	0	0
WAL 18127	Carrington BB1	Hunter River Alluvium	Hunter Unregulated and Alluvial Water Sources WSP	Hunter Regulated River Alluvial Water Source – Upstream Glennies Creek management zone	383	0	0	0
WAL 18158	Ollenberry	Hunter River Alluvium	Hunter Unregulated and Alluvial Water Sources WSP	Hunter Regulated River Alluvial Water Source – Upstream Glennies Creek management zone	65	0	0	0
WAL 18307	HVO West – Parnells Creek Dam (Diversion Works Bywash)	Unregulated River	Hunter Unregulated and Alluvial Water Sources WSP	Jerrys Water Source; Jerrys Management Zone	500	32	0	32

Licence Number	Description	Water Source	Water Sharing Plan	Water Source Management Zone	Entitlement (ML)	Passive Take / Inflows (ML)	Active Pumping (ML)	Total Take (ML)
WAL 18327	HV Loading Point Pump Bayswater Creek (Diversion Works)	Unregulated River	Hunter Unregulated and Alluvial Water Sources WSP	Jerrys Water Source; Jerrys Management Zone	150	0	0	0
WAL 23889	Greenleek	Wollombi Brook	Hunter Unregulated and Alluvial Water Sources WSP	Lower Wollombi Brook Water Source	144	0	0	0
WAL 36190	HVO North, old farm bore	Hunter River Alluvium	Hunter Unregulated and Alluvial Water Sources WSP	Hunter Regulated River Alluvial Water Source – Jerrys Management Zone	120	0	0	0
WAL 41527	HVO North (Carrington Pit)	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16)	Permian Coal Seams	700	0	0	0
WAL 41533	HVO North – Pit Excavation	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16)	Permian Coal Seams	20	0	0	0

Table 3-6: Groundwater Access Licences

Licence Number	Description	Water Source	Water Sharping Plan (WSP)	Water Source – Management Zone	Entitlement (ML)	Passive Take / Inflows (ML)	Active Pumping (ML)	Total (ML)
WAL 39798	Lemington Underground (LUG) Bore	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16)	Permian Coal Seams	1,800	0	510.6	510.6
WAL 40462	HVO Pit Excavations / Alluvial Lands Bores (x4)	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16)	Permian Coal Seams	2,400	751	0	751
WAL 40463	HVO Pit Excavations / Alluvial Lands Bores (x4)	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16)	Permian Coal Seams	180	180	0	180
WAL 40466	HVO Pit Excavations / Alluvial Lands Bores (x4)	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16)	Permian Coal Seams	460	460	0	460
WAL 41527	HVO North – Carrington Pit	Permian Coal Seams	North Coast Fractured and Porous Rock Groundwater Sources WSP (commenced 1/7/16) Previously Water Act 1912	Permian Coal Seams	700	700	0	700

3.1.2 | MANAGEMENT PLANS, PROGRAMS, STRATEGIES

HVO is required by the site approvals to develop and submit a range of environmental management plans for approval prior to implementation. Approved management plans are made publicly available on the HVO website (https://hvo.com.au/).

Many updated plans have been submitted to DPHI. Some plans remain under review and will be submitted to DPHI in 2025. The status of management plans is shown in **Table 3-7** and **Table 3-8**.

Table 3-7: Management Plans Required for HVO North

Management Plan	Date Approved	Date of Latest Version Submitted to DPHI
Agricultural Lands Reinstatement Management Plan*	20/06/2022	11/08/2023
Fine Reject Management Strategy	19/01/2023	-
HVO Air Quality and Greenhouse Gas Management Plan	19/05/2022	-
HVO Blast Management Plan	03/04/2019	29/08/2023
HVO Bushfire Management Plan	N/A	N/A
HVO Environmental Management Strategy	08/01/2019	29/08/2023
HVO Noise Management Plan	17/03/2025	-
HVO North Heritage Management Plan	21/10/2024	-
HVO River Red Gum Rehabilitation & Restoration Strategy	19/05/2022	11/08/2023
HVO Water Management Plan	16/10/2018	29/08/2023
Final Void Management Plan	16/05/2022	-
Rehabilitation Management Plan and Forward Program**	N/A	N/A

*The Agricultural Lands Reinstatement Management Plan states that the agricultural reinstatement activities and monitoring results will be reported in the HVO Annual Environment Review (Annual Review). However, work has not yet commenced hence no monitoring or reporting against the management plan specific to the Carrington West Wing project is provided in this report.

**The Rehabilitation Management Plan and Forward Program is prepared in accordance with the provisions under the Mining Act 1992 and is not approved by DPHI.

N/A: Plan does not require approval by DPHI.

Table 3-8: Management Plans Required for HVO South

Management Plan	Date Approved	Date of Latest Version Submitted to DPHI
HVGC Amenity Management Plan	09/05/2024	-
HVO Air Quality and Greenhouse Gas Management Plan	19/05/2022	-
HVO Biodiversity Offset Strategy	23/10/2017	-
HVO Blast Management Plan	03/04/2019	29/08/2023
HVO Bushfire Management Plan	N/A	N/A
HVO Environmental Management Strategy	08/01/2019	29/08/2023
HVO Integrated Biodiversity Management Plan	02/08/2018	11/08/2023
HVO Noise Management Plan	17/03/2025	-
HVO River Red Gum Rehabilitation & Restoration Strategy	19/05/2022	11/08/2023
HVO South Aboriginal Cultural Heritage Management Plan	21/10/2024	-
HVO Water Management Plan	16/10/2018	29/08/2023
Rehabilitation Management Plan and Forward Program**	N/A	N/A
Biodiversity Management Plan (offsets component)	26/06/2017- Goulburn River Biodiversity Area Management Plan***	-

** The Rehabilitation Management Plan and Forward Program is prepared in accordance with the provisions under the Mining Act 1992 and is not approved by DPHI.

*** Is a component of a management plan managed by Mt Thorley Warkworth (MTW)

N/A: Plan does not require approval by DPHI.

4 | OPERATIONS SUMMARY

4.1 | MINING

Areas to be mined are geologically modelled, a mine plan is formed, and the relevant mining locations are surveyed prior to mining. The mining process is illustrated in **Figure 4-1**. There are no active underground workings at HVO.

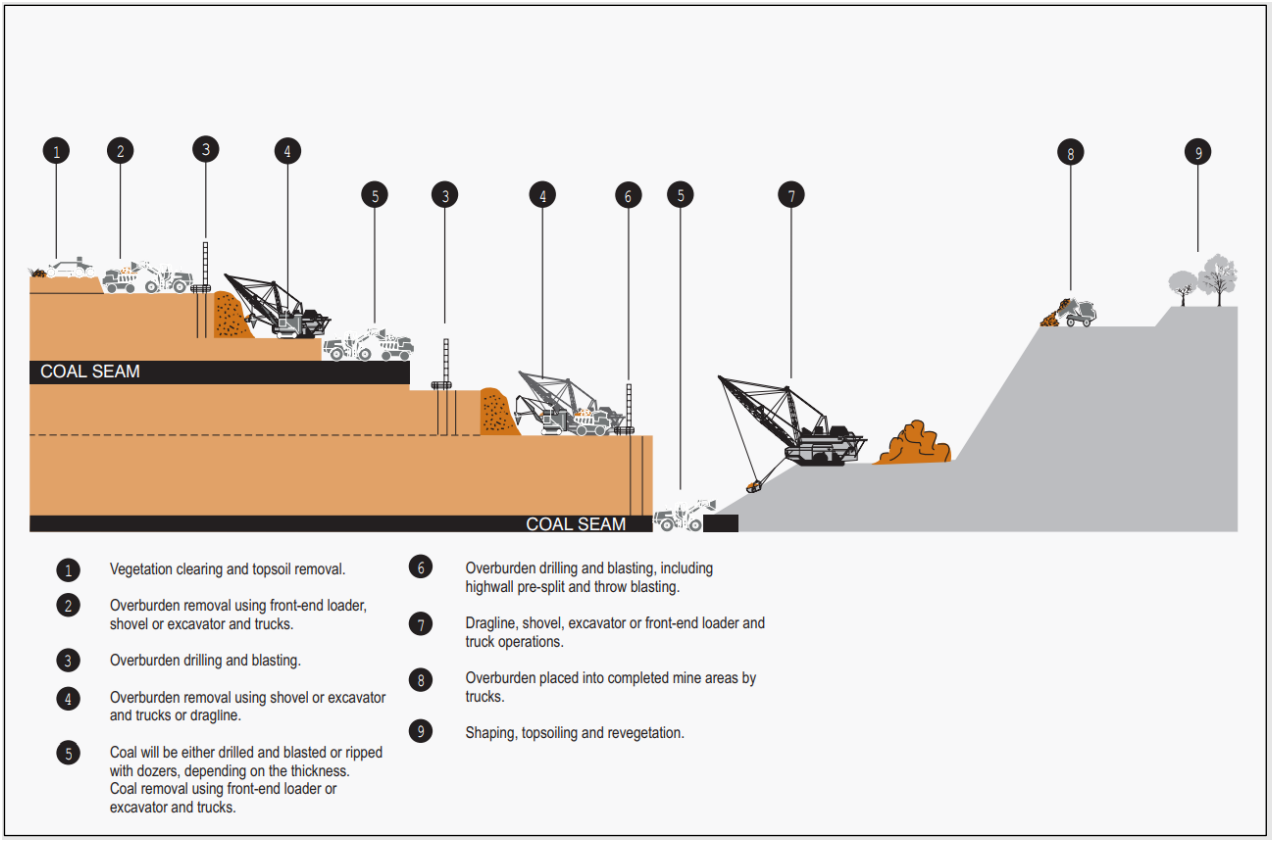

Figure 4-1: Open Cut Mining Schematic

HVO's last dragline ceased operation in 2023, with material movement being replaced by truck and excavators. Mining progress deviated slightly from the schedule of the RMP as a result of normal variations in productivity and utilisation.

The mining equipment employed to carry out mining operations at HVO in 2023 and 2024 is detailed in **Table 4-1** along with the fleet forecast for 2025.

Table 4-1: HVO Equipment Used 2023-2025

Equipment Type	Number Used in 2023	Number Used in 2024	Forecast Numbers in 2025
Scrapers	3	3	3
Drills	9	9	9
Draglines	0	0	0
Shovels	2	2	2
Excavators	13	13	13
Trucks	90	90	90
Loaders	6	7	7
Service Trucks	6	6	6
Track Dozers	31	32	33
Rubber Tyre Dozers	4	4	4
Graders	12	13	13
Water Trucks	10	10	10
Floats	1	1	1
Cable Reeler	1	1	1
Cable Tractors	2	2	2
Total	**190**	**193**	**194**

4.1.1 | MINERAL PROCESSING

HVO generally operates two CHPPs – Hunter Valley (HVCPP) and Howick (HCPP). HCPP was restarted in August 2024 following minor chute and MCC upgrades. The commencement of a new fit for purpose carpark facility began construction at HCPP in 2024 with the carpark scheduled for completion in 2025.

Upgrades to HVCPP consist of a flotation plant, which is currently under construction and expected to be completed in 2025. The flotation upgrade involves the addition of a flotation circuit to the existing HVCPP. The upgrade aims to increase the overall product yield by floating ultrafine coal that currently reports to the Carrington tailings storage facility. Upgrades of HVCPP raw coal dust suppression system were also completed in 2024 with skirt boxes fitted with dust containment hood and double dust curtains, as well as improved dust spray nozzle configurations to provide optimal misting of the coal stream at the head and tail ends of the conveyors.

During 2024 coal was transported to both HVCPP and HCPP where it was crushed to size and processed to remove impurities. Processing produces saleable coal, along with coarse and fine reject material. Coarse rejects are disposed of in-pit and fine rejects are placed in a tailings dam in accordance with the RMP. HVCPP has stockpile facilities for processed (saleable) coal, whilst the raw (unprocessed) coal stockpiles were decommissioned in March and May 2024. HCPP has stockpile facilities for both processed and raw coal.

Product coal is transported to one of two loading points, Hunter Valley Load Point (HVLP) and Newdell Load Point (NLP) via conveyor belt or road. The capacity of HVCPP and HOCPP stockpile facilities are listed in **Table 4-2** along with the capacities of HVLP and NLP stockpiles.

Table 4-2: Stockpile Capacities

Location	Raw Stockpile (t)	Saleable Stockpile (t)
Hunter Valley CHPP	0	40,000
Howick CHPP	15,000	32,000
Newdell Load Point	0	450,000
Hunter Valley Load Point	0	354,000

As previously noted, product coal is transported to one of two loading points via conveyor belt or road as detailed in Error! Not a valid bookmark self-reference.**.** The coal from HVCPP is transported to HVLP and NLP by means of overland conveyor whereas coal from HOCPP is trucked to NLP. After the coal has reached either HVLP or the NLP it is transported to the Port of Newcastle by rail.

Table 4-3: Methods of Coal Transportation

Transport Category	Quantity (Mt)
Coal transported from the site via trains	11.6
Amount of coal received from Hunter Valley Operations South of the Hunter River	6.3
Amount of coal hauled by road to the Hunter Valley Loading Point	Nil
Coal hauled by road to the Newdell Load Point	0.8
Amount of coal hauled by road from the Newdell Loading Point to the Ravensworth Coal Terminal	Nil
Amount of coal hauled by road from the Hunter Valley Loading Point to the Ravensworth Coal Terminal	Nil
Number of coal haulage truck movements generated by the development. (Includes coal hauled to stockpile, coal hauled to bins, coal hauled from stockpile to bins)	150,574

4.1.2 | PRODUCTION STATISTICS

Project approvals allow for the extraction of up to 22 million ROM tonnes from operations north of the Hunter River and 20 million ROM tonnes from operations south of the Hunter River. A summary of production and waste at HVO during 2024 in comparison to previous years and approval limits is provided in **Table 4-4**.

Product coal includes low-ash, semi-soft and steaming coals.

Table 4-4: Production Statistics and Correlating Project Approval Limits

Aspect	Approved Limit (PA 06_0261 and DA 450-10-2003)	Reporting Period 2023	Reporting Period 2024	Forecast for 2025
Prime Waste (Mbcm)	-	94.72	104.68	105.43
ROM Coal (Mtpa) (mined)	42	15.28	14.83	18.63
- *HVO South*	20	7.23	6.35	10.00
- *West Pit*	12	6.24	7.2	6.30
- *Mitchell Pit*		0.41	1.28	2.33
Total ROM Coal Processed	26	13.77	13.5	17.4
HVCPP Feed (Mt) – ar	N/A	11.88	12.6	15.17
HVCPP Product (Mt) – ar		8.63	9.1	11.46
HVCPP Bypass (Mt) – ar		1.88	1.9	0
HVCPP Coarse Reject (Mt) – ar		2.35	1.92	1.92
HVCPP Tailings (Mt) – db		0.89	1.58	1.83
HCPP Feed (Mt) – ar		0	0.9	1.70
HCPP Product (Mt) – ar		0	0.6	1.11
HCPP Bypass (Mt) – ar		0	0.2	1.40
HCPP Coarse Reject (Mt) – ar		0	0.3	0.35
HCPP Tailings (Mt) – db		0	0.1	0.23

ar – ‘as received’ includes moisture

db – ‘dry basis’ does not include moisture

4.1.3 | SUMMARY OF CHANGES

The below changes occurred in 2024:

- CHPP production increased in 2024 compared with 2023 due to the restarting of HCPP and improved HVCPP performance after partial completion of the debottlenecking project upgrades.
- Mining in the Carrington West Wing location has not yet commenced. As of the time of reporting, mining in this area is not planned to commence during 2025.
- HCPP restarted production in August 2024 after minor chute and MCC upgrades were completed.
- Construction of a carpark facility was completed HCPP in 2024.
- A flotation plant is currently under construction at HVCPP and is due to be completed in 2025. The flotation plant aims to increase the overall product yield by floating ultrafine coal that currently reports to the Carrington tailings storage facility.
- HVCPP raw coal stockpiles were decommissioned in March and May 2024.
- HVCPP raw coal dust suppression system upgrades completed in 2024.
- Tailings emplacement continued in the Carrington and Cumnock Void 3 tailings storage facilities during 2024.

4.2 | FORECAST OPERATIONS FOR NEXT REPORTING PERIOD

Table 4-5 outlines the forecast operations for the next reporting period.

Table 4-5: Production Operations Forecast

Material	Unit	2024 (Forecast)	2024 (Actual)	2025 Forecast	2026 Forecast
Stripped Topsoil	kbcm	172.0	138	93	139
Rock / Overburden	Mbcm	112.50	106.64	107.32	111.45
ROM Coal	Mt	17.26	14.83	18.63	20.35
Reject Material	Mt	4.49	1.88	3.71	4.94
Product	Mt	12.77	11.72	13.99	14.89

5 | ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

DPHI responded to HVO on 18 June 2024 accepting the 2023 HVO Annual Review. DPHI did not require any changes to the 2023 Annual Review nor request any changes to be made to future Annual Reviews.

6 | ENVIRONMENTAL PERFORMANCE

6.1 | METEOROLOGICAL DATA

The collection of meteorological (weather) data is carried out to assist in day-to-day operational decisions, planning, environmental management and to maintain a historic record. The meteorological stations record:

- wind speed
- wind direction
- temperature
- humidity
- solar radiation
- rainfall

HVO operates two real-time meteorological stations; the HVO Corporate Meteorological Station and the Cheshunt Meteorological Station. The locations of these monitors are shown in **Figure 6-2**. Daily average data is publicly available via the Monthly Environmental Monitoring Reports published on the HVO website.

Total annual rainfall for 2024 was 645.2mm (recorded at the HVO Corporate Meteorological Station) compared to 459.0mm in 2023 and 1047.2mm in 2022. (**Figure 6-1**).

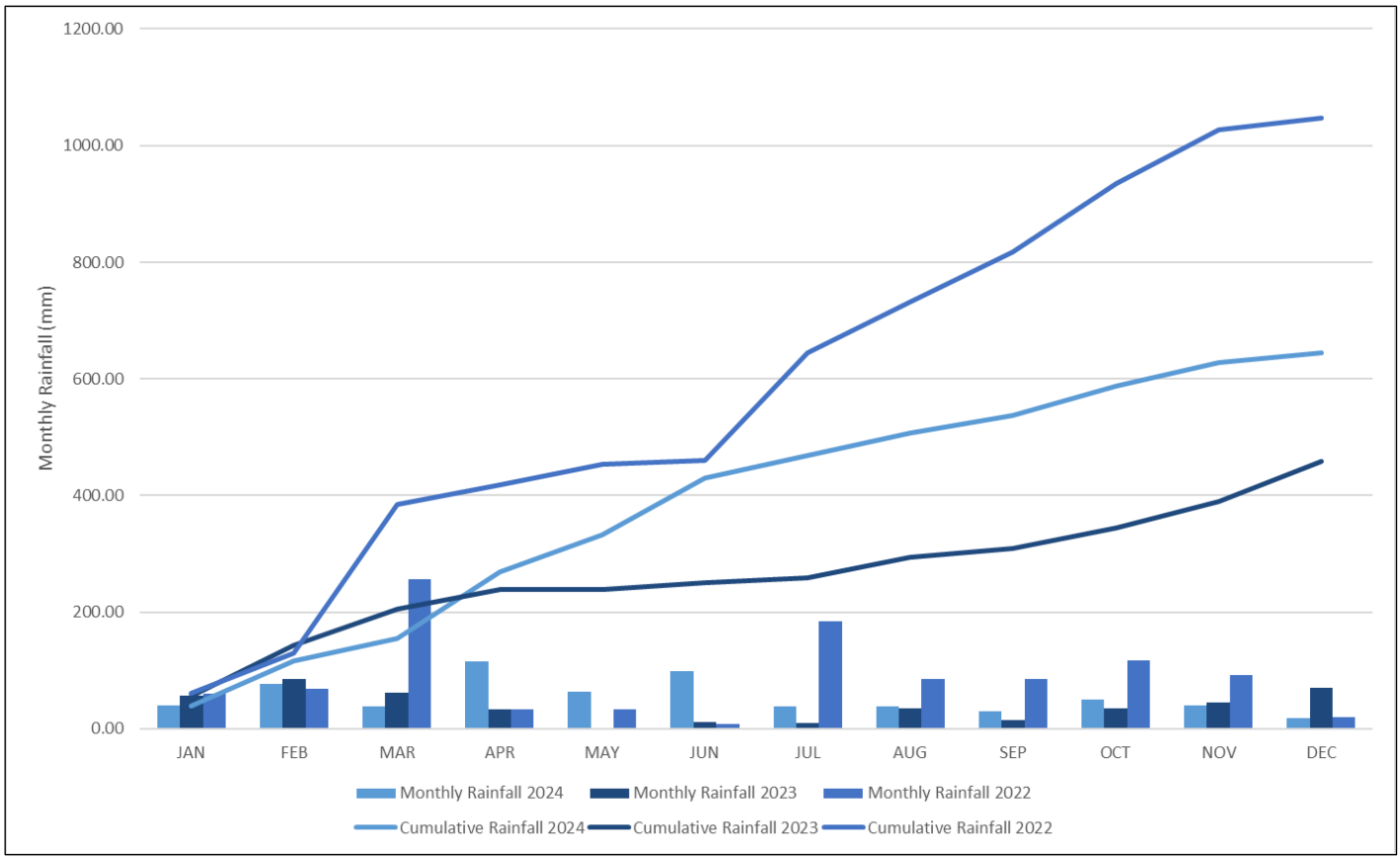

Figure 6-1: HVO Corporate Meteorological Station 2022 – 2024 Rainfall Data

6.2 | NOISE

6.2.1 | NOISE MANAGEMENT

Mining activities at HVO are managed to minimise adverse noise impacts and to maintain compliance with permissible noise limits at nearby private residences. A combination of proactive and reactive noise controls are employed to ensure effective management of noise. Noise controls are as detailed in the HVO Noise Management Plan (NMP).

6.2.2 | SOUND ATTENUATION OF HEAVY EQUIPMENT

All haul trucks at HVO have been fitted with sound attenuation kits. New equipment brought to site arrives sound attenuated or is scheduled for retrofitting prior to operation.

Onsite sound power level testing was completed on sixteen (16) heavy vehicles during 2024. HVO acquired twenty-seven (27) new heavy vehicles during 2024, all of which achieved compliance in accordance with site power testing requirements. Routine sound power level testing will be completed according to a schedule to ensure compliance throughout 2025.

6.2.3 | REAL TIME NOISE MANAGEMENT

HVO operates a network of directional real-time noise monitors to measure and manage noise emissions and to minimise community impact.

The real-time system generates alarms when elevated noise is measured, triggering the implementation of reactive controls to reduce noise levels. HVO received and responded to 1,372 noise alarms during 2024. Noise alarm triggers are based on internally set noise criteria. Alarms received include noise exceedances from other mines and non-mine sources. HVO recorded twelve (12) hours of equipment downtime for the management of noise during 2024. The location of real-time noise monitoring locations as per the approved NMP are shown in **Figure 6-2**. The Barnowl noise monitor at Moses Crossing experienced intermittent outages which had become more prevalent due to deteriorating software and hardware. A replacement monitor is scheduled for installation during 2025.

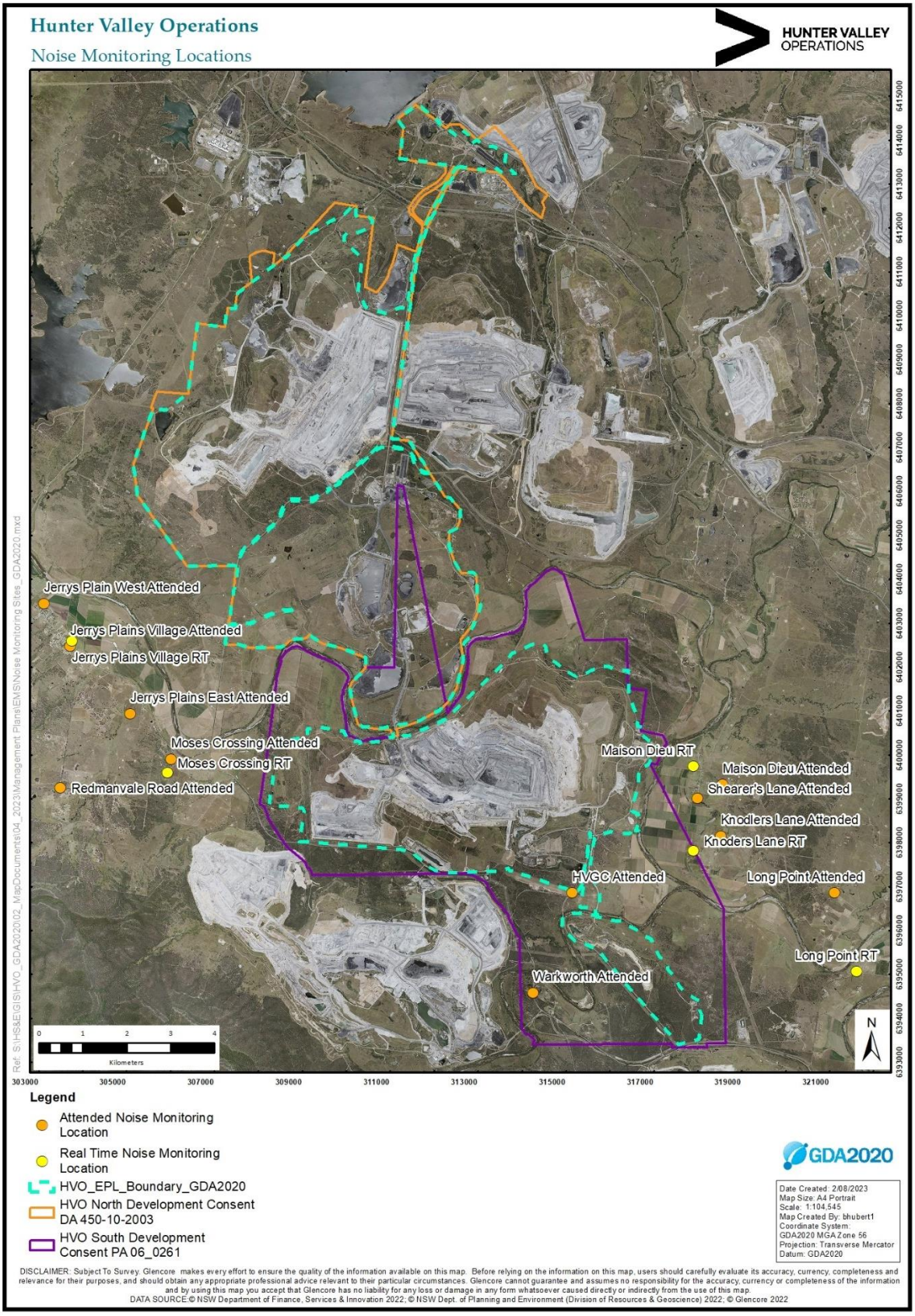

Figure 6-2: HVO Attended and Real Time Noise Monitoring Locations

Attended monitoring during 2024 was compared to real time noise monitoring results where a comparison could be made (e.g., where HVO was audible) in order to validate real time noise monitoring systems. Where comparisons were able to be made, results indicated that the real time monitoring system generally recorded higher noise measurements than attended monitoring, or measurements that aligned with real time measurements. Comparisons were not able to be made for a majority of measurements due to low/inaudible noise from HVO than attended noise measurements.

Details of this assessment is provided in **Table 6-1**.

Table 6-1: Comparison of Attended and Real Time Noise Monitoring During 2024

Monitoring Location	Number of attended noise measurements where comparison could be made[1]		Real time measurements that aligned[2] with attended measurements		Real time measurements with positive variance > 3dB(A) of attended measurements		Real time measurements with negative variance >3dB(A) of attended measurements	
	South	North	South	North	South	North	South	North
MaisonDieu	3	0	0	0	3	0	0	0
Knodlers Lane	2	0	1	0	1	0	0	0
Long Point	1	0	0	0	0	0	1	0
Kilburnie South	1	2	0	0	1	2	0	0
Jerrys Plains Village	0	2	0	1	0	1	0	0

Notes:

[1] Includes measurements under all meteorological conditions

[2] Aligned indicates measurements were within 3dB (A) of each other or measurement results <25dB indicated that source contribution was in audible or not measurable.

6.2.4 | OPERATIONAL NOISE PERFORMANCE

HVO engages a suitably qualified and experienced acoustic consultant to undertake routine attended noise compliance monitoring at nearby private residences to assess compliance with the relevant Project Approval and EPL noise criteria, in accordance with the HVO NMP. Monitoring is undertaken at a frequency of one night per month and an additional one night per quarter as required by the HVO North Approval. This monitoring is undertaken to evaluate and assess noise impacts under a range of meteorological conditions throughout the year.

A total of 121 measurements were recorded during 2024. Each measurement involves an assessment of HVO mine noise against the various $L_{Aeq,\ 15minute}$ and $L_{A1,1min}$ noise criteria in place under the HVO North and South Approvals. Full details for all noise assessments completed can be found in HVO Monthly Environmental Monitoring Reports published on the HVO website.

HVO was compliant with relevant noise criteria for all measurements recorded in 2024.

Comparison between the 2024 L_{Aeq} attended noise monitoring results (maximum HVO contribution levels measured under applicable meteorological conditions) and previous years are shown in **Table 6-2**.

Table 6-2: Comparison of 2024 Noise Monitoring Results Against Previous Years

Year	Number of Measurements	Number of measurements which exceeded allowable noise (under applicable	Number of non-compliances
2024	121	0	0
2023	120	0	0
2022	120	0	0
2021	121	1	0
2020	110	0	0
2019	101	1	0
2018	105	3	0
2017	100	1*	0
2016	109	2*	0

* The now superseded NSW Industrial Noise Policy (INP) allowed for the measured result to be less than or equal to 2 dB above the applicable noise limit without constituting a non-compliance. Note: Where the measured result is greater than 2dB above the applicable noise limit, the site has 75 minutes to reduce noise levels below applicable noise limits before constituting a non- compliance. As of late October 2017, the NSW INP was superseded by the Noise Policy for Industry (NpfI), with the requirements of this policy implemented in late 2017.

6.2.5 | COMPARISON WITH PREDICTIONS

Comparisons against the predicted noise levels in the Noise Impact Assessment (NIA) for HVO North prepared in October 2010 to support Modification 3 of the HVO North DA (450-10-2003). Noise predictions contained within the NIA do not correspond with specific meteorological conditions. Attended noise monitoring results have been compared directly to Year 5, mitigated, total noise predictions in the NIA for Carrington & West Pit under all meteorological conditions where noise criteria were applicable. This comparison is shown in **Table 6-3**.

Table 6-3: Comparison of 2024 Attended Noise Monitoring Against EIS Predictions

Location	Units	EIS Prediction	2024 max measured LAeq 15 min (under applicable met conditions)
Shearers Lane	dB(A)	27	34
Kilburnie South	dB(A)	37	34
Jerrys Plains	dB(A)	41	33
Jerrys Plains East	dB(A)	39	30
Jerrys Plains West	dB(A)	41	31

Comparison of measured results against the modelled predictions demonstrates noise levels lower than predicted at the majority of monitoring locations. While the maximum noise measured for Shearers Lane was 34 dBA (against an EIS prediction of 27), noise was below the EIS prediction for the majority of monitoring events, with 66% of measurements being inaudible or not measurable.

Comparisons against the predicted noise levels in the HVO South Modification 5 Environmental Assessment have been made against Stage 2 modelling scenario (indicative of activities carried out during 2021), (Table 6.10 of Appendix E– Hunter Valley Operations South Modification 5 Approval Environmental Assessment Report Volume 2). The comparison (**Table 6-4**) indicates that noise during 2024 was lower than predicted levels for all receptors.

Table 6-4: Comparison of 2024 Monitoring Against HVO South (Stage 2 HVO South Modification 5 EA – 2017)

Location	Units	EIS Prediction (INP)	2024 max measured LAeq 15 min (under applicable met conditions)
Knodlers Lane	dB(A)	40	32
Maison Dieu	dB(A)	40	33
Shearers Lane	dB(A)	41	34
Kilburnie South	dB(A)	39	34
Jerrys Plains	dB(A)	34	Inaudible
Jerrys Plains East	dB(A)	36	<20
Jerrys Plains West	dB(A)	32	Inaudible
Long Point	dB(A)	37	27

6.3 | BLASTING

6.3.1 | BLASTING MANAGEMENT

HVO operates a blast monitoring network to assess and evaluate blast vibration and overpressure impacts against the HVO North and HVO South Consent Criteria. There was 100% blast data capture for all blast monitors in 2023.

Monitors are located at or in close proximity to nearby privately owned residences as shown in Figure 2 in Appendix D of the HVO Blast Management Plan (HVO, 2019). The monitors function as regulatory compliance monitors. These monitors are located at:

- Jerrys Plains Village
- Warkworth
- Maison Dieu
- Moses Crossing
- Knodlers Lane

See **Figure 6-3** for the blast monitoring locations.

6.3.2 | BLASTING PERFORMANCE

234 blast events were initiated at HVO during the reporting period. 115 blasts were fired at HVO South and 119 at HVO North. HVO complied with all blasting related consent and licence conditions. Air blast overpressure and ground vibration results for all blasts fired during the reporting period are presented in **Figure 6-4** to **Figure 6-8**.

There were no blasts recorded with overpressure greater than 115 dB(L). There were no exceedances of the 5 mm/s ground vibration criteria at any residence on privately-owned land.

Blasting occurred only between the hours of 7am and 6pm Monday to Saturday and no blasting was carried out on Sundays or Public Holidays. No more than four (4) blasts were fired per day and the maximum number of blasts fired during any week was eight (8), which is less than the maximum weekly blasting frequencies as specified in both project approvals.

HVO closed Lemington Road on 60 occasions for an average of 11.4 minutes, and Comleroi Road on 3 occasions for an average of 16.7 minutes. In addition, on 30 occasions the closure of Lemington Road and Comleroi Road was initiated however was cancelled due to changes in operational requirements.

In accordance with PA 06_0261, long term blast monitoring data has been reviewed to identify any trends in the monitoring data over the life of the project. Both ground vibration and overpressure monitoring results have remained generally consistent since monitoring commenced, with no increasing trends developing in the data. Notably in 2024 there was only one exceedance of 115 dB(L) air blast overpressure criteria.

See **Table 6-5** and **Table 6-6** for a review of long-term blasting data for both ground vibration and overpressure.

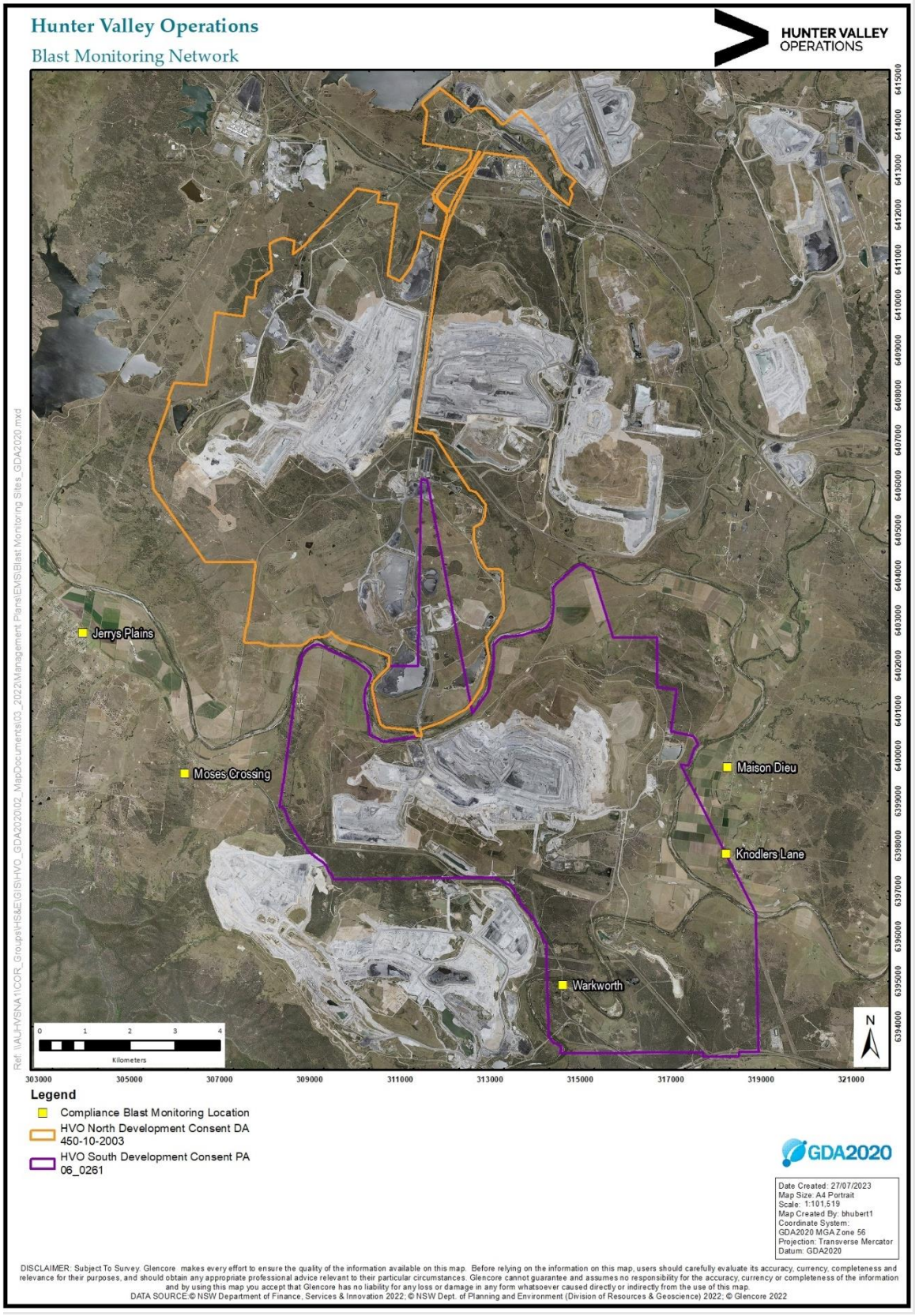

Figure 6-3: HVO Blast Monitoring Network

Table 6-5: Recent Blasting Data Trends for HVO North

Monitoring Location	2021		2022		2023		2024	
	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)
Moses Crossing	0	0	0	0	0	0	0	0
Jerrys Plains	0	0	0	0	0	0	0	0
Warkworth	0	0	0	0	0	0	0	0
Maison Dieu	0	0	0	0	0	0	0	0
Knodlers Lane	0	0	0	0	0	0	0.4	0

Table 6-6: Recent Blasting Data Trends for HVO South

Monitoring Location	2021		2022		2023		2024	
	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)	Percentage of blasts over 115dB(L) (%)	Percentage of blasts >5mm/s (%)
Moses Crossing	0	0	0	0	0	0	0	0
Jerrys Plains	0	0	0	0	0.4	0	0	0
Warkworth	0	0	0	0	0	0	0	0
Maison Dieu	0	0	0	0	0	0	0	0
Knodlers Lane	0	0	0.8	0	0	0	0	0

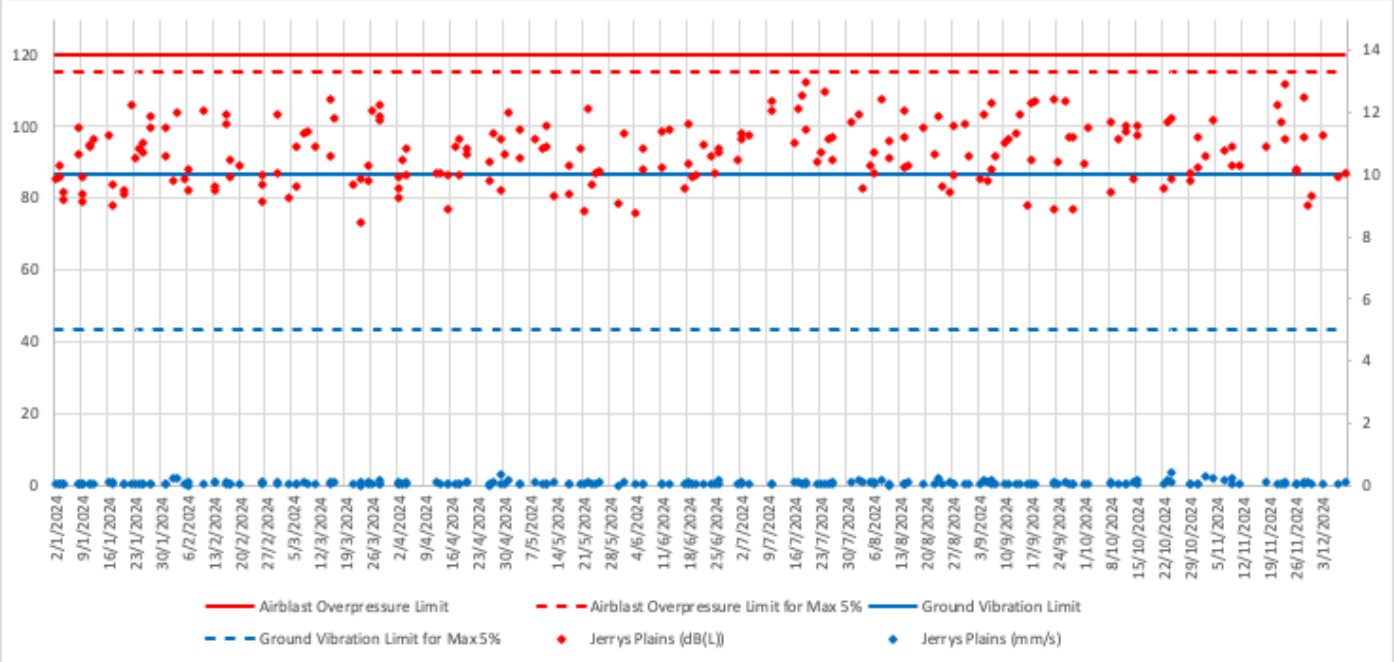

Figure 6-4: Jerrys Plains Blast Monitoring Results 2024

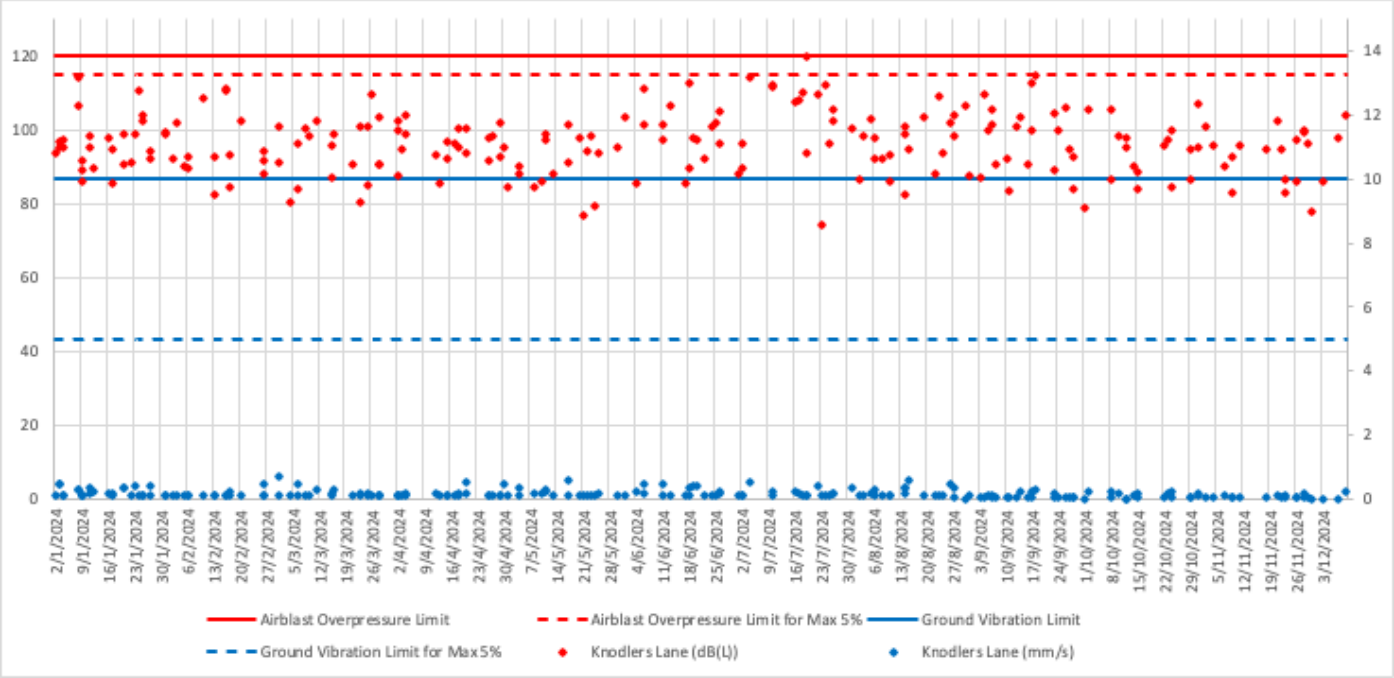

Figure 6-5: Knodlers Lane Blast Monitoring Results 2024

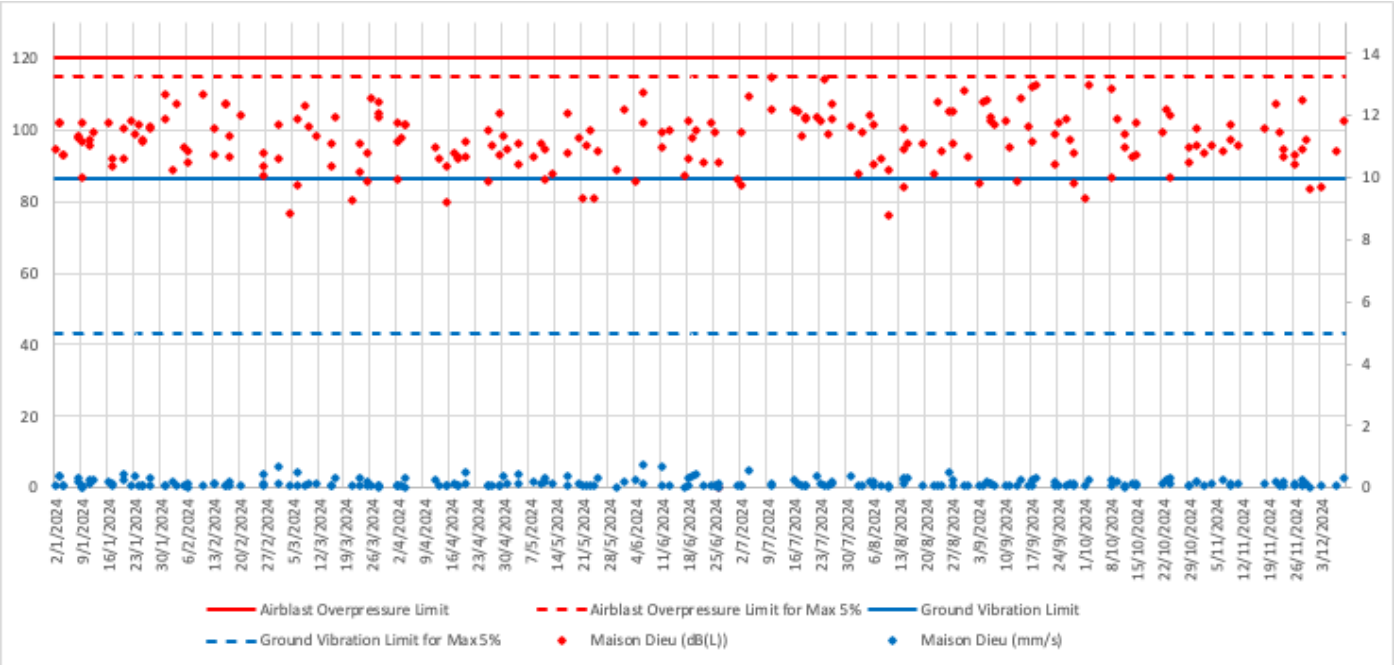

Figure 6-6: Maison Dieu Blast Monitoring Results 2024

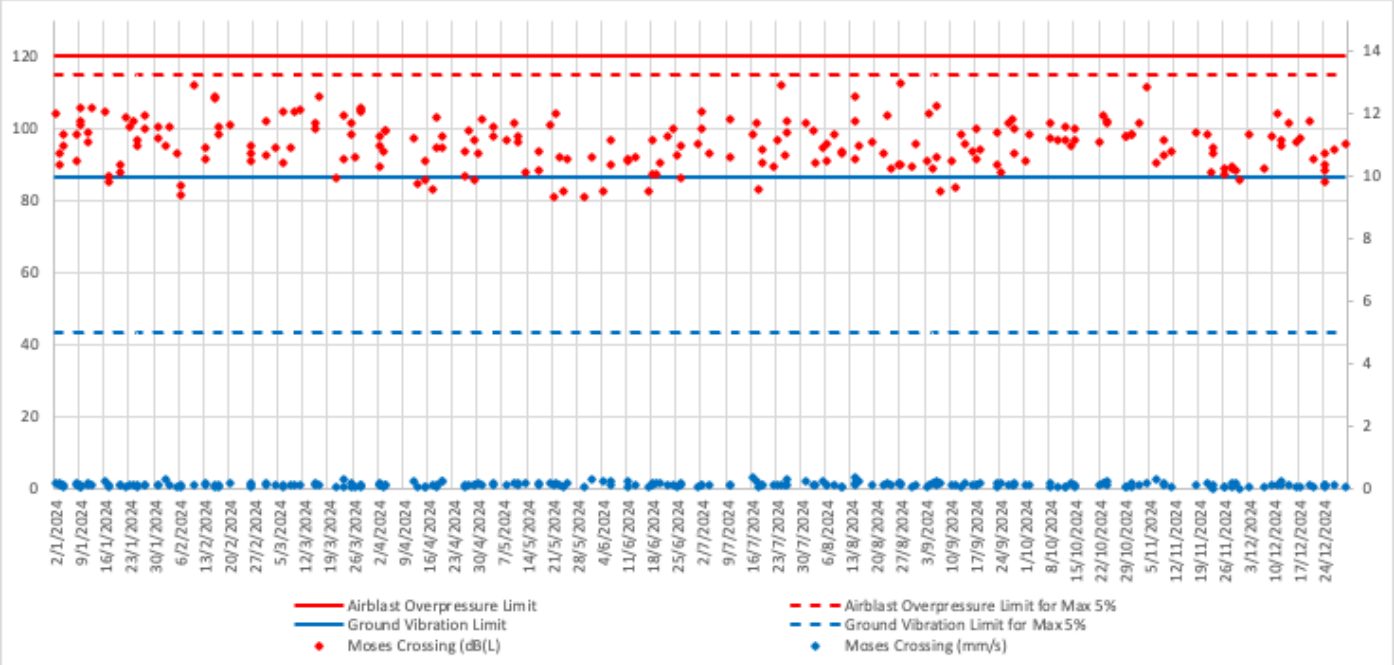

Figure 6-7: Moses Crossing Blast Monitoring Results 2024

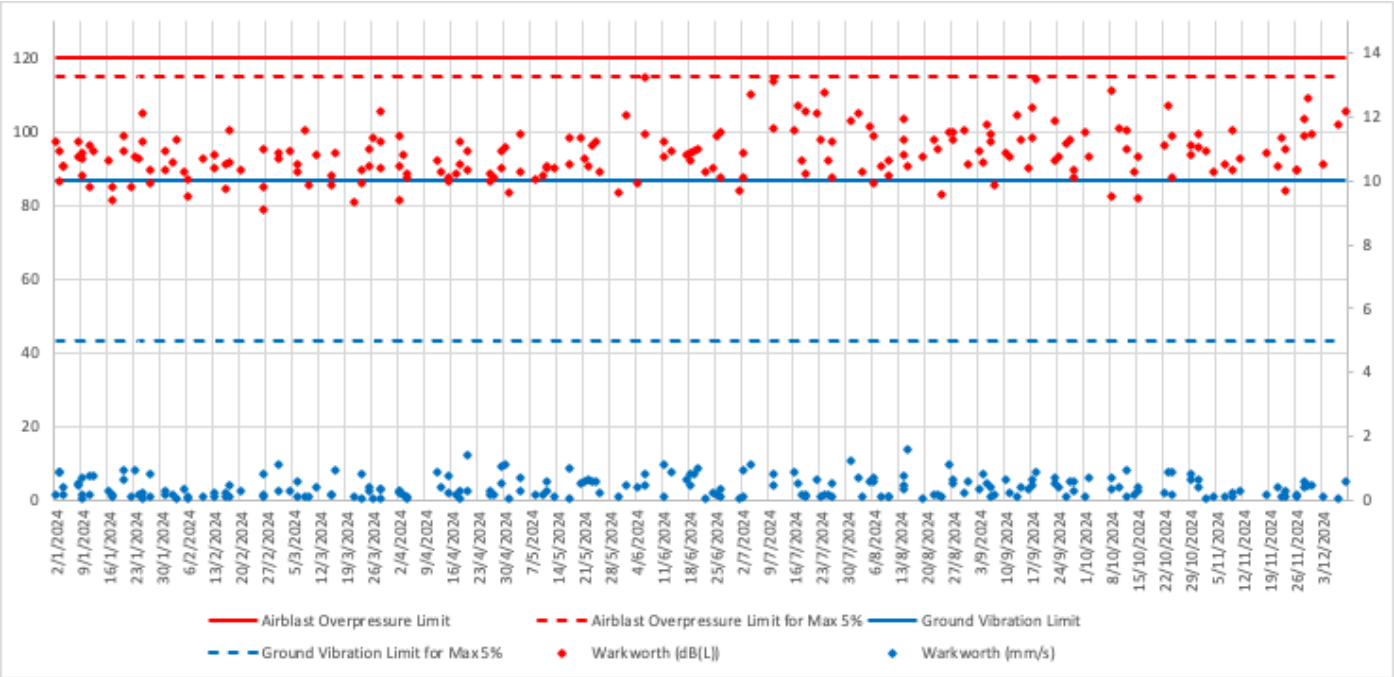

Figure 6-8: Warkworth Blast Monitoring Results 2024

6.3.3 | BLAST FUME MANAGEMENT

Blasting operations at HVO are undertaken in accordance with the HVO Post Blast Fume Generation Mitigation and Management Plan. The plan outlines the practices to be utilised to reduce the risk of generation of post blast fume and reduce potential offsite impact from any fume which may be produced. This includes specialised blasting design, appropriate product selection, on-bench water management, implementation of fume management zones and use of existing blasting permissions to identify likely path of any fume which may be produced and restrictions on firing.

All blasts are observed for fume and any fume produced is ranked according to the Australian Explosive Industry & Safety Group (AEISG) Scale.

Fume rankings for shots fired during 2024 and comparison to previous years is provided in **Table 6-7**. There was a marginal increase in Category 3 and 4 blast fume events during 2024 compared to 2023. This included:

- Ten (10) Category 3 blast fume events, of which internal investigations were undertaken into the cause of each, and outcomes incorporated into updating current practices where appropriate.
- Three (3) Category 4 blast fume events, of which all were reported to DPHI. In summary these events entailed:
    - A blast in Cheshunt Pit 1 on 4 June, which produced post blast fume ranked as Level 4B. Fume from the blast travelled from initiation points in an easterly direction and dispersed onsite. Internal investigation found the blast was impacted by a rain event following loading and before initiation;
    - A blast in Cheshunt Pit 2 on 15 October, which produced post blast fume ranked as Level 4B. Fume from the blast travelled from the initiation point in a north-westerly direction and dispersed onsite. An external investigation found cracking and weak strata as the likely causes. As a result, loading practices were updated to minimise the risk of future events; and
    - A blast in West Pit on 22 November, which produced post blast fume ranked as Level 4B. Fume and dust from the blast travelled from the initiation point in a westerly direction and dispersed within the blast exclusion zone. An external investigation found weak strata, wet blast holes and a rain event as the likely causes.

No community complaints were received regarding blast fume.

Table 6-7: Visible Blast Fume Ranking According to the AEISG Colour Scale

AEISG Ranking	2019	2020	2021	2022	2023	2024
0	202	160	170	212	218	194
1	39	22	45	52	43	58
2	15	27	27	30	23	26
3	4	0	3	4	6	10
4	0	0	1	0	1	3
5	0	0	0	0	0	0
Total*	260	209	246	298	291	291

* Where a number of individual blasts were fired as a blast event, fume was assessed for each individual blast pattern rather than for the event as a whole.

6.4 | AIR QUALITY

6.4.1 | AIR QUALITY MANAGEMENT

Air quality management initiatives are implemented at HVO to ensure that:

- Air quality impacts on surrounding residents are minimised;
- All statutory requirements are adhered to; and
- Local community and regulators are kept informed through prompt and effective response to issues and complaints.

Air quality control mechanisms employed at HVO are described in detail in the *Hunter Valley Operations Air Quality and Greenhouse Gas Management Plan (AQGGMP)*, publicly available via the HVO website.

HVO continued to implement operational controls to manage dust emissions in accordance with the AQGGMP. An improvement programme continued for West Pit to further mitigate dust emissions including reintroduction of chemical dust suppressants, trialling mobile irrigation systems, improving the standard of dust inspections and conducting dust TARP training with the workforce.

6.4.2 | AIR QUALITY MONITORING

Air quality monitoring at HVO is undertaken in accordance with the HVO Air Quality Monitoring Program (AQMP). An extensive network of monitoring equipment is utilised to assess performance against the relevant conditions of HVO's approvals. Air quality monitoring locations are shown in **Figure 6-9**. Air quality monitoring data is made publicly available through the HVO Monthly Environmental Monitoring Report, available on the HVO website.

6.4.3 | AIR QUALITY PERFORMANCE

6.4.3.1 | REAL TIME AIR QUALITY MANAGEMENT

HVO's real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger limits to guide the operational management of air quality on site.

A total of 1,456 real time alarms for air quality and meteorological conditions were received and acknowledged during 2024, which is a decrease from 3,150 alarms recorded during 2023. This decrease is likely due to the increase in wet weather days recorded across site during 2024.

In response, 2,891 hours of equipment downtime was recorded due to air quality management. A detailed breakdown of air quality related equipment stoppages (per month, per equipment type) presented in **Figure 6-10.** Note that these delays are instances where operations were completely stopped and does not include occasions where operations were changed/modified but not stopped (e.g. changed from exposed dump to in-pit dump).

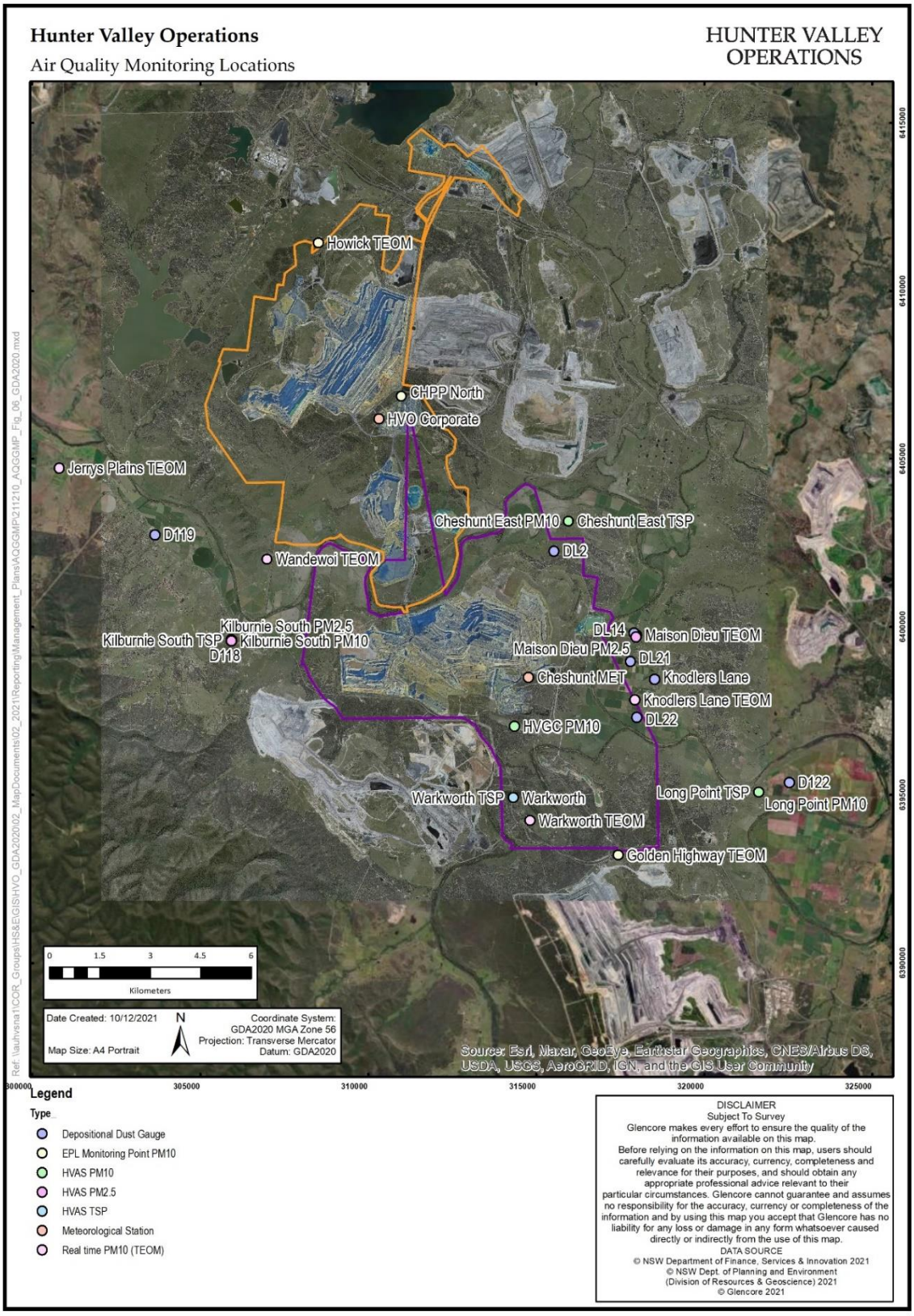

Figure 6-9: Air Quality Monitoring Locations

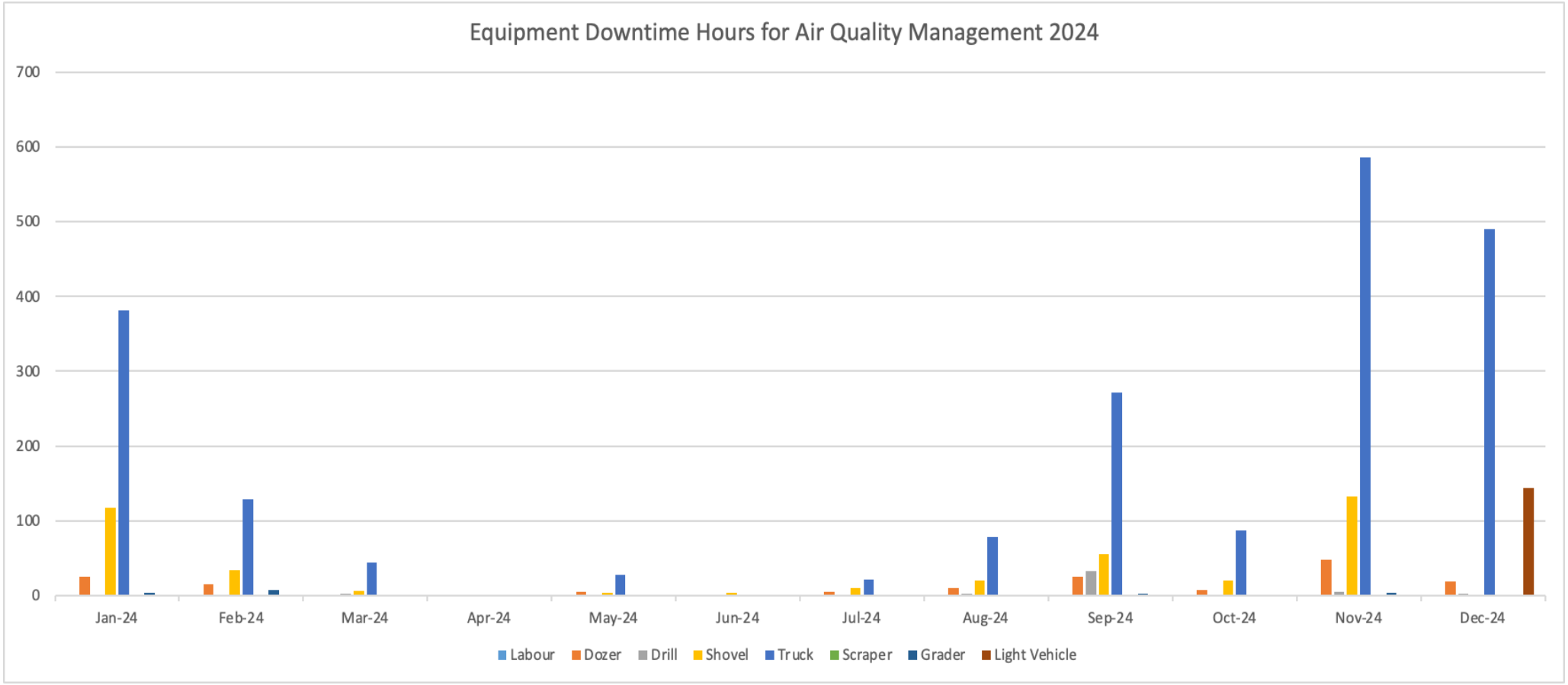

Figure 6-10: Equipment Downtime Hours for Air Quality Management 2024

Data availability from HVO's real time air quality monitoring stations is presented in **Table 6-8.** There was high data availability across the network with common reasons for data mis-captures being data-logger and modem issues.

Table 6-8: Real Time PM_{10} Air Quality Monitoring Data Availability 2024

Monitoring Location	2024 Data Availability
Warkworth	97.3%
Knodlers Lane	99.5%
Maison Dieu	97.5%
Howick	98.6%
CHPP North	88.2%
Wandewoi	94.2%
Golden Highway	98.4%
Jerrys Plains	99.2%

Note: Data availability calculated across 2023 is based on availability of a 24-hour average result. Greater than 75% data capture is required to record a 24hr average result.

6.4.3.2 | TEMPORARY STABILISATION

Aerial seeding was undertaken during May 2024 by fixed wing aircraft to provide temporary cover to areas exposed to wind generated dust and erosion at HVO. Waste dumps and exposed areas were selected for seeding if they were not planned to be disturbed within the preceding six months. An area of approximately 395 ha was seeded with fourteen tonnes of selected seed mix with germination opportunities across all seasons (refer to **Figure 6-11**). All areas were seeded using an exotic pasture and legume mix suitable for autumn sowing. A starter fertiliser was mixed with the seed prior to loading to provide sufficient nutrients for plant growth.

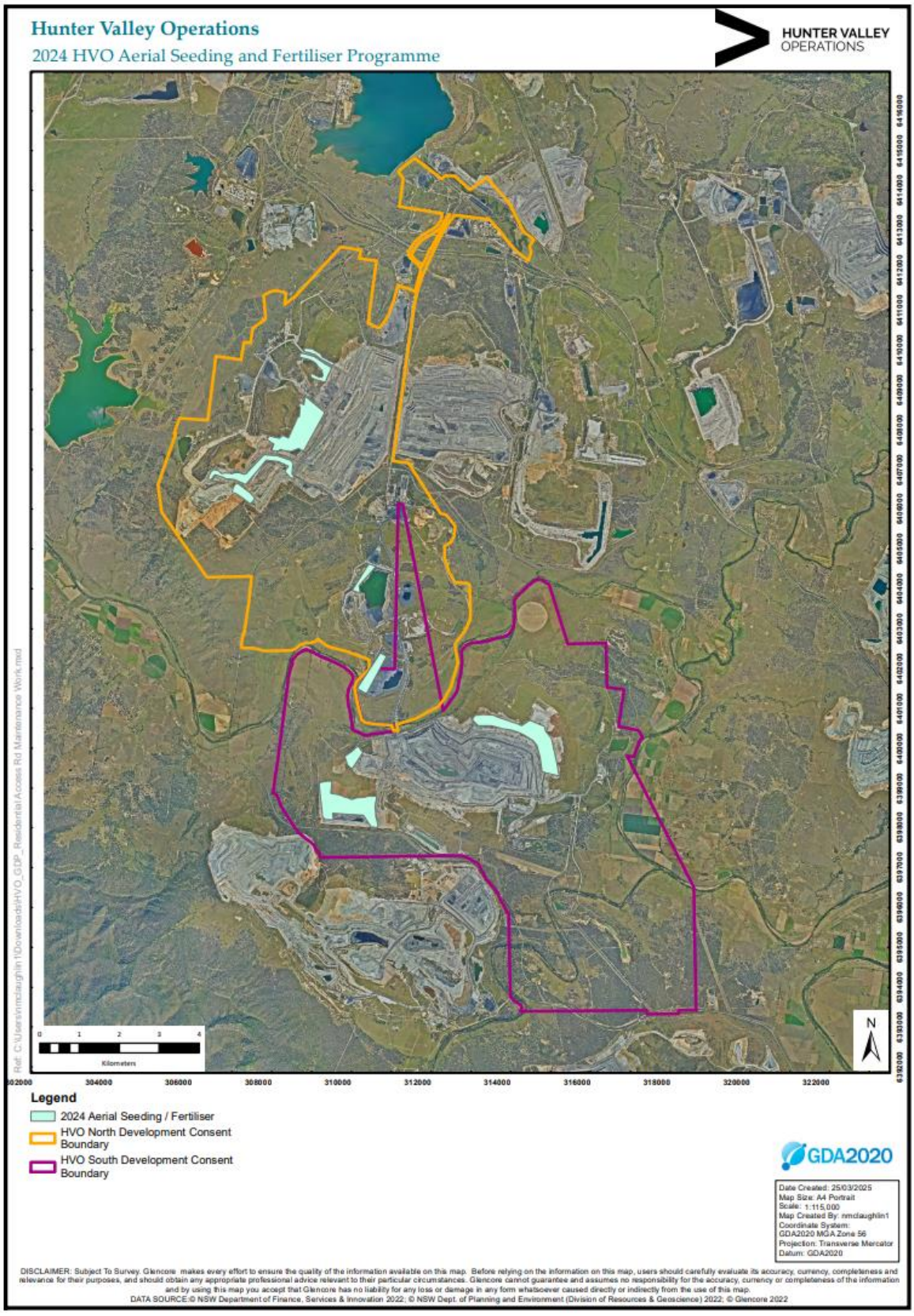

Figure 6-11: 2024 Aerial Seeding Locations

6.4.3.3 | DEPOSITIONAL DUST

Depositional dust is monitored at nine locations in accordance with the AQGGMP. The annual average insoluble matter deposition rates in 2024 compared with the depositional dust impact assessment criterion and previous years' data are shown in **Figure 6-12**.

Depositional dust samples are collected monthly. Where field observations denote a sample as contaminated (typically with insects, bird droppings or vegetation), the results are excluded from annual average compliance assessment.

The DL30 and Warkworth monitoring locations exceeded the annual average insoluble matter deposition rate criteria of 4 g/m^2/month (HVO North only) during 2024. However, all results were below the maximum insoluble solids incremental increase criterion of 2 g/m^2/month and hence compliant with criteria (**Figure 6-13**).

An external specialist investigation (See Appendix A:) determined the exceedances to be due to local sources of dust in close proximity to the monitor. The elevated levels at DL30 and Warkworth were assessed to estimate the maximum contribution from HVO North to the annual results. The HVO North maximum contribution to the incremental increase at DL30 was 0.2 g/m^2/month, and 0.1 g/m^2/month at Warkworth. These maximum concentrations were not deemed to have caused the exceedances (**Table 6-9**). The monitors are located in close proximity to HVO South, on the opposite side of HVO North. Given the significant separation distances between HVO North and these monitors, HVO North's contribution to these monitoring sites would always be low and likely indiscernible from background concentrations and the influences of other mines. Therefore, HVO North could only reasonably have a tangible impact at its nearest monitors which include D118 and D119. These monitors recorded annual average deposited dust levels below both the incremental and cumulative criteria.

Table 6-9: Dust Deposition Annual Average Assessment

Date	Site	Measured Annual Average Dust Deposition (g/m^2/month)	Annual Average Dust Deposition Criteria (g/m^2/month)	HVO's Contribution to Dust Deposition (g/m^2/month)	Discussion
2024	DL30	4.3	4	0.2	An external consultant was engaged to investigate the exceedance, which determined that HVO North could have only provided a minor contribution to the exceedance which is attributable to local sources of dust near the monitor.
2024	Warkworth	8.3	4	0.0	An external consultant was engaged to investigate the exceedance, which determined that HVO North could have only provided a minor contribution to the exceedance which is attributable to local sources of dust near the monitor.

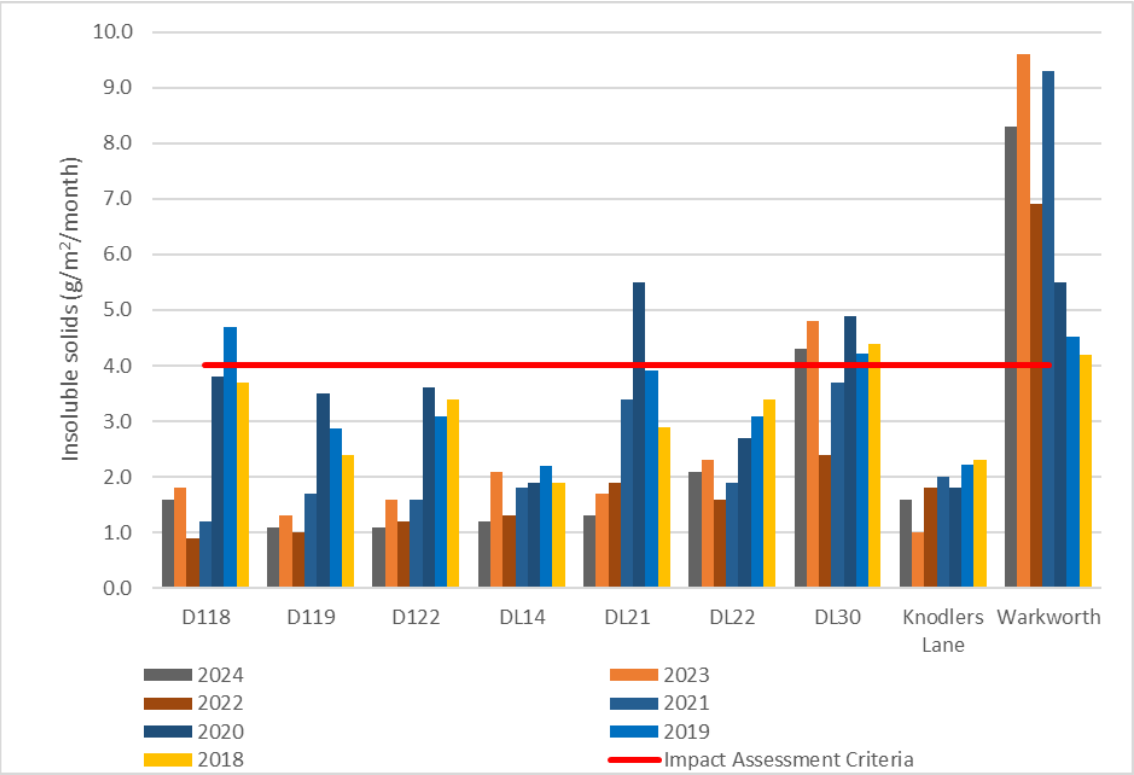

Figure 6-12: Annual Average Insoluble Matter Deposition Rates 2018-2024

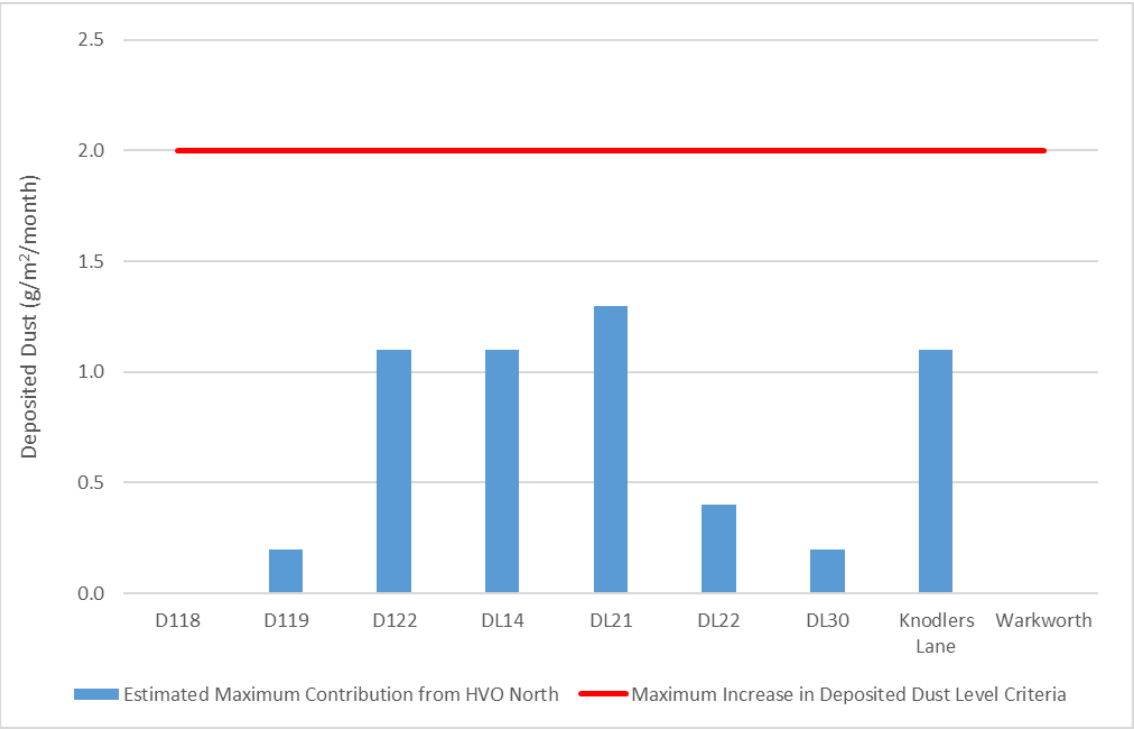

Figure 6-13: Maximum Allowable Increase in Deposited Dust Level 2024

6.4.3.4 | TOTAL SUSPENDED PARTICULATES (TSP)

TSP is monitored using High Volume Air Samplers (HVAS) at six locations in accordance with the AQGGMP.

Annual average TSP concentrations recorded in 2024 compared with the long-term impact assessment criterion and data from previous years are shown in **Figure 6-14.** TSP results in 2024 are considered to be similar to historical trends with the exception of Warkworth which recorded 137.5 µg/m^3 compared to a criteria of 90 ug/m^3.

Contributions at the TSP monitors were estimated to be the 24-hour concentrations minus an estimated background level on the corresponding day. The background level is considered to be the level which excludes the contribution from HVO but may include the influence of other sources, including other mines, localised sources, or regional sources of background dust. For the Warkworth monitor, which is often downwind of HVO South and a neighbouring mine concurrently, the daily contribution is considered to include both mines. In order to determine the contribution from HVO South alone, the combined mining increment was scaled by the proportion of time the monitor was downwind of HVO South relative to the total time the monitor was downwind of both mines during each 24-hour period.

Further methodology for determining HVO contribution is presented in Section 2.7.1 of Appendix A:. This investigation method has determined the maximum possible contribution of HVO South to the Warkworth annual average to be 41.6 µg/m^3.

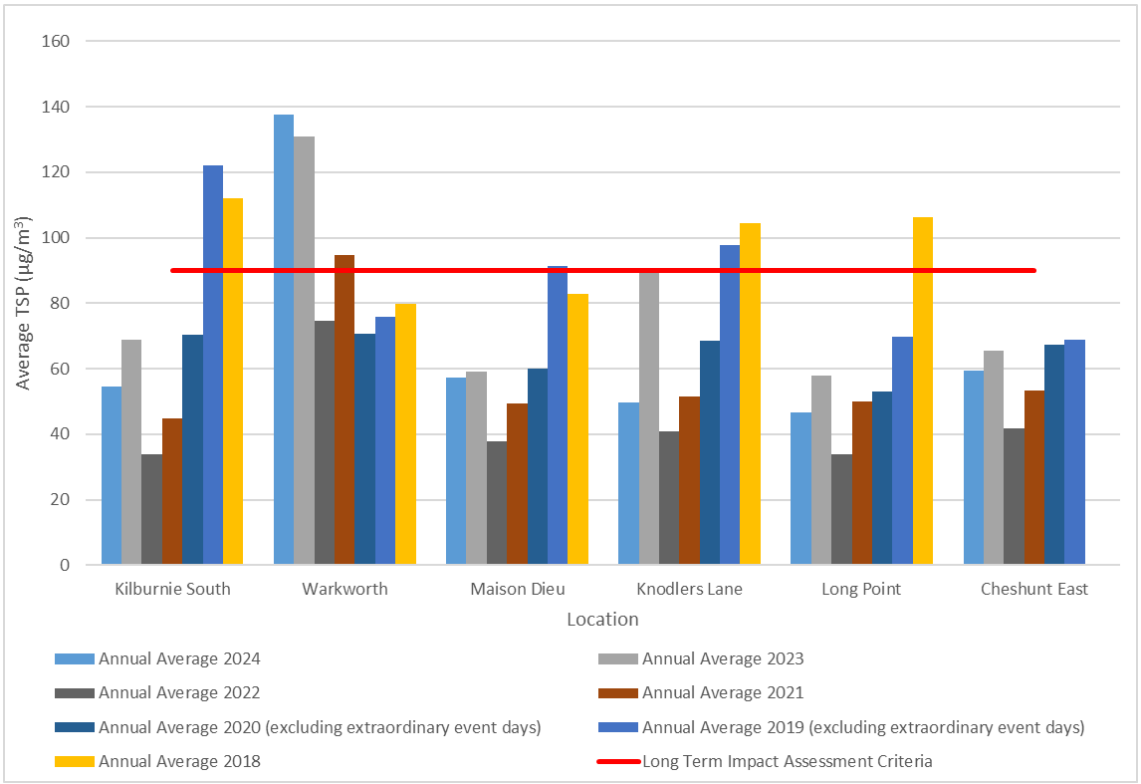

Figure 6-14: Annual Average TSP Concentrations 2018 to 2024 (Excludes Extraordinary Events)

Table 6-10: 2024 TSP HVAS Exceedance Investigation

Date	Site	Measured Annual Average TSP Level (µg/m^3)	HVO Annual Average TSP Criteria (µg/m^3)	Estimated HVO Maximum Contribution to TSP Level (µg/m^3)	Discussion
2024	Warkworth	137.5	90 (HVO South)	41.6	Investigated by external consultant based on wind direction. Refer to **Appendix A**.

Two (2) TSP measurements were not able to be collected on the scheduled sampling date (based on a sampling frequency of every six days). Details of these mis-captures are provided in **Table 6-11**.

Table 6-11: TSP HVAS 24hr Mis-captures

HVAS Location	Date	Reason for Miscapture
Cheshunt East TSP	27/08/2024	HVAS did not run for sufficient time due to an area wide power outage.
Kilburnie South TSP	13/11/2024	HVAS did not run for sufficient time due to a power trip

6.4.3.5 | PARTICULATE MATTER <10µM (PM_{10})

Particulate Matter <10 µm^3 (PM_{10}) is monitored using High Volume Air Samplers (HVAS) and Real Time Tapered Element Oscillating Microbalance (TEOM) monitors. Monitoring is used to assess against short term (24 hour) and annual average air quality criteria.

6.4.3.5.1 | PARTICULATE MATTER <10µM (PM_{10}) – SHORT TERM (24-HOUR AVERAGE) IMPACT ASSESSMENT CRITERIA

Short Term (24-hour average) PM_{10} concentrations from HVO North and South were measured using HVAS and TEOM monitors and assessed against the relevant criteria as per the AQGGMP. For TEOM monitors, this is calculated daily using measured hourly average data. The HVAS samples are taken over a 24-hour period every sixth day. Short term (24-hour average) results recorded by HVO's TEOM compliance monitoring network during 2024 is presented in **Figure 6-15**. The data presented includes total measured results including contribution from all particulate sources.

Two PM_{10} measurements were not able to be collected on the scheduled sampling date (based on a sampling frequency of every six days). Details of these mis-captures are provided in **Table 6-12**.

Table 6-12: PM_{10} HVAS 24hr Mis-captures

HVAS Location	Date	Reason for Miscapture
Cheshunt East PM_{10}	27/08/2024	HVAS did not run for sufficient time due to an area wide power outage.
Kilburnie South PM_{10}	13/11/2024	HVAS did not run for sufficient time due to a power trip

In 2024 there were no exceedances recorded against the HVO South Consent due to site contributions being below the incremental air quality criterion (HVO South contribution alone). Six (6) air quality exceedances were recorded against the HVO North Consent based on the total contribution criteria (HVO North contribution plus all other sources). Outcomes of the exceedance assessments are provided in **Table 6-13.** These exceedances required notification to DPHI as the HVO contribution was greater than 0 (zero). Refer to **Section 11** for further information on these notifications. A complete record of HVO's assessment of measured exceedances is included in Appendix A:

Table 6-13: 2024 PM_{10} 24hr Exceedance Investigation

Date	Site	Measured 24-Hour Average PM_{10} Level ($\mu g/m^3$)	HVO 24-Hour Average PM_{10} Criteria ($\mu g/m^3$)	Estimated HVO Maximum Incremental Contribution to PM_{10} Level ($\mu g/m^3$)	Discussion
5/02/2024	Cheshunt East HVAS	69.1	50	13.4	Investigated based on wind direction, site contribution not significant.
13/03/2024	Jerrys Plains TEOM	51.2	50	13.3[1]/6.4[2]	Investigated based on wind direction, site contribution below compliance limit
4/11/2024	Jerrys Plains TEOM	57.9	50	6.5[1]/1.2[2]	Investigated based on wind direction, site contribution not significant.
7/11/2024	Cheshunt East HVAS	53.9	50	11.1	Investigated based on wind direction, site contribution not significant.
14/12/2024	Jerrys Plains TEOM	50.5	50	9.5[1]/6.3[2]	Investigated based on wind direction, site contribution not significant.

1 HVO South contribution

2 HVO North contribution

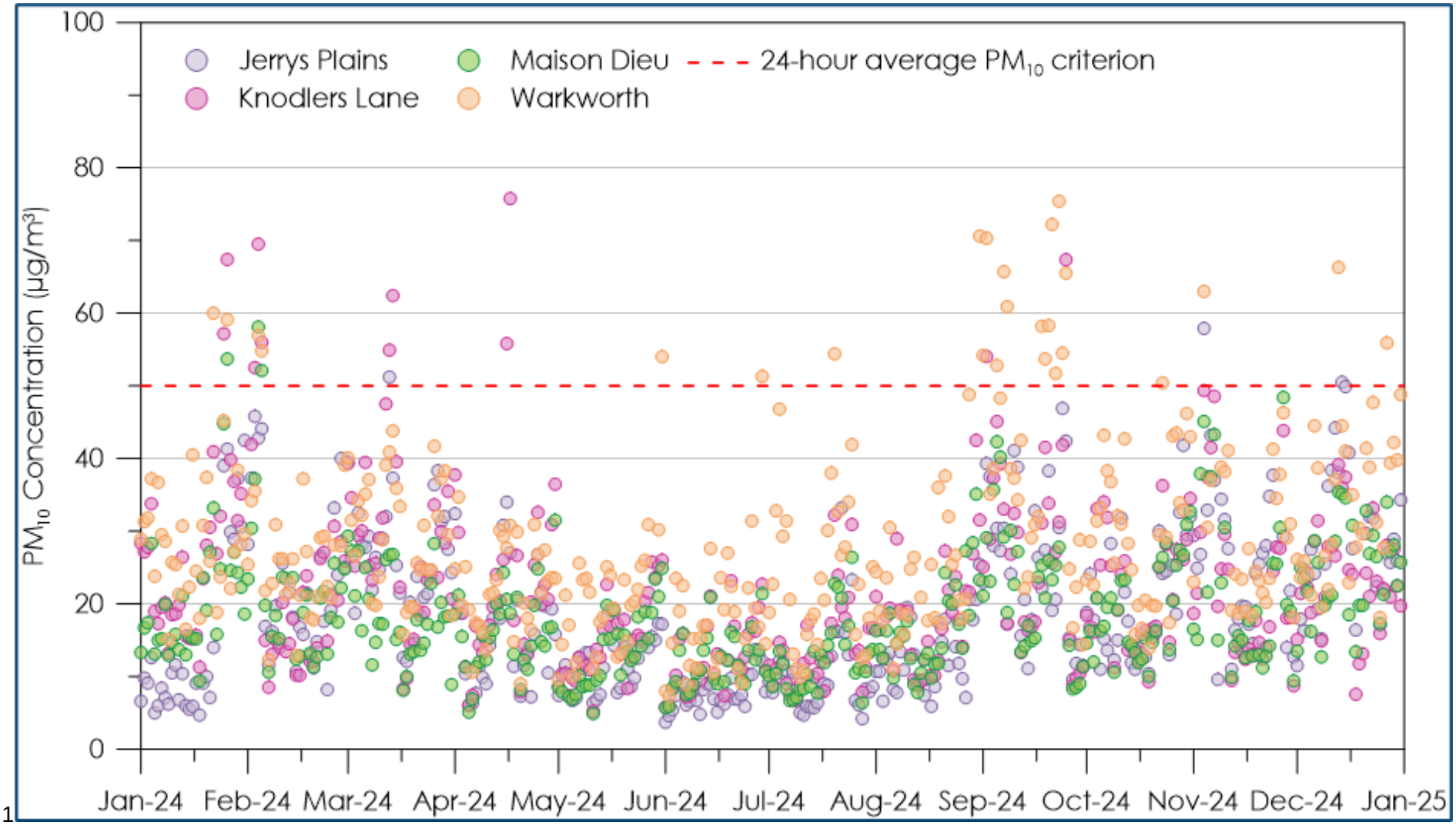

Figure 6-15: TEOM 24-hour Average Total PM_{10} Results 2024

6.4.3.5.2 | LONG TERM PM_{10} IMPACT ASSESSMENT CRITERIA

Annual average PM_{10} concentrations were calculated for both HVAS and TEOM monitors and assessed against the relevant criteria as per the AQGGMP. This was undertaken for TEOM monitors using hourly average data and was calculated for HVAS units using 24-hour average concentrations on each of the run days.

Annual average PM_{10} levels were above the impact assessment criteria at the Hunter Valley Gliding Club (HVAS) and Warkworth (TEOM) during the reporting period (refer to **Table 6-14**). These exceedances were investigated by a specialist consultant (see **Appendix A**). The investigation estimated maximum incremental contribution to PM_{10} level from HVO South to be a minor contribution to the overall result. There are no privately owned residences near the Warkworth or Glider Club monitors and HVO has a Concessions and Mitigation Agreement with the Gliding Club with respect to air quality levels when the facilities are in use. Refer to Section 2.6.1 of **Appendix A** for more information.

Table 6-14: 2024 PM_{10} Exceedance Investigation

Date	Site	Measured Annual Average PM10 Level (µg/m^3)	HVO Annual Average PM10 Criteria (µg/m^3)	Estimated HVO Maximum Contribution to PM_{10} Level (µg/m^3) from HVO South	Discussion
2024	Warkworth (TEOM)	28.0	25 (HVO South)	2.7	Investigated based on wind direction, site contribution not significant.
2024	Glider Club (HVAS)	28.8	25 (HVO South)	11.2	Investigated based on wind direction, site contribution not significant.

A comparison of the long term PM_{10} impact assessment criterion and previous years' data are shown in **Figure 6-16**.

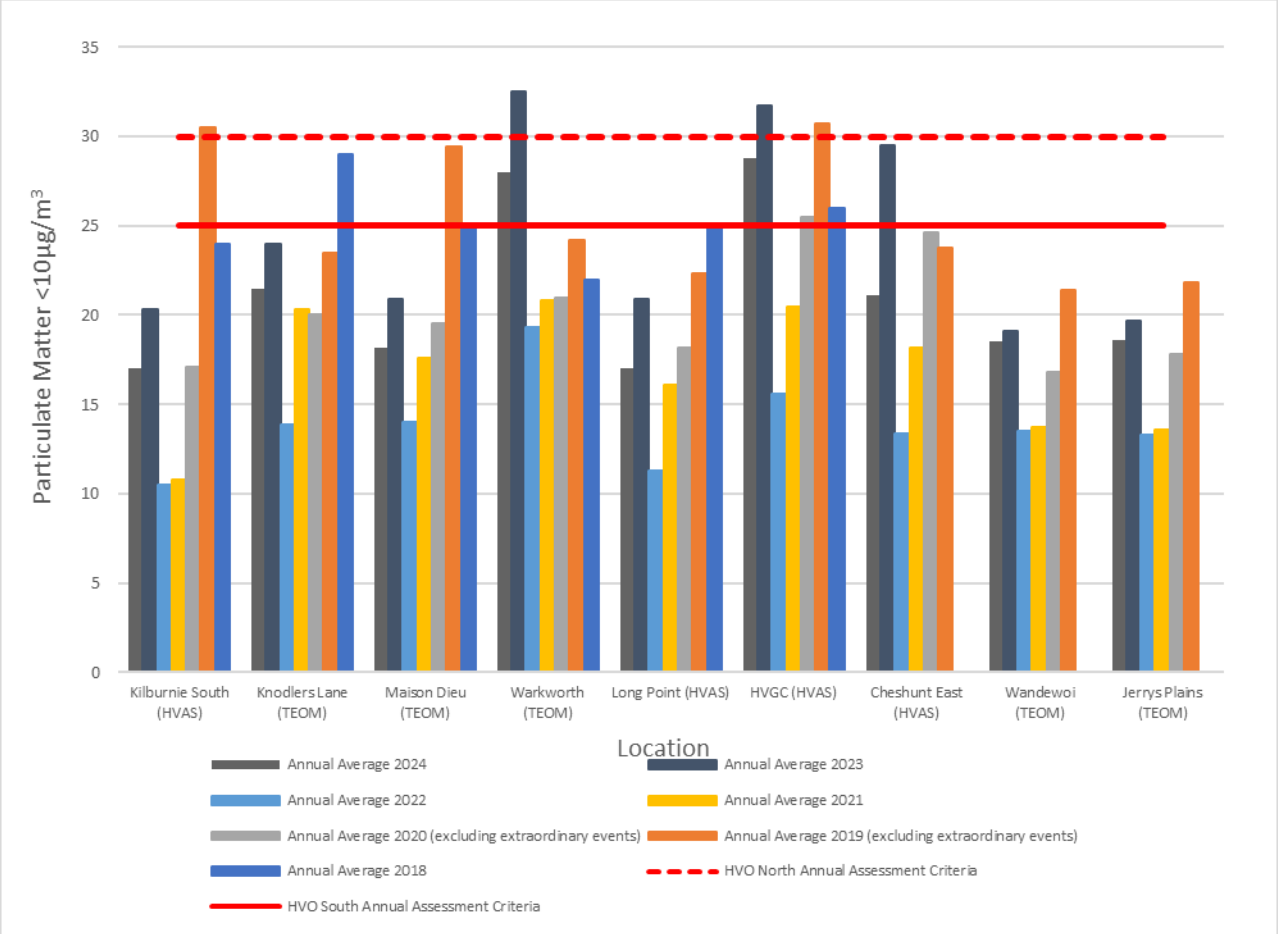

Figure 6-16: Annual Average HVAS PM10 Results 2018 to 2024

6.4.3.5.3 | $PM_{2.5}$ SHORT TERM IMPACT ASSESSMENT CRITERIA

$PM_{2.5}$ samples were collected at Maison Dieu and Kilburnie South using HVAS, and these results are provided in **Table 6-16** and **Figure 6-17**.

There were four (4) $PM_{2.5}$ measurements that were not able to be collected on the scheduled sampling dates (**Table 6-15**).

Table 6-15: $PM_{2.5}$ HVAS Mis-captures - 2024

HVAS Location	Date	Reason for Miscapture
Kilburnie South	12/03/2024	No power at unit due to blown electrical fuse
Maison Dieu	28/06/2024	Power tripped at monitoring unit
Kilburnie South	13/11/2024	Power tripped at monitoring unit

Results above criteria were recorded over 4 monitoring days during 2024. The results were investigated and HVO's contribution was assessed based on wind direction (**Table 6-16**). The investigations determined HVO South was below its incremental criteria for all results. As discussed in the Long-Term Impact section the $PM_{2.5}$ levels recorded appear to be anomalously high when compared to co-located PM_{10} monitor results.

Table 6-16: Short Term Impact Assessment Criteria – $PM_{2.5}$ Results 2024

Date	Site	Measured 24-Hour Average $PM_{2.5}$ Level ($\mu g/m^3$)	HVO South 24-Hour Average $PM_{2.5}$ Incremental Criteria ($\mu g/m^3$)	Estimated HVO South Contribution to $PM_{2.5}$ Level ($\mu g/m^3$)	Discussion
5/02/2024	Kilburnie South	48.2	25	1.3	Investigated based on wind direction and background, site contribution below criteria
5/02/2024	Maison Dieu	37.0	25	12.3	Investigated based on wind direction and background, site contribution below criteria
2/09/2024	Maison Dieu	29.1	25	6.2	Investigated based on wind direction and background, site contribution below criteria
7/11/2024	Maison Dieu	51.4	25	4.4	Investigated based on wind direction and background, site contribution below criteria
7/11/2024	Kilburnie South	25.6	25	0.9	Investigated based on wind direction and background, site contribution below criteria

Date	Site	Measured 24-Hour Average $PM_{2.5}$ Level ($\mu g/m^3$)	HVO South 24-Hour Average $PM_{2.5}$ Incremental Criteria ($\mu g/m^3$)	Estimated HVO South Contribution to $PM_{2.5}$ Level ($\mu g/m^3$)	Discussion
25/11/2024	Kilburnie South	25.9	25	6.5	Investigated based on wind direction and background, site contribution below criteria

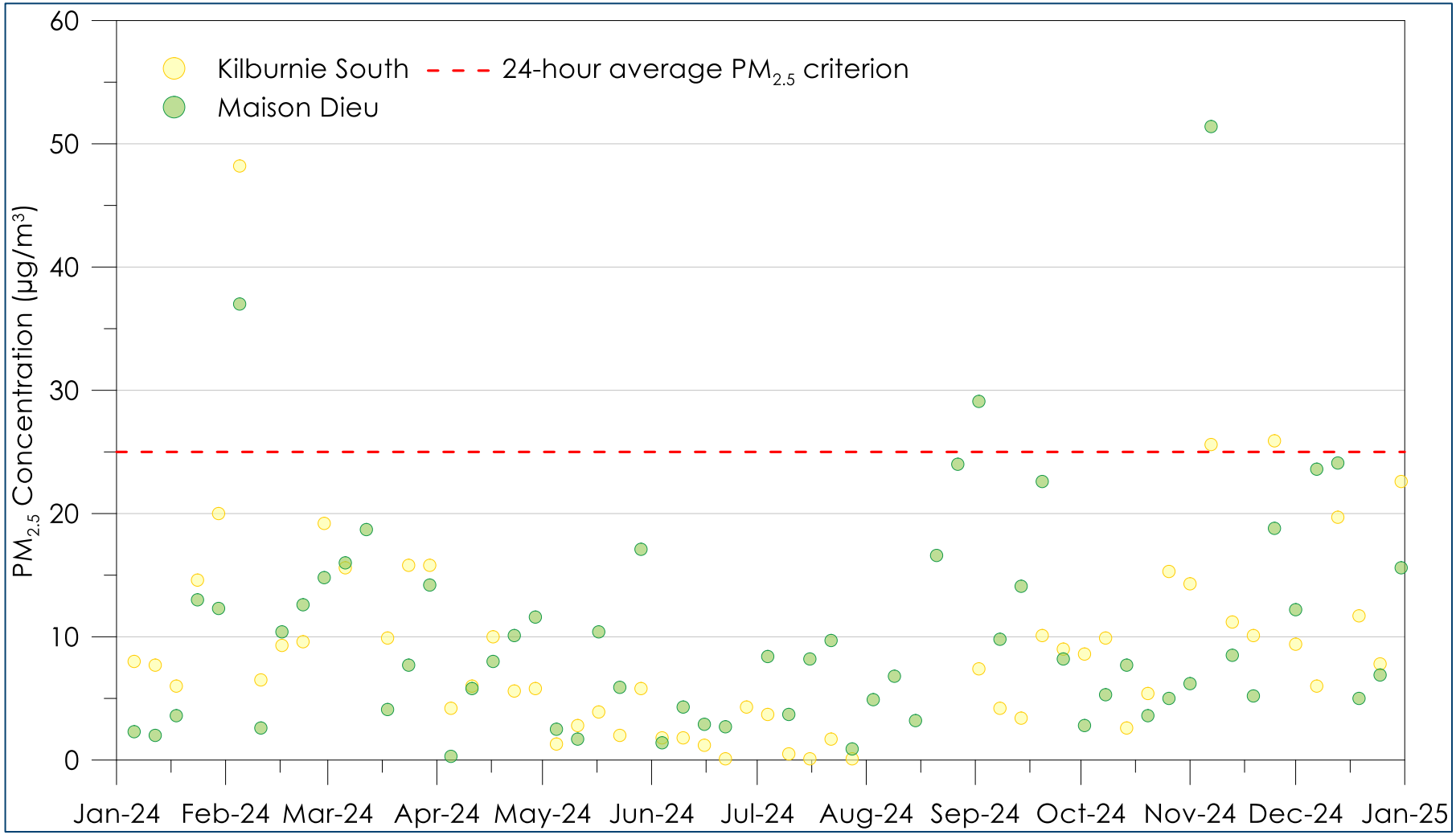

Figure 6-17: 24-hour Average $PM_{2.5}$ Results 2024

6.4.3.5.4 | PARTICULATE MATTER <2.5µM ($PM_{2.5}$) – LONG TERM (ANNUAL AVERAGE) IMPACT ASSESSMENT CRITERIA

Annual average $PM_{2.5}$ was above the annual average criteria of 8 µg/m^3 at both locations for the reporting period (**Table 6-17)**. While HVO's contribution is not calculated to be significant, the elevated total levels are considered to be anomalously high and are not consistent with other regional $PM_{2.5}$ monitors or expected ratios of co-located $PM_{2.5}$ monitors. $PM_{2.5}$ levels recorded have been investigated throughout the year, including:

- Monitoring locations have been inspected multiple times to identify any significant local $PM_{2.5}$ sources, with none identified.
- Calculation of PM_{10}:$PM_{2.5}$ ratios for monitoring equipment for co-located units (as shown in **Table 6-18**). The ratio in the Hunter Valley is typically 0.3 to 0.4. Ratios measured at HVO range from 0.40 to 0.78.
- Comparison to levels recorded by EBAMs installed in March 2023.

It is believed that the source of the high readings is due to the high-volume air sampler monitoring method. HVO engaged an air quality consultant to review the air quality monitoring network. The review recommended the implementation of real-time $PM_{2.5}$ monitoring at Maison Dieu and Kilburnie South. During March 2023, HVO installed Beta Attenuation Mass Monitors (EBAMs) which is an equivalent type to that used in the EPA's Upper Hunter Air Quality Monitoring Network. The use of the EBAMs is pending DPHI approval of the AQGG Management Plan. The aim of these monitors is to determine the potential contribution of HVO South to annual average $PM_{2.5}$ levels recorded at HVO HVAS monitors. Given that the results recorded at the Maison Dieu and Kilburnie South HVAS monitors appears to be implausibly high, monitoring data at these locations have been used in order to estimate HVO South's increment to the recorded levels.

HVO South contributions to the BAM monitors were estimated on an hourly basis for HVAS run days. The hourly contributions were estimated as the concentrations recorded at each monitor minus the estimated background level. The hourly contributions were then averaged for each 24-hour period to determine the 24-hour contributions from HVO South. The percentage contribution of the total level recorded at the BAM monitors was applied to the HVAS monitoring results for 2024 to determine the potential contribution from HVO South to the monitors. The two BAM monitors at Maison Dieu and Kilburnie South recorded an average of 4.9µg/m^3 and 4.8 µg/m^3 respectively. Further information is presented in Section 2.5.1 of Appendix A:

Table 6-17: $PM_{2.5}$ Annual Average Monitoring Data 2024

Monitoring Location	HVO South Annual Average $PM_{2.5}$ Criteria (µg/m^3)	Measured Annual Average $PM_{2.5}$ Level (µg/m^3)	Estimated Contribution to Annual Average $PM_{2.5}$ Level (µg/m^3)
Maison Dieu	8	10.5	0.4
Kilburnie South	8	8.9	0.1

Table 6-18: Annual $PM_{2.5}$ / PM_{10} Ratios in Upper Hunter

Year	$PM_{2.5}$ / PM_{10} Ratios					
	Muswellbrook	Singleton	Camberwell	Merriwa	Maison Dieu	Kilburnie South
2015	0.46	0.39	0.33	*	*	*
2016	0.44	0.41	0.31	*	*	*
2017	0.43	0.39	0.27	*	*	*
2018	0.35	0.34	0.27	*	*	*
2019	0.35	0.36	0.26	*	*	*
2020	0.41	0.41	0.31	*	0.63	0.78
2021	0.41	0.37	0.30	0.38	0.48	0.54
2022	0.39	0.36	0.32	0.31	0.40	0.57
2023	0.35	0.37	0.30	0.34	0.43	0.62
2024	0.41	0.44	0.33	0.34	0.50	0.47

* Monitoring locations were not in place during this year

$PM_{2.5}$ levels measured at the Maison Dieu and Kilburnie South HVAS units were higher than UHAQMN annual average $PM_{2.5}$ results in comparable locations, as shown in **Table 6-19**.

Table 6-19: UHAQMN Annual Average $PM_{2.5}$ Results for 2024

UHAQMN Monitor	Measured Annual Average 2024 $PM_{2.5}$ Level ($\mu g/m^3$)
Muswellbrook	7.1
Singleton	7.3
Camberwell	5.9
Merriwa	4.6

6.4.4 | COMPARISON AGAINST EA PREDICTIONS

Table 6-20 and **Table 6-21** show a comparison between 2024 air quality data and the Stage 2 predictions made in the HVO South Modification 5 EIS. Comparisons have been made against the predictions listed in the EA for the nearest private residence to each monitoring location.

PM_{10} measurements in 2024 were similar to or below predicted levels for all monitoring locations for both short term (24-hour average) and long term (annual average) criteria as shown in **Table 6-14**. Annual average TSP measurements in 2024 were below predicted levels for all monitoring locations aside from Warkworth and Knodlers Lane. These results are discussed in **Section 6.4.3.4**.

*Table 6-20: HVO South PM_{10} Annual Average Results Compared Against Cumulative Predictions^*

Site (EA Receptor)	Short Term (24hr) Criteria		Long Term (Annual Average) Criteria	
	Predicted Maximum 24hr PM_{10} Due to HVO South Alone ($\mu g/m^3$) Stage 2	2024 Maximum 24hr PM_{10} HVO Contribution ($\mu g/m^3$)	Predicted PM_{10} Annual Averages ($\mu g/m^3$) Stage 2	2024 PM_{10} Annual Average ($\mu g/m^3$)
Maison Dieu (256)	36	18.5	21	18.2
Warkworth (90)	95	22.4	46	28.0
Kilburnie South (307)	31	17.9	27	17.0
Knodlers Lane (117)	59	29.8	28	21.5
Long Point (137)	36	13.0	20	17.0
Hunter Valley Gliding Club***	>50	44.6	>30	28.8

^ Cumulative predictions for Stage 2 of the HVO South Mod 5 Environmental Assessment.

*** The HVGC has entered into a Concessions and Mitigation Agreement with Hunter Valley Operations.

*Table 6-21: HVO South TSP Annual Average Results Compared Against Cumulative Predictions^*

Site (EA Receptor)	Long Term (Annual Average) TSP Criteria	
	Stage 2 Prediction ($\mu g/m^3$)	2024 PM_{10} Annual Average ($\mu g/m^3$)
Maison Dieu (256)	60	49.6
Warkworth (90)	106	137.5
Kilburnie South (307)	76	54.6
Knodlers Lane (117)	75	79.0
Long Point (137)	61	46.7

^ Cumulative predictions for Stage 2 of the HVO South Mod 5 Environmental Assessment.

Table 6-22 and **Table 6-23** detail comparisons between 2024 air quality monitoring results and the modelled predictions from the 2010 HVO North Carrington West Wing Air Quality Impact Assessment. Predictions have been sourced from modelled scenarios of Year Five of the Carrington West Wing development. It should be noted that while Approval has been granted for the commencement of that project, works have not yet commenced.

Annual average PM_{10} levels for 2024 were above the predicted annual average presented in **Table 6-22** however HVO estimated contributions (North and South) to these were low. Annual average TSP levels were also above predicted levels (**Table 6-23**). HVO contribution to these has been estimated **(Appendix A:)**to be low and not considered to be the primary cause of the elevated levels.

*Table 6-22: HVO North 2024 PM_{10} Annual Average Results Compared Against Cumulative Predictions^*

Site (EA Receptor)	Long Term (Annual Average) Criteria			
	Predicted PM_{10} Annual Average ($\mu g/m^3$)	2024 PM_{10} Annual Average ($\mu g/m^3$)	HVO North Estimated Contribution to 2024 PM_{10} Annual Average ($\mu g/m^3$)	HVO South Estimated Contribution to 2024 PM_{10} Annual Average ($\mu g/m^3$)
Maison Dieu (6)	21.1	18.2	*	2.2
Warkworth (39)	46.3	28.0	*	2.7
Kilburnie South (4)	26.7	17.0	1.2	2.4
Jerrys Plains (13)	13.4	18.6	1.3	2.9
Cheshunt East (7)	29.3	21.1	4.5	*

^ Cumulative predictions for Year Five (CWW) of the HVO North Environmental Assessment.

* no relevant criteria for this location under the consent

*Table 6-23: HVO North 2024 TSP Annual Average Results Compared Against Cumulative Predictions^*

Site (EA Receptor)	Long Term (Annual Average) Criteria		
	Predicted TSP Annual Average ($\mu g/m^3$)	2024 TSP Annual Average ($\mu g/m^3$)	HVO TSP Contribution ($\mu g/m^3$)
Maison Dieu (6)#	43.7	49.6	9.6 (HVO South)
Warkworth (39) #	46.3	137.5	41.6 (HVO South)
Kilburnie South (4)	44.9	54.6	2.6 (HVO North) 9.8 (HVO South)
Cheshunt East (7)	44.5	59.5	18.3 (HVO North)

^ Cumulative predictions for Year Five (CWW) of the HVO North Environmental Assessment.

Being upwind of HVO South, separate HVO North contribution was not calculated.

6.5 | GREENHOUSE GAS AND ENERGY MANAGEMENT

6.5.1 | REPORTED GREENHOUSE GAS EMISSIONS

HVO reports greenhouse gas emissions (GHG) in accordance with National Energy and Greenhouse Gases (NGER) legislation. Each financial year HVO is required to submit to the Federal government the emissions from their NGERs registered facility into the Emissions and Energy Reporting System (EERS). The NGERs reporting year is based on a financial year, not a calendar year such as this Annual Review. The values in this report also cover a financial year.

Table 6-24 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) compared to annual average emissions forecast for HVO South (PA 06_0261) in the *Air Quality and Greenhouse Gas Study HVO South Modification 5 (Todoroski Air Sciences, 2017*) (the EIS forecast). Greenhouse emission forecasts for HVO North are only suitable for comparison in the EIS for the Carrington West Wing modification, which has not commenced.

Table 6-24: Greenhouse Gas Emissions 2024

Emissions	NGERS Reported Emissions (tonnes CO_2e-)			Predicted Emissions
	FY22	FY23	FY24	
Scope 1	577,874	456,690	637,147	570,807
Scope 2	93,865	61,585	58,720	137,231
Total Scope 1 & Scope 2	671,739	518,275	695,867	708,038

6.5.2 | COMPARISON AGAINST PREDICTIONS

The EIS forecast estimated that the annual average greenhouse gas emissions (Scope 1 and Scope 2) from HVO South would be 708,038 CO_2e-. As outlined in **Table 6-24**, total emissions during FY2024 were 695,867 CO_2e-. Total emissions reported are for the HVO Complex, which includes activities in both HVO South and HVO North. While Scope 1 emissions were above EIS forecast for the financial year, Scope 2 emissions were below forecast, and total Scope 1 and Scope 2 was below the EIS forecast. Considering that total emissions are below forecast and that the forecast does not include HVO North, HVO is considered to be operating in line with predictions.

Table 6-24 shows reported emissions for the past 3 NGERS reporting periods. Levels have been below predictions during each reporting period. Greenhouse gas emissions show close alignment with coal production for each reporting period.

6.5.3 | STEPS TAKEN TO IMPROVE ENERGY EFFICIENCY AND REDUCE GHG EMISSIONS

HVO is actively engaged in minimising greenhouse gas emissions associated with their coal operations and supporting the NSW Government objectives of net-zero emissions by 2050. In addition, HVO is governed by a range of climate change commitments made by Yancoal and Glencore, as the JV partners of HVO, including:

- Yancoal
    - Supporting innovation and investment in carbon capture, utilisation and storage through various industry and policy initiatives, to work towards the commitments outlined in the Paris Agreement;
    - Taking a constructive role in public policy development and participation in relevant industry associations, guided by recognition of the aims of the Paris Agreement; and
    - Supporting research into technologies that will reduce GHG emissions from the downstream consumption of products (Scope 3).

- Glencore
    - Glencore Coal Australia open cut and underground sites minimise emissions from diesel and electricity consumption by:
        - Optimisation of mining practices e.g. haulage planning, blast design, conveying arrangements.
        - Optimisation of engine performance e.g. studies undertaken in collaboration with OEMs to enhance fuel efficiency and emissions reduction.
        - New fleet is purchased with the most fuel-efficient engines available.
        - Ongoing monitoring of potential biofuel and fuel additive opportunities.
        - Ongoing monitoring and assessment of emerging technologies.

HVO also manages greenhouse gas emissions through the following:

- Continuing to look to use new, economically feasible, technologies to improve efficiencies and reduce emissions including fuel switching and electricity from renewable sources.
- Update our 3-year plan every three years for investigating and implementing all reasonable and feasible measures to minimise greenhouse gas emissions.
- Continue to implement operational control efficiencies such as minimising haul distances, and optimising ramp gradients, payload management and scheduling activities to optimise equipment use.

6.6 | WASTE AND HAZARDOUS MATERIALS

6.6.1 | RECYCLING

HVO has continued reinforcing the principles of effective waste management across the site, including recycling.

During the reporting period, 7% of non-mineral waste material generated at HVO was disposed of in licensed offsite landfill facilities and 93% of waste was recycled. This is a similar result to 2023.

A total of 12,211 tonnes of waste was removed from site during the reporting period. The high recycling rates are influenced by the recycling of effluent (9,694 tonnes), waste oil (1,088 tonnes) and scrap steel (814 tonnes).

6.6.2 | SEWAGE TREATMENT/DISPOSAL

The sewage treatment and disposal facilities at HVO consist of sewage treatment plants which treat, disinfect and re-use the treated effluent on-site where practicable. The remaining effluent from some septic systems that is unable to be treated on site is sent to approved facilities for disposal.

HVO currently operates 3 main grouped on-site sewage management facilities that are interconnected from multiple systems. These facilities are located at Howick, HVO North and HVO South. Design works continued towards upgrade of these systems.

6.6.3 | HYDROCARBONS

A total of 1,088 kL of waste oil was taken offsite to be refined into a base oil for reuse in new oil products during the reporting period. Other hydrocarbons recycled via a licenced waste hydrocarbon disposal contractor include approximately 17.3 tonnes of waste grease.

6.6.4 | CONTAMINATED SOIL

HVO operates and maintains two bioremediation areas to manage hydrocarbon contaminated soil.

Contaminated soil is taken to one of the bioremediation areas and placed in cells based on the time of contamination. Contaminated soil is spread out in beds approximately 300 mm in height and turned to provide aeration for beneficial microbial activity.

Soil in the treatment area is sampled and tested as required until total hydrocarbon levels are below relevant guidelines. Soil meeting these criteria is then removed and disposed of in the spoil dump.

6.6.5 | ACID ROCK DRAINAGE

There were no observed issues relating to Acid Rock Drainage during 2024. The Geochemical Monitoring Programme was reviewed during the reporting period, and this will be implemented from 2025.

6.6.6 | BUILDING DEMOLITION

No building demolition was conducted during 2024.

6.6.7 | WASTE/HAZARDOUS MATERIALS NON-COMPLIANCES

There were no externally reportable incidents related to waste or hazardous material management during the reporting period.

6.7 | HERITAGE

6.7.1 | ABORIGINAL CULTURAL HERITAGE MANAGEMENT AND COMMUNITY CONSULTATION

Aboriginal cultural heritage is managed under the provisions of separate Aboriginal Cultural Heritage Management Plans (ACHMPs) approved for each consent. At HVO North, where mining or associated development activities may impact Aboriginal cultural heritage sites, an Aboriginal Heritage Impact Permit (AHIP) must also be sought from Heritage New South Wales (formerly Office of Environment and Heritage) under Part 6 of the National Parks and Wildlife Act 1974 (NPW Act), on the basis of the management requirements established through the ACHMP process.

The HVO South ACHMP area was approved as a State Significant Development which excludes the requirement for obtaining AHIPs prior to implementing cultural heritage management measures authorised under the provisions of the ACHMP.

HVO consults with the Hunter Valley Operations Cultural Heritage Working Group (CHWG) which is comprised of representatives from HVO and Registered Aboriginal Parties (RAPs) from upper Hunter Valley aboriginal community groups, corporations and individuals. The CHWG met and discussed cultural heritage management matters associated with HVO at two meetings during 2024 – 2 May and 19 December.

Aboriginal cultural heritage at HVO is managed in consultation with the RAPs associated with the CHWG, in accordance with the ACHMPs, and development consent conditions, to protect, manage and mitigate cultural heritage at HVO. Management measures include:

- Ongoing consultation and involvement of the local Aboriginal community in all matters pertaining to Aboriginal cultural heritage management;
- Compliance with existing ACHMP's and Development Consent conditions;
- A cultural heritage Geographic Information System (GIS) and Cultural Heritage Zone Plan (CHZP) incorporating cultural heritage spatial and spatial data (site location, description, assessments, date recorded, associated reports, management provisions and various other details to assist with the management of sites);
- A Ground Disturbance Permit (GDP) system for the assessment and approval of ground disturbing activities to ensure these activities do not disturb cultural heritage places;
- Limit of Disturbance Boundary (LODB) procedures to demarcate approved disturbance areas and delineate areas not to be disturbed;
- Ongoing cultural heritage site inspections, monitoring and auditing along with regular compliance inspections of development works;
- Protective management measures such as fencing/barricading sites to avoid disturbance, protective buffer zones, cultural heritage off-set areas; and
- Communicating cultural heritage issues and site awareness to personnel via internal electronic and face to face processes.

In consultation with the CHWG and Heritage NSW, a Cultural Heritage Storage Facility (CHSF) was established at the Hunter Valley Services complex. The CHSF is a storage shed, with an adjacent shipping container, fitted out to allow safe and secure storage of cultural materials such as stone artefacts. It is a central repository for all materials collected during community collection and salvage activities on all lands related to HVO (including offset properties).

6.7.2 | ABORIGINAL ARCHAEOLOGICAL AND CULTURAL HERITAGE INVESTIGATIONS

EMM conducted a due diligence assessment and survey at one area during 2024. This area was the subject of a proposal to extend an existing car park to accommodate truck parking. As part of the pre works, five objects were identified that required verification by an archaeologist to determine if they were cultural in origin. The objects were inspected by RAPs on 2 May 2025 and an EMM archaeologist on 3 May 2024, with both groups confirming they were ACH artefacts. As a result, permanent barricading has been installed and the car park redesigned to avoid the artefacts. The site has been documented as AHIMS 37-2-6621.

During 2024, consultation with Registered Aboriginal Parties (RAPs) associated with the HVO Continuation Project (HVO South (SSD1186621) and HVO North (SSD 11826681) continued in accordance with the Aboriginal Cultural Heritage Consultation Requirements for Proponents (DECCW 2010). A summary of the primary consultation activities completed during the 2024 included:

- Provision of newsletters
- Project update letters/emails
- Introduction to proposed time extension modification to the HVO North Development Consent (DA 450-10-2003) letter/email

Consultation with Project RAPs will remain ongoing throughout 2025 during the assessment phase of the HVO Continuation Project.

HVO also conducted consultation meetings as part of the requirements for preparing the ACHA for the Mitchell Pit South AHIP application. Consultation meetings were conducted on the following dates:

- Meeting 1: 7 February 2024;
- Sub Committee Meeting: 28 March 2024
- Meeting 2: 2 May 2024;
- Meeting 3: 31 May 2024

The Mitchell Pit South AHIP application was submitted to Heritage NSW on 13 August 2024. The application was approved, with AHIP 5350 issued on 23 December 2024.

That's

6.7.3 | HERITAGE AUDITS AND INCIDENTS

Under the provisions of the HVO South ACHMP, two compliance inspections were conducted during 2024 and under the provisions of the HVO North HMP, a single compliance inspection was conducted during 2024. The purpose of the compliance inspections is to provide / allow RAPs:

- The opportunity to visit mine operations and mine areas to inspect operational compliance with ACHMP/HMP provisions and GDP procedures;
- To inspect and monitor the condition and management of sites; and
- To review the effectiveness and performance of the ACHMP/HMP provisions in the management of cultural heritage at the mine.

These compliance inspections were conducted by RAP representatives of the CHWG with the assistance of a qualified archaeologist and HVO personnel.

The biannual 2024 HVO South compliance inspection was conducted on 22 April 2024 by two RAP representatives of the CHWG. A total of fifteen Aboriginal heritage sites were inspected focusing on locations on the Hunter River at the Nichols block and Barellan and Comleroi farms. The findings and recommendations of these inspections are documented in the HVO South Aboriginal Heritage Management Plan April 2024 Compliance Audit Inspections report dated June 2024 and included as **Appendix C:**

The annual 2024 HVO South and HVO North compliance inspection was conducted between 18 and 20 of November 2024 by three RAP representatives of the CHWG, a suitably qualified and experienced archaeologist and HVO personnel. During the HVO South portion of the compliance inspection, a total of 55 Aboriginal heritage sites were inspected in the HVO South Area / Long Point area. These areas are not active mining areas, with some utilised for grazing by third party rural licensees. During the HVO North portion of the compliance inspection, a total of 37 heritage sites were assessed including Carrington south, Carrington north, Hunter Valley Services, Hunter Valley Load Point on the north west periphery of West Pit and CM-CD-1. The findings and recommendations of these inspections are documented in the Hunter Valley Operations Aboriginal Heritage Management Plans November 2024 Compliance Audit Inspections report dated December 2024 and included as **Appendix C:**

The inspections found that all sites have been managed in conformance with the ACHMP/HMP requirements. Sites requiring maintenance and upgrades to site barricading, fencing and vegetative sediment controls were identified. Barricade upgrade and maintenance will be included as part of the works proposed for 2025. Inspections were hampered by high vegetation and ground cover. The CM-CD1 site report included reference to the recent program of cultural burning (refer to **Section 6.8.2**) and the need to complete fencing, to assist with demarcation of control zones for various activities including exclusion areas and areas where specific land management activities can be conducted. The report also noted the need to maintain feral pig control programs to reduce potential disturbance of this site.

During the reporting period, there were 45 GDPs assessed for cultural heritage management considerations at HVO.

There were no incidents, nor any unauthorised disturbance caused to cultural heritage sites at HVO during 2024.

Figure 6-18: Participants of the CM-CD-1 cultural burn, conducted 4 September 2024

6.7.4 | HISTORIC HERITAGE – MANAGEMENT AND COMMUNITY CONSULTATION

Consultation was conducted at the Hunter Valley Operations Community Consultative Committee (CCC) Meetings held on 7 February, 8 May, 28 August and 13 November 2024 as outlined in **Section 9**. Topics discussed included:

- Yard maintenance works and Termite Interception System inspections at LEP listed European heritage properties;
- Progress on HVO 's plan for an Historic Homestead Project, which included the completion of detailed survey and condition reports for the Archerfield, Wandewoi and Carrington Stud homesteads;
- Ongoing maintenance of the Cockatoo Fence Asset Protection Zone maintenance works;
- Preparation of the Archerfield homestead Conservation Management Plan; and
- Planning and tender for the Wandewoi homestead balustrade repair.

A Conservation Management Plan was prepared and submitted to Singleton Council for the Archerfield homestead complex of buildings in 2024. Conservation and maintenance works are planned for Archerfield and Wandewoi homesteads during 2025 and 2026.

Figure 6-19: Aerial view of Wandewoi homestead

6.8 | BUSHFIRE MANAGEMENT

The following bushfire management control and mitigation activities outlined in the HVO Bushfire Management Plan were completed at HVO during 2024.

6.8.1 | OPERATIONAL AREAS

Bushfire mitigation measures undertaken in operational areas in 2024 are detailed in **Table 6-25**.

Table 6-25: Bushfire Mitigation Measures Undertaken in Operational Areas

Task	Completion Note
Inspect and maintain operational area fire trails and breaks	Completed as per SAP maintenance strategy
Inspect, install and maintain signage for main intersections, and gates of firebreak trails	Completed as per SAP maintenance strategy
Inspect and maintain areas surrounding administration buildings, workshops, crib huts and external roads	Completed as per SAP maintenance strategy
Inspect and maintain areas around power poles, switch yards, transformers, air break switches, and substations	Completed as per SAP maintenance strategy
Inspect and maintain areas around powerlines	Completed as per SAP maintenance strategy
Inspect and maintain areas around CHPP and load points	Completed as per SAP maintenance strategy
Inspect and maintain HC1 conveyor	Completed as per SAP maintenance strategy
Inspect and maintain workshops	Completed as per SAP maintenance strategy
Inspect and maintain water hydrant and pump function	Completed as per SAP maintenance strategy
Report any instances of bushfire outbreak to supervisor / manager, or raise emergency alarm	HVO did not record any bushfire related emergency alarms during 2024
Review Bushfire Management Plan including currency of information including maps, access routes	Plan reviewed and updated during 2024. Updated Plan endorsed by Hunter RFS (August) and Singleton Council (September) 2024
Bushfire reporting in the Annual Review, including any incidents and/or complaints	Completed – this report. No incidents or complaints received during 2024
Annual liaison with Rural Fire Service	Meeting held 23 September 2024

6.8.2 | NON-OPERATIONAL AREAS

Bushfire mitigation measures undertaken in non-operational areas in 2024 are detailed in **Table 6-26**.

Table 6-26: Bushfire Mitigation Measures Undertaken in Non-Operational Areas

Task	Completion Note
Report any instances of bushfire outbreak to supervisor / manager, or raise emergency alarm	HVO did not record any bushfire related emergency alarms at its non-operational properties during 2024
Inspect and maintain non-operational fire trails and breaks	Inspection and maintenance of fire trails completed during August and November 2024
Inspect, install and maintain signage for gates or firebreak trails	Fire trail signage inspected during August and November 2024
Review fuel loads and complete necessary reduction including areas adjacent to neighbouring properties	Fuel load inspection and review completed between May and September 2024

HVO conducted its first cultural burn at cultural heritage site CM-CD-1 on 4 September 2024. This work was conducted in accordance with the HVO North Heritage Management Plan and will be a regular component of HVO's land management and pasture based fuel load management.

6.8.3 | HVO BUSHFIRE MANAGEMENT PLAN REVIEW AND IMPROVEMENT

HVO reviewed and updated the Bushfire Management Plan in 2024, with RFS and Singleton Council endorsement of the Plan during September 2024.

7 | WATER MANAGEMENT

HVO manages surface and ground water according to three main objectives:

- Fresh water usage is minimised.
- Impacts on the environment and HVO neighbours are minimised; and
- Interference to mining production is minimal.

This is achieved by:

- Minimising freshwater use from the Hunter River.
- Preferentially using mine water for coal preparation and dust suppression.
- Emphasis on control of water quality and quantity at the source.
- Segregating waters of different quality where practical.
- Recycling on-site water.
- Ongoing maintenance and review of the system; and
- Disposing of water to the environment in accordance with statutes and regulations.

Plans showing the layout of all water management structures and key pipelines are shown in **Figure 7-1** to **Figure 7-3**. The HVO Water Management Plan contains further detail on management practices and is available on HVO website. Note that **Figure 7-1** to **Figure 7-3** are updated versions of plans presented in the currently approved *HVO Water Management* Plan and have been included in the revised version of the plan provided to DPHI for approval.

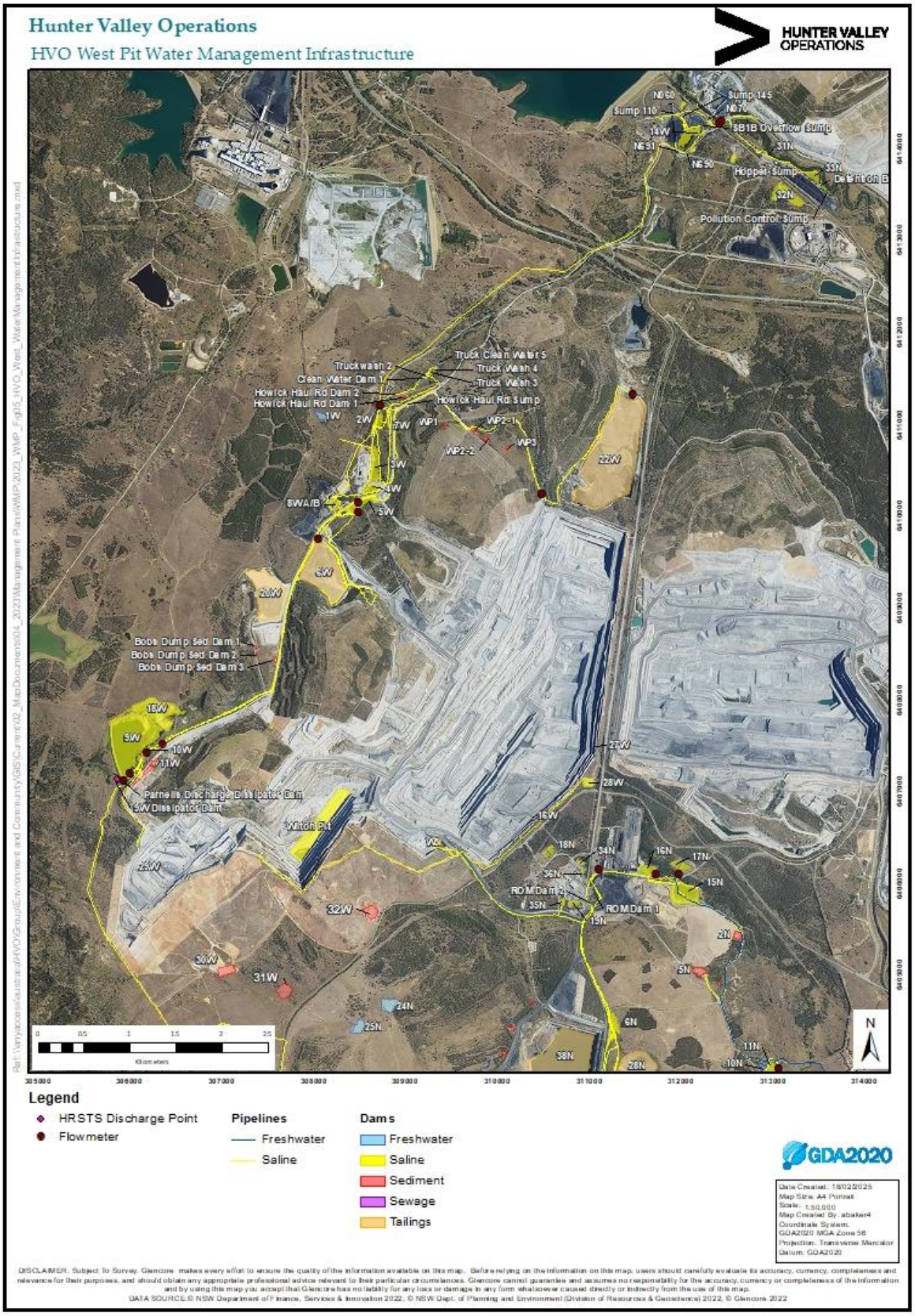

Figure 7-1: West Pit Water Management Infrastructure

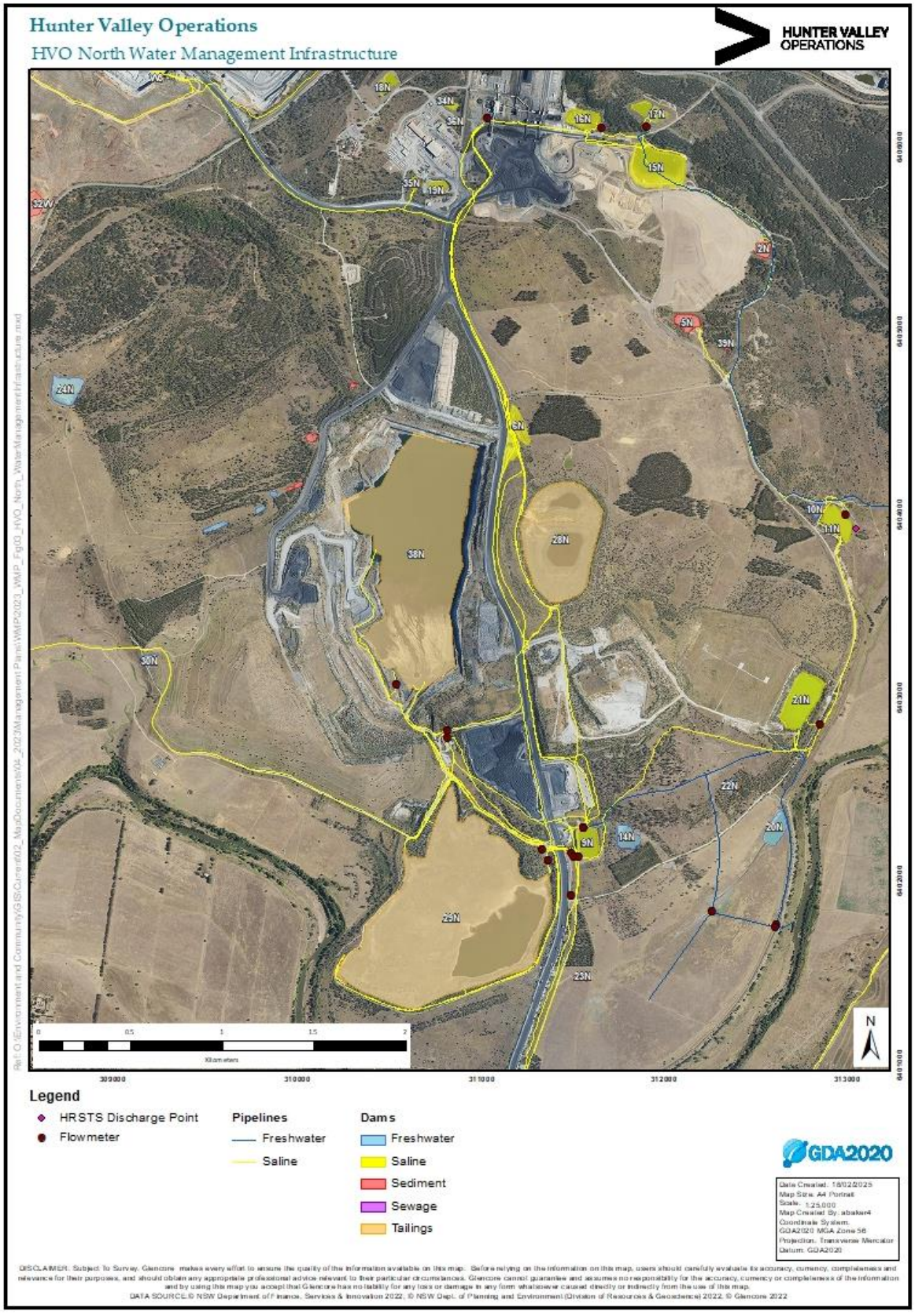

Figure 7-2: North Pit Water Management Infrastructure

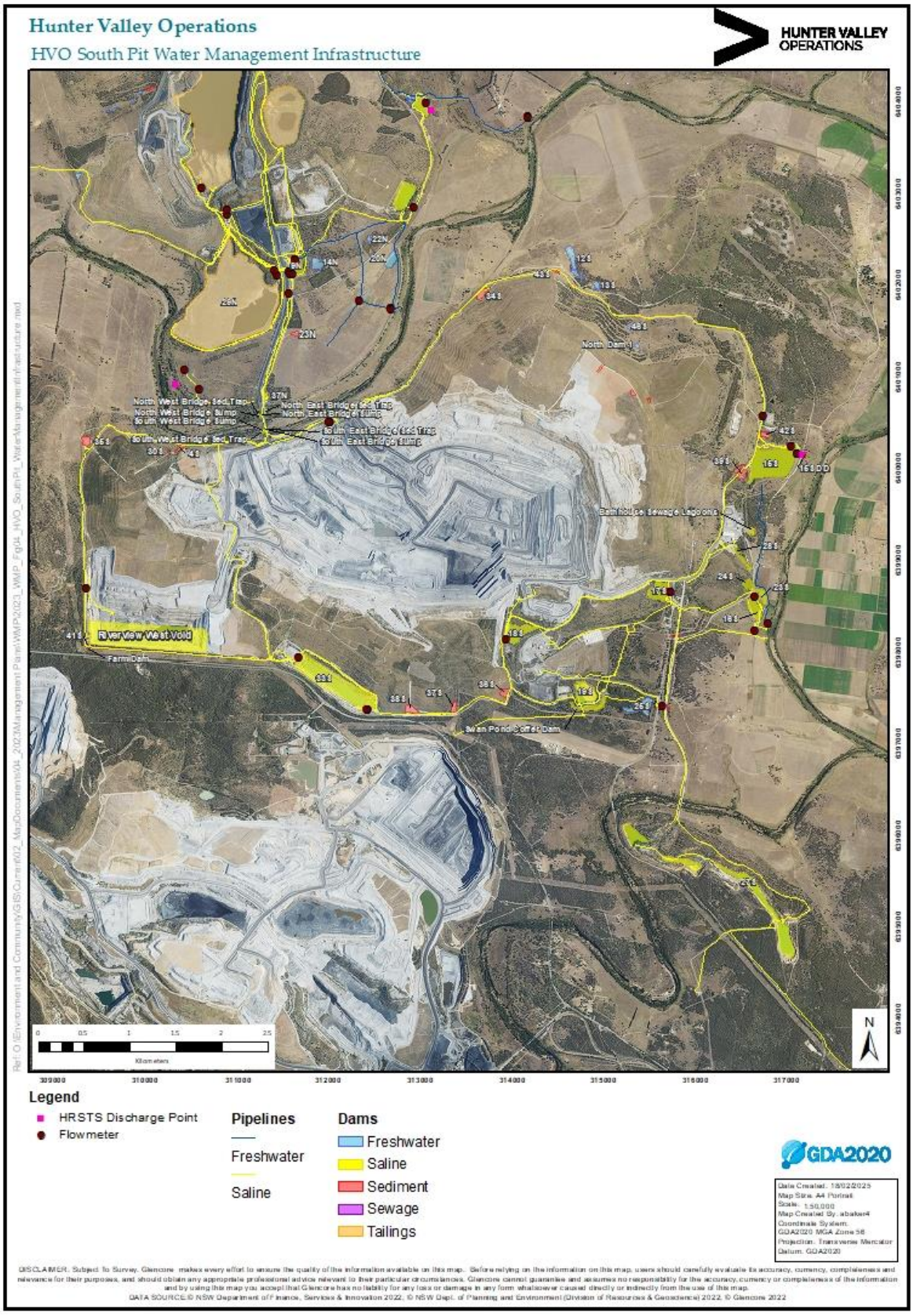

Figure 7-3: South Pit Water Management Infrastructure

7.1 | WATER BALANCE

The 2024 static water balance for HVO is presented in **Table 7-1**.

Table 7-1: 2024 Water Balance

Water Stream	Volume (ML)
Inputs	
Fresh Water (potable)	56 (0.6%)
Fresh Water (Hunter River extraction)	2 (0%)
Groundwater	1,660 (17.8%)
Rainfall Runoff	6,307 (67.6%)
Recycled to CHPP from Tails & Storage (not included in total)	1,266 (13.6%)
Imported (Liddell/Ravensworth (via Cumnock))	4 (0%)
Water from ROM Coal	1,299 (13.9%)
Total Inputs	**9,328**
Outputs	
Dust Suppression	2,101 (29.9%)
Evaporation – Mine Water & Tailings Dams	2,257 (32.1%)
Entrained in Process Waste	682 (9.7%)
Discharged (HRSTS)	80 (1.0%)
Vehicle Wash-down	311 (4.4%)
Sent to Third Party	6 (0.1%)
Miscellaneous Industrial Use	351 (5.0%)
Water in Coarse Reject	396 (5.6%)
Water in Product Coal	853 (12.1%)
Total Outputs	**7,038**
Change in Pit Storage	**2,291 (increase)**

7.1.1 | WATER INPUTS

A total of 645.2 mm of rainfall was recorded at HVO in 2024 producing an estimated 6,307 ML of runoff. Water falling on undisturbed clean water catchments is diverted off site into natural systems where practicable.

Groundwater inflows to the pits are calculated via numerical groundwater modelling methods and were estimated to have contributed 1,660 ML to the site during 2024 (**Table 7-1**). 2 ML of fresh water was extracted from the Hunter River during the reporting period.

7.1.2 | WATER OUTPUTS

The main outputs were water use for dust suppression (2,101 ML), evaporation from dams (2,257 ML), water entrained in process waste (682 ML) and water in product coal (853 ML).

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS) allowing it to discharge from licensed discharge points during declared discharge events, associated with increased flow in the Hunter River. HVO maintains three licensed discharge monitoring locations:

- Dam 11N, located at HVO North, which discharges to Farrell's Creek.
- Lake James, located at HVO South, which discharges to the Hunter River; and
- Parnell's Dam, located at HVO West, which discharges to Parnell's Creek.

80 ML was discharged under the Hunter River Salinity Trading Scheme and Environment Protection Licence 640 during 2024.

7.2 | SURFACE WATER

Surface water monitoring activities continued in 2024 in accordance with the HVO WMP and HVO Surface Water Monitoring Program (SWMP). HVO maintains a network of surface water monitoring sites located on mine site dams, discharge points and surrounding natural watercourses (**Figure 7-4**). Water quality monitoring is undertaken to verify the effectiveness of the water management system onsite, and to identify the emergence of potentially adverse effects on surrounding watercourses. A number of mine water dams are monitored routinely to verify the quality of mine water. This water is used in coal processing, dust suppression, and other day to day activities around the mine.

Surface water monitoring data is reviewed on a quarterly basis. The review involves a comparison of measured pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS) results against internal trigger values which have been derived from the historical data set. The response to measured monitoring levels outside the trigger limits is detailed in the HVO Monthly Environmental Monitoring Reports that can be found on the HVO website.

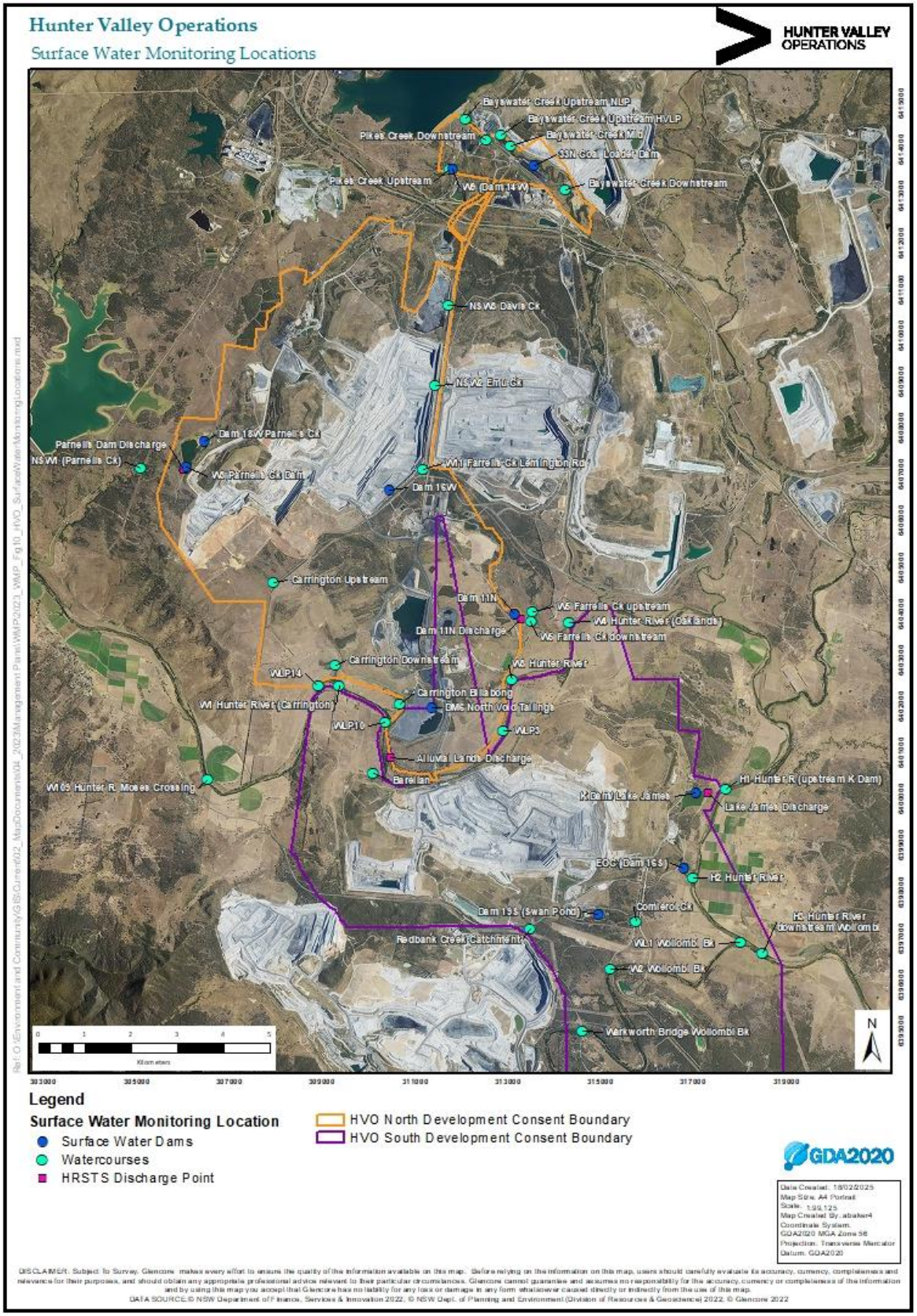

Figure 7-4: Surface Monitoring Locations

7.2.1 | SURFACE WATER MONITORING

Routine surface water monitoring was undertaken in 2024 in accordance with the HVO SWMP. All laboratory analysis of surface water was carried out in accordance with approved methods by a NATA accredited laboratory.

Water quality is evaluated through the parameters of pH, EC and TSS. Pertinent surface water sites are also sampled for comprehensive analysis annually. Long term water quality trends for the Hunter River, Wollombi Brook, other surrounding tributaries, and site dams are also presented in this section. The sampling frequency for ephemeral water sites was modified in 2016, from quarterly to a rain-event trigger system, in an effort to ensure samples taken were more representative of typical water quality for those streams – up to eight sampling events per annum can now be taken under the revised sampling protocol.

All required sampling and analysis was undertaken, except as detailed in **Table 7-2**. Australia and New Zealand Environment and Conservation Council (ANZECC) criteria are shown in the figures for comparative purposes only.

Table 7-2: HVO Water Monitoring Data Recovery for 2024 (By Exception)

Location	Data Recovery (%)	Comments
46S	75%	No access during monitoring event
DM6	75%	No access during monitoring event

7.2.1.1 | HUNTER RIVER

The Hunter River was sampled from eight monitoring locations during 2024. Long term trends for pH, EC and TSS are shown in **Figure 7-5** to Error! Reference source not found..

No exceedances were triggered during 2024

Figure 7-5: Hunter River pH Trends 2017 - 2024

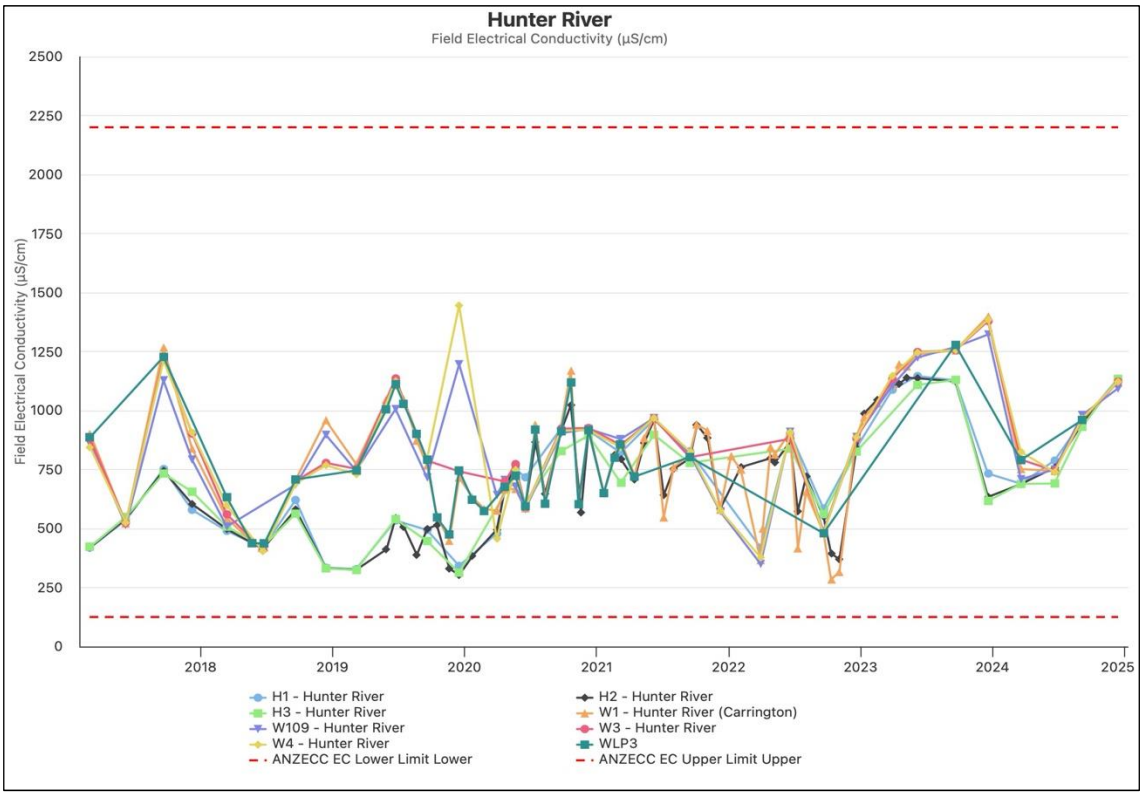

Figure 7-6: Hunter River EC Trends 2017 - 2024

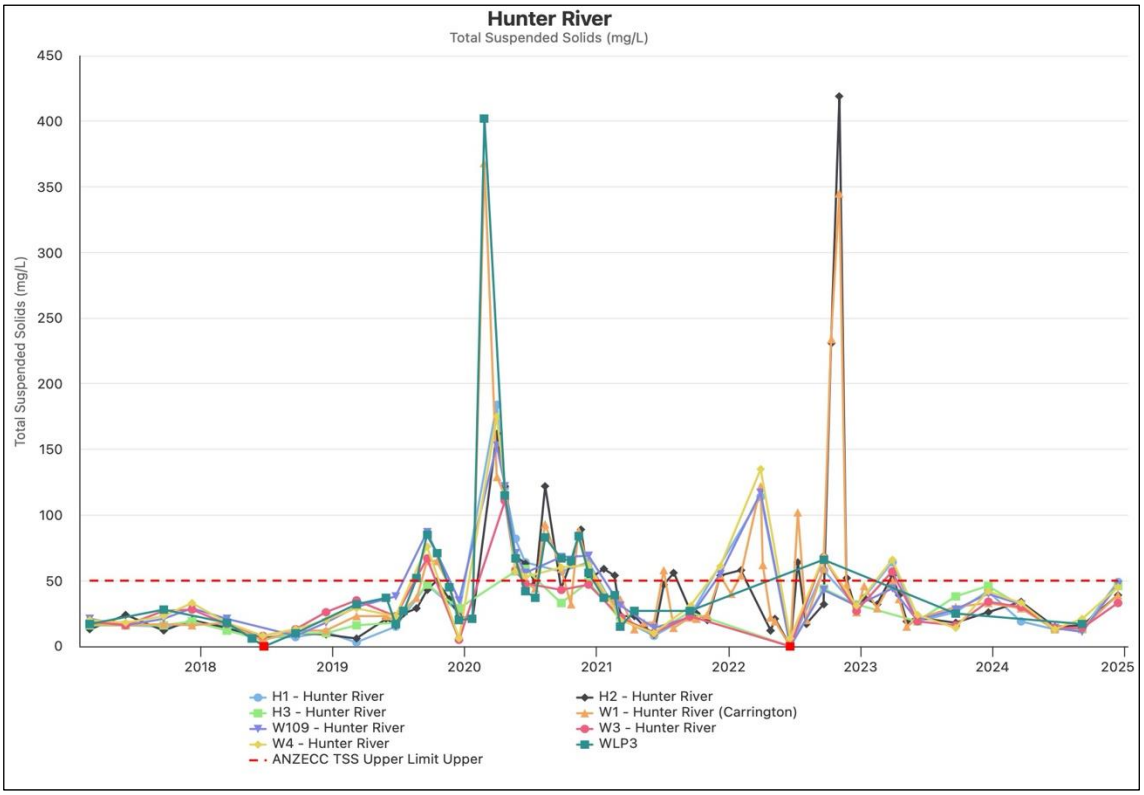

Figure 7-7: Hunter River TSS Trends 2017 - 2024

7.2.1.2 | WOLLOMBI BROOK

Wollombi Brook was sampled from three monitoring locations during 2024. Long term trends for pH, EC and TSS from Wollombi Brook are shown in **Figure 7-8** to **Figure 7-10**. Results were generally consistent with historical trends and acceptable ranges.

Monitoring undertaken 11/03/2024 at Wollombi Brook W2 recorded a TSS level of 160 mg/m^3. The most recent rainfall recorded prior was 15.8mm on 2/03/2024, 9 days prior to sampling. Field observations by the monitoring consultant stated there was no flow and that 'suspended fines' were present. Given the absence of flow, the result indicates either recent disturbance of the pooled water, or dispersive fines that had not settled since the rainfall event 9 days prior. There were no mining related activities in the vicinity of W2 that could have caused the elevated TSS result.

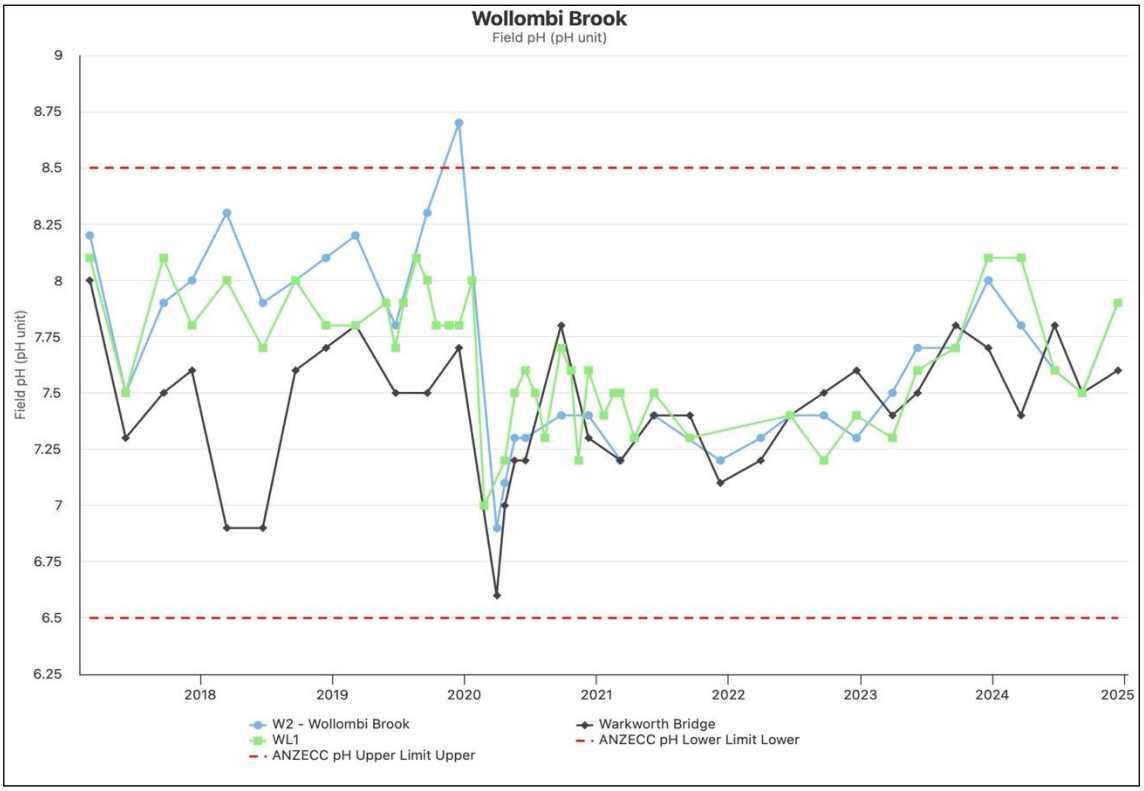

Figure 7-8: Wollombi Brook pH Trends 2017 - 2024

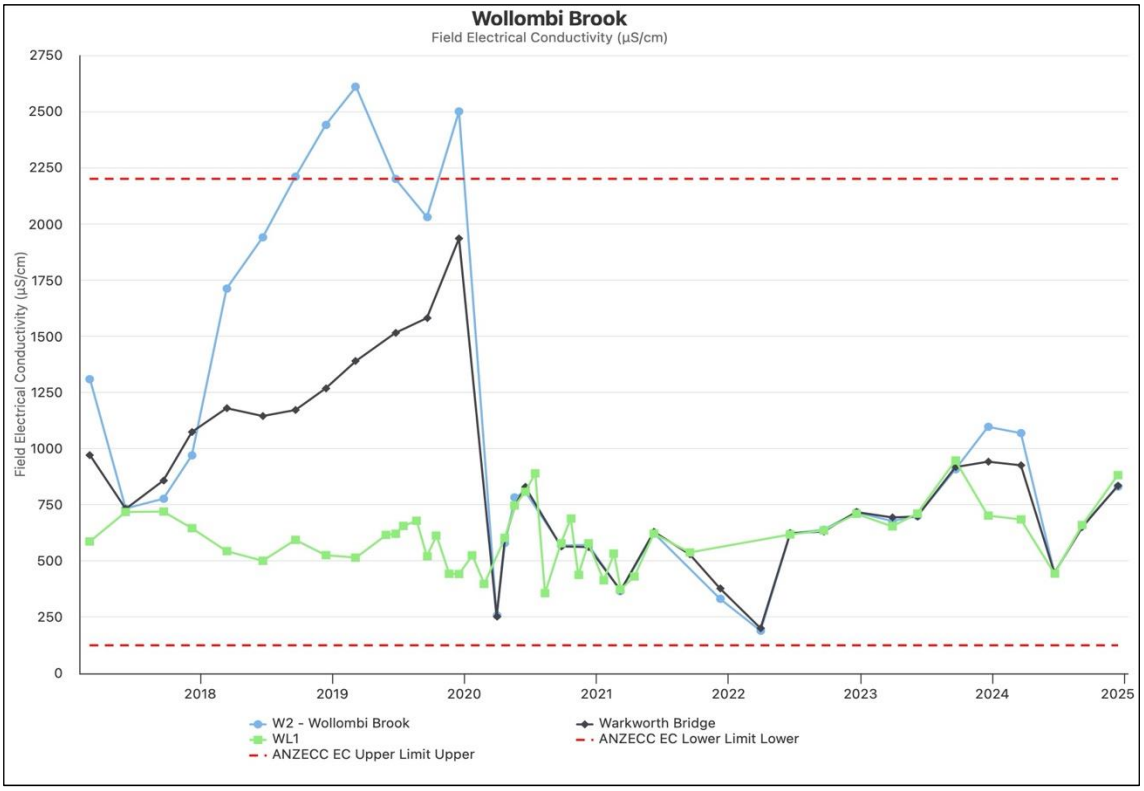

Figure 7-9: Wollombi Brook EC Trends 2017 – 2024

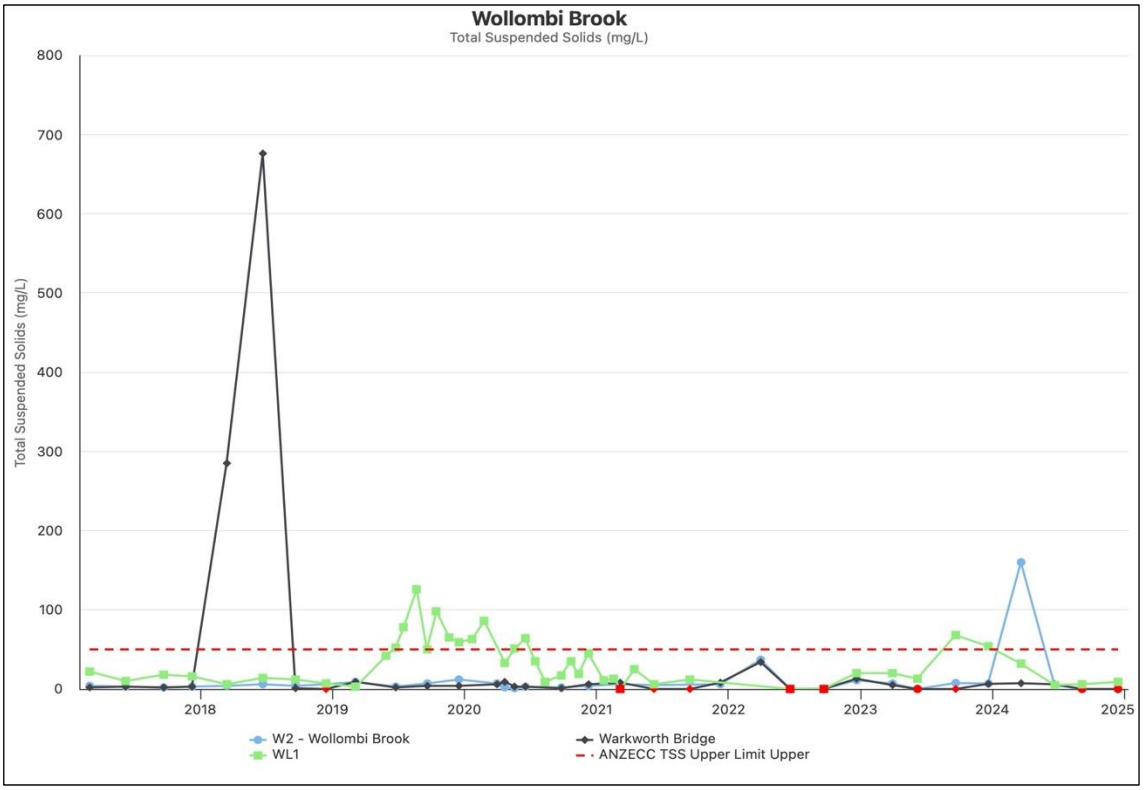

Figure 7-10: Wollombi Brook TSS Trends 2017 - 2024

7.2.1.3 | OTHER SURROUNDING TRIBUTARIES

Rain event-based monitoring of natural tributaries surrounding HVO continued during 2024.

In accordance with the HVO WMP, two rain event sampling rounds were triggered during 2024. These occurred following rainfall greater ≥30mm in a 24-hour period on the days of 05/04/2024 and 01/06/2023. Monitoring during these rain events occurred on the following water courses:

- Comleroi Creek.
- Emu Creek.
- Farrells Creek.
- Pikes Creek (no water running to be sampled).
- Redbank Creek.
- Davis Creek.
- Bayswater Creek; and
- Parnells Creek. (no water running to be sampled).

Long term trends for pH, EC and TSS are shown **Figure 7-11** to **Figure 7-14**. On occasion, some sampling sites recorded results outside of the internal trigger levels however, results for water quality remained generally consistent with historical trends The ephemeral nature of these monitoring locations is the primary reason for the considerable variation in physical water quality.

Trigger tracking results are detailed in **Table 7-3**.

Table 7-3: Other Tributaries Internal Trigger Exceedance Results

Location	Date	Trigger Limit	Action Taken in Response
Bayswater Creek Upstream HPLV	03/06/2024	TSS – 50	First Exceedance of TSS. - Field Observations indicate that the sample was brown in colour and slightly turbid. - Approximately 60mm of rainfall in the seven days prior to exceedance. - Large rain event 2 days prior to exceedance, 39.4mm at Cheshunt and 45.2mm at HVO Corp on 01/06/2024) is considered to have resulted in the elevated reading due to transportation of particulates in rainwater runoff to Bayswater Creek. - No sediment basins overtopped during rain event - The result on 03/6/24 is consistent with the most recent previous elevated TSS result (50 mg/L, 21/12/2023) following significant rain event (30.4mm at Cheshunt and 39mm at HVO Corp between 19/12/2023 and 20/12/2023). Investigation: There were no onsite events identified to indicate that the TSS exceedance was associated with a HVO mining impact. The TSS exceedance appears to be a result of rainfall prior to sampling leading to elevated suspended solids concentrations in broader catchment runoff.
Bayswater Creek Midstream HPLV	03/06/2024	TSS – 50	First Exceedance of TSS. - Field Observations indicate that the sample was brown in colour and slightly turbid. - Approximately 60mm of rainfall in the seven days prior to exceedance. - Large rain event 2 days prior to exceedance, 39.4mm at Cheshunt and 45.2mm at HVO Corp on 01/06/2024) is considered to have resulted in the elevated reading due to transportation of particulates in rainwater runoff to Bayswater Creek. - No sediment basins overtopped during rain event - The result on 03/6/24 is consistent with the most recent previous elevated TSS result (50 mg/L, 21/12/2023) following significant rain event (30.4mm at Cheshunt and 39mm at HVO Corp between 19/12/2023 and 20/12/2023). Investigation: There were no onsite events identified to indicate that the TSS exceedance was associated with a HVO mining impact. The TSS exceedance appears to be a result of rainfall prior to sampling leading to elevated suspended solids concentrations in broader catchment runoff.

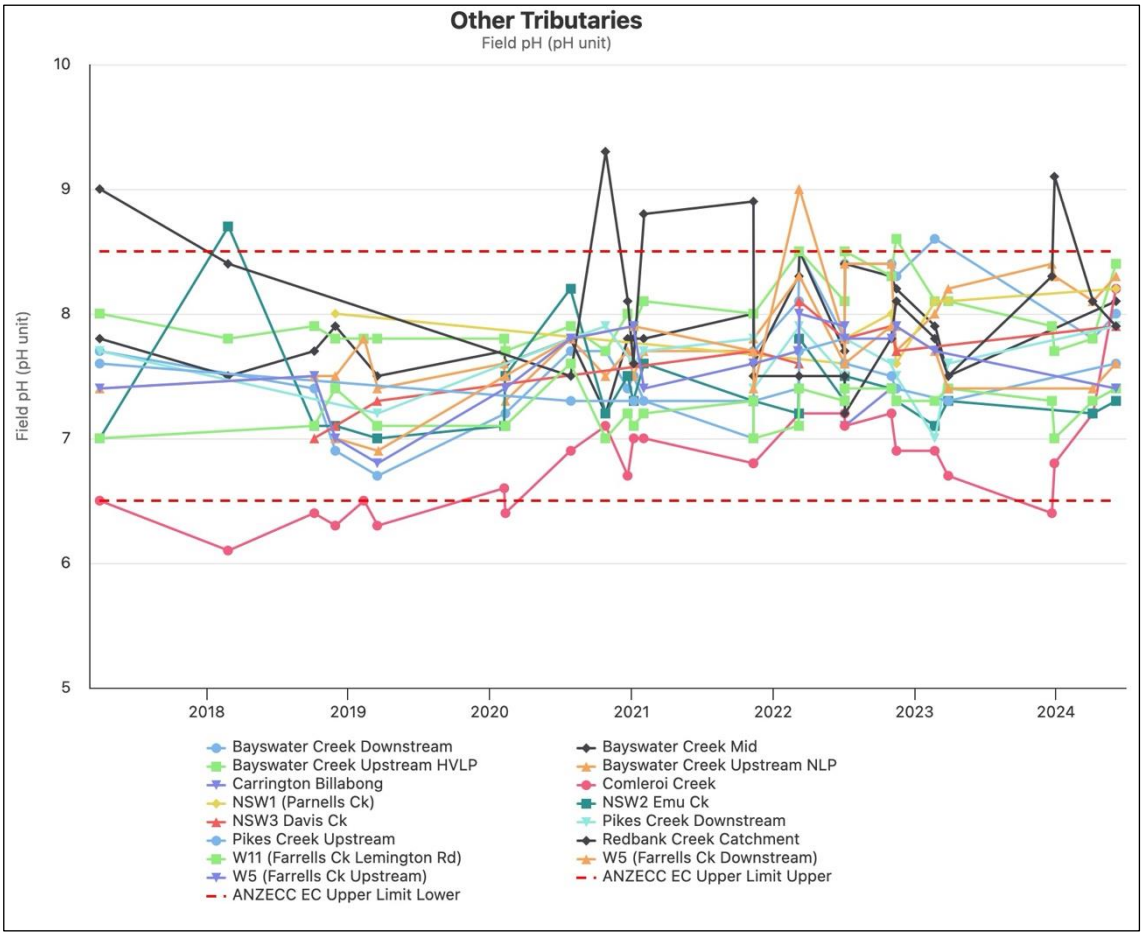

Figure 7-11: Other Tributaries pH Trends 2017 - 2024

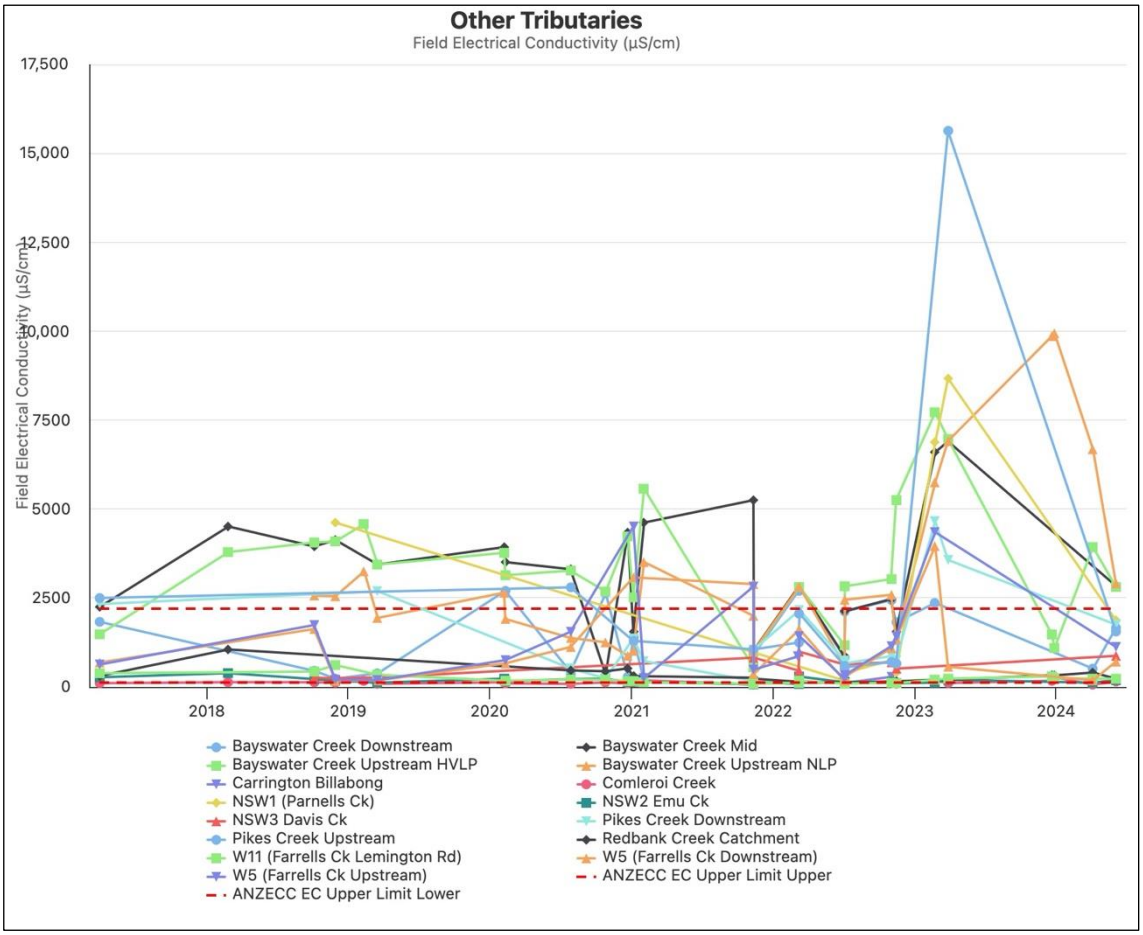

Figure 7-12: Other Tributaries EC Trends 2017 - 2024

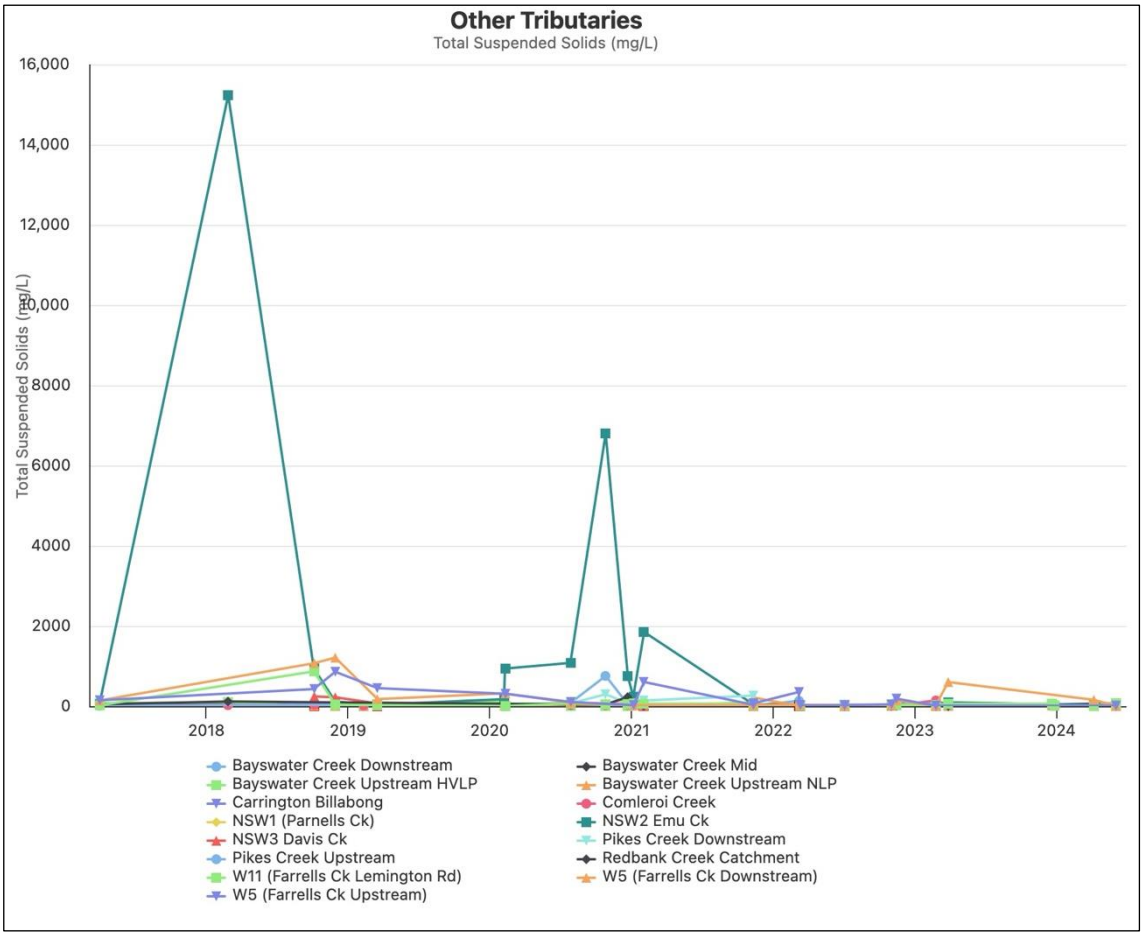

Figure 7-13: Other Tributaries TSS Trends 2017 – 2024

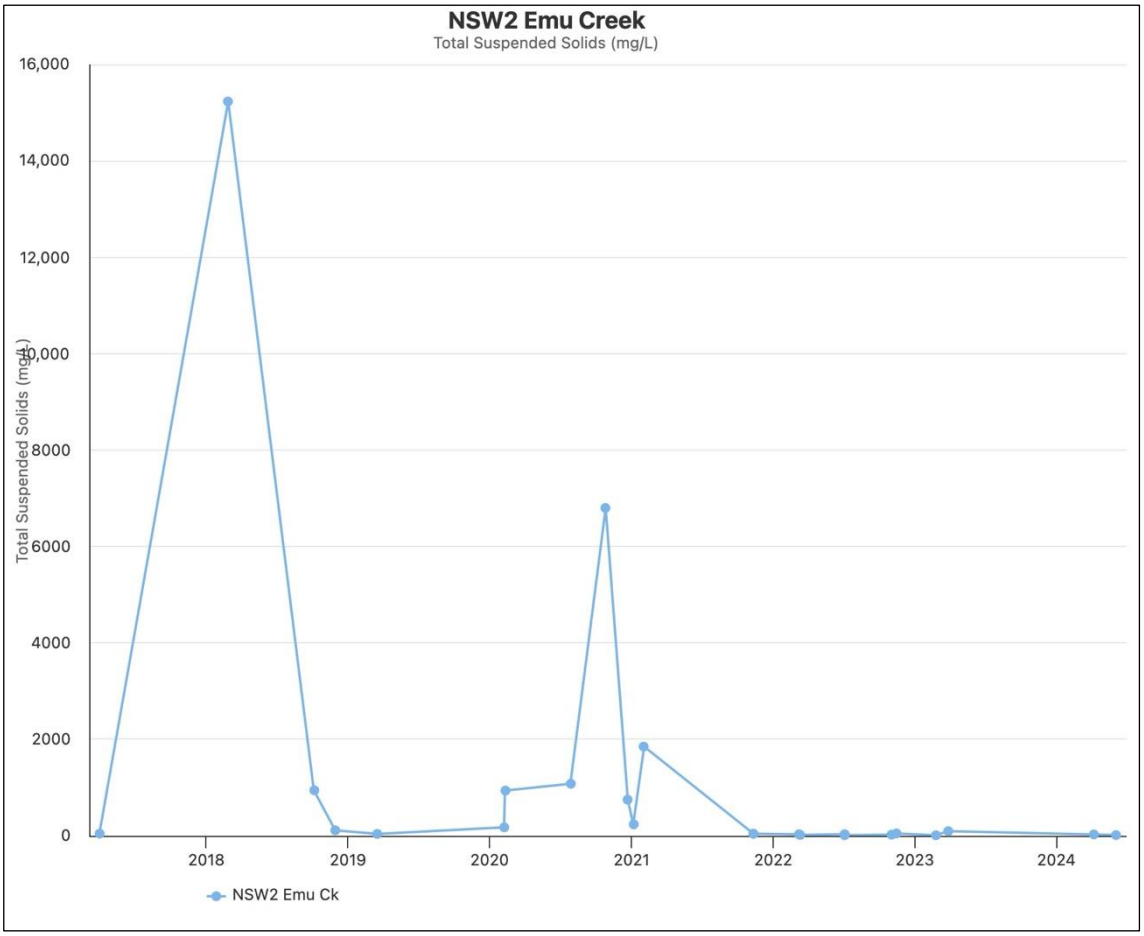

Figure 7-14: NSW2 Emu Creek TSS Trends 2017-2024

7.2.1.4 | HVO SITE DAMS

During 2024 monitoring was completed at across 10 onsite dams. Long term trends for pH, EC and TSS are shown in **Figure 7-15** to **Figure 7-17**. HVO's onsite dams do not have impact assessment criteria. Results for water quality remained generally consistent with historical water quality trends.

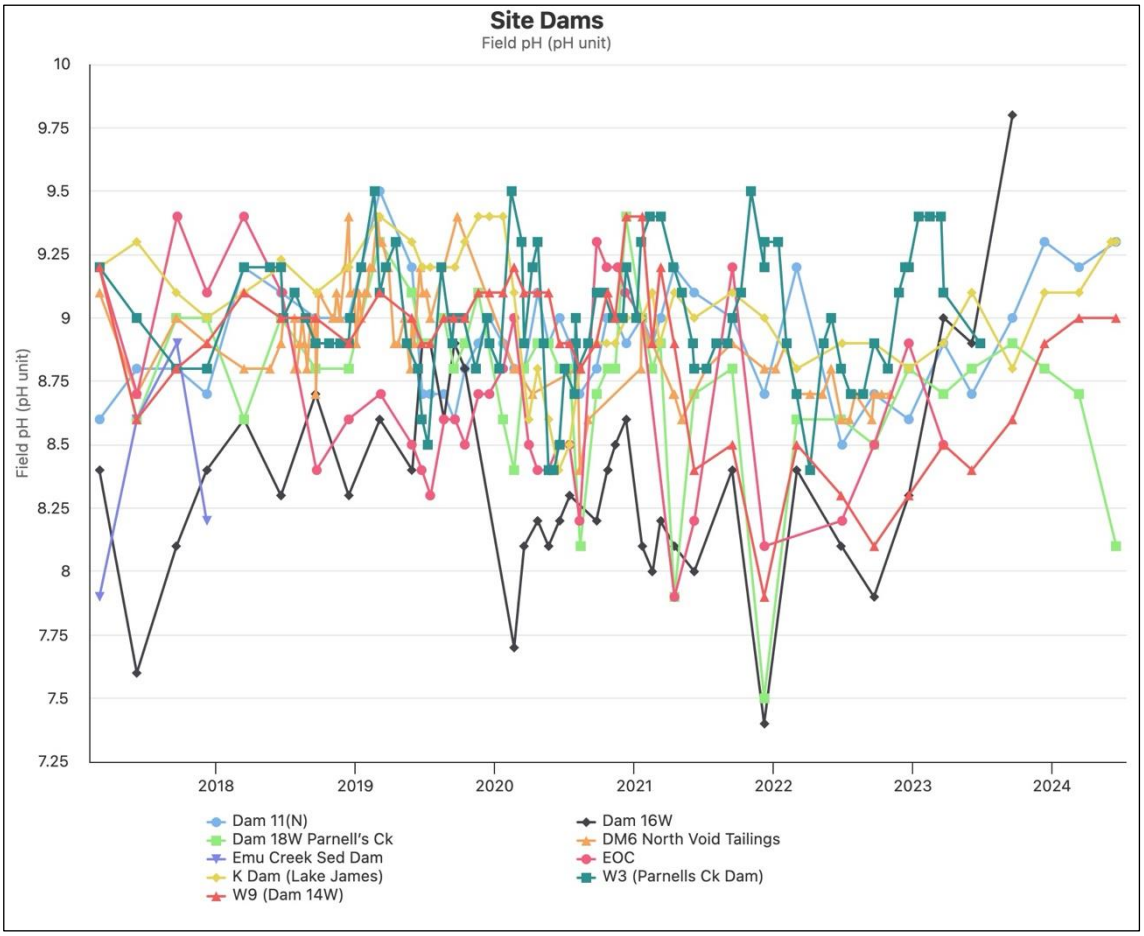

Figure 7-15: HVO Site Dams pH Trends 2017 - 2024

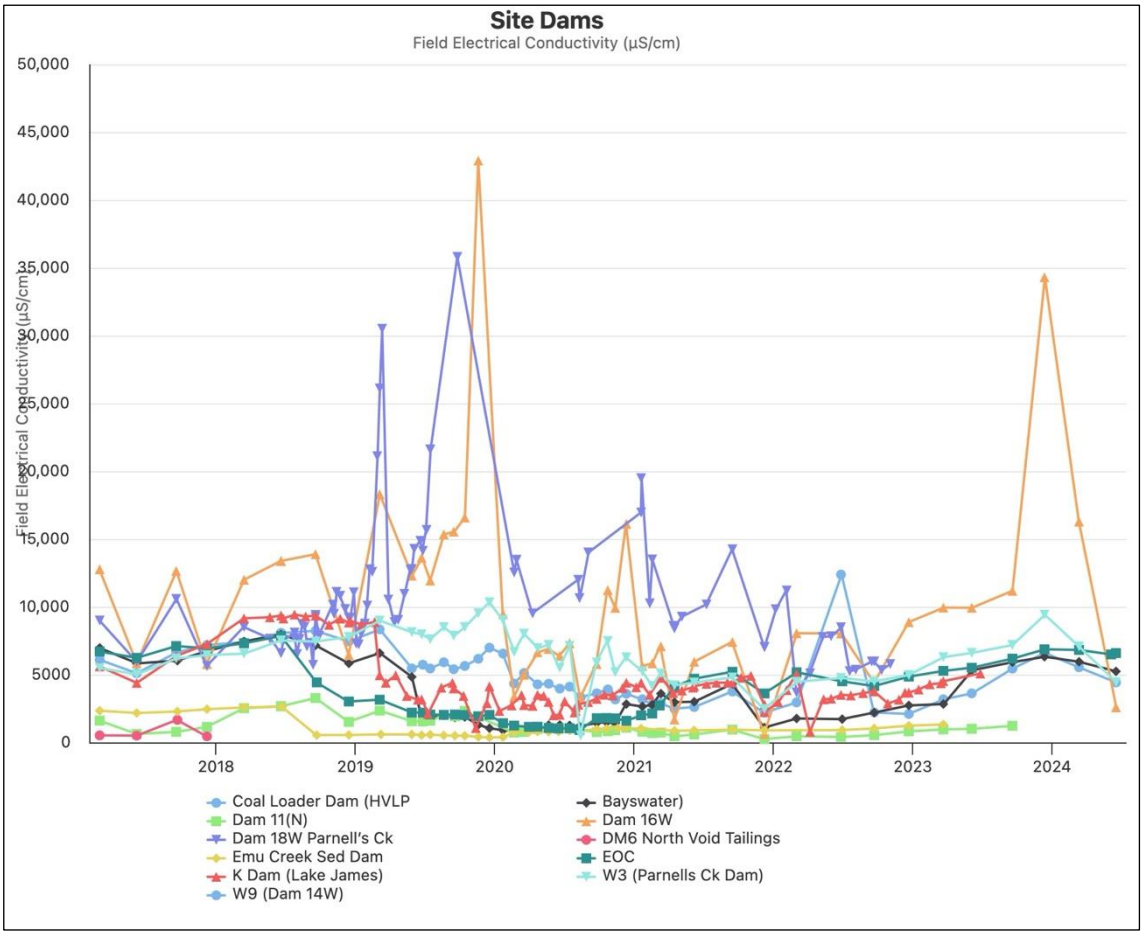

Figure 7-16: HVO Site Dams EC Trends 2017 – 2024

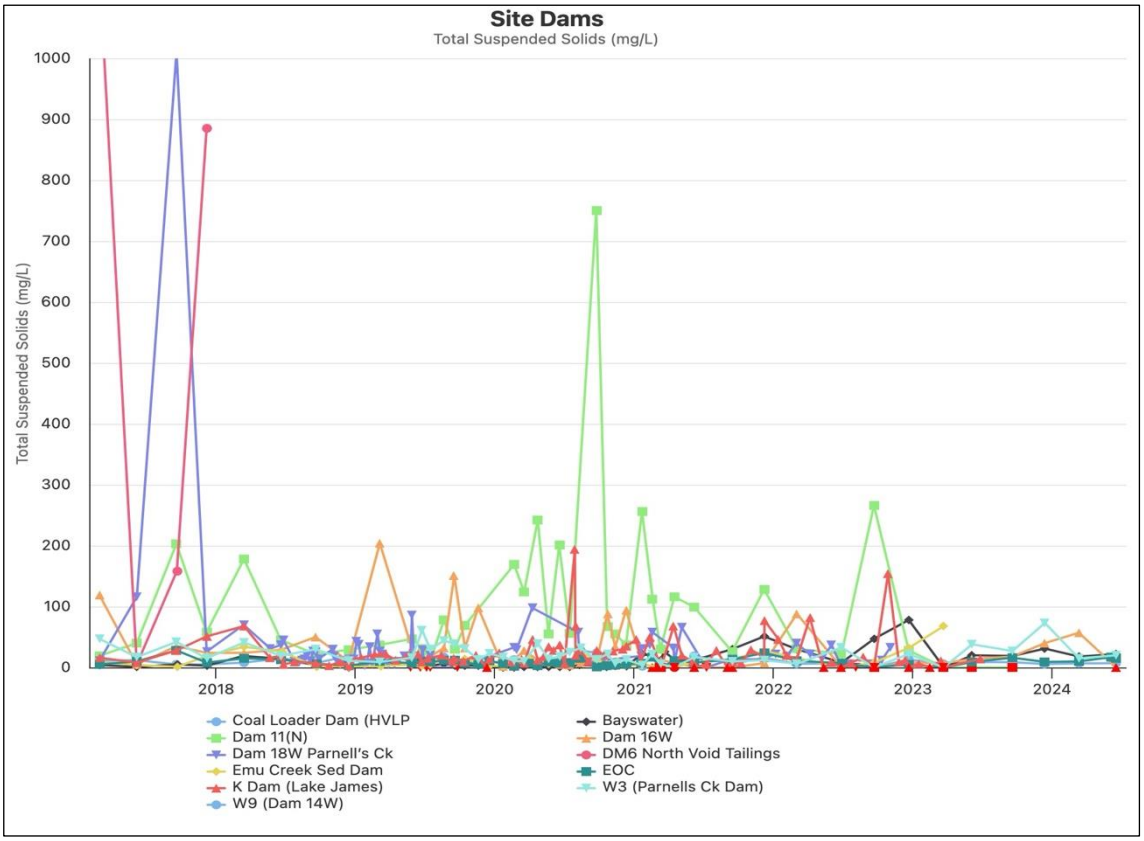

Figure 7-17: HVO Site Dams TSS Trends 2017 - 2024

7.3 | COMPARISON WITH EIS PREDICTIONS

7.3.1 | SOUTH PIT EIS PREDICTIONS

The South Pit EIS estimated an 'instantaneous' water quality for Electrical Conductivity of 5,700 µS/cm as an upper limit. Instantaneous water quality is a simple estimate obtained by dividing the total salt available by the maximum amount of possible void water. Electrical Conductivity measurements at Lake James averaged 6,664 µS/cm during 2024, are slightly elevated compared to predicted EC levels.

The South Pit EIS estimated average runoff water quality from undisturbed catchments to be 400 mg/L for TSS and 615 µS/cm for EC. Comleroi Creek, south of Cheshunt Pit, was sampled twice during rainfall events in 2024 resulting in average TSS of 14 mg/L and average EC of 218 µS/cm, demonstrating that runoff water from undisturbed catchments in the HVO South area is of better quality than that which was predicted in the EIS.

7.3.2 | CARRINGTON PIT EIS PREDICTIONS

The long term mine water quality for Carrington is discussed in the Carrington Mine Environmental Impact Statement (ERM 1999). The EIS estimated an “instantaneous” water quality for Electrical Conductivity of 7,050 µS/cm.

Dewatering from Carrington is a mixture of surface runoff from overburden emplacements, coal mining areas and seepage from the coal seams and alluvium. Water is directed to Dam 9N and into Dam 11N. The average EC and TSS in Dam 11N during 2024 was 5,648 µS/cm and 17.3 mg/L respectively and is considered broadly representative of mine water quality for Carrington.

The Carrington EIS states that runoff from undisturbed catchments within the Carrington Pit will be directed around the mine via contour banks or surface drains to discharge where possible into natural creeks. The salinity of the runoff water was predicted to be approximately 615 µS/cm. Runoff from rehabilitated lands was initially predicted to have higher TSS, with levels approaching pre-mining conditions after several years. Carrington Billabong (where water quality would be measured for this comparison) did not have any EC results during the 2024 rain event monitoring rounds, as the area was recorded as dry on all occasions.

7.3.3 | WEST PIT EIS PREDICTIONS

The West Pit EIS included the data in **Table 7-4** as representative of water quality in the local catchment area. During the review period Emu Creek (NSW2) recorded an average pH of 7.2 and an average EC of 314 µS/cm, both lower than the predicted results of **Table 42**. The pH and EC at Farrells Creek (combined upstream and downstream monitoring sites) averaged 7.5 and 675 µS/cm respectively during the review period, were also lower than EIS predictions. The average pH and EC for Davis Creek (NSW3) were 7.9 and 874 µS/cm respectively during the review period, equal to and slightly lower than EIS predictions. Parnell’s Dam measured an average EC of 5,912 µS/cm in 2024, within the prediction.

Table 7-4: Representative Water Quality for West Pit

Watercourse	pH (pH Units)	EC (µS/cm)
Davis Creek	7.7 to 8.4	767 to +8,000
Emu Creek	7.5 to 8.8	365 to +1,000
Farrells Creek	7.0 to 9.2	195 to +12,000
Mine Water (Parnell's Dam)	-	2,400 to 6,300

7.4 | PERFORMANCE RELATING TO HRSTS DISCHARGES

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing it to discharge to the Hunter River via three licensed discharge points, including Dam 11N, Dam 15S (Lake James) and Dam 9W (Parnells Dam). Discharges can only take place subject to the scheme's regulations.

As required by the EPL, HVO submitted a discharge report for the 2023/24 financial year. A total of 79.7ML of water discharged during 2024 in accordance with the HRSTS.

7.5 | GROUNDWATER

7.5.1 | GROUNDWATER MANAGEMENT

Groundwater monitoring activities were undertaken in 2024 in accordance with the HVO WMP and Groundwater Monitoring Programme. The monitoring results are used to establish and monitor trends in physical and geochemical parameters of surrounding groundwater potentially influenced by mining.

The groundwater monitoring programme at HVO measures the quality of groundwater against background data, EIS predictions and historical trends. Ground water quality is evaluated through the parameters of pH, EC, and Standing Water Level (SWL) (measured as elevation in metres with respect to the Australian Height Datum, mAHD). On a periodic basis (nominally once per annum) a comprehensive suite of analytes are measured, including major anions, cations and metals. Prior to sampling for comprehensive analysis, bore purging is undertaken to ensure a representative sample is collected.

Groundwater monitoring data is reviewed regularly for trigger exceedances and analysed in detail on a quarterly basis. The review involves a comparison of measured results against internal trigger values which have been derived from the historical data set. Trigger limits are calculated as the 95th percentile maximum value (EC and pH) and the 5th percentile minimum value (pH only) from data collected since 2011. Trigger levels have been set on the basis of geographical proximity and target stratigraphy. Bores that record as dry and bores of unknown seam have not been included in calculation of the trigger limits. The response to measured data outside the trigger limits is detailed in the HVO Water Management Plan. Where investigations and subsequent actions have been undertaken following review of monitoring data, these are detailed in this section. Monitoring locations are shown in **Figure 7-18**.

The Annual Groundwater Impacts Review conducted during 2024 is provided in **Appendix B:.**

7.5.2 | GROUNDWATER PERFORMANCE

Sampling of groundwater was carried out in accordance with the HVO Groundwater Monitoring Programme. Where laboratory analysis was undertaken, this was performed by a NATA accredited laboratory. Sites with a data capture rate of less than 100 per cent are outlined in **Table 7-5**. Data recovery presented in this table has been calculated based on the number of times the sampling location was able to be accessed and at least one sampling parameter was able to be collected. Detailed data capture by sampling parameters is provided in **Appendix B:.**

Table 7-5: HVO Groundwater Monitoring Data Recovery for 2024 (By Exception)

Location	Data Recovery	Comments
BZ4A(2)	50%	Insufficient water to sample
C122(BFS)	50%	Unable to sample due to wildlife
CGW45	0%	Blocked, unable to sample
GW-101	50%	Dry, unable to sample
GW-107	50%	Dry, unable to sample
GW-108	50%	Blocked, unable to sample
NPz3	0%	Bore collapsed
NPz5	0%	Mined through
4051C	50%	Blocked, unable to sample
4116P	0%	Blocked, during Q2 sampling round, now remediated
B425(WDH)	50%	Insufficient water to sample
C122(BFS)	50%	Insufficient water to sample
CGW45	0%	Blocked, unable to sample
D510(AFS)	0%	Blocked, unable to sample
D612(AFS)	50%	Insufficient water to sample
GW-101	50%	Dry, insufficient water to sample
GW-107	50%	Dry, insufficient water to sample
GW-108	0%	Blocked, unable to sample
NPz3	0%	Bore collapsed
NPz5	0%	Mined through
4051C	50%	Blocked, unable to sample
C122(BFS)	50%	Insufficient water to sample
CGW45	0%	Blocked, unable to sample
CGW45	0%	No access
GW-101	50%	Dry, insufficient water to sample
GW-107	50%	Dry, insufficient water to sample
GW-108	0%	Blocked, unable to sample

Location	Data Recovery	Comments
NPz3	0%	Bore collapsed
NPz5	0%	Mined through
BUNC45A	50%	HVO requested that a sample not to be collected in Q4
BZ4A(2)	50%	Insufficient water to sample in Q2 and Q4
BZ8-2	75%	No access in Q4
CGW45	0%	Blocked
D612 (AFS)	50%	Dry Q1 to Q4
GW-101	50%	Dry Q1 to Q4
GW-107	50%	Dry Q1 to Q4
GW-108	50%	Blocked, unable to sample Q1 to Q4
NPz3	0%	Bore Collapsed
NPz5	0%	Mined through, no longer exists
GW-103	0%	All sensors failed in 2020
GW-105 (V3)	0%	Sensor failed in 2020
GW-110	0%	Calibration data unavailable

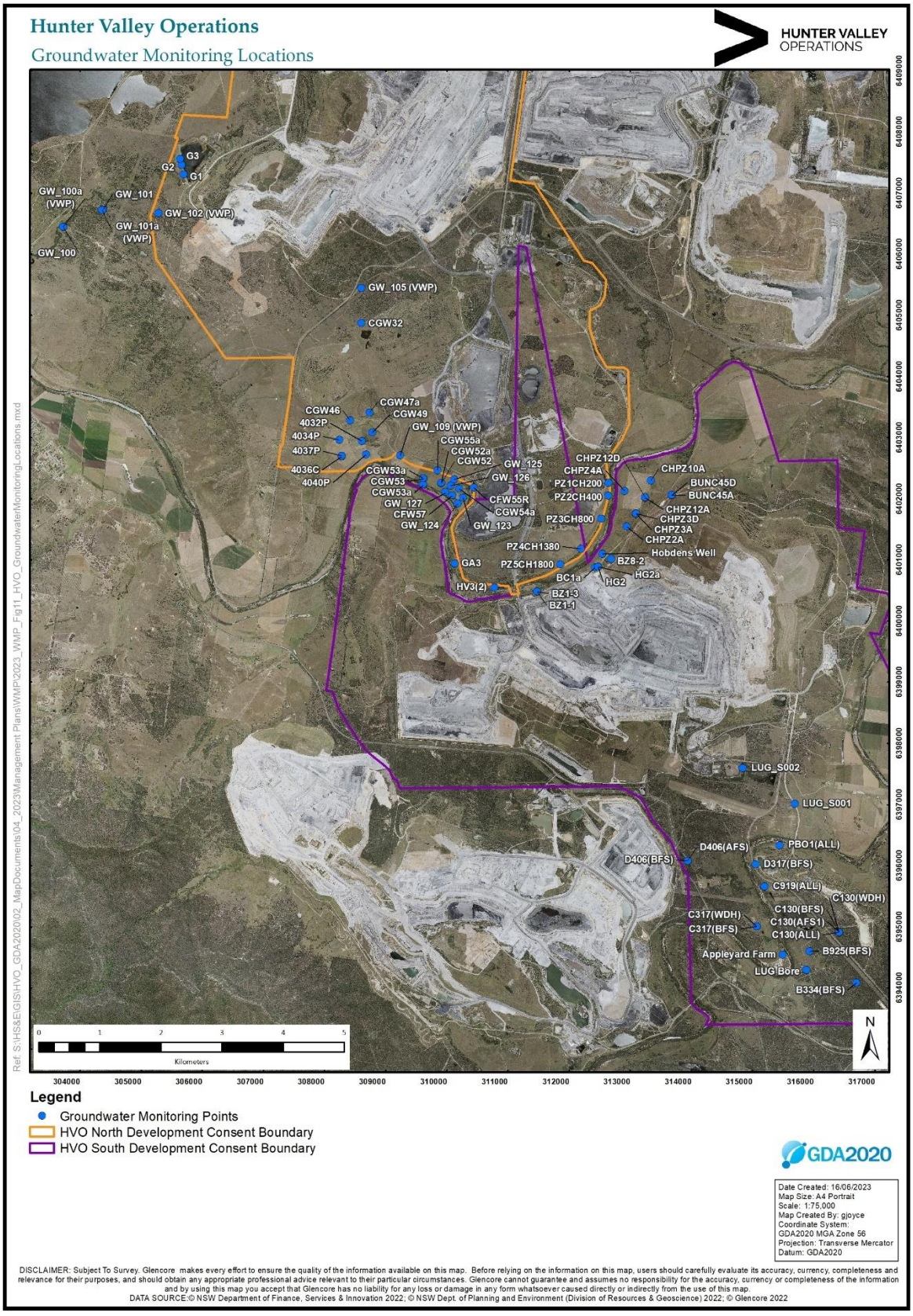

Figure 7-18: Groundwater Monitoring Network at HVO

7.5.3 | GROUNDWATER MONITORING SUMMARY

The following section presents groundwater monitoring data in relation to the geographic locations and target stratigraphy for groundwater monitoring bores.

Each location is discussed, and a summary of monitoring data presented. Where monitoring results required further investigation, these results are summarised. A trigger is considered to be exceeded when levels are outside of the internal statistical trigger limit for three (3) consecutive monitoring events. A detailed Annual Groundwater Review is provided in **Appendix B:.**

7.5.4 | CARRINGTON BROONIE

The EC, pH and SWL trends for 2017 to 2024 for Carrington Broonie Seam groundwater bores are shown in **Figure 7-19** to **Figure 7-21** respectively. Water quality results were generally consistent with historical ranges with some minor variation noted with pH and SWL results. These levels were considered to be consistent with historical concentrations, with no adverse impacts identified.

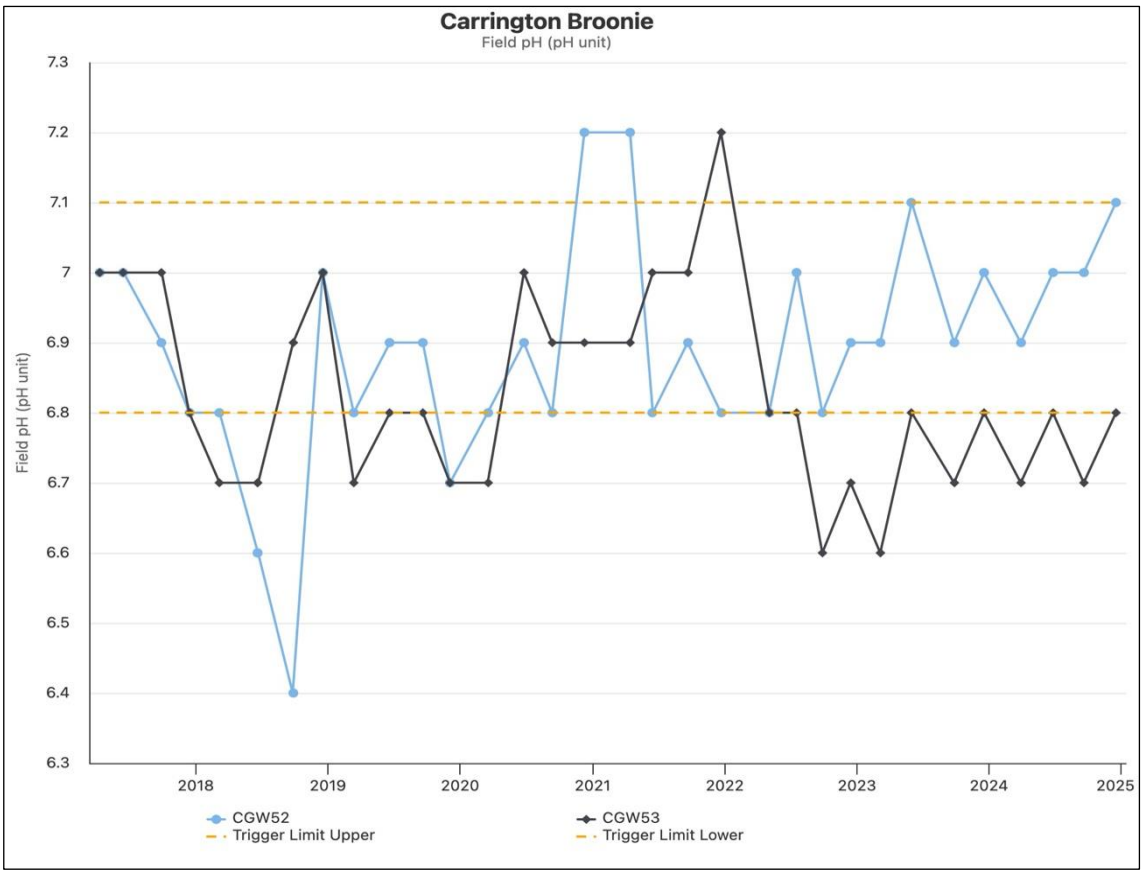

Figure 7-19: Carrington Broonie Groundwater pH Trends 2017 - 2024

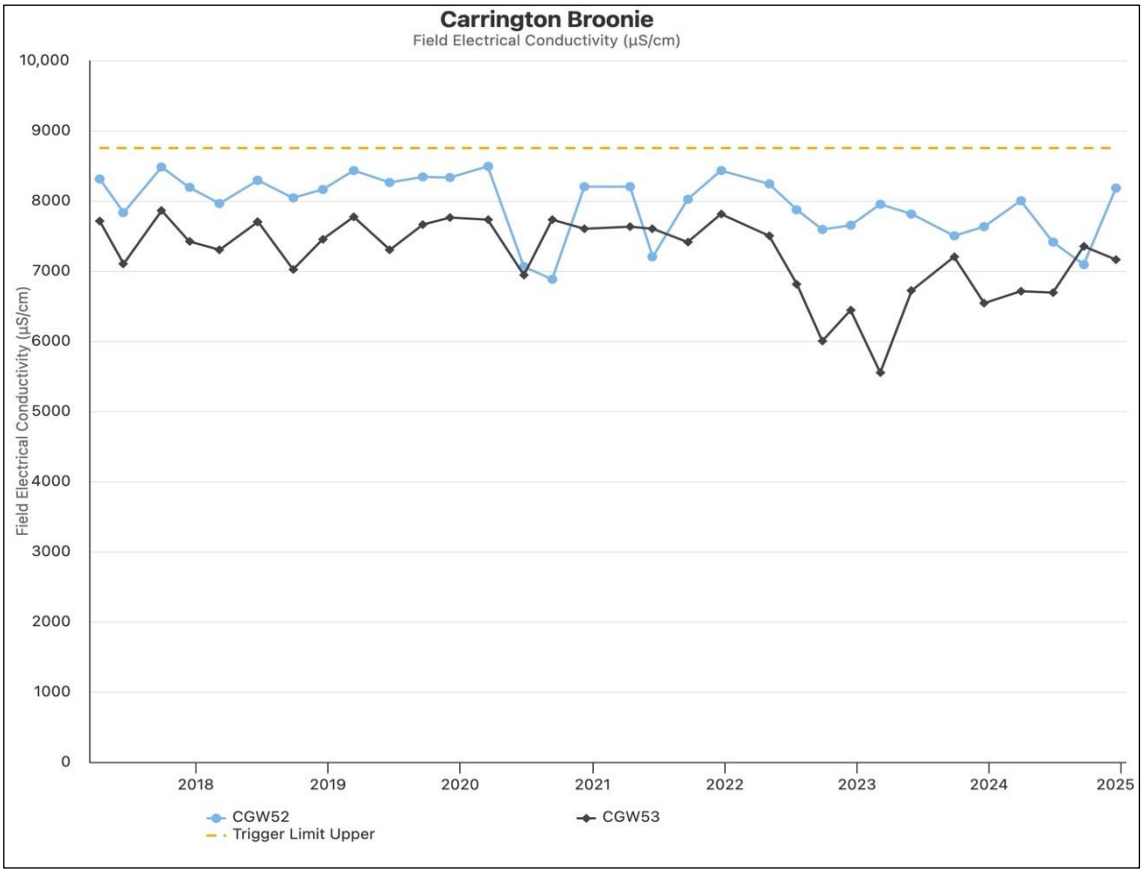

Figure 7-20: Carrington Broonie Groundwater EC Trends 2017 - 2024

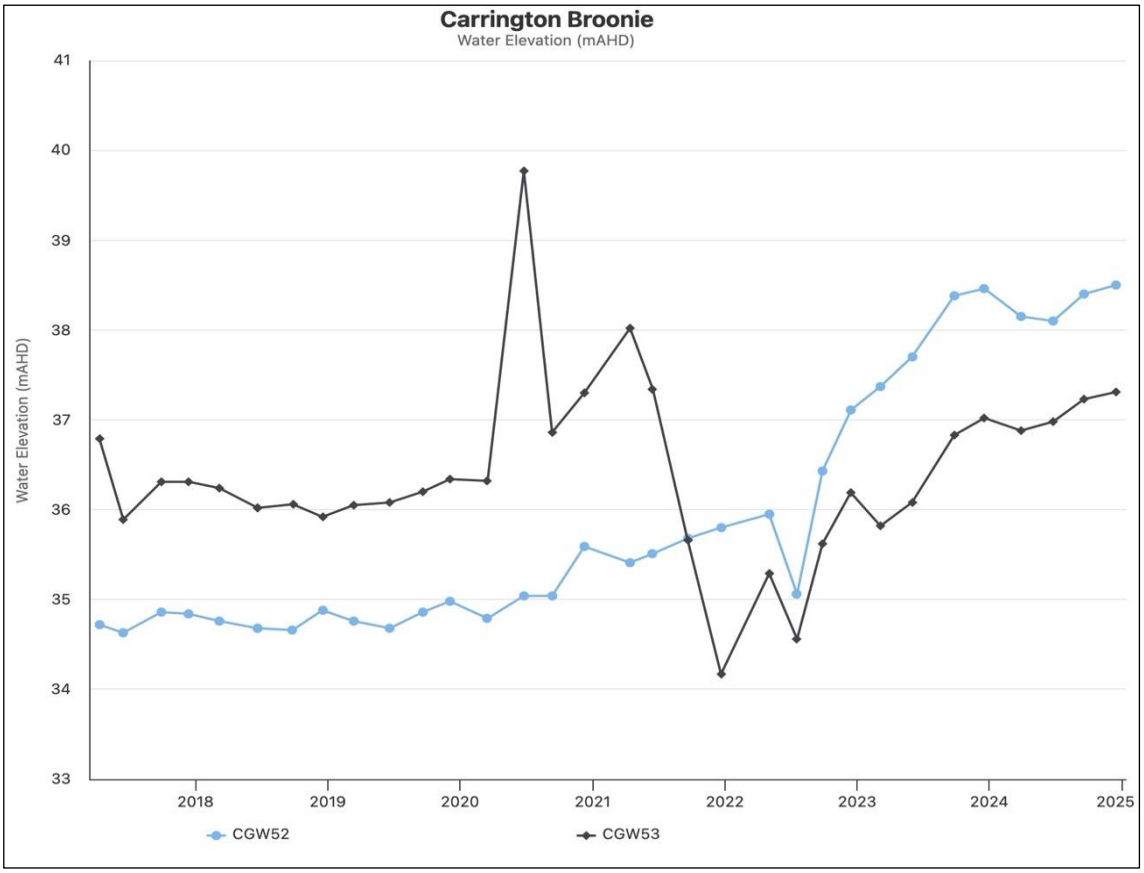

Figure 7-21: Carrington Broonie Groundwater SWL Trends 2017 - 2024

7.5.5 | CARRINGTON ALLUVIUM

The EC, pH and SWL trends for 2017 to 2024 for Carrington Alluvium groundwater bores are shown in **Figure 7-22** to **Figure 7-24**. Water quality results were generally consistent with historical trends.

New triggers have been developed following an expert review of the groundwater network and better represent current conditions and monitoring in the area. These have been included in the revised Water Management Plan pending approval. Monitoring results are assessed against these new triggers as part of the North Void Tailings Storage Facility (NV TSF) Pollution Reduction Programme monitoring and reporting requirements via the Environmental Protection Licence. The current EC trigger is considered not to be representative of historical (pre-mining) conditions or adequate to assess improving water quality following seepage from the NV TSF.

HVO continued to mitigate potential impacts of seepage from the NV TSF. This included no deposition of tailings to the TSF and decanting of surface water to allow the tailings to dry and consolidate. Monitoring of the area continues at an increased frequency including data collection from continuous groundwater loggers measuring water level and quality. EC and pH have stabilised and standing water level has declined; this is an indication that current controls are being effective.

As part of a Pollution Reduction Programme, works in 2024 included ongoing assessment of effectiveness for a low permeability barrier wall to be constructed between the TSF and the alluvium.

Trigger exceedances in the Carrington Alluvium are detailed in **Table 6.2** of **Appendix B:**

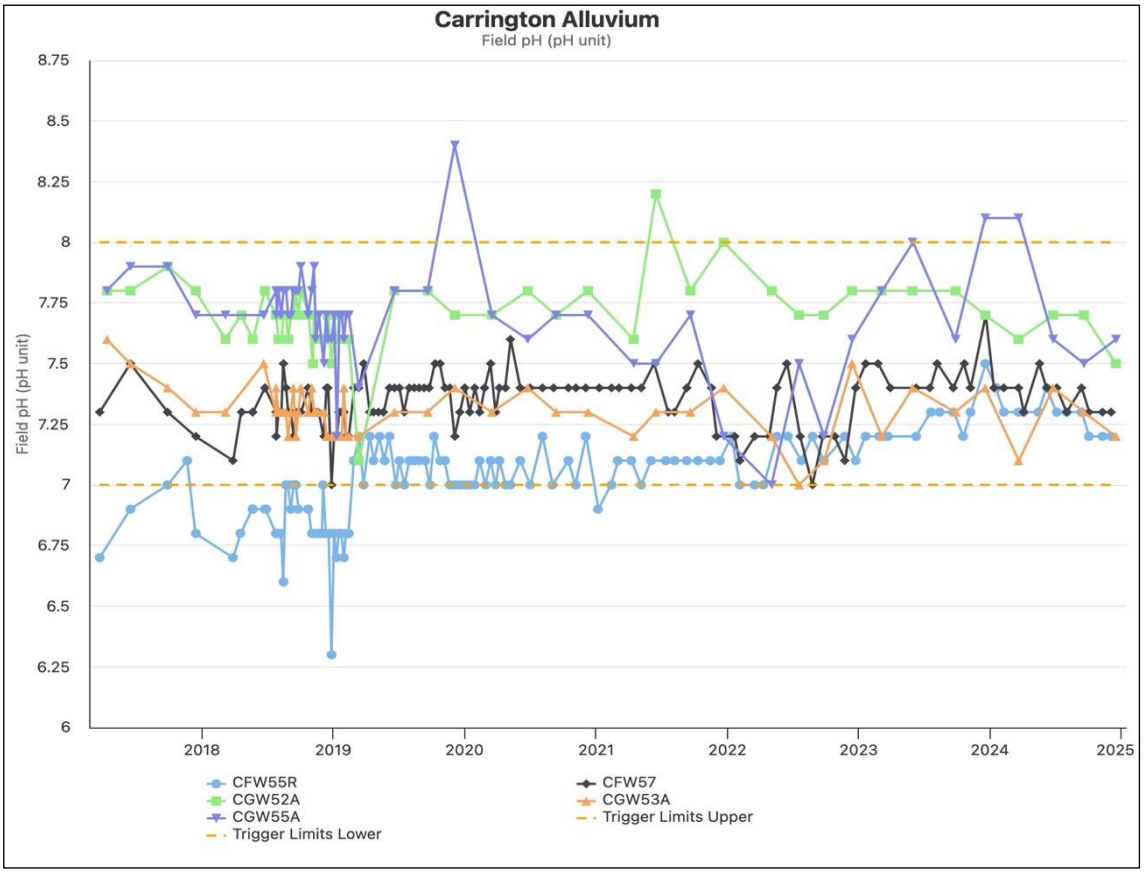

Figure 7-22: Carrington Alluvium Groundwater pH Trends 2017 - 2024

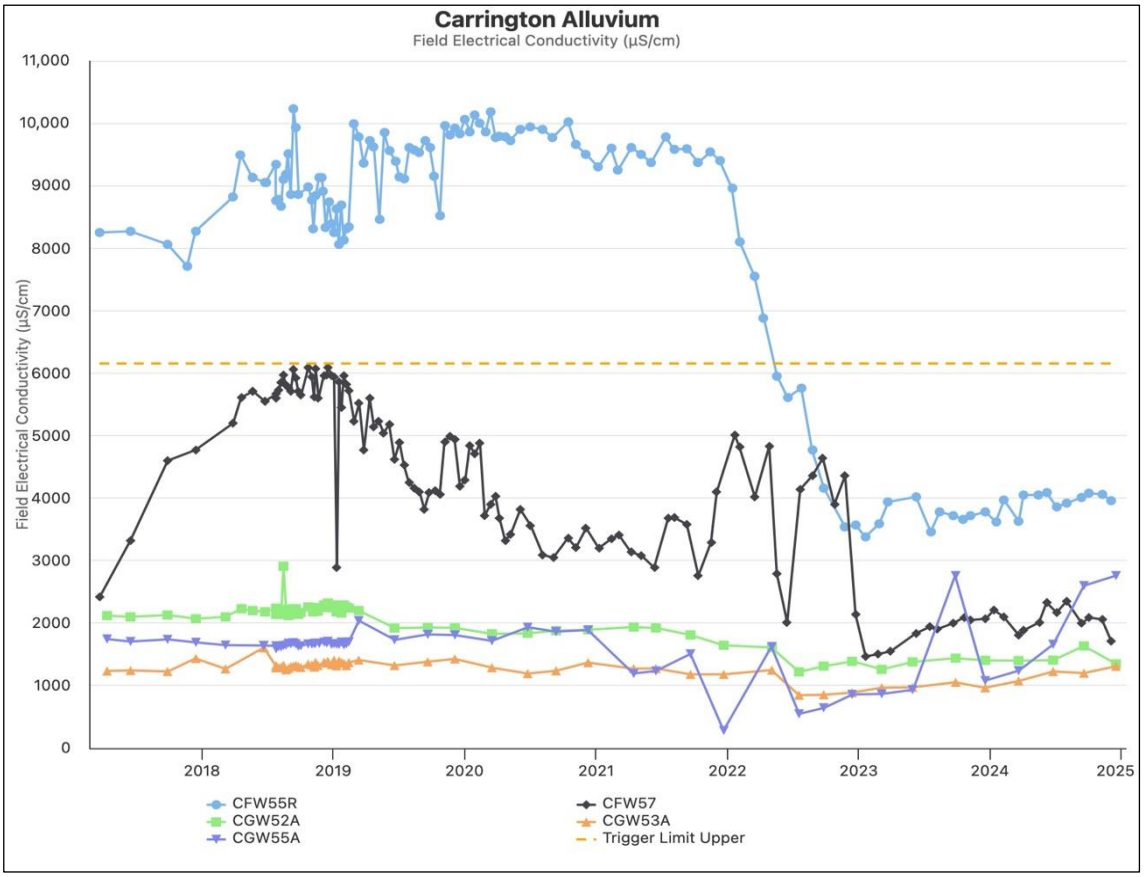

Figure 7-23: Carrington Alluvium Groundwater EC Trends 2017-2024

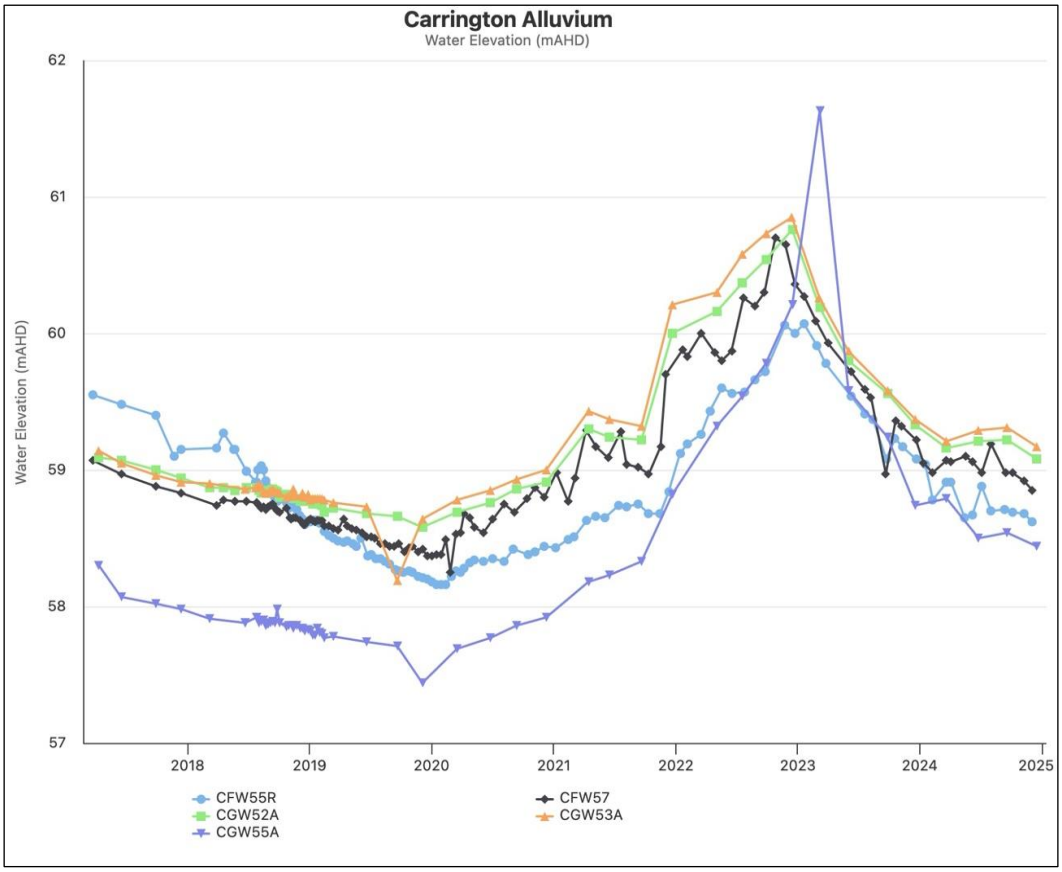

Figure 7-24: Carrington Alluvium Groundwater SWL Trends 2017 - 2024

7.5.6 | CARRINGTON INTERBURDEN

The EC, pH and SWL trends for 2017 to 2024 for groundwater bores in the Carrington Interburden are shown in **Figure 7-25** to **Figure 7-27** respectively. Water quality results were generally consistent with historical trends aside from CGW51a pH. There have been 11 consecutive readings above the pH trigger level at CGW51a since September 2022 – refer to **Table 6.2** of **Appendix B:**

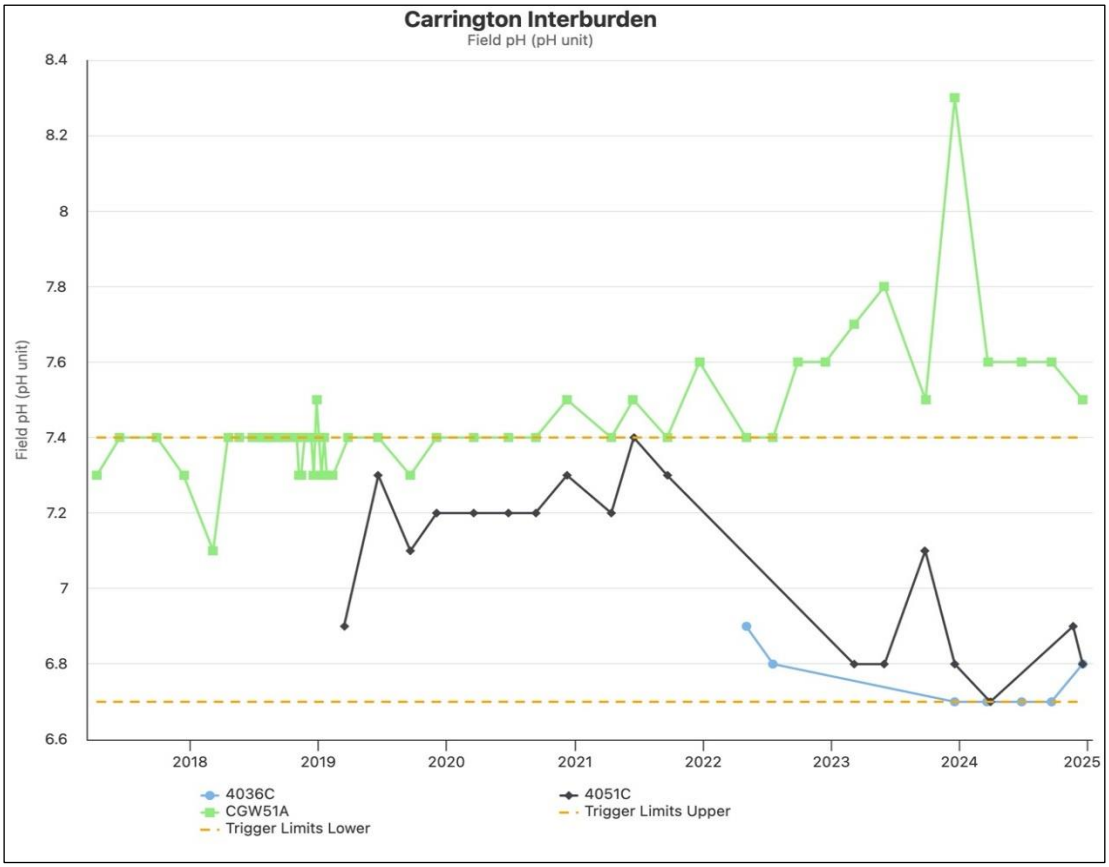

Figure 7-25: Carrington Interburden Groundwater pH Trends 2017 – 2024

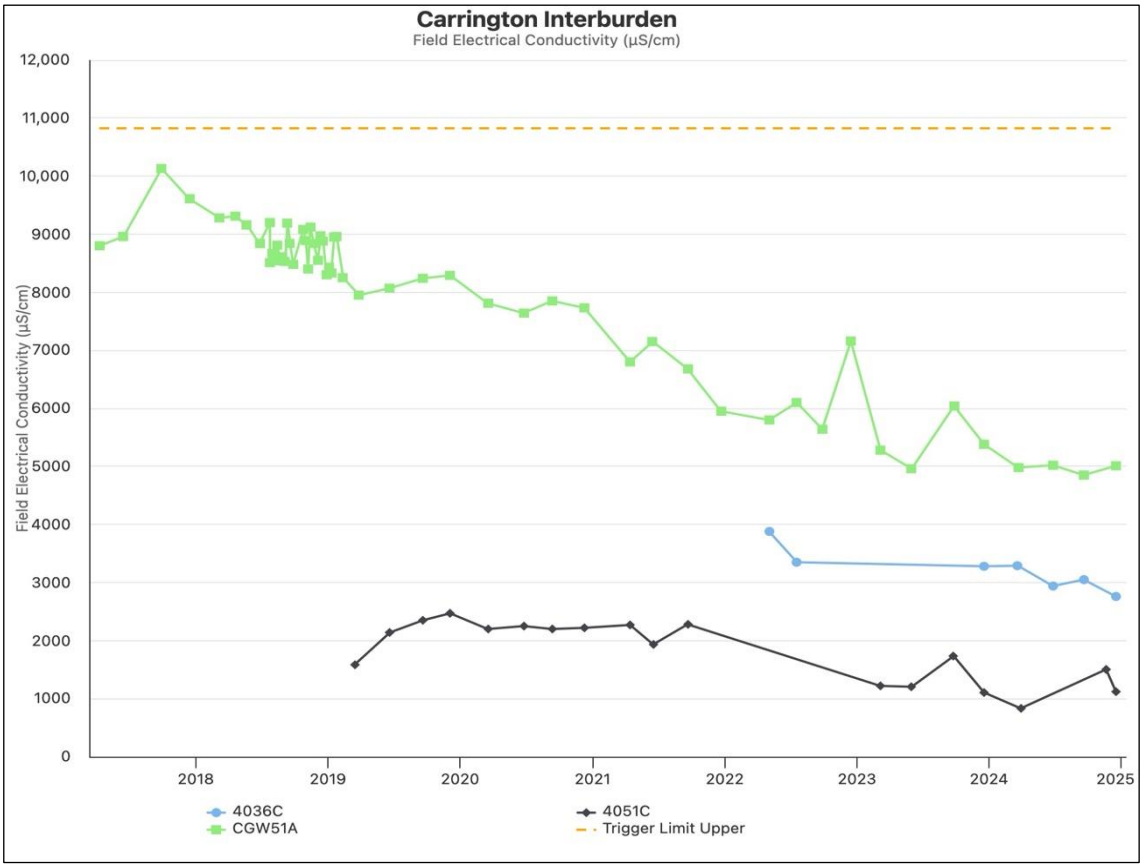

Figure 7-26: Carrington Interburden Groundwater EC Trends 2017 - 2024

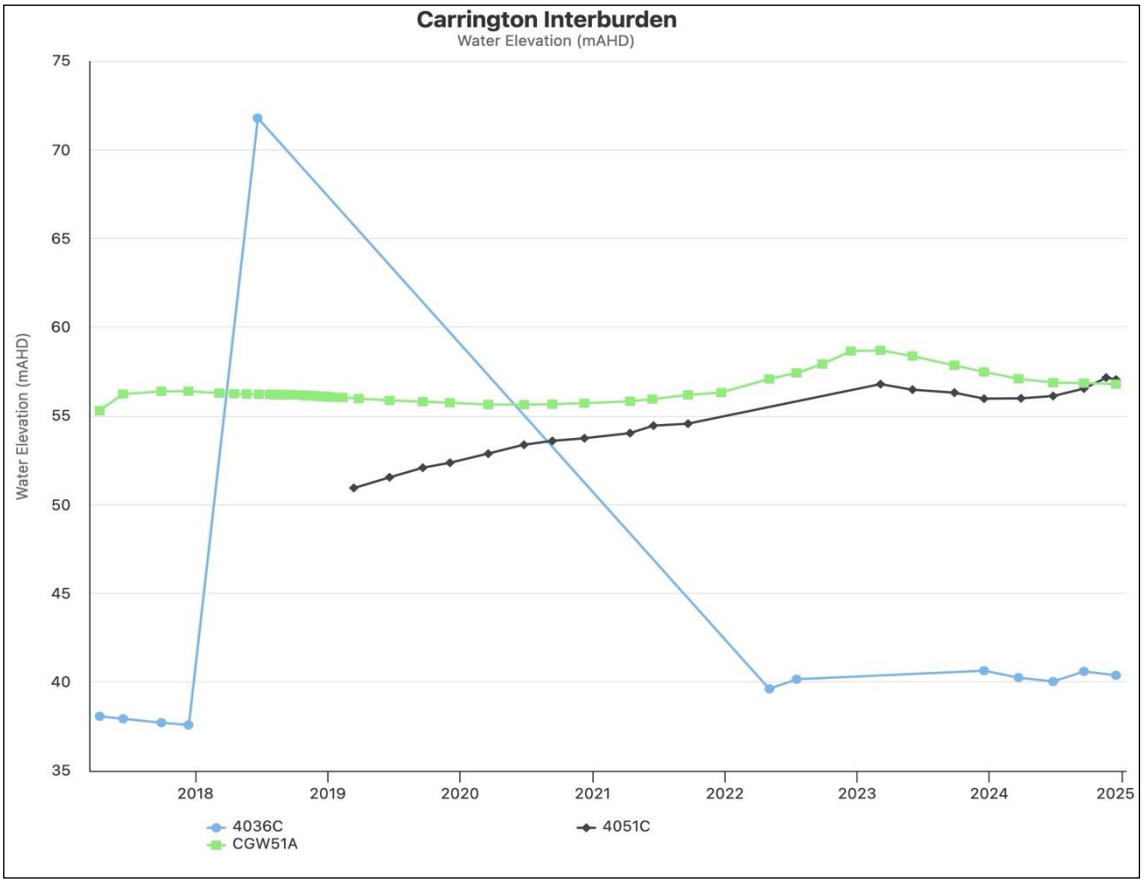

Figure 7-27: Carrington Interburden Groundwater SWL Trends 2017 - 2024

7.5.7 | CARRINGTON WEST WING ALLUVIUM

Results are shown in **Figure 7-28** to **Figure 7-30**. Water quality results were generally consistent with historical trends. Bore CGW49 intersects alluvium within the western limb of the paleochannel. Historical readings show that bore CGW49 has recorded pH ranging between 7.3 and 7.7. Review of pH readings remained fairly stable and within historical levels over 2024. The results show no adverse impacts due to mining.

There were no trigger exceedances in 2024.

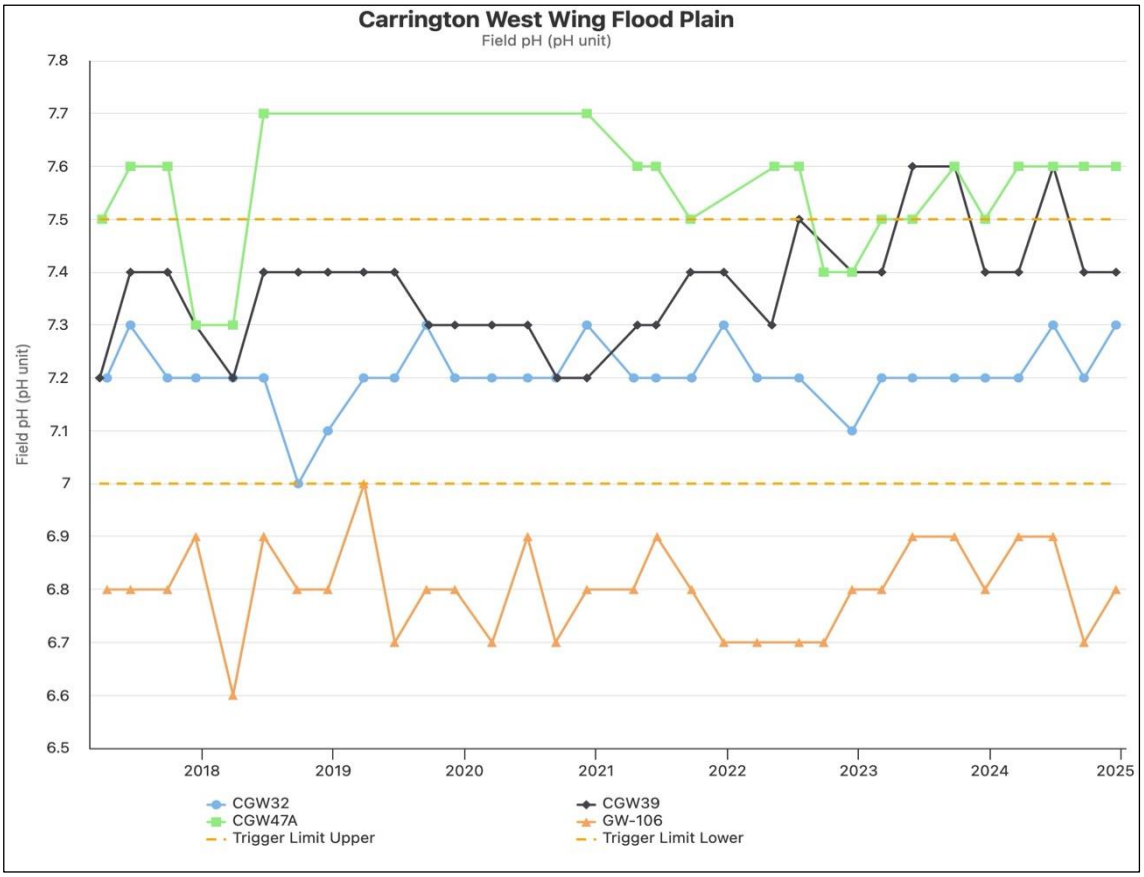

Figure 7-28: Carrington West Wing Alluvium Groundwater pH Trends 2017 - 2024

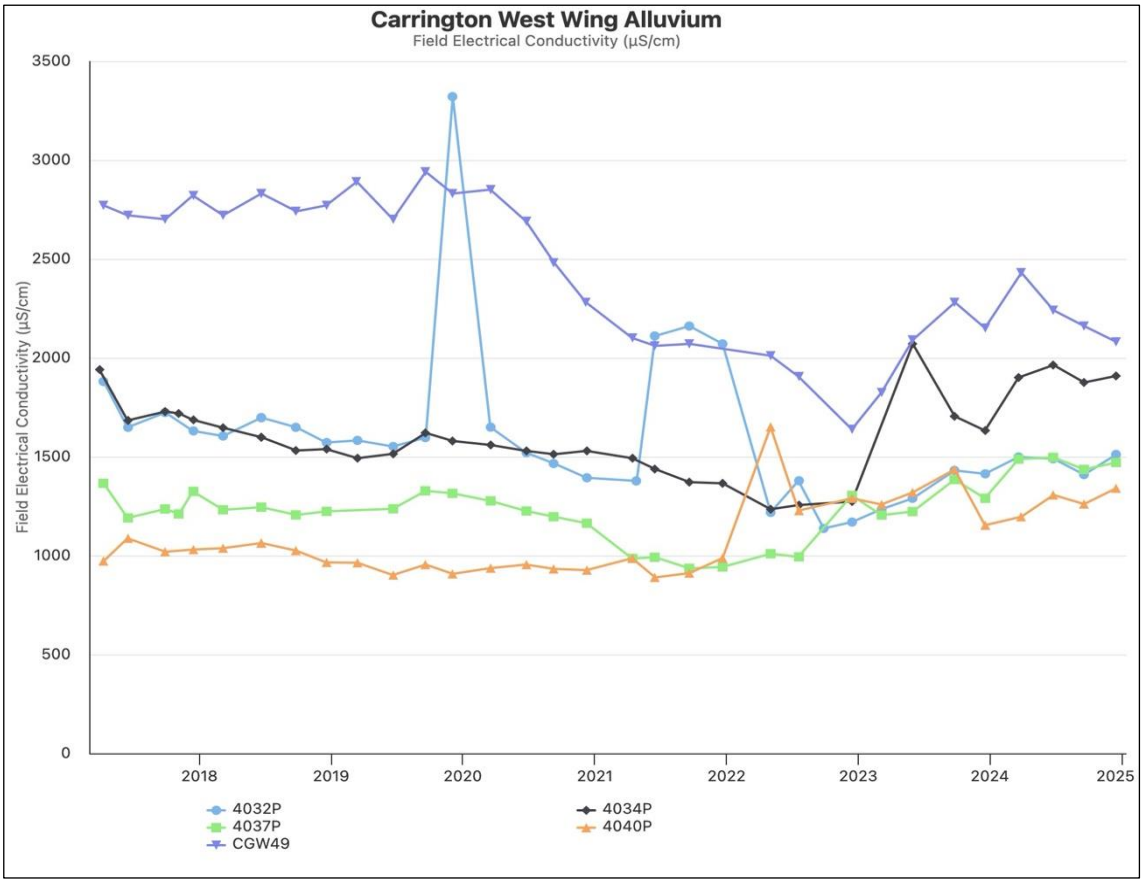

Figure 7-29: Carrington West Wing Alluvium Groundwater EC Trends 2017 – 2024

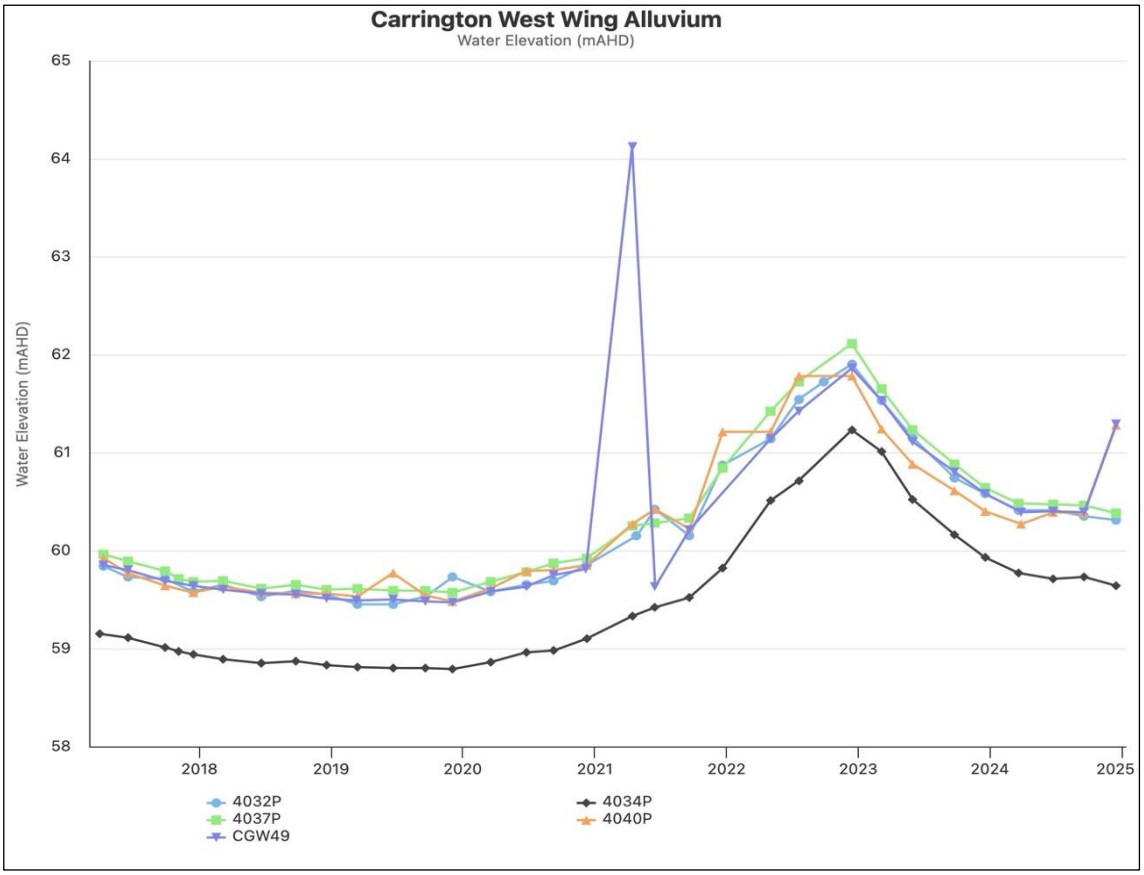

Figure 7-30: Carrington West Wing Alluvium Groundwater SWL Trends 2017 - 2024

7.5.8 | CARRINGTON WEST WING FLOOD PLAIN

Results are shown in **Figure 7-31** to **Figure 7-33**. Water quality results were generally consistent with historical trends.

There were no trigger exceedances during 2024.

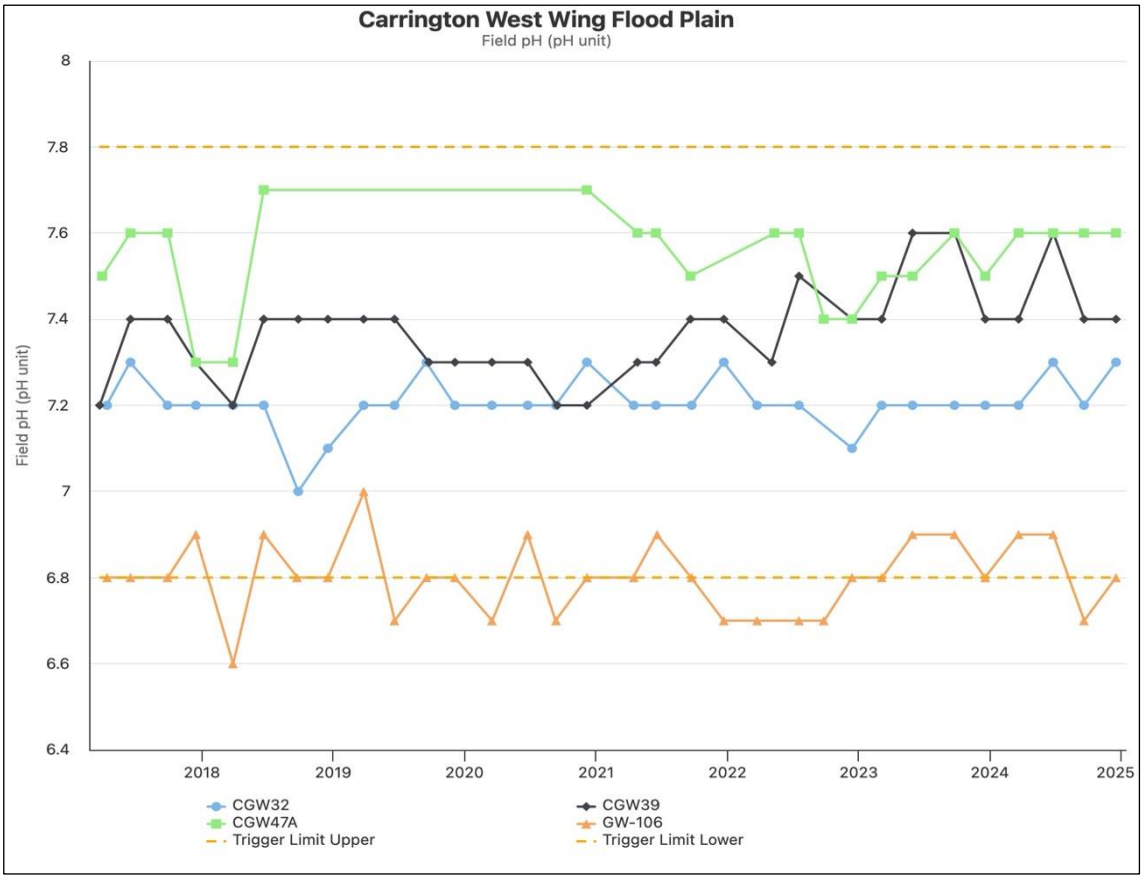

Figure 7-31: Carrington West Wing Flood Plain Groundwater pH Trends 2017 - 2024

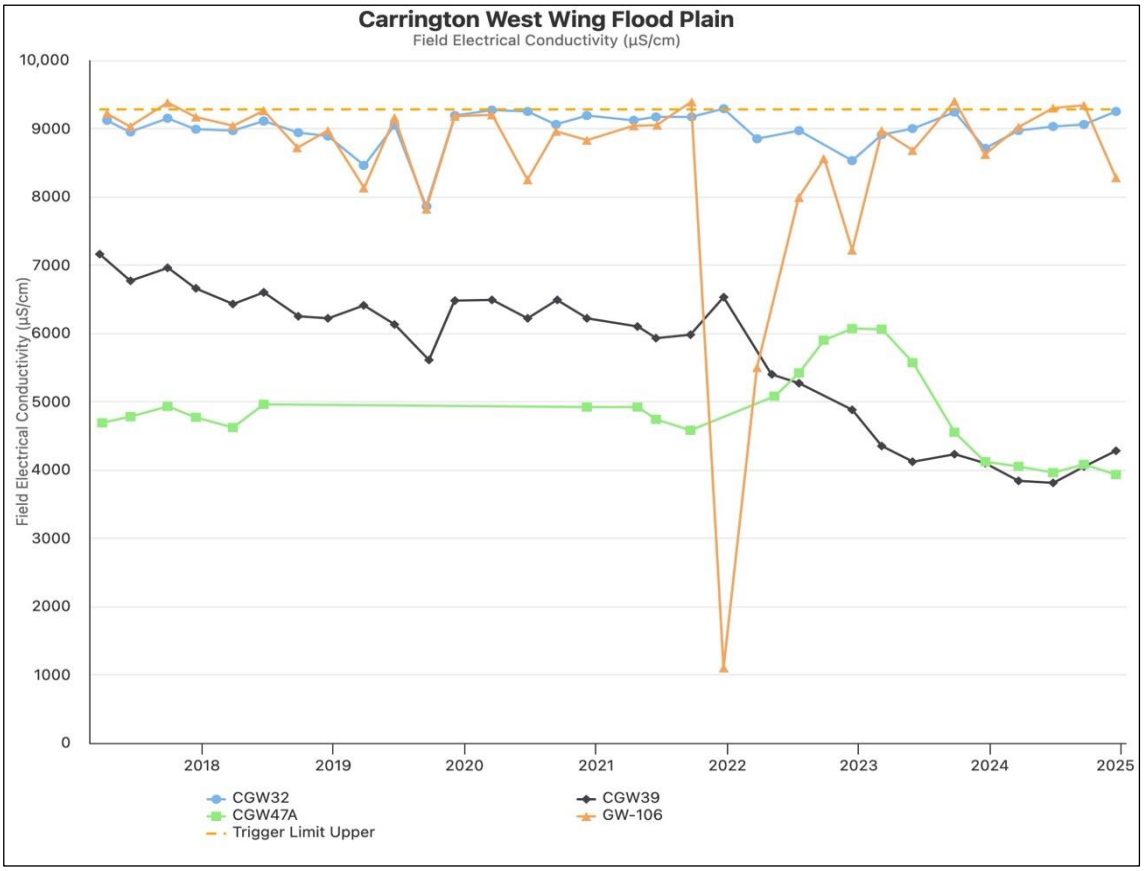

Figure 7-32: Carrington West Wing Flood Plain Groundwater EC Trends 2017 – 2024

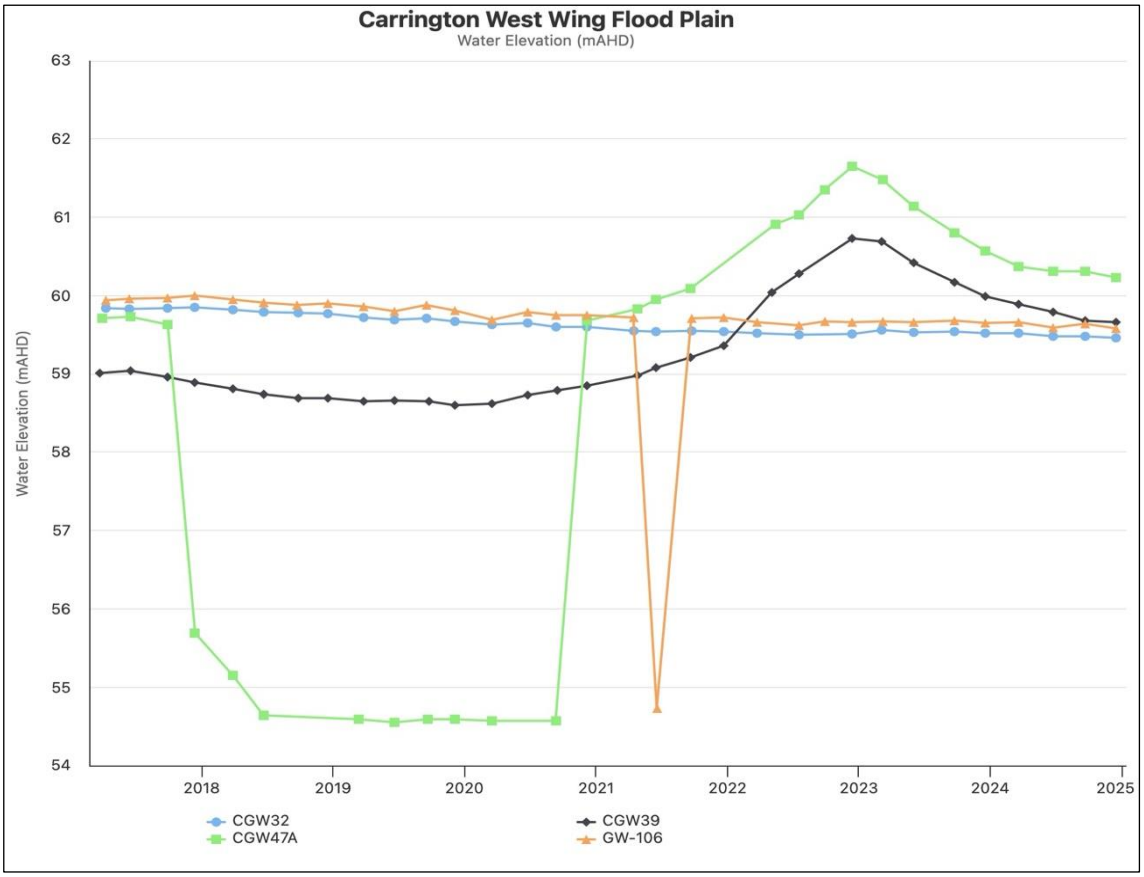

Figure 7-33: Carrington West Wing Flood Plain Groundwater SWL Trends 2017 - 2024

7.5.9 | CHESHUNT / NORTH PIT ALLUVIUM

Electrical Conductivity, pH and SWL trends for 2017 to 2024 are shown in **Figure 7-34** to **Figure 7-36**. Water quality results were generally consistent with historical trends. Hobdens Well is screened within alluvium, located between the Hunter River and Cheshunt Pit. Historical readings show that Hobdens Well has recorded pH ranging between 7.1 and 7.6. Review of pH readings indicated levels fluctuated slightly, but within historical levels over 2024. It is recommended by Umwelt that the trigger level is updated to reflect historical trends.

Trigger tracking results for Hobdens Well are further detailed in **Table 5.3** of **Appendix B**.

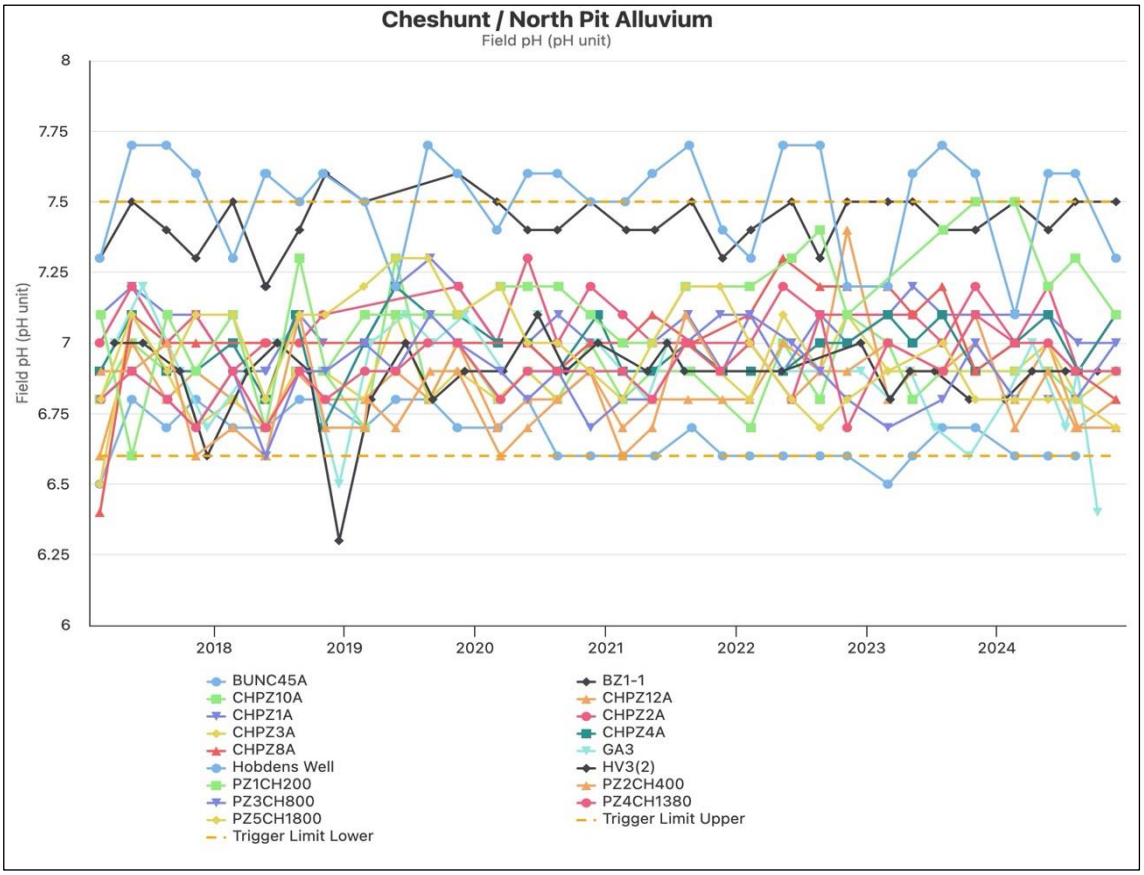

Figure 7-34: Cheshunt / North Pit Alluvium Groundwater pH Trends 2017 - 2024

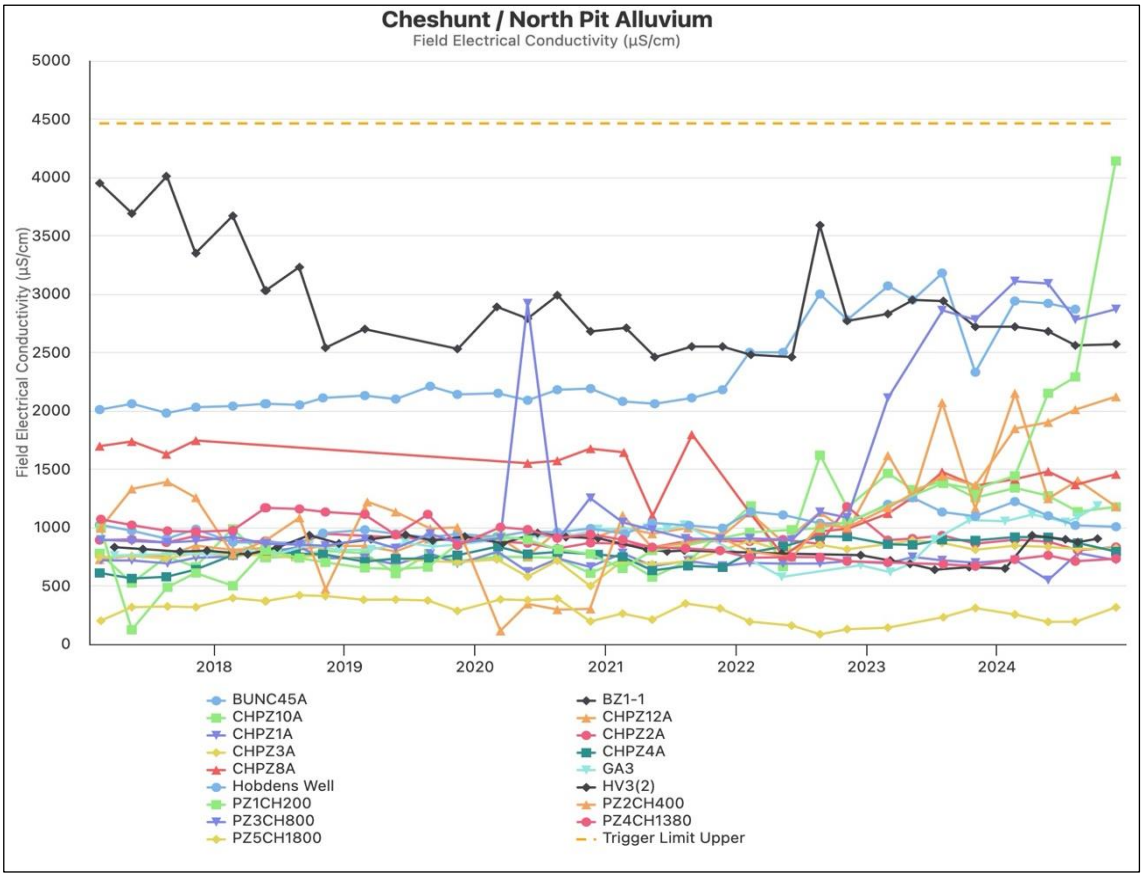

Figure 7-35: Cheshunt / North Pit Alluvium Groundwater EC Trends 2017 – 2024

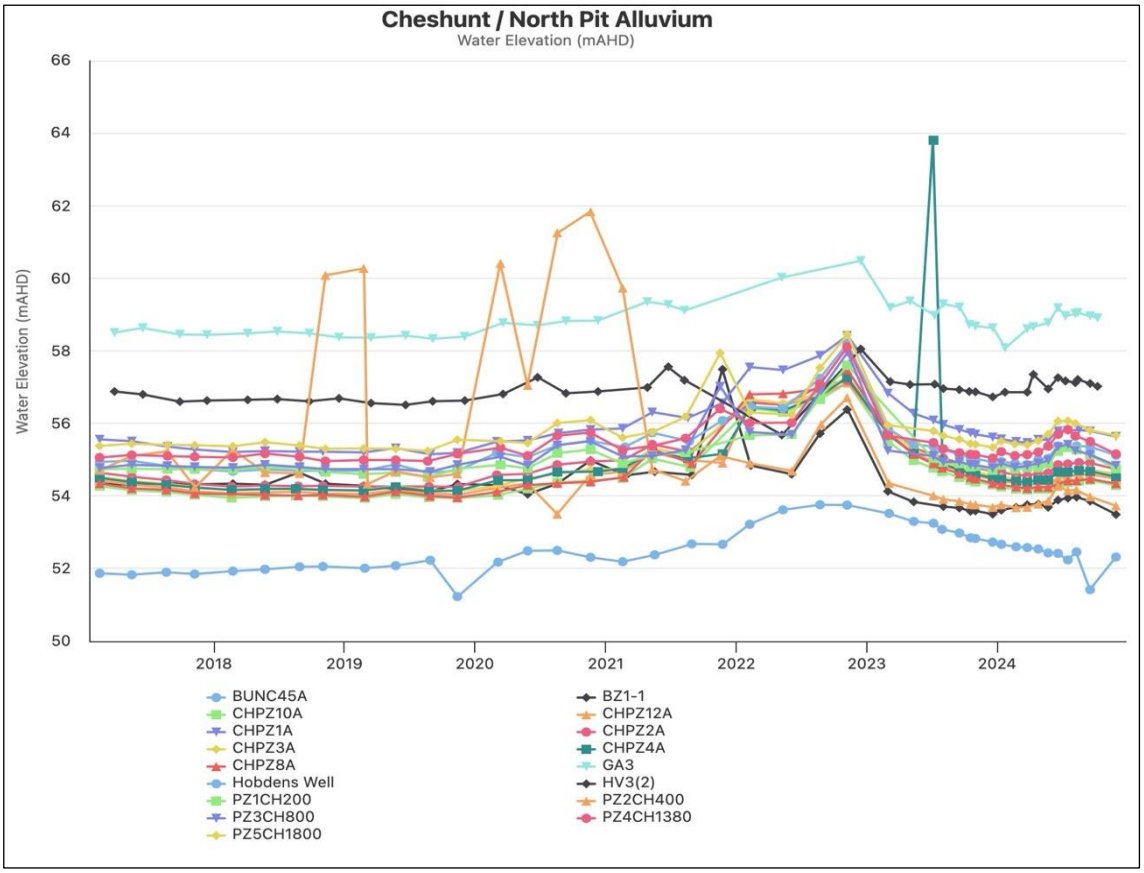

Figure 7-36: Cheshunt / North Pit Alluvium Groundwater SWL Trends 2017 - 2024

7.5.10 | CHESHUNT INTERBURDEN

The EC, pH and SWL trends for 2017 to 2024 are shown in **Figure 7-37** to **Figure 7-39**. Water quality results were generally consistent with historical trends.

There were no trigger exceedances during 2024 (i.e. more than 3 consecutive results outside of trigger limits).

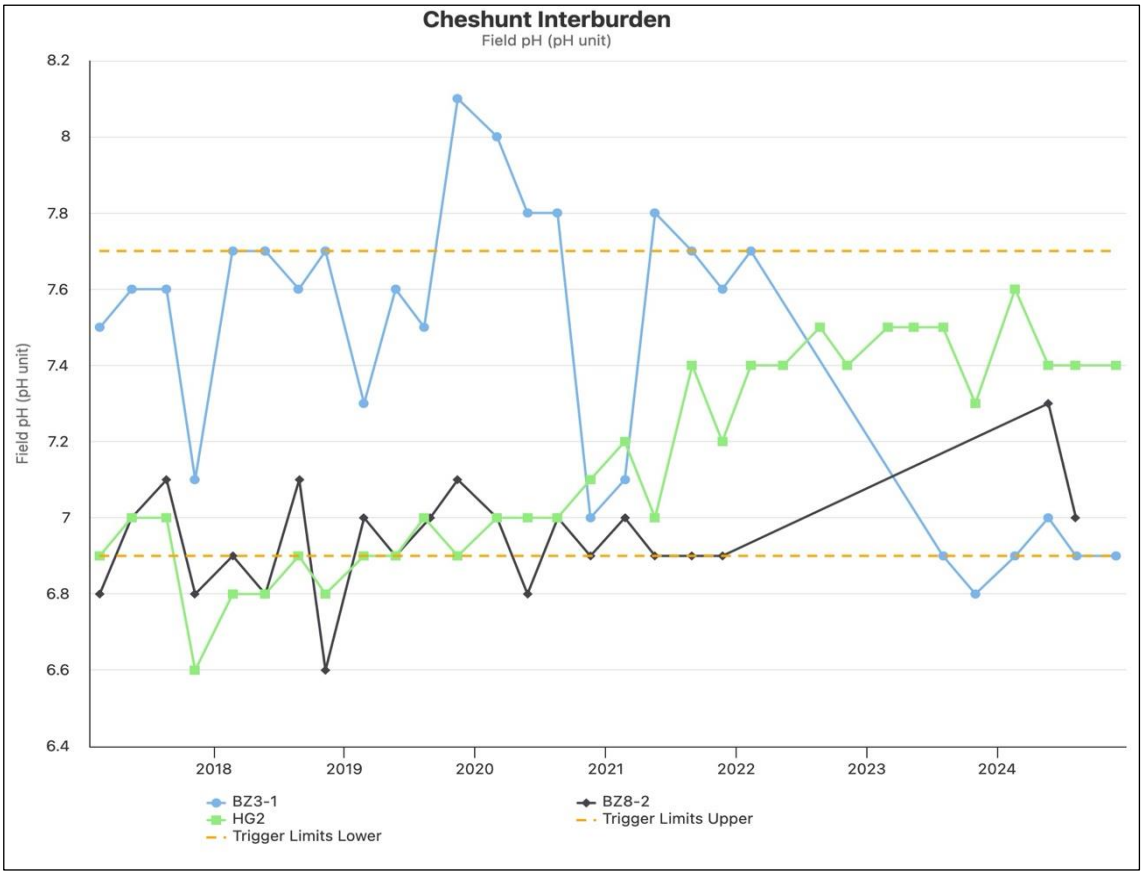

Figure 7-37: Cheshunt Interburden Groundwater pH Trends 2017 - 2024

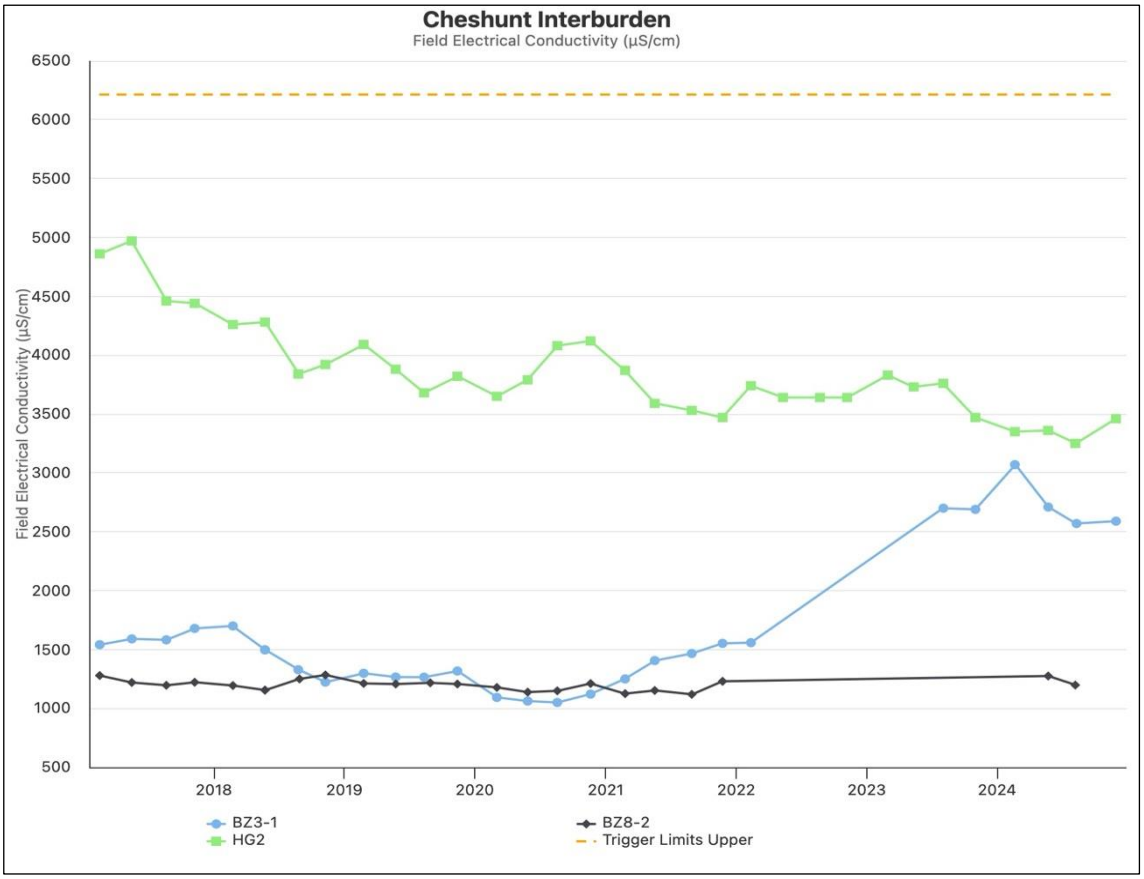

Figure 7-38: Cheshunt Interburden Groundwater EC Trends 2017 – 2024

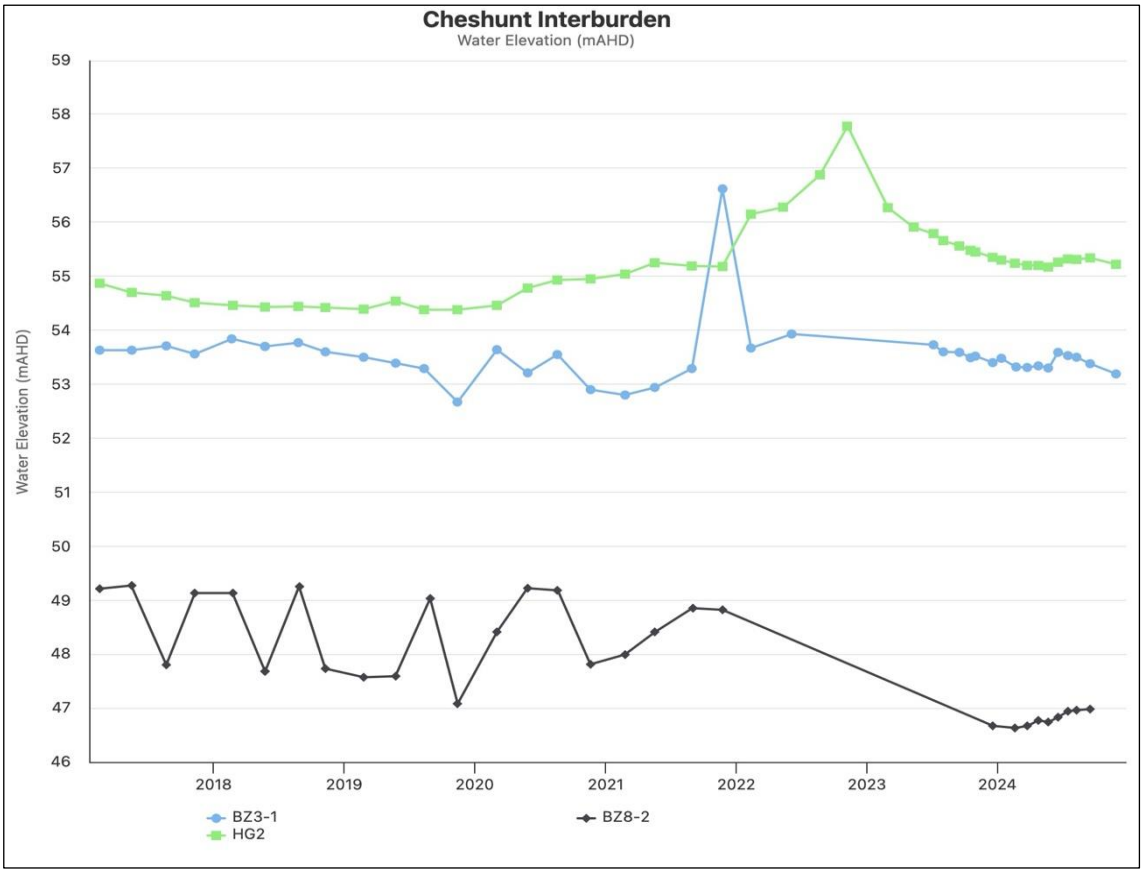

Figure 7-39: Cheshunt Interburden Groundwater SWL Trends 2017 - 2024

7.5.11 | CHESHUNT MT ARTHUR

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-40** to **Figure 7-42**. Water quality results were generally consistent with historical trends except for pH. Based on historical data, pH results from all three bores have been gradually trending downward since July 2011. The groundwater level measured at the bores has typically been within or below the screened section of bores BZ4A(2) and BZ3-3 (pH – 5th Percentile). Purging/sample collection within bore BZ2A(1) and BZ3-3 may induce localised groundwater drawdown to within the screened section. This may be the cause of the reducing pH measured at these bores. The updated draft WMP includes amendments to the Cheshunt - Mt Arthur seam groundwater monitoring, including:

• BZ2A(1) and BZ3-3 being removed from trigger level assessment, with trigger values remaining for BZ4(A)2; and

• the pH trigger level value reducing to 6.4 (from the current value of 6.5) for all bores monitoring the Cheshunt- Mt Arthur Seam.

Bore BZ3-3, located between Cheshunt Pit and the Hunter River, and had an increasing pH trend between June 2006 (6.0) and August 2012 (7.1) followed by a decreasing trend between December 2012 (7.1) and November 2022 (6.1). The 2023 readings ranging between of 6.2 and 6.4 are within the historical range. The 2019 Groundwater Annual Review (SLR, 2020) recommended further investigation of the bore condition and construction to confirm the geology being monitored in all of the 'BZ' bores in the Cheshunt area to understand the cause of the variability in the trends between the bores. Comprehensive water quality analysis was undertaken in August 2022. The results indicated the declining pH trend is not due to connectivity to spoil water via the nearby fault.

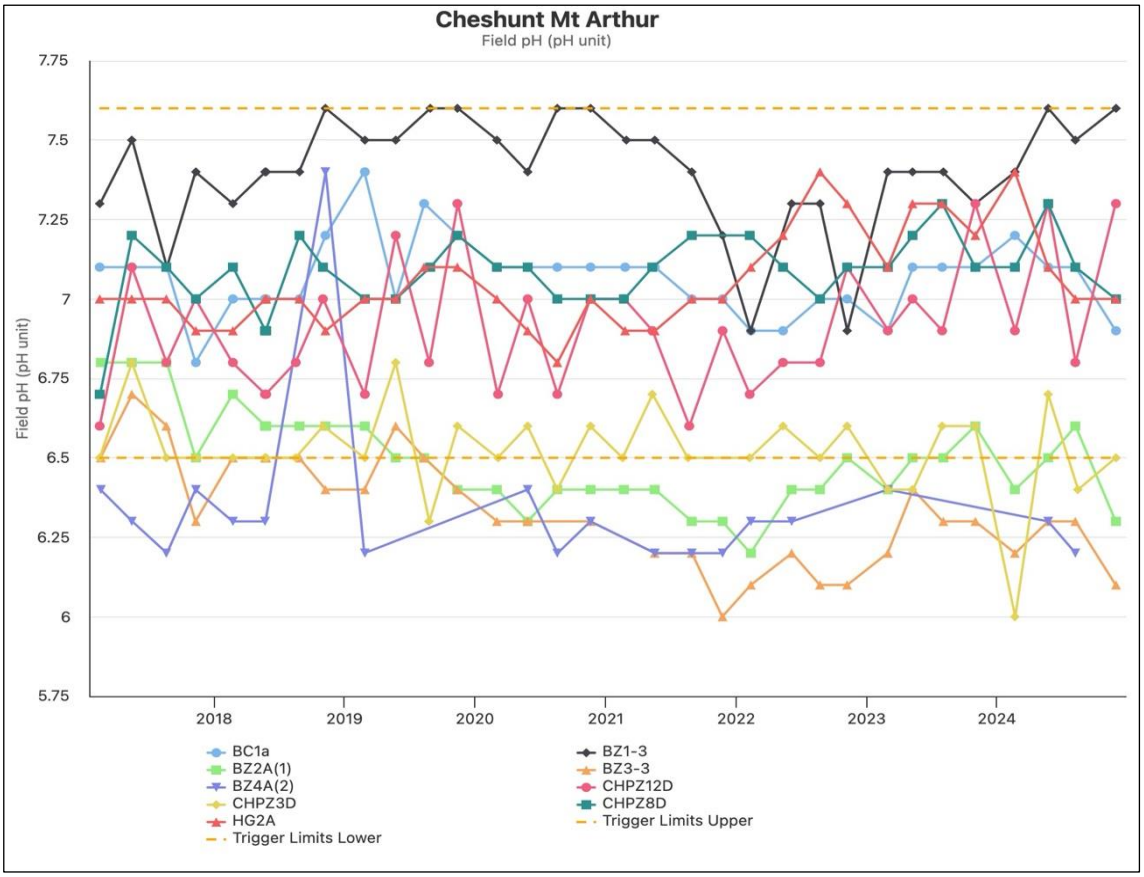

Figure 7-40: Cheshunt Mt Arthur Groundwater pH Trends 2017 - 2024

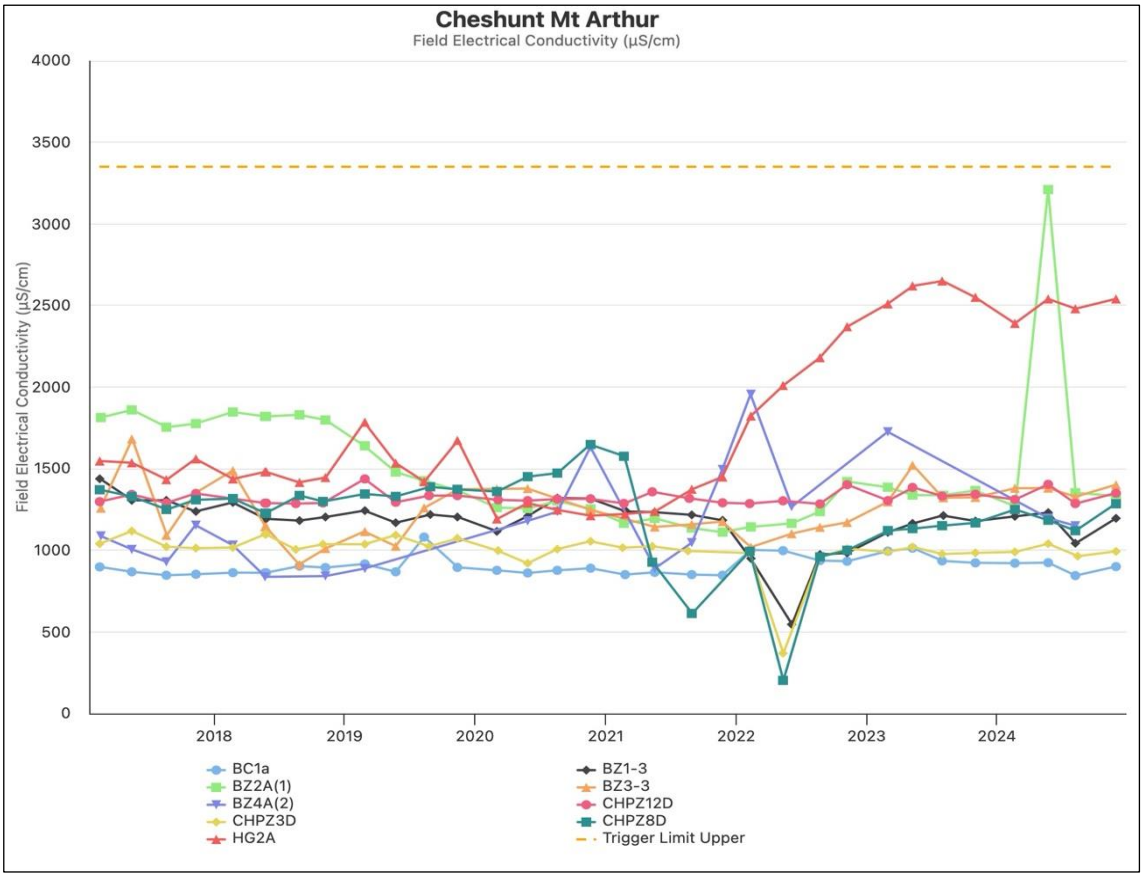

Figure 7-41: Cheshunt Mt Arthur Groundwater EC Trends 2017 – 2024

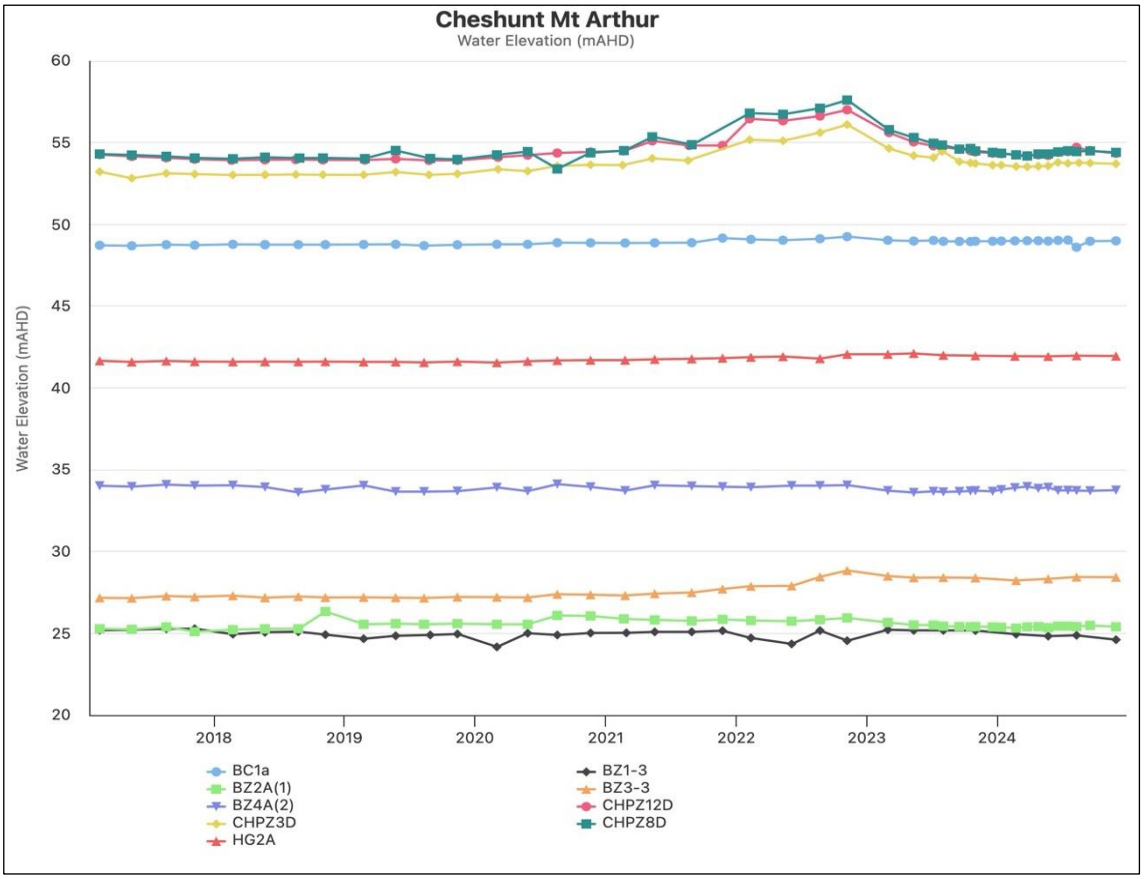

Figure 7-42: Cheshunt Mt Arthur Groundwater SWL Trends 2017 - 2024

7.5.12 | CHESHUNT PIERCEFIELD

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-43** to **Figure 7-45**. Water quality results were generally consistent with historical trends.

There were no trigger exceedances recorded in 2024.

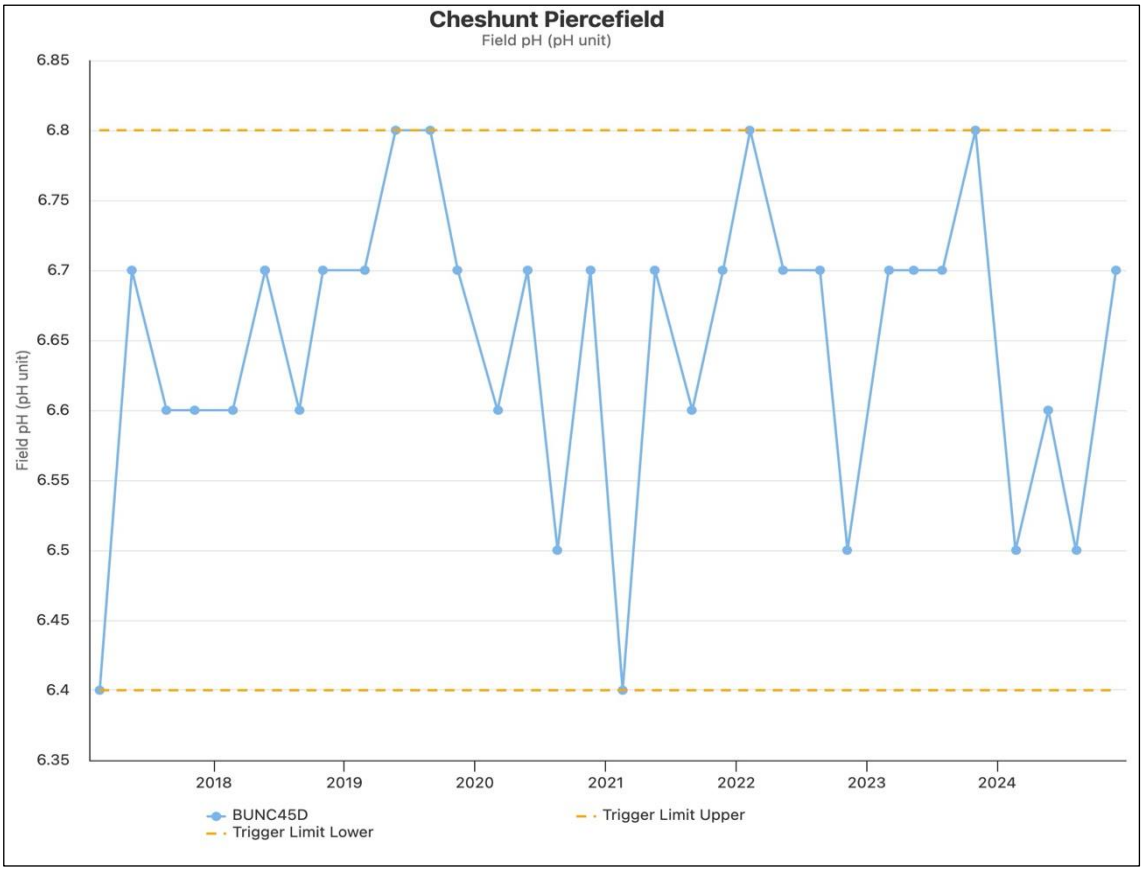

Figure 7-43: Cheshunt Piercefield Groundwater pH Trends 2017 - 2024

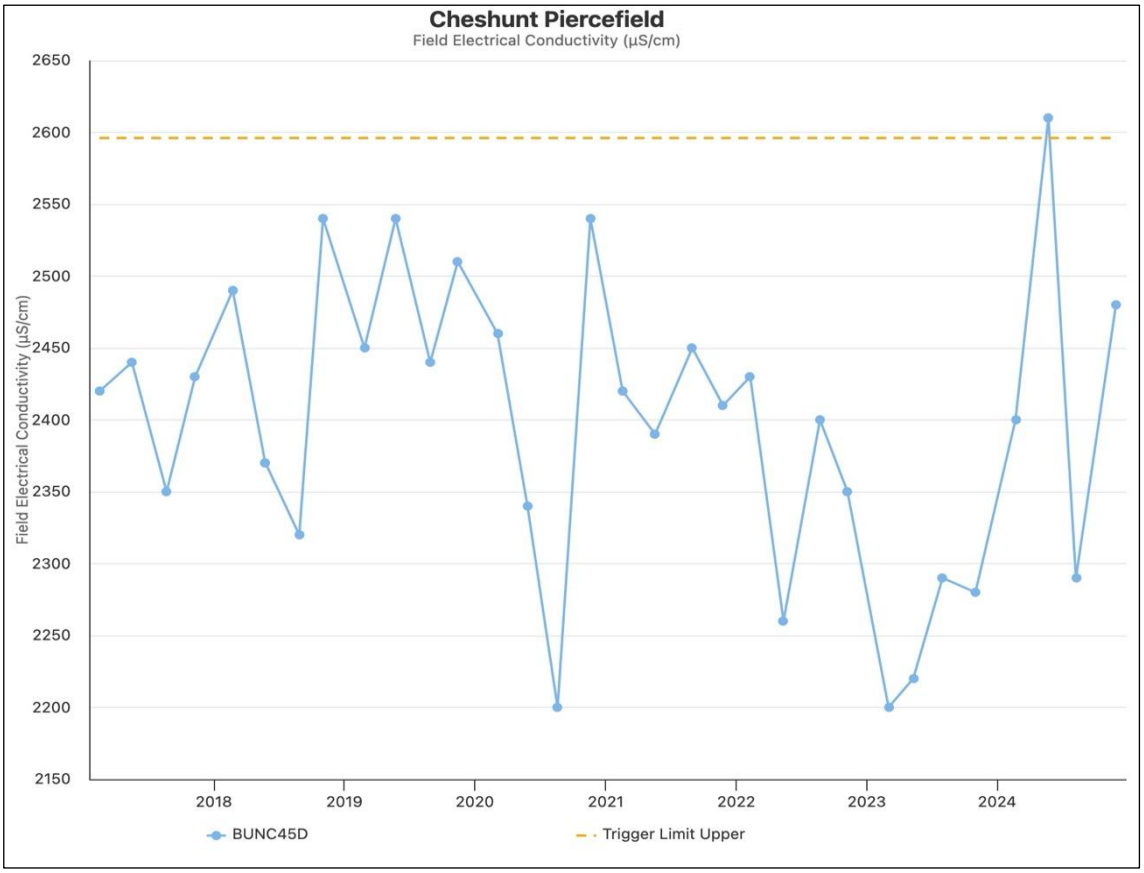

Figure 7-44: Cheshunt Piercefield Groundwater EC Trends 2017 – 2024

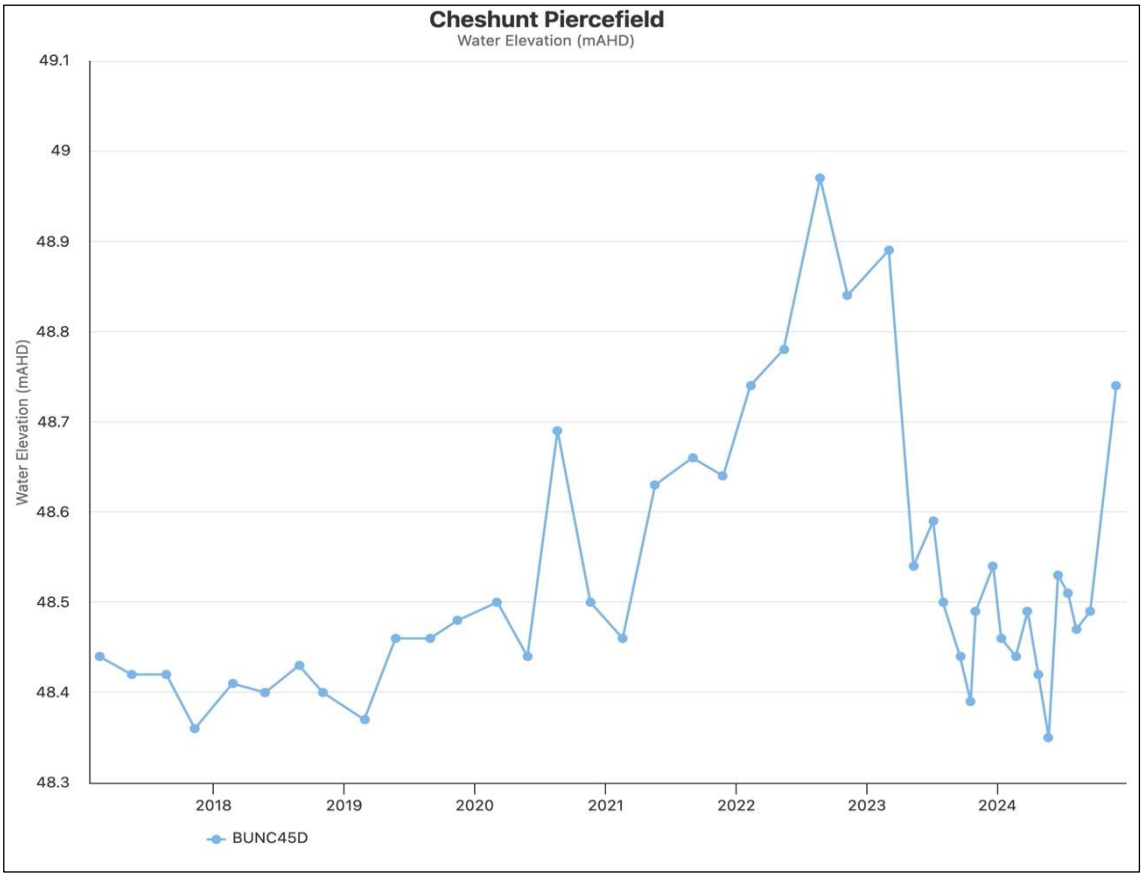

Figure 7-45: Cheshunt Piercefield Groundwater SWL Trends 2017 - 2024

7.5.13 | LEMINGTON SOUTH ALLUVIUM

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-46** to **Figure 7-48**. Water quality results were generally consistent with historical trends. Refer to **Table 5.4** of **Appendix B:**

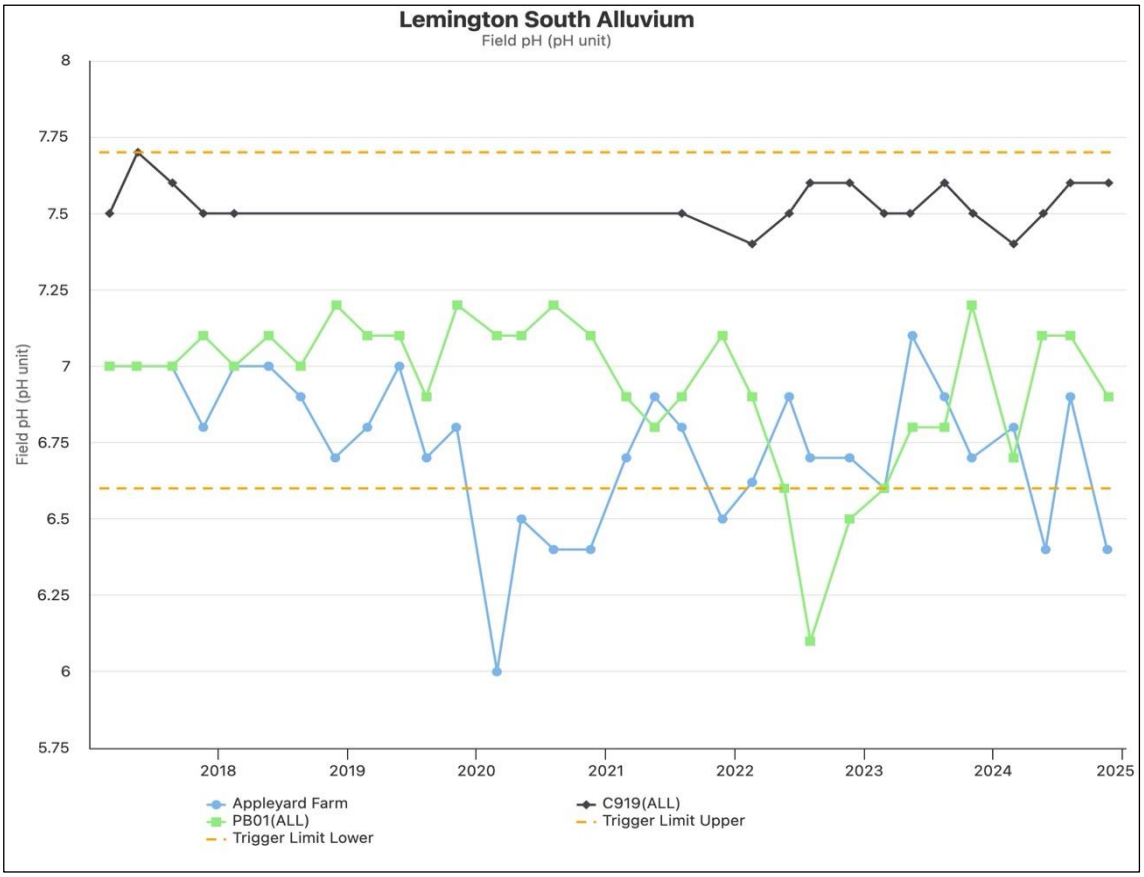

Figure 7-46: Lemington South Alluvium Groundwater pH Trends 2017 - 2024

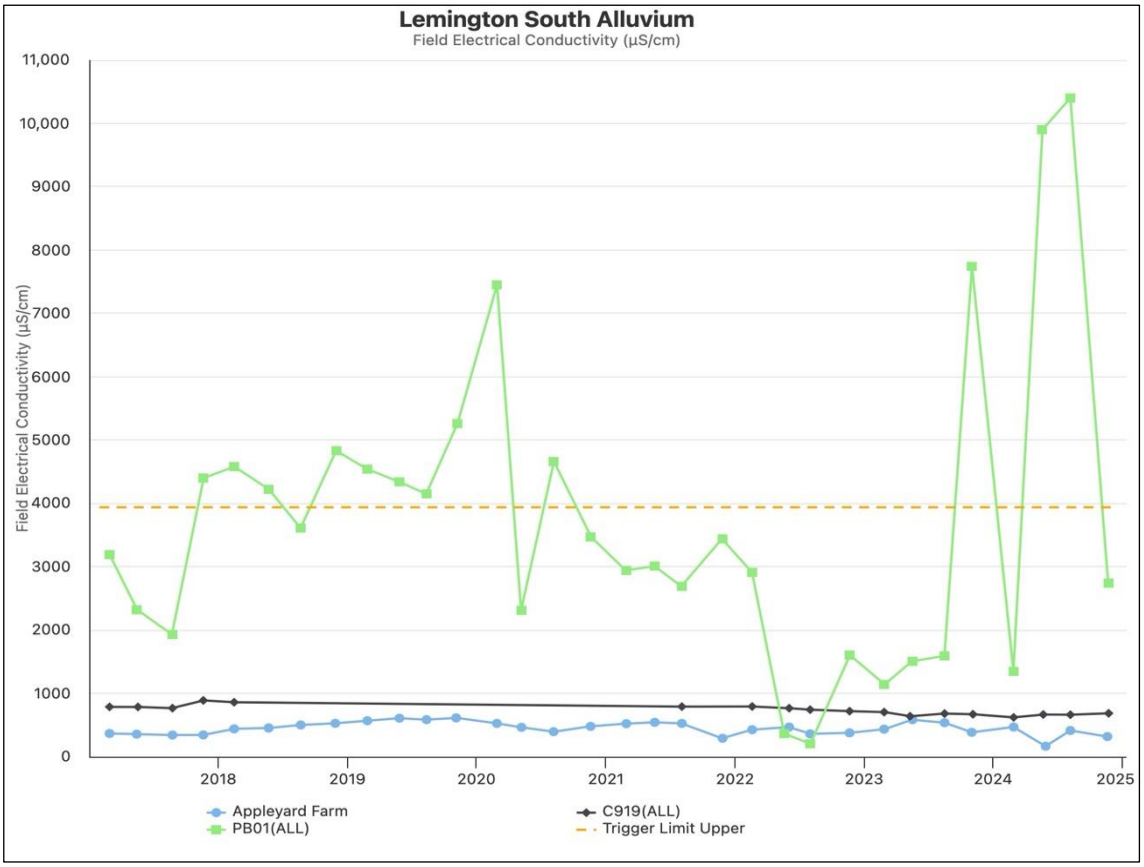

Figure 7-47: Lemington South Alluvium Groundwater EC Trends 2017 – 2024

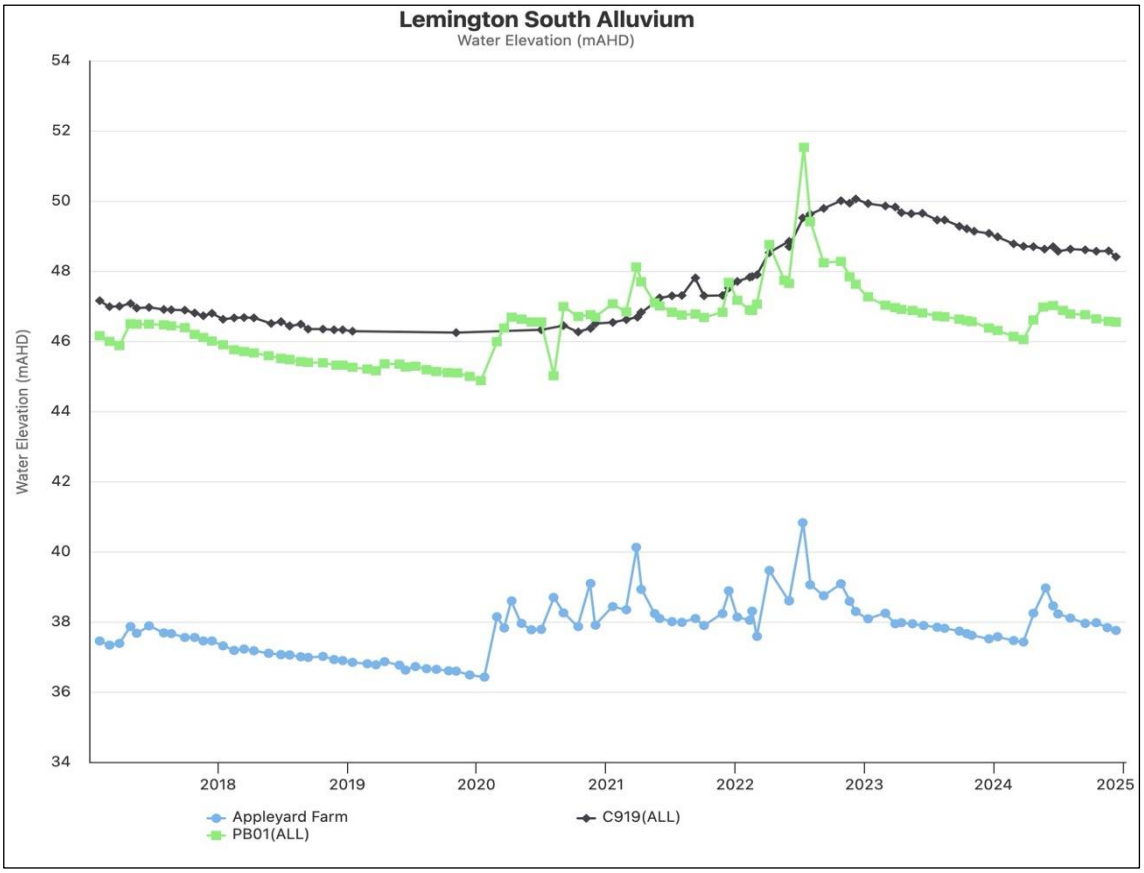

Figure 7-48: Lemington South Alluvium Groundwater SWL Trends 2017 - 2024

7.5.14 | LEMINGTON SOUTH ARROWFIELD

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-49** to **Figure 7-51**. Water quality results were generally consistent with historical trends.

There were no exceedances of trigger levels (3 or more consecutive events) in 2024.

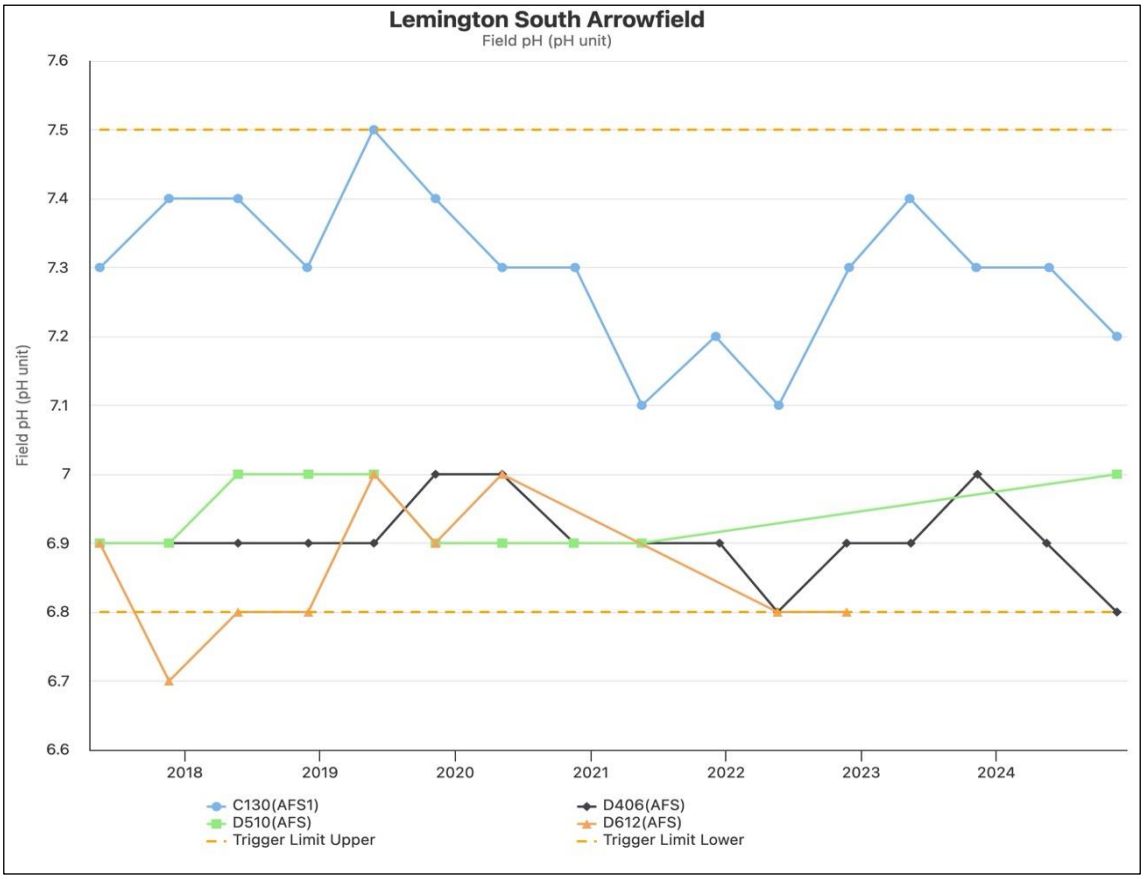

Figure 7-49: Lemington South Arrowfield Groundwater pH Trends 2017 - 2024

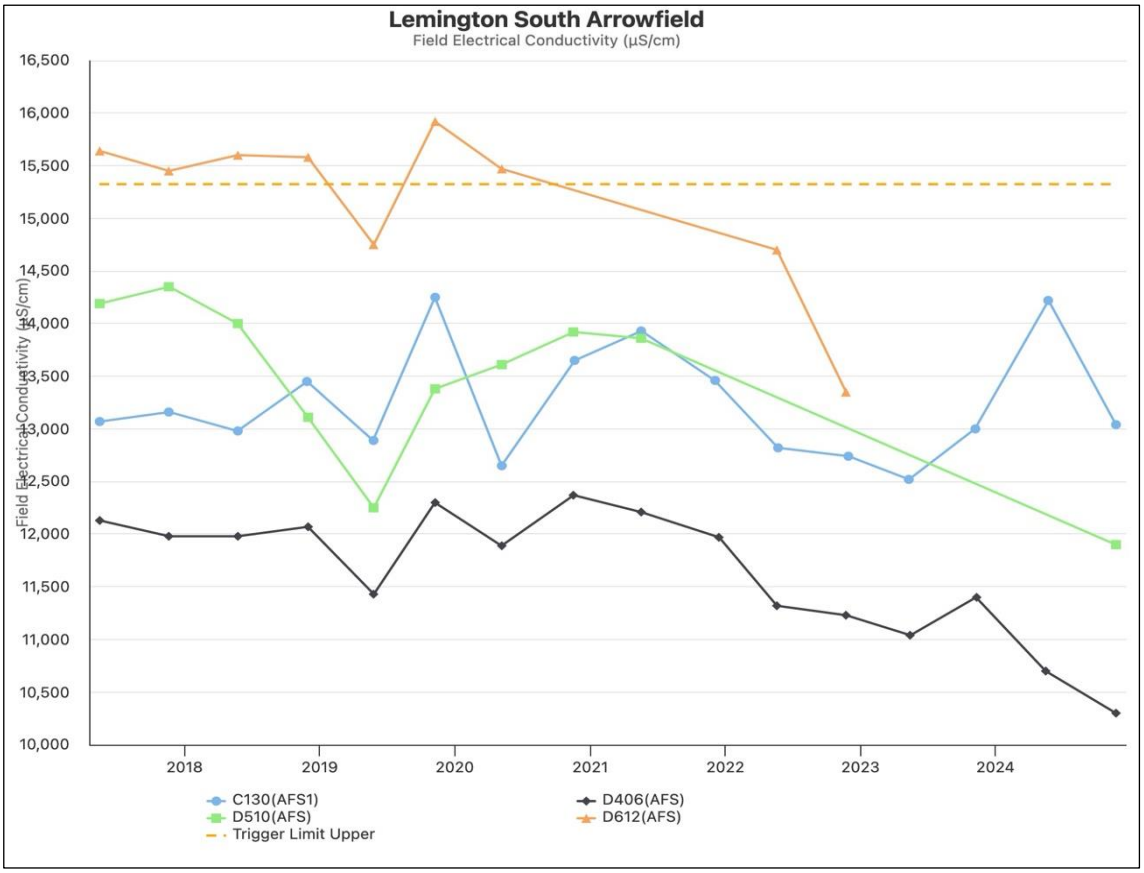

Figure 7-50: Lemington South Arrowfield Groundwater EC Trends 2017 - 2024

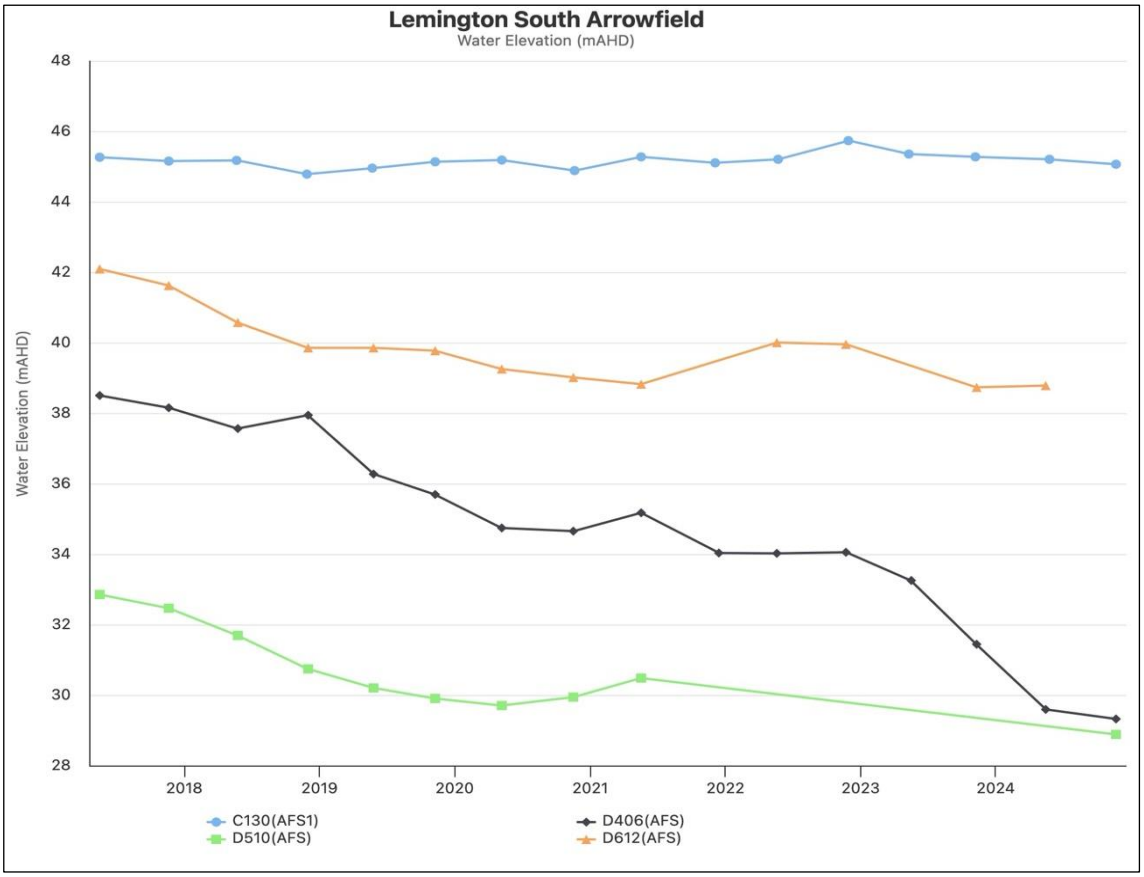

Figure 7-51: Lemington South Arrowfield Groundwater SWL Trends 2017 - 2024

7.5.15 | LEMINGTON SOUTH BOWFIELD

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-52** to **Figure 7-54**. Water quality results were generally considered to be consistent with historical trends. There were no exceedances of trigger levels (3 or more consecutive events) in 2024.

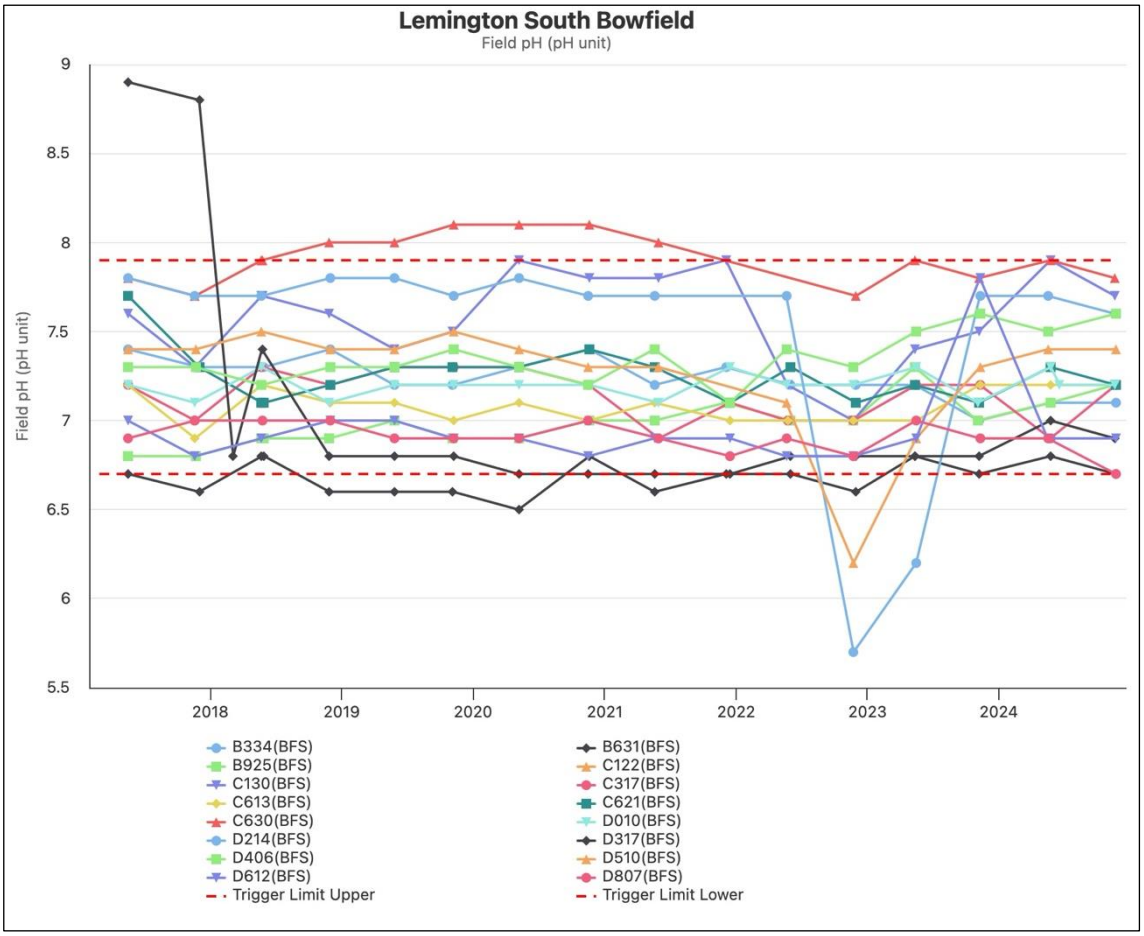

Figure 7-52: Lemington South Bowfield Groundwater pH Trends 2017 – 2024

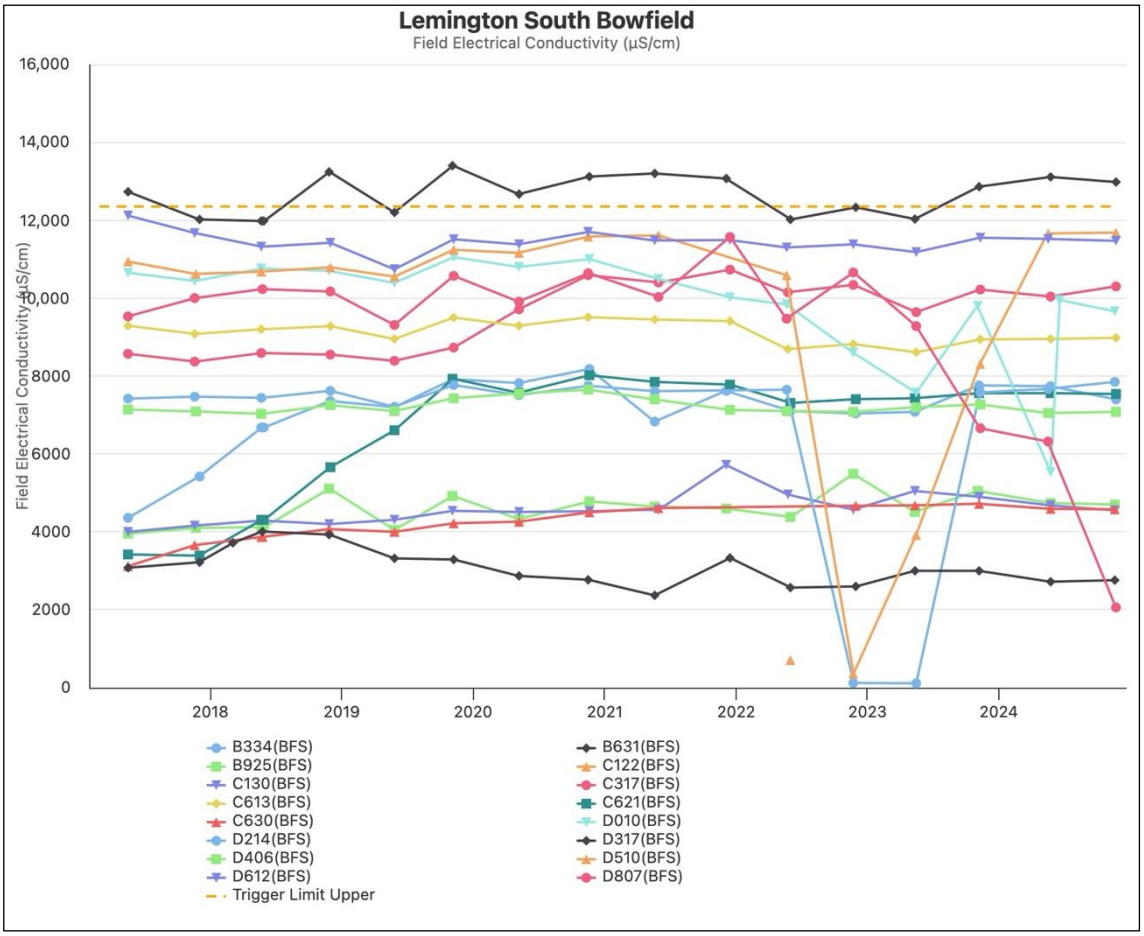

Figure 7-53: Lemington South Bowfield Groundwater EC Trends 2017 – 2024

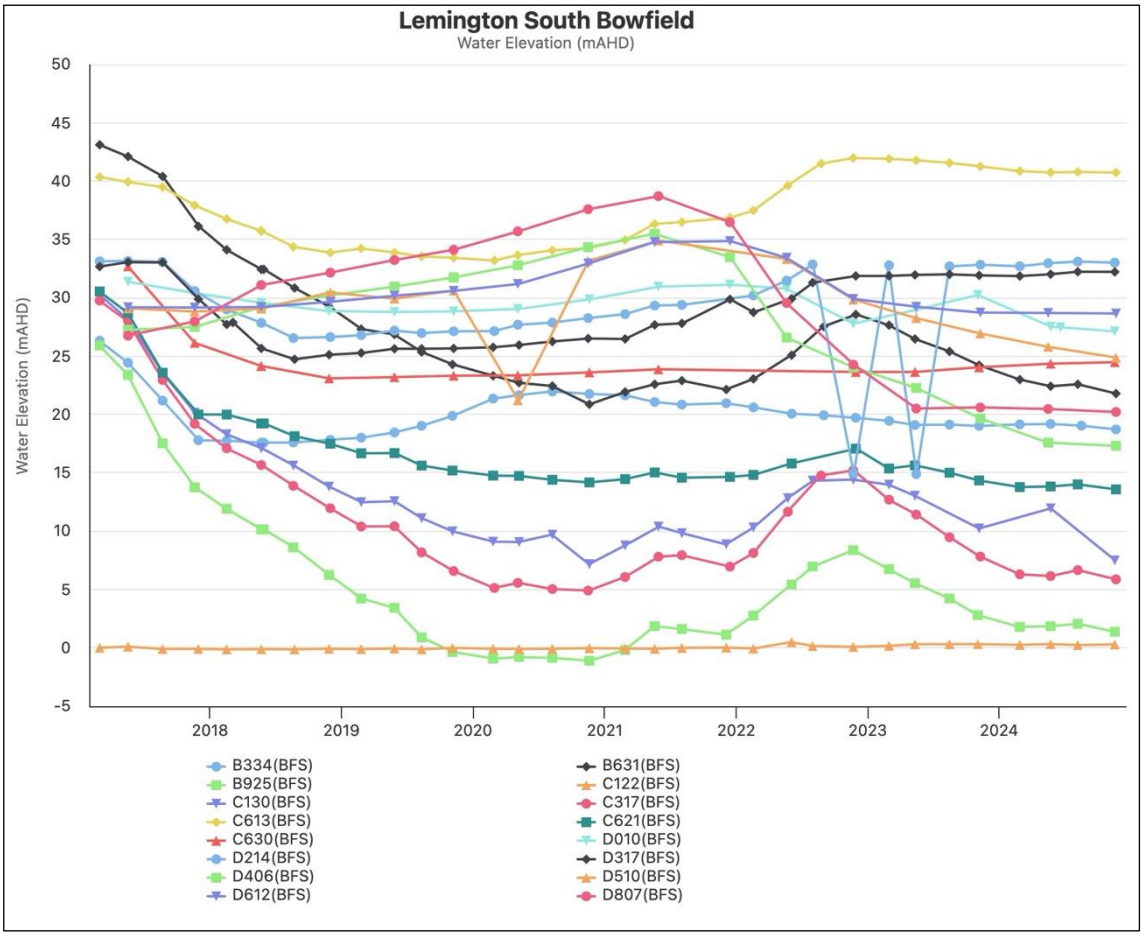

Figure 7-54: Lemington South Bowfield Groundwater SWL Trends 2017 - 2024

7.5.16 | LEMINGTON SOUTH INTERBURDEN

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-55** to **Figure 7-57**. Historical readings of C130(ALL) show regular fluctuations of pH between 6.6 and 7.2 The 2024 readings for pH are considered consistent with historical concentrations.

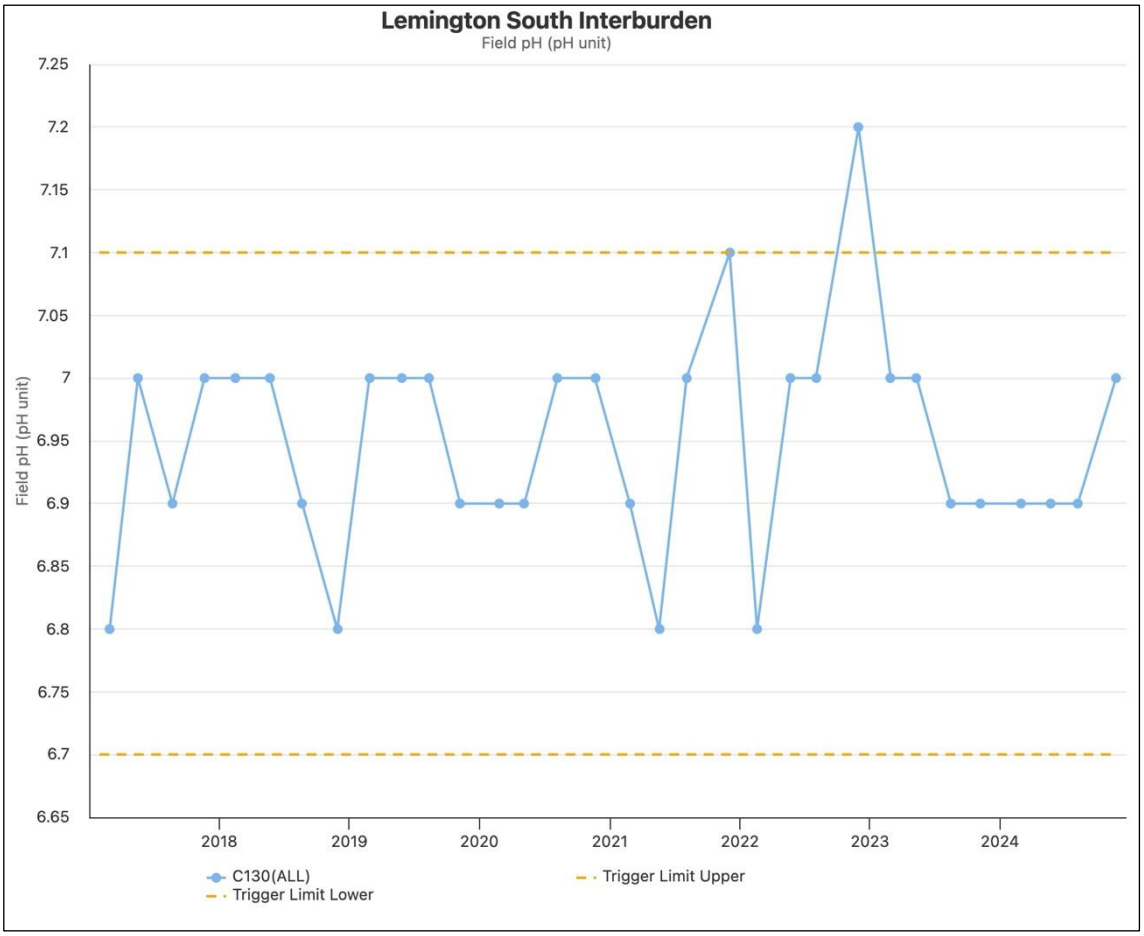

Figure 7-55: Lemington South Interburden Groundwater pH Trends 2017 - 2024

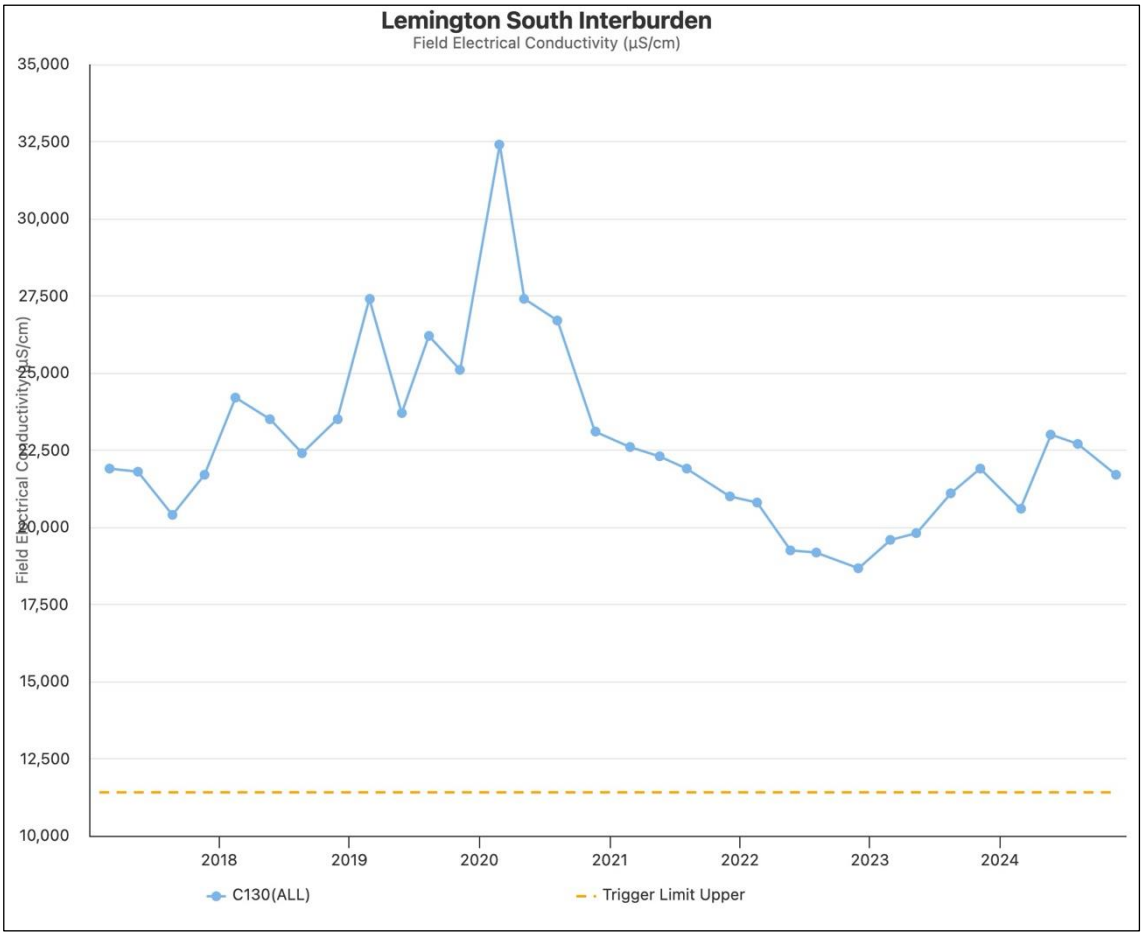

Figure 7-56: Lemington South Interburden Groundwater EC Trends 2017 - 2024

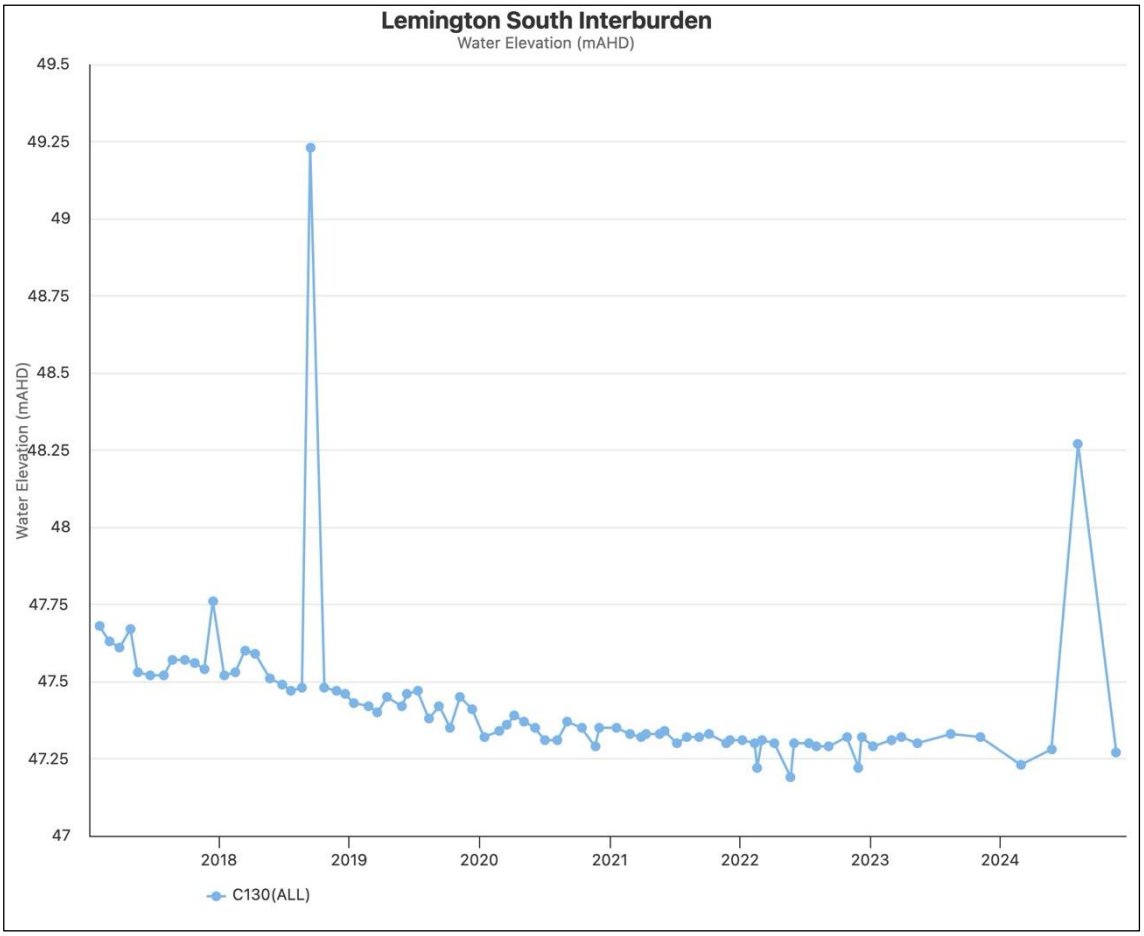

Figure 7-57: Lemington South Interburden Groundwater SWL Trends 2017 - 2024

7.5.17 | LEMINGTON SOUTH WOODLANDS HILL

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-58** to **Figure 7-60**. Water quality results were generally consistent with historical trends, with no measurements outside of trigger limits for three (3) consecutive monitoring events or greater aside from C130(WDH), with EC above trigger limits for the last 3 monitoring events. This was investigated by Umwelt in the Groundwater Annual Review (refer to **Section 5.2.4.2** of **Appendix B:**

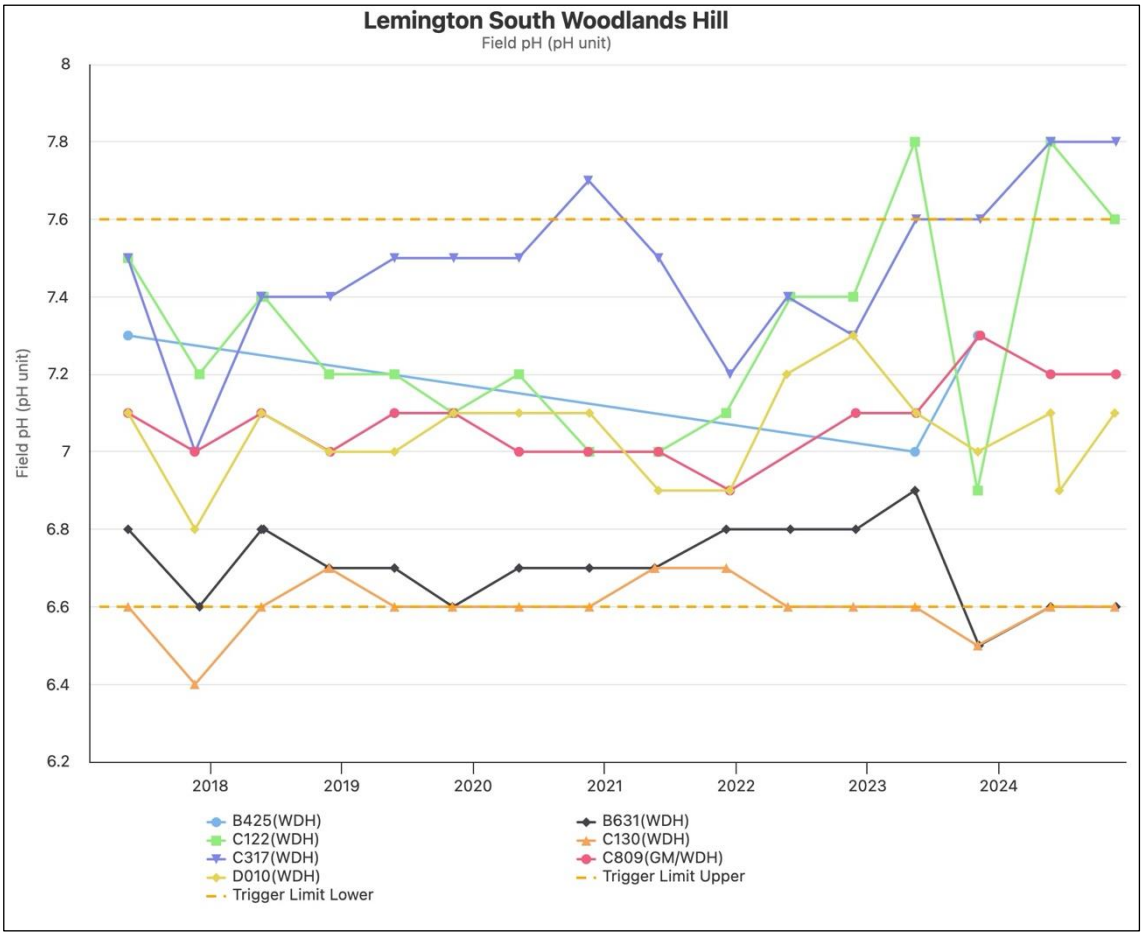

Figure 7-58: Lemington South Woodlands Hill Groundwater pH Trends 2017 – 2024

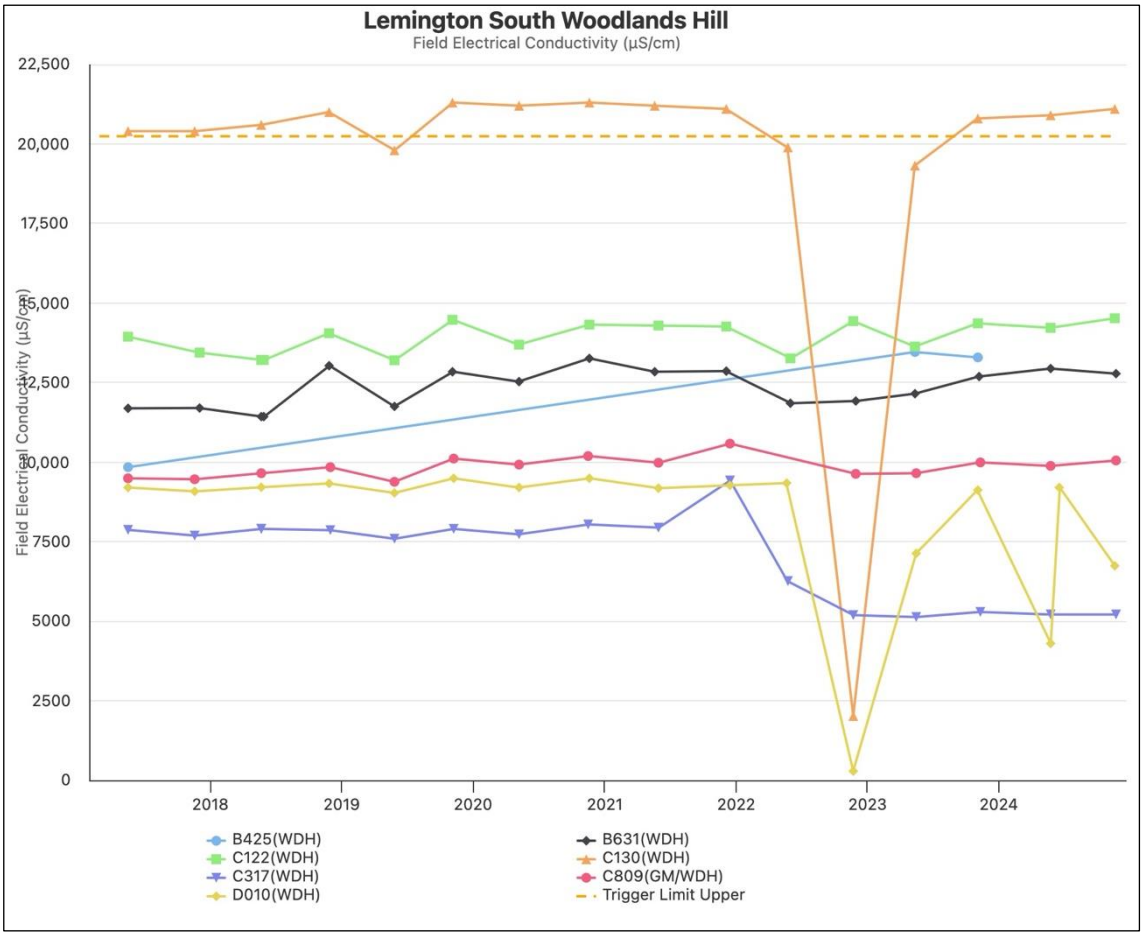

Figure 7-59: Lemington South Woodlands Hill Groundwater EC Trends 2017 - 2024

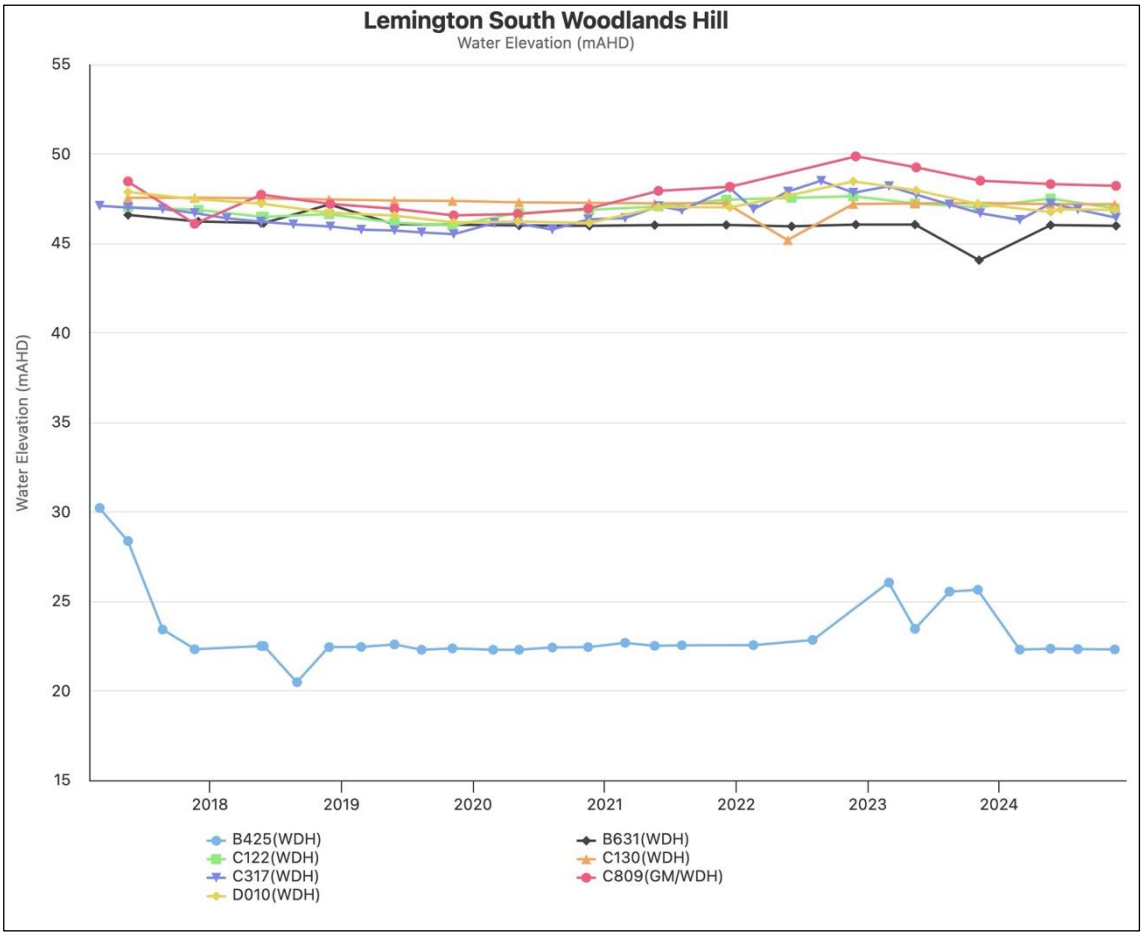

Figure 7-60: Lemington South Woodlands Hill Groundwater SWL Trends 2017 - 2024

7.5.18 | LEMINGTON SOUTH GLEN MUNRO

pH, EC and SWL trends at Lemington South Glen Munro from 2017 to 2024 are shown in **Figure 7-61** to **Figure 7-63**. Water quality results were generally consistent with historical trends.

EC levels for D010(GM) were above trigger level in Q2 and Q4. The assignment of trigger values has been removed for bore D010(GM) in the draft WMP that has been submitted to DPHI for approval.

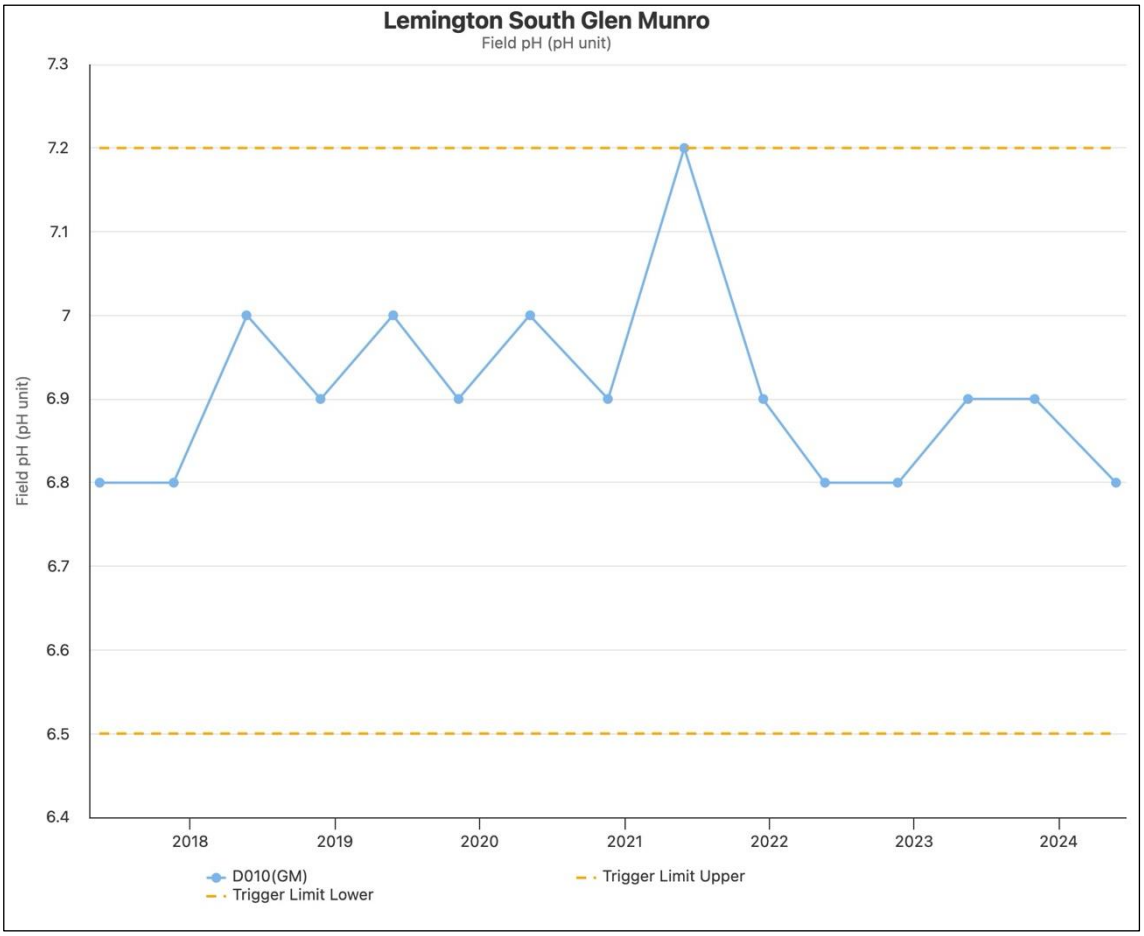

Figure 7-61: Lemington South Glen Munro Groundwater pH Trends 2017 - 2024

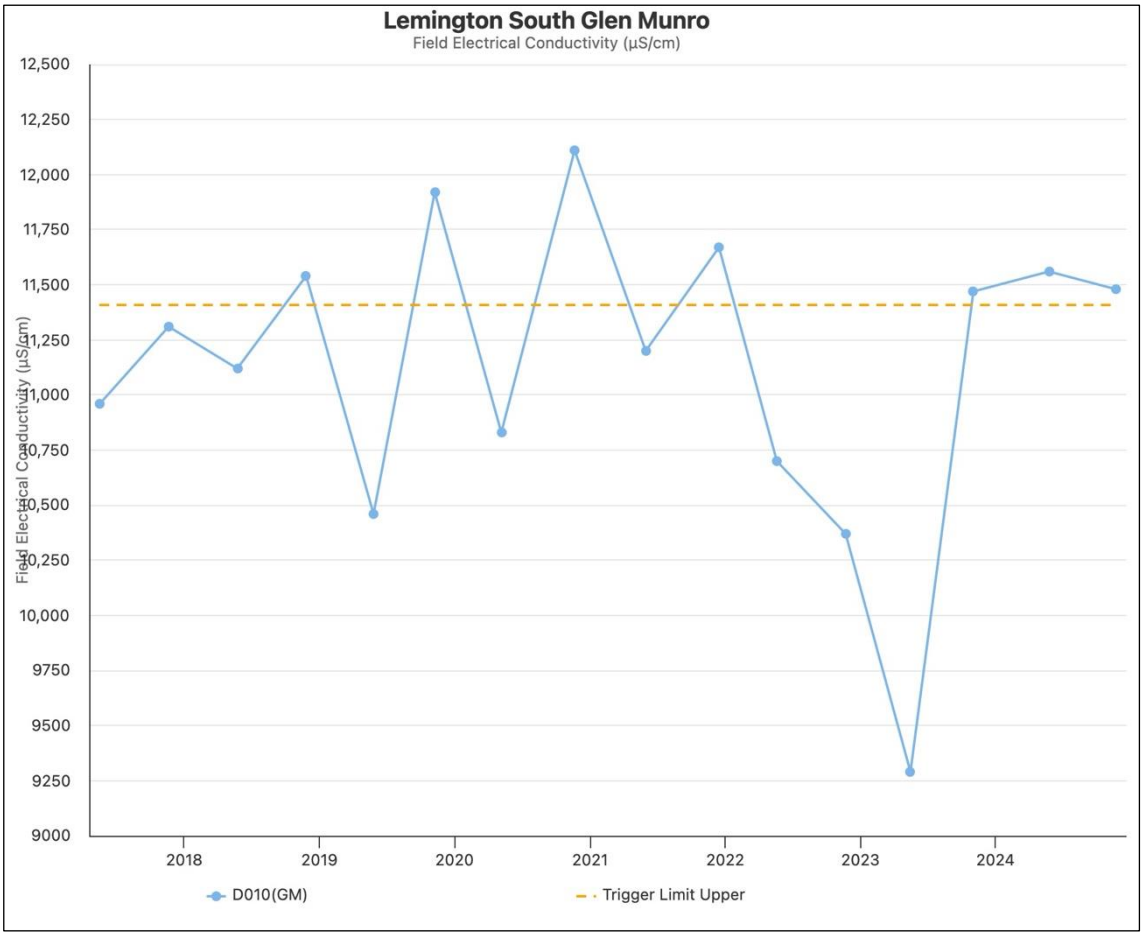

Figure 7-62: Lemington South Glen Munro Groundwater EC Trends 2017 - 2024

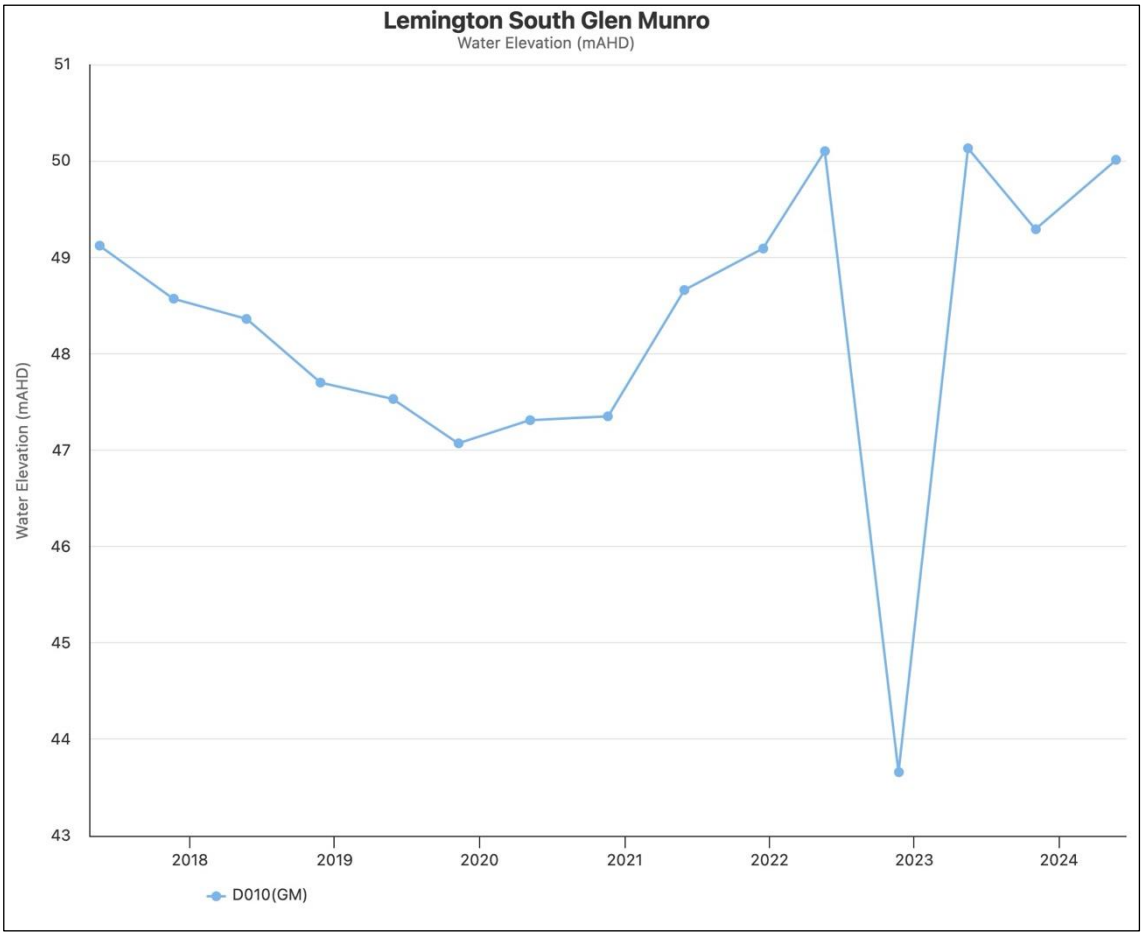

Figure 7-63: Lemington South Glen Munro Groundwater SWL Trends 2017 - 2024

7.5.19 | NORTH PIT SPOIL

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-64** to **Figure 7-66**. Groundwater within the spoil flows from northern-most bore DM1 in a southerly direction towards the southern-most bore MB14HVO03. EC and pH were found to generally be within historical levels.

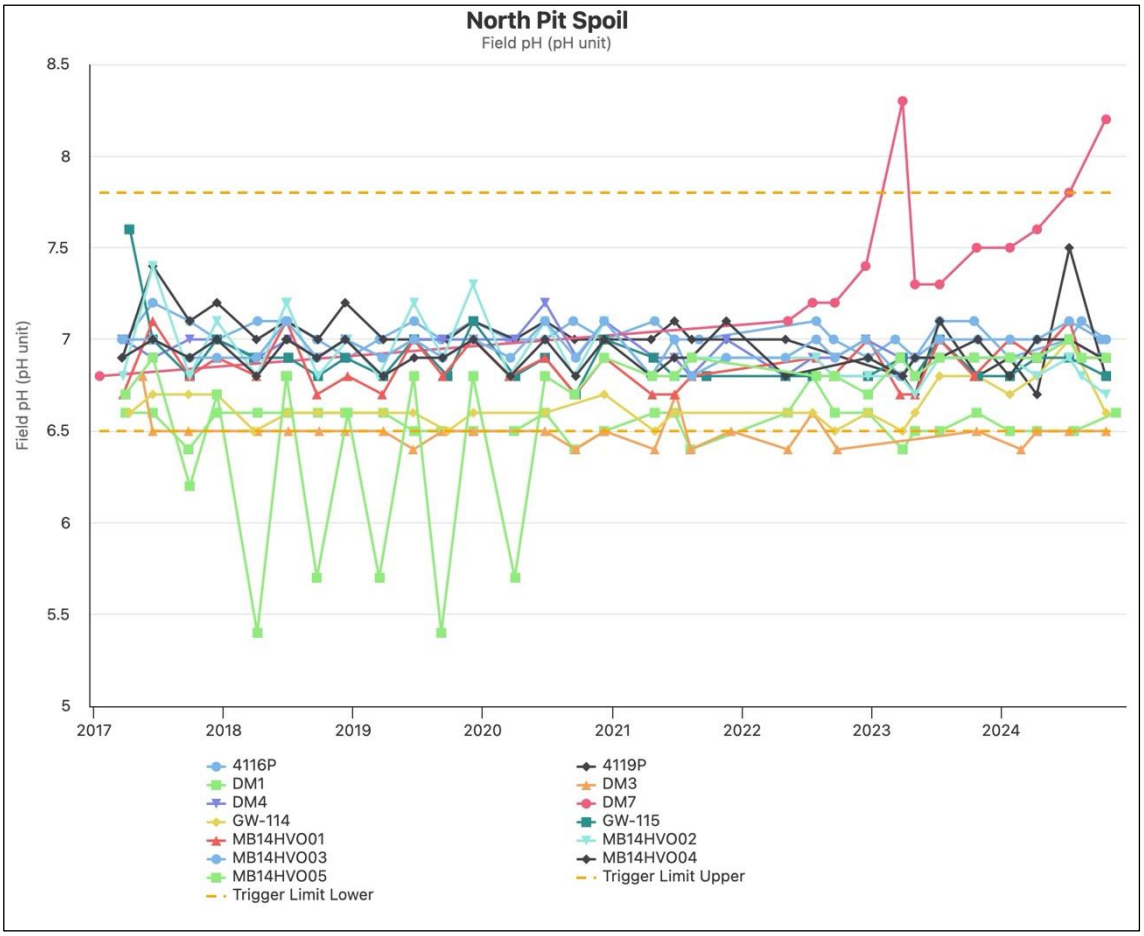

Figure 7-64: North Pit Spoil Groundwater pH Trends 2017 - 2024

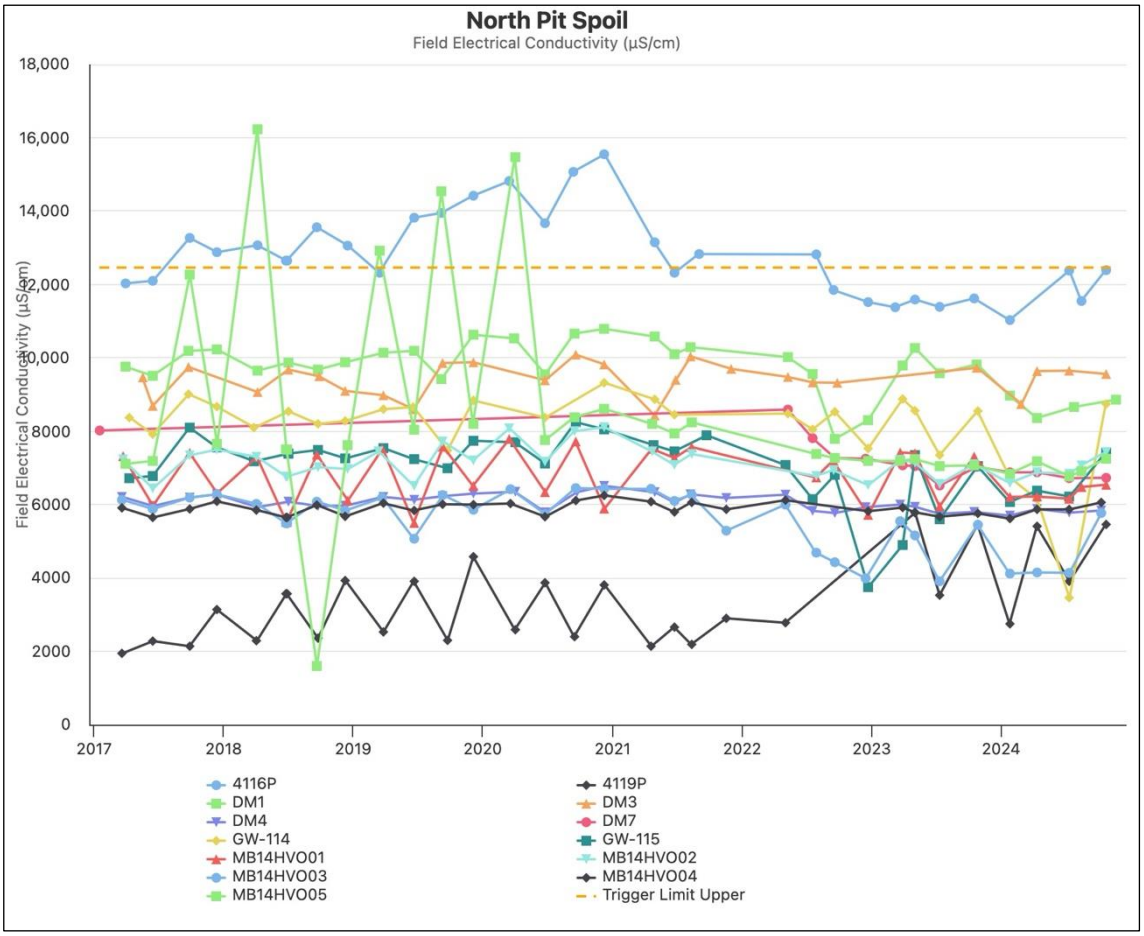

Figure 7-65: North Pit Spoil Groundwater EC Trends 2017 – 2024

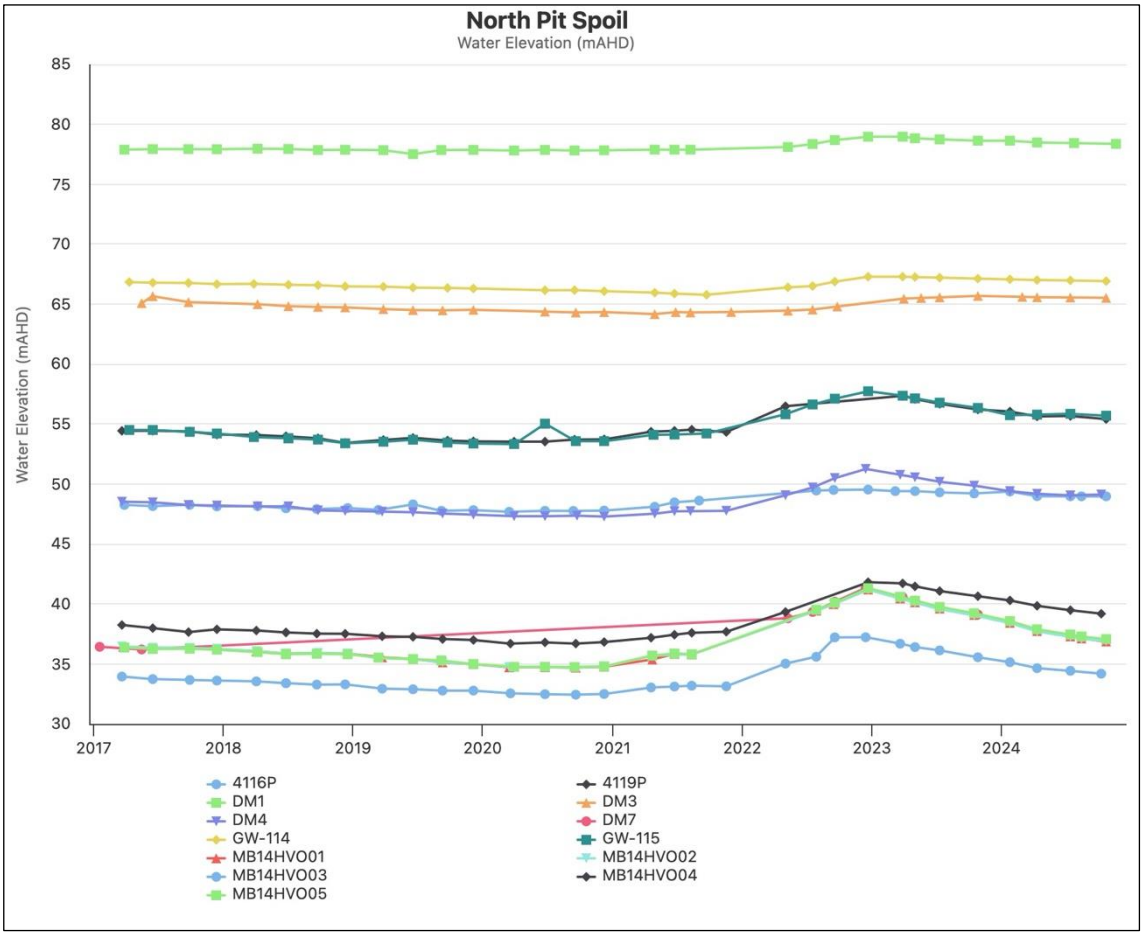

Figure 7-66: North Pit Spoil Groundwater SWL Trends 2017 - 2024

7.5.20 | WEST PIT ALLUVIUM

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-67** to **Figure 7-69**. Bore GW-101 was unable to be sampled due to insufficient water and lack of access throughout 2024. Water quality results were generally consistent with historical trends.

Bores G1, G2 and G3 continued to be monitored on a monthly basis during the reporting period. Monitoring in bores GW-100 and GW-101 was undertaken quarterly in accordance with the HVO Groundwater Monitoring Programme.

Bore GW-100 recorded consecutive EC readings above the trigger level for 2024. Prior to 2023, EC concentrations remained relatively stable. The EC exceedances are understood to be due to declining groundwater levels. Trends will continue to be monitored to determine if they are related to mining activities. Further detail on this exceedance is presented in **Appendix B:**

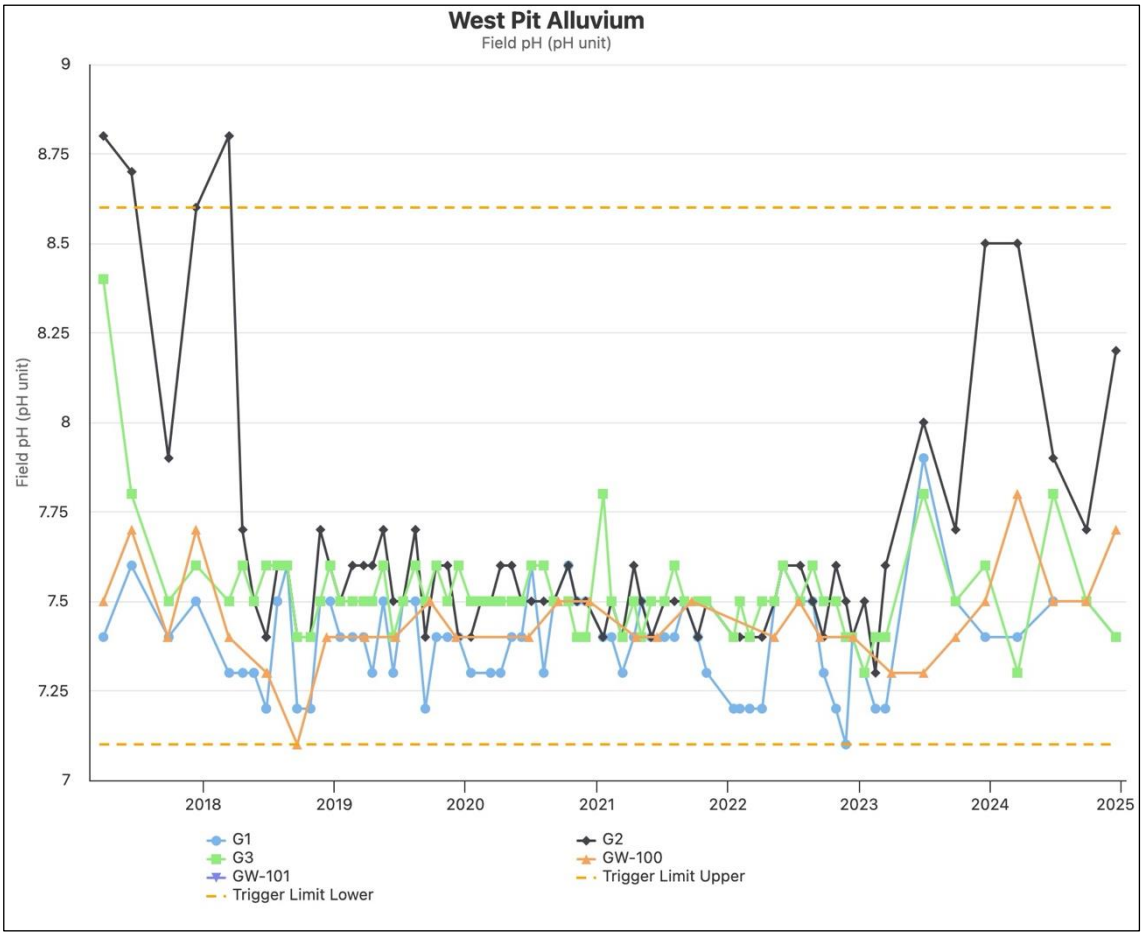

Figure 7-67: West Pit Alluvium Groundwater pH Trends 2017 - 2024

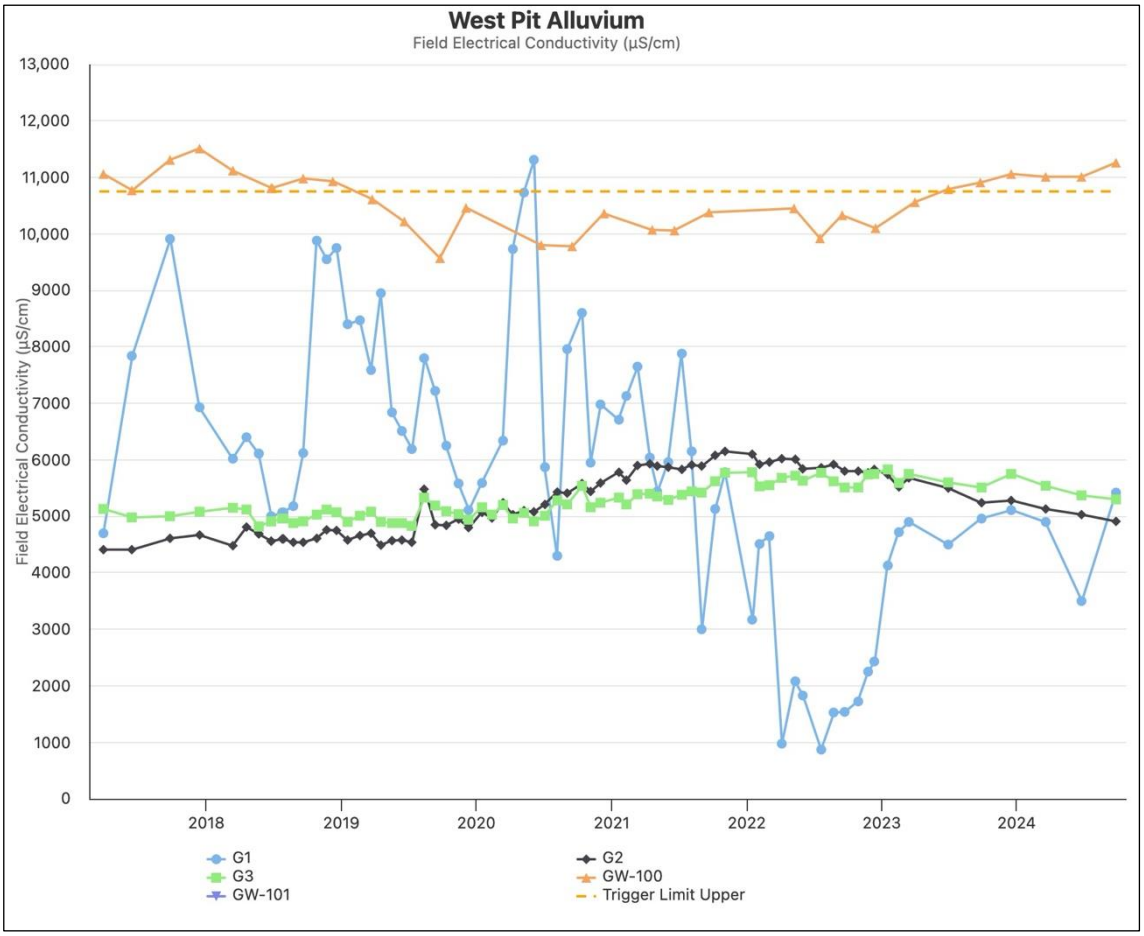

Figure 7-68: West Pit Alluvium Groundwater EC Trends 2017 - 2024

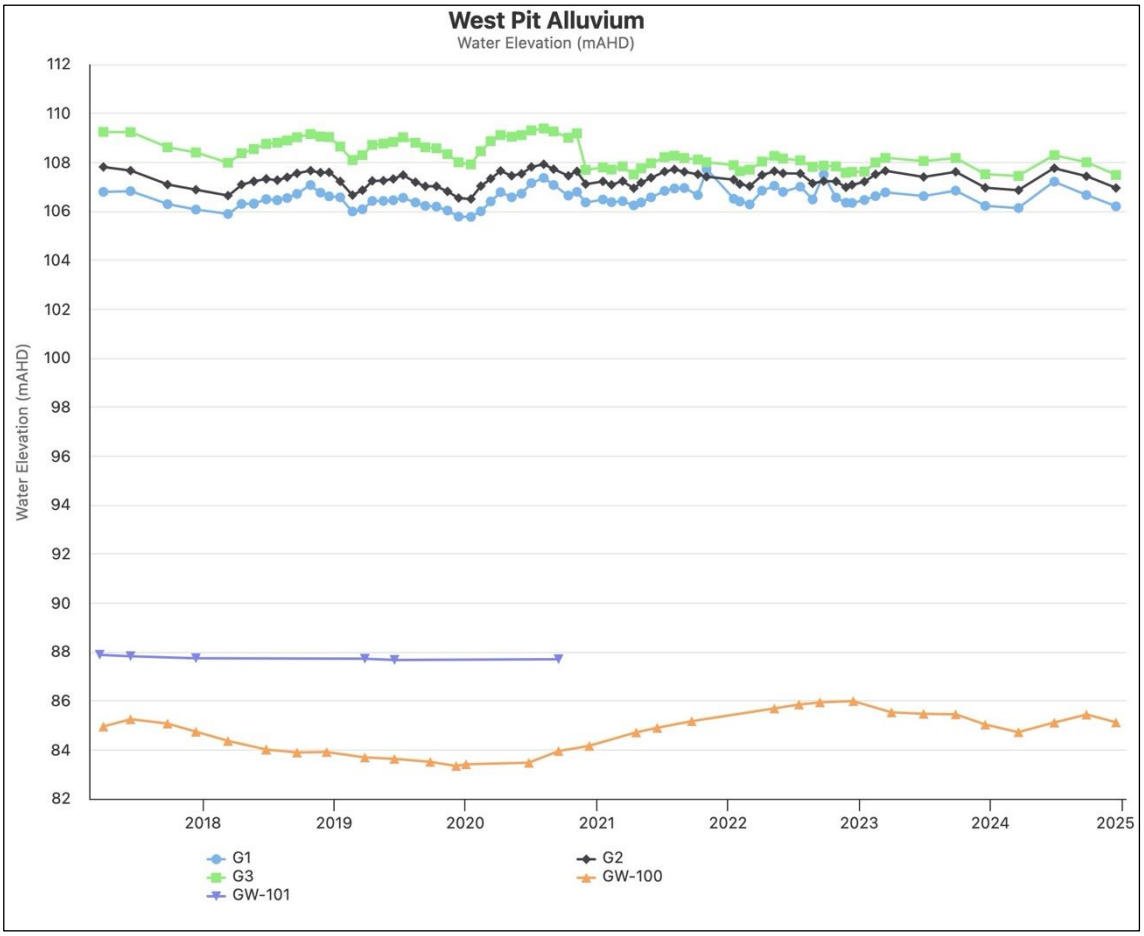

Figure 7-69: West Pit Alluvium Groundwater SWL Trends 2017 - 2024

7.5.21 | WEST PIT SANDSTONE/SILTSTONE

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-70** to **Figure 7-72**. Water quality results were generally consistent with historical trends.

EC was above trigger limit at NPZ2 for all readings during the monitoring period. NPZ2 is located northwest of West Pit beyond the outcrop of coal seams mined at West Pit and intersects Interburden sequences beneath the coal seams. EC readings range from 12,590 µS/cm (December 2014) and 19,400 µS/cm (December 2009). The 2024 readings are consistent with historical concentrations. The 2019 Groundwater Network Review (SLR, 2019a) noted that the bore is unlikely to detect relevant site impacts and recommended removal from the compliance monitoring network but kept in operational monitoring network for future work. The bore has already been removed from the compliance monitoring network in version 3.4 of the WMP which is currently with DPHI for approval.

Further discussion of NPZ2 levels is presented in **Table 6.2** of **Appendix B:**

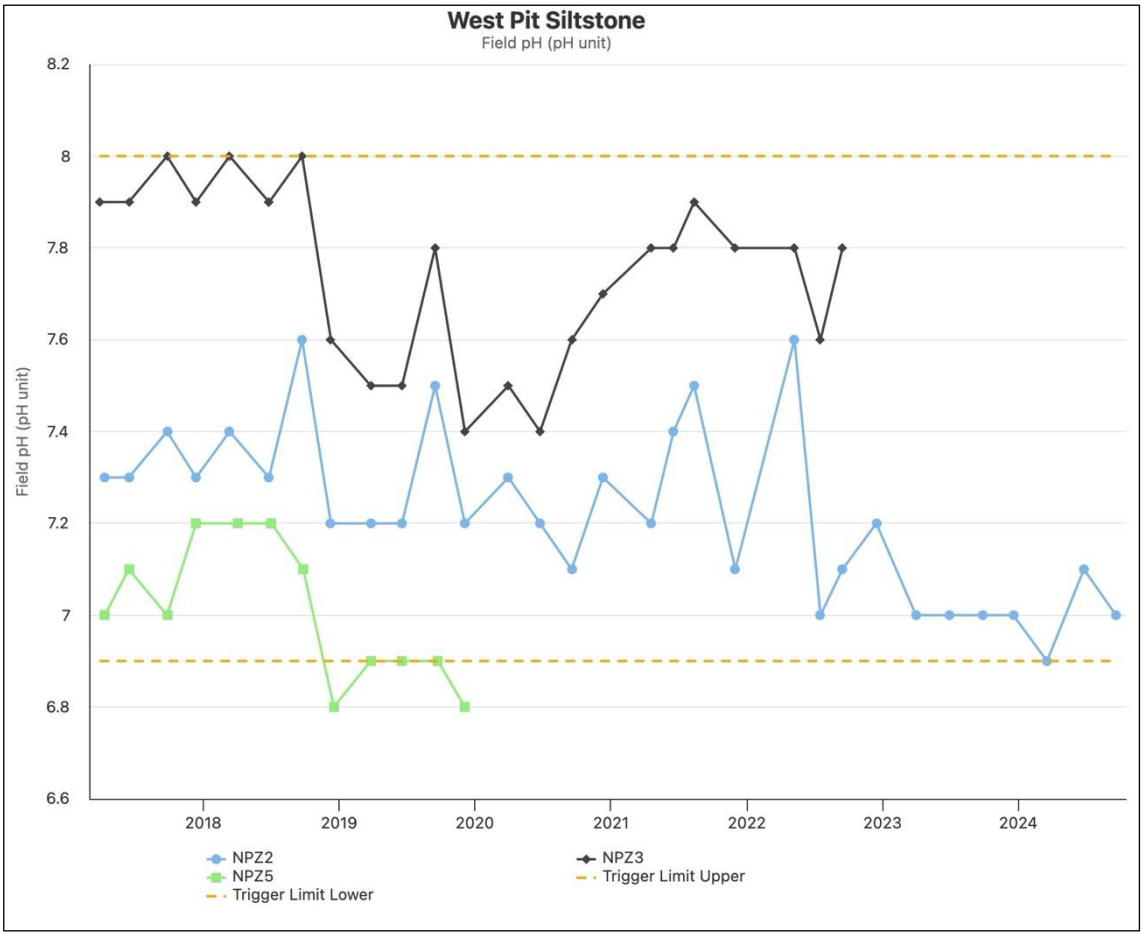

Figure 7-70: West Pit Sandstone/Siltstone Groundwater pH 2017 - 2024

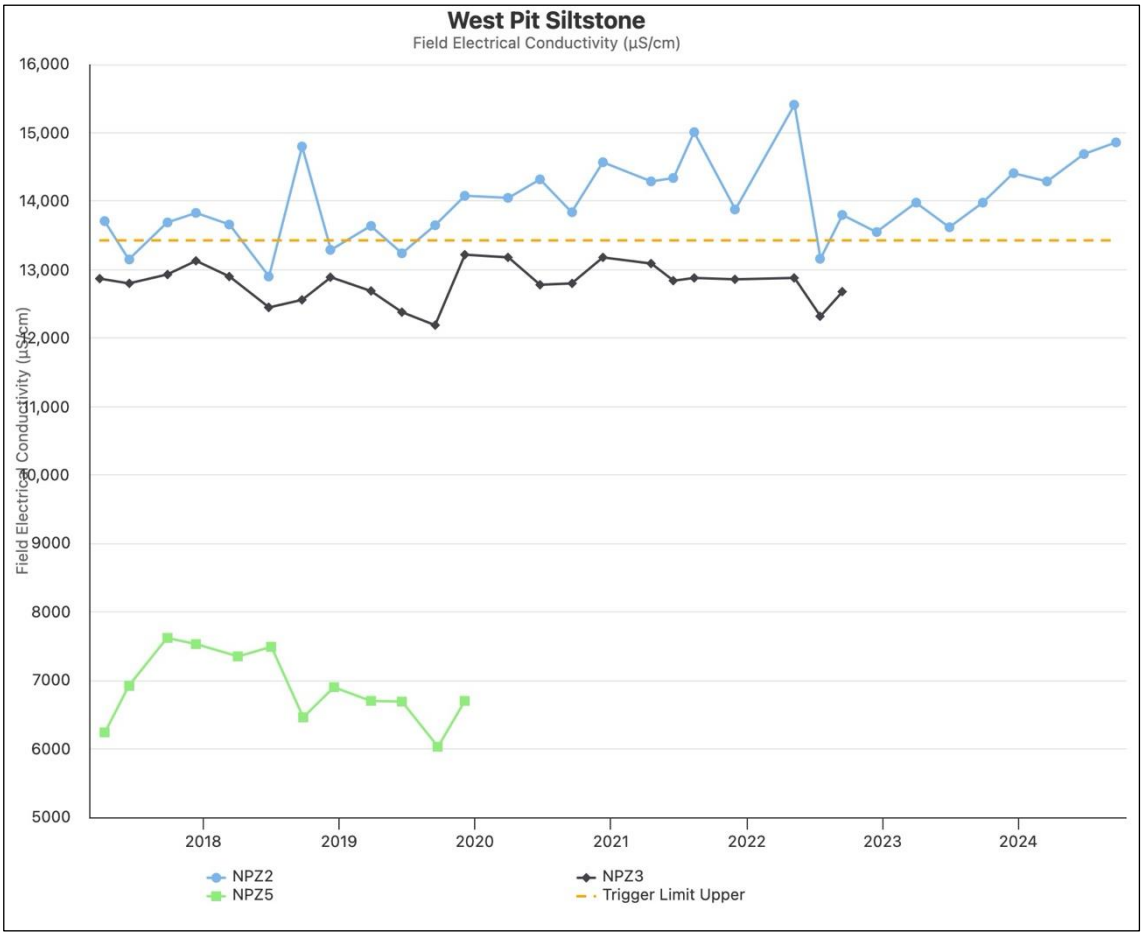

Figure 7-71: West Pit Sandstone/Siltstone Groundwater EC Trends 2017 - 2024

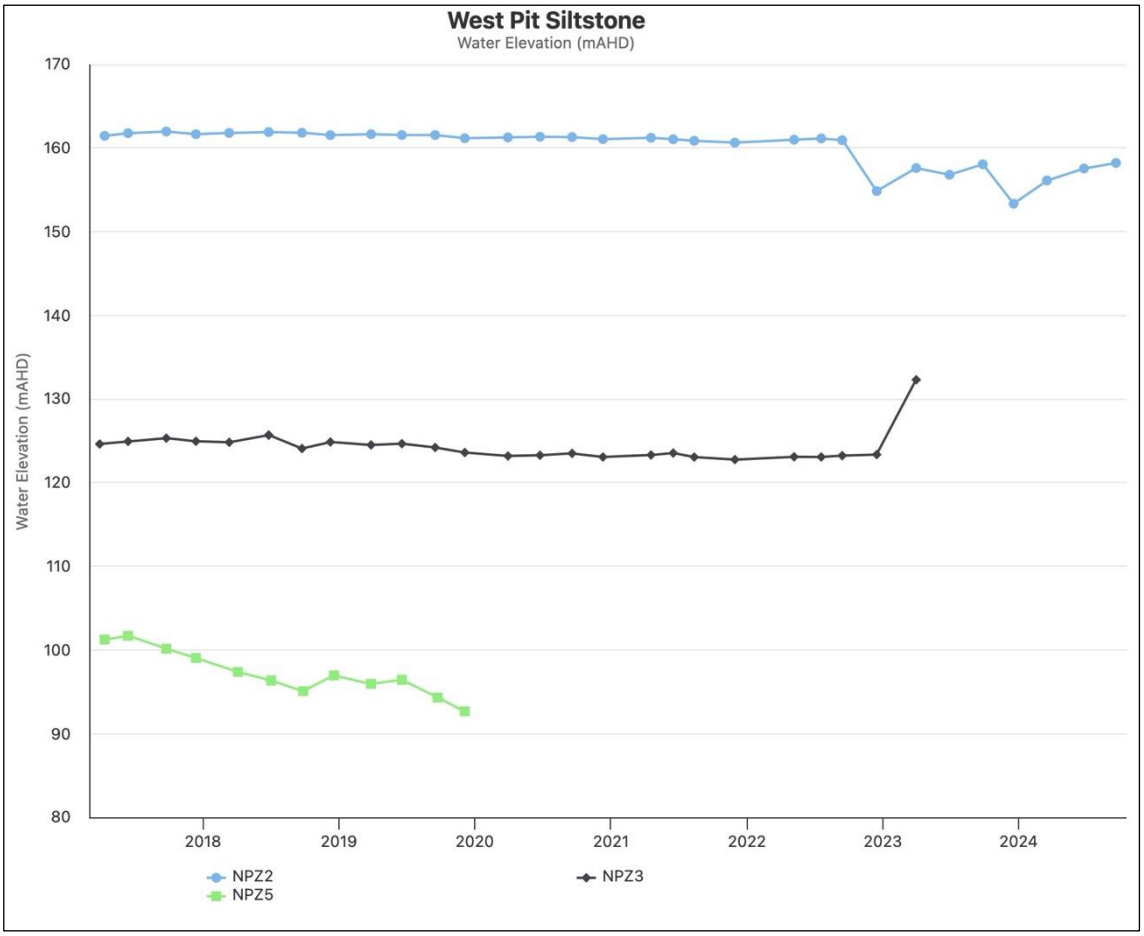

Figure 7-72: West Pit Sandstone/Siltstone Groundwater SWL Trends 2017 – 2024

7.5.22 | CARRINGTON WEST WING BAYSWATER

The pH, EC and SWL trends for 2017 to 2024 are shown in **Figure 7-73** to **Figure 7-75**. Water quality results showed a drop in EC and SWL. Bore CGW46 recorded pH below the lower trigger level in Q1, Q2 and Q4. Historical pH readings for the bore since 2005 show regular fluctuations of between 7.1 and 7.8. The 2023 readings ranging from 7.0 to 7.3 are considered consistent with historical concentrations, with no adverse impacts identified. The bore was successfully cleaned and purged by AECOM during 2024 and was reassessed using a borehole camera during 2024.

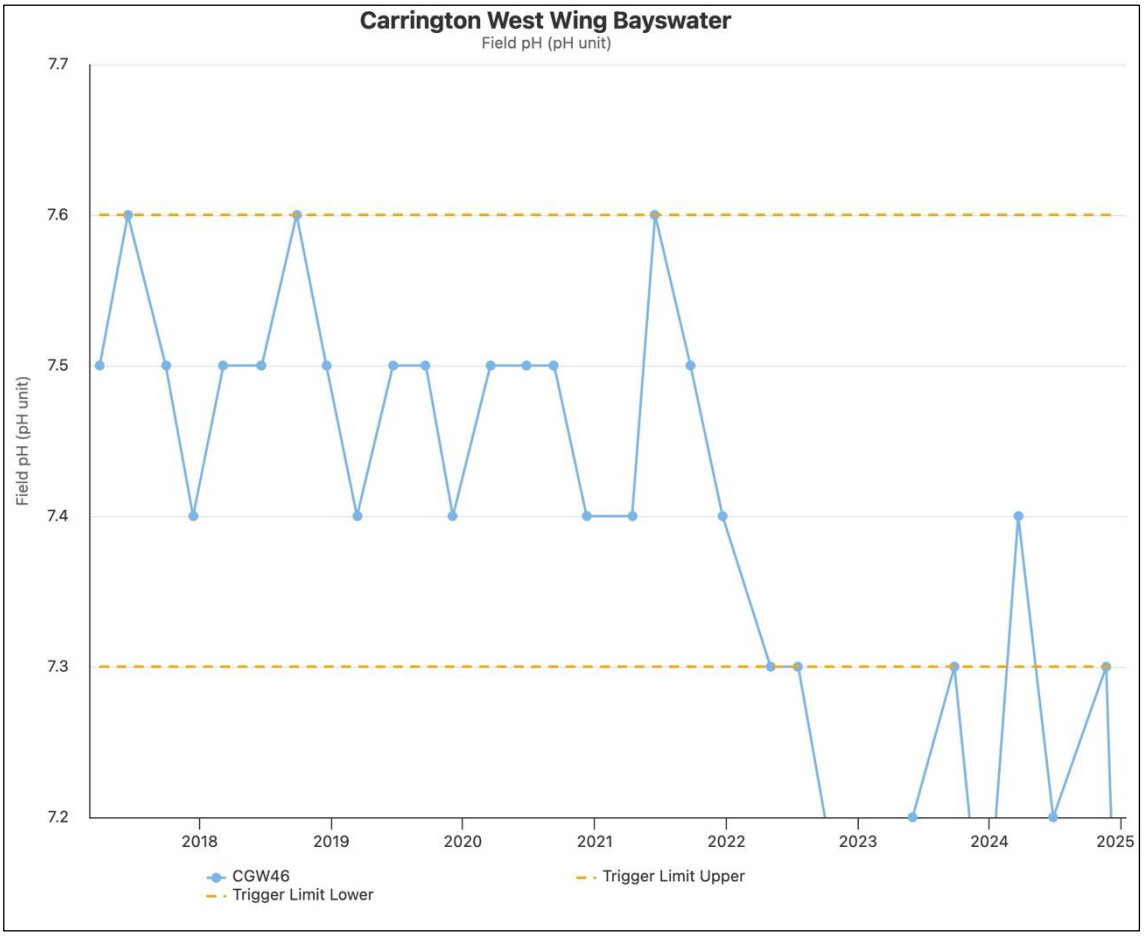

Figure 7-73: Carrington West Wing Bayswater Groundwater pH Trends 2017 to 2024

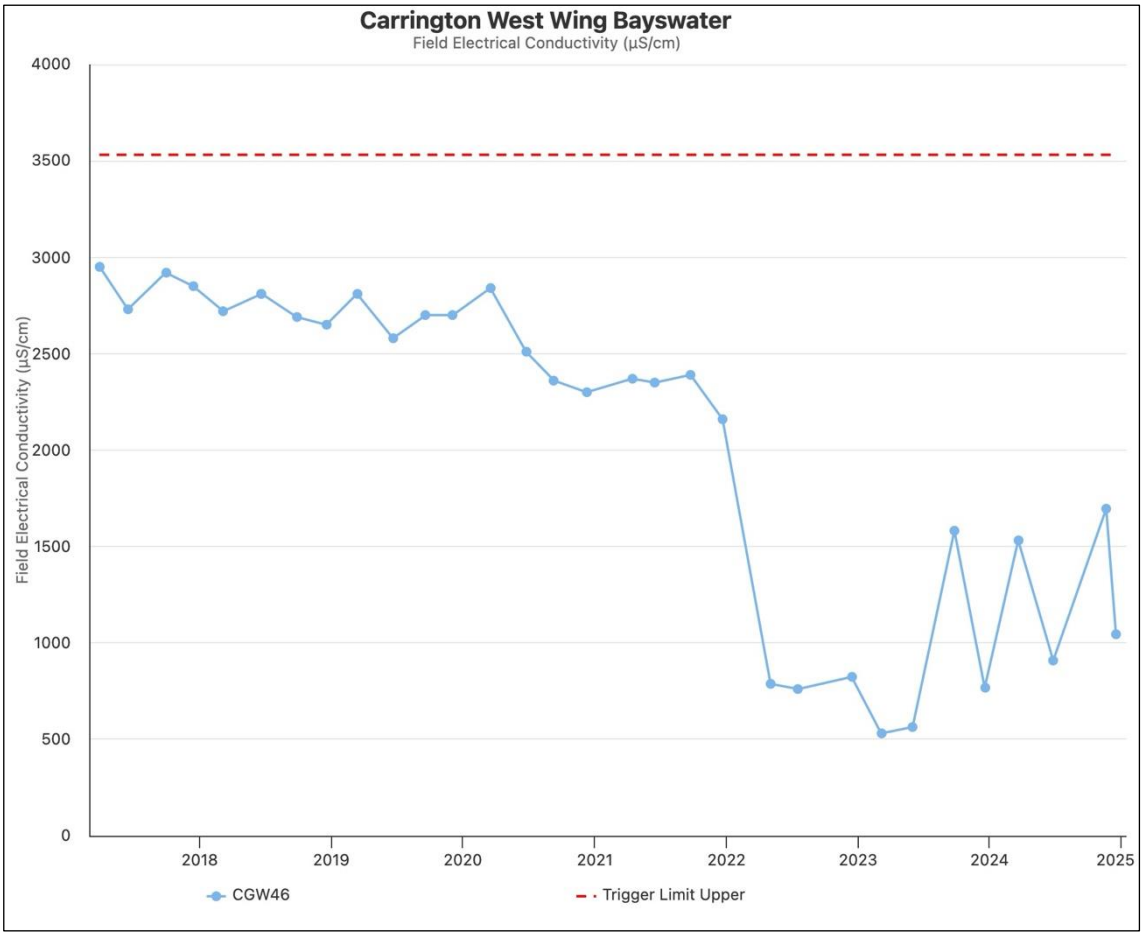

Figure 7-74: Carrington West Wing Bayswater Groundwater EC Trends 2017 to 2024

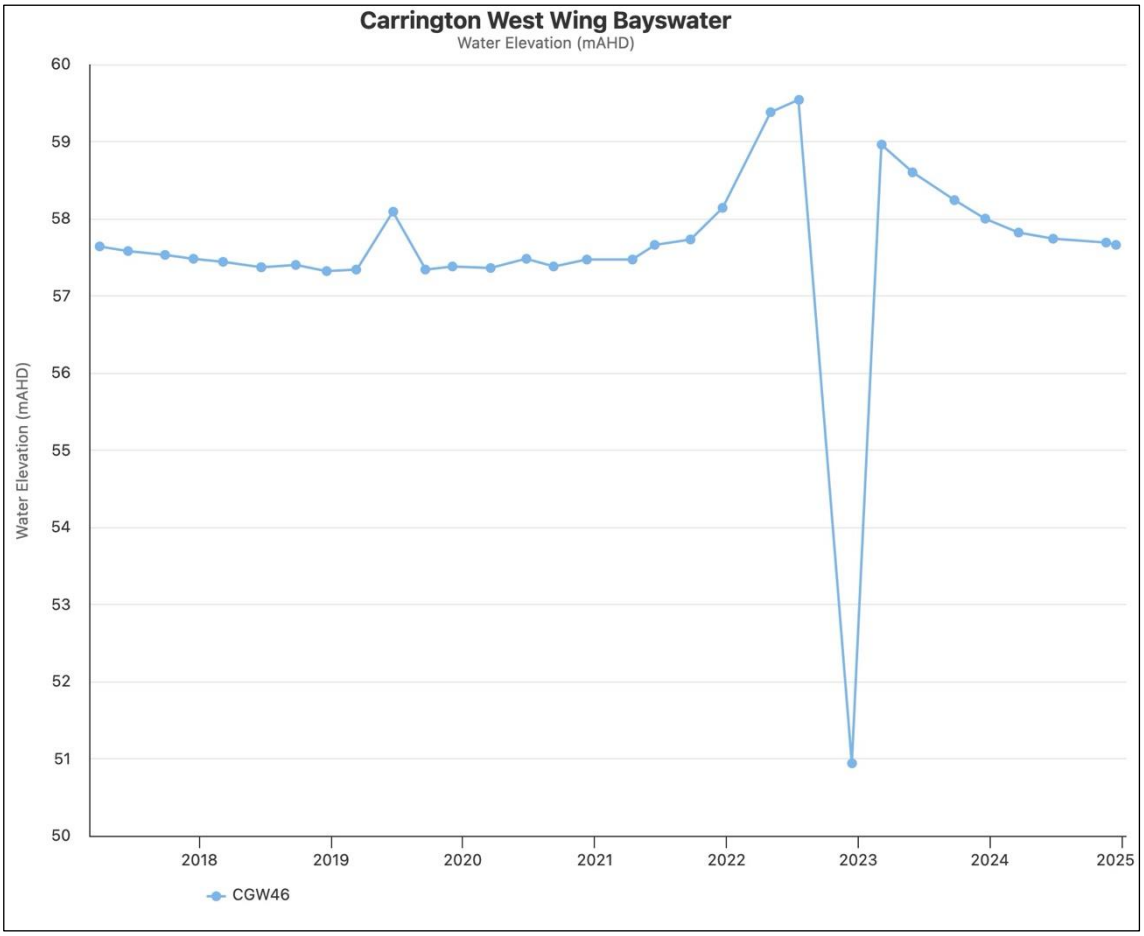

Figure 7-75: Carrington West Wing Bayswater Groundwater SWL Trends 2017 to 2024

7.6 | COMPENSATORY WATER SUPPLY

During 2024 HVO did not provide compensatory water supply or alternate compensation in lieu of compensatory water supply under any new or existing agreements, and circumstances which may trigger a requirement to provide a compensatory water supply were not identified.

7.7 | PROGRESS AGAINST RECOMMENDATIONS IN 2022 ANNUAL GROUNDWATER REVIEW

A number of recommendations were made in the Annual Groundwater Monitoring Review produced by Umwelt (Appendix B of the 2023 Annual Review) in **Section 9**. Progress against these actions is shown in

Table 7-6**.**

Table 7-6: Progress Against Recommendations in 2023 Annual Groundwater Review

Recommendation	Progress in 2024
4051C - Bore is blocked. Recommend the condition of the bore is checked with a downhole camera and if bore is irreparable, it should be removed from the WMP.	Bore repaired and monument reinstated in Q1 2025.
B425(WD) - Verify the depth of the base of screen and total depth. If current bore details are correct the bore should be removed from the WMP, and ongoing monitoring be conducted at nearby bore C130(WDH). Groundwater levels have been below the base of the screen at B425(WDH) since 2017.	Depth of base of screen and total depth verified in 2024. It is noted that B425(WDH) has been removed from revised WMP which is awaiting DPHI approval.
BZ2A(1) - Water quality exceedance during the reporting period. Recommend the bore condition and construction details are checked and the pH trigger levels be reviewed. Comprehensive water quality analysis should be undertaken to help determine the cause of the declining pH trend. It is noted that the bore has already been removed from the compliance monitoring network in version 3.4 of the WMP which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval.
BZ3-3 - Water quality exceedance during the reporting period. The bore is a 25 mm diameter bore, which is hindering water quality sampling and should be removed from the monitoring schedule.. It is noted that the bore has already been removed from the compliance monitoring network in version 3.4 of the WMP which is currently with DCCEEW for approval.	Updated in revised WMP. Awaiting DPHI approval. Depth of base of screen and total depth confirmed in 2024.
BZ4A(2) - Provide screen interval depth collected in 2024 by AECOM. If current bore details are correct the bore should be removed from the WMP but kept as part of the operational monitoring network for ongoing monitoring of groundwater recovery post mining. Water quality samples should not be collected if the groundwater level is below the base of the screen.	Depth of base of screen and total depth confirmed. Water level below screen, water samples not taken as too low. To be removed from WMP.
C130(WDH) - Revise EC and pH trigger levels in the draft WMP as water quality data trends indicate the trigger will continue to exceed the trigger levels in the draft WMP which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval. Bore purged and re-sampled Q1 2025.
C630(BFS) - Water quality exceedance during the reporting period. Recommend that the proposed pH and EC trigger levels are revised before finalising version 3.4 of the WMP which is currently with DPHI for approval.	PH & EC trigger levels revised by Groundwater specialist prior to submitting WMP v3.4.
CFW55R - Groundwater level trigger exceedance during the reporting period. Revised water level trigger level already updated in version 3.4 of the WMP, which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval.
CFW55R - Water quality exceedance during the reporting period. It is noted that the trigger level has already been reviewed and updated to 11,510 µS/cm in version 3.4 of the WMP which is currently with DPHI for approval. Current EC readings will be below the revised trigger level.	Updated in revised WMP. Awaiting DPHI approval.
CFW57 - Groundwater level trigger exceedance during the reporting period. Revised water level trigger level already updated in version 3.4 of the WMP, which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval.

Recommendation	Progress in 2024
CGW39 - Check the condition and location of the bore and confirm if it is screened within alluvium or spoil.	Screens inspected with camera in 2024. Nothing visible of concern to note.
CGW45 - Bore has been blocked and unable to be monitored since 2018. Bore has been checked and an extension has been added to increase the height of the casing above the ground surface to avoid further blockages. Work is continuing to clear the existing blockage and reinstating the bore.	Bore scheduled to be unblocked Q2 2025.
CGW51a - Bore CGW51a should be decommissioned to minimise potential mixing due to the construction of the bore and a new bore be installed within the spoil material to replace CGW51a. It is noted that bore CGW51a has been removed from the draft WMP which is awaiting approval.	Updated in revised WMP. Awaiting DPHI approval. New bore scheduled for installation in 2025.
CGW53a - Groundwater level trigger exceedance during the reporting period. Revised water level trigger level already updated in version 3.4 of the WMP, which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval.
CGW55a - Groundwater level trigger exceedance during the reporting period. Revised water level trigger level already updated in version 3.4 of the WMP, which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval.
D510(AFS) - Bore blocked in May 2022. Check condition of bore and casing with a downhole camera. If unable to be remediated, remove from the WMP.	Bore blocked and damaged. Remove from WMP. Bore repaired and monument reinstated January 2025.
G1 - The condition of bore G1 is checked to determine the cause of the water quality fluctuations.	Water quality results have been stable since January 2023. Potentially impacted previously to increased rainfall in 2022.
GW-103 - The sensors have been checked and are irreparable. The VWP will be removed from the draft WMP.	Updated in revised WMP. Awaiting DPHI approval.
GW-105 - Check the VWP sensors as the deepest sensor has failed and is no longer recording data.	The deepest sensor (VW3) has failed due to an open circuit and is no longer recording data. The sensor should be removed from the revised WMP and the monitoring schedule.
GW-106 - Water quality exceedance during the reporting period. It is noted that the bore has already been removed in version 3.4 of the WMP, which is currently with DPHI for approval.	Updated in revised WMP. Awaiting DPHI approval.
GW-109 - Check the VWP sensors as the deepest sensor (VW3) has failed and no longer recording data. Local site conditions and the condition of the GW-109 should be reviewed, and groundwater conditions within the spoil in Carrington Pit continue to be monitored to determine if the difference between sensors VW1 and VW2 is due to sensor drift or an additional source of recharge to the shallow stratigraphy.	Status of VW3 and site condition to be assessed during 2024. Results seem consistent after new battery installation.
GW-110 - Calibration data from VWP installation required, if available, to convert raw data to water levels.	Calibration data unavailable for conversion. To be decommissioned as per recommendation in Annual GW Report Appendix

Recommendation	Progress in 2024
NPz2 - Water quality exceedance during the reporting period. It is noted that the bore has already been removed from the compliance monitoring network in version 3.4 of the WMP which is currently with DPHI for approval. Bores NPz2 and NPz3 remain in the monitoring program to assist with future assessments and assessment of post closure groundwater conditions.	Updated in revised WMP. Awaiting DPHI approval. Bore NPz3 scheduled for replacement Q4 2025.

8 | REHABILITATION AND LAND MANAGEMENT

8.1 | SUMMARY OF REHABILITATION

Rehabilitation at HVO is undertaken in accordance with commitments made in 2024-2026 Forward Works Program (FWP) and Rehabilitation Management Plan (RMP).

A summary of the key rehabilitation performance indicators is shown in **Table 8-1**.

Table 8-1: Key Rehabilitation Performance Indicators

Mine Area Type	Previous Reporting Period (Actual) Year 2023 (ha)	This Reporting Period (Actual) Year 2024 (ha)	Next Reporting Period (Forecast) Year 2025 (ha)
A. Total disturbance footprint[1]	6964.78	7233.83	7393.18
B. Total active disturbance[2]	4161.10	4303.28	4473.62
C. Growth medium development[3]	138.69	44.75	34.00
D. Land under active rehabilitation[4]	2803.69	2930.55	2919.56
E. Completed rehabilitation[5]	0.00	0.00	0.00

8.2 | REHABILITATION OVERVIEW

A summary of rehabilitation completed in 2024 is shown in Error! Not a valid bookmark self-reference..

[1] **Total mine footprint** includes all areas within a mining lease that either have at some point in time or continue to pose a rehabilitation liability due to mining and associated activities. As such it is the sum of total active disturbance, decommissioning, landform establishment, growth medium development, ecosystem establishment, ecosystem development and relinquished lands (as defined in NSW RR Guidelines). Please note that subsidence remediation areas are excluded

[2] **Total active disturbance** includes all areas ultimately requiring rehabilitation such as: on-lease exploration areas, stripped areas ahead of mining, infrastructure areas, water management infrastructure, sewage treatment facilities, topsoil stockpiles areas, access tracks and haul road, active mining areas, waste emplacements (active/unshaped/in or out-of-pit), and tailings dams (active/unshaped/uncapped).

[3] **Growth medium development** – includes the sum of mine disturbed land that is under the following rehabilitation phases – decommissioning, landform establishment and growth medium development (as defined in NSW RR Guidelines).

[4] **Land under active rehabilitation** – includes areas under rehabilitation and being managed to achieve relinquishment – includes the following rehabilitation phases– "ecosystem and land use establishment" or "ecosystem land use development" as described in the NSW RR Guidelines

[5] **Completed rehabilitation** – requires formal sign off by the NSW RR that the area has successfully met the rehabilitation land use objectives and completion criteria.

Table 8-2: Summary of New Rehabilitation Completed in 2024

Rehabilitation Site Name	Rehabilitation Type	Seed Mix	Area (ha)	Summary
HVORIV202401	New Rehabilitation	Woodland	5.53	Final landform sown with final cover
HVOCHE202401	New Rehabilitation	Pasture	0.65	Final landform sown with final cover
HVOWES202401	New Rehabilitation	Pasture	0.71	Final landform sown with final cover
HVOWES202402	New Rehabilitation	Pasture	2.98	Final landform sown with final cover
HVORIV202402	New Rehabilitation	Pasture	6.89	Final landform sown with final cover
HVOCHE202402	New Rehabilitation	Woodland	25.54	Final landform sown with final cover
HVOCAR202402	New Rehabilitation	Pasture	27.17	Final landform sown with final cover
HVOCAR202401	GMD	Pasture	88.51	Final landform sown with final cover
TOTAL REHABILITATION			**157.98**	

8.3 | REHABILITATION PERFORMANCE

A total of 157.98 ha rehabilitation was undertaken during 2024, including 69.47 ha of new rehabilitation, and 88.51 ha of Growth Media Development (GMD) progression. Details of the rehabilitation areas completed during 2024 are provided in Error! Reference source not found. and Error! Reference source not found..

Table 8-3 details the amount of rehabilitation and disturbance completed during the reporting period compared with proposed area in the respective FWP.

Table 8-3: Summary of Rehabilitation and Disturbance Completed in 2024

FWP	2023 Totals (ha)	
	Actual	Proposed FWP (2023)
Rehabilitation		
HVO North	30.86	30.54
HVO South	38.61	38.41
GMD North	88.51	88.51
GMD South	0	0
HVO Total	157.98	157.46
Rehabilitation Disturbance		
HVO North	20.01	6.53
HVO South	14.85	9.90
HVO Total	34.86	16.44
New Disturbance		
HVO North	262.70	320.72
HVO South	0.00	63.82
HVO Total	262.70	384.55
Net Rehabilitation (Rehabilitation minus Rehabilitation Disturbance)		
HVO Total (Rehab)	HVO Total (Rehab Disturbance)	HVO Total
157.98	34.86	123.12

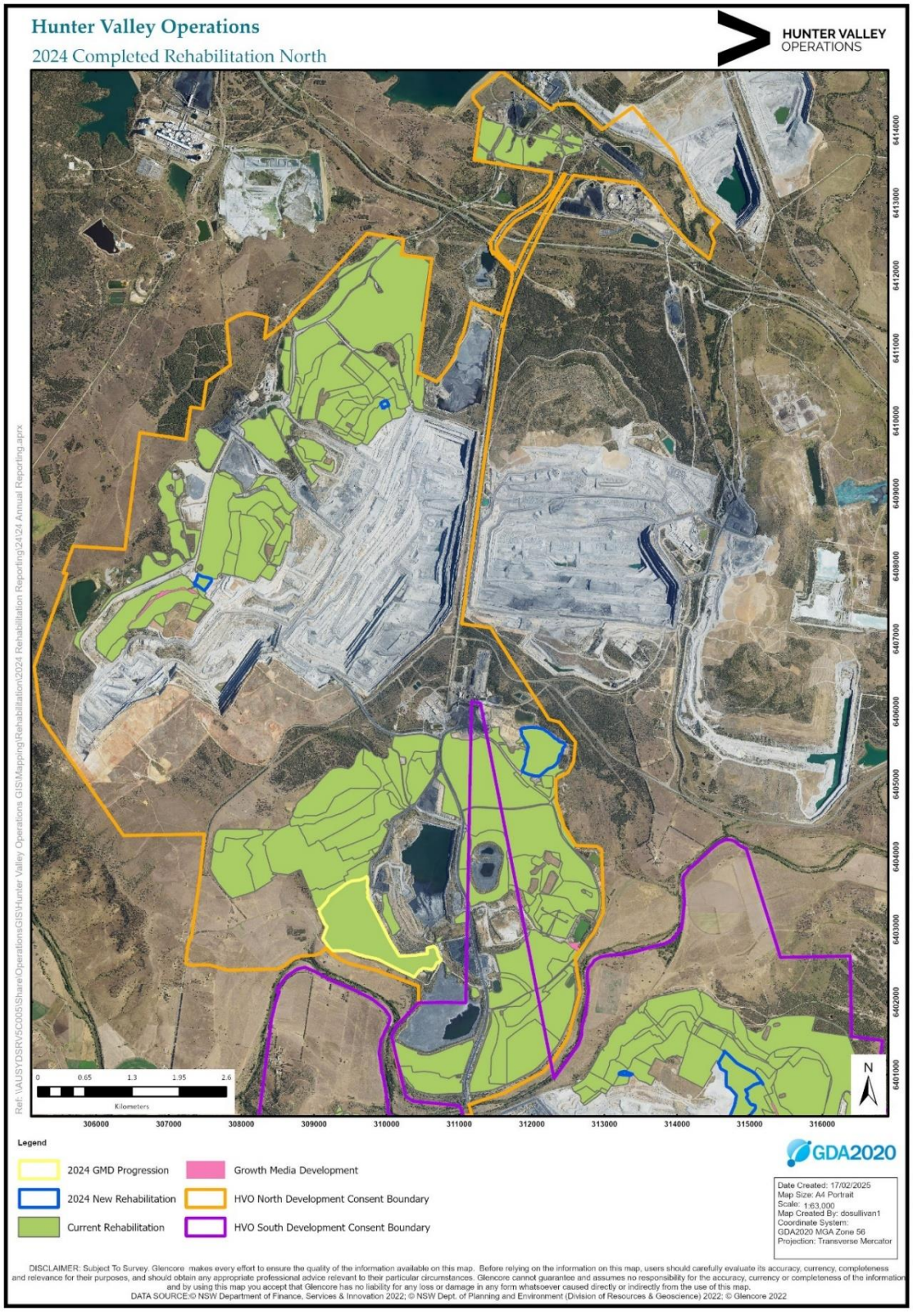

Figure 8-1: HVO Rehabilitation Areas – North

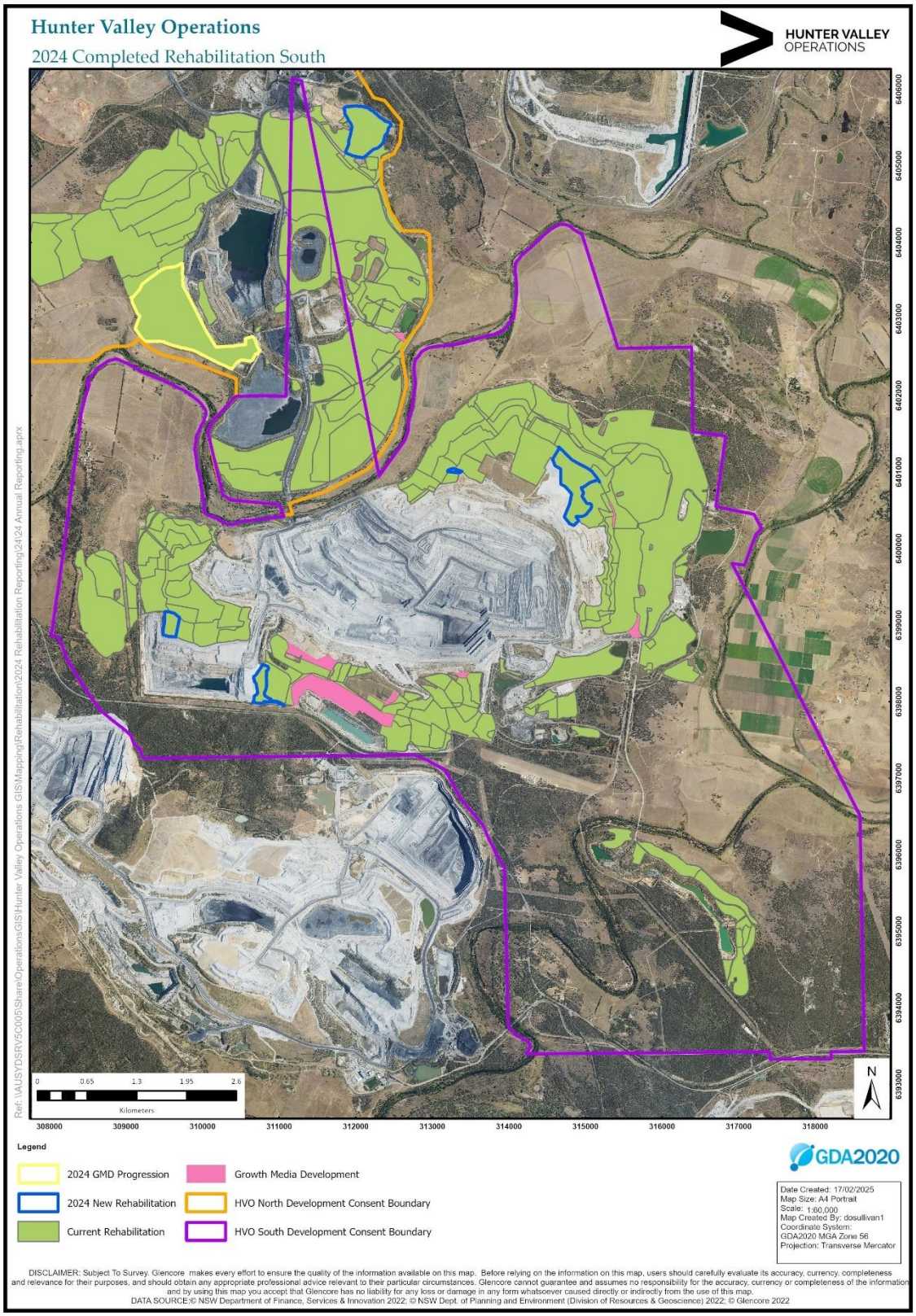

Figure 8-2: HVO Rehabilitation Areas - South

A comparison of rehabilitation progression against predictions in the *HVO West Pit Extension and Minor Modifications Environmental Impact Statement (EIS) (October 2003*) and subsequent modifications to the HVO North approval (DA 450-10-2003) indicates that rehabilitation progression is generally consistent with EIS predictions. Planning approval modifications that changed the rate of rehabilitation progression at HVO North include: Carrington East Extension (Modification 2 - 2006); Carrington Out-of-Pit TSF (Modification 4 - 2014); and Carrington In-Pit TSF (Modification 6 - 2014). When the modifications listed above are taken into account the EIS projection for cumulative rehabilitation area at the end of 2018 was 1,766.9 hectares. The EIS projection for average annual rehabilitation between 2018 (Year 14) and 2024 (Year 20) is 26.2 hectares hence projected rehabilitation at the end of 2024 was 1950.30 hectares. Land under active rehabilitation at HVO North at the end of 2024 totalled 1,810.51 hectares. A further 3.27 hectares is classified as within growth medium development phase representing a total rehabilitation management footprint at end of 2024 of 1,1813.78 hectares. This is below EIS predictions due to the rate of mining progression in HVO North being slower than forecast in the EIS and hence effecting areas available for rehabilitation.

As at the end of 2024, rehabilitation progress for HVO South is consistent with the predictions in the Hunter Valley Operations South - Modification 5 (2017) although with similar considerations to HVO North with respect to current rehabilitation phase classifications. The EIS projection for cumulative rehabilitation area at the end of Stage 2 (Year 2022) was 1,114 hectares The EIS projection for average annual rehabilitation between Stage 2 and Stage 3 (Year 2026) is 22 hectares hence projected rehabilitation at the end of 2024 was 1158 hectares. Land under active rehabilitation at the end of 2024 was 1,109.70 hectares in association with 41.47 hectares in growth medium development phase with the total rehabilitation management footprint at end 2024 totalling 1151.17 hectares and therefore consistent with EIS progression.

8.4 | REHABILITATION PROGRAMME VARIATIONS

The 2024 variations to the rehabilitation programme are summarised in **Table 8-4**.

Table 8-4: Variations to the Rehabilitation Program in 2024

FWP	Has rehabilitation work proceeded generally in accordance with the conditions of an accepted Rehabilitation Management Plan?	Comment
HVO South	Yes	HVO South net rehabilitation (net rehabilitation = rehabilitation minus – rehabilitation disturbance) completed during period 2024 was 23.76. HVO North net rehabilitation (net rehabilitation = rehabilitation minus – rehabilitation disturbance) completed during period 2024 was 99.36. Both areas are progressing in line with FWP forecasts **Historic rehabilitation** Following receipt of a Section 240 notice issued 18/7/19 from the Resources Regulator, rehabilitation in the GMD phase that was only sown with a cover crop was re-classified from completed to temporary rehab. HVO has since commenced a program of re-sowing these areas with its final land use species. Further information is provided in **Section 8.9.2**. During 2024, 88.51 ha of GMD was progressed to final cover in HVO North.
HVO North	Yes	

8.5 | REHABILITATION TRIALS

No rehabilitation trials were conducted during 2024.

8.6 | KEY ISSUES THAT MAY AFFECT REHABILITATION

The first rehabilitation risk assessment for HVO was undertaken in 2022 and was used in the development of the RMP. This risk assessment was reviewed in 2024. There were no risks identified as being a high risk to rehabilitation establishment. The ten medium risks identified were

- Failure to identify topsoil types when salvaging/stockpiling (e.g. pasture vs woodland);
- Limited biological resources available for salvage;
- Soil (topsoil and/or subsoil) deficit for rehabilitation activities;
- Soils inadequate to support revegetation or agricultural land capability;
- Weed infestation limiting target species / community;
- Low tailings beach shear strength delays capping;
- TSF final landforms contained by constructed embankments not geotechnically stable;
- Weather and climatic influences (drought, flood) during initial establishment;
- Insufficient establishment of target species and limited species diversity; and
- Acacia Saligna infestations limiting target species/community

These key risks have been addressed in a rehabilitation Trigger Action Response Plan (TARP) within the HVO RMP. The TARP identifies the required management actions in the event of impacts to rehabilitation, or where rehabilitation outcomes are not achieved in an acceptable timeframe.

8.7 | REHABILITATION MONITORING

HVO adopted the revised GCAA rehabilitation monitoring program to monitor rehabilitation areas and trajectory towards meeting the rehabilitation objectives and performance and closure criteria. The monitoring framework comprises Initial Establishment Monitoring (IEM) and Long Term Monitoring (LTM) depending upon the age of the rehabilitation area. Additionally, a walkover assessment is completed whereby the full extent of each monitoring block included in the annual program is assessed for maintenance requirements.

IEM is a rapid style assessment of young (≤3 years old) rehabilitated areas, principally to determine germination success and landform stability, and describes differing methods for HVO's key final land uses of grazing and non-specific woodland.

LTM utilises the Biodiversity Assessment Methodology (BAM) to compare rehabilitation areas with analogue site results. The objective of the LTM program (areas ≥4 years old) is to evaluate progress of rehabilitation towards fulfilling completion criteria and, ultimately, the targeted post-mining land use. Like methods apply for LTM of both rehabilitation and reference monitoring sites.

Monitoring during 2024 represented a continuation of this ecological monitoring program adopted during 2020. During the 2024 monitoring, 124 sites were monitored and these comprised:

- 8 IEM Non-specific Woodland sites (4 blocks);
- 46 LTM Non-specific Woodland sites (19 blocks);
- 21 IEM Pasture sites (8 blocks); and
- 48 LTM Pasture sites (17 blocks).

The results of the annual rehabilitation monitoring, combined with the annual walkover, are utilised to assess rehabilitation performance against the sites closure criteria, the RMP TARP and GCAA's Rehabilitation Report Card. The location of sites monitored in 2024 can be seen below in Figure 8-3.

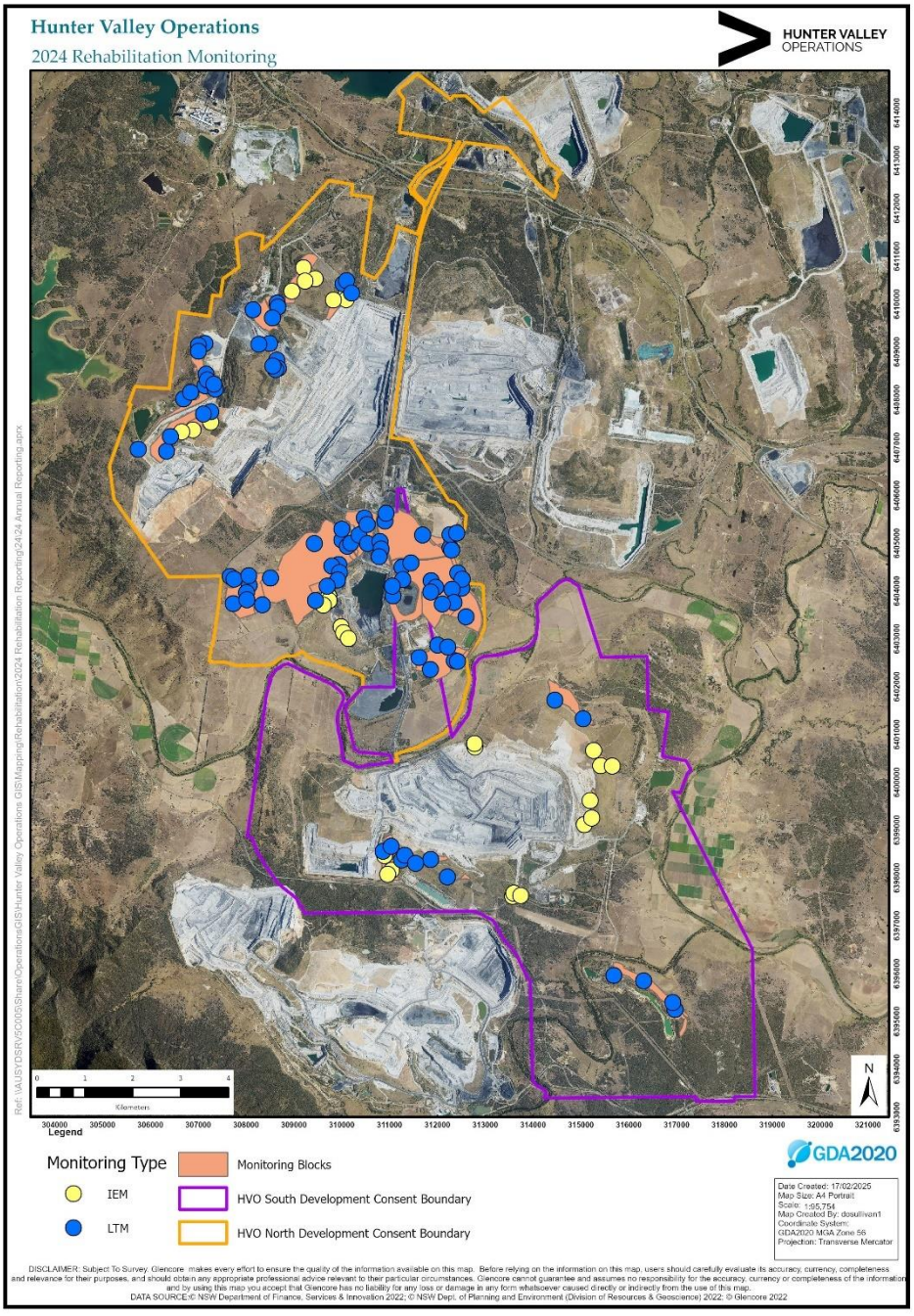

Figure 8-3: 2024 Rehabilitation Monitoring Sites

8.7.1 | MONITORING PEFORMANCE

Overall, the majority of the rehabilitation blocks monitored in 2024 are trending towards meeting the rehabilitation criteria. Generally, older rehabilitation blocks (prior to 2015) exhibited lower target species diversity and higher weed coverage. Recommendations have been made to improve these blocks and a detailed maintenance plans have been developed for each block. Erosion was also a major contributor to maintenance works required in older rehabilitation blocks. Monitoring results from younger blocks generally identified a higher abundance of species from target communities, lower weed presence and less erosion.

Pasture IEM blocks generally performed well, with only low occurrence of weeds or bare ground being observed. Erosion was present within a number of these blocks however it was generally minor and isolated in nature. Pasture composition also either met, or was trending towards meeting, early establishment targets. Pasture LTM block monitoring results were more variable. Groundcover was acceptable across all blocks, however moderate to major erosion was also noted in three of the 17 blocks monitored. Weed species were also more prevalent, however targeted maintenance was only identified as being required in six of the 17 blocks. Suitable pasture species composition was low across all long-term monitoring sites. To address this HVO will engage an agronomist to develop a pasture rehabilitation monitoring program in 2025.

Native woodland IEM blocks exhibited acceptable groundcover and minimal erosion. Weed species were present and require targeted maintenance in three of the four blocks monitored. Tree stems and native composition were generally below early establishment targets, however active management of these aspects were not recommended due to the young age of the rehabilitation and expectation they will improve over time. Of the 19 native woodland LTM blocks monitored, two exhibited moderate to major erosion which requires rework, despite all blocks having acceptable groundcover levels. Weed species were also prevalent, with only two of the 19 blocks not requiring targeted weed control. Native tree canopy results performed well, despite native tree stem densities and native species composition generally being below target levels. To address low species composition levels in older woodland an infill planting program will be completed in older woodland rehabilitation in 2025.

HVO has developed a detailed maintenance plan for all rehabilitation blocks on site, which will be implemented continuously to continue progressing rehabilitation towards closure criteria.

8.8 | REHABILITATION MAINTENANCE

Management of rehabilitated areas is undertaken proactively to assist in initial establishment and when issues are identified through monitoring, auditing or inspections.

An overview of key rehabilitation maintenance activities is detailed below.

8.8.1 | EAST TSF ENFORCEABLE UNDERTAKING

HVO previously operated the East TSF adjacent to its Hunter Valley Coal Preparation Plant. The East TSF was capped and rehabilitated approximately 25 years ago in accordance with practices commonly employed at the time.

During March 2019, discharge of dirty water from the area occurred into the adjacent Farrell Creek. HVO conducted initial remediation works to the incident area, repairing some existing contour banks and re-seeded some bare areas to enhance the stability of the area. HVO subsequently entered into an Enforceable Undertaking with the NSW EPA that requires HVO to prepare and implement a Remediation Plan for the East TSF.

A remediation plan for the area was developed which included:

- Placing additional fill to ensure minimum cap of 0.5m across the facility
- Construction of surface water management and sediment and erosion controls including contour banks and a drop structure to convey water into existing sediment dams
- Topsoiling, biomix application and seeding with pasture final land use species

HVO notified the NSW EPA that works were completed in accordance with the design in December 2024. The site will now be managed in accordance with HVO rehabilitation monitoring and maintenance program.

8.8.2 | SECTION 240 MAINTENANCE PROGRAM

In July 2019 the NSW Resources Regulator (RR) issued HVO with Notice 3259 under Section 240(1)(c) of the Mining Act (1992) (Section 240 Improvement Notice) requiring HVO to outline measures or actions to improve progressive rehabilitation performance across the site. This notice also required HVO to develop a maintenance plan to re seed areas that were seeded with a cover crop and not final land use. HVO was also issued with S240 notices NTCE 0009902 and NTCE 0009942 in relation to contour bank failure, tunnelling and gullying on HVO's Western Out of Pit (WOOP) emplacement which required HVO rehabilitate the area in consultation with Hunter Local Land Services (HLLS).

In response to these notices HVO has developed and committed to a rehabilitation maintenance and improvement program across the site. An overview of work from the plan undertaken during 2024 is detailed further below.

8.8.2.1 | WOOP DUMP REPAIRS

In response to S240 notices NTCE 0009902 and NTCE 0009942 covering contour bank failure, tunnelling and gullying on HVO's Western Out of Pit (WOOP) emplacement, works were completed in January 2025 and involved repair of the contour banks, stabilisation of gully erosion and construction of a drop structure. In line with requirements under the S240 notice, HVO submitted a report on the 5th of March 2025 to the NSW RR detailing works completed and outlining ongoing control measures to be implemented to prevent a recurrence of erosion, poor surface water management and landform instability. Works were completed to the satisfaction of the HLLS and included:

- Repair of tunnel erosion on contour banks
- Repair of gully erosion
- Turf lining of contour banks on HLLS land
- Installation of a drop structure, coir logs and jute mesh
- Topsoiling, amelioration and seeding of maintenance work areas

The site will be incorporated into the HVO rehabilitation monitoring program and HVO will continue to work with HLLS to ensure long term stability of the landform is maintained.

Figure 8-4- Jute mesh and vegetation establishment at WOOP Dump

8.8.2.2 | SEEDING OF COVER CROP AREAS TO FINAL LAND USE

Since 2020, HVO has seeded 328 hectares of rehabilitation that was initially seeded with cover crop with final land use including 88.5 hectares at Carrington in 2024.Maintenance works completed included mulching the area, boom spraying, amelioration and seeding with pasture final land use.

Figure 8-5: Seeding of Final Land Use Species at Carrington

In 2025, HVO will seed the remaining 10.75ha of cover crop area that is yet to be seeded with final land use that is not going to be disturbed by future mining activities. The maintenance plan for these areas can be seen below in **Table 8-5**.

Table 8-5: 2025 GMD Plan

Location	Block Name	Area (Hectares)	Works Required
Cheshunt	• HVOCHE201302 • HVOCHE201303	3.1	• Boom spraying of weeds • Soil amelioration (if required) • Seeding with final land use (Pasture)
Riverview	• HVORIV201301 • HVORIV201302	4.49	
Carrington	• HVOCAR201701	0.96	
Wilton	• HVOWIL201301	2.31	

Once works have been completed these areas are reclassified from GMD to rehabilitation and monitored in line with the rehabilitation monitoring methodology outlined above.

8.8.3 | REHABILITATION MAINTENANCE PROGRAM

Rehabilitation inspections and monitoring conducted at HVO aim to identify rehabilitation risks and maintenance requirements. Each year an annual rehabilitation maintenance plan is developed which includes range of maintenance activities that are undertaken to improve the quality of rehabilitation at HVO and progress towards closure criteria. These include weed spraying, erosion repair, vegetation management and topsoil management. Works completed in 2024 are discussed below.

8.8.3.1 | WEED CONTROL

Broadacre weed treatment within rehabilitation areas is undertaken using agricultural methods comprising boom sprays, wick wipers and slasher/mulchers. In existing rehabilitation areas boom spraying is primarily used to manage cover crop and fallow areas prior to sowing to final native seed mixes. Pre-emergent application of herbicide is used when appropriate and necessary to control emerging weeds in the period between sowing and germination of the desired species. Wick wiping targets rapidly growing exotic grasses and other erect growing weeds in the period following native germination while desirable species remain below the wiper target zone. Slashing and mulching is also used to remove rank pasture grasses, stimulate fresh growth and control dense infestation of Acacia Saligna. Hand spraying and manual removal of weeds is undertaken in rehabilitation areas with early stage and establishing native vegetation that would be likely to be damaged or destroyed should broadacre methods be used.

The key weed species targeted in 2024 maintenance works were Galenia (Galenia pubescens), Saligna (Acacia saligna), Blue Heliotrope (Heliotropium amplexicaule), Rhodes grass (Chloris gayana) and Mustard Weed (Brassica juncea).

During 2024 rehabilitation blocks totalling 233ha were boom sprayed, wick wiped, slashed/mulched or spot sprayed. Blocks managed can be seen below in **Figure 8-6.**

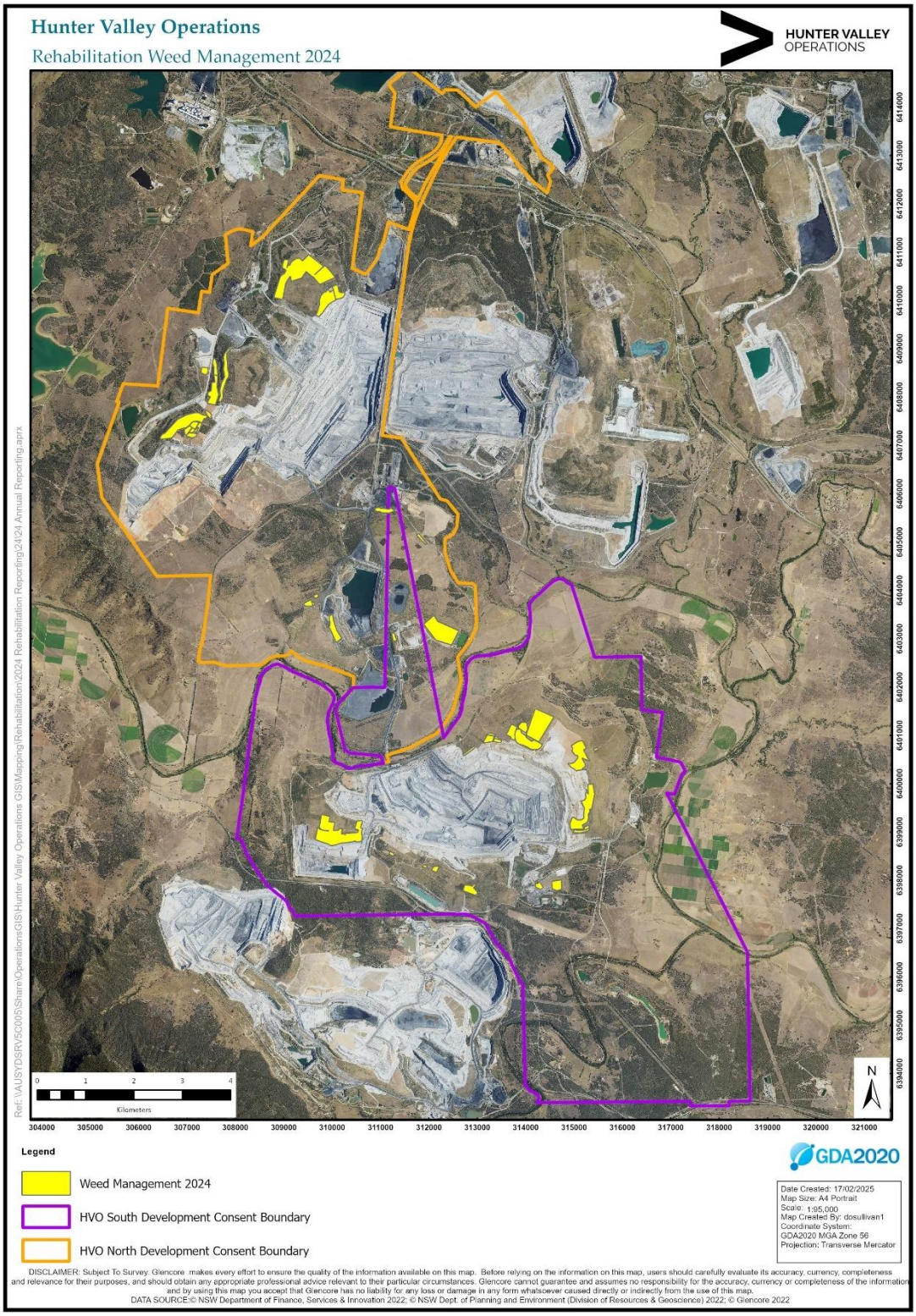

Figure 8-6: Weed Management Activities Conducted in 2024

8.8.3.2 | EROSION REPAIRS

Drainage structures such as contour banks, drop structures and sediment dams are largely functioning as designed and require little to no maintenance, particularly in more recently established rehabilitation areas. Erosion repairs were conducted across the site during 2024 in line with the annual rehabilitation maintenance plan including drainage repair, contour re shaping and desilting. As discussed above, major re-work of erosion areas was completed at the WOOP Dump and East TSF in 2024.

Temporary erosion controls such as coir logs are also placed in new rehabilitation areas as required to limit erosion and sediment and erosion plans developed for individual rehabilitation areas as required.

The 2024 rehabilitation monitoring identified some contour failures in historical areas which had mainly stabilised, along with some minor riling and gullying in newer rehabilitation areas. These have been prioritised and incorporated into HVO's rehabilitation maintenance plan.

8.8.3.3 | VEGETATION ENHANCEMENT

In addition to the progression of GMD areas throughout the year, HVO undertakes regular re-seeding in rehabilitation areas that have been identified as failing or requiring additional species diversity. The need for these interventions, and the most appropriate method, are identified during the Annual Walkover, Ecological monitoring and internal monthly inspection of rehabilitation areas. During 2024, erosion repairs were re-seeded and no tube-stock planting occurred. A tubestock infill planting program will be completed in 2025 to increase diversity in older woodland sites.

8.8.3.4 | TOPSOIL MANAGEMENT

Prior to topsoil stripping occurring, soil profiling and testing is completed to understand amelioration required and topsoil stripping depth. If possible, topsoil is directly placed on rehabilitation areas. If this cannot occur the soil is placed in a topsoil stockpile, where it is shaped and seeded with a target species for its intended final land use (pasture/woodland).

An annual inspections of topsoil stockpiles is completed to identify required maintenance activities. In 2024 the annual inspection identified a number of maintenance works including weed control, mulching and re-seeding (if weed species have dominated). These maintenance activities will be completed as part of the 2025 rehabilitation maintenance program.

8.8.4 | GRAZING OF REHABILITATION AREAS

Grazing of rehabilitation areas is utilised to encourage and maintain pasture diversity, encourage nutrient cycling, and assist in fuel load management. A licence agreement is in place for grazing 666ha of HVO North rehabilitation area, with temporary fuel load licences across a further 394ha of rehabilitated land around HVO North and 210ha around HVO South. Opportunities to integrate grazing to assist rehabilitation progression continues to be assessed.

During 2024, HVO undertook an assessment of the Alluvial Lands Rehabilitation Area which included engaging an agronomist to undertake a land capability assessment and complete gap analysis to understand what is needed for the site to reach relevant completion criteria. Outcomes from this work will continue to be implemented in 2025 in line with the annual rehabilitation maintenance plan.

8.9 | VERTEBRATE PEST MANAGEMENT

A number of baiting programs are carried out on a seasonal basis as part of the HVO Vertebrate Pest Action Plan. These programs are conducted at a level of frequency designed to disrupt pest species breeding/colonisation cycles and employ a variety of methodologies including baiting, trapping and ground based shooting.

8.9.1 | WILD DOG AND FOX BAITING PROGRAMS

Three 1080 ground baiting programs targeting wild dogs and foxes were implemented across operational and biodiversity areas. These were undertaken during summer, winter, and spring. Each program consisted of approximately 60 bait sites utilising meat and ejector baits. Baits were checked over a three to six week period and replaced each week when taken. The winter and spring baiting programs were synchronised to coincide with neighbouring mine operations programs, with the timing of these events coordinated with and by Hunter Local Land Services.

8.9.2 | PIG TRAPPING AND BAITING

Two pig baiting program using sodium nitrite 'Hoggone' baiting systems were implemented at HVO during autumn and winter. The autumn program resulted in 33 pigs being controlled, while the winter program accounted for 34 pigs. An additional 59 pigs were controlled by rural licensees using a combination of pig traps, shooting and 'Hoggone' baiting systems on buffer properties over the course of the year. The programs undertaken throughout the year resulted in 126 pigs being controlled.

8.9.3 | GROUND BASED SHOOTING

Two shooters attend the HVO site on a regular basis opportunistically controlling feral pest species. Feral species controlled include pigs, wild dogs, foxes, hares/ rabbits, deer, and cats.

Table 8-6 summarises the results from the programs carried out at HVO during 2024 with wild dog and fox baiting locations and results for the programs illustrated in Error! Reference source not found. to Error! Reference source not found..

Table 8-6: Summary of Vertebrate Pest Management 2024

	1080 Baiting			Hoggone Baiting	Trapping		Shooting			
	Total Lethal Baits Laid	Takes by Wild Dog	Takes by Fox	Takes by Feral Pig	Wild Dog	Feral Pig	Feral Pig	Wild Dog/ Fox	Feral Cat	Hares & Rabbits
Summer	169	48	74	0	0	0	1	0	0	0
Autumn-Winter	173	43	18	33	0	24	19	0	0	0
Spring	183	5	84	34	0	0	15	0	0	0
Total	**525**	**96**	**176**	**67**	**0**	**24**	**35**	**0**	**0**	**0**

Table 8-7 provides a comparison of results from the last 25 baiting programs undertaken at HVO. Results reported indicate the majority of takes by dogs or foxes. Sighting reports also confirm that a high number of wild dogs and foxes rapidly re infiltrate the area after programs complete. The number of takes by dogs in spring has dropped (5 takes in spring compared to 43 in the autumn program), and takes by foxes has increased (84 in spring compared to 18 in autumn). The results validate recommendations by the current vertebrate pest control contractor to extend the length of baiting programs to catch new dogs and foxes entering the territory vacated by terminated pest animals. Programs in 2024 were extended by several weeks and the quantity of baits laid increased by approximately 20% compared to previous years. This resulted in a significant increase in takes attributed to foxes and a decline in wild dog takes. The decline in wild dog takes is consistent with a decline in the 2023 reporting period.

Table 8-7: Comparison of Results Between Baiting Programs at HVO

Baiting Program	No of Baiting Sites	Baiting Opportunities	Baits taken by Dogs	Dog (%)	Baits Taken by Foxes	Fox (%)	Baits Taken by Non Target Species	Other (%)	Total No. of Baits Taken	No Sites Where Baits Taken At Least Once	Represented as Percentage (%)	No. Sites with Baits Taken on All Occasions	No. Sites With No Baits Taken	No. Baits Disturbed Not Taken	No. Baits Taken Alternatively by Dog or Fox	Baiting Efficiency %	Baiting Efficiency Excluding Other
1606 HVO	60	180	94	96%	4	4%	0	0	98	54	90%	10	6	6	4	54%	54%
1609 HVO	60	180	83	94%	5	6%	0	0%	88	49	82%	11	11	12	3	49%	49%
1702 HVO	59	117	58	84%	10	14.5%	1	1.5%	69	49	87%	20	11	7	5	59%	58%
1705 HVO	60	120	70	95%	4	5%	0	0%	74	51	85%	23	9	3	0	62%	62%
1709 HVO	60	120	67	96%	3	4%	0	0	70	48	80%	22	12	5	2	58%	58%
1803 HVO	60	120	69	90%	6	8%	2	2%	77	49	82%	31	11	7	0	64%	63%
1806 HVO	60	120	77	94%	5	6%	0	0%	82	50	83%	32	10	8	4	68%	68%
1809 HVO	61	122	73	87%	10	12%	1	1%	84	50	82%	34	11	2	6	69%	68%
1905 HVO	64	124	61	85%	10	14%	1	1%	72	50	78%	22	17	8	8	64%	63%
1910 HVO	60	120	66	93%	4	6%	1	1%	71	48	80%	23	12	9	2	59%	58%
2002 HVO	60	140	72	94%	4	5%	1	1%	77	48	80%	2	12	9	2	55%	54%
2005 HVO	60	118	44	71%	15	24%	3	5%	62	41	68%	21	19	12	6	53%	50%
2010 HVO	60	120	56	89%	4	6%	3	5%	63	43	72%	20	17	7	2	53%	50%

Baiting Program	No of Baiting Sites	Baiting Opportunities	Baits taken by Dogs	Dog (%)	Baits Taken by Foxes	Fox (%)	Baits Taken by Non Target Species	Other (%)	Total No. of Baits Taken	No Sites Where Baits Taken At Least Once	Represented as Percentage (%)	No. Sites with Baits Taken on All Occasions	No. Sites With No Baits Taken	No. Baits Disturbed Not Taken	No. Baits Taken Alternatively by Dog or Fox	Baiting Efficiency %	Baiting Efficiency Excluding Other
2102 HVO	60	113	51	65%	16	21%	11	14%	78	53	80%	26	7	12	5	69%	59
2105 HVO	60	119	65	72%	16	18%	11	12%	90	55	92%	37	5	8	7	76%	66%
2110 HVO	63	119	47	61%	15	19%	15	19%	77	51	81%	26	12	4	5	65%	52%
2202 HVO	60	118	48	71%	7	10%	14	21%	68	46	77%	22	14	2	4	58%	46%
2205 HVO	60	119	48	74%	9	14%	8	12%	65	45	75%	20	15	2	6	55%	48%
2210 HVO	60	117	49	59%	6	9%	21	32%	66	45	75%	21	15	1	4	56%	38%
2302 HVO	60	116	44	51%	10	12%	32	37%	86	49	82%	36	11	5	3	74%	47%
2305 HVO	60	120	54	68%	7	9%	18	23%	79	52	87%	27	8	5	3	66%	51%
2310 HVO	55	204	22	32%	39	56%	8	12%	69	50	91%	5	8	8	*	34%	30%
2402-03 HVO	51-60	169	48	38%	74	59%	3	3%	125	58	97%	22	1	*	25	74%	72%
2405-06 HVO	60	173	43	68%	18	28%	2	4%	63	39	65%	6	21	*	6	36%	35%
2410-11	61	183	5	5%	84	88%	6	8%	95	52	85%	11	9	*	3	52%	48%

*Data no longer recorded

8.10 | HISTORIC HOMESTEADS

Planning for improvements to historic heritage homesteads progressed in 2024 and included the preparation of detailed costings and budget for the works identified in the 2023 Phase 1 Survey and Condition Reports for the Archerfield, Wandewoi and Carrington Stud homesteads. Tenders were completed for balustrade repair works to the Wandewoi homestead in December 2024, with works planned to commence in 2025.

8.10.1 | DERELICT RURAL BUILDINGS

HVO removed debris from a timber hayshed at Comleroi Farm that lost its roof following an isolated weather event in Feb 2024. Following this event an audit was conducted of all known rural timber structures to identify buildings with poor structural integrity and prioritise their repair or demolition.

8.11 | TAILINGS MANAGEMENT

Key tailings management activities in 2024 included:

- Continued Secondary Flocculent dosage into Carrington in Pit TSF was made, to improve beaching;
- Additional pumping infrastructure installed in Carrington in Pit TSF to reduce decant size and increase consolidation.
- Spigot locations re-designed to optimise storage and minimise decant pond size.
- Temporary cessation of deposition into Dam 6W TSF has been extended, allowing time for consolidation prior to final top up deposition.
- Ongoing implementation of the North Void TSF Management Plan to manage and mitigate any potential impacts from an identified seepage pathway. Provision of quarterly and annual analysis reports to EPA;
    - North Void Shear Vane Testing of Surface and GeoChem Sampling completed
- Capping of Bob's Dump initiated

Table 8-8 outlines the current state of Tailings Storage Facilities across HVO that are still active or pending decommissioning.

Table 8-8: HVO Tailings Storage Facilities

Facility	Status	Decant System
North Void	Inactive	Decant pumps in place, pumping as required.
Dam 6W	Inactive	Decant pumps in place, pumping as required.
Cumnock Void	Active	Decant pump in place, regular pumping when deposition occurring.
Bob's Dump	Inactive; preparation for decommissioning	Pump in place, pumping as required.
Southeast TSF	Decommissioned and rehabilitated	N/A
Central TSF	Inactive	No pumps required due to drying after rainfall (small catchment reporting to TSF).
Carrington In-pit TSF	Active	Decant pumps in place, regular pumping.

8.12 | RIVER RED GUM RESTORATION AND REHABILITATION

8.12.1 | RIVER RED GUM OVERVIEW

Eucalyptus camaldulensis (River Red Gum) populations have become increasingly rare and degraded in the Hunter Valley, and the entire population occurring within the Hunter catchment is now listed as an Endangered Population under the NSW *Biodiversity Conservation Act 2016*. There are a number of River Red Gum sites across HVO North and South. HVO manages the River Red Gum stands on lands that it owns in accordance with the HVO River Red Gum Restoration and Rehabilitation Strategy (Strategy) (HVO 2020) which is a compliance requirement under Sch 3, Condition 31 of DA 450-10-2003.

The sites at HVO have been categorised into a high level of management at the Carrington Billabong, intermediate level at the priority sites and low level at the low priority sites. Each level has been allocated varying amount of monitoring and maintenance as outlined in the Strategy.

As the site with the highest priority, the objectives of the monitoring program at Carrington Billabong are to:

- determine if there is any improvement or deterioration in RRG within Carrington Billabong;
- determine if there is any improvement or deterioration of the natural habitat at Carrington Billabong;
- provide management recommendations to achieve further improvements in the ecological management of the site to assist in the recovery of RRG and their habitat;
- remove any potential influence that mining activities at HVO may have on the population. The monitoring results are compared to a reference site to the north of HVO that is not within a mining area.

The locations of the River Red Gum stands at HVO are shown in **Figure 8-3**.

The Strategy has an established monitoring programme of the river red gum subpopulations and vegetation communities in Carrington Billabong and priority sites on the Hunter River and Wollombi Brook in HVO North and South. The Reference Site is located between Scone and Aberdeen (NSW).

Ecological monitoring was not required in 2024 and is scheduled to occur in 2025.

In previous years, tubestock plantings have been undertaken to reduce the linear influence of the billabong on the existing mature *E. camaldulensis*, and contribute towards the development of a vegetated corridor representing the Hunter Floodplain Red Gum Woodland community, connecting the Hunter River populations with the stands in the Billabong. Over time, the new plantings should offer some protection to the mature individuals from storm events and assist to reduce the competitive advantages of the annual weeds on recruiting native species.

The vast majority of the earlier planting have survived through 2024 as they were above the level of the grass and were not able to be overshaded. The planting losses that did occur were primarily the result of herbivore grazing, and losses attributable to grass growth when ground conditions prevented the slasher from accessing the area. These losses will be supplemented during the 2025 planting works.

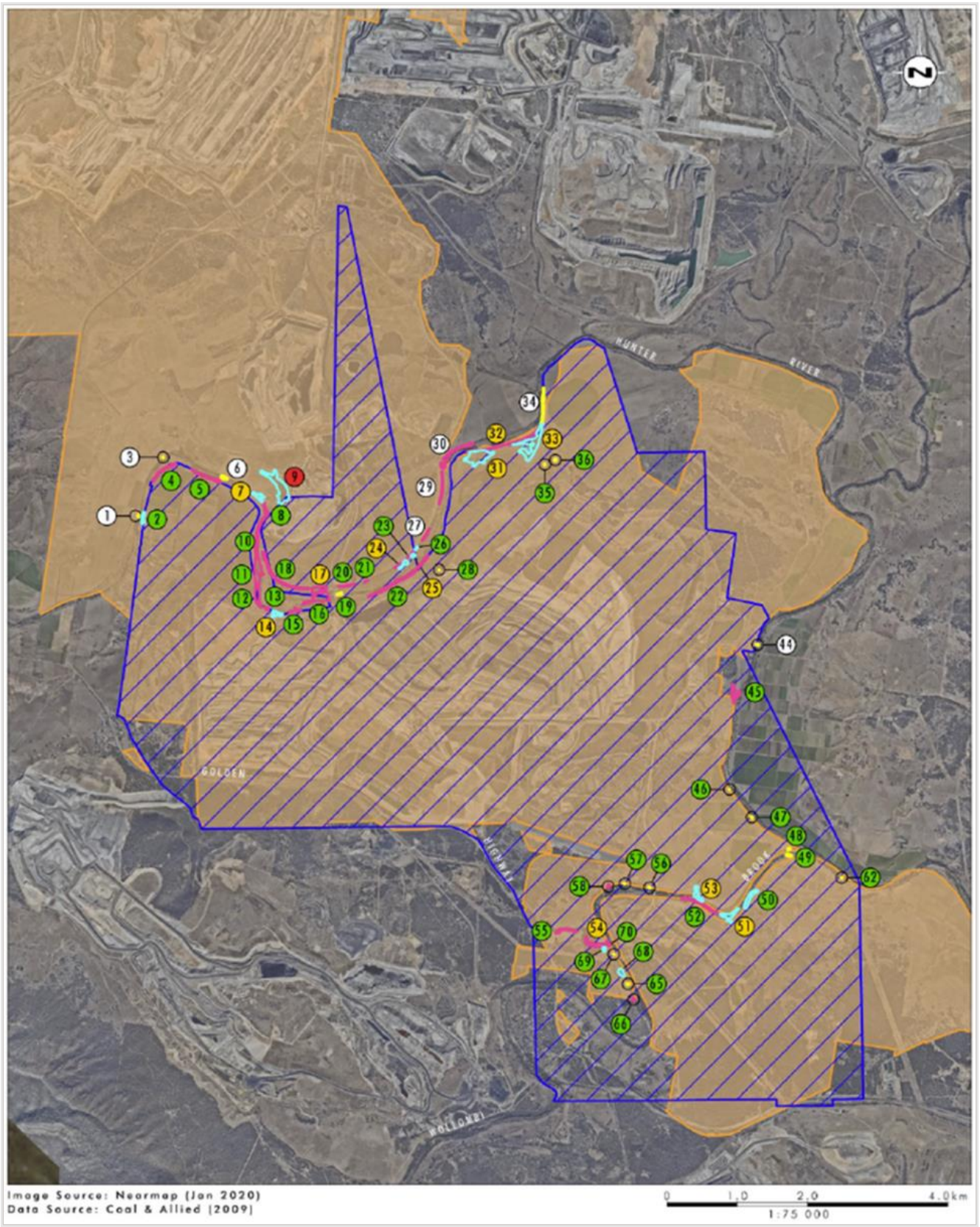

Figure 8-3: Eucalyptus camaldulensis stands being managed at HVO

8.12.2 | RRG MONITORING ACTIVITIES

8.12.2.1 | RAINFALL AND RECRUITMENT

The rainfall received in 2024 was around the average received at HVO (**Figure 8-4**). The total rainfall for the year at HVO (Corp) was 645.2 mm, which was an increase on 2023.

This increased rainfall from 2023 was observed within the alluvial areas via a flush of thistle in particular. While observed recruitment of native species did not occur within the River Red Gum areas, native species germination was observed within other remnant bushland areas across HVO.

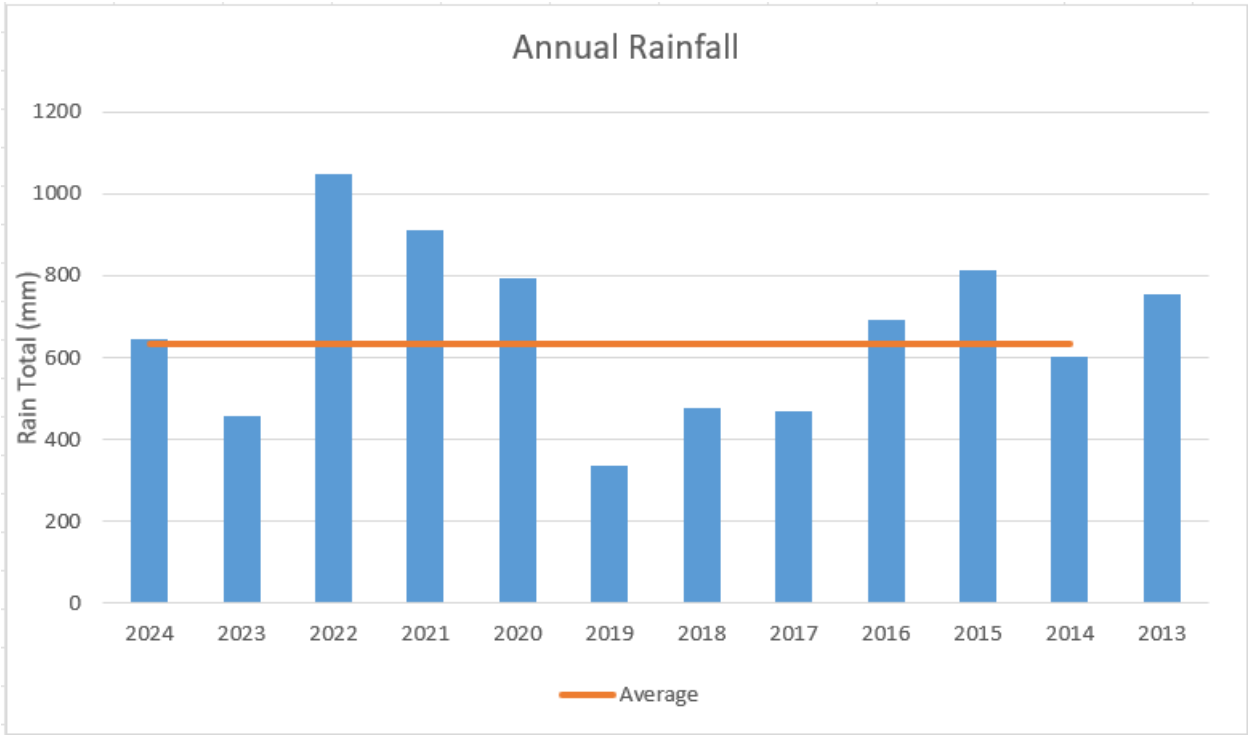

Figure 8-4: Annual rainfall at HVO Lemington since 2013

8.12.2.2 | CONSERVATION GENOMICS

During 2024, the Research Centre for Ecosystem Resilience at the Botanic Gardens of Sydney, included stands of River Red Gum at HVO within their study assessing the genetic relationships of the Hunter Catchment *E. camaldulensis* population to the species wider distribution, assess levels of genetic diversity and health of remnant stands in the region, and develop genetically informed seed sourcing strategies to maximise the success and self-sustainability of restored populations of the species in the region (Fahey et al 2024).

The results indicated that the Carrington billabong stand was the most genetically diverse stand occurring within the Hunter. It was shown that *E. camaldulensis* frequently hybridises with other Red Gum species where they co-occur both within and outside the Hunter catchment, and that all stands in the region are *E.* subsp. *camaldulensis*, with close genetic relationships to populations in the Namoi catchment. Based upon the frequency of hybrids and levels of genetic diversity, it was recommended seeds are sourced from the largest stands of *E. camaldulensis*, and preferentially from stands along major waterways, rather than smaller tributaries, to minimise the collection of hybrid seed and maximise captured genetic diversity.

These results were published in:

> Fahey P, Hogbin P, van der Merwe M, Rossetto M (2024) Conservation Genomics of *Eucalyptus camaldulensis* in the Hunter in support of genetically informed seed sourcing. Research Centre for Ecosystem Resilience, Royal Botanic Garden Sydney.

As such, the management of the River Red Gums at HVO has incorporated these findings into the management actions; *E. camaldulensis* seed has been purchased from the Namoi to include within the plantings at HVO for 2025, and seed is only collected at HVO from the stands along the Hunter River, not those on the Wollombi Brook.

8.12.2.3 | CARRINGTON BILLABONG TREE HEALTH DECLINE

The results of previous monitoring events have indicated that some mature trees within the Carrington billabong have been in decline. During 2023 and 2024, it was noted that a few trees had died, or were being repeatedly defoliated by insects. Preliminary investigations by an arborist in 2023 observed that a population of juvenile plantings immediately adjacent to the affected trees were not being defoliated to the same extent. This indicates that the insect defoliation was a secondary impact, as a result of a primary infection.

Soil testing around the declining vegetation identified the presence of the soil pathogen, *Phytophthora*.

During 2024, ArborCarbon was contracted to assist HVO with determining the cause(s) of decline and premature death of River Red Gums at Carrington Billabong. Their report stated that soil-borne pathogens, such as *Phytophthora inundata,* may be causing stress to the trees and dieback, allowing foliage-feeding insect pests to further impact canopy health.

Phytophthora inundata is a plant pathogen causing damage to trees and shrubs, particularly in wet or flooded soils. As a result of the La Nina weather system during previous years, the Billabong was flooded for most of 2022 and the first few months of 2023, which would have allowed the *P.inundata* to 'germinate' and become mobile.

While it is not technically feasible to eradicate *Phytophthora* species at the Carrington Billabong, management of the area aims to:

- slow the spread of the pathogens across Hunter Valley Operations land,
- reduce feral animals within the area, specifically pigs, to prevent to dispersal of the soil pathogen, and
- maintain ecological processes for the potential development of natural resistance in the population of susceptible species.

These aims are being implemented through a concentrated effort on vertebrate pest management activities, targeted weed management within riparian areas to reduce pig habitat, extensive plantings of river red gums within priority areas to reduce edge effects and connect individual stands where possible, and, planting *E.camaldulensis* tubestock originating from the Namoi catchment at HVO to assist to improve genetic fitness of the HVO populations.

8.12.2.4 | RIVER RED GUM MONITORING

As per the River Red Gum Rehabilitation and Restoration Strategy, no monitoring was required during 2024. Biennial monitoring will resume in 2025.

8.12.2.5 | GROUNDWATER MONITORING

The groundwater at key locations across HVO are monitored to determine the impact of mining and whether any reported seepage from the North Void tailings storage facility is having an impact on the Carrington Billabong.

Triggers have been defined for water levels and water quality (pH, sulphate and sulphate/chloride ratio) to determine whether any hydrological changes could be influencing the adjacent vegetation communities, such as the River Red Gum populations. Three consecutive readings above the trigger level constitute an exceedance, which will initiate further investigation into the likely causes of the values and/or report the exceedance in specified cases. The groundwater level trigger criteria relate to an observed rise in groundwater levels by more than 0.5 m over a 12-month period and in conjunction with water quality changes, not related to climate trends.

The location of the trigger bores in the vicinity of the Carrington Billabong can be seen in **Figure 8-5**.

There were no bores with groundwater levels above the trigger level during the reporting period. Groundwater levels have generally trended downwards in response to generally below average rainfall from January 2023 onwards.

pH levels for the trigger bores ranged between 7.3 (CFW55R and GW-127) and 7.9 (GW-125) during the reporting period. There were no pH trigger exceedances recorded during the reporting period.

A recorded change in the sulphate and water level in some bores in the alluvium was identified in 2017 to be due to seepage from the adjacent North Void Tailings facility. As noted in the groundwater section of this report, management actions have been successful in lowering sulphate levels and these are now generally stable.

Sulphate concentrations for the trigger bores remained low (<200 mg/L), with no concentrations above the trigger level recorded. The exception was sulphate concentrations in bore CFW55R, which fluctuated with a concentration of 380 mg/L in June 2024 and 389 mg/L in September 2024.

Overall, there was a declining sulphate/chloride ratio trend over the reporting period, with the exception of bore CFW55R, which fluctuated similar to sulphate concentrations. Elevated sulphate concentrations were recorded at the Hunter River surface water monitoring sites WLP10 and WLP14 above the trigger level of 40 mg/L in August and September 2024. Sulphate concentrations were higher at the upstream site WLP14 (48 mg/L) compared to downstream site WLP10 (43 mg/L) in August, indicating the source of the elevated sulphate concentrations is likely upstream of HVO. In September, sulphate concentrations at downstream site WLP10 (41 mg/L) were slightly higher than upstream site WLP14 (40 mg/L).

EC and pH levels in the Hunter River, recorded at WLP10 increased over the reporting period but did not exceed the trigger levels. At WLP14 EC and pH remained relatively stable.

Figure 8-5: Groundwater Monitoring Locations adjacent to the Carrington Billabong

Table 8-9: Observations that Relate to the Monitoring Objectives Outlined in the Strategy

Goals	Objectives	2024 Observations
To reduce the impacts of threatening processes on the stands	To supress or eradicate the in situ environmental factors that are acting to reduce the viability of the remnant population	Weeds continue to dominate the species assemblage at Carrington Billabong. However, the previous 10 years of data suggests that active management and restoration should continue in order to "suppress and eradicate" this threat. *Phytophthora* protocols have been implemented, and feral pig management is continuing to minimise the spread of *Phytophthora* where possible. The growth of plantings in cleared areas adjacent to the Billabong has continued. It is hoped that, while these trees may protect the remnant trees from climatic factors, they may also provide habitat for birds and other species that may prey on the invertebrates that consume the eucalypt leaves.
	To improve the conditions within this population such that it can withstand reasonable periods of stress, predation and shortage of water supply	Planted eucalypts (discussed above) will play a role in protecting the remnant from climatic and biotic threats. Recommendations from genetic studies will be incorporated, and tubestock, originating from seed collected from the Namoi catchment, will be introduced across HVO stands.
To aid the establishment of the appropriate conditions to promote the health of the River Red Gum populations	To identify the likely *ex situ* factors that are contributing to the reduction in viability of this population and the health of the billabong and act, where possible, to control those factors or to take account of those factors in management approaches if they are not able to be directly controlled	The ERA outlines the groundwater exceedance issues around Carrington Billabong and ecological monitoring and triggers. To minimise the spread of *Phytophthora* where possible, *Phytophthora* protocols have been implemented, access tracks have been revised, and feral pig management is continuing.

Goals	Objectives	2024 Observations
	To ensure that the results of ongoing monitoring are appropriately used to modify the management regime in response to new or unexpected information	Annual weed and condition assessments, along with biennial ecological assessments, provide information to ensure that the intended targets are being achieved. Further monitoring, weed management and tubestock planting is planned for 2025.
Increase the understanding of the water requirements of the River Red Gums	Develop an understanding of water requirements through the timely monitoring of responses of River Red Gums to flood and storm events	The Strategy requires additional monitoring to be undertaken when triggered by flooding. No floods occurred during 2024. Groundwater monitoring is undertaken at Carrington Billabong.
To enhance the River Red Gum population to enable it to persist as a viable functioning population	To assist this population to continue to self-propagate to ensure ample replacement of senescing trees with juvenile recruits.	Limited natural recruitment has been observed to date. In 2024, grass weed wiping was trialled to determine the effectiveness of this technique for targeted weed control. Active weed and feral animal control will continue to assist the community to become a self-sustaining population.
	To support the establishment of a self-sustaining, functional and viable ecosystem that resembles what is likely to have been present in Carrington Billabong prior to European settlement	Ecological monitoring will continue in 2025. Management activities will continue, which will include tubestock planting to consolidate and expand on linear populations and connect adjacent areas where possible.
	To support the establishment of a self-sustaining, functional and viable ecosystem	
To increase biodiversity including residence habitat, foraging habitat and native flora and fauna species	To increase habitat for the identified and potential native flora and fauna species	During 2024, 1000 tubestock of RRG were planted across HVO priority areas in combination with 400 other species representative of the EEC community or species that provide dense habitat for insectivorous birds. While not all survived kangaroo and pig

Goals	Objectives	2024 Observations
		activities, or competition from grass and weeds, in combination with tubestock plantings that occurred in 2021 and 2022, the habitat area and local linkages will improve with tubestock establishment over time. The earlier trees have established and will provide effective habitat for small fauna in the future. Further tubestock plantings are planned for 2025.
To determine if there is any improvement or deterioration in RRG within Carrington Billabong	Monitoring was not required during 2024, however, tree deaths were investigated and the presence of *Phytophthora inundata* was confirmed. 2023 monitoring assessed the trees as "stressed" and had moderate to severe insect/fungal attack. This was exacerbated in an area of the Billabong during 2024 with several mature trees succumbing to the Phytophthora infection and repeated insect attacks.	
To determine if there is any improvement or deterioration of the natural habitat at Carrington Billabong	Monitoring was not required during 2024.	
To provide management recommendations to achieve further improvements in the ecological management of the site to assist in the recovery of RRG and their habitat	While it is not technically feasible to eradicate *Phytophthora* species at the Carrington Billabong, management of the RRG across HVO aims to: • slow the spread of the pathogens across Hunter Valley Operations land, • reduce feral animals within the area, specifically pigs, to prevent to dispersal of the soil pathogen, • continued weed management and reduce ground cover biomass, • continue to plant additional canopy and midstorey species in open areas, and • maintain ecological processes for the potential development of natural resistance in the population of susceptible species.	

8.12.3 | ECOLOGICAL RISK ASSESSMENT

HVO has a monitoring programme in place to monitor changes in groundwater quality due to seepage from the North Void TSF. Carrington Billabong is located adjacent to the North Void TSF.

As part of Condition 8, E2.1 of EPL 640, HVO has implemented a monitoring program that includes an Ecological Risk Assessment (ERA) (Umwelt 2020) that assesses the impact to the RRG community from the North Void TSF seepage. The annual monitoring is required to detect any notable decline in ecological condition of RRG at the Carrington Billabong. Should ecological monitoring identify any of the following factors, additional investigations will be implemented to determine the cause:

- An increase in tree dieback of 10% or greater compared to the previous year;
- Adult tree death of 10% compared to the previous year;
- Remnant ecological health scores decline of 10% compared to the previous year; and
- Unforeseen event that indicates a relatively rapid decline in ecological health or function that can't be linked to catchment wide causes (such as drought).

The results of the 2024 monitoring relative to these ERA trigger values is presented in **Table 8-10**.

Table 8-10: Factors to be Considered to Detect a Notable Decline in Ecological Condition of the RRG Community in Accordance with the ERA (Umwelt 2020)

Trigger	Monitoring Outcome - 2024
Groundwater quality indicates an increase in seepage from NV TSF	There were no bores with water levels trending above the trigger levels over the reporting period. With the exception of CFW55R, sulphate concentrations remained relatively stable over the reporting period. Sulphate concentrations in bore CFW55R fluctuated over the reporting period with an overall slight increase. Surface water monitoring sites in the Hunter River upstream and downstream of the NV TSF did not record any levels above the trigger levels for pH or EC during the reporting period. However, sulphate concentrations were elevated in August and September above the trigger level. Concentrations were higher at the upstream monitoring site (WLP14) indicating the source is likely further upstream from HVO.
An increase in tree dieback of 10% or greater compared to the previous year	For the 44 trees were monitored in both 2023 and 2024, there was a general decrease in the health of trees. Data for these trees showed that 30% had a decrease in the Canopy extent, 50% had a decrease in Crown tip growth, and 14% showed an increase in the Crown tip dieoff; and overall 32% of trees had a decrease in the overall canopy condition score, although, 48% of trees showed no change in canopy condition. Investigations identified *Phytophthora* to be present within the Billabong and, along with the repeated insect herbivory on the weakened trees, is likely to have contributed to tree decline.

Adult tree death of 10% compared to the previous year	Mortality of RRG cannot be determined for 2024 as not all trees from 2023 were monitored. However, no dead trees monitored in 2024 were alive when they were last surveyed, indicating that there has been no new deaths and no change in the mortality rate at Carrington Billabong.
Remnant ecological health scores decline of 10% compared to the previous year	2024 REHA assessments at Carrington Billabong were marginally higher than what was recorded in 2023, with only one site having a lower score in 2024 than in 2023.
Unforeseen event that indicates a relatively rapid decline in ecological health or function that can't be linked to catchment wide causes (such as drought)	Although rainfall in 2024 was around the climatic average, no RRG were monitored at the Reference site in 2024, so potential impacts of the rainfall at Carrington Billabong cannot be compared against any catchment wide patterns which may have occurred.

8.12.4 | MANAGEMENT ACTIONS

8.12.4.1 | TUBESTOCK PLANTING

A tubestock planting campaign did occur during March and April 2024. The focus was on the priority areas identified within the River Red Gum Rehabilitation and Restoration Strategy. 1400 tubestock were planted in the areas indicated in **Figure 8-6**.

The plants received supplementary watering post-planting to assist with establishment, but, in some areas, were subject to kangaroo grazing, pig rooting and overshadowing by thistle growth which reduced survival. These areas will be replanted during 2025 with the aim to expand the individual stands to reduce edge effects, develop connections between stands where possible, and improve ecological processes within the community.

Lessons from the 2024 plantings will be applied to the management activities in 2025.

Figure 8-6: 2024 Priority River Red Gum planting areas.

8.12.4.2 | WEED MANAGEMENT

During 2024, weed management outside the rehabilitation areas at HVO had a focus on riparian areas and other areas identified by the various inspections as containing specific priority weed species. These areas were targeted as they would afford benefits to the management of the River Red Gum populations, reducing pig habitat within riparian areas, improve the condition of areas that are assessed under the requirements of the HVO Riparian Vegetation and Stream Erosion Monitoring Program, and assist to reduce weeds that were known to be of concern.

As with previous years, the primary weeds of concern within riparian and River Red Gum areas include the balloon vine (*Cardiospermum grandiflorum*) and castor oil plant (*Ricinus communis*), which can smother adult trees, outcompete juvenile regrowth via shading, and provide habitat for feral pig populations. Thistle growth was an additional weed that caused issues during 2024 within the alluvial areas. The growth was rapid between inspections and, given the excellent growing conditions experienced, was able to smother the planted tubestock in some areas where it was not identified.

The River Red Gum areas that were targeted for weed control can be seen in **Figure 8-7**.

Within the Billabong, HVO has been concentrating efforts on regular slashing the open areas and the adjacent grazing paddock to reduce the possibility for weeds to establish and reseed. Previously, the density of exotic weeds smothered the shorter native species in the area. Slashing the open areas within the Billabong and priority areas did occur and the weeds did not obtain the height observed in previous years. The exception was the River Red Gum Priority site 33 where thistle growth was able to overshadow the planted tubestock resulting in plant losses before they were detected.

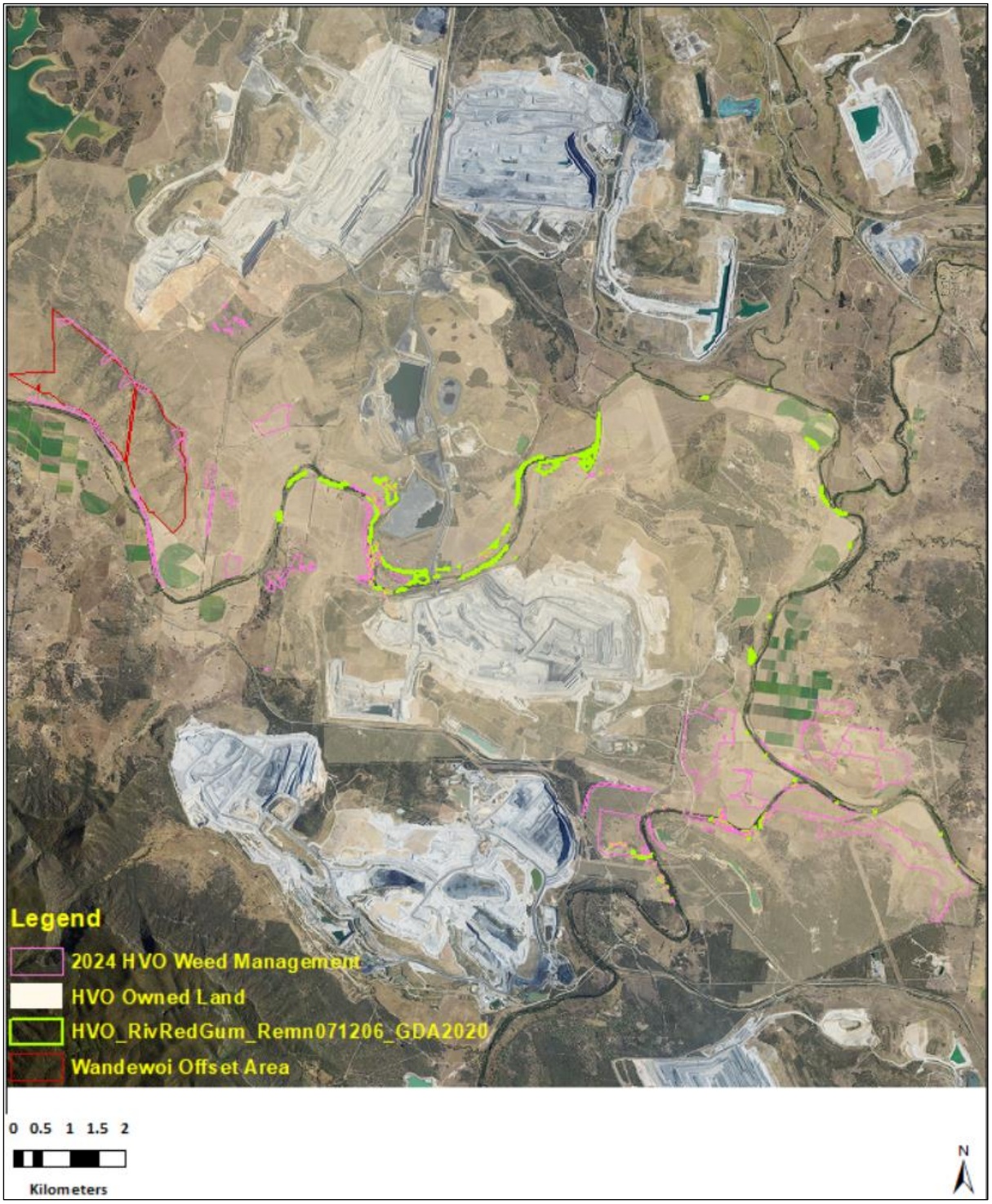

Figure 8-7: Weed management at HVO

8.12.4.3 | VERTEBRATE PEST CONTROL

As part of HVO's Vertebrate Pest Action Plan, programs are carried out on a seasonal basis and include sites where the River Red Gum populations are found. These programmes are conducted at a level of frequency designed to disrupt pest species breeding/colonisation cycles and employ a variety of methodologies including baiting, trapping and ground-based shooting. Feral pig control was undertaken in the Billabong and other RRG sites as a result of pig activity being observed. The focus on riparian weed management during 2024 was also intended to disrupt potential breeding sites for feral pigs. The removal of this habitat will open these areas, encourage native species recruitment and reduce the number of suitable areas for pigs to reside. Further detail on vertebrate pest control undertaken in 2024 is included in **Section 8.9**.

8.13 | BIODIVERSITY OFFSETS

8.13.1 | GOULBURN RIVER BIODIVERSITY AREA OVERVIEW

In accordance with condition 29 of HVO's Project Approval, PA 06_0261, Hunter Valley Operations are accountable for managing a 140ha offset at the Goulburn River Biodiversity Area (BA).

HVO manage a number of other offsets including the Wandewoi, Condon View, Crescent Head and Mitchelhill biodiversity areas, however, these are managed under EPBC approval 2016/7640, are subject to compliance reporting under that approval and are not subject to further discussion in this document.

The Goulburn River BA is located near the town of Merriwa and, when considered in combination with the adjoining offset for the Warkworth Mine, forms an area of protected vegetation extending from the Goulburn River National Park (**Figure 8-9**). The Goulburn River BA is managed according to the Goulburn River Management Plan that is available on the HVO website.

Given that the Goulburn River offsets for the Warkworth Mine and HVO are adjacent to each other, and both parties have a common managing partner in Yancoal, HVO and the Warkworth Mine have a commercial agreement for the HVO BA to be managed by the Warkworth Mine on its behalf. The benefit of this agreement is a reduction in duplication related to the management and monitoring activities that are undertaken by consultants and contractors. As such, while the figures presented below may include information relating to the Warkworth Mine, the text will focus on the data and activities originating from the HVO BA.

8.13.2 | WEATHER RECORDS

Overall, the rainfall recorded at the closest weather station to the Goulburn River BA exceeded the average total rainfall during 2024 (**Figure 8-8**). In this period, the Merriwa (Roscommon gauge) received 738.2 mm, which exceeded, by 140 mm, the mean average rainfall for the area (598 mm).

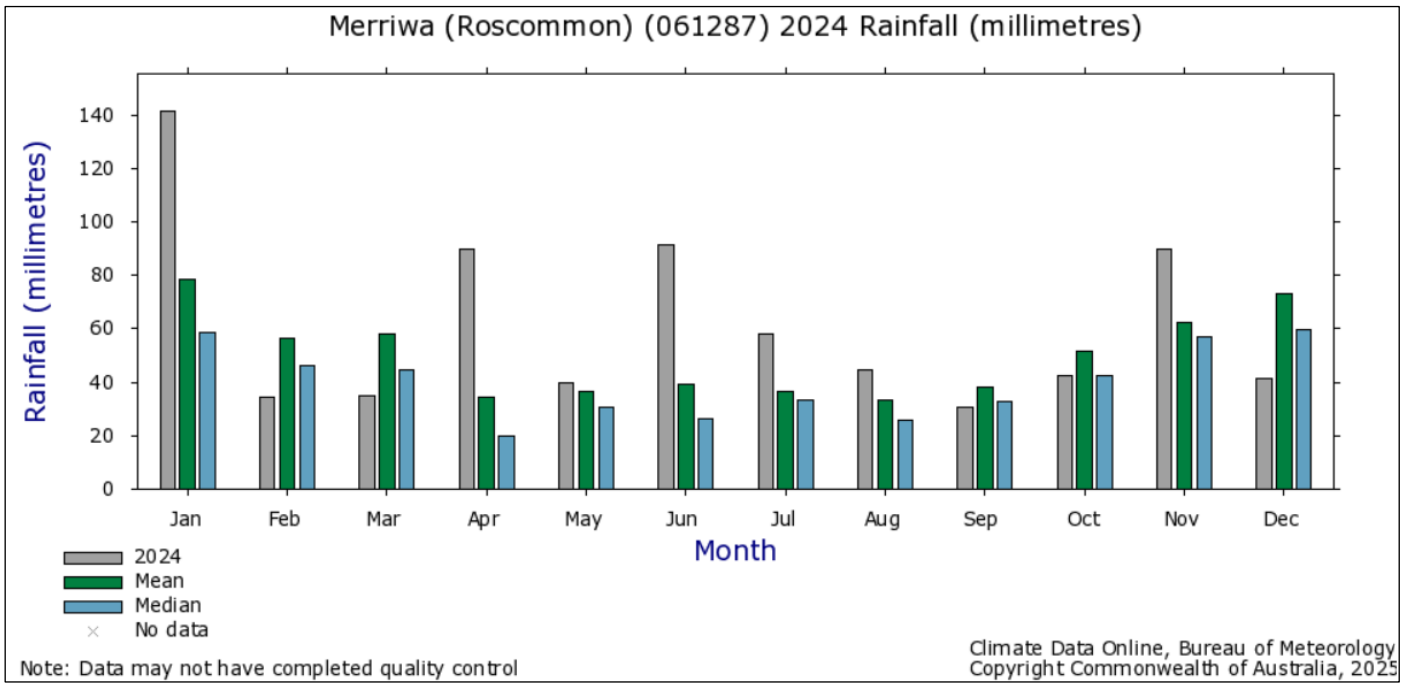

Figure 8-8: Rainfall Records Recorded at the Merriwa (Roscommon) Gauge - 2024

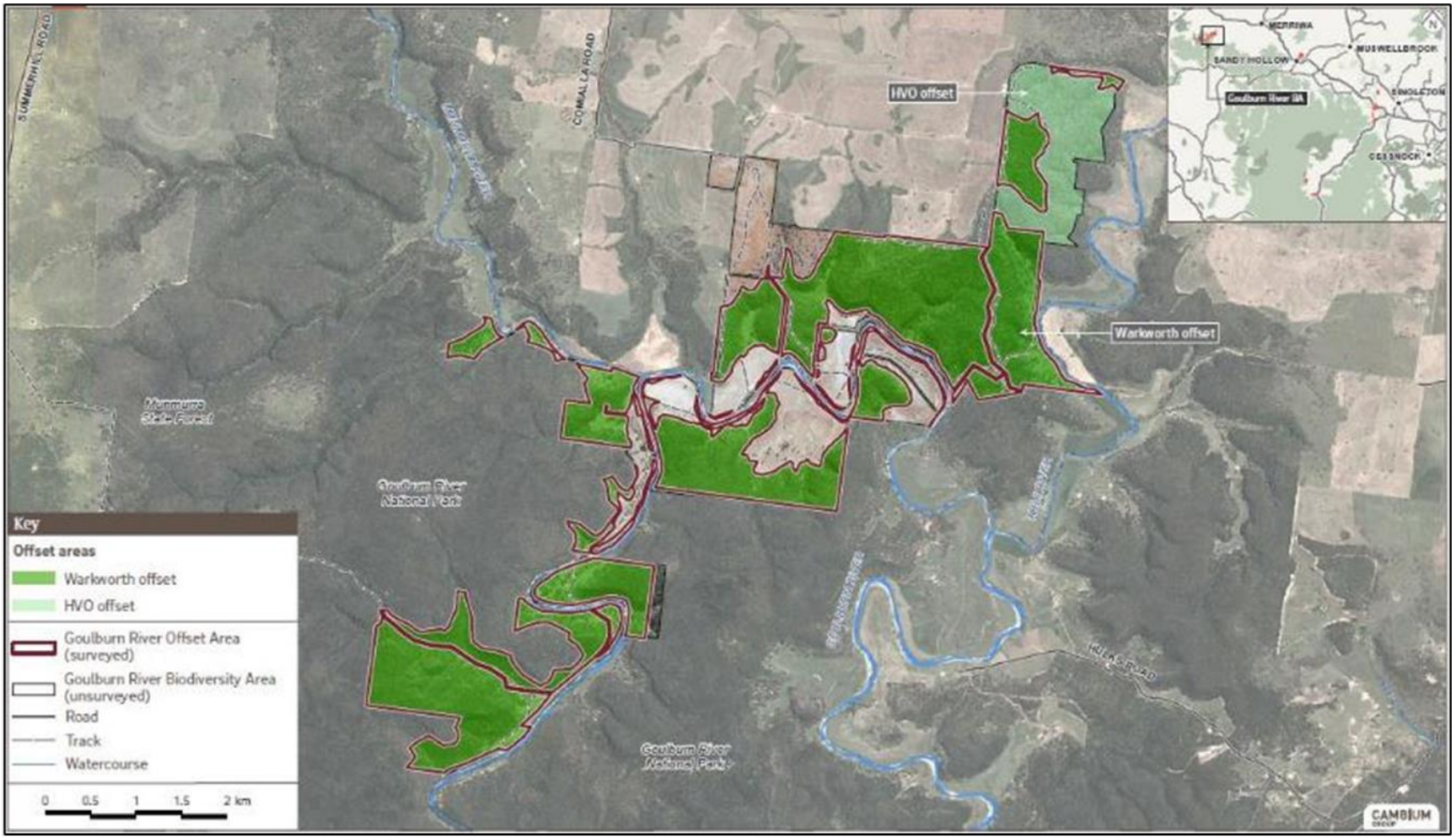

Figure 8-9: HVO's Goulburn River Offset and Adjoining Warkworth Mine Offset

8.13.3 | BIODIVERSITY AREA MANAGEMENT ACTIVITIES

The management activities implemented within the HVO biodiversity offset during 2024 were primarily weed management and feral animal control.

The tracks and fence lines were slashed during 2024 and the areas treated for weeds is shown in **Figure 8-10**. The majority of the HVO offset is in good condition with few weeds. The need for weed and feral animal intervention is assessed during the regular property inspections.

A summary of the key actions in the offset management plan and whether they occurred during 2024 is outlined in **Table 8-11** below.

Table 8-11: Biodiversity Area Management Activities 2024

Activity	Description
Weed Control	Focus on Prickly Pear and African Lovegrass.
Habitat Monitoring	The remnant woodland vegetation at the HVO portion of the Goulburn River BA is generally stable and should continue to recover from past disturbance with limited management intervention. The vegetation is in generally good condition, with a high native floristic biodiversity and low weed cover.
Bird Assemblage Monitoring	No Regent Honeyeaters or Swift Parrots were recorded, despite Regent Honeyeaters being recorded in the adjacent MTW biodiversity area. Three threatened bird species were detected during the surveys, and emus were recorded within the HVO offset for the first time. There was no statistically significant difference in species richness in total and woodland birds relative to 2022.
Infrastructure Management and Improvement	Tracks and fence lines slashed for vegetation regrowth and fire management.
Vertebrate Pest Management	Autumn/Winter and the Spring vertebrate pest management (baiting) programmes undertaken. Vertebrate pest thermal ground shoot occurred in March.
Property Inspections	Property inspections occurred in Feb, April, May, Sept, Oct, Dec.

Figure 8-10: Areas of weed control within HVO's Goulburn River Offset and adjoining Warkworth Mine Offset

8.13.3.1 | PROPERTY INSPECTIONS AND RAPID CONDITION ASSESSMENT

The HVO offset was assessed for the presence of weeds, native fauna, waste or stray stock, the state of the gates and fences and tracks, as well as any evidence of vertebrate pests or unauthorised activities during February, April, May, September, October and December 2024.

The reports were reviewed on receipt and any necessary actions undertaken or scheduled. In general, the site has limited weed issues despite the proximity to farmland, minor pig activities are typically detected during the inspections, and a variety of native fauna are observed commonly include kangaroos, wallabies and wallaroos, lace monitors and various species of native birds.

The tracks are typically in good condition and any fallen trees are removed during the inspection.

Signage on the gates into the HVO offset identify the HVO biodiversity offset and assist to delineate the boundary from the adjoining MTW biodiversity area.

The Rapid Condition Assessment was undertaken in November 2024 and the results are presented in **Table 8-12**. The results are consistent with the assessment for 2023, with both sites having a tally of 19 during both years.

Table 8-12: Rapid Condition Assessment results for 2024

Rapid Site Assessment - Woodland

Biodiversity Area	Goulburn River
Date	November 15 and 22 2024
Auditor	J Blair

Note: True = 1, False = 0 **Site #**	R GR1	R GR2	R GR3	R GR4	R GR5	R GR6	R GR7	R GR8	R GR9	R GR10	R GR11	R HVO1	R HVO2
Low grazing intensity - never farmed	1	1	Grassland	Grassland	1	1	1	1	1	1	1	1	1
Tree and shrub regeneration present (<2m)	1	1			1	1	1	1	1	1	1	1	1
Infrequent fire regime (<5year intervals)	1	1			1	1	1	1	1	1	1	1	1
Healthy mature trees (no dieback)	1	1			1	1	0	0	0	1	1	1	1
Little to no evidence of rabbits	1	1			1	1	1	1	1	1	1	1	1
Little to no evidence of foxes/cats	1	1			1	1	1	1	1	1	1	1	1
Low abundance of weeds (most remnants contain some weeds)	1	1			1	0	0	1	0	0	0	1	1
No evidence of firewood collection	1	1			1	1	1	1	1	1	1	1	1
No obvious signs of erosion or salinity	1	1			1	0	1	1	1	1	1	1	1
Not susceptible to fertiliser application, herbicide or pesticide drift	1	1			1	1	1	1	1	1	1	1	1
Less than 20% trees with Mistletoe (NB some mistletoe is healthy)	1	1			1	1	0	1	1	1	1	1	1
Few tracks, trails or fence lines	0	1			1	1	1	1	1	1	1	0	1
Presence of native shrubs	1	1			1	0	0	0	0	0	1	1	1
Presence of large, old growth trees with hollows	1	1			0	0	0	0	1	0	1	1	0
Dead timber is left standing	1	1			1	1	1	1	1	1	0	1	1
Fallen timber and logs are left on the ground	1	1			1	1	1	1	1	1	1	1	1
Abundance of native ground flora	1	1			1	0	1	1	1	1	1	1	1
Presence of litter, cryptogams, cracks and rocks	1	1			1	1	1	1	1	1	1	1	1
Remnant is large (> 5ha is optimum)	1	1			1	1	1	1	1	1	1	1	1
Connected to or in close proximity to other remnant vegetation	1	1			1	1	1	1	1	1	1	1	1
Health Rating	19	20			19	15	15	17	17	17	18	19	19

Note. The results relevant for the HVO offset are shown on the right side as HVO1 and HVO2.

8.13.3.2 | FERAL ANIMAL CONTROL

HVO undertakes vertebrate pest management activities within the offset properties that it manages. The aim of the vertebrate pest management program is to target wild dogs and foxes that have been reported in and around the BA. The programme involves 1080 ground baiting and ejector baiting in conjunction with the Hunter Local Land Services (HLLS), National Parks and Wildlife Services (NPWS) and local landholders. The Autumn/Winter and the Spring programs were the 18th and 19th respective programs to have occurred at the Goulburn River BA.

The ground baiting method used aligns with the *Humane pest animal control: Code of Practice and Standard Operating Procedures* produced by NSW Department of Primary Industry (DPI). An attractant was also added to lure wild dogs and foxes to the baiting sites to maximise the chances of the bait being detected and taken. The household grade fertilizer**,** *Charlie Carp (*seaweed extract*)* was used as an attractant in this program.

In accordance with the Pesticide Control (1080 Liquid Concentrate and Bait Products) Order 2020, neighbours were notified of the baiting program at least three days prior to the laying of the baits, by letter and / or public notice. In addition to the letter and public notices, 1080 poison notice signs were established on all properties that were baited.

During each program, nine bait stations were established within and adjacent to the HVO biodiversity area along with monitoring cameras to record the effectiveness of the stations. The locations and results of the Spring 2024 program is shown in **Figure 8-11.**

With the exception of one location in autumn, during both programs, each station recorded at least one bait taken within the baiting period. The camera monitoring indicated that the baits were taken by either a dog, fox, pig or, less frequently, goannas.

For the HVO portion of Goulburn River BA during the winter programme, there were 15 takes recorded over nine bait sites: two by wild dogs, eight by foxes, and five by non-target species. The Spring baiting programme recorded 17 takes over the nine bait sites, four by wild dogs, six by foxes, and seven by non-target species.

The results reflect seasonal change where the lace monitors become less active in cooler months and foraging decreases substantially. The results are welcomed as although research shows that Australian native fauna is naturally resistant to 1080 and concentrations in the meat bait need to be substantially higher to adversely affect the animals, any native species take is an undesirable outcome for baiting results. Therefore, continued baiting during this season is ideal to minimise lace monitor takes and optimise target species takes.

The motion sensor cameras established at the sites in photographic mode successfully captured images of target species taking the baits and as well as documenting species that occur within the area. These include an emu plus chicks, bush-tailed possums, wallaby species, wombats, lace monitors as well as pigs, hares, foxes and various bird species.

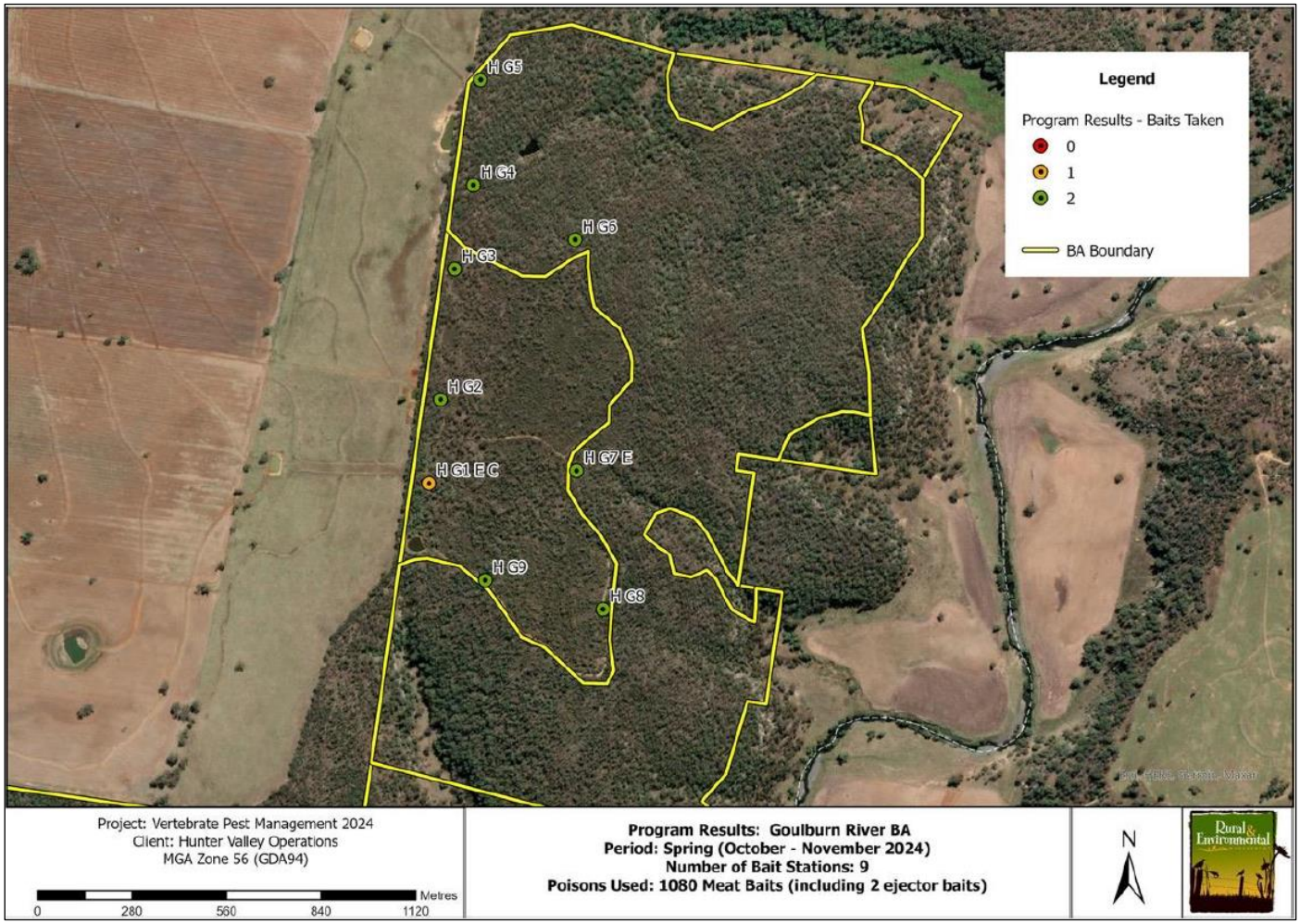

Figure 8-11: 2024 Vertebrate pest baiting locations and Spring Programme results at the Goulburn River Offset

Note: the HVO BA in the northeast corner contained nine baits.

9 | COMMUNITY

9.1 | COMPLAINTS

HVO provides a 24-hour Community Complaints Hotline (via freecall number 1800 888 733) for community members to comment on concerns relating to its operations. All complaint details are recorded in a database in accordance with Condition M6.2 of Environmental Protection Licence 640 and made available on HVO's website (www.hvo.com.au).

A total of thirteen (13) complaints were received by HVO during 2024 (refer to **Figure 9-1**). This represents an increase over nine (9) complaints for the previous year, however it is lower than the average amount of complaints received at HVO over the past decade (**Figure 9-3**). Complaints were related to blasting, dust, traffic and noise. **Figure 9-2** presents the number of complaints per complaint type. Details of complaints received during 2024 are outlined in **Table 9-1.**

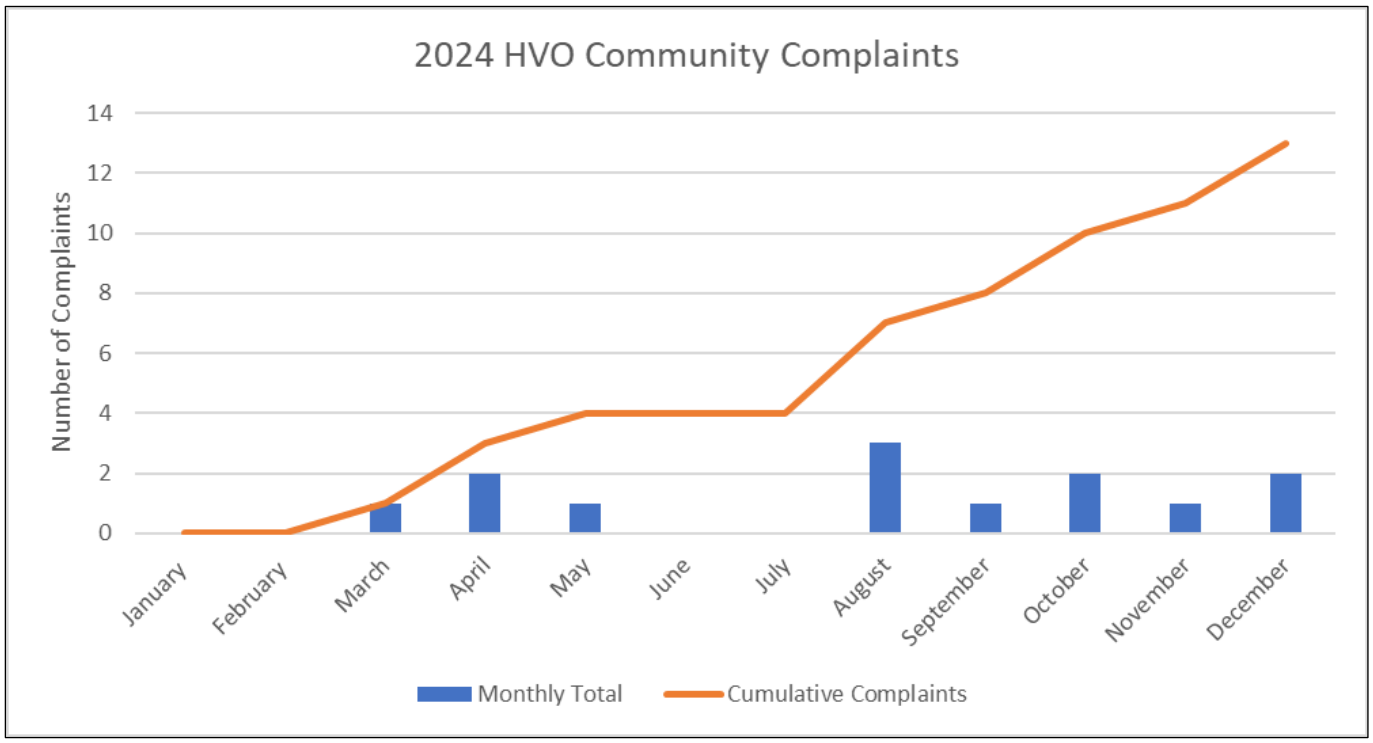

Figure 9-1: Summary of Community Complaints in 2024

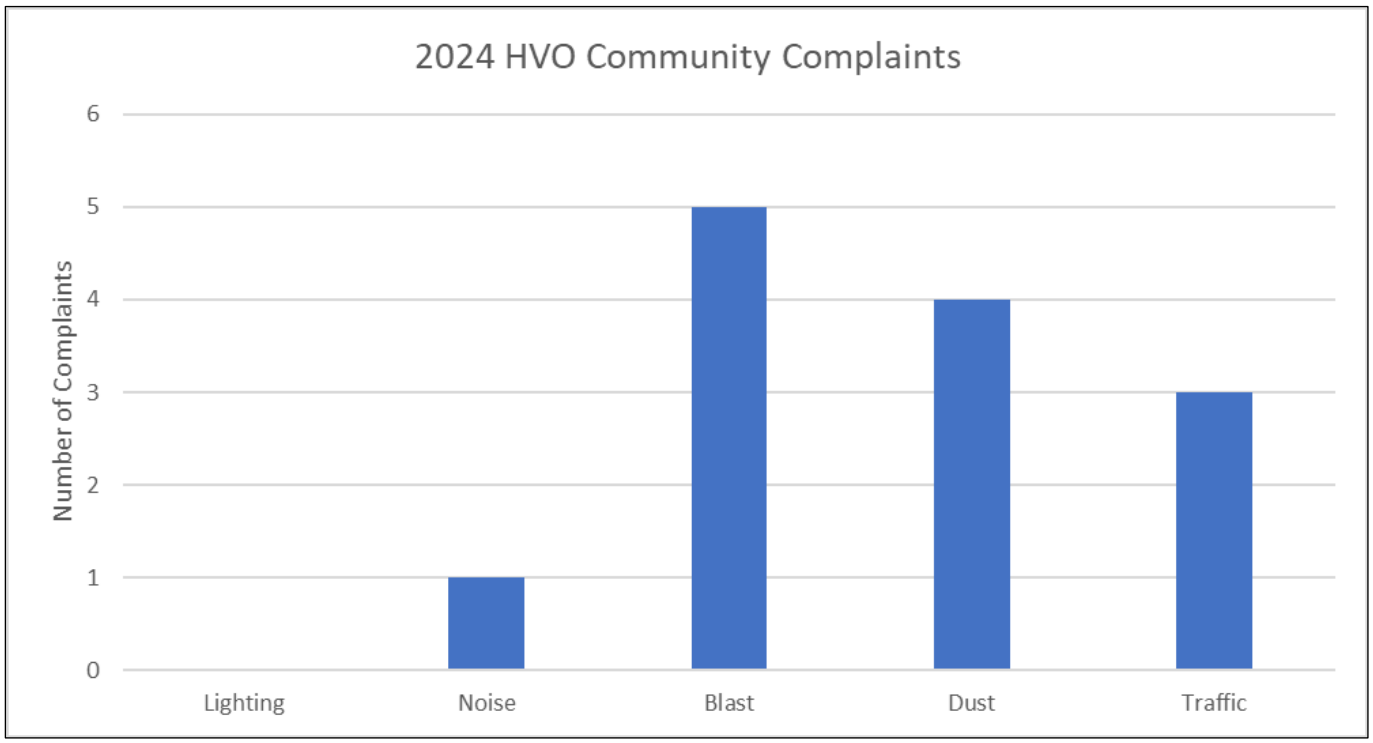

Figure 9-2: Number of Complaints per Type in 2024

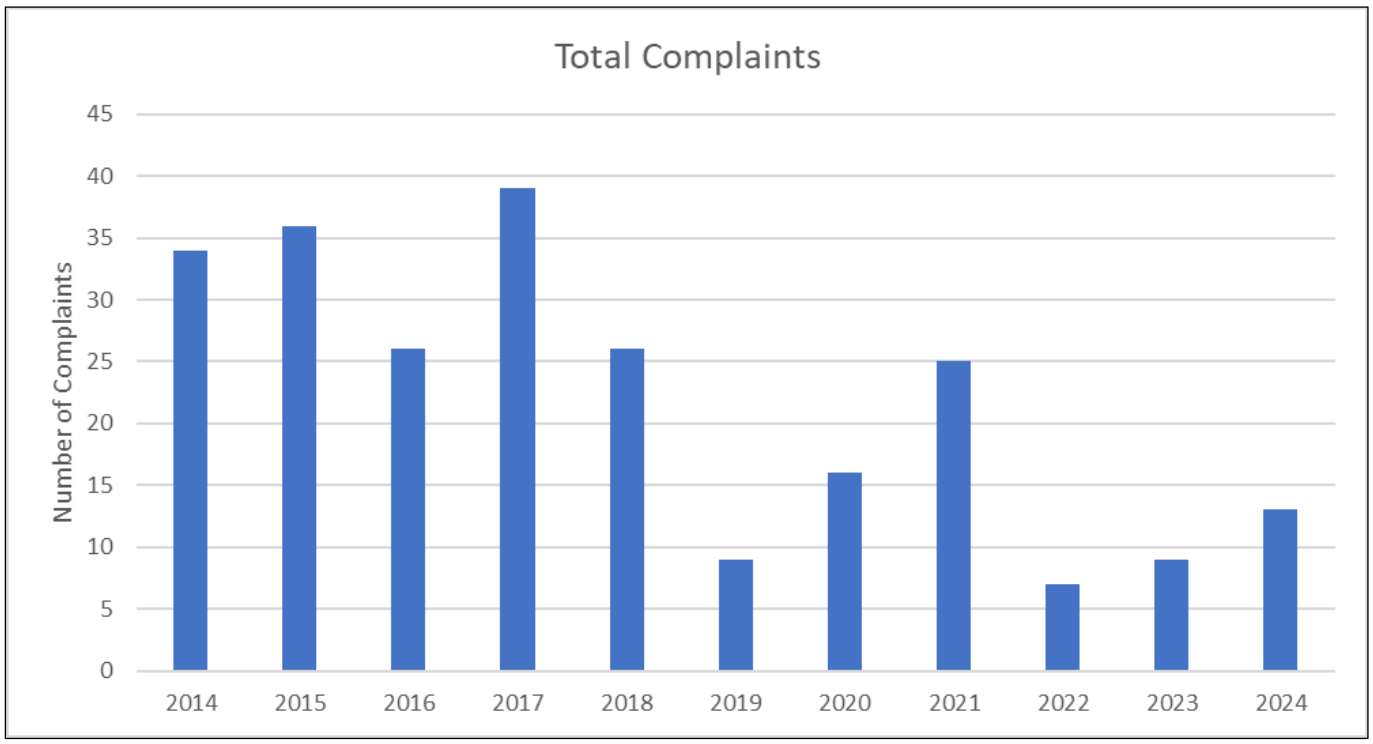

Figure 9-3: Community Complaints 2014-2024

Table 9-1: Details of Complaints Received in 2024

Date	Time	Nature of Complaint	Description	Follow Up Action
12 March 2024	8:59pm	Noise	A resident of Jerrys Plains called the Community Complaints Hotline at 8:59pm regarding noise, commenting that "noise is pretty loud tonight" as well as equipment horns could be heard	The OCE on duty in South Pit contacted the resident at 9:02pm and subsequently notified the OCE on duty in West Pit. Following communication between West Pit OCE and relevant equipment operators, horn use and dumping practices – thought to be the causes of the disturbance – were altered and/or stopped. An internal investigation conducted following the complaint found that no noise alarms had triggered within one hour of the complaint. Horn noise was audible from noise recordings at the Jerrys Plains noise monitor.
2 April 2024	1:31pm	Blast	A resident of Jerrys Plains called the United Wambo Joint Venture (UWJV) Community Complaints Hotline at 1:31pm regarding noise and vibration from a blast. This was relayed to HVO given they did not have a blast at that time.	A member of the HVO Environment and Community team contacted the resident to advise a blast had been fired in the Mitchell Pit at 1:29pm. The closest monitor to the resident recorded overpressure of 105.5 dBL against a criteria of 120 dBL and ground vibration of 0.11mm/s against a criteria of 10mm/s.
4 April 2024	12:30pm	Traffic	A resident of Jerrys Plains called the Community Complaints Hotline at 12:30pm regarding traffic incidents at HVO North entry off Lemington Road. The resident reported that a vehicle exiting HVO North on the afternoon of 3 April failed to stop at the stop sign and almost collided with his wife's vehicle. They have witnessed other vehicles failing to stop at the same location within the past two months.	An internal investigation following the complaint resulted in a sitewide presentation about the importance of road safety whilst travelling to and from HVO delivered at daily HCOMs. Vegetation maintenance was performed to increase visibility at the intersection.

Date	Time	Nature of Complaint	Description	Follow Up Action
3 May 2024	7:40am	Traffic	A resident of Jerrys Plains called the Environment and community Officer directly regarding a traffic incident at HVO North's intersection with Lemington Road. The resident reported that a vehicle (small truck) exiting HVO North at approximately 7:40am on 3 May failed to stop at the stop sign and almost collided with his wifes vehicle.	Following an internal investigation into the complaint, a site-wide communication about road safety and the 100km/h speed limit along Lemington Road was delivered at daily HCOMs. In addition, road marking, signs and the surveillance camera near the intersection will be upgraded.
30 August 2024	10:05am	Blast	A resident of Jerrys Plains contacted the HVO Environment and Community officer directly via telephone at 10:05am describing two loud blasts in succession as well as floor movement and house shudder. The Environment and Community Officer communicated to the resident advising that a blast had been fired in the HVO Mitchell Pit at 10:04am.	The closest monitor to the resident recorded overpressure of 100.18 dBL against a criteria of 120 dBL and ground vibration of 0.06mm/s against a criteria of 10mm/s.
30 August 2024	10:13am	Blast	A resident of Jerrys Plains contacted the HVO Community Complaints Hotline at 10:13am describing two loud blasts in succession. The Environment and Community Officer communicated to the resident via telephone shortly after the call to advise a blast had been fired in the HVO Mitchell Pit at 10:04am.	The closest monitors to the resident, Jerrys Plains, recorded blasting levels below relevant criteria. Jerrys Plains Village: Overpressure 100.18 dBL against a criteria of 120dBL and ground vibration of 0.06mm/s against a criteria of 10mm/s. HVO conducted an internal investigation into the blast and provided the results to the resident

Date	Time	Nature of Complaint	Description	Follow Up Action
30 August 2024	10:19am	Blast	A resident of Jerrys Plains contacted the HVO Community Complaints Hotline at 10:19am describing two loud blasts in succession. The Environment and Community Officer communicated to the resident via telephone shortly after the call o advise a blast had been fired in the HVO Mitchell Pit at 10:04am.	The closest monitors to the resident, Jerrys Plains, recorded blasting levels below relevant criteria. Jerrys Plains Village: Overpressure 100.18 dBL against a criteria of 120dBL and ground vibration of 0.06mm/s against a criteria of 10mm/s. HVO conducted an internal investigation into the blast and provided the results to the resident.
24 September 2024	1:50pm	Blast	A resident of Maison Dieu contacted the HVO Community Complaints Hotline at 1:50pm describing a blast that occurred at 1.30pm that shook their house and left dust over their cars.	The HVO Environment and Community Officer communicated to the resident via telephone shortly after the call to advise a blast had been fired in the HVO Cheshunt Pit at 1:29pm. The closest monitors to the resident, Maison Dieu and Knodlers Lane, recorded blasting levels below relevant criteria. These monitors recorded overpressures of 112.74 and 114.6dBL respectively against a criteria of 120dBL and ground vibration of 0.33 and 0.26mm/s respectively against a criteria of 10mm/s. HVO conducted an internal investigation into the blast and as requested, provided the outcomes to the resident.
21 October 2024	6:33pm	Traffic	A member of the community called the HVO Community Complaints Hotline at 6:33am on 22 October regarding a traffic hazard at the intersection of the HVO South access road and Golden Highway. The community member reported that a vehicle exiting HVO South on the afternoon of 21 October failed to give way causing hem to brake sharply to avoid a collision with the offending vehicle.	A communication about the importance of providing an adequate gap at this intersection was provided to Mine and Maintenance teams at HVO South.

Date	Time	Nature of Complaint	Description	Follow Up Action
30 October 2024	1:50pm	Air Quality	A resident of Putty Road, Mt Thorley contacted the HVO community complaints hotline at 1.50pm on 30 October 2024 regarding poor air quality. The resident was not able to attribute the dusty conditions to a blast event or any other event or location related to HVO. The residence is approximately 13km from HVO's nearest active mining area.	The daily 24-hr results from the two closest real-time PM10 monitors (Knodlers Lane and Maison Dieu) were below the compliance limits.
4 November 2024	9:27am	Air Quality	A resident of Putty Road, Mt Thorley contacted HVO regarding poor air quality. The resident attributed dusty conditions to HVO South.	Representatives from HVO's Environment and Community team attended the residence to discuss the residents' concerns. The daily 24-hr results from the two closest real-time PM10 monitors (Knodlers Lane and Maison Dieu) were below the compliance limits. The residence is approximately 13km from HVO's nearest active mining area.
17 December 2024	11:00am	Air Quality	A resident of Putty Road, Mt Thorley contacted the HVO community complaints hotline regarding poor air quality. The resident attributed the dusty conditions to HVO South.	The resident was contacted by a HVO Environment and Community Officer to further discuss the nature of the complaint. The daily 24-hr results from the two closest real-time PM10 monitors (Knodlers Lane and Maison Dieu) were below the compliance limits.
21 December 2024	11:14am	Air Quality	A resident of Putty Road, Mt Thorley directly contacted a HVO Environment and Community Officer via telephone regarding poor air quality. The resident attributed the dusty conditions to HVO South.	The daily 24-hr results from the two closest real-time PM10 monitors (Knodlers Lane and Maison Dieu) were below the compliance limits.

9.2 | REVIEW OF COMMUNITY ENGAGEMENT

9.2.1 | COMMUNICATION

Two near neighbour newsletters were sent to HVO's near neighbours during 2024 providing an overview of:

- Operational updates
- Community initiatives and contributions
- Community grants programme
- Community information days
- Weed and pest management
- Continuation Project updates
- Communication tools –website, environmental monitoring public reporting website and the blast notification SMS alert system
- Water filter, tank cleaning and gutter cleaning availability

The HVO website as well as a social media channels also provided regular communications throughout 2024 on various aspects of the business.

9.2.2 | CONSULTATION AND ENGAGEMENT ACTIVITIES

Consultation and engagement activities included:

- Community grants
- Support of the Jerrys Plains Primary School Ready4school (preschool) programme
- Apprentice community working bees at Branxton pre-school
- Community perception survey
- The Community Consultative Committee
- Supply of amenity resources – water filters, tank and gutter cleans
- Resident notifications of air quality exceedances (where applicable)
- Community information sessions

Community information sessions were held at Jerrys Pains (23 April and 23 October) and Maison Dieu (13 April and 26 October) to provide information to near neighbours on current operations and the HVO Continuation Project.

HVO continued to encourage the community to contact the company in a way that suits the individual community members, including a 24-hour community information hotline.

9.2.3 | COMMUNITY CONSULTATIVE COMMITTEE

The HVO CCC meetings were held in February, May, August, and November 2024. The HVO CCC meet to discuss operations, projects and mine activities. The Committee is comprised of HVO representatives, community members and other key external stakeholders, including Singleton Council.

The HVO CCC minutes are available on the HVO website (www.hvo.com.au). The community is invited to visit the website(s) to learn more about the HVO CCC.

In 2024 CCC members were:

- Dr Colin Gellatly (Independent chairperson)
- Cr Sue George (Singleton Council)
- Dr Neville Hodkinson
- Mrs Janelle Wenham
- Mr Brian Atfield
- Mrs Di Gee
- Mr Todd Mills
- Mr Michael Wellard
- Mrs Jeanie Hayes
- Mrs Sarah Purser (minute taker)
- HVO General Manager – David Foster
- HVO Environment & Community Manager – Andrew Speechly
- HVO Environment & Community Officer – Nic McLaughlin

9.2.4 | COMMUNITY GRANTS

HVO supports local not for profit organisations applications for support that have a clear community benefit in terms of capacity building, heath, environment and/or local need via its community grants programme. A total financial contribution of approximately $121,721 was provided to community organisations during 2024.

Local organisations successful in obtaining funding included:

- Jerrys Plains Public School – Ready4School programme
- Singleton PCYC - 2024 Book Fair to raise funds for youth activities at the centre
- Rotary Club of Singleton on Hunter - Silver sponsor of Singleton Art Prize
- Singleton Public Library - Little Bang Science Programme workshops for 3–5-year-olds
- Denman Public School - Renaissance Star Reading literacy programme for Kindergarten to Year 6 students
- Singleton Public School - Replace electronic whiteboards in classrooms
- Singleton Neighbourhood Centre - Personal safety devices for volunteers servicing vulnerable groups
- Maitland Tenambit BMX Club - Installation of a transponder (timing loop) system to enable riders to compare racing and training times
- Upper Hunter Homeless - Additional food kept on site to feed people experiencing homelessness
- Sandy Hollow Public School - Line marking of athletic fields and beach sand for long jump pit
- Hunter Valley Camp Draft - Upgrade toilet and shower facilities for both sexes at Whittingham facility
- Mark Hughes Foundation - Support to hold 50 Sparkling Years fundraising event

- Muswellbrook High School - Funding for Student Representative Council to hold a colour run event to support Motor Neuron Disease research
- Cessnock City Council - Support to hold Our Bushland Festival
- Australian Stock Horse Association - Prize money for Eastern Branch ASHS Championships and Performance Weekend
- Sunnyfield - Weekly pottery classes during school term for clients with a disability
- St Catherine's Catholic College - First Aid Course for Year 10 students
- NSW Scout Association - Support an Upper Hunter scout to attend the Queensland Scout Jamboree
- Business Singleton - Platinum sponsor of Singleton Business Awards
- Maitland Steam and Antique Machinery Association - Mezzanine flooring to prevent flooding at Hunter Valley Steamfest
- Muswellbrook Chamber of Commerce - Exhibit sponsor of TV, Movie and Nostalgia Festival
- Westpac Rescue Helicopter - Charity Golf Day
- Bellbird Cricket Club - Gazebos, iPads
- Detour Youth Services - Music therapy room
- Singleton Neighbourhood Centre - Signage
- Samaritans Singleton - Christmas Eve Lunch 2024
- Singleton Fire Brigade Social Club - Annual Santa lolly run

In addition to the HVO community grants programme, five HVO haul trucks continued their partnerships with local/regional charities during 2024. The trays of the trucks have been painted in the colours of Westpac Rescue Helicopter Service, Hunter Prostate Cancer Alliance, Type 1 Foundation, Singleton Family Support and Hunter Breast Cancer Foundation. The charities receive an agreed donation for every load the trucks haul, plus other fundraising support throughout the year. These charities received a combined $40,000 for the 2024 calendar year. Each of the five charities also took part in the HVO Family Day where donations were collected as part of the dunk tank display.

Multiple HVO employees donated back their Christmas gift vouchers, of which HVO matched that giving and delivered $3,400 in gift vouchers to Singleton Family Support ($2,600) and the Singleton Salvation Army ($1,800) in time for Christmas. HVO also provided St Vincent de Paul with non-perishable food items collected as part of HVOs staff Christmas giving project.

Food remaining after the HVO Family Day on 25 May 2024 was donated and transported to the Singleton Neighbourhood centre.

The HVO apprentice programme conducted two full days of in-kind service at Branxton Preschool during early 2024 to assist in the construction of the school's new playground area by:

- Erecting raised garden beds
- Painting structures and fences
- Spreading mulch
- Erecting signage
- Assembling outdoor furniture
- Laying turf

9.2.5 | HVO CONTINUATION PROJECT

Community members and stakeholders have been consulted through each step of the HVO Continuation Project. Community feedback has helped to design and refine the proposal and our plans to minimise and manage social and environmental impacts.

HVO used a variety of tools to provide information and gather feedback consistent with the State Significant Development Engagement Guidelines 2021, Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010 and the Secretary's Environmental Assessment Requirements (SEARs) issued by DPHI.

Engagement has also included the following:

- Project newsletters for the local community;
- Community information sessions in Jerrys Plains, Maison Dieu and Long Point;
- Other community and stakeholder meetings;
- Consultation with HVO's Community Consultative Committee;
- Information on the HVO website and social media channels;
- Consultation with 33 RAPs; and
- Responding to email and phone enquiries.

The HVO Continuation Project Environmental Impact Statement was placed on public exhibition by DPHI during February 2023. HVO reviewed all submissions and in November 2023 submitted a Submissions Report and an Amendment Report to DPHI. During 2024 DPHI has asked for more detailed information on several occasions as part of its assessment of the HVO Continuation Project. HVO is conducting additional modelling and mine planning to provide this information.

The Federal Government will independently assess the HVO Continuation Project in accordance with the *Environment Protection and Biodiversity Conservation Act* 1999.

10 | INDEPENDENT AUDIT

The last Independent Environmental Audit (IEA) was undertaken in November 2022. This audit was undertaken against the conditions of both Project Approval PA 06_0261 (as modified) and DA 450-10-2003 (as modified). The audit also assessed compliance with other licences and approvals including mining leases and EPL 640.

RPS AAP Consulting Pty Ltd (RPS) were engaged and endorsed by DPHI as suitably qualified, independent experts to undertake the audit. The timeframe for the audit was from 2 December 2019 to 30 November 2022. The site inspection component of the audit was undertaken over three days between 28 and 30 November 2022.

The audit report and HVO's response to the auditor's recommendations were submitted to the DPHI on 23 February 2023.

The audit report was revised and resubmitted June 2023 to address comments from DPHI.

The audit identified 14 non-compliances with PA 06_0261 and DA 450-10-2003:

- 6 non-compliances associated with PA 06_0261
- 8 non-compliances associated with DA 450-10-2003

These findings, along with the auditor's recommendation and HVO's response to these recommendations, are summarized in **Table 10-1**. The 2022 IEA can be downloaded from the HVO Website.

The next IEA is scheduled to commence in November 2025.

Table 10-1: Independent Audit Recommendations

Ref	Recommendation	HVO Response	Due Date
HVO South – PA 06_0261 Non-Compliance Recommendations			
S2 C2	No Further Action Required	No Further Action Required	N/A
S2 C2A	Refer S2 C2	No Further Action Required	N/A
S3 C2	Reference in Table 9 of the Monthly Environmental Monitoring Reports should be updated to reference LA1, 1-minute criteria Where a tonality penalty has been applied, the monthly report should include discussion and clarification on whether this constitutes an exceedance or is attributable to other sources.	HVO will amend future Monthly Environmental Monitoring Reports to included updated reference HVO will amend future Noise Reports to include discussion and clarification regarding observed tonality penalties	Complete
S2 C7	No Further Action Required	No Further Action Required	N/A
S3 C15	Ensure that the blasting schedule on the HVO website is maintained.	Issue with the Blasting Schedule link from the “Contacts” page has been rectified	Complete
S3 C15	It is recommended that management plans, and other necessary documents include a table itemising the matters raised during consultation with identified parties, and description of the resolution of these matters.	HVO will amend and include in future revised management plans and other necessary documents a table itemising the matters raised during consultation with identified parties, and description of the resolution of these matters.	Complete*
S3 C18	Recommend updating Section 1, Table 1 to Table 3 of the BMP to ensure correct references in column 3 (“Section of BMP which addresses this requirement”, “Where Commitment is addressed”, “Where Condition is addressed”).	HVO will amend in the next revision of the Blast Management Plan.	Complete* The BMP was updated and resubmitted
S3 C19	It is recommended that operators are provided with refresher training to ensure awareness of these TARPs and to ensure more proactive management of wheel generated and plant-generated dust.	HVO will roll out refresher training to operators to ensure awareness of Dust TARPS.	Complete

Ref	Recommendation	HVO Response	Due Date
S3 C25	Repair the eroded batter to Dam 37S or redirect flow to the existing stabilised entries. Sediment should then be removed from the basin to restore capacity	HVO will include repair works in future works programs to ensure completion. HVO will undertake a review of current sediment storage capacity compared to dam design criteria to determine whether further desilting is required.	Complete
S3 C27	Version 3.4 of the WMP has been issued to the secretary and is awaiting approval. Review the contents of the WMP to reflect the audit findings when next updated.	HVO will amend in the next revision of the Water Management Plan.	Complete* WMP was resubmitted.
S3 C58	Ensure that waste containers have lids fitted and/or are stored undercover to limit additional generation of contaminated liquid.	HVO will undertake a site inspection to ensure lids are fitted to waste containers on bunded pallets that are not undercover and reinforce this expectation with a site communication.	Complete
HVO North – DA 450-10-2003 Non-Compliance Recommendations			
S2 C2	No Further Action Required	No Further Action Required	N/A
S2 C2A	Refer S2 C2	No Further Action Required	N/A
S3 C2	Where a tonality penalty has been applied, the monthly report should include discussion and clarification on whether this constitutes an exceedance or is attributable to other sources.	HVO will amend future Noise Reports to include discussion and clarification regarding observed tonality penalties	Complete
S3 C4A	It is recommended that operators are provided with refresher training to ensure awareness of these TARPs and to ensure more proactive management of wheel generated and plant-generated dust	HVO will roll out refresher training to operators to ensure awareness of TARPS	Complete
S3 C7	Reference in Table 9 of the Monthly Environmental Monitoring Reports should be updated to reference LA1, 1-minute criteria	HVO will amend future Monthly Environmental Monitoring Reports to included updated reference	Complete

Ref	Recommendation	HVO Response	Due Date
S3 C10	Recommend updating Section 8.1.1, Table 8-1 to reference AS1055- 2018 (supersedes AS1055-1997), and include reference to NSW EPA Approved methods for the measurement and analysis of environmental noise in NSW, 2022.	HVO will amend in the next revision of the Noise Management Plan.	Complete
S3 C19	Recommend updating Section 1, Table 1 to Table 3 of the BMP to ensure correct references in column 3 (“Section of BMP which addresses this requirement”, “Where Commitment is addressed”, “Where Condition is addressed”).	HVO will amend in the next revision of the Blast Management Plan.	Complete*
S3 C20	No Further Action Required	No Further Action Required	N/A
S3 C21	No Further Action Required	No Further Action Required	N/A
S3 C27	Version 3.4 of the WMP has been issued to the secretary and is awaiting approval. Review the contents of the WMP to reflect the audit findings when next updated. Repair the inlet to Dam 5N to stop ongoing sedimentation, remove sediment from the dam, and confirm the capacity of Dam 5N and Dam 2N meets industry guidelines.	HVO will amend in the next revision of the Water Management Plan. HVO will include repair works in future works programs to ensure completion. HVO will undertake a review of current storage capacity in relation to Bluebook Standard to confirm whether current storage capacities are sufficient or additional capacity is required.	Complete* Complete Complete
S3 C28A	No Further Action Required	No Further Action Required	N/A

* Date indicates when Management Plans are submitted for Department approval. Timing of approval and finalisation of the plan with the changes is outside of HVO’s control.

11 | INCIDENTS AND NON-COMPLIANCES

During 2024 there were twelve (12) incidents that required reporting to DPHI. These were related to air quality, blast fume and water and are summarised below.

Cheshunt East PM_{10} Exceedance – 5 February 2024

HVO recorded a 24-hour average of 69.1 µg/m^3 at the Cheshunt East HVAS, above the HVO North consent criteria of 50 µg/m^3. The maximum HVO contribution to this exceedance was calculated to be 13.4 µg/m^3. HVO considers that all reasonable and feasible avoidance and mitigation measures were taken in accordance with the site AQGGMP to manage particulate emissions on this day.

Jerrys Plains PM_{10} Exceedance – 13 March 2024

HVO recorded a 24-hour average of 51.2 µg/m^3 at the Jerrys Plains TEOM, above the HVO North consent criteria of 50 µg/m^3. The maximum HVO contribution to this exceedance was calculated to be 13.3 µg/m^3. HVO considers that all reasonable and feasible avoidance and mitigation measures were taken in accordance with the site AQGGMP to manage particulate emissions on this day.

Level 4B Blast Fume Event - 4 June 2024

HVO initiated a blast in Cheshunt Pit 1 at 1:09pm on Tuesday 4 June 2024. Post initiation, fume was observed and ranked Level 4B in accordance with the AEISG rating scale. Blast fume travelled from the initiation point post ignition in a south-easterly direction, dispersing over the pit. The blast was postponed due to the identification of a 'possible' risk of blast fume, and the Glider Club being occupied and downwind of the blast on 31 May 2024 when the blast was initially scheduled.

HVO received approximately 51mm of rain between 31 May and 2 June. This is considered to be the primary cause of the fume. The blast was designed and loaded in accordance with fume mitigation practices and HVO's pre-blast risk assessment adequately identified risks and controls to mitigate offsite impacts.

Dam 17N Pumping Incident - 22 June 2024

During a routine inspection by the CHPP, a small diameter hose was found to be discharging mine water into Farrells Creek. The hose was connected to a pump as part of works to dewater Dam 17N. The maximum estimated volume discharged to Farrells Creek was 523kL between 13 and 22 June. The pump was immediately turned off and water quality testing undertaken. Upstream water quality had a higher salinity than the discharged water and downstream samples. It was determined that no actual or potential environmental harm was caused. EPA was notified on 24 June and incident report submitted. HVO received a Penalty Infringement Notice of $30,000 from the EPA for this event.

Jerrys Plains PM_{10} Exceedance – 4 November 2024

HVO recorded a 24-hour average of 57.9 µg/m^3 at the Jerrys Plains TEOM, above the HVO North consent criteria of 50 µg/m^3. The maximum HVO contribution to this exceedance was calculated to be 1.2 µg/m^3. HVO considers that all reasonable and feasible avoidance and mitigation measures were taken in accordance with the site AQGGMP to manage particulate emissions on this day.

Cheshunt East PM10 Exceedance – 7 November 2024

HVO recorded a 24-hour average of 53.9 µg/m^3 at the Cheshunt East HVAS, above the HVO North consent criteria of 50 µg/m^3. The maximum HVO contribution to this exceedance was calculated to be 11.1 µg/m^3. HVO considers that all reasonable and feasible avoidance and mitigation measures were taken in accordance with the site AQGGMP to manage particulate emissions on this day.

Level 4B Blast Fume Event – 22 November 2024

HVO initiated a blast in West Pit at 1:20pm on Friday 22 November 2024. Post initiation, fume was observed and ranked Level 4B in accordance with the AEISG rating scale. Blast fume travelled from the initiation point post ignition in a westerly direction, dispersing over the pit. The blast was planned to be fired on Wednesday 20th November, however loading of the blast was delayed by two days due to rain. As part of the pre-blast risk assessment, it was identified that fume was possible from the blast as a result of rain received during loading (9.4mm).

The blast was designed and loaded in accordance with fume mitigation practices and HVO's pre-blast risk assessment adequately identified risks and controls to mitigate offsite impacts. Internal loading practices are being reviewed and will be updated as required to reduce likelihood of fume generation as a result of loss in confinement and water ingress.

Jerrys Plains PM_{10} Exceedance – 14 December 2024

HVO recorded a 24-hour average of 50.6 µg/m3 at the Jerrys Plains TEOM, above the HVO North consent criteria of 50 µg/m3. The maximum HVO contribution to this exceedance was calculated to be 13.0 µg/m3. HVO considers that all reasonable and feasible avoidance and mitigation measures were taken in accordance with the site AQGGMP to manage particulate emissions on this day.

DL30 and Warkworth Depositional Dust Exceedances – 2024 Annual Average

The DL30 and Warkworth monitoring locations exceeded the annual average insoluble matter deposition rate criteria of 4 g/m^2/month (HVO North only) during 2024. However, all results were below the maximum insoluble solids incremental increase criterion of 2 g/m^2/month and hence compliant with criteria.

An external specialist investigation determined the exceedances to be due to local sources of dust in close proximity to the monitors. The elevated levels at DL30 and Warkworth were assessed to estimate the maximum contribution from HVO North to the annual results. The HVO North maximum contribution to the incremental increase at DL30 was 0.2 g/m^2/month, and 0.0 g/m^2/month at Warkworth. These maximum concentrations were not deemed to have caused the exceedances. The monitors are located in close proximity to HVO South, on the opposite side of HVO North. Given the significant separation distances between HVO North and these monitors, HVO North's contribution to these monitoring sites would always be low and likely indiscernible from background concentrations and the influences of other mines. Therefore, HVO North could only reasonably have a tangible impact at its nearest monitors which include D118 and D119.

Warkworth TSP Exceedance – 2024 Annual Average

The Warkworth TSP monitoring location recorded an annual average of 137.5 µg/m^3 compared to a criteria of 90 ug/m^3.

Contributions at the TSP monitors were estimated to be the 24-hour concentrations minus an estimated background level on the corresponding day. The background level is considered to be the level which excludes the contribution from HVO but may include the influence of other sources, including other mines, localised sources, or regional sources of background dust. For the Warkworth monitor, which is often downwind of HVO South and a neighbouring mine concurrently, the daily contribution is considered to include both mines. In order to determine the contribution from HVO South alone, the combined mining increment was scaled by the proportion of time the monitor was downwind of HVO South relative to the total time the monitor was downwind of both mines during each 24-hour period.

Further methodology for determining HVO contribution is presented in Section 2.7.1 of **Appendix A**. This investigation method has determined the contribution of HVO South to the Warkworth annual average to be 41.6 µg/m^3.

Warkworth and Hunter Valley Glider Club (HVGC) PM_{10} Exceedances – 2024 Annual Average

Annual average PM_{10} levels were above the impact assessment criteria of 25 µg/m^3 for HVO South at the Hunter Valley Gliding Club (HVAS) (28.8 µg/m^3) and Warkworth (TEOM) (28.0 µg/m^3) during 2024. These exceedances were investigated by a specialist consultant (see **Appendix A**). The investigation estimated maximum incremental contribution to PM_{10} level from HVO South to be a minor contribution to the overall result (2.7 µg/m^3 for Warkworth, 28.8 µg/m^3 for HVGC). There are no privately owned residences near the Warkworth or Glider Club monitors and HVO has a Concessions and Mitigation Agreement with the Gliding Club with respect to air quality levels when the facilities are in use. Refer to Section 2.6.1 of **Appendix A** for more information.

Maison Dieu and Kilburnie South $PM_{2.5}$ Exceedances – 2024 Annual Average

Annual average $PM_{2.5}$ was above the annual average criteria of 8 µg/m^3 at Maison Dieu (10.5 µg/m^3) and Kilburnie South (8.9 µg/m^3) for the reporting period. While HVO's contribution is not calculated to be significant, the elevated total levels are considered to be anomalously high and are not consistent with other regional $PM_{2.5}$ monitors or expected ratios of co-located $PM_{2.5}$ monitors. $PM_{2.5}$ levels recorded have been investigated throughout the year, including:

- Monitoring locations have been inspected multiple times to identify any significant local $PM_{2.5}$ sources, with none identified.
- Calculation of PM_{10}:$PM_{2.5}$ ratios for monitoring equipment for co-located units. The ratio in the Hunter Valley is typically 0.3 to 0.4. Ratios measured at HVO range from 0.31 to 0.78.
- Comparison to levels recorded by new EBAMs installed in March 2023.

It is believed that the source of the high readings is due to the high-volume air sampler monitoring method. HVO engaged an air quality consultant to review the air quality monitoring network. The review recommended the implementation of real-time $PM_{2.5}$ monitoring at Maison Dieu and Kilburnie South. During March 2023, HVO installed Beta Attenuation Mass Monitors (EBAMs) which is an equivalent type to that used in the EPA's Upper Hunter Air Quality Monitoring Network. The use of the EBAMs is pending DPHI approval of the AQGG Management Plan. The aim of these monitors is to determine the potential contribution of HVO South to annual average $PM_{2.5}$ levels recorded at HVO HVAS monitors. Given that the results recorded at the Maison Dieu and Kilburnie South HVAS monitors appears to be implausibly high, monitoring data at these locations have been used in order to estimate HVO South's increment to the recorded levels.

12 | ACTIVITIES TO BE COMPLETED IN 2025

12.1 | APPROVALS

Continued assessment and determination of the HVO Continuation Project and HVO North MOD 8.

12.2 | NOISE

Noise management improvements identified for implementation in 2025 include:

- Sound Power Level testing of various heavy mining equipment,
- Install replacements for ageing Barnowl monitors; and
- Fitting of sound attenuation to new heavy mining equipment brought to site.

12.3 | AIR QUALITY

Air quality management improvements identified for implementation in 2025 include:

- Aerial seeding of overburden that is temporarily unavailable for rehabilitation where available,
- Continue implementation of recommendations from a review of the air quality monitoring program,
- Upgrading watercart fill points for reliability and improve filling times,
- Implement new real-time monitoring data interface; and

12.4 | BLASTING

HVO will continue to manage blasting activities in 2025 in accordance with the *Blast Management Plan*.

12.5 | ABORIGINAL AND HISTORIC HERITAGE

Improvements to historic heritage identified for implementation during 2025 include implementation of the balustrade repair work for Wandewoi homestead and tendering for repair works identified at Archerfield homestead.

Following approval of the Mitchell Pit South AHIP application and the granting of AHIP 5350 during December 2024, HVO will commence community salvage works during early 2025.

12.6 | WATER

Improvements to mine water management in 2025 include:

- Install erosion and sediment control infrastructure ahead of mining in Mitchell Pit;
- Detailed engineering and scoping of water containment projects beyond 2025;
- Continue geotechnical investigations and engineering for barrier wall installation or alternative method to control seepage from the North Void TSF; and
- Ongoing upgrade of internal water transfer pipelines, pumping infrastructure, and system controls and monitoring

12.7 | REHABILITATION

During the next reporting period key focus areas for HVO will be:

- Completion of annual rehabilitation target of 54.6 ha of new rehabilitation,
- Continuation of Section 240 rehabilitation maintenance plan including progression of 10.75 hectares of historic cover crop management areas to final target land use.

12.8 | TAILINGS STORAGE FACILITIES

The following tailing storage facility activities are planned for 2025:

- Continuation of management activities for the North Void TSF, focusing on monitoring, dewatering and surface strength development,
    - CPTu testing and additional groundwater monitoring locations to be installed in 2025, to inform ground water modelling, barrier wall design and TSF closure plans.
- Review & Update of all tailings dam Operational and Maintenance Manuals,
- Continue capping activities on Bob's Dump TSF; and
    - CPTu testing and additional groundwater monitoring locations to be installed in 2025, to inform ground water modelling, barrier wall design and TSF closure plans.
- Continue Geochemical sampling analysis on tailings and exploration drill holes
- Installation of new spigot locations in Carington In Pit TSF; and
- CSER research project vegetation trial occurring on Dam 6.

12.9 | STAKEHOLDER ENGAGEMENT

The following stakeholder engagement activities are planned for 2025:

- Hosting four CCC meetings,
- Implementing two rounds of the HVO Community Grants Fund,
- Undertaking an improvement project in the community with HVO Apprentices,
- Developing and distributing two community newsletters,
- Conducting two Community Information sessions (at Jerrys Plains and Maison Dieu),
- Regular website updates including environmental monitoring reports and CCC meeting agendas, minutes and presentations;
- Regular social media updates;
- Hosting a School Site Tour; and
- Stakeholder engagement activities related to the HVO Continuation Project and HVO North MOD 8.

12.10 | INDEPENDENT ENVIRONMENTAL AUDIT

The next IEA is scheduled to commence in November 2025.

APPENDIX A: ANNUAL AIR QUALITY REVIEW

APPENDIX B: ANNUAL GROUNDWATER REVIEW

APPENDIX C: 2024 HERITAGE COMPLIANCE INSPECTION AUDITS

APPENDIX D: APPROVAL LETTER

Department of Planning, Housing and Infrastructure

NSW GOVERNMENT

NSW Planning ref: DA450-10-2003-PA-99

Ben de Somer
Manager Environment and Community
HV Operations Pty Ltd
ABORIGINAL COUNTRY
1011 Lemington Road
LEMINGTON NSW 2330
13/05/2025

Sent via the Major Projects Portal only

Subject: Hunter Valley Operations (MP06_0261 and DA450-10-2003) - Annual Review 2024

Dear Mr de Somer

I refer to the Hunter Valley Operations Annual Review for the period 1 January 2024 to 31 December 2024, submitted as required by Schedule 5, Condition 9 of DA450-10-2003 as modified (the consent) and Schedule 5, Condition 4 of MP06_0261 as modified (the approval) to the NSW Department of Planning, Housing and Infrastructure (NSW Planning) on 31 March 2025.

NSW Planning has reviewed the Annual Review and considers it to generally satisfy the reporting requirements of the consent and approval and the NSW Planning *Annual Review Guideline* (October 2015). Please make publicly available a copy of the 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.

NSW Planning has assessed the non-compliances identified in Section 1, Table 1-2 of the Annual Review (excluding the non-compliance with EPL 640) and determined that no breach of the consent or approval has occurred.

Should you wish to discuss the matter further, please contact Joel Curran, Senior Compliance Officer on 02 4904 2702 or email compliance@planning.nsw.gov.au

Yours sincerely

Benjamin Harrison

4 Parramatta Square, 12 Darcy Street, Parramatta NSW 2150
Locked Bag 5022, Parramatta NSW 2124

www.dphi.nsw.gov.au

1