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CAPTAINS FLAT AIR QUALITY MONITORING REPORT

JUNE 2021 TO MARCH 2024

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Description	**Data collected from 22 June 2021 to 31 March 2024 for the air quality monitoring program at Captains Flat, NSW**

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GLOSSARY

Acronym / Symbol	Description
As	Arsenic
AS/NZS	Australian/New Zealand Standard
Ba	Barium
BoM	Bureau of Meteorology
Cd	Cadmium
Co	Cobalt
Cr	Chromium
Cu	Copper
DPIE	Department of Planning, Industry and Environment (NSW)
Fe	Iron
Hg	Mercury
HVAS	High-volume air sampler
IPC-MS	Inductively coupled plasma spectrometric method
Pb	Lead
LOR	Limit of Reporting
Mn	Manganese
Mo	Molybdenum
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NERDDC	National Health and Medical Research Council
Ni	Nickel
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of less than 2.5 microns
PM_{10}	Particulate matter with an aerodynamic diameter of less than 10 microns
Regional NSW	NSW Department of Regional NSW
RFS	Rural Fire Service
SAQP	Sampling and Analysis Quality Plan
SCS	Soil Conservation Services
Se	Selenium
Ti	Titanium
TSP	Total suspended particulates, particulate matter with an aerodynamic diameter of less than 50 to 100 microns (measured at less than 50 microns for this report)
Zn	Zinc
$\mu g/m^3$ or $\mu g\ m^{-3}$	Micrograms per cubic metre

1. EXECUTIVE SUMMARY

An air quality monitoring program was commissioned in Captains Flat, NSW to inform air quality risks associated with heavy metals in airborne particulate matter from the legacy Lake George Mine. Sampling at five locations commenced on 22 June 2021 and is on-going. This report summarises all data from 22 June 2021 to 31 March 2024. Sampling is configured to measure a 24-hour average sample every one day in six at five sensitive receptors around the town.

Upon completion of the first year of monitoring (sample dates from 22 June 2021 to 17 June 2022), the annual average of total suspended particulate (TSP) and lead concentrations were 17.4 µg/m³ and 0.004 µg/m³ respectively. On completion of the second year of monitoring (sample dates from the 23 June 2022 to 18 June 2023) the annual average of TSP and lead concentrations were 19.57 µg/m³ and 0.004 µg/m³ respectively. These values are below the annual average criteria of 90 µg/m³ for TSP and 0.5 µg/m³ for lead. Average concentrations from the entire monitoring period are currently 18.4 µg/m³ for TSP and 0.004 µg/m³ for lead, remaining below the annual average NSW EPA criteria.

The 24-hour TSP samples above the annual TSP criterion were: AQM2 on 17 February 2022 (117.4 µg/m³), AQM1 on 10 August 2022 (97.2 µg/m³), AQM4 on 28 August 2022 (109.1 µg/m³), AQM2 on 06 February 2023 (91.1 µg/m³) and AQM4 on 08 March 2024 (126.5 µg/m³). These values do not constitute an exceedance of the criteria but are provided as an indication of discrete events of elevated concentrations. All 24-hour lead concentrations were below the annual average lead air quality criterion.

During the monitoring period, there were multiple instances where the 24-hour concentrations of the heavy metals - barium and nickel - exceeded the relevant NSW EPA 1-hour criteria. Recommendations have been made in section 6 of the report, outlining the course of action to be taken by Regional NSW, to understand the risk of these high concentrations.

2. INTRODUCTION

2.1 Overview

Ramboll Australia Pty Ltd (Ramboll) has been contracted by the Department of Regional NSW to implement and maintain an air quality monitoring program to inform air quality risks associated with the legacy Lake George Mine, in Captains Flat, NSW. The multi-agency government taskforce has completed the Captains Flat Lead Management Plan. This taskforce included representatives from the Department of Regional NSW, NSW EPA, Transport for NSW, Crown Lands, Department of Education, Department of Health, Department of Primary Industries and Queanbeyan-Palerang Regional Council. The Aim of the Lead Management Plan is to reduce community exposure to lead resulting from historic mining in the town (Regional NSW, 2021).

Moving forward, the air quality monitoring program is being managed by the Legacy Mines Program to continue to collect monitoring data whilst the works is being undertaken on the former Lake George mine site. The program involves environmental sampling of multiple media on public properties to assess current risk and provision of guidance regarding lead risk abatement measures. Work commenced early 2021 and is on-going, with additional data collected, analysed, and reported on a previously 2-monthly and now quarterly basis.

2.2 Program background

The air quality monitoring program was commissioned on 21 June 2021, with the first sample collected 22 June 2021. From 27 October 2021 routine servicing of the air quality monitoring program was handed over to Soil Conservation Services (SCS), with Ramboll providing calibration and reporting services.

Previous reports delivered by Ramboll are listed below:

- 318001193-T4a Captains Flat Air Quality Monitoring Report 2021-08, summarising data collected from 22 June 2021 to 20 August 2021.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2021-10, summarising data collected from 22 June 2021 to 02 October 2021.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2021-12, summarising data collected from 22 June 2021 to 07 December 2021.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2022-02, summarising data collected from 22 June 2021 to 30 January 2022.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2022-04, summarising data collected from 22 June 2021 to 31 March 2022.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2022-06, summarising data collected from 22 June 2021 to 30 May 2022.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2022-Q3, summarising data collected from 22 June 2021 to 15 September 2022.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2022-Q4, summarising data collected from 22 June 2021 to 02 December 2022.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2023-Q1, summarising data collected from 22 June 2021 to 01 April 2023.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2023-Q2, summarising data collected from 22 June 2021 to 30 July 2023.

- 318001193-T4a Captains Flat Air Quality Monitoring Report 2023-Q3, summarising data collected from 22 June 2021 to 28 September 2023.
- 318001193-T4a Captains Flat Air Quality Monitoring Report 2023-Q4, summarising data collected from 22 June 2021 to 31 December 2023.

2.3 Pollutants of concern

The mine operated from 1892 to 1962 producing lead, zinc, copper, pyrite, silver, and gold (Regional NSW, 2021). All the mine workings were underground with associated processing and transport above ground. Spreading of lead and zinc contamination from the site are the primary issues of concern (Regional NSW, 2021).

Lead (Pb) is emitted to the air from both natural and anthropogenic sources. Measured concentrations in ambient air have greatly reduced nationally following the phase-out of leaded fuels from 2000 to 2002, where typically urban concentrations are now less than 10% of the air quality criteria (NEPC, 2001). **Appendix 2** shows historic annual average lead concentration in Australian capital cities from 1981 to 2000, after which monitoring ceased in urban areas. Ambient lead remains a risk in areas where local point sources exist, such as metal smelting facilities, mining operations and waste incineration. Inhalation and ingestion of lead at elevated levels can lead to a range of health impacts, including cancer, neurotoxicity, and reproductive toxicity.

Zinc (Zn) occurs widely in the environment, but adverse health effects can occur when exposure is high. Elevated exposure can occur through exposure to mining, smelting, and processing or metal ores and metal plating.

Additionally, metals associated with mining and processing ore are of interest to this program. A suite of fifteen metals in air were analysed including: arsenic (As); barium (Ba); cadmium (Cd); chromium (Cr); cobalt (Co); copper (Cu); iron (Fe); lead (Pb); manganese (Mn); mercury (Hg); molybdenum (Mo); nickel (Ni); selenium (Se); titanium (Ti) and zinc (Zn).

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3. METHODOLOGY

3.1 Study Area

The legacy Lake George Mine is in the town of Captains Flat, in the Southern Tablelands of rural New South Wales, approximately 50 km south-east of Canberra. Captains Flat has a distinctive valley terrain orientated roughly north to south, which is likely to influence local meteorology (refer to **Figure 3-1**). This is an important characteristic as wind speed and direction directly impact transport and dispersion of air pollutants.

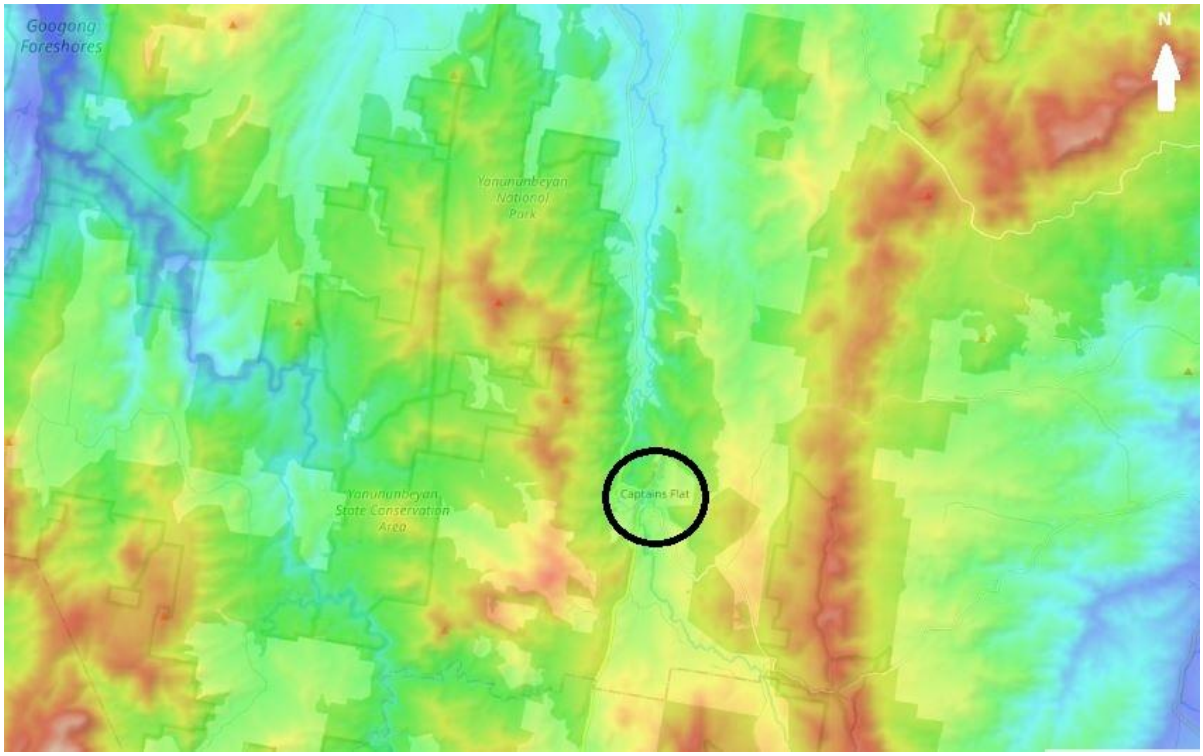

Figure 3-1: Terrain features in and around Captains Flat, NSW (red high, purple low; Yamazaki et al, 2017)

The study area for the air quality monitoring program encompasses areas of former mining activities, including The Old Mine Site, Former Smelter, Northern Tailings Dump, and Former Rail Loadout Facility, which are located around and south-east to the Captains Flat Railway Station. The largest community area is north-east to the station, containing sensitive receptors such as residential properties and Captains Flat Public School. The project boundary and site elements are presented in **Figure 3-2**.

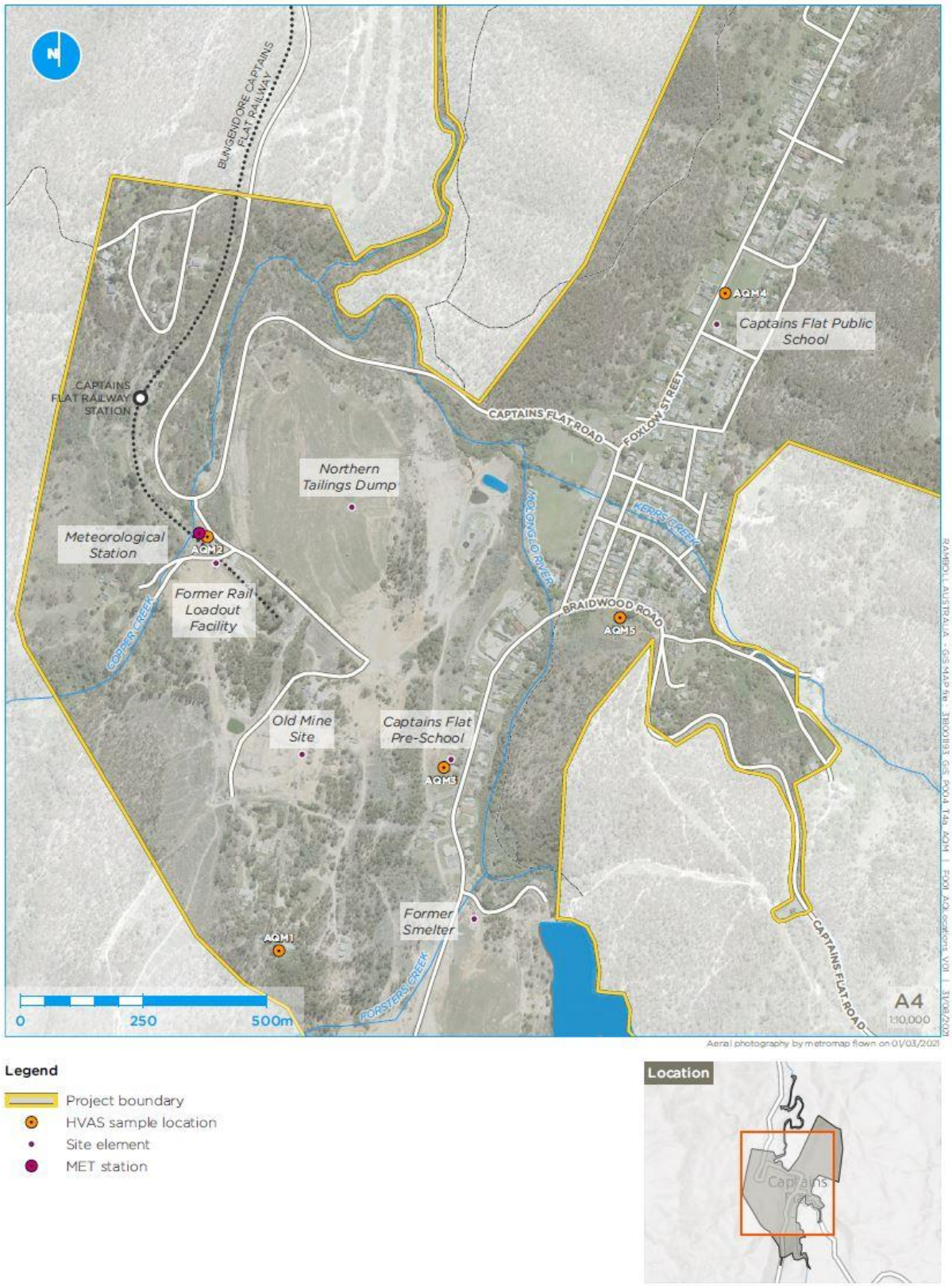

Figure 3-2: Project boundary and locations of interest

3.2 Sampling design

The monitoring program involves environmental sampling of TSP and testing for lead and other heavy metals in particulate form. Five locations of concern and/or relevance within the study area were identified for sampling to be carried out. The five monitoring locations are shown in **Figure 3-2** and summarised in **Table 3-1** with the respective justification for selection. A meteorological station is maintained at one location (AQM2) to inform movement and dispersion of air.

Table 3-1: Air Quality Monitoring Locations

ID	Location description	Address	Justification for selection
AQM1	Residence	Old Mine Road	Representative of potential impacts to the south-west. Located on elevated terrain relative to the other selected locations.
AQM2 & MET	Residence	2 Copper Creek Road	Identified as the nearest sensitive receptor (residents) to the northern tailings dump and the former rail loadout facility.
AQM3	Captains Flat former Preschool	27 Foxlow Street	Identified as a sensitive receptor of interest (residents) and representative of potential impacts to the south-east.
AQM4	New Preschool	Foxlow Street	Representative of potentials impacts to the largest community to the north-east.
AQM5	Residence	2 Braidwood Road	Representative of potential impacts to residents down-wind of the mine.

Sensitive receptors include locations where people reside and work, including residential properties, hospitals, schools, and parks. Remnants of materials from past above ground mine processing and transport activities are the source of contaminants (metals, particularly lead and zinc). Wind erosion is expected to be the main exposure pathway, linking pollutant sources to receptors; hence the importance of monitoring wind movements and understanding wind patterns. The five monitoring locations are deemed appropriate to provide results representative of the study area and encompasses the main sensitive receptors in the town.

3.3 Monitoring equipment and siting

High-volume air samplers (HVAS; Hi-Vol 3000) were utilised for sampling TSP. They consist of a TSP sampling head (i.e., inlet) that has a reported cut-point for particles of 50 µm diameter or less. The sampler draws a known volume of air across a pre-weighed filter for 24-hours.

The instruments are calibrated and maintained by Ramboll, as far as practicable, consistent with the recommendations of *AS/NZS 3580.9.3 – Method 9.3 – Determination of suspended particulate matter – Total suspended particulate matter (TSP) – High volume sampler gravimetric method* and the manufacturers recommendations. Sampling is configured for a 24-hour period every 1 day in 6 (midnight to midnight). Prior to Ramboll taking on all the calibration and maintenance duties, SCS serviced the instruments on a 6-day basis, commencing from 27 October 2021 and ending 19 September 2022.

Quality assurance is done using a field blank to capture any influences of the handling and storage process. A blank sample paper is handled in the same way as the actual sample papers and remains on site throughout the sampling exercise. The blank sample is sent for laboratory analysis along with the exposed samples. Established acceptance criterion for TSP field blanks is ±8 mg, above which the handling procedure should be investigated for potential contamination.

A meteorological station was initially supplied by the Rural Fire Service (RFS) and subsequently replaced by a project-owned station commissioned by Ramboll (more information in **Section 3.6**). Photos of the monitoring equipment in-situ are shown in **Appendix 3**.

Siting of all equipment was completed, as far as practicable, in accordance with the recommendations of *AS/NZS 3580.1.1 – Methods for sampling and analysis of ambient air – Part 1.1: Guide to siting air monitoring equipment*. Selecting monitoring locations requires compromises to meet the technical recommendations of *AS 3580.1.1* and practical conditions such as access approval, security, and power availability.

Locating the AQM2 instrument was limited by sewer connections in the residence backyard, which limited trenching for electrical works. The monitoring location is obstructed by the house and shed between the instrument and the nearest potential source of interest, the former rail loadout facility. This, however, was the most appropriate location for the monitor.

Many residences in Captains Flat operate woodfires during the winter which are a significant source of particulate matter. Woodsmoke from the Old Mine Road (AQM1) residence chimney can be seen in **Appendix 3** near the monitoring location. A temporary air quality monitoring campaign completed for the Miners Road and Copper Creek Road Upgrade on behalf of Queanbeyan-Palerang Regional Council during October 2021 confirmed elevated particulate matter concentrations during the night-time period, likely a result of biomass burning in the town.

3.4 Measurement of metals in TSP

TSP are airborne solid particles and water droplets less than approximately 50 to 100 µm in aerodynamic diameter, consisting of a myriad of different constituents from various sources.

The samples are analysed for 15 heavy metals in TSP: As, Ba, Cd, Cr, Co, Cu, Fe, Pb, Mn, Hg, Mo, Ni, Se, Ti, and Zn. The Australian Standard to measure lead in particulates (*AS/NZS 3580.9.15 Determination of suspended particulate matter – Particulate metals high or low volume sampler gravimetric collection – Inductively coupled plasma (ICP) spectrometric method)* requires measurement of the TSP fraction to analyse for lead content. Samples are weighed and analysed by a NATA accredited laboratory consistent with the recommendations of *AS 3580.9.15.*

3.5 Assessment criteria

Relevant NSW ambient air quality criteria for this monitoring program are presented in **Table 3-2**. There are no NSW ambient air quality criteria for the heavy metals – Cobalt, Molybdenum, Selenium, Titanium and Zinc.

Table 3-2: Air Quality Assessment Criteria

Pollutant	Averaging period	Criteria (µg/m³) [1]	Source
Arsenic and arsenic compounds	1-hour	0.09	NSW EPA (2022)
Barium (soluble compound)	1-hour	9	NSW EPA (2022)
Cadmium and cadmium compounds	1-hour	0.018	NSW EPA (2022)
Chromium (III) compounds	1-hour	9	NSW EPA (2022)
Copper dusts and mists	1-hour	18	NSW EPA (2022)
Iron oxide fumes	1-hour	90	NSW EPA (2022)
Lead	Annual	0.5	NSW EPA (2022)
Manganese and compounds	1-hour	18	NSW EPA (2022)
Mercury (organic)	1-hour	0.18	NSW EPA (2022)
Nickel and nickel compounds	1-hour	0.18	NSW EPA (2022)
Total suspended particulates (TSP)	Annual	90	NHMRC (1996)

Note:

1. All criteria values referenced to 25°C and 101.3kPa

3.6 Meteorology monitoring and terrain influences

Meteorology is a primary driver of transport and dispersion in the atmosphere. A Bureau of Meteorology (BoM) station is maintained in Tuggeranong, approximately 36 km to the north-west of Captains Flat. These data are unlikely to be representative of Captains Flat given the differences in terrain, as Tuggeranong is a relatively flat urban environment. The nearest BoM station to Captains Flat is located in Braidwood, approximately 34.5 km to the north-east of Captains Flat. Braidwood may be more representative of the conditions at Captains Flat than Tuggeranong, but again the terrain differs significantly. Absence of local meteorology data in Captains Flat was identified as a data gap for the program in the Sampling and Analysis Quality Plan (SAQP; Ramboll, 2021).

The RFS loaned a meteorological station to the monitoring program for short-term use; prior to the project specific meteorological station being installed. The RFS meteorological station was decommissioned during the October reporting for use by RFS operations during fire season. Data between 22 June and 26 September 2021 was sourced from the RFS meteorological station, and data from 27 September 2021 onwards is sourced from the project meteorological station. From 7 August to 20 September 2022 the project station was not logging from capacity issues; meteorological data for this period was sourced from the BoM Goulburn Airport AWS station, located approximately 90 km to the north-east of Captains Flat. The capacity issue has now been resolved.

The RFS monitoring station measured wind speed and direction at 10 m height, wind speed, wind direction, temperature and humidity at 3 m height, and rainfall at ground level. During the June to August 2021 monitoring period, the 10 m wind sensors was calibrated south, so these data were corrected during analysis by 180º. Some intermittent data loss occurred from the station,

caused by an issue with the firmware but data capture remained high (97.9% 10-minute data capture for the monitoring period). On 31 August 2021 the calibration and firmware issues were reported as rectified by RFS.

The project meteorological station (Lufft WSS800-UMB) measures wind speed and direction, temperature, relative humidity, air pressure, precipitation intensity, precipitation quantity and radiation at 10 m height. The sensors are mounted on a sensor arm fixed to a pump-up mast with lightning stake protection, with data capture and telemetry allowing remote access to the data. From 21 November to 5 December 2022 the unit was offline, potentially bumped by the gardening contractor, where the power cable was found to be wrapped around the logger and the cable not firmly in place on the power outlet. The unit was again found to be offline from 4 February 9:00 to 8 February 13:00 2023, likely from the gardening contractor moving the cable.

3.7 Data presentation and analysis

Monitoring results including all data since program inception were analysed as described below.

3.7.1 Meteorological conditions

Three sets of wind roses were generated to understand wind patterns and prevailing winds:

- Monthly wind roses with all available data.
- Monthly wind roses with data separated into day and night periods, determined by sunrise and sunset at location.
- Monthly wind roses with 24-hour averaged wind data for sample days only: these data are used to create the polar plots that must match the 24-hour pollutant data. This can be compared with the above wind roses using all raw data, and illustrates a limitation of the method, which is further discussed in **Section 4.4**.

Rainfall can contribute to suppressing particulate matter therefore a timeseries graph with daily rainfall data is presented for comparison with reported pollutant results.

3.7.2 TSP and metal concentrations measured

Timeseries graphs of TSP and metals concentrations analysed since the beginning of the monitoring program were plotted for ease of visualization and identification of peak concentrations. Blank sample results are presented and discussed.

3.7.3 Potential factors influencing dispersion

Bivariate polar plots can be useful for source identification with longer datasets; this technique has been applied to the initial concentration data against the average wind conditions during each sampling day. The requirement to average 24-hour wind conditions to compare to the 24-hour sampling period is a limitation of the method, where wind conditions can vary considerably over a diurnal period (presented in the second set of wind roses mentioned in **Section 3.7.1**).

Additionally, the bivariate plots for the key pollutants TSP, lead and zinc are presented spatially on a topographical map in **Appendix 1**. The plots were prepared using the openair data analysis package in R (Carslaw & Ropkins, 2012).

3.7.4 Correlations for potential source identification

The relationship between concentrations of air pollutants over time can provide an indication of whether the pollutants originated from the same source. Therefore, correlation matrices have been prepared to compare the relationship between each heavy metal and TSP.

The plots, developed using lattice multivariate data visualisation (Sarkar, 2007) in openair, display the correlation coefficient as a shape, colour, and numeric value as a representation of a scatter plot. A perfect or near-perfect correlation is shown as a 45-degree sloped line, whereas zero correlation is shown as a circle.

3.8 Technical limitations

Data collection is limited to a 24-hour period every 1 day in 6, that is, data capture is not continuous which is a limitation of the method appropriate for this application. Moreover, as described in **Section 3.7.3**, the 24-hour sampling period is a limitation of the method, as results are given as a 24-hour average without capturing varying conditions within the day.

As described in **Section 3.6**, the project meteorological station was monitoring but not logging for approximately 1.5 month during August and September 2022. In the absence of local data, meteorological data was sourced from a BoM station. Conditions were however notably different to those at Captains Flat (see **Section 4.2**), reinforcing the importance of having local meteorological data to understand site conditions for dispersion and transport of air pollutants.

Another technical limitation of the 24-hour average concentrations is that comparable air quality criteria do not exist. As a result, the 24-hour concentrations must be compared to criteria for varying time periods (1-hour or annual).

4. RESULTS

4.1 Overview

Results from the monitoring period including all data since program inception are presented in the following sections:

- Meteorological conditions (**Section 4.2**).
- TSP and metal concentrations measured (**Section 4.3**).
- Potential factors influencing dispersion (**Section 4.4**).
- Correlations for potential source identification (**Section 4.5**).

4.2 Meteorology conditions

Wind roses from conditions measured at 10 m height at 2 Copper Creek Road, Captains Flat are presented in **Figure 5 1**. As described in **Section 3.6**, data from 7 August to 20 September 2022 was sourced from the BoM Goulburn Airport AWS. The location is influenced by local terrain and differences are noted in the August and September 2022 wind roses compared with the previous months, suggesting these conditions are less representative of the local conditions.

Analysis of wind conditions shows prevailing winds from the south-west and north-west to north. Calmer conditions were generally recorded in summer, whilst winter and spring recorded higher wind speeds. The strongest winds recorded by the site meteorological station are generally 4 to 6 m/s, with occasional 6 to 8 m/s winds measured from the south and south-west. As observed in the wind roses from August and September 2022, wind speeds recorded by the BoM station were higher (up to 12.9 m/s) and predominately from the north-west.

Wind conditions also exhibit diurnal changes. When the data is separated into day and night periods, it shows the northerlies occur more often during the day and the south-westerlies occur during the night (see Figure 4-2).

Section 4.4 below presents polar plots using averaged wind conditions over 24-hours to match the 24-hour pollutant data. These averaged wind conditions for sample days only are shown in **Figure 4-4**, to illustrate a limitation of the method (further discussed in **Section 4.4**).

Daily rainfall data from the RFS, project and Goulburn Airport AWS meteorological stations are presented in **Figure 4-5**. No rainfall was measured from 22 June to mid-July 2022 after which moderate rainfall was measured. Heavy rainfall events with a total volume of over 50 mm measured in one day were recorded in January, April to June, August and November 2023. A very heavy rainfall event occurred on the 7th of June 2023, reaching over 300 mm. This was followed by a period of low to no rainfall throughout July 2023 up until a large rainfall event on the 21st of August 2023, reaching over 100 mm. The Goulburn Airport AWS (used from 7 August to 20 September 2022) recorded much higher rainfall than compared with the project station for the same period in 2021 or any other month.

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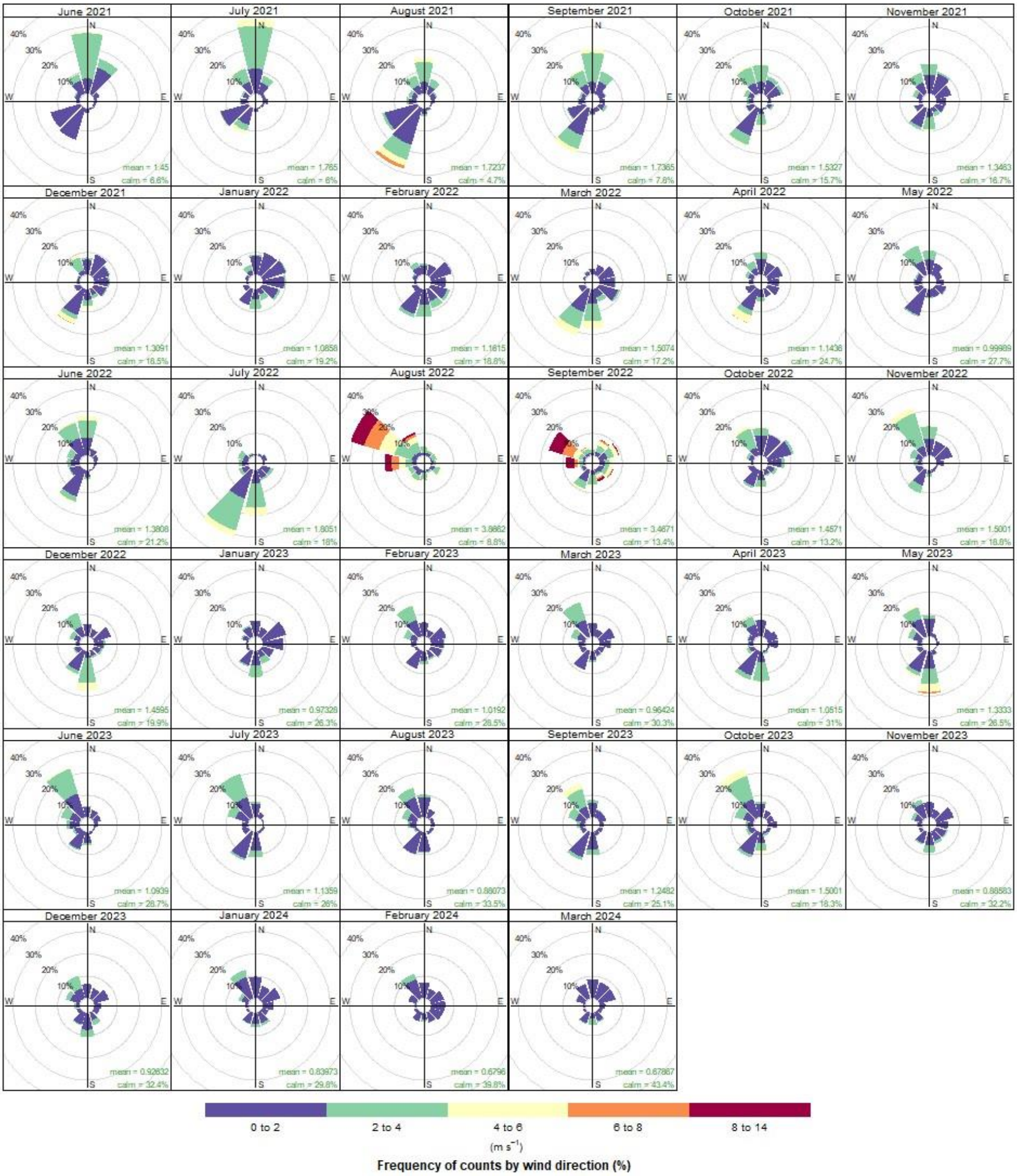

Figure 4-1: Monthly wind roses for all data collected at 2 Copper Creek Road, 22 June 2021 to 31 March 2024 (produced with openair; Carslaw & Ropkins, 2012)

Notes: Data from 7 August 13:00 to 15 September 2022 sourced from BoM Goulburn Airport AWS; No data recorded from 21 November 17:00 to 05 December 2022, and from 04 February 9:00 to 8 February 13:00 2023 (unit was offline).

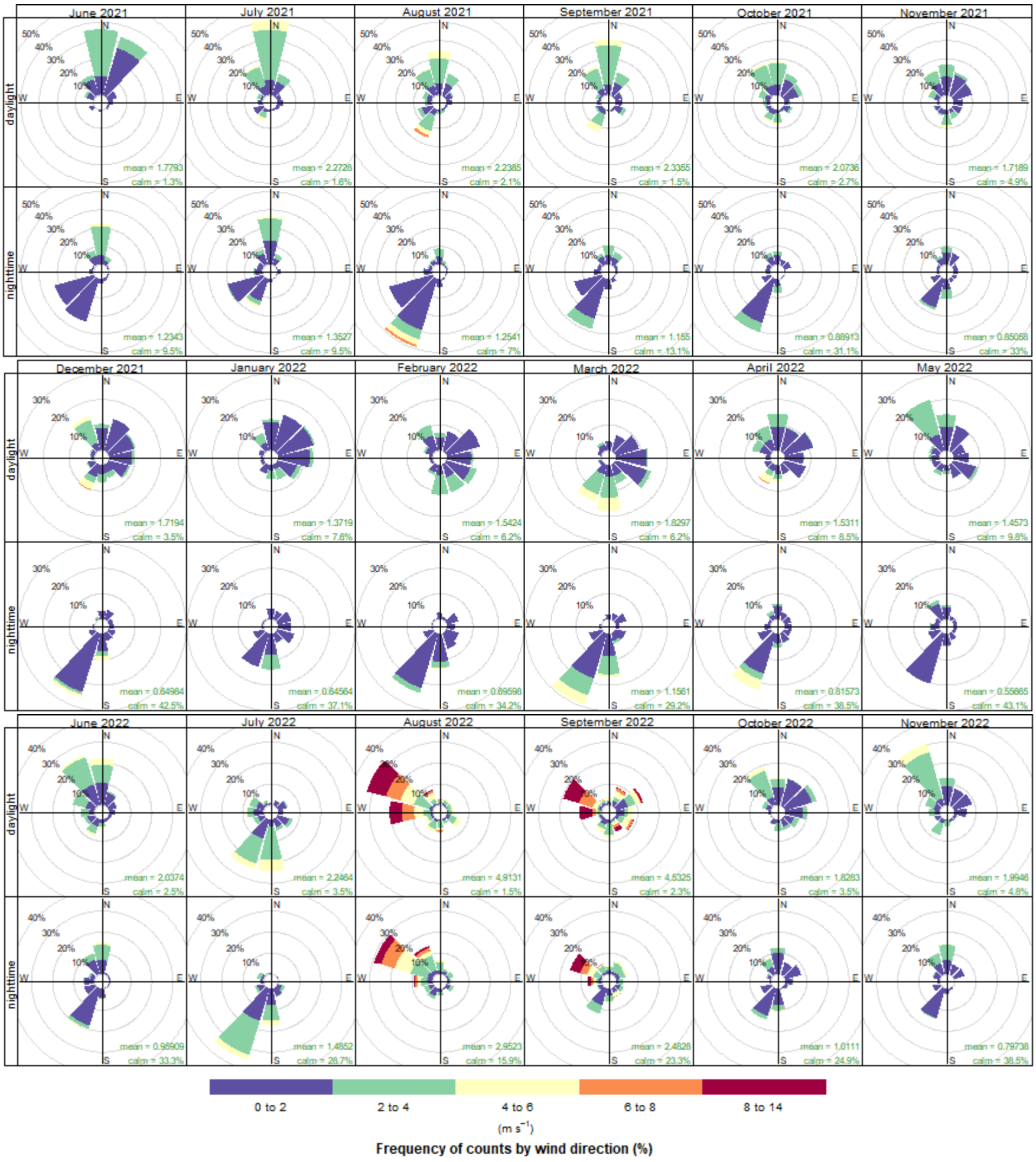

Figure 4-2: Day and night wind roses (10 m) for all available data at 2 Copper Creek Road, Captains Flat, NSW, 22 June 2021 to 30 November 2022 (produced with openair; Carslaw & Ropkins, 2012)

Notes: Data from 7 August 13:00 to 15 September 2022 sourced from BoM Goulburn Airport AWS; No data recorded from 21 November 17:00 to 5 December 2022.

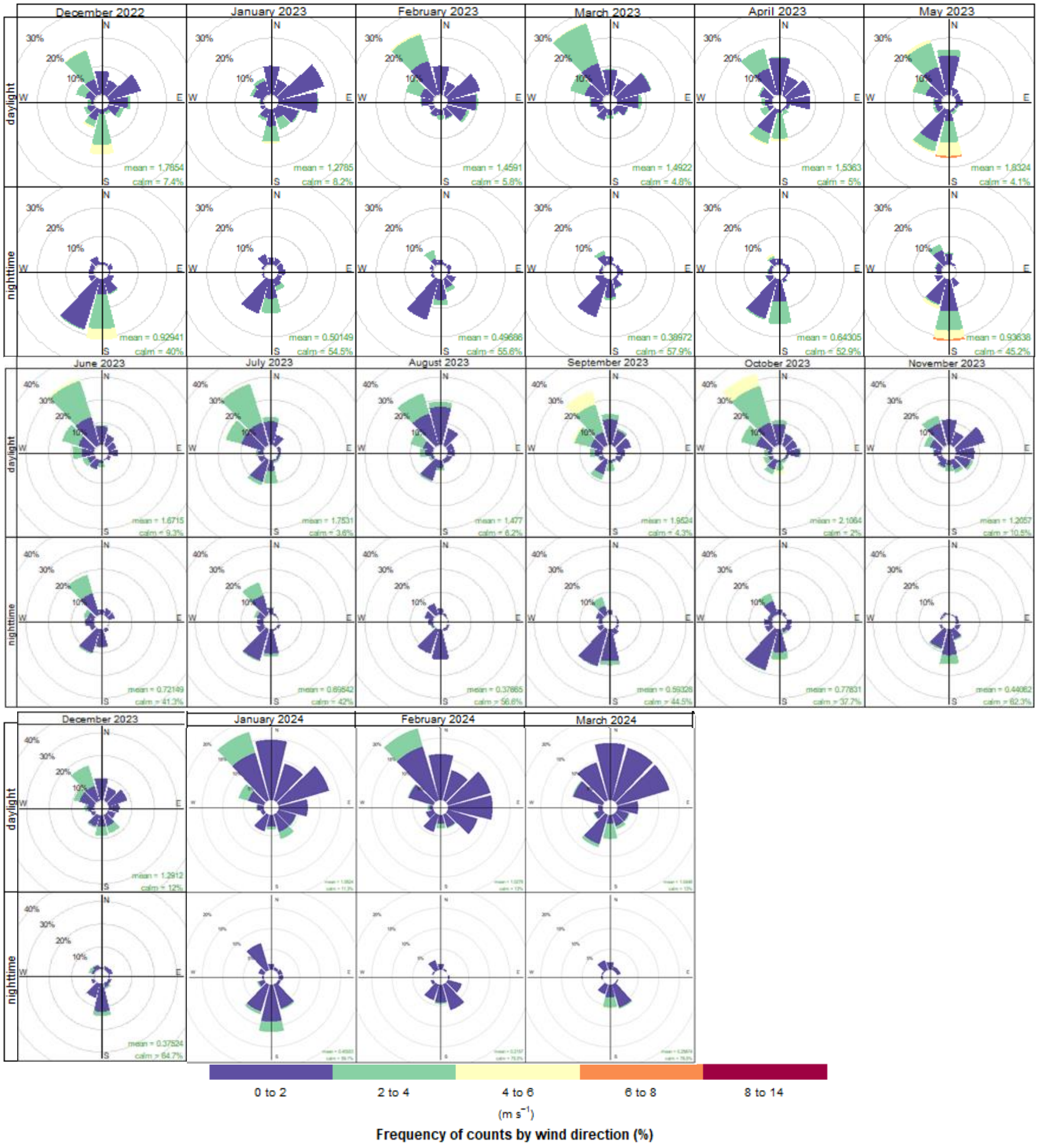

Figure 4-3: Day and night wind roses (10 m) for all available data at 2 Copper Creek Road, Captains Flat, NSW, 1 December 2022 to 31 March 2024 (produced with openair; Carslaw & Ropkins, 2012)

Notes: No data recorded from 21 November 17:00 to 5 December 2022, and from 04 February 9:00 to 8 February 13:00 2023 (unit was offline).

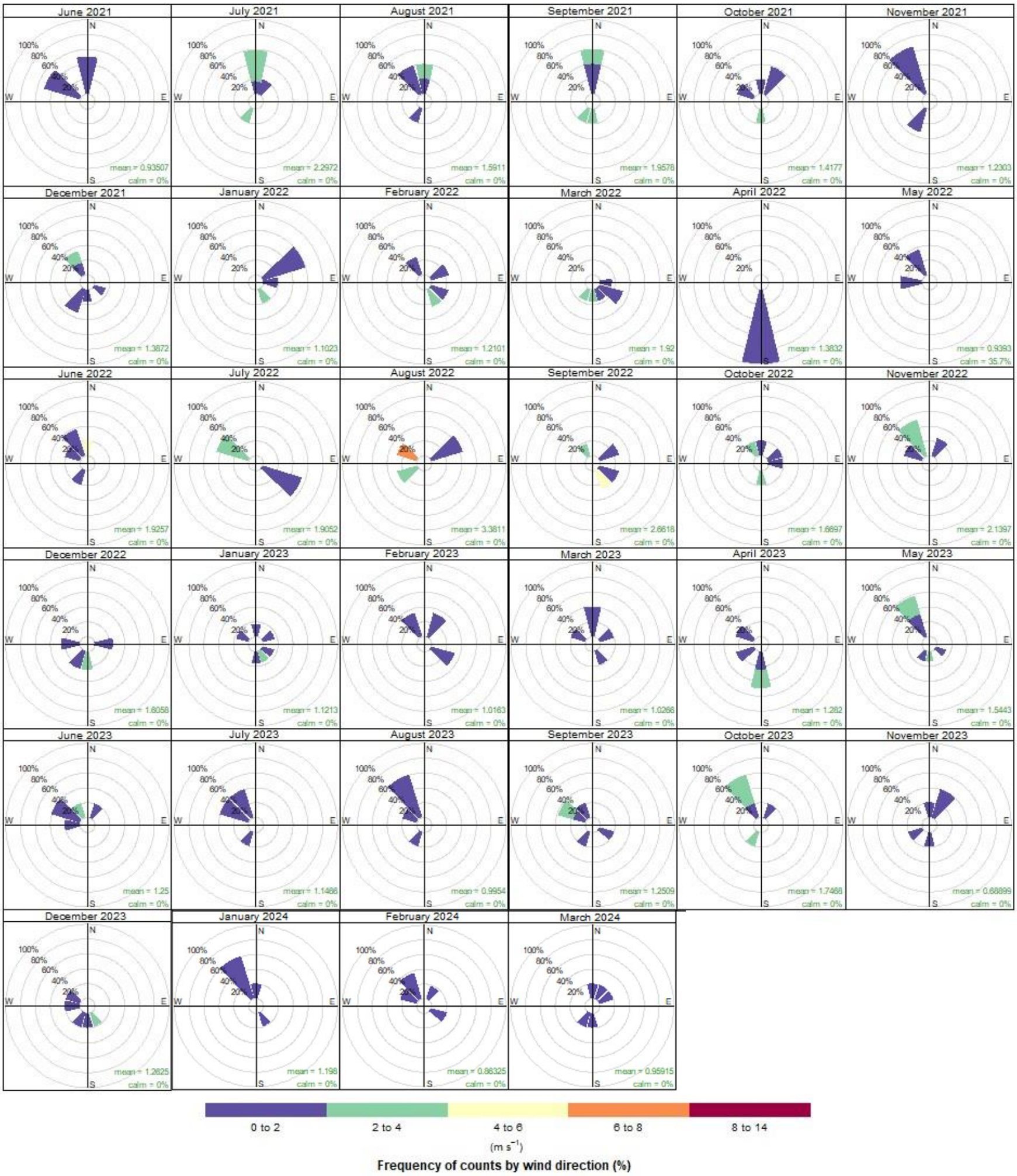

Figure 4-4: 24-hour average wind roses for sample days (24-hour period) only (produced with openair; Carslaw & Ropkins, 2012)

Notes: Data from 7 August 13:00 to 15 September 2022 sourced from BoM Goulburn Airport AWS; No data recorded from 21 November 17:00 to 5 December 2022, and from 04 February 9:00 to 8 February 13:00 2023 (unit was offline).

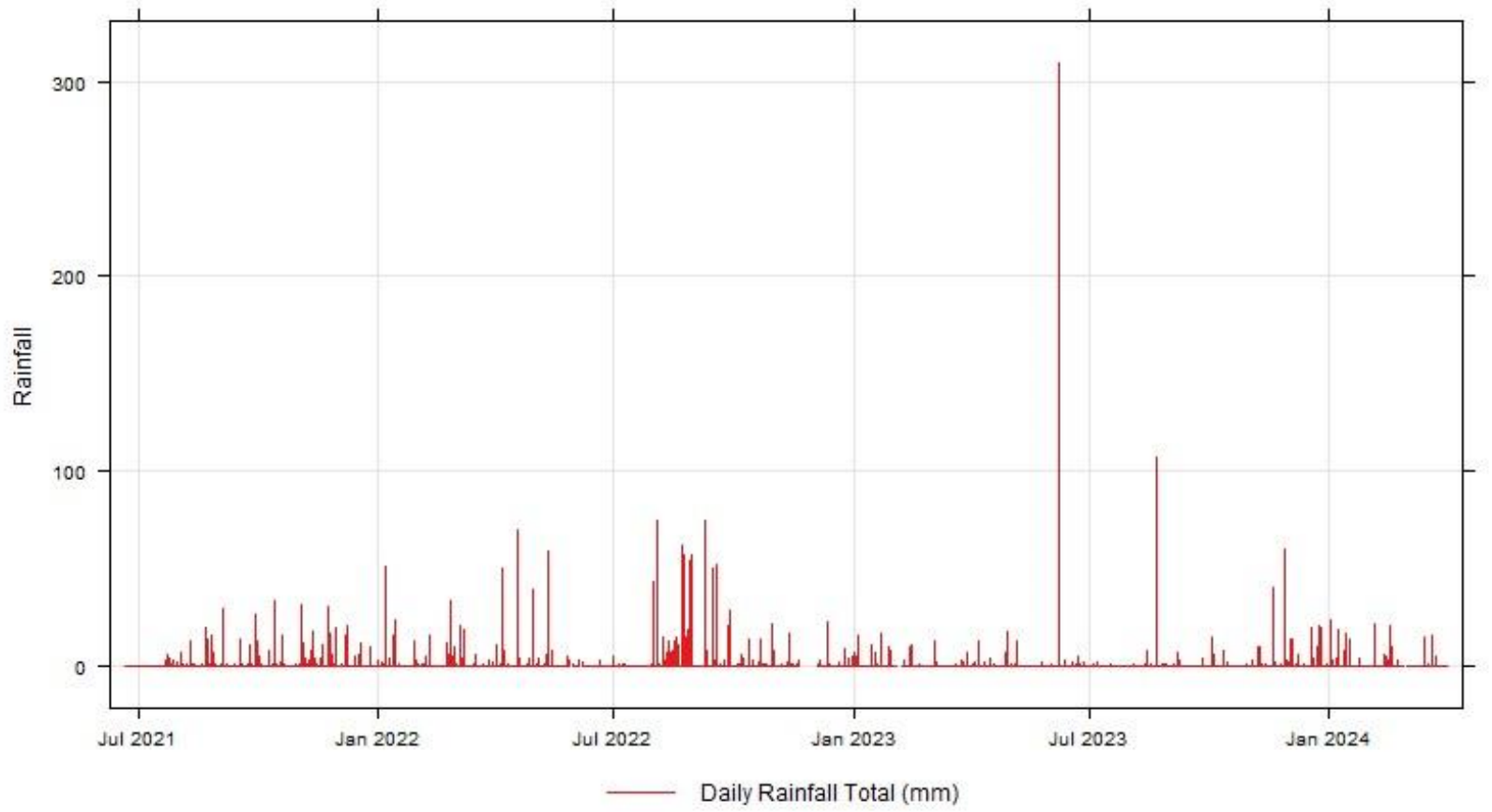

Figure 4-5: Daily rainfall July 2021 – March 2024

Notes: Data from 7 August 13:00 to 20 September was sourced from BoM Goulburn station; No data was recorded from 21 November 17:00 to 05 December 2022, and from 04 February 9:00 to 8 February 13:00 2023 (unit was offline).

4.3 TSP and Heavy Metals

Figure 4-6 to **Figure 4-21** show timeseries of TSP and each of the 15 metals analysed with the applicable criteria since the beginning of the monitoring program.

The annual averages for the first and second year of monitoring are presented in Table 4-1. These values are below the annual average criteria of 90 µg/m³ for TSP and 0.5 µg/m³ for lead.

Table 4-1: Annual average TSP and Lead for the first and second year of monitoring

Monitoring Year	Dates	Annual Average (µg/m³)	
		TSP	Lead
1	22 June 2021 to 17 June 2022	17.38	0.004
2	23 June 2022 to 18 June 2023	19.57	0.004

Average concentrations from the entire monitoring period are currently 18.4 µg/m³ for TSP and 0.004 µg/m³ for lead, remaining below the annual average criteria. The 24-hour TSP samples above the annual TSP criterion were:

- 17 February 2022 at AQM2 (117.4 µg/m³),
- 10 August 2022 at AQM1 (97.2 µg/m³),
- 28 August 2022 at AQM4 (109.1 µg/m³),
- 06 February 2023 at AQM2 (91.1 µg/m³).
- 08 March 2024 at AQM4 (126.5 µg/m³).

All 24-hour lead concentrations were below the annual average lead air quality criterion. Most heavy metals remained below their respective 1-hour criteria; however, concentrations of barium and nickel have been recorded in high concentrations throughout the monitoring period – often recorded well above the 1-hour criteria. The consequences of these exceedances are discussed in section 6 – Recommendations.

Analysis of blank sample results are detailed in **Table 4-2** and were within the established acceptance criterion (blank TSP mass difference = ±8 mg between initial and final weighing) with the exception of the August 2022 sample (blank TSP mass difference = 11.3 mg). This result may suggest that the samples were not well handled or stored by the servicing contractor. The program has been modified since this period, with servicing completed by Ramboll from 16 September 2022. The following blank samples recorded some of the lowest differences in masses between the initial and final weighing during the monitoring program, suggesting that the new servicing process has improved sample handling. Due to an analytical service issue, the final filter mass of the TSP samples measured during July 2023 were not recorded and therefore have been marked as NA in the following section.

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Table 4-2: Blank sample details

Blank sample ID	Date analysed	Initial filter mass (mg)	Final filter mass (mg)	Blank TSP Difference (mg)
AQM5 – HVS723	02/10/2021	2753.3	2755.2	1.9
AQM5 – HVS817	12/10/2021	2741.1	2744.4	3.3
AQM5 – HVS1183	13/12/2021	2684.8	2688.1	3.3
AQM5 – HVS1144	05/02/2022	2829.8	2836.0	6.2
AQM5 - HVS1136	06/04/2022	2821.5	2827	5.5
AQM5 - HVS1436	04/08/2022	2686.5	2697.8	11.3
AQM5 - HVS1586	9/10/2022	2556.8	2558.1	1.3
AQM5 - HVS1698	8/12/2022	2738.7	2741.1	2.4
AQM5 - HVS1826	6/04/2023	2673.5	2673.6	0.1
AQM5 - HVS2015	07/06/2023	2684.4	2683.2	1.2
AQM5 – HVS1976	8/07/2023	2738.2	2736.9	1.3
AQM5 – HVS2045	04/08/2023	2699.5	NA	NA
AQM5 – HVS1966	07/09/2023	2664.9	2667.1	2.2
AQM5 – HVS3072	06/10/2023	2791.8	2792.1	0.3
AQM5 - HVS3109	8/12/2023	2714.7	2719.8	5.1
AQM5 – HVS3249	01/02/2024	2769.9	2774.6	4.7

Invalidated or missing samples during the monitoring program are summarised in **Table 4-3**. One sample was lost on 4 July 2021 from AQM5 when the instrument was impacted by high winds. Four sets of samples were invalidated from all sites (1 and 7 November 2021, 12 April, and 24 May 2022), following some confusion about the sampling methodology when the program was handed over to SCS for servicing. Sampling during April and May was not completed by SCS. One sample from AQM2 on 18 May 2022 was not found on site upon retrieval by Ramboll. One sample had a damaged filter on 13 May 2023 and hence the TSP value was not included. As previously mentioned, the TSP samples from July did not undergo a final weighing due to procedural error at the laboratory. On November 9, 2023, a AQM5 blank sample and a AQM3 sample were not measured at the lab as they were missing.

Table 4-3: Invalidated or missing samples [1]

Date sampled	Site	Sample ID	Comments
04/07/2021	AQM 5	No sample	Lost during high winds
01/11/2021	AQM 1	AQM 1 – HVS847	Invalidated – not serviced on correct day by SCS
01/11/2021	AQM 2	AQM 2 – HVS848	Invalidated – not serviced on correct day by SCS
01/11/2021	AQM 3	AQM 3 – HVS846	Invalidated – not serviced on correct day by SCS
01/11/2021	AQM 4	AQM 4 – HVS844	Invalidated – not serviced on correct day by SCS
01/11/2021	AQM 5	AQM 5 – HVS845	Invalidated – not serviced on correct day by SCS
07/11/2021	AQM 1	AQM 1 – HVS854	Invalidated – not serviced on correct day by SCS
07/11/2021	AQM 2	AQM 2 – HVS855	Invalidated – not serviced on correct day by SCS
07/11/2021	AQM 3	AQM 3 – HVS849	Invalidated – not serviced on correct day by SCS
07/11/2021	AQM 4	AQM 4 – HVS853	Invalidated – not serviced on correct day by SCS
07/11/2021	AQM 5	AQM 5 – HVS856	Invalidated – not serviced on correct day by SCS
12/04/2022	AQM 1	AQM 1 – HVS1073	No sample – Not replaced by SCS
12/04/2022	AQM 2	AQM 2 – HVS1060	No sample – Not replaced by SCS
12/04/2022	AQM 3	AQM 3 – HVS985	No sample – Not replaced by SCS
12/04/2022	AQM 4	AQM 4 – HVS1170	No sample – Not replaced by SCS
12/04/2022	AQM 5	AQM 5 – HVS1163	No sample – Not replaced by SCS
18/04/2022	AQM 1	No sample	No sample – Not replaced by SCS
18/04/2022	AQM 2	No sample	No sample – Not replaced by SCS
18/04/2022	AQM 3	No sample	No sample – Not replaced by SCS
18/04/2022	AQM 4	No sample	No sample – Not replaced by SCS
18/04/2022	AQM 5	No sample	No sample – Not replaced by SCS
30/04/2022	AQM 1	No sample	No sample – Not replaced by SCS
30/04/2022	AQM 2	No sample	No sample – Not replaced by SCS
30/04/2022	AQM 3	No sample	No sample – Not replaced by SCS
30/04/2022	AQM 4	No sample	No sample – Not replaced by SCS
30/04/2022	AQM 5	No sample	No sample – Not replaced by SCS
18/05/2022	AQM 2	No sample	Missing upon retrieval
24/05/2022	AQM 1	AQM 1 – HVS1155	No sample – Not replaced by SCS
24/05/2022	AQM 2	AQM 2 – HVS1122	No sample – Not replaced by SCS
24/05/2022	AQM 3	AQM 3 – HVS1133	No sample – Not replaced by SCS
24/05/2022	AQM 4	AQM 4 – HVS1139	No sample – Not replaced by SCS
24/05/2022	AQM 5	AQM 5 – HVS1246	No sample – Not replaced by SCS
30/05/2022	AQM 1	No sample	No sample – Not replaced by SCS
30/05/2022	AQM 2	No sample	No sample – Not replaced by SCS
30/05/2022	AQM 3	No sample	No sample – Not replaced by SCS
30/05/2022	AQM 4	No sample	No sample – Not replaced by SCS
30/05/2022	AQM 5	No sample	No sample – Not replaced by SCS
23/06/2022	AQM 3	AQM 3 - HVS1255	Filter damaged
05/07/2022	AQM 1	AQM 1 - HVS1240	Invalidated

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Date sampled	Site	Sample ID	Comments
05/07/2022	AQM 2	AQM 2 - HVS1243	Invalidated
05/07/2022	AQM 3	AQM 3 - HVS1253	Invalidated
05/07/2022	AQM 4	AQM 4 - HVS1270	Invalidated
05/07/2022	AQM 5	AQM 5 - HVS1263	Invalidated
11/07/2022	AQM 1	No sample	
11/07/2022	AQM 2	No sample	
11/07/2022	AQM 3	No sample	
11/07/2022	AQM 4	No sample	
11/07/2022	AQM 5	No sample	
17/07/2022	AQM 2	AQM 2 - HVS1234	Filter damaged
29/07/2022	AQM 1	No sample	
29/07/2022	AQM 2	No sample	
29/07/2022	AQM 3	No sample	
29/07/2022	AQM 4	No sample	
29/07/2022	AQM 5	No sample	
10/08/2022	AQM 2	AQM 2 - HVS1259	Filter damaged
16/08/2022	AQM 1	No sample	Missing
16/08/2022	AQM 2	No sample	Missing
16/08/2022	AQM 3	No sample	Missing
16/08/2022	AQM 4	HVS 1141	Missing
16/08/2022	AQM 5	No sample	Missing
28/08/2022	AQM 2	AQM 2 - HVS1358	Filter damaged
09/09/2022	AQM 3	AQM 3 - HVS1250	Filter damaged
09/09/2022	AQM 5	AQM 5 - HVS1259	Filter damaged
15/09/2022	AQM 1	AQM 1 - HVS_UNKNOWN	Missing
15/09/2022	AQM 2	AQM 2 - HVS_UNKNOWN	Missing
15/09/2022	AQM 3	AQM 3 - HVS_UNKNOWN	Missing
15/09/2022	AQM 4	AQM 4 - HVS_UNKNOWN	Missing
15/09/2022	AQM 5	AQM 5 - HVS_UNKNOWN	Missing
13/05/2023	AQM 2	AQM 2 – HVS17494	Filter damaged
30/07/2023	AQM 1	AQM 1 - HVS2031	Filter papers not post-weighed
24/07/2023	AQM 1	AQM 1 - HVS1965	Filter papers not post-weighed
18/07/2023	AQM 1	AQM 1 - HVS2046	Filter papers not post-weighed
12/07/2023	AQM 1	AQM 1 - HVS2021	Filter papers not post-weighed
6/07/2023	AQM 1	AQM 1 - HVS2006	Filter papers not post-weighed
30/07/2023	AQM 2	AQM 2 - HVS2030	Filter papers not post-weighed
24/07/2023	AQM 2	AQM 2 - HVS1967	Filter papers not post-weighed
18/07/2023	AQM 2	AQM 2 - HVS2047	Filter papers not post-weighed
12/07/2023	AQM 2	AQM 2 - HVS2038	Filter papers not post-weighed

Date sampled	Site	Sample ID	Comments
6/07/2023	AQM 2	AQM 2 - HVS2007	Filter papers not post-weighed
30/07/2023	AQM 3	AQM 3 - HVS2029	Filter papers not post-weighed
24/07/2023	AQM 3	AQM 3 - HVS1963	Filter papers not post-weighed
18/07/2023	AQM 3	AQM 3 - HVS2048	Filter papers not post-weighed
12/07/2023	AQM 3	AQM 3 - HVS2037	Filter papers not post-weighed
6/07/2023	AQM 3	AQM 3 - HVS1997	Filter papers not post-weighed
30/07/2023	AQM 4	AQM 4 - HVS2028	Filter papers not post-weighed
24/07/2023	AQM 4	AQM 4 - HVS2023	Filter papers not post-weighed
18/07/2023	AQM 4	AQM 4 - HVS2049	Filter papers not post-weighed
12/07/2023	AQM 4	AQM 4 - HVS2036	Filter papers not post-weighed
6/07/2023	AQM 4	AQM 4 - HVS2005	Filter papers not post-weighed
30/07/2023	AQM 5	AQM 5 - HVS2027	Filter papers not post-weighed
24/07/2023	AQM 5	AQM 5 - HVS1961	Filter papers not post-weighed
18/07/2023	AQM 5	AQM 5 - HVS2050	Filter papers not post-weighed
12/07/2023	AQM 5	AQM 5 - HVS2035	Filter papers not post-weighed
6/07/2023	AQM 5	AQM 5 - HVS1998	Filter papers not post-weighed
9/11/2023	AQM 5	No sample	Missing
9/11/2023	AQM 3	AQM 3 - HVS3154	Missing

Note: Ramboll took over the servicing of the program from 16 September 2022.

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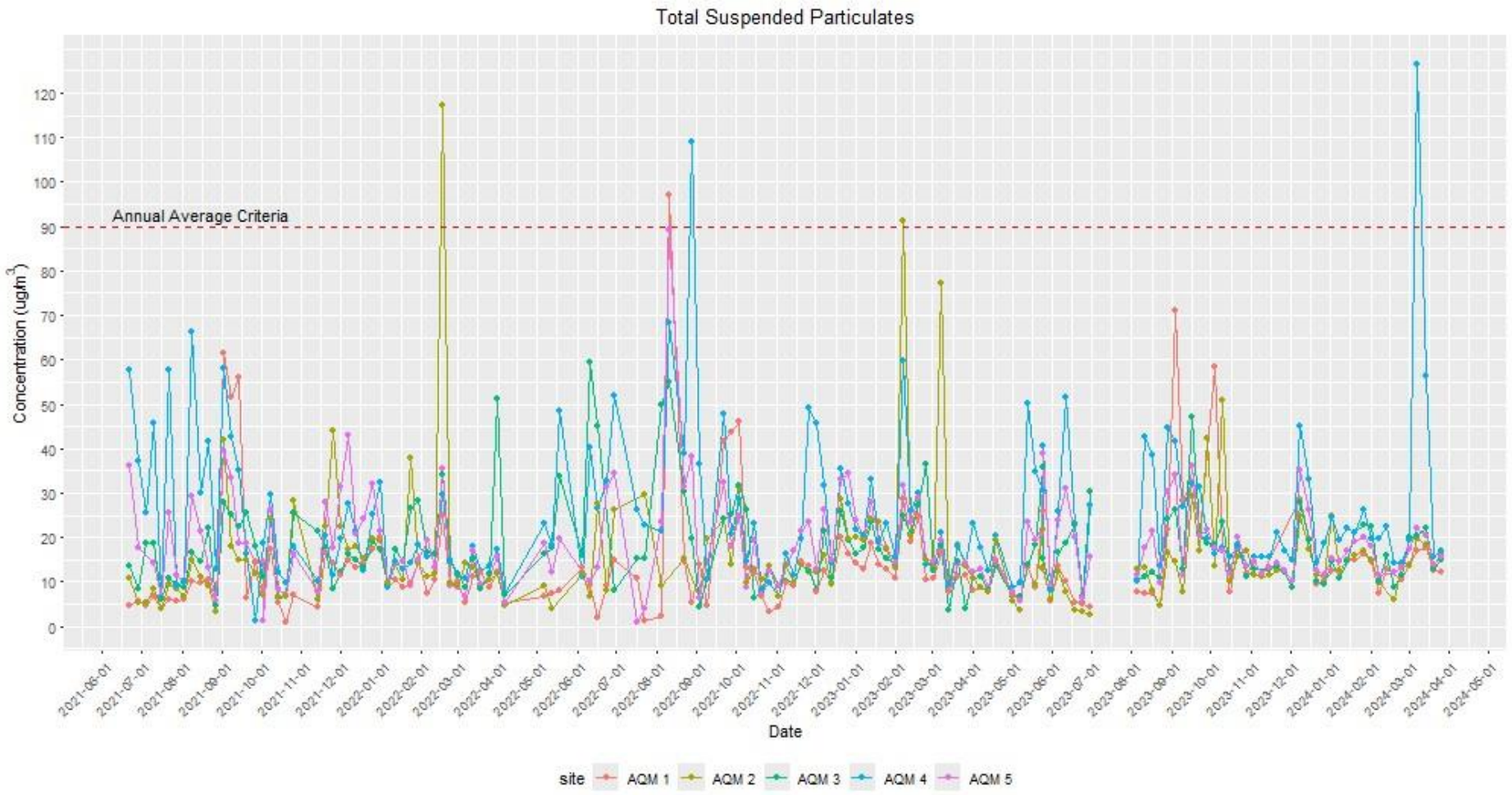

Figure 4-6: 24-hour total suspended particulate (TSP) concentration measured at each sampling location every one day in six, from 22 June 2021 (annual average TSP criteria: 90 µg/m³; LOR 0.0061 µg/m³)

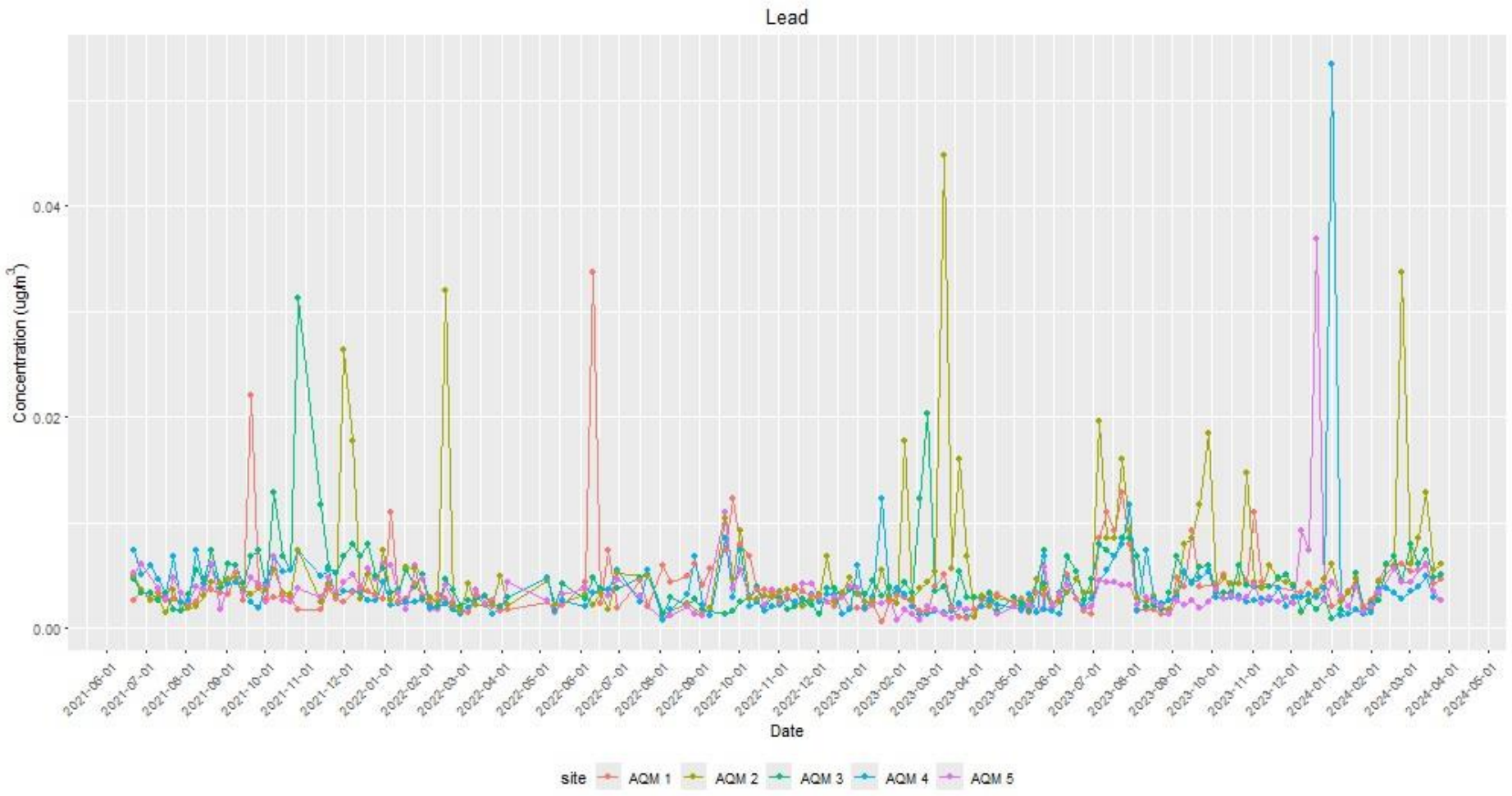

Figure 4-7: 24-hour lead concentration measured at each sampling location every one day in six, from 22 June 2021 (annual average lead criteria not shown: 0.5 µg/m³; LOR 0.0006 µg/m³)

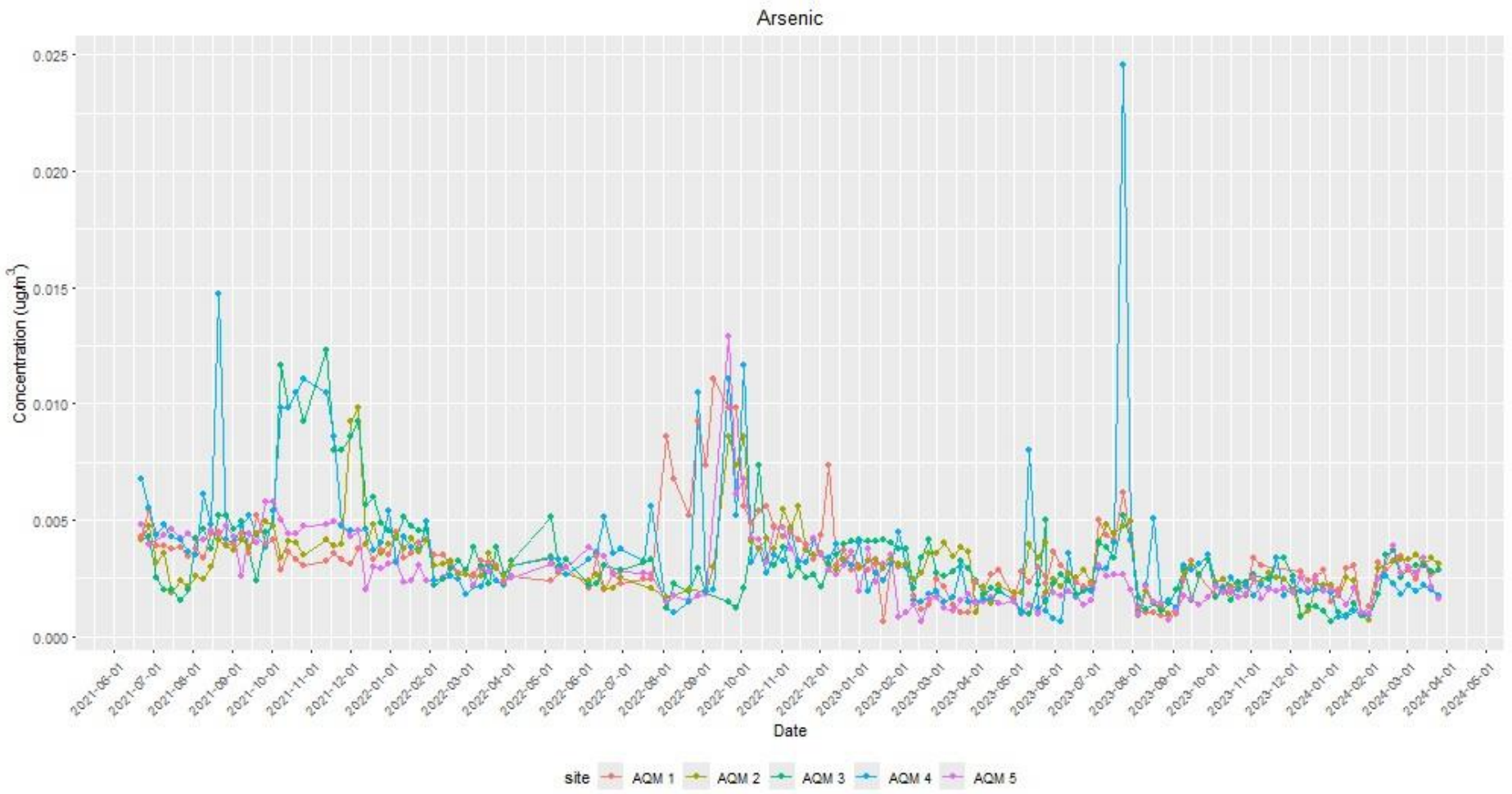

Figure 4-8: 24-hour arsenic concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average arsenic criteria not shown: 0.09 µg/m³; LOR 0.0006 µg/m³)

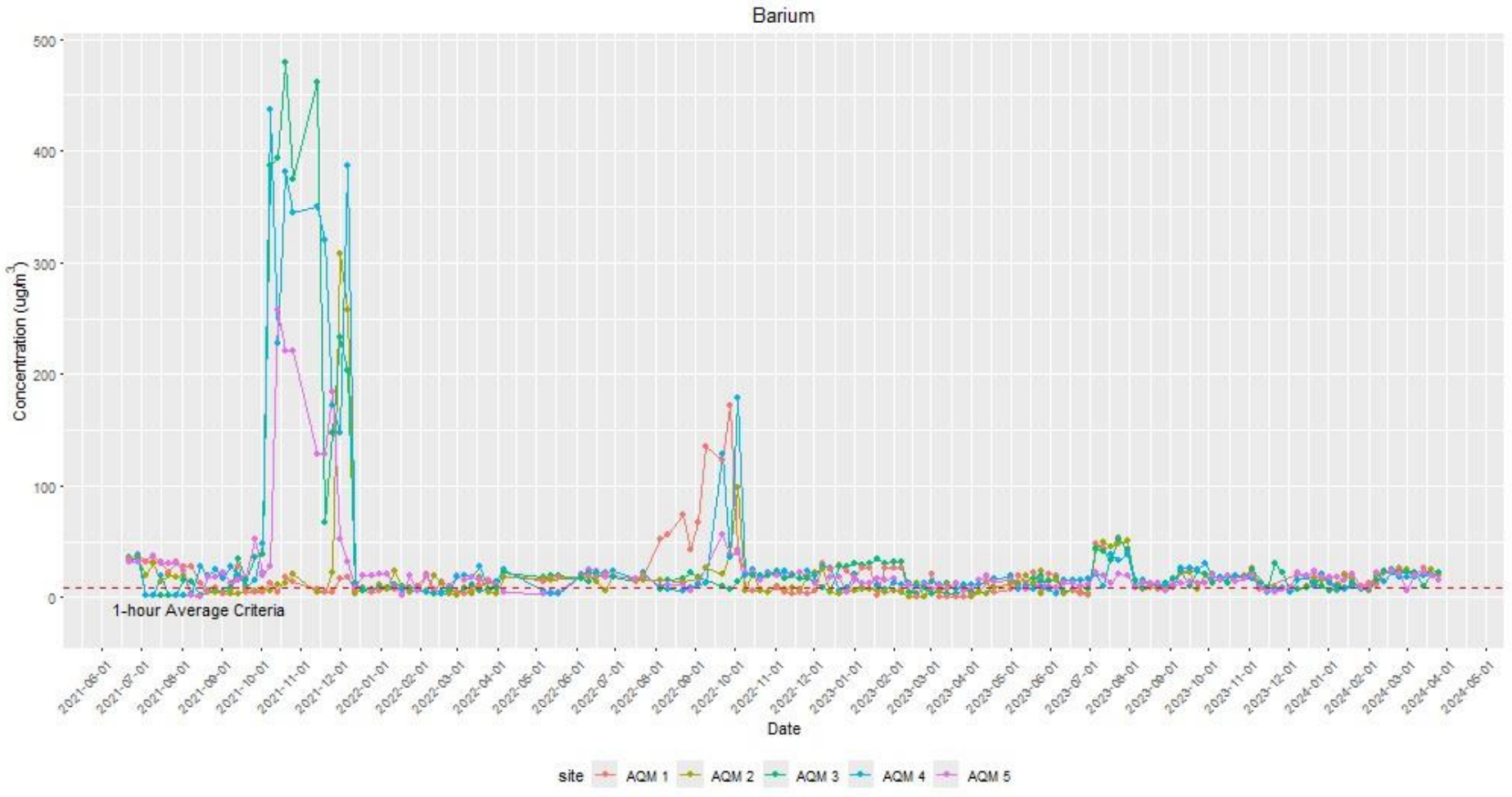

Figure 4-9: 24-hour barium concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average barium criteria: 9 µg/m³; LOR 0.0006 µg/m³)

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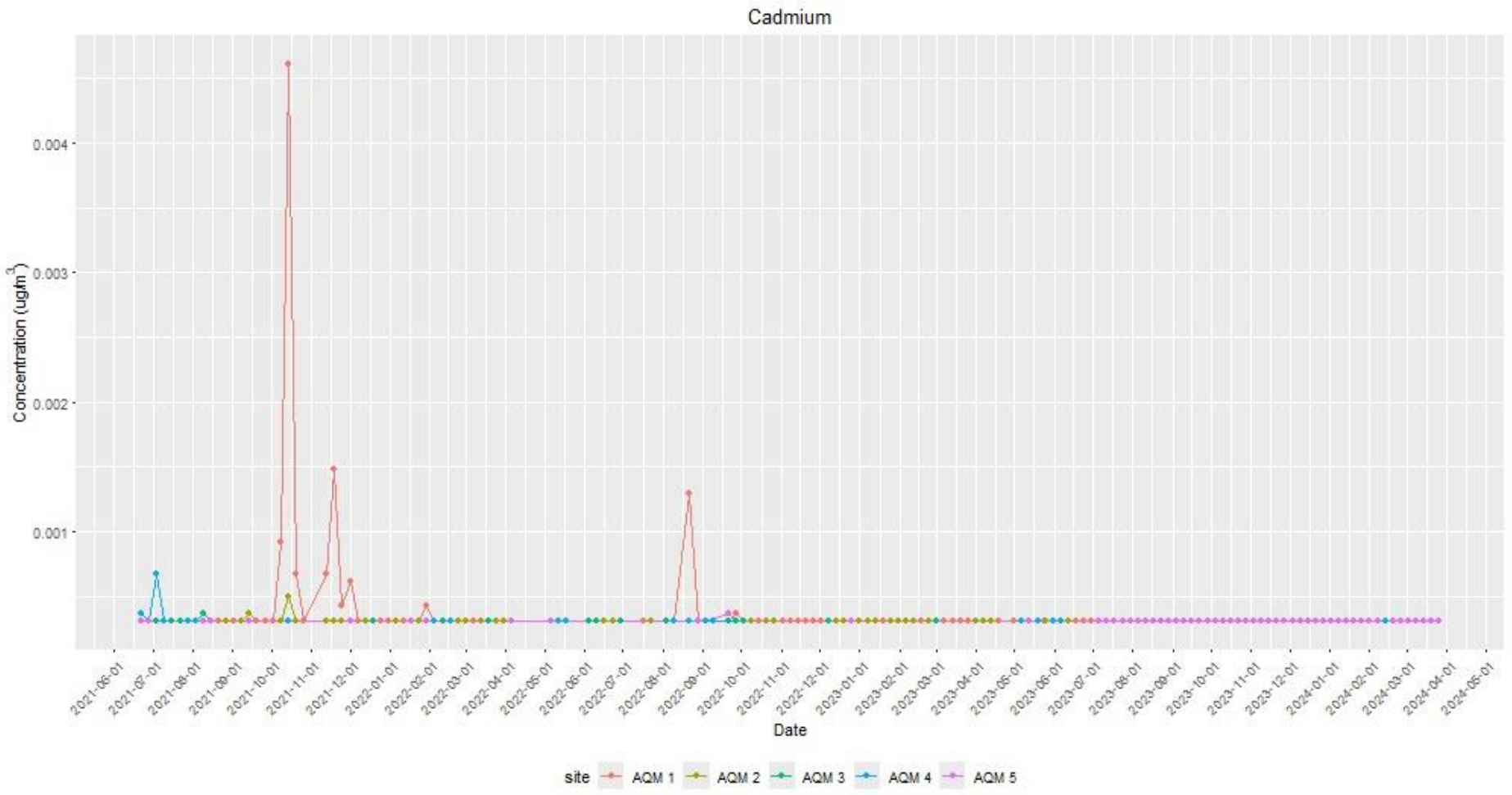

Figure 4-10: 24-hour cadmium concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average cadmium criteria not shown: 0.018 µg/m³; LOR 0.0003 µg/m³)

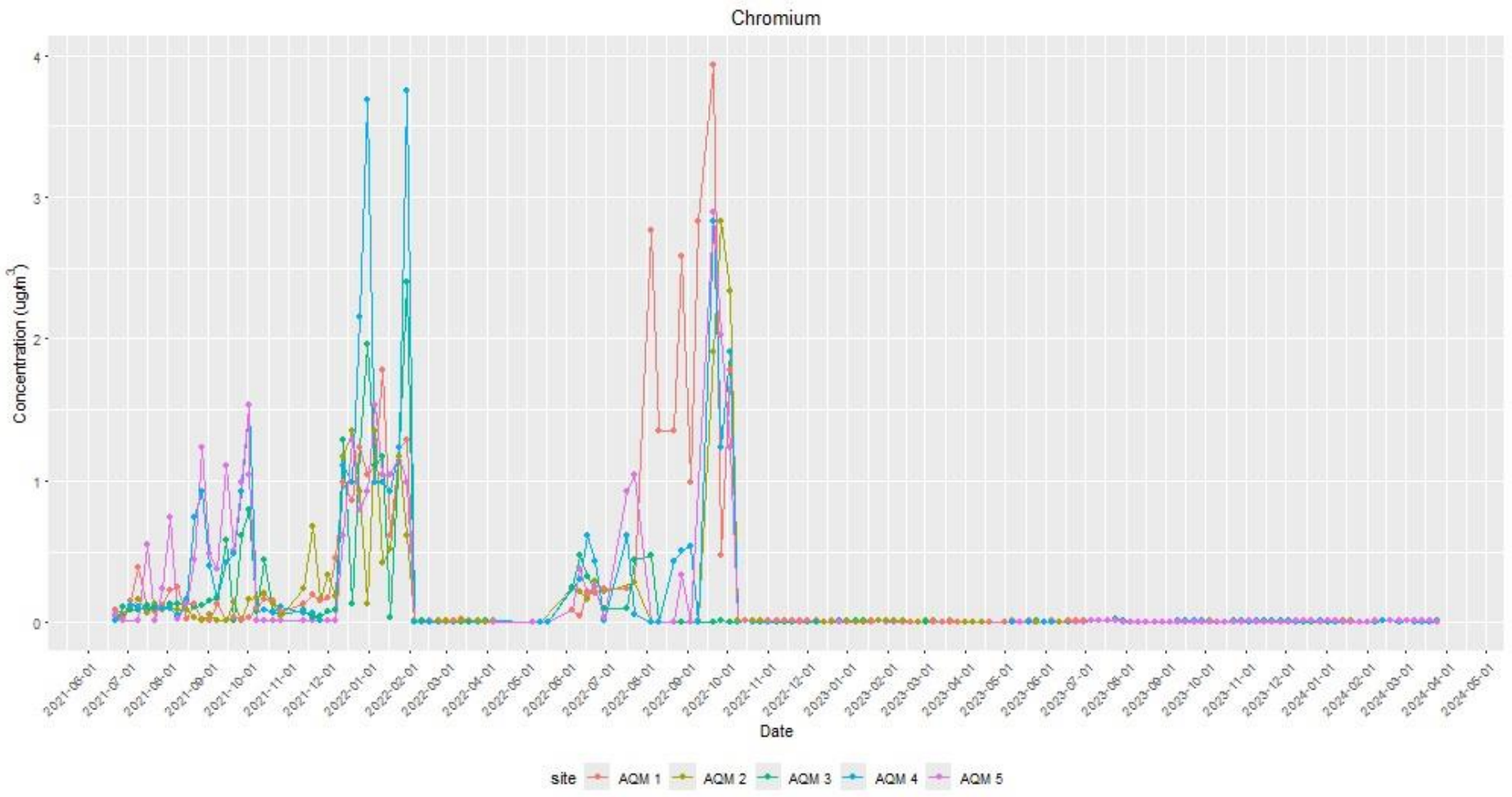

Figure 4-11: 24-hour chromium concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average chromium criteria not shown: 9 µg/m³; LOR 0.0006 µg/m³)

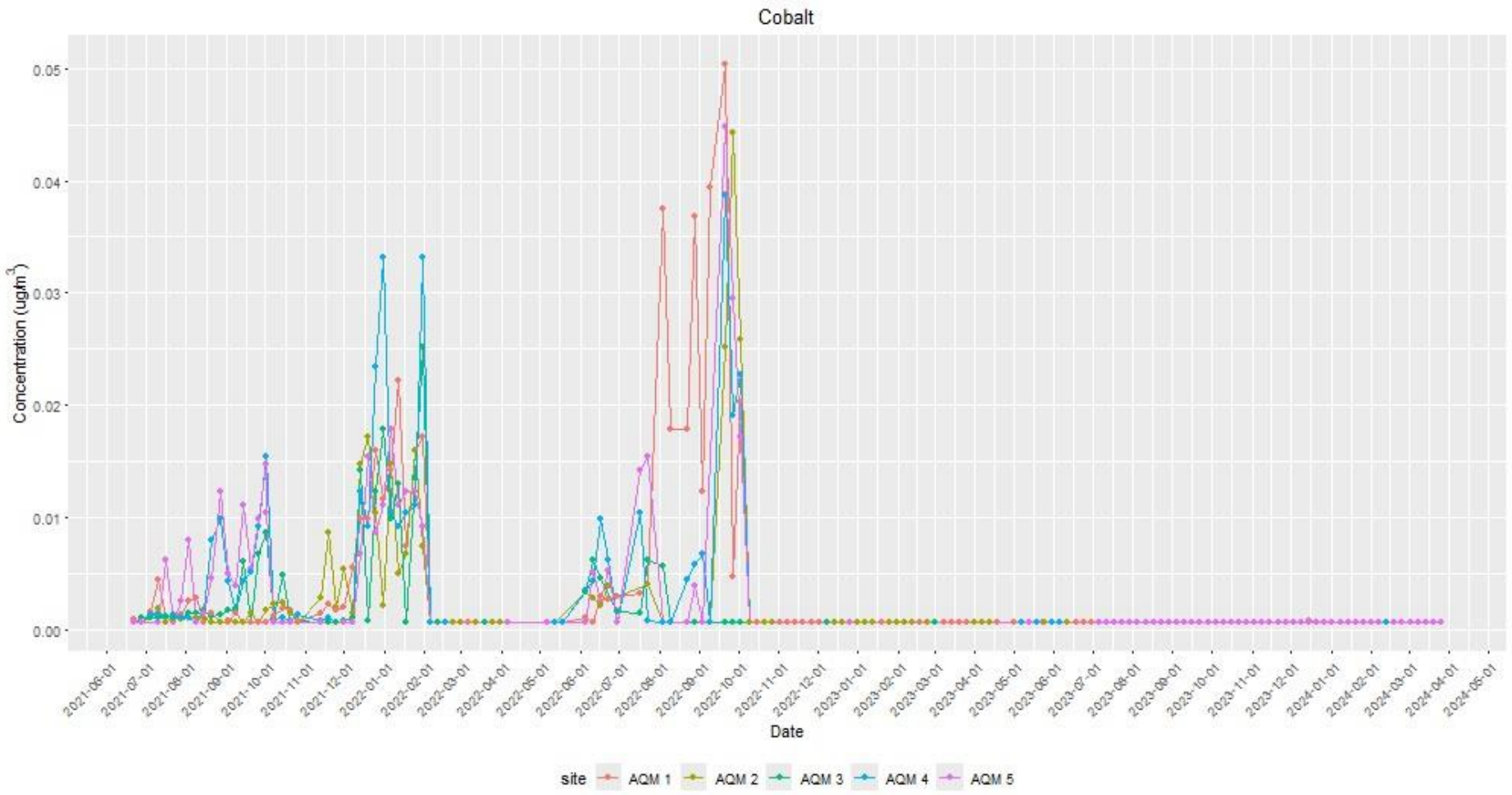

Figure 4-12: 24-hour cobalt concentration measured at each sampling location every one day in six, from 22 June 2021 (LOR 0.0006 µg/m³)

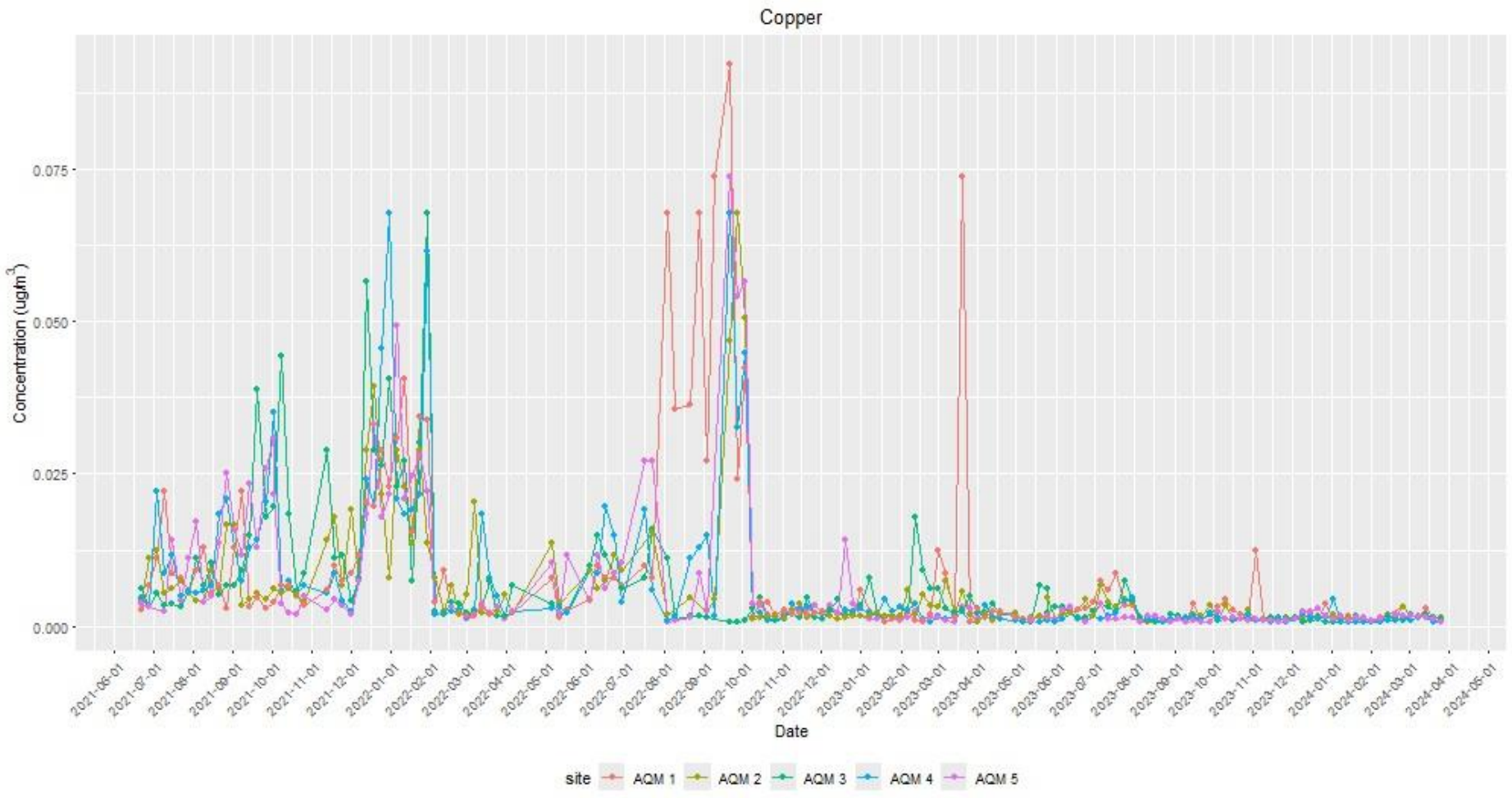

Figure 4-13: 24-hour copper concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average copper criteria not shown: 18 µg/m³; LOR 0.0006 µg/m³)

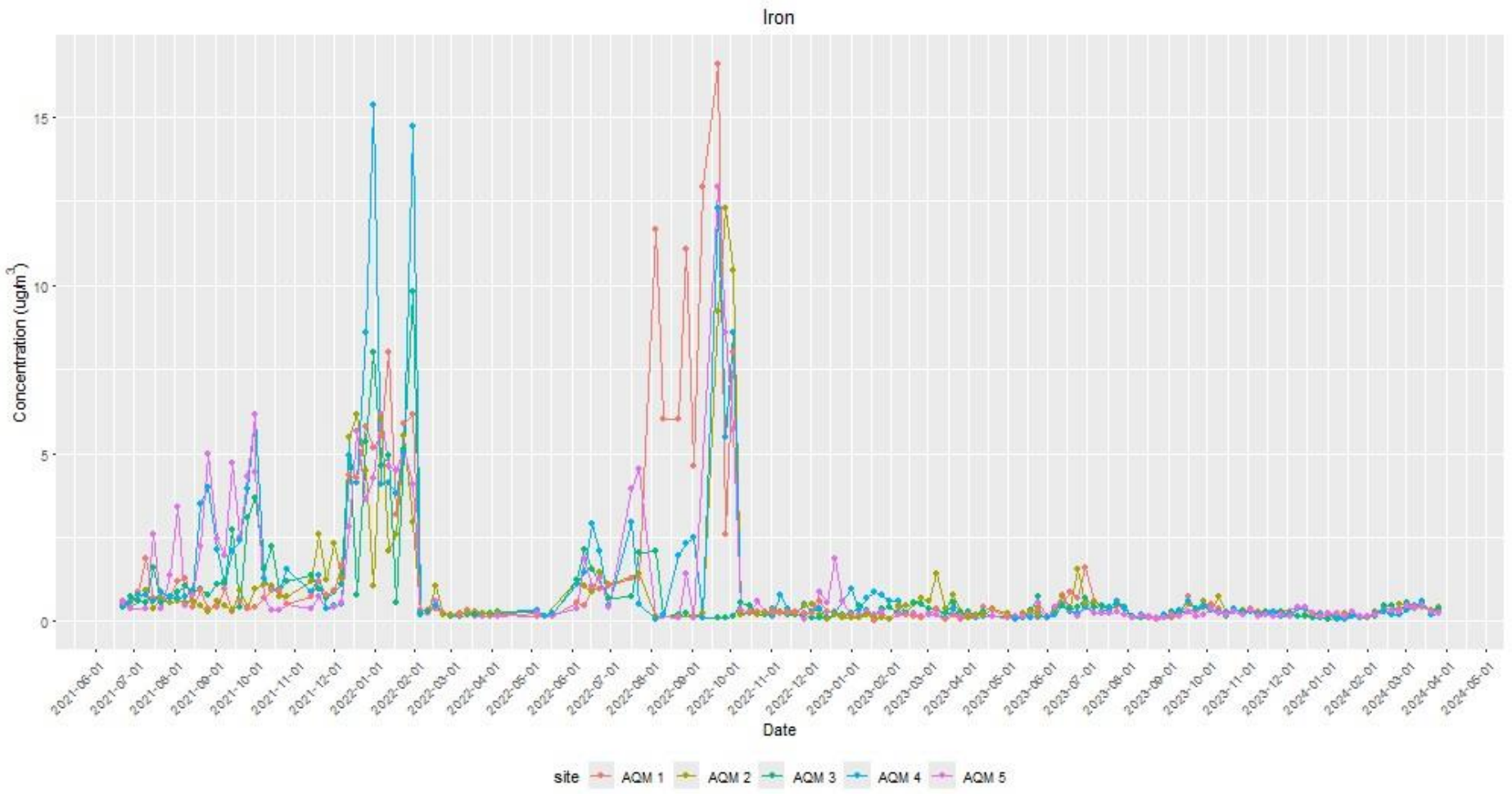

Figure 4-14: 24-hour iron concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average iron criteria not shown: 90 µg/m³; LOR 0.0061 µg/m³)

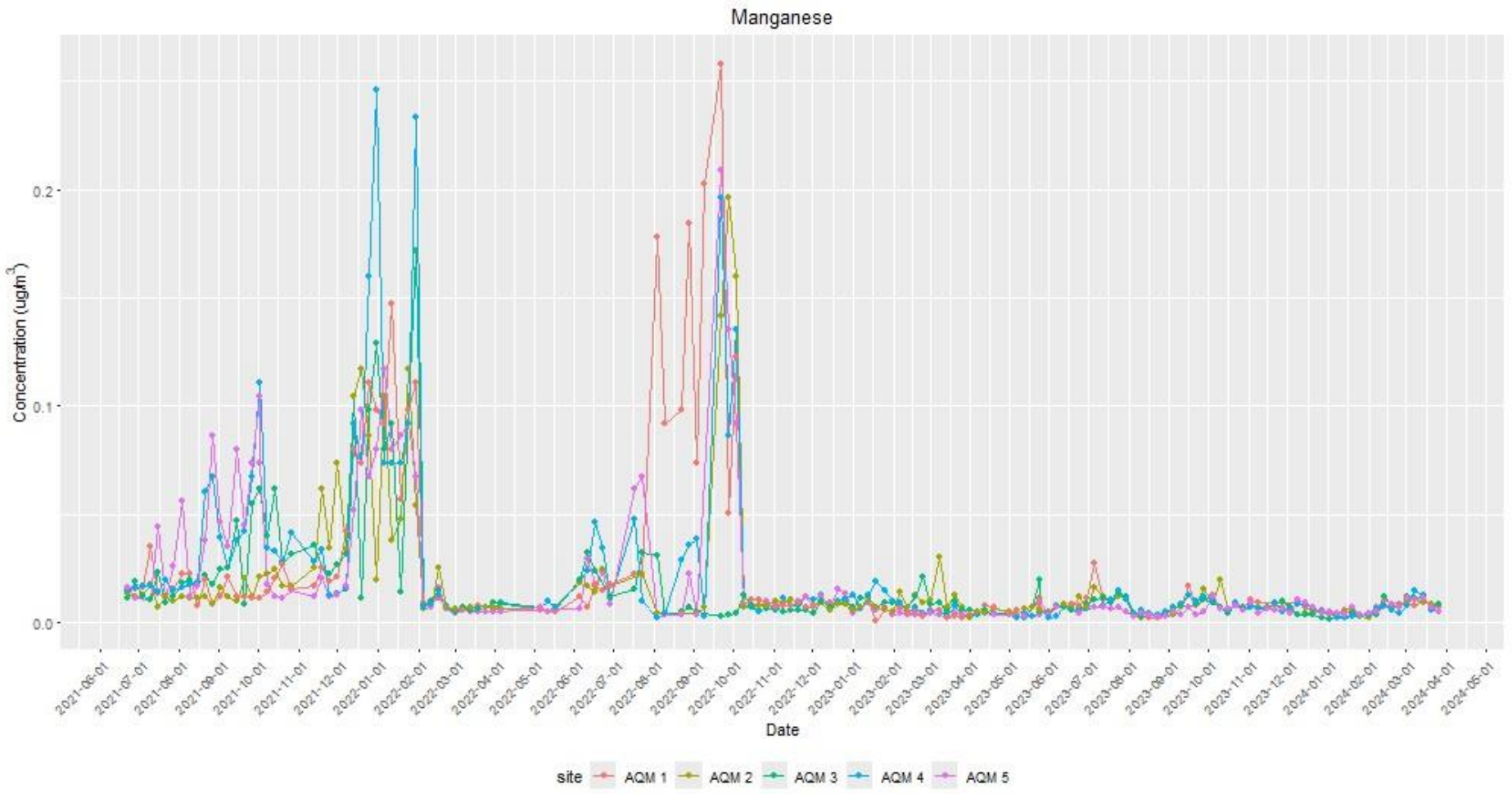

Figure 4-15: 24-hour manganese concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average managenese criteria not shown: 18 µg/m³; LOR 0.0006 µg/m³)

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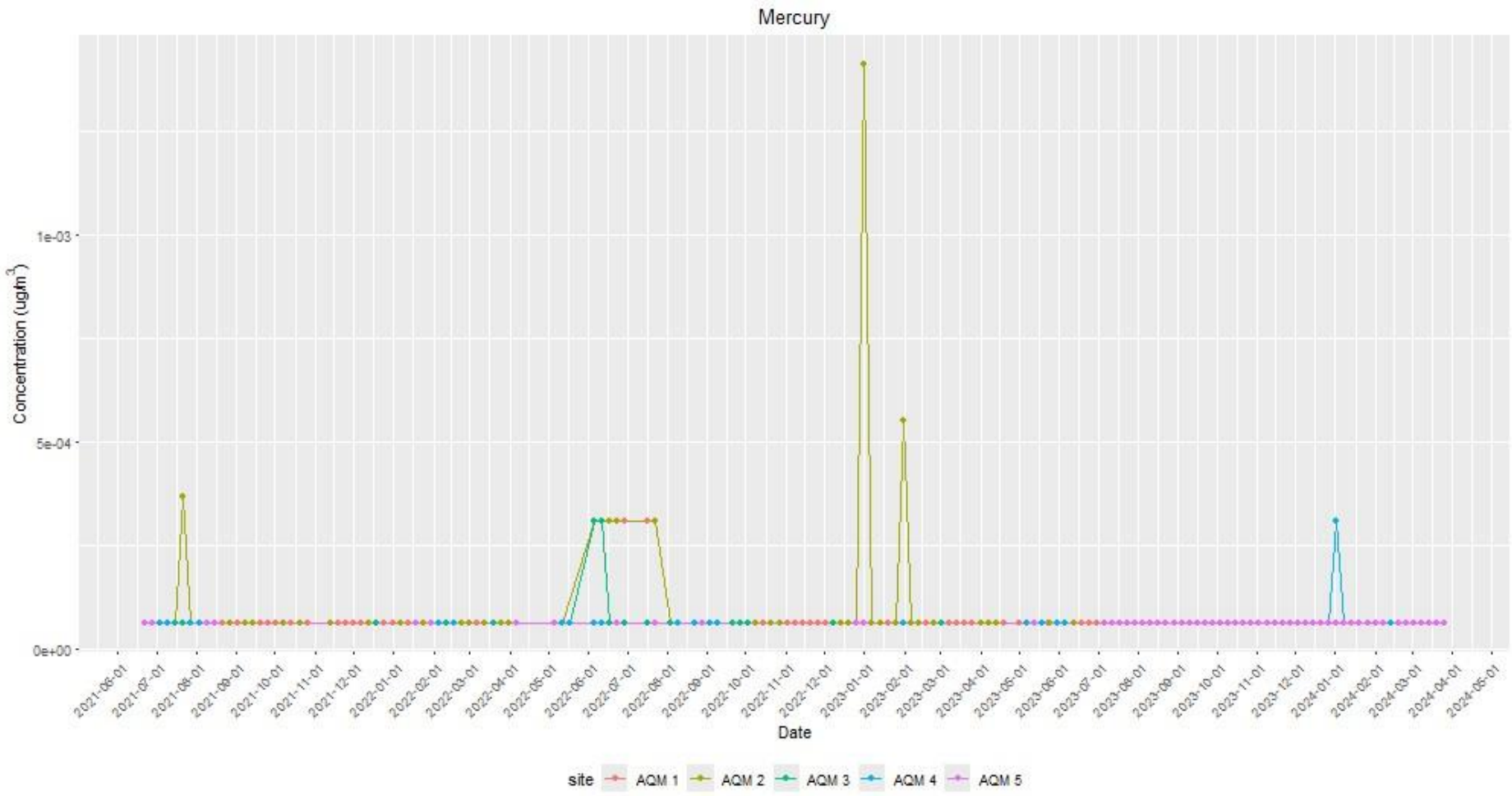

Figure 4-16: 24-hour mercury concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average mercury criteria not shown: 0.18 µg/m³; LOR 0.0001 µg/m³[1])

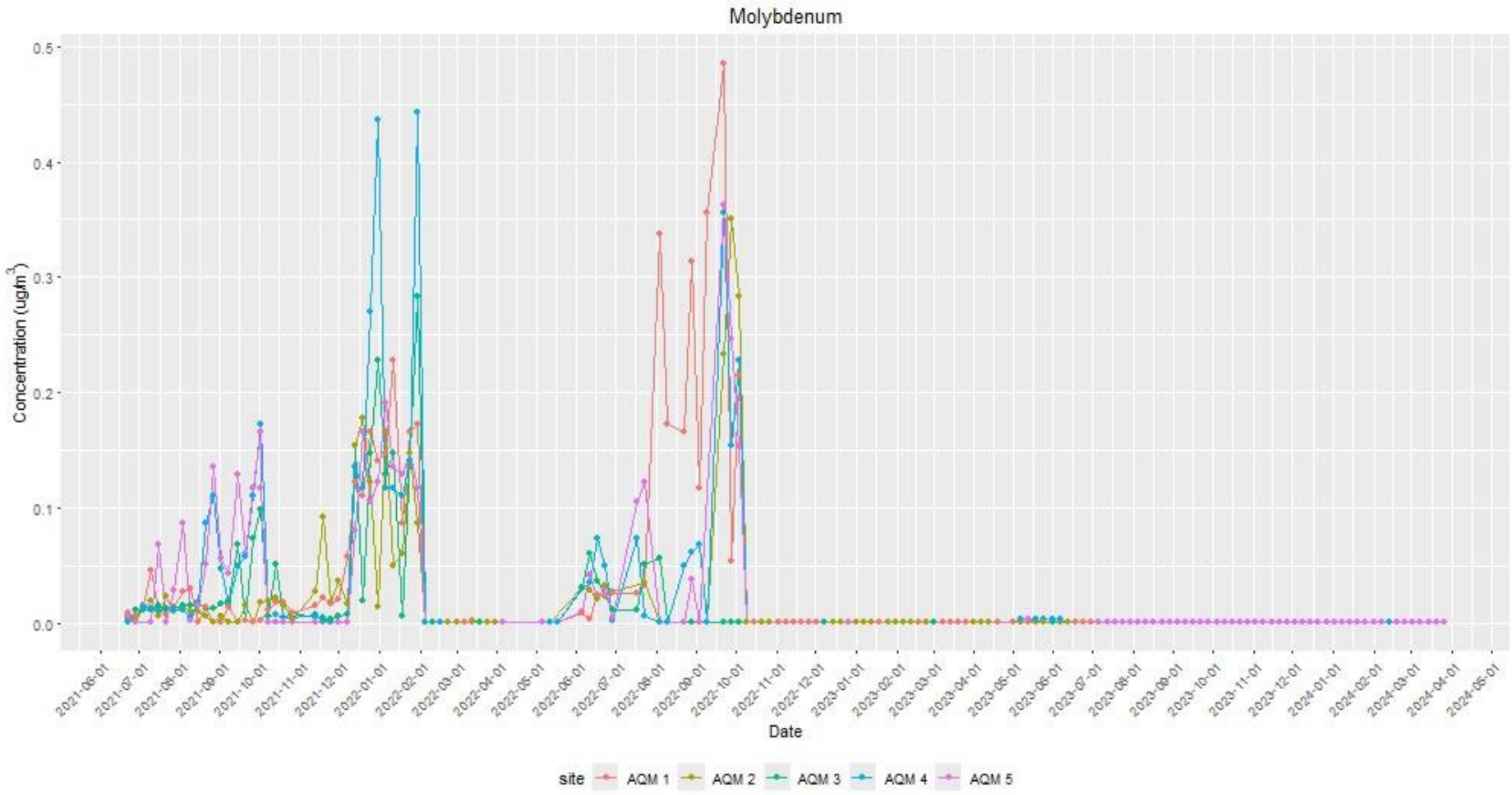

Figure 4-17: 24-hour molybdenum concentration measured at each sampling location every one day in six, from 22 June 2021 (LOR 0.0006 µg/m³)

[1] LOR 0.0003 µg/m³ (5 times dilution needed to be placed) in the AQM1 samples from the 05, 11, 17, 23 and 29 June, and 17 and 23 July 2022, the AQM2 samples from the 05, 11, 17, 23 and 29 June, and 23 July 2022, and the AQM3 samples from the 05 and 11 June 2022.

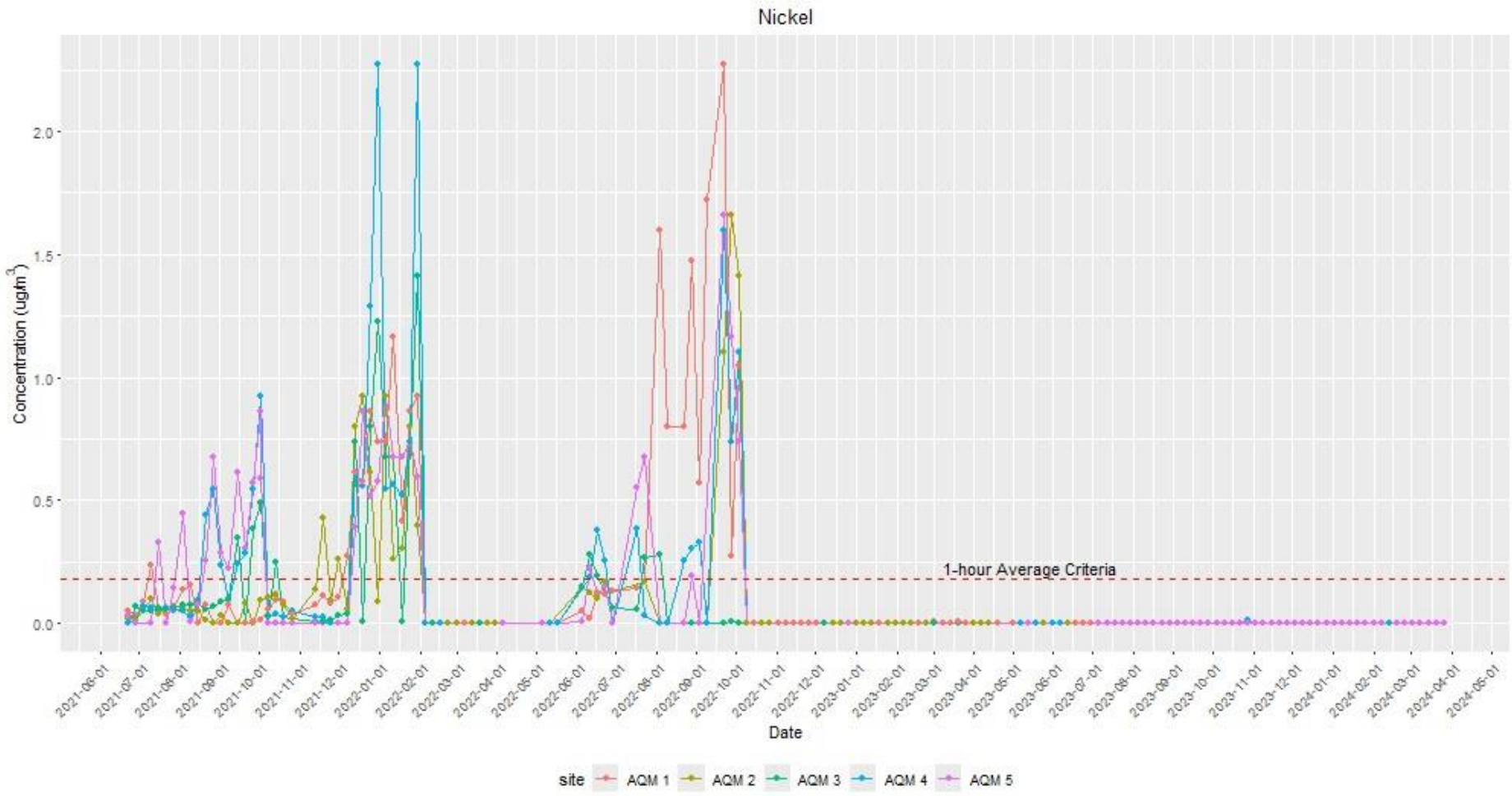

Figure 4-18: 24-hour nickel concentration measured at each sampling location every one day in six, from 22 June 2021 (1-hour average nickel criteria: 0.18 µg/m³; LOR 0.0006 µg/m³)

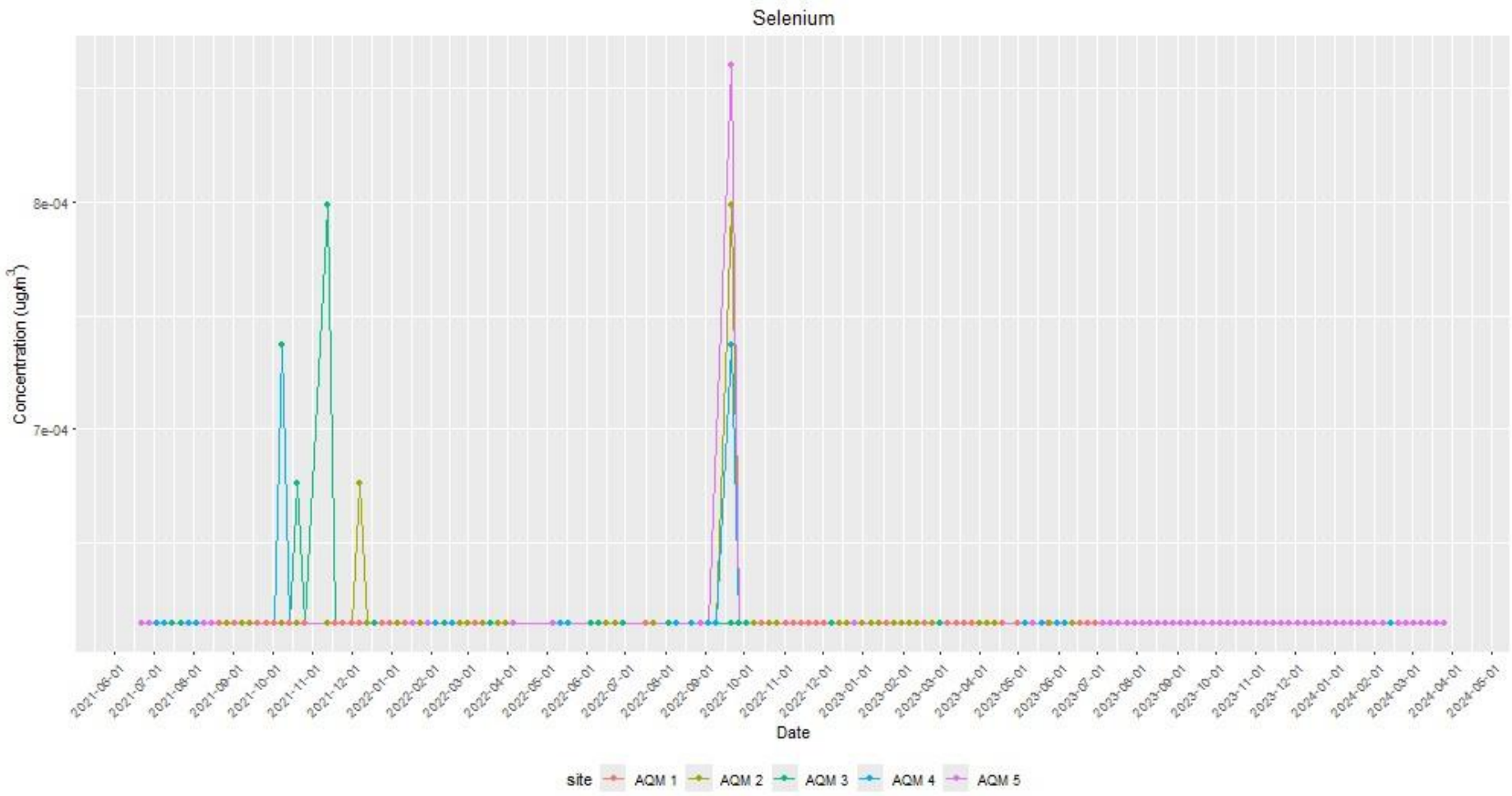

Figure 4-19: 24-hour selenium concentration measured at each sampling location every one day in six, from 22 June 2021 (LOR 0.0006 µg/m³)

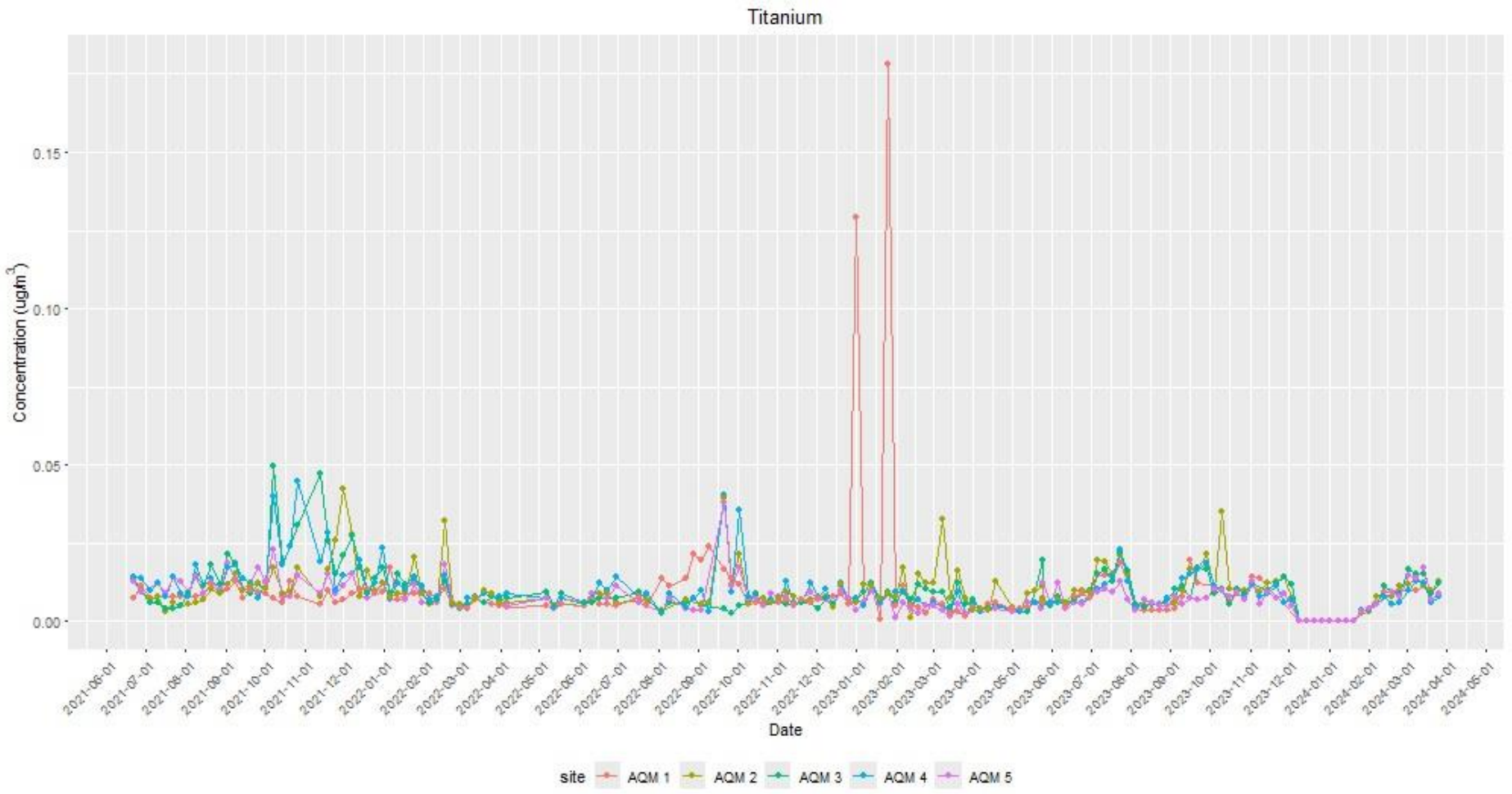

Figure 4-20: 24-hour titanium concentration measured at each sampling location every one day in six, from 22 June 2021 (LOR 0.0006 µg/m³)

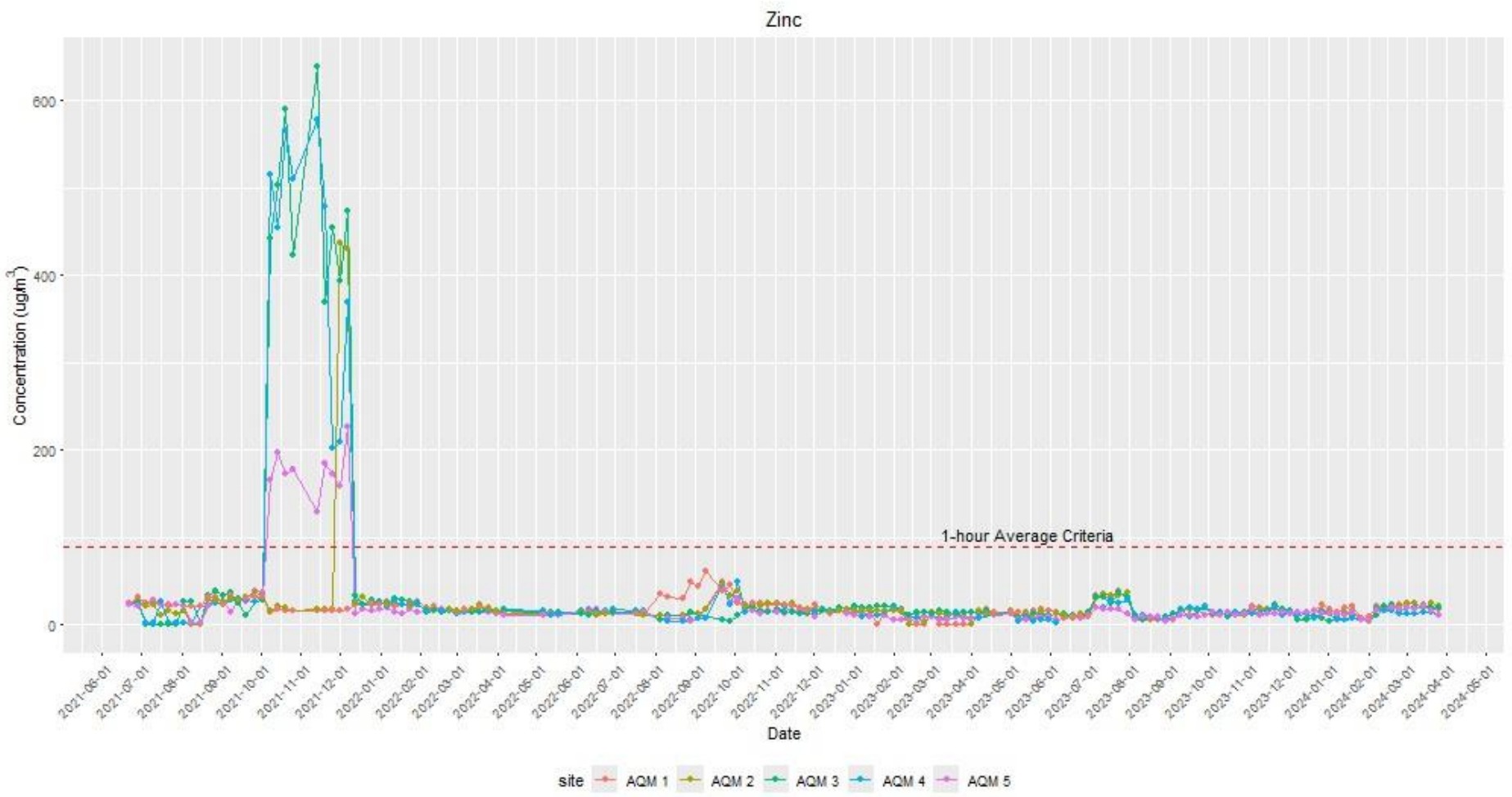

Figure 4-21: 24-hour zinc concentration measured at each sampling location every one day in six, from 22 June 2021 (LOR 0.0006 µg/m³)

4.3.1 Exceedance Investigation - TSP

Days where the concentrations exceeded the annual criteria have been further investigated and are summarised in **Table 4-4**. The daily-average TSP concentrations from the 10 and 28 August 2022 recorded by AQM1 and AQM4, respectively, that exceeded the annual criterion were not further investigated due to the absence of local meteorological data which could lead to inaccurate conclusions. Moreover, these samples are from August 2022 when sufficient QA was not achieved, suggesting potential contamination during the handling procedure. Similarly, the daily-average TSP concentration of 91.1 µg/m³ (i.e., slightly above the annual criterion) recorded by AQM2 on 6 February 2023 was not further investigated as the meteorological station was offline on that day following adjustment of the cable by the gardening contractor.

Table 4-4: Investigation days

Location and sample ID	Date	Pollutant (concentration)	Reason	On the day and antecedent rainfall
AQM 2 – HVS1059	17/02/2022	TSP (117.4 µg/m³)	Above annual average criteria	0 mm, 6th day without rain
AQM 1 – HVS1352	10/08/2022	TSP (97.2 µg/m³)	Above annual average criteria	Not analysed due to lack of local meteorology
AQM 4 – HVS1315	28/08/2022	TSP (109.1 µg/m³)	Above annual average criteria	Not analysed due to lack of local meteorology
AQM 2- HVS1707	06/02/2023	TSP (91.1 µg/m³)	Above annual average criteria	Not analysed due to meteorological station being offline
AQM 4 – HVS3363	08/03/2024	TSP (126.5 µg/m³)	Above annual average criteria	0 mm, no rain since 22 February 2024

On 17 February 2022 and 08 March 2024, high concentrations of TSP, exceeding the annual criteria, were recorded at locations AQM2 and AQM4 respectively. It is worth highlighting that this criterion applies for annual period averages, so the comparison to a daily average is a conservative approach to identify concentrations worth further investigation. Rainfall results for both days indicate that the weather was dry, with no recorded rainfall on the day or 5 days prior. Wind roses of the day from 17 February 2022 (**Figure 4-22**) show night winds coming from south-west, and stronger day winds coming from north (border of the northern tailings dump) and north-west. Analysis of the wind roses from 08 March 2024 (**Figure 5-23**) shows strong day winds coming from the north. AQM4 is located north-east all four locations of former mining activities, indicating that the source of the high concentration of TSP on 08 March 2024 was unlikely to originate from Captains Flat.

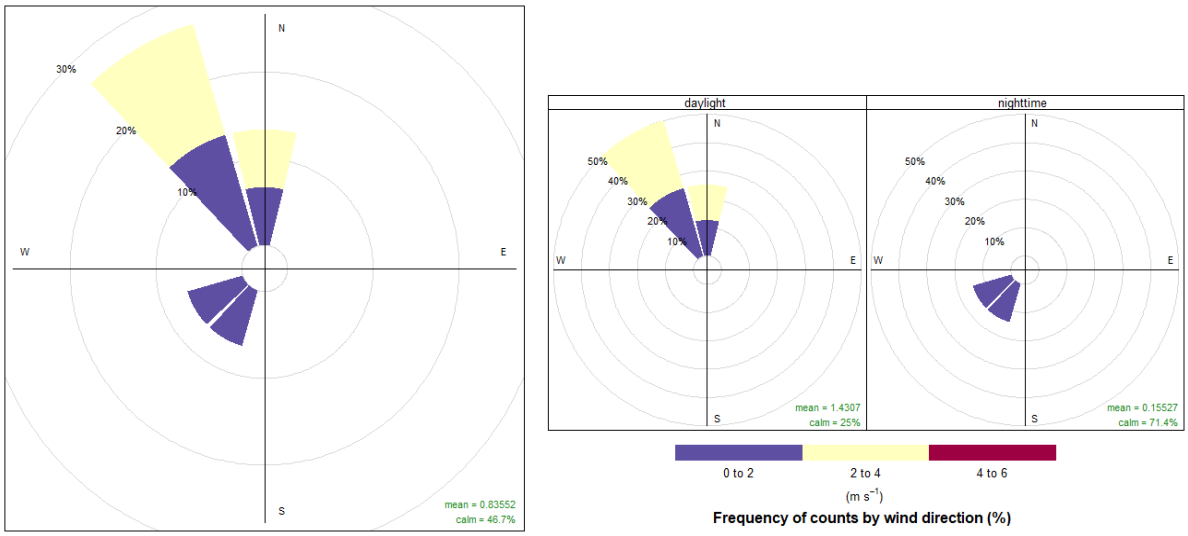

Figure 4-22: Wind roses (10 m) for 17 February 2022 at 2 Copper Creek Road, Captains Flat, NSW (produced with openair; Carslaw & Ropkins, 2012)

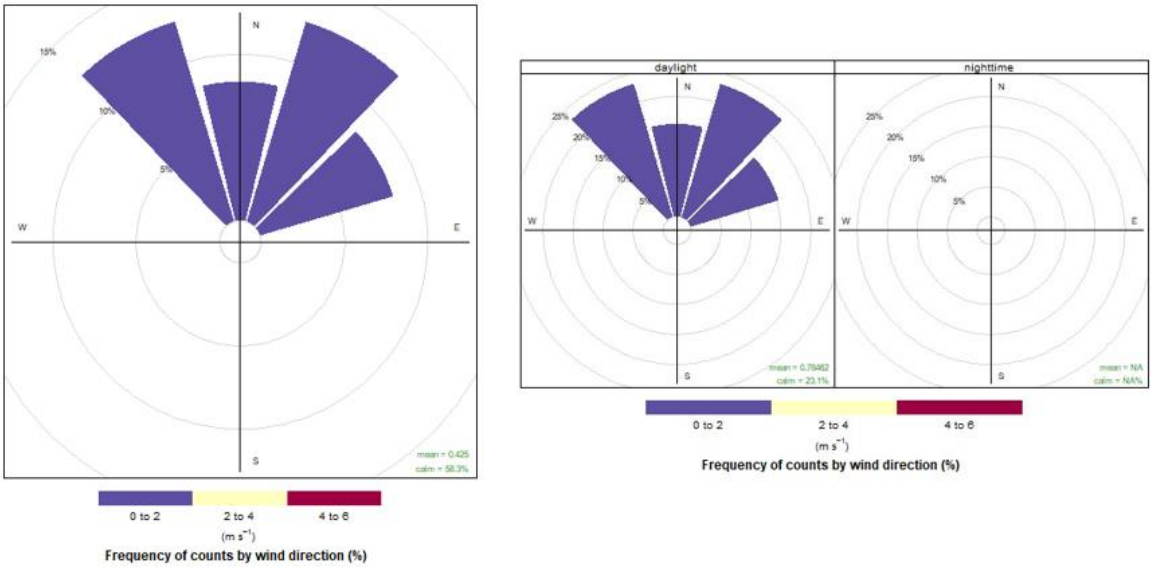

Figure 4-23: Wind roses (10 m) for 08 March 2024 at 2 Copper Creek Road, Captains Flat, NSW (produced with openair; Carslaw & Ropkins, 2012)

4.3.2 Exceedances Investigation – Barium and Nickel

The heavy metals barium and nickel have been recorded in concentrations which exceed the 1-hour NSW EPA criteria on multiple occasions throughout the study period. There were in total, 535 instances where the barium 24-hour concentrations exceeded the 1-hour NSW EPA criteria and 101 instances where nickel was recorded in concentrations above the NSW EPA criteria. There has not been a nickel exceedance recorded since 10 March 2022. Considering the longevity of the exceedances, Ramboll has provided recommendations, in Section 6, for the course of action to be taken by Regional NSW, to understand the risk of these high concentrations.

4.4 Potential Factors Influencing Dispersion

Bivariate polar plots (concentrations as a function of wind speed and direction) are presented for TSP and each heavy metal analysed in **Figure 4-4** to **Figure 4-9**. Additionally, the bivariate plots for key pollutants TSP, lead and zinc are presented spatially on a topographical map in **Appendix 1**.

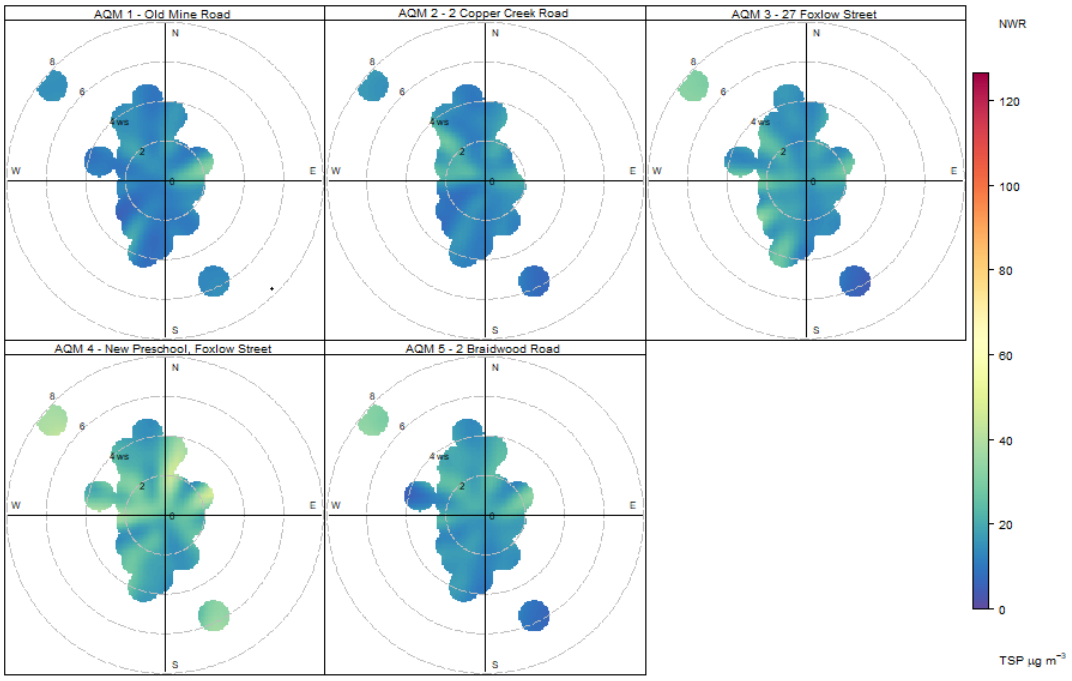

Figure 4-24: Polar plots showing 24-hour TSP concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

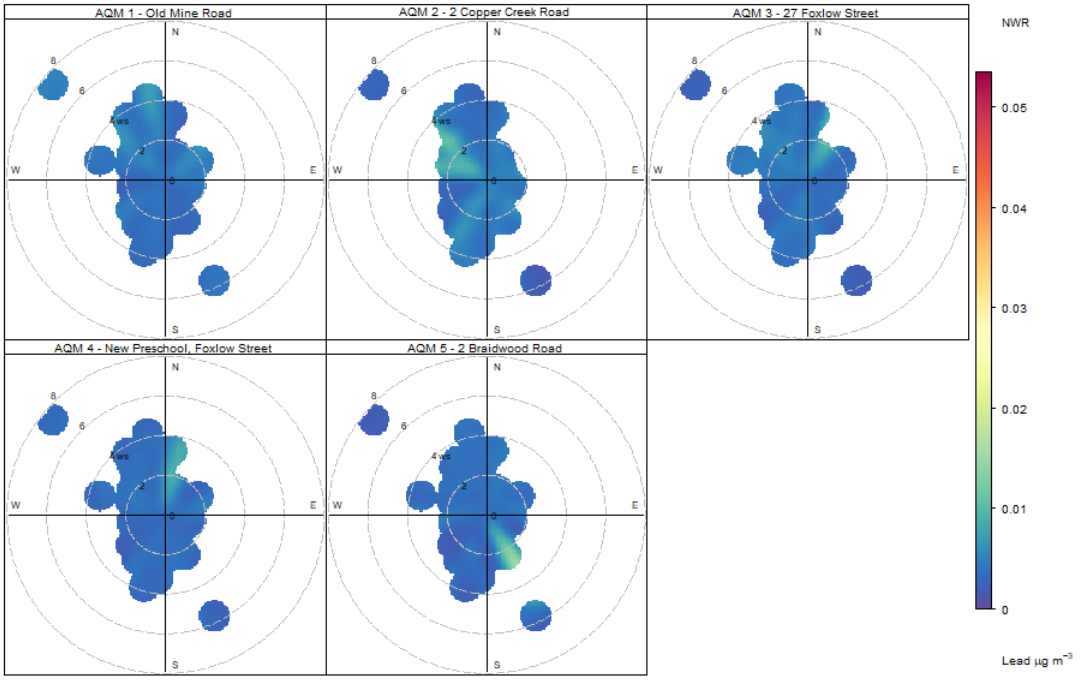

Figure 4-25: Polar plots showing 24-hour lead concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

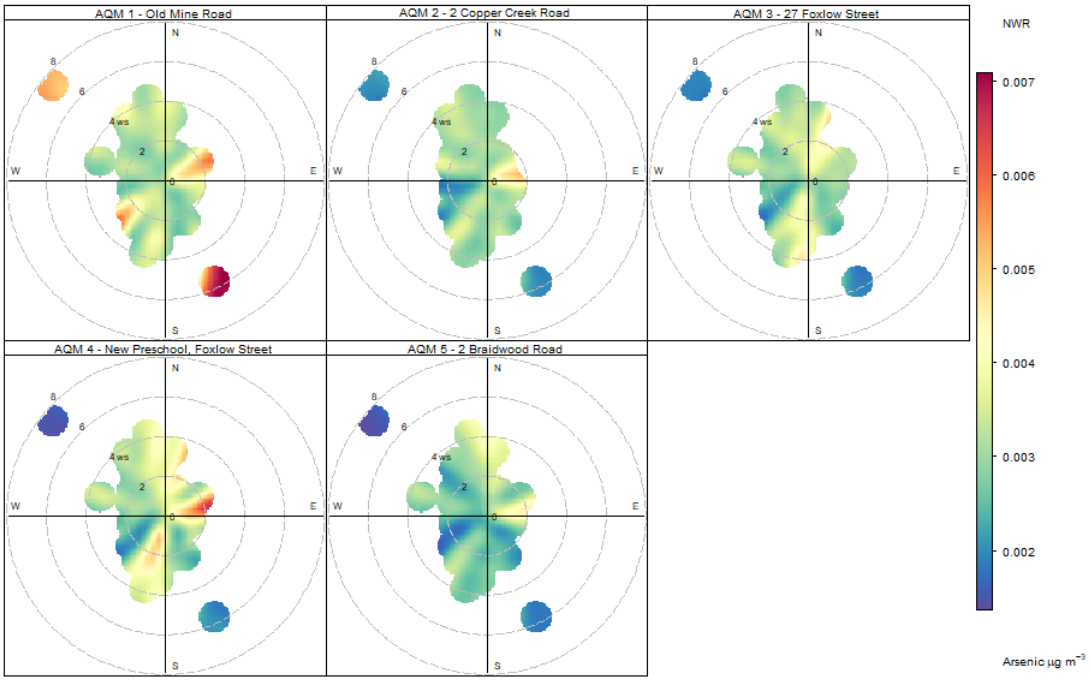

Figure 4-26: Polar plots showing 24-hour arsenic concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

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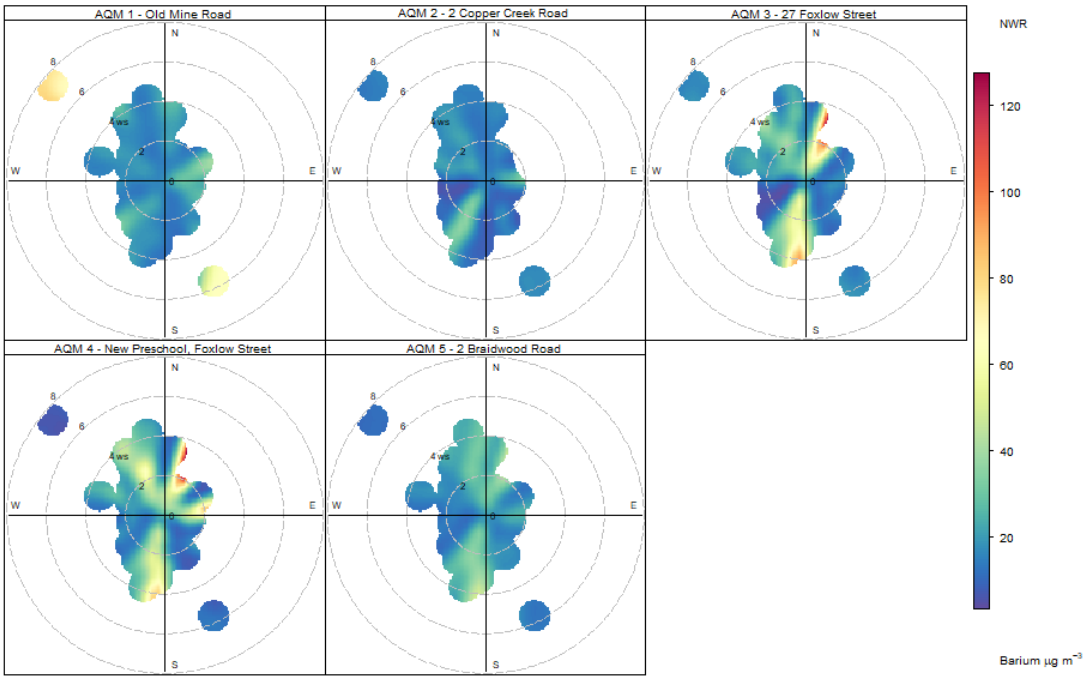

Figure 4-27: Polar plots showing 24-hour barium concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

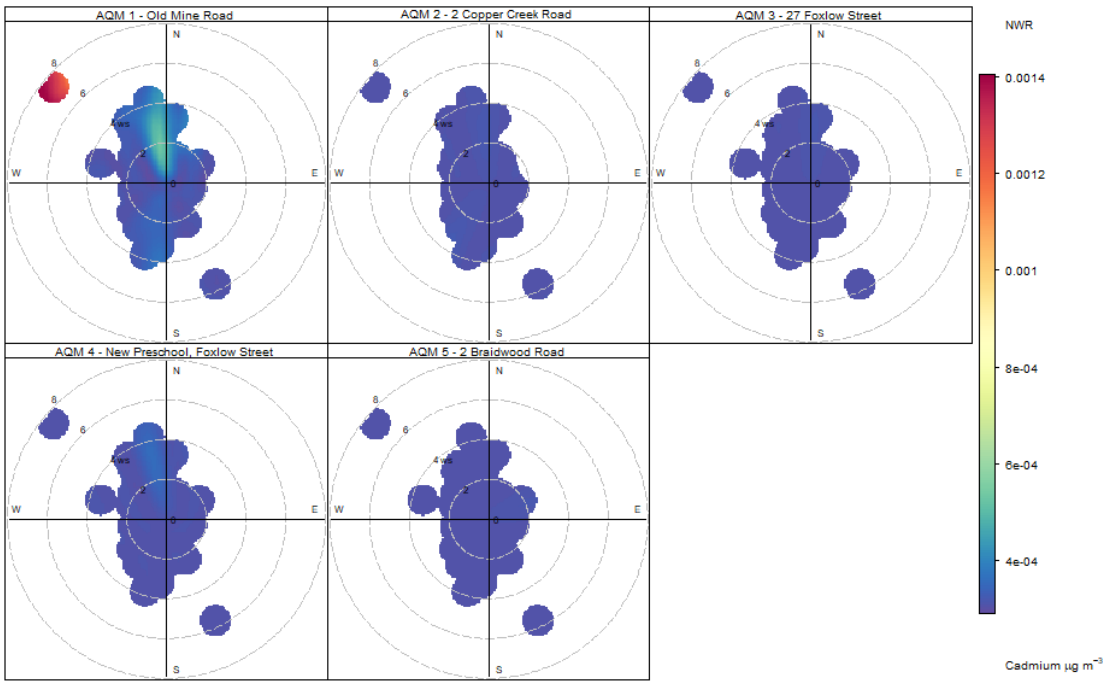

Figure 4-28: Polar plots showing 24-hour cadmium concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

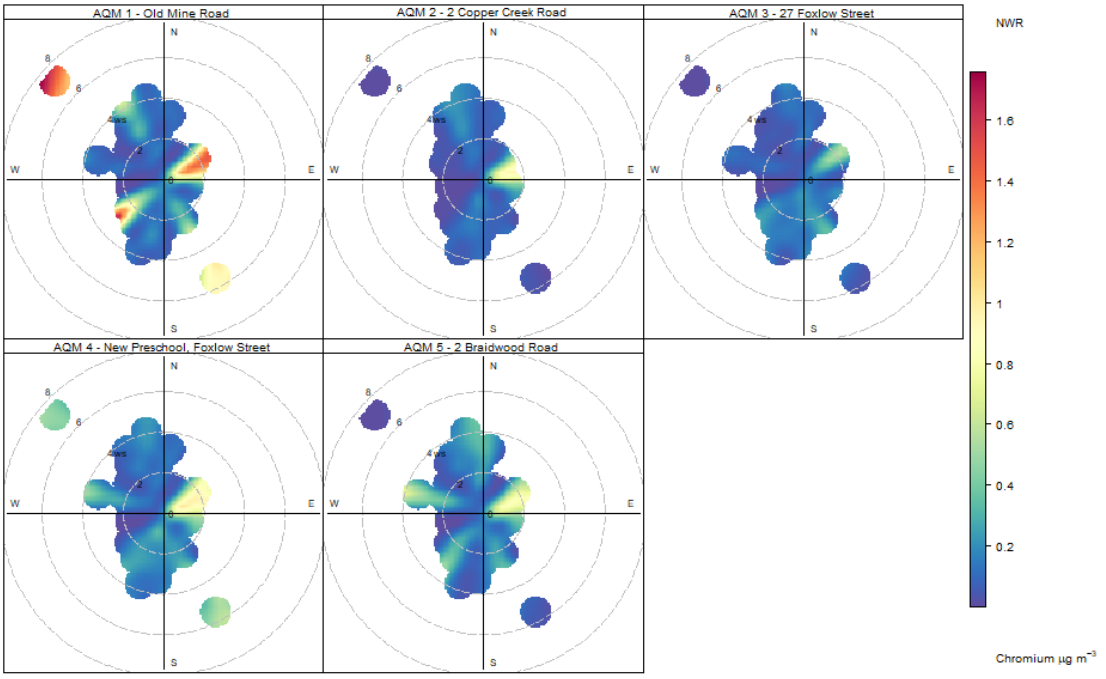

Figure 4-29: Polar plots showing 24-hour chromium concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

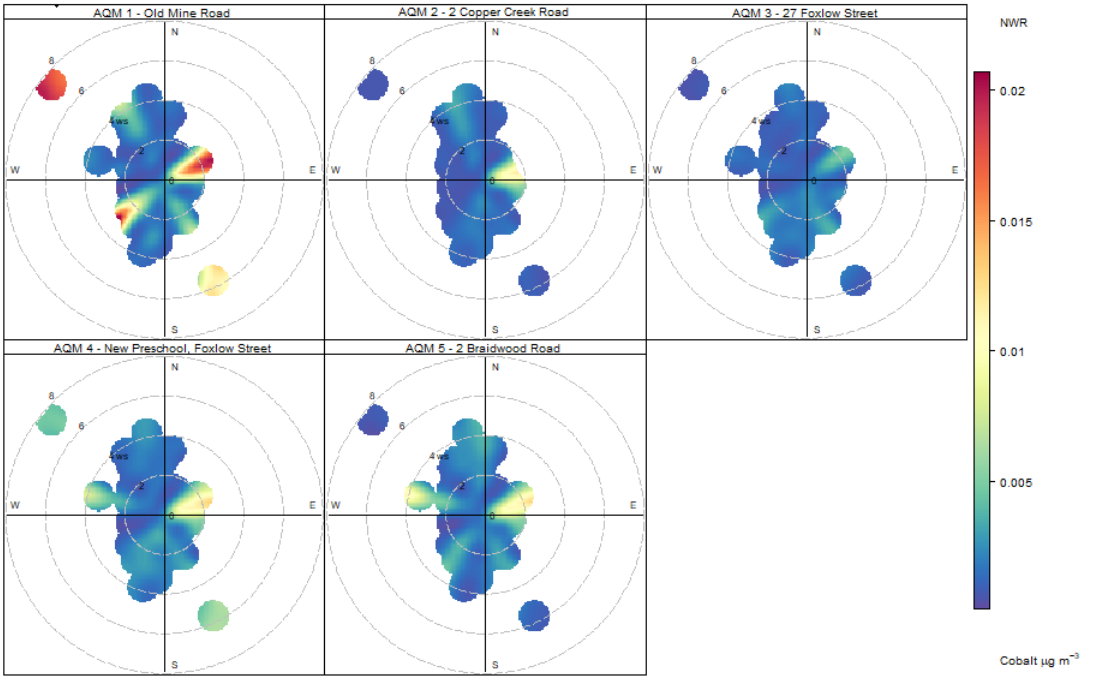

Figure 4-30: Polar plots showing 24-hour cobalt concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

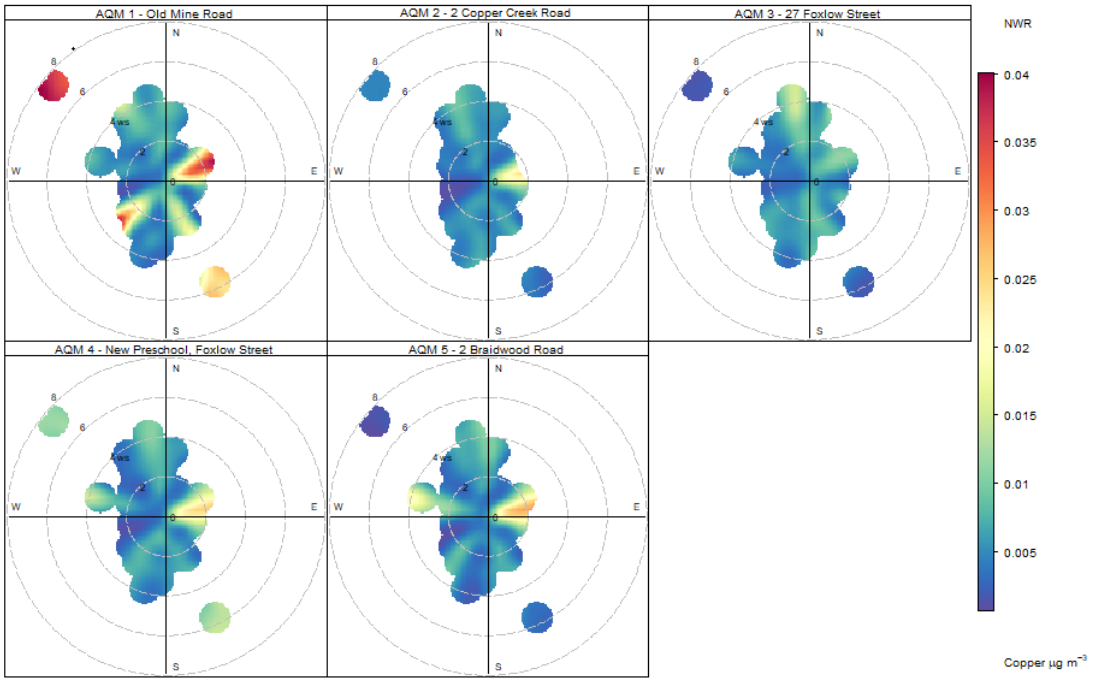

Figure 4-31: Polar plots showing 24-hour copper concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

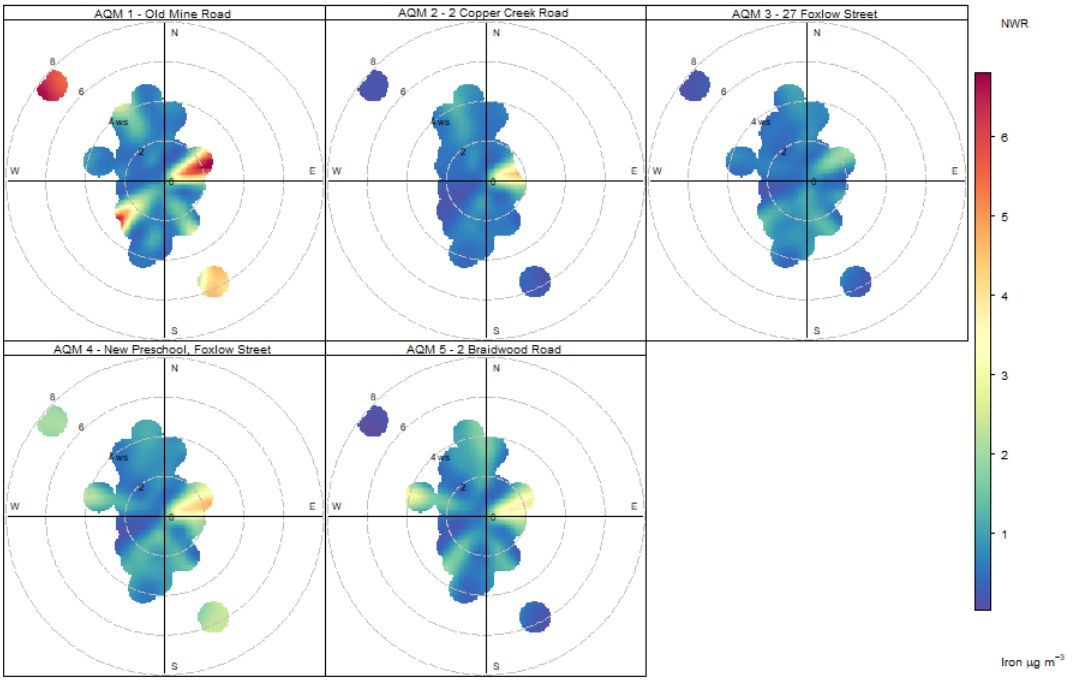

Figure 4-32: Polar plots showing 24-hour iron concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

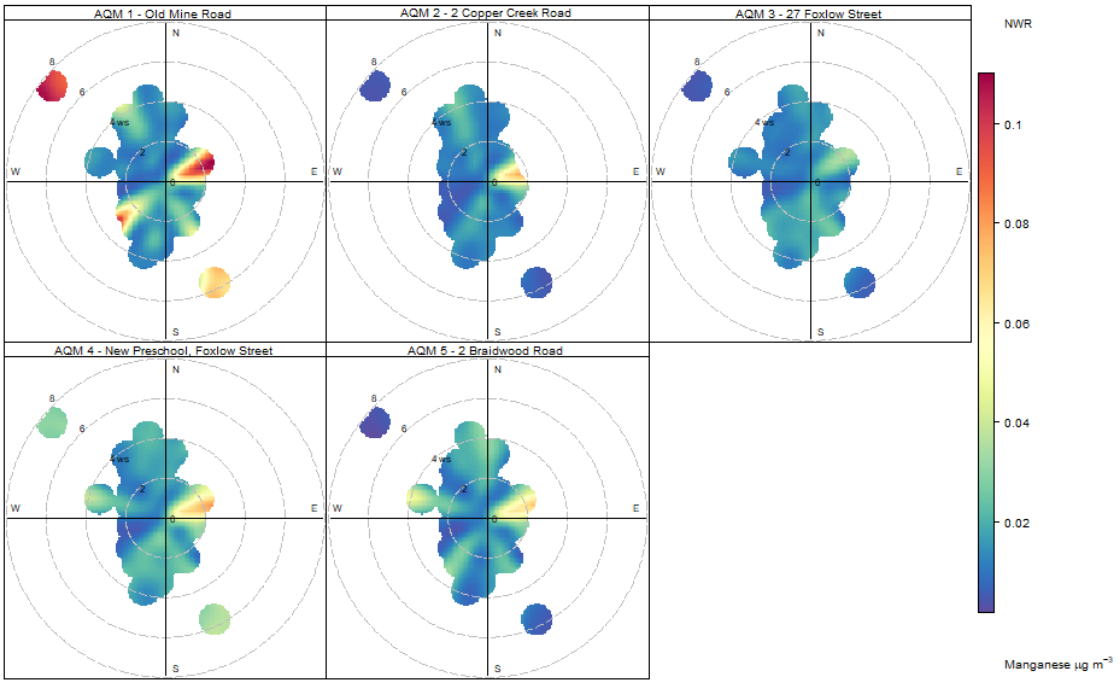

Figure 4-33: Polar plots showing 24-hour manganese concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

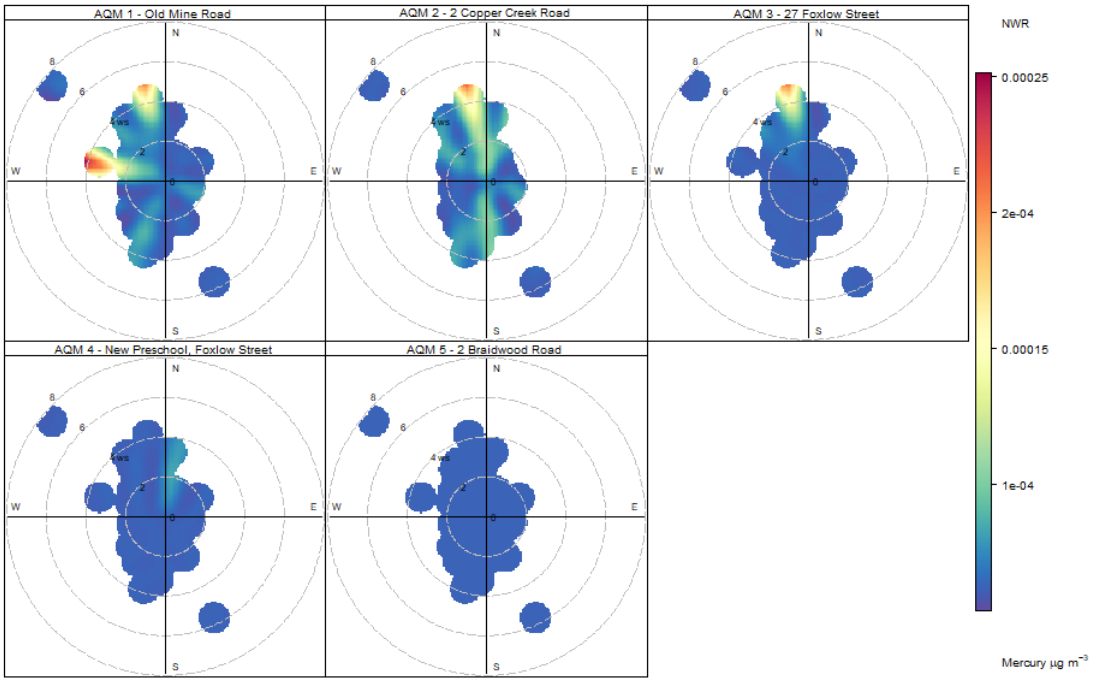

Figure 4-34: Polar plots showing 24-hour mercury concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

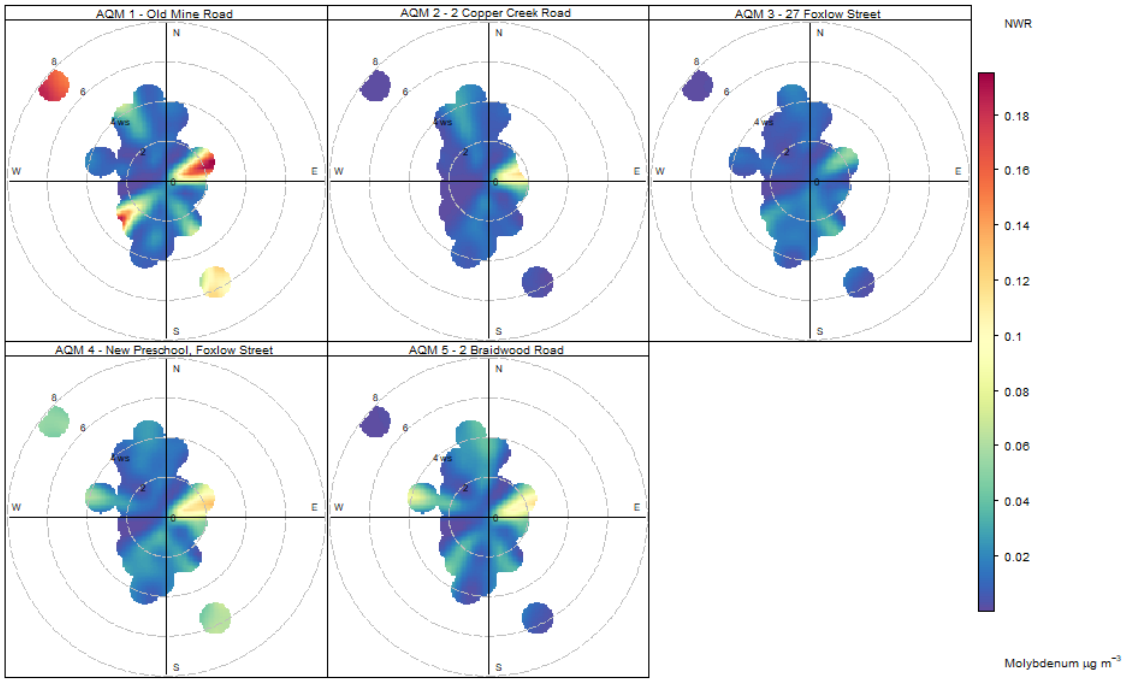

Figure 4-35: Polar plots showing 24-hour molybdenum concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

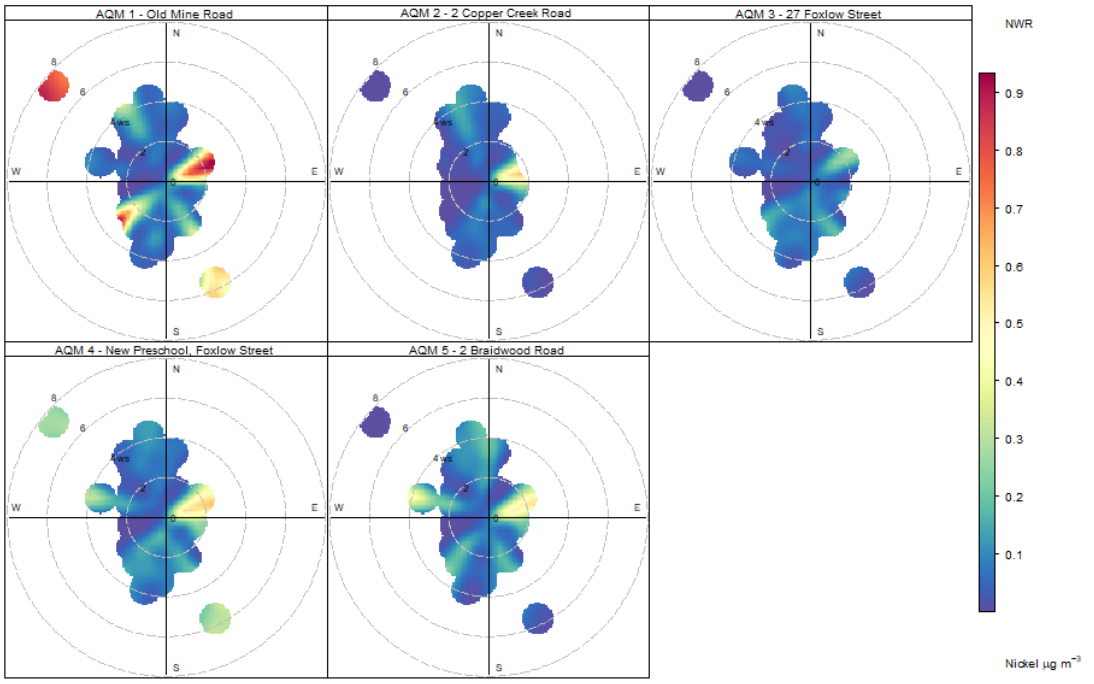

Figure 4-36: Polar plots showing 24-hour nickel concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

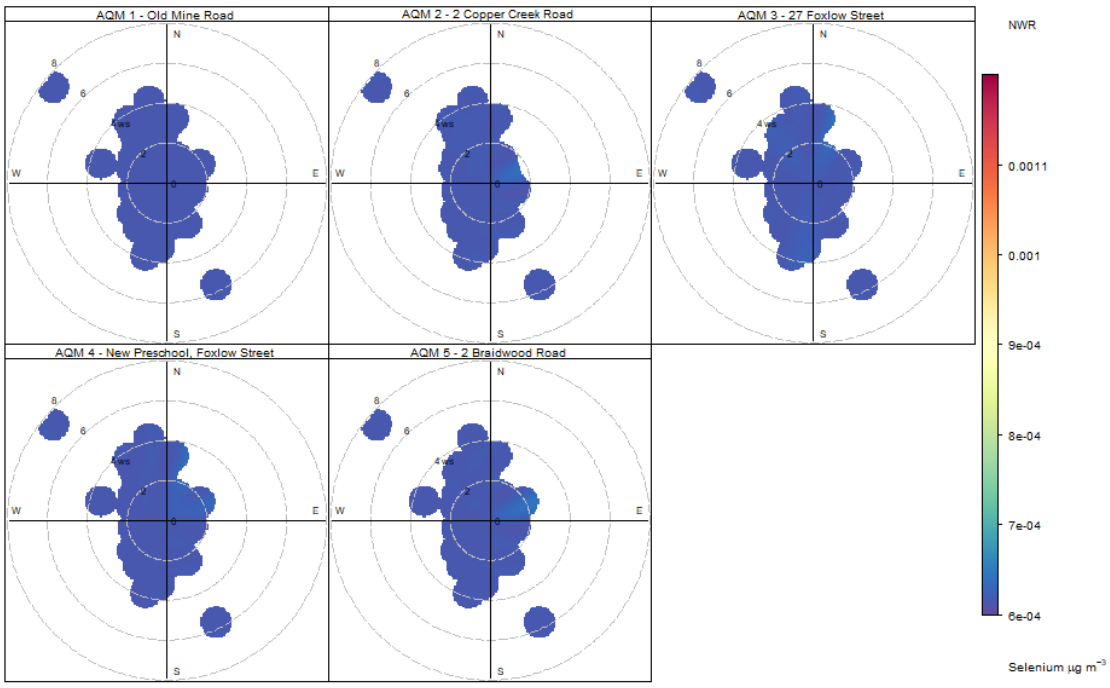

Figure 4-37: Polar plots showing 24-hour selenium concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

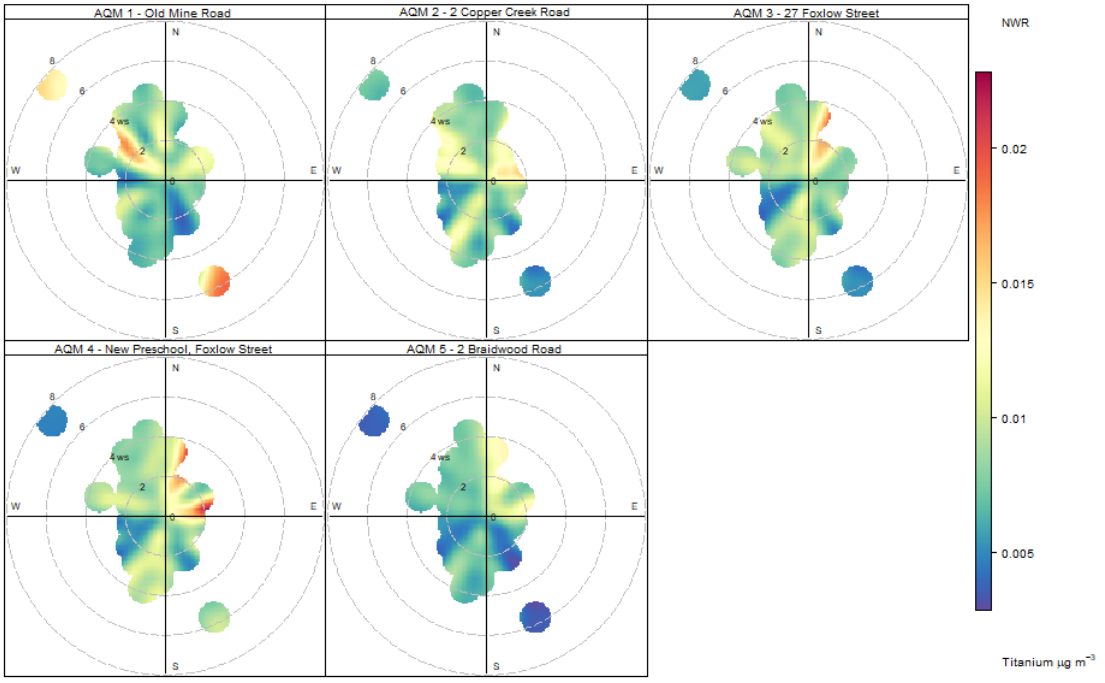

Figure 4-38: Polar plots showing 24-hour titanium concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

Confidential

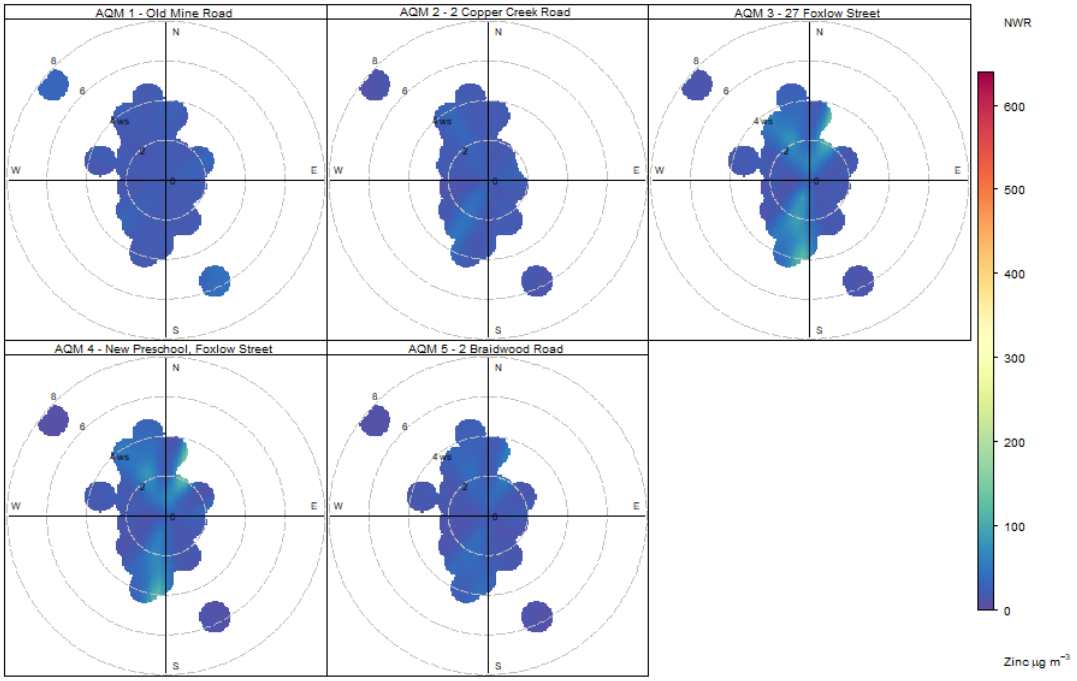

Figure 4-39: Polar plots showing 24-hour zinc concentration and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 to 31 March 2024 (prepared with openair; Carslaw & Ropkins, 2012)

Confidential

4.5 Correlations for potential source identification

Correlation matrices are presented for each sampling location from **Figure 4-40** to **Figure 4-4** to compare the relationship between each heavy metal and TSP. Note that the data is clustered by relationship, so each plot is ordered differently depending on the determined correlation, and there are limits on presentation when pollutants are below LOR. **Figure 4-5** presents a comparison between the five locations, where the number of pollutants was reduced to 14 (pollutants with concentrations below LOR in at least one location were disregarded: mercury and selenium) and the cluster of pollutants was forced in the same order for ease of comparison.

The data shows strong correlations when comparing some pollutants, particularly between copper, manganese, cobalt, molybdenum, nickel, chromium, and iron.

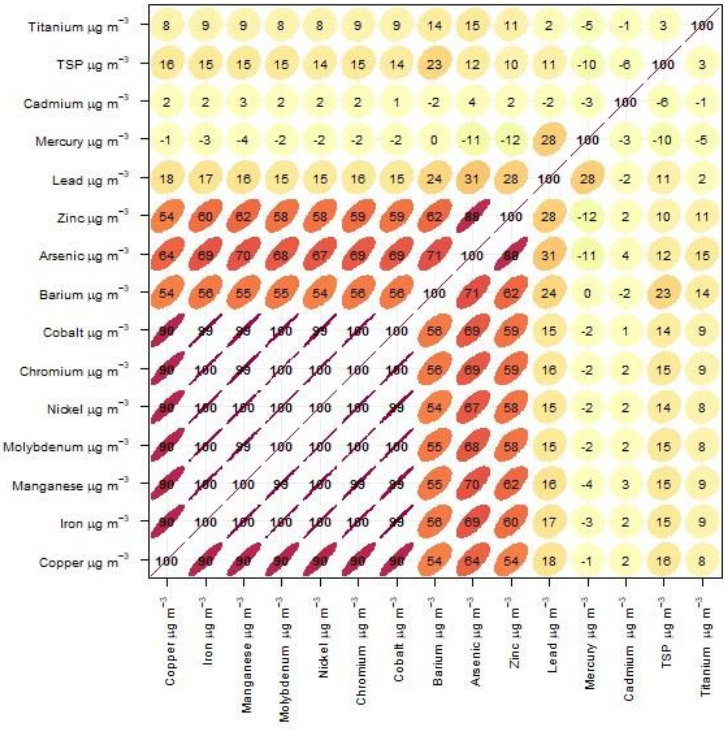

Figure 4-40: Heavy metal and TSP correlations in all samples collected since 22 June 2021 at AQM1 – Old Mine Road

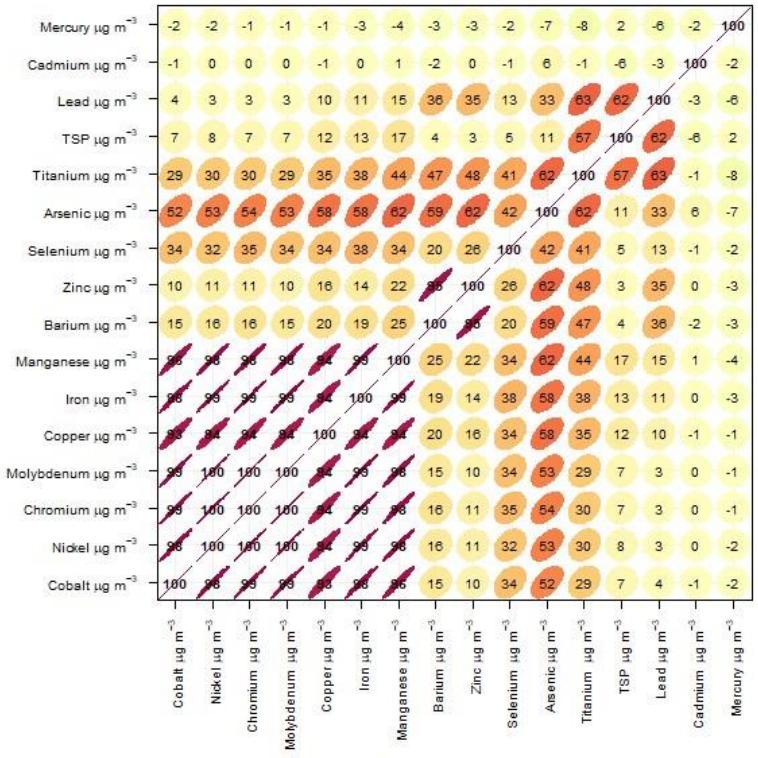

Figure 4-41: Heavy metal and TSP correlations in all samples collected since 22 June 2021 at AQM2 – 2 Copper Creek Rd

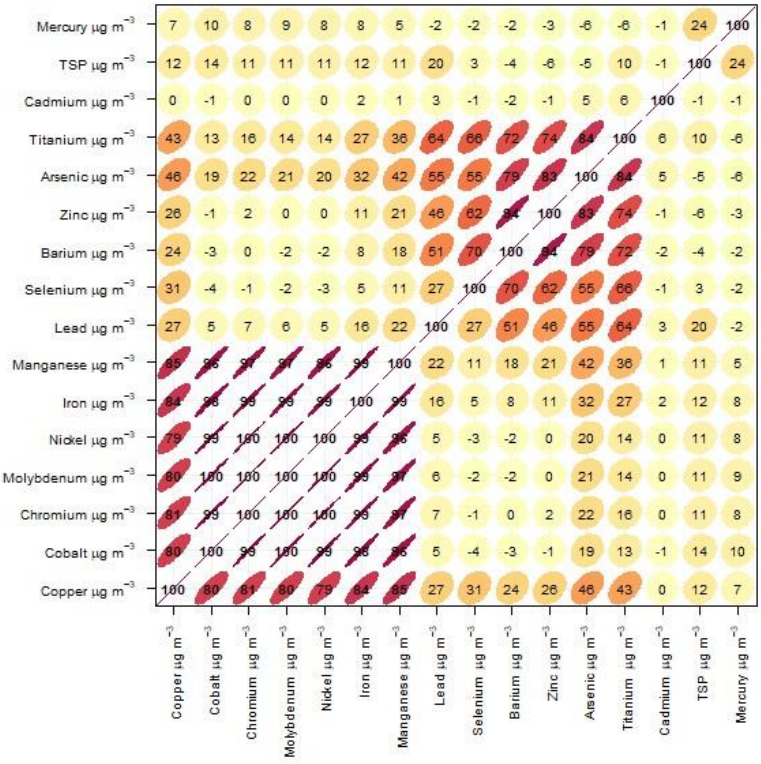

Figure 4-42: Heavy metal and TSP correlations in all samples collected since 22 June 2021 at AQM3 – Former Pre-School

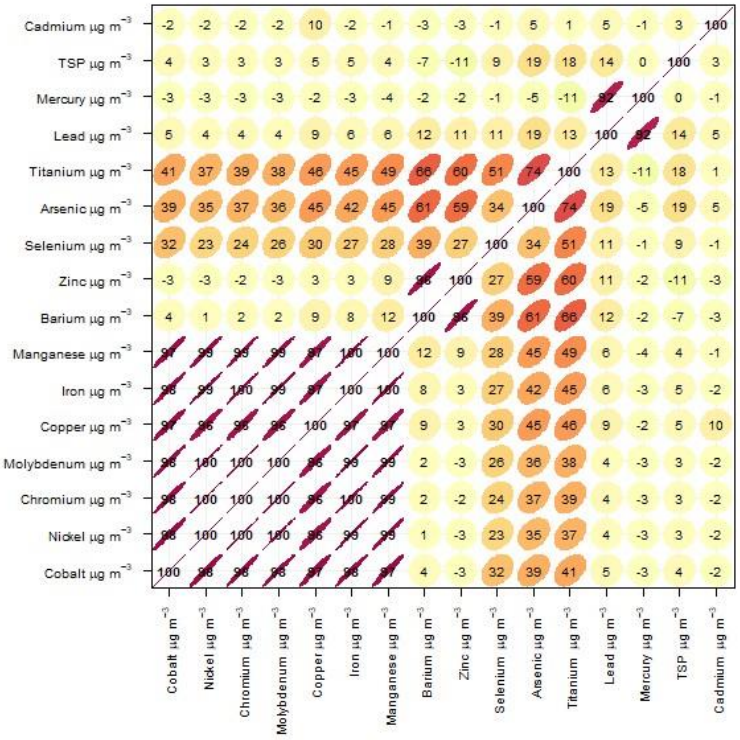

Figure 4-43: Heavy metal and TSP correlations in all samples collected since 22 June 2021 at AQM4 – New Preschool

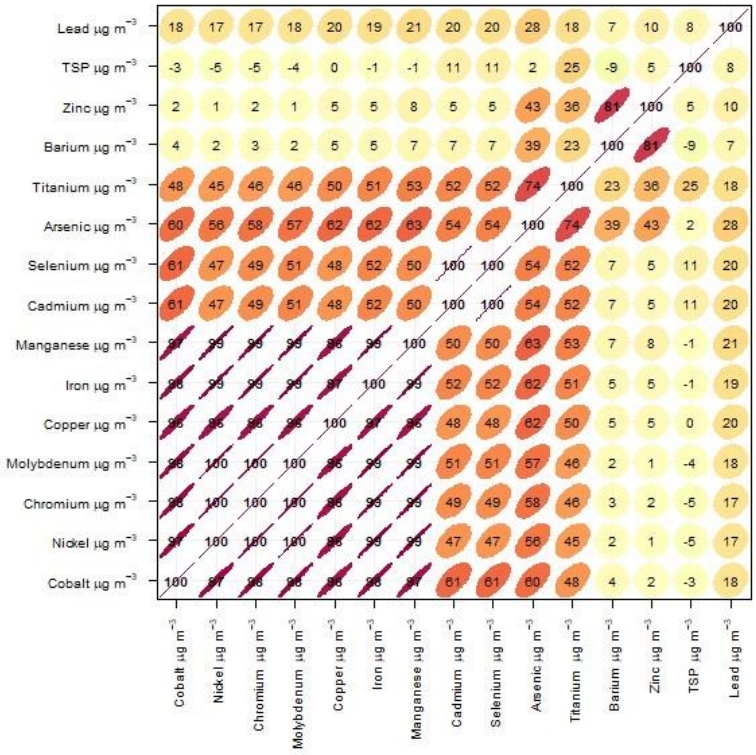

Figure 4-44: Heavy metal and TSP correlations in all samples collected since 22 June 2021 at AQM5 – 2 Braidwood Road

Confidential

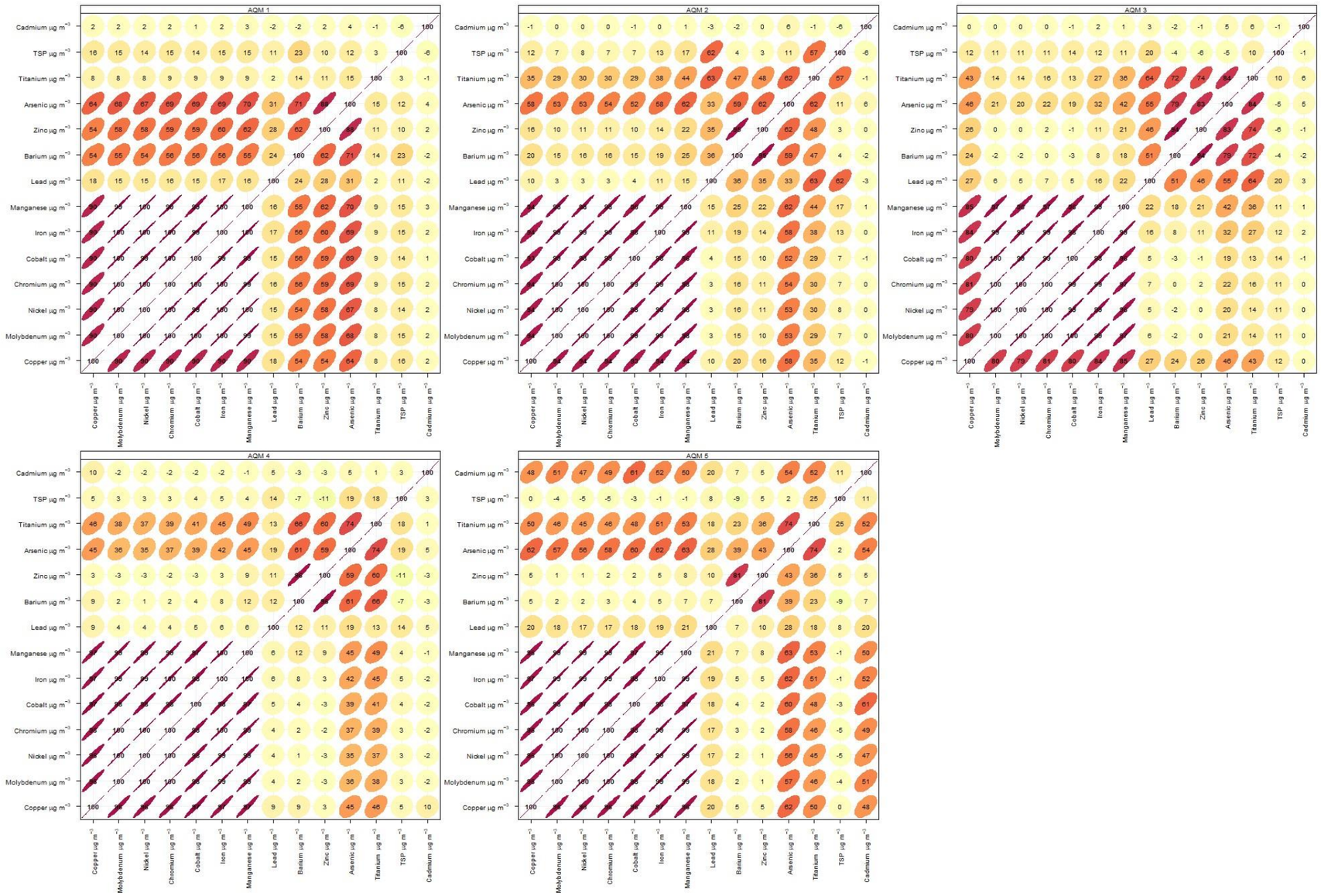

Figure 4-45: Heavy metal and TSP correlations in all samples collected since 22 June 2021 at all locations

Confidential

5. DISCUSSION

An air quality monitoring program was commissioned in Captains Flat, NSW to inform air quality risks associated with heavy metals in airborne particulate matter from the legacy Lake George Mine. Sampling at five locations commenced on 22 June 2021 and is on-going. This report summarises all data from 22 June 2021 to 31 March 2024. Sampling is configured to measure a 24-hour average sample every one day in six at five sensitive receptors around the town.

Throughout the study period a total of five exceedances of the annual TSP criteria occurred. Two exceedances were able to be further investigated. It was concluded that the 17 February 2022 exceedance at AQM2 was likely a result of dry conditions and strong winds from the north. The 08 March 2024 exceedance at AQM4 was also likely a result of dry conditions and strong winds from the north. Due to AQM4's location in comparison to the four locations of former mining activity, it is unlikely that the source of the 08 March 2024 exceedance was from Captains Flat.

AQM3 and AQM4 reported similar results for some pollutants (i.e., As, Ba, Cr, Co, Cu, Fe, Mn, Ni, Mo, Se, Ti, Zn), suggesting they are affected by the same pollution source. A very strong correlation exists between Cr, Co, Cu, Fe, Mn, Mo, and Ni, suggesting that these pollutants could be originating from the same source(s).

Analysis of some polar plots (i.e., TSP, Zn, As, Ti and Ba) suggests that a higher frequency of elevated concentrations from winds occurring in a north-south direction, affecting locations AQM3 and AQM4 in particular. This is likely a function of the distinctive valley terrain which is oriented in north-south direction. It is also noted that AQM1 recorded elevated concentration levels of various pollutants coming from the west, where there are no sites of former mining activities.

Exceedances of the NSW EPA 1-hour criteria of barium and nickel occurred on multiple days throughout the study period. Recommendations are outlined in section 6 – Recommendations.

6. RECOMMENDATIONS

Ramboll recommends Regional NSW contact the NSW EPA to explore whether there is a regional issue, other than historic mining, which may be contributing to the observed concentrations of barium and nickel and to assess appropriateness of further risk assessment.

7. LIMITATIONS

This document is issued in confidence to Regional NSW for the purposes of assessing air quality risks to inform the lead management plan for Captains Flat, NSW *including the mine site rehabilitation and public space lead abatement works that are refenced in the Lead Management Plan*. It should not be used for any other purpose.

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APPENDIX 1
SPATIAL BIVARIATE PLOTS

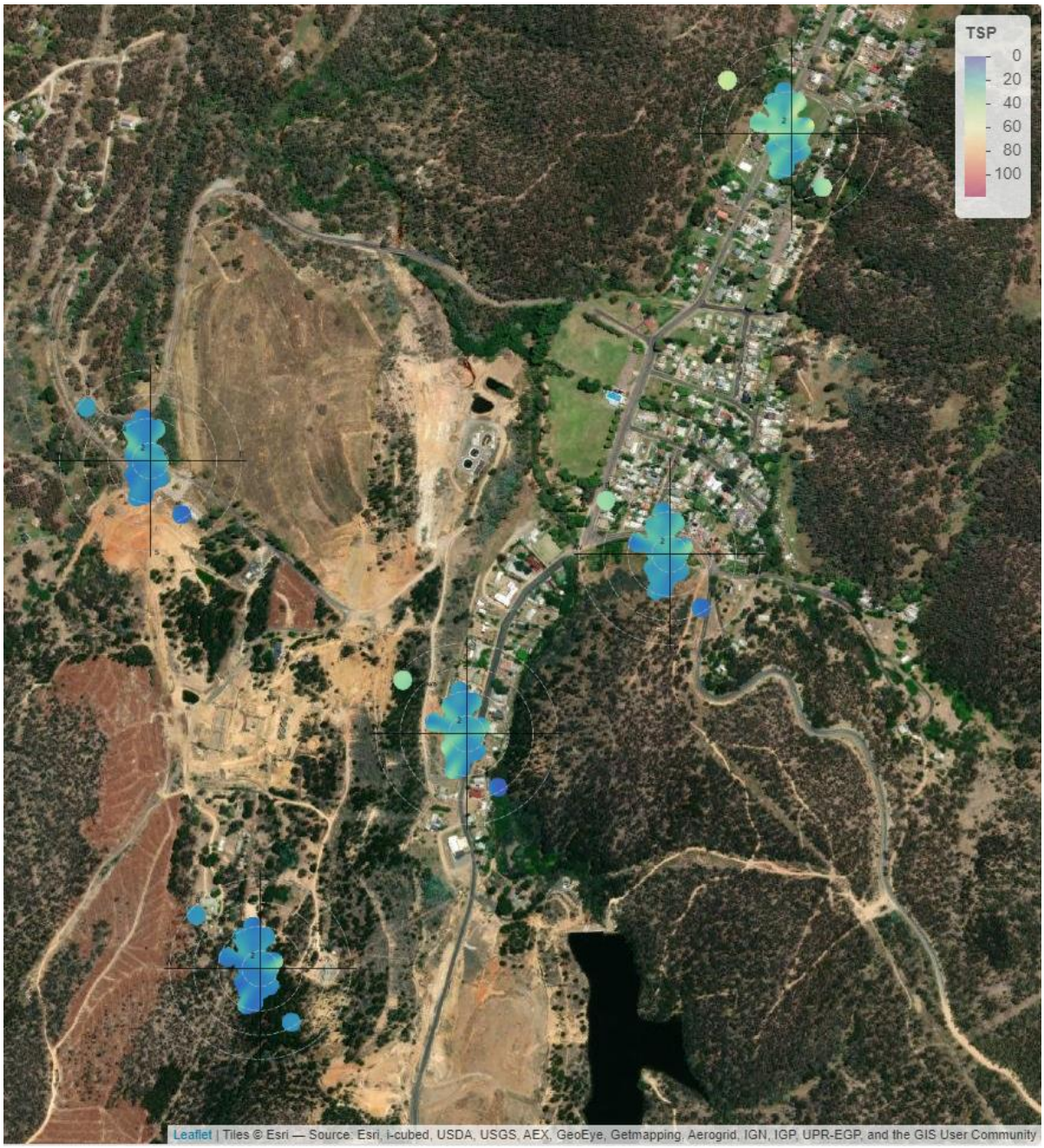

Figure 8-1: Polar map plots showing 24-hour TSP concentration (µg/m^3) and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 (prepared with openair; Carslaw & Ropkins, 2012)

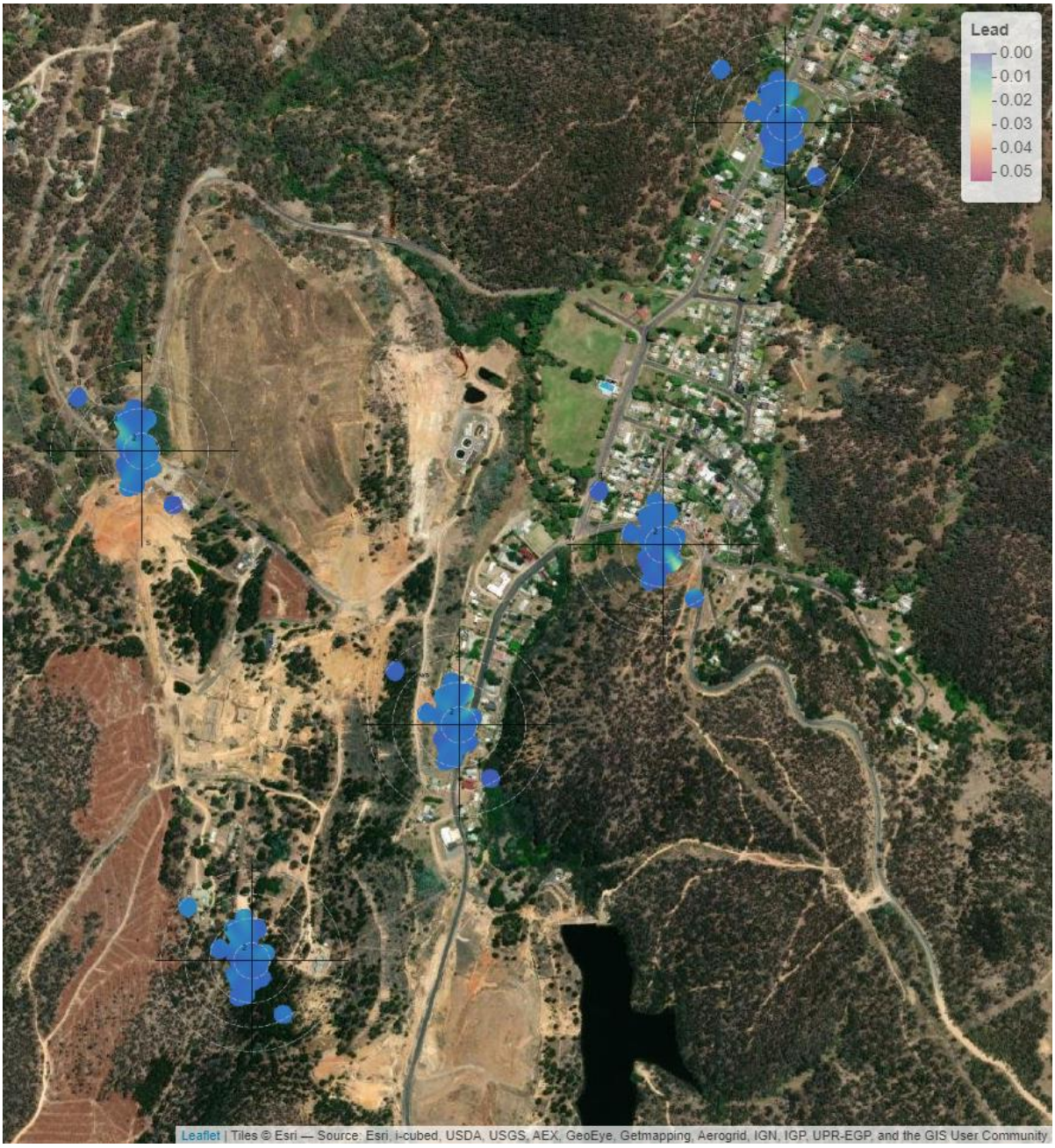

Figure 8-2: Polar map plots showing 24-hour lead concentration (µg/m^3) and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 (prepared with openair; Carslaw & Ropkins, 2012)

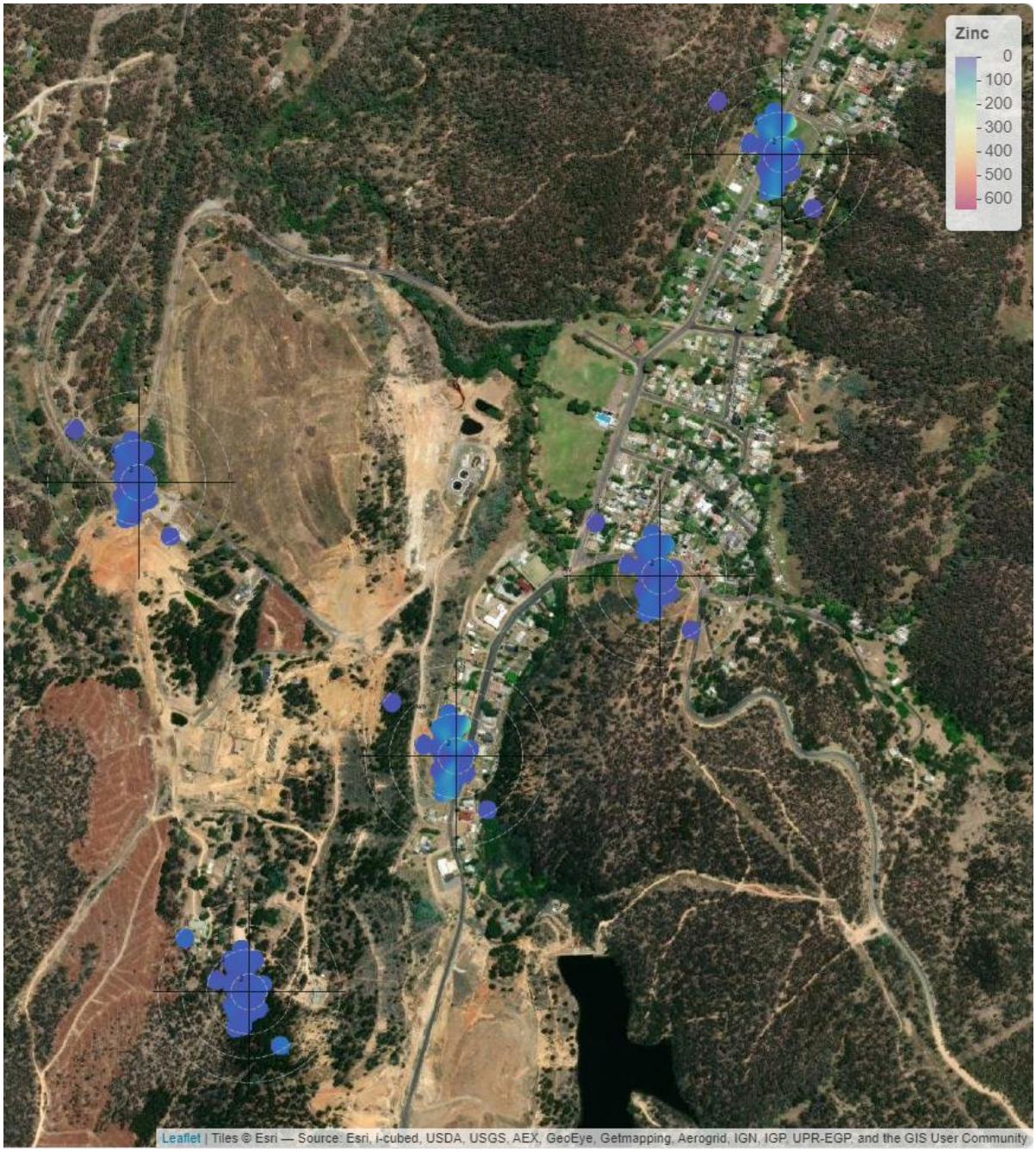

Figure 8-3: Polar map plots showing 24-hour zinc concentration (µg/m³) and 24-hour average wind speed and direction at each monitoring location, from 22 June 2021 (prepared with openair; Carslaw & Ropkins, 2012)

APPENDIX 2
HISTORICAL LEAD CONCENTRATIONS AROUND AUSTRALIA (NEPC, 2001)

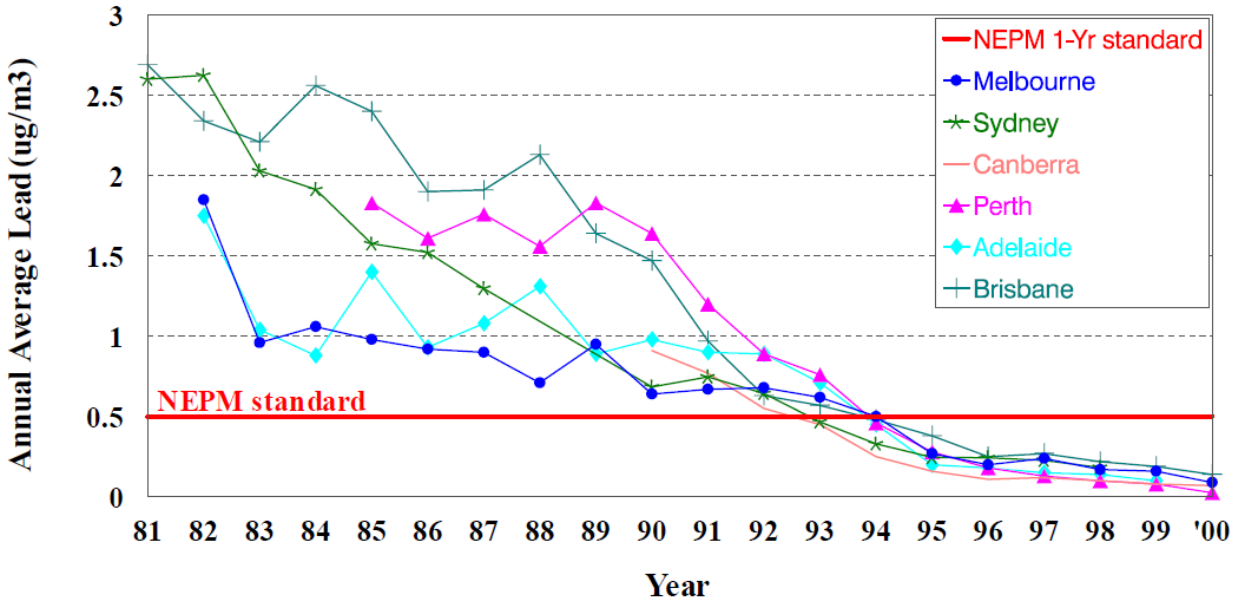

Figure A: Annual lead concentrations in Australian Capital Cities, 1981-2000 (NEPC, 2001)

APPENDIX 3
IMAGES OF AIR QUALITY MONITORING INSTRUMENTS IN-SITU

AQM1 – Old Mine Road

AQM2 – 2 Cooper Creek Road

MET – 2 Copper Creek Road (project station foreground, RFS station background)

AQM3 – Former Pre-School

AQM4 – New Preschool

AQM5 – 2 Braidwood Road

Figure B: High-volume air samplers and meteorological station in-situ in Captains Flat, NSW

APPENDIX 4
LABORATORY REPORTS

Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1043666-A**
Project name CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001553
Received Date Nov 13, 2023

Client Sample ID			**AQM 1 - HVS3158**	**AQM 1 - HVS3115**	**AQM 1 - HVS3122**	**AQM 1 - HVS3090**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030251**	**M23-No0030252**	**M23-No0030253**	**M23-No0030254**
Date Sampled			**Nov 03, 2023**	**Oct 28, 2023**	**Oct 22, 2023**	**Oct 16, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.5	3.5	3.6	3.0
Barium	1.0	Total ug	44000	32000	29000	30000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	21	13	13	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	20	2.4	3.3	4.5
Iron	10	Total ug	630	460	520	310
Lead	1	Total ug	18	7.1	9.8	5.4
Manganese	1.0	Total ug	17	11	15	9.2
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.8	1.2	1.3	1.8
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	23	12	14	9.7
Zinc	1	Total ug	36000	24000	24000	22000
Particulates - Final weighing	0.01	mg	2794.7	2731.4	2747.7	2724.4
Particulates - Initial weighing	0.01	mg	2770.8	2712.2	2719	2711.8

Client Sample ID			**AQM 1 - HVS3038**	**AQM 1 - HVS3078**	**AQM 2 - HVS3157**	**AQM 2 - HVS3123**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030255**	**M23-No0030256**	**M23-No0030257**	**M23-No0030258**
Date Sampled			**Oct 10, 2023**	**Oct 04, 2023**	**Nov 03, 2023**	**Oct 28, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.5	2.8	4.0	2.8
Barium	1.0	Total ug	28000	24000	37000	27000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	13	10	16	9.8
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	7.3	5.2	1.6	4.3
Iron	10	Total ug	610	850	460	520

Client Sample ID			AQM 1 - HVS3038	AQM 1 - HVS3078	AQM 2 - HVS3157	AQM 2 - HVS3123
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030255**	**M23-No0030256**	**M23-No0030257**	**M23-No0030258**
Date Sampled			**Oct 10, 2023**	**Oct 04, 2023**	**Nov 03, 2023**	**Oct 28, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	8.3	6.8	7.2	24
Manganese	1.0	Total ug	12	21	13	12
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	2.3	3.8	1.7	1.3
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	16	18	19	16
Zinc	1	Total ug	21000	18000	27000	19000
Particulates - Final weighing	0.01	mg	2795.7	2825.5	2788.3	2765.1
Particulates - Initial weighing	0.01	mg	2767.6	2730.4	2769.4	2737.3

Client Sample ID			AQM 2 - HVS3121	AQM 2 - HVS3091	AQM 2 - HVS3039	AQM 2 - HVS3068
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030259**	**M23-No0030260**	**M23-No0030261**	**M23-No0030262**
Date Sampled			**Oct 22, 2023**	**Oct 16, 2023**	**Oct 10, 2023**	**Oct 04, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.4	3.5	4.0	3.8
Barium	1.0	Total ug	31000	32000	26000	34000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	12	13	13	14
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.0	2.2	5.6	1.8
Iron	10	Total ug	560	470	1200	550
Lead	1	Total ug	7.0	6.9	7.8	6.3
Manganese	1.0	Total ug	13	10	32	15
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.4	1.2	2.5	1.2
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	17	17	57	16
Zinc	1	Total ug	22000	24000	18000	25000
Particulates - Final weighing	0.01	mg	2746	2740.6	2853.9	2737.2
Particulates - Initial weighing	0.01	mg	2720.8	2723.9	2771.2	2714.9

Client Sample ID			AQM 3 - HVS3161	AQM 3 - HVS3124	AQM 3 - HVS3116	AQM 3 - HVS3092
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030263**	**M23-No0030264**	**M23-No0030265**	**M23-No0030266**
Date Sampled			**Nov 03, 2023**	**Oct 28, 2023**	**Oct 22, 2023**	**Oct 16, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.3	3.8	3.8	2.5
Barium	1.0	Total ug	41000	30000	32000	20000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	17	14	14	8.9
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.7	1.9	2.0	1.4
Iron	10	Total ug	500	430	580	280
Lead	1	Total ug	6.4	6.6	9.6	5.4
Manganese	1.0	Total ug	13	11	14	7.2
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.2	1.2	1.3	1.2
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	20	14	17	8.9
Zinc	1	Total ug	30000	25000	23000	16000
Particulates - Final weighing	0.01	mg	2795.2	2749.8	2745.4	2739.7
Particulates - Initial weighing	0.01	mg	2774.1	2731.6	2715.5	2719.7

Client Sample ID			AQM 3 - HVS3040	AQM 3 - HVS3085	AQM 4 - HVS3160	AQM 4 - HVS3125
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030267**	**M23-No0030268**	**M23-No0030269**	**M23-No0030270**
Date Sampled			**Oct 10, 2023**	**Oct 04, 2023**	**Nov 03, 2023**	**Oct 28, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.4	2.7	2.8	3.6
Barium	1.0	Total ug	29000	22000	28000	28000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	12	10	12	15
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.7	1.5	1.4	3.3
Iron	10	Total ug	440	510	440	370
Lead	1	Total ug	5.4	5.5	4.3	4.2
Manganese	1.0	Total ug	11	15	12	9.7
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	3.6	< 1	4.1
Nickel	1.0	Total ug	1.2	1.1	1.3	20
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	17	14	19	12
Zinc	1	Total ug	23000	20000	20000	20000
Particulates - Final weighing	0.01	mg	2802.6	2744.8	2803.8	2753.7
Particulates - Initial weighing	0.01	mg	2764.4	2715	2778.5	2731.6

Client Sample ID			AQM 4 - HVS3117	AQM 4 - HVS2096	AQM 4 - HVS3041	AQM 4 - HVS3061
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030271**	**M23-No0030272**	**M23-No0030273**	**M23-No0030274**
Date Sampled			**Oct 22, 2023**	**Oct 16, 2023**	**Oct 10, 2023**	**Oct 04, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.2	4.1	3.2	3.6
Barium	1.0	Total ug	33000	30000	29000	30000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	12	12	12	13
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.9	1.8	2.0	2.2
Iron	10	Total ug	590	360	420	540
Lead	1	Total ug	5.1	4.8	4.5	4.9
Manganese	1.0	Total ug	15	9.6	10	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.6	1.3	1.5	2.8
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	15	13	16	18
Zinc	1	Total ug	24000	22000	22000	23000
Particulates - Final weighing	0.01	mg	2754.6	2704.5	2809.8	2795.8
Particulates - Initial weighing	0.01	mg	2725.1	2678.9	2781.1	2769.5

Client Sample ID			AQM 5 - HVS3159	AQM 5 - HVS3126	AQM 5 - HVS3118	AQM 5 - HVS2099
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030275**	**M23-No0030276**	**M23-No0030277**	**M23-No0030278**
Date Sampled			**Nov 03, 2023**	**Oct 28, 2023**	**Oct 22, 2023**	**Oct 16, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.1	2.9	2.7	3.2
Barium	1.0	Total ug	33000	27000	24000	32000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	16	11	10	12
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.7	1.5	1.9	2.2
Iron	10	Total ug	520	350	470	350
Lead	1	Total ug	6.7	4.7	4.5	5.1
Manganese	1.0	Total ug	15	9.3	13	9.8
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	2.0	1.3	1.4	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	21	11	15	13
Zinc	1	Total ug	29000	20000	18000	24000
Particulates - Final weighing	0.01	mg	2781.3	2756.2	2759.3	2709.3
Particulates - Initial weighing	0.01	mg	2757.3	2734.3	2726.7	2690.1

Client Sample ID			AQM 5 - HVS3054	AQM 5 - HVS3069
Sample Matrix			**Filter paper**	**Filter paper**
Eurofins Sample No.			**M23-No0030279**	**M23-No0030280**
Date Sampled			**Oct 10, 2023**	**Oct 04, 2023**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	1.0	Total ug	3.0	3.5
Barium	1.0	Total ug	25000	33000
Cadmium	0.5	Total ug	< 0.5	< 0.5
Chromium	1.0	Total ug	12	13
Cobalt	1.0	Total ug	< 1	< 1
Copper	1.0	Total ug	1.9	4.0
Iron	10	Total ug	390	630
Lead	1	Total ug	4.6	6.0
Manganese	1.0	Total ug	10.0	19
Mercury	0.1	Total ug	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1
Nickel	1.0	Total ug	1.4	1.6
Selenium	1.0	Total ug	< 1	< 1
Titanium	1.0	Total ug	16	17
Zinc	1	Total ug	19000	24000
Particulates - Final weighing	0.01	mg	2799.4	2742.4
Particulates - Initial weighing	0.01	mg	2771.8	2713.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Melbourne	Nov 13, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Nov 13, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Nov 14, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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IANZ# 1327	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
Report #: 1043666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Nov 13, 2023 12:29 PM
Due: Nov 20, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	CANCELLED	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																		
1	AQM 1 - HVS3158	Nov 03, 2023		Filter paper	M23-No0030251	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS3115	Oct 28, 2023		Filter paper	M23-No0030252	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS3122	Oct 22, 2023		Filter paper	M23-No0030253	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	AQM 1 - HVS3090	Oct 16, 2023		Filter paper	M23-No0030254	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	AQM 1 - HVS3038	Oct 10, 2023		Filter paper	M23-No0030255	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	AQM 1 - HVS3078	Oct 04, 2023		Filter paper	M23-No0030256	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	AQM 2 - HVS3157	Nov 03, 2023		Filter paper	M23-No0030257	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	AQM 2 - HVS3123	Oct 28, 2023		Filter paper	M23-No0030258	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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IANZ# 1327	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001553
Report #: 1043666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Nov 13, 2023 12:29 PM
Due: Nov 20, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	CANCELLED	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	AQM 2 - HVS3121	Oct 22, 2023		Filter paper	M23-No0030259	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	AQM 2 - HVS3091	Oct 16, 2023		Filter paper	M23-No0030260	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	AQM 2 - HVS3039	Oct 10, 2023		Filter paper	M23-No0030261	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	AQM 2 - HVS3068	Oct 04, 2023		Filter paper	M23-No0030262	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	AQM 3 - HVS3161	Nov 03, 2023		Filter paper	M23-No0030263	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	AQM 3 - HVS3124	Oct 28, 2023		Filter paper	M23-No0030264	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	AQM 3 - HVS3116	Oct 22, 2023		Filter paper	M23-No0030265	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	AQM 3 - HVS3092	Oct 16, 2023		Filter paper	M23-No0030266	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	AQM 3 - HVS3040	Oct 10, 2023		Filter paper	M23-No0030267	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 3 -	Oct 04, 2023		Filter paper	M23-No0030268	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001553
Report #: 1043666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Nov 13, 2023 12:29 PM
Due: Nov 20, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	CANCELLED	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 3 - HVS3085	Oct 04, 2023		Filter paper	M23-No0030268																		
19	AQM 4 - HVS3160	Nov 03, 2023		Filter paper	M23-No0030269	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	AQM 4 - HVS3125	Oct 28, 2023		Filter paper	M23-No0030270	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	AQM 4 - HVS3117	Oct 22, 2023		Filter paper	M23-No0030271	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	AQM 4 - HVS2096	Oct 16, 2023		Filter paper	M23-No0030272	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	AQM 4 - HVS3041	Oct 10, 2023		Filter paper	M23-No0030273	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	AQM 4 - HVS3061	Oct 04, 2023		Filter paper	M23-No0030274	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	AQM 5 - HVS3159	Nov 03, 2023		Filter paper	M23-No0030275	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	AQM 5 - HVS3126	Oct 28, 2023		Filter paper	M23-No0030276	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	AQM 5 -	Oct 22, 2023		Filter paper	M23-No0030277	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
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Project ID: 318001553

Order No.: 318001553
Report #: 1043666
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Nov 13, 2023 12:29 PM
Due: Nov 20, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	CANCELLED	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	HVS3118																						
28	AQM 5 - HVS2099	Oct 16, 2023		Filter paper	M23-No0030278	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	AQM 5 - HVS3054	Oct 10, 2023		Filter paper	M23-No0030279	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	AQM 5 - HVS3069	Oct 04, 2023		Filter paper	M23-No0030280	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	BLANK - HVS	Nov 09, 2023		Filter paper	M23-No0030281				X														
Test Counts						30	30	30	1	30	30	30	30	30	30	30	30	30	30	30	30	30	30

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram
mg/L: milligrams per litre
µg/L: micrograms per litre
ppm: parts per million
ppb: parts per billion
%: Percentage
org/100 mL: Organisms per 100 millilitres
NTU: Nephelometric Turbidity Units
MPN/100 mL: Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30%; however the following acceptance guidelines are equally applicable: Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported, have been reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	Total ug	< 1			1.0	Pass	
Barium	Total ug	< 1			1.0	Pass	
Cadmium	Total ug	< 0.5			0.5	Pass	
Chromium	Total ug	< 1			1.0	Pass	
Cobalt	Total ug	< 1			1.0	Pass	
Copper	Total ug	< 1			1.0	Pass	
Iron	Total ug	< 10			10	Pass	
Lead	Total ug	< 1			1	Pass	
Manganese	Total ug	< 1			1.0	Pass	
Mercury	Total ug	< 0.1			0.1	Pass	
Molybdenum	Total ug	< 1			1	Pass	
Nickel	Total ug	< 1			1.0	Pass	
Selenium	Total ug	< 1			1.0	Pass	
Titanium	Total ug	< 1			1.0	Pass	
Zinc	Total ug	< 1			1	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	N/A
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Adam Bateup	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Ramboll Australia Pty Ltd
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North Sydney
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Accreditation Number 1261
Site Number 1254

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Attention: **Stephen Maxwell**

Report **1061983-A**
Project name CAPTAINS FLAT LEAD MANAGEMENT PALN
Project ID 318001553
Received Date Jan 23, 2024

Client Sample ID			**AQM 1 - HVS3293**	**AQM 1 - HVS3231**	**AQM 1 - HVS3221**	**AQM 1 - HVS3224**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035263**	**S24-Ja0035264**	**S24-Ja0035265**	**S24-Ja0035266**
Date Sampled			**Jan 20, 2024**	**Jan 14, 2024**	**Jan 08, 2024**	**Jan 02, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.9	4.7	3.3	2.4
Barium	1.0	Total ug	33000	34000	19000	21000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	19	21	15	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.0	2.8	1.6	1.9
Iron	10	Total ug	490	380	280	240
Lead	1	Total ug	7.8	5.8	4.4	3.3
Manganese	1.0	Total ug	11	9.4	7.1	5.3
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.3	1.4	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	34000	32000	23000	31000
Particulates - Final weighing	0.01	mg	2680.3	2788.1	2789.9	2795.3
Particulates - Initial weighing	0.01	mg	2656.1	2763.5	2770.2	2774.7

Client Sample ID			**AQM 1 - HVS3220**	**AQM 1 - HVS3189**	**AQM 1 - HVS3211**	**AQM 1 - HVS3086**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035267**	**S24-Ja0035268**	**S24-Ja0035269**	**S24-Ja0035270**
Date Sampled			**Dec 27, 2023**	**Dec 21, 2023**	**Dec 15, 2023**	**Dec 09, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.6	4.2	3.9	4.5
Barium	1.0	Total ug	31000	29000	30000	34000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	20	19	17	16
Cobalt	1.0	Total ug	< 1	< 1	1.2	< 1
Copper	1.0	Total ug	6.1	2.0	3.2	2.4
Iron	10	Total ug	360	330	590	600
Lead	1	Total ug	7.6	5.2	6.8	5.6

Client Sample ID			AQM 1 - HVS3220	AQM 1 - HVS3189	AQM 1 - HVS3211	AQM 1 - HVS3086
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035267**	**S24-Ja0035268**	**S24-Ja0035269**	**S24-Ja0035270**
Date Sampled			**Dec 27, 2023**	**Dec 21, 2023**	**Dec 15, 2023**	**Dec 09, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Manganese	1.0	Total ug	9.1	8.0	12	15
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.1	1.1	1.6	1.6
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	39000	27000	25000	25000
Particulates - Final weighing	0.01	mg	2781.1	2774.7	2795.1	2772.8
Particulates - Initial weighing	0.01	mg	2764.4	2759.1	2762.9	2726.1

Client Sample ID			AQM 2 - HVS3292	AQM 2 - HVS3100	AQM 2 - HVS3223	AQM 2 - HVS3207
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035271**	**S24-Ja0035272**	**S24-Ja0035273**	**S24-Ja0035274**
Date Sampled			**Jan 20, 2024**	**Jan 14, 2024**	**Jan 08, 2024**	**Jan 02, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.9	4.1	2.8	3.6
Barium	1.0	Total ug	26000	31000	9600	25000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	15	15	13	16
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.7	2.1	1.8	3.3
Iron	10	Total ug	410	300	270	420
Lead	1	Total ug	7.6	5.6	4.2	10
Manganese	1.0	Total ug	8.8	8.4	6.2	8.4
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.3	1.5	1.1	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	28000	23000	18000	24000
Particulates - Final weighing	0.01	mg	2665.1	2737.3	2783.1	2795.8
Particulates - Initial weighing	0.01	mg	2639.2	2713.6	2762.5	2755.4

Client Sample ID			AQM 2-HVS3222	AQM 2 - HVS3190	AQM 2 - HVS3210	AQM 2 - HVS3084
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035275**	**S24-Ja0035276**	**S24-Ja0035277**	**S24-Ja0035278**
Date Sampled			**Dec 27, 2023**	**Dec 21, 2023**	**Dec 15, 2023**	**Sep 12, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.6	3.7	1.8	1.4
Barium	1.0	Total ug	25000	25000	16000	12000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	16	17	8.1	5.5
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.4	2.5	1.7	1.5
Iron	10	Total ug	320	340	310	220
Lead	1	Total ug	7.7	5.7	4.4	2.5
Manganese	1.0	Total ug	8.0	8.1	6.5	5.7
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.3	1.4	1.2	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	26000	27000	12000	9100
Particulates - Final weighing	0.01	mg	2791.1	2774.3	2802.9	2754.6
Particulates - Initial weighing	0.01	mg	2772.7	2755.8	2774.8	2714.2

Client Sample ID			AQM 3 - HVS3294	AQM 3 - HVS3237	AQM 3 - HVS3198	AQM 3 - HVS3225
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035279**	**S24-Ja0035280**	**S24-Ja0035281**	**S24-Ja0035282**
Date Sampled			**Jan 20, 2024**	**Jan 14, 2024**	**Jan 08, 2024**	**Jan 02, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.3	1.4	1.7	< 1
Barium	1.0	Total ug	20000	15000	17000	9100
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	8.4	6.8	7.9	4.6
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.9	< 1	< 1	< 1
Iron	10	Total ug	290	140	150	100
Lead	1	Total ug	8.6	2.1	2.8	1.6
Manganese	1.0	Total ug	6.6	3.5	4.1	2.6
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	15000	11000	12000	6700
Particulates - Final weighing	0.01	mg	2678.4	2777.5	2774.8	2792.2
Particulates - Initial weighing	0.01	mg	2643.9	2753.7	2756.9	2768.6

Client Sample ID			AQM 3 - HVS3219	AQM 3 - HVS3178	AQM 3 - HVS3212	AQM 3 - HVS3096
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035283**	**S24-Ja0035284**	**S24-Ja0035285**	**S24-Ja0035286**
Date Sampled			**Dec 27, 2023**	**Dec 21, 2023**	**Dec 15, 2023**	**Sep 12, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.8	2.1	2.1	1.3
Barium	1.0	Total ug	17000	20000	14000	12000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	8.2	8.5	7.9	5.3
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.2	2.0	1.6	1.2
Iron	10	Total ug	170	180	280	270
Lead	1	Total ug	4.5	2.9	4.1	2.7
Manganese	1.0	Total ug	4.0	5.8	6.3	6.3
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	1.1	1.1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	13000	15000	11000	8700
Particulates - Final weighing	0.01	mg	2785.9	2787.8	2794.9	2757.3
Particulates - Initial weighing	0.01	mg	2770.3	2771.4	2763.6	2711.6

Client Sample ID			AQM 4 - HVS3295	AQM 4 - HVS3235	AQM 4 - HVS3201	AQM 4 - HVS3227
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035287**	**S24-Ja0035288**	**S24-Ja0035289**	**S24-Ja0035290**
Date Sampled			**Jan 20, 2024**	**Jan 14, 2024**	**Jan 08, 2024**	**Jan 02, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.8	1.3	1.3	3.0
Barium	1.0	Total ug	17000	13000	13000	20000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	7.4	6.2	6.4	14
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.0	< 1	1.0	7.1
Iron	10	Total ug	210	130	120	360
Lead	1	Total ug	2.9	2.2	1.9	87
Manganese	1.0	Total ug	5.1	3.4	3.2	8.1
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	0.5
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	1.1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	13000	9500	9700	22000
Particulates - Final weighing	0.01	mg	2682.1	2797.8	2783.9	2814.2
Particulates - Initial weighing	0.01	mg	2647.6	2761.8	2752.4	2774.5

Client Sample ID			AQM 4 - HVS3202	AQM 4 - HVS3180	AQM 4 - HVS3214	AQM 4 - HVS3083
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035291**	**S24-Ja0035292**	**S24-Ja0035293**	**S24-Ja0035294**
Date Sampled			**Dec 27, 2023**	**Dec 21, 2023**	**Dec 15, 2023**	**Sep 12, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.2	3.2	3.0	3.1
Barium	1.0	Total ug	34000	16000	30000	26000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	15	14	15	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.2	2.4	2.2	3.3
Iron	10	Total ug	350	360	610	600
Lead	1	Total ug	6.1	4.8	5.3	4.9
Manganese	1.0	Total ug	8.3	9.9	14	14
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.1	1.3	1.7	1.2
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	25000	12000	22000	19000
Particulates - Final weighing	0.01	mg	2793	2773.3	2818.2	2784.2
Particulates - Initial weighing	0.01	mg	2762.8	2750.3	2764.6	2710.8

Client Sample ID			AQM 5 - HVS3296	AQM 5 - HVS3236	AQM 5 - HVS3199	AQM 5 - HVS3226
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035295**	**S24-Ja0035296**	**S24-Ja0035297**	**S24-Ja0035298**
Date Sampled			**Jan 20, 2024**	**Jan 14, 2024**	**Jan 08, 2024**	**Jan 02, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.4	2.2	2.9	3.2
Barium	1.0	Total ug	34000	25000	30000	30000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	13	11	14	15
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.1	1.5	2.7	1.9
Iron	10	Total ug	490	260	420	360
Lead	1	Total ug	6.5	3.5	5.1	7.2
Manganese	1.0	Total ug	11	5.8	7.4	8.5
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.2	< 1	1.2	1.5
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	24000	18000	22000	22000
Particulates - Final weighing	0.01	mg	2684.2	2797.3	2771.7	2796.2
Particulates - Initial weighing	0.01	mg	2653	2769.7	2747.9	2771.1

Client Sample ID			AQM 5 - HVS3200	AQM 5 - HVS3179	AQM 5 - HVS3213	AQM 5 - HVS3094
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ja0035299**	**S24-Ja0035300**	**S24-Ja0035301**	**S24-Ja0035302**
Date Sampled			**Dec 27, 2023**	**Dec 21, 2023**	**Dec 15, 2023**	**Dec 09, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.1	3.9	3.2	4.1
Barium	1.0	Total ug	29000	39000	32000	36000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	13	16	15	15
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.7	4.9	3.8	4.1
Iron	10	Total ug	280	420	680	680
Lead	1	Total ug	4.3	60	12	15
Manganese	1.0	Total ug	7.0	11	15	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	1.3	2.4	1.7
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Tin	1.0	Total ug	< 1	< 1	< 1	< 1
Zinc	1	Total ug	21000	28000	23000	25000
Particulates - Final weighing	0.01	mg	2777.6	2768.3	2811.1	2780.6
Particulates - Initial weighing	0.01	mg	2758.6	2748	2768.3	2723.5

Client Sample ID			BLANK - HVS3256
Sample Matrix			**Filter paper**
Eurofins Sample No.			**S24-Ja0035303**
Date Sampled			**Jan 23, 2024**
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic	1.0	Total ug	3.0
Barium	1.0	Total ug	32000
Cadmium	0.5	Total ug	< 0.5
Chromium	1.0	Total ug	15
Cobalt	1.0	Total ug	< 1
Copper	1.0	Total ug	1.3
Iron	10	Total ug	340
Lead	1	Total ug	4.3
Manganese	1.0	Total ug	6.3
Mercury	0.1	Total ug	< 0.1
Molybdenum	1	Total ug	< 1
Nickel	1.0	Total ug	1.2
Selenium	1.0	Total ug	< 1
Tin	1.0	Total ug	< 1
Zinc	1	Total ug	23000
Particulates - Final weighing	0.01	mg	2773.7
Particulates - Initial weighing	0.01	mg	2768.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Melbourne	Feb 02, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Jan 24, 2024	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Jan 24, 2024	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PALN
Project ID: 318001553

Order No.: 318001553
Report #: 1061983
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Jan 23, 2024 2:10 PM
Due: Jan 31, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																	
1	AQM 1 - HVS3293	Jan 20, 2024		Filter paper	S24-Ja0035263	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS3231	Jan 14, 2024		Filter paper	S24-Ja0035264	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS3221	Jan 08, 2024		Filter paper	S24-Ja0035265	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	AQM 1 - HVS3224	Jan 02, 2024		Filter paper	S24-Ja0035266	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	AQM 1 - HVS3220	Dec 27, 2023		Filter paper	S24-Ja0035267	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	AQM 1 - HVS3189	Dec 21, 2023		Filter paper	S24-Ja0035268	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	AQM 1 - HVS3211	Dec 15, 2023		Filter paper	S24-Ja0035269	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	AQM 1 - HVS3086	Dec 09, 2023		Filter paper	S24-Ja0035270	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	AQM 2 - HVS3292	Jan 20, 2024		Filter paper	S24-Ja0035271	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	AQM 2 - HVS3100	Jan 14, 2024		Filter paper	S24-Ja0035272	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	AQM 2 - HVS3223	Jan 08, 2024		Filter paper	S24-Ja0035273	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	AQM 2 - HVS3207	Jan 02, 2024		Filter paper	S24-Ja0035274	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	AQM 2- HVS3222	Dec 27, 2023		Filter paper	S24-Ja0035275	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	AQM 2 - HVS3190	Dec 21, 2023		Filter paper	S24-Ja0035276	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	AQM 2 - HVS3210	Dec 15, 2023		Filter paper	S24-Ja0035277	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	AQM 2 - HVS3084	Sep 12, 2023		Filter paper	S24-Ja0035278	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	AQM 3 - HVS3294	Jan 20, 2024		Filter paper	S24-Ja0035279	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 3 -	Jan 14, 2024		Filter paper	S24-Ja0035280	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 3 - HVS3237	Jan 14, 2024		Filter paper	S24-Ja0035280																	
19	AQM 3 - HVS3198	Jan 08, 2024		Filter paper	S24-Ja0035281	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	AQM 3 - HVS3225	Jan 02, 2024		Filter paper	S24-Ja0035282	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	AQM 3 - HVS3219	Dec 27, 2023		Filter paper	S24-Ja0035283	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	AQM 3 - HVS3178	Dec 21, 2023		Filter paper	S24-Ja0035284	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	AQM 3 - HVS3212	Dec 15, 2023		Filter paper	S24-Ja0035285	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	AQM 3 - HVS3096	Sep 12, 2023		Filter paper	S24-Ja0035286	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	AQM 4 - HVS3295	Jan 20, 2024		Filter paper	S24-Ja0035287	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	AQM 4 - HVS3235	Jan 14, 2024		Filter paper	S24-Ja0035288	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	AQM 4 -	Jan 08, 2024		Filter paper	S24-Ja0035289	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	HVS3201																					
28	AQM 4 - HVS3227	Jan 02, 2024		Filter paper	S24-Ja0035290	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	AQM 4 - HVS3202	Dec 27, 2023		Filter paper	S24-Ja0035291	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	AQM 4 - HVS3180	Dec 21, 2023		Filter paper	S24-Ja0035292	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	AQM 4 - HVS3214	Dec 15, 2023		Filter paper	S24-Ja0035293	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
32	AQM 4 - HVS3083	Sep 12, 2023		Filter paper	S24-Ja0035294	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
33	AQM 5 - HVS3296	Jan 20, 2024		Filter paper	S24-Ja0035295	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
34	AQM 5 - HVS3236	Jan 14, 2024		Filter paper	S24-Ja0035296	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
35	AQM 5 - HVS3199	Jan 08, 2024		Filter paper	S24-Ja0035297	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
36	AQM 5 - HVS3226	Jan 02, 2024		Filter paper	S24-Ja0035298	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
37	AQM 5 - HVS3200	Dec 27, 2023		Filter paper	S24-Ja0035299	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
38	AQM 5 - HVS3179	Dec 21, 2023		Filter paper	S24-Ja0035300	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
39	AQM 5 - HVS3213	Dec 15, 2023		Filter paper	S24-Ja0035301	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
40	AQM 5 - HVS3094	Dec 09, 2023		Filter paper	S24-Ja0035302	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
41	BLANK - HVS3256	Jan 23, 2024		Filter paper	S24-Ja0035303	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	Total ug	< 1			1.0	Pass	
Barium	Total ug	< 1			1.0	Pass	
Cadmium	Total ug	< 0.5			0.5	Pass	
Chromium	Total ug	< 1			1.0	Pass	
Cobalt	Total ug	< 1			1.0	Pass	
Copper	Total ug	< 1			1.0	Pass	
Iron	Total ug	< 10			10	Pass	
Lead	Total ug	< 1			1	Pass	
Manganese	Total ug	< 1			1.0	Pass	
Mercury	Total ug	< 0.1			0.1	Pass	
Molybdenum	Total ug	< 1			1	Pass	
Nickel	Total ug	< 1			1.0	Pass	
Selenium	Total ug	< 1			1.0	Pass	
Tin	Total ug	< 1			1.0	Pass	
Zinc	Total ug	< 1			1	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Nileshni Goundar	Analytical Services Manager
Mary Makarios	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1013996-A**
Project name CAPTAINS FLAT MANAGEMENT PLAN
Project ID 318001553
Received Date Aug 04, 2023

Client Sample ID			**AQM 1 - HVS2031**	**AQM 1 - HVS1965**	**AQM 1 - HVS2046**	**AQM 1 - HVS2021**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Au0012229**	**S23-Au0012230**	**S23-Au0012231**	**S23-Au0012232**
Date Sampled			**Jul 30, 2023**	**Jul 24, 2023**	**Jul 18, 2023**	**Jul 12, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	6.6	10	6.8	7.1
Barium	1.0	Total ug	68000	88000	73000	72000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	25	33	26	27
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	5.4	5.7	14	9.5
Iron	10	Total ug	630	780	680	780
Lead	1	Total ug	13	21	15	18
Manganese	1.0	Total ug	17	21	17	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	2.1	1.8	1.8	1.6
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	21	30	23	24
Zinc	1	Total ug	50000	63000	53000	53000
Particulates - Initial weighing	0.01	mg	2696.9	2670.9	2710.1	2674.4

Client Sample ID			**AQM 1 - HVS2006**	**AQM 2 - HVS2030**	**AQM 2 - HVS1967**	**AQM 2 - HVS2047**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Au0012233**	**S23-Au0012234**	**S23-Au0012235**	**S23-Au0012236**
Date Sampled			**Jul 06, 2023**	**Jul 30, 2023**	**Jul 24, 2023**	**Jul 18, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	8.1	8.0	7.7	7.2
Barium	1.0	Total ug	78000	83000	78000	75000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	30	29	29	27
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	12	6.2	7.0	5.1
Iron	10	Total ug	980	660	1000	680
Lead	1	Total ug	14	15	26	14

Client Sample ID			AQM 1 - HVS2006	AQM 2 - HVS2030	AQM 2 - HVS1967	AQM 2 - HVS2047
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S23-Au0012233	S23-Au0012234	S23-Au0012235	S23-Au0012236
Date Sampled			Jul 06, 2023	Jul 30, 2023	Jul 24, 2023	Jul 18, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Manganese	1.0	Total ug	44	19	19	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	6.1	2.0	2.0	2.2
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	24	25	34	25
Zinc	1	Total ug	56000	60000	56000	54000
Particulates - Initial weighing	0.01	mg	2679.3	2689.9	2671	2696

Client Sample ID			AQM 2 - HVS2038	AQM 2 - HVS2007	AQM 3 - HVS2029	AQM 3 - HVS1963
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S23-Au0012237	S23-Au0012238	S23-Au0012239	S23-Au0012240
Date Sampled			Jul 12, 2023	Jul 06, 2023	Jul 30, 2023	Jul 24, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	7.8	6.6	6.7	8.5
Barium	1.0	Total ug	80000	69000	69000	84000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	28	25	26	33
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	6.2	11	6.8	12
Iron	10	Total ug	760	940	660	810
Lead	1	Total ug	14	32	14	14
Manganese	1.0	Total ug	19	26	19	22
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.8	2.0	2.0	1.9
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	31	32	26	36
Zinc	1	Total ug	58000	50000	51000	61000
Particulates - Initial weighing	0.01	mg	2700.1	2682.6	2709.4	2652.2

Client Sample ID			AQM 3 - HVS2048	AQM 3 - HVS2037	AQM 3 - HVS1997	AQM 4 - HVS2028
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S23-Au0012241	S23-Au0012242	S23-Au0012243	S23-Au0012244
Date Sampled			Jul 18, 2023	Jul 12, 2023	Jul 06, 2023	Jul 30, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.5	6.2	6.5	6.7
Barium	1.0	Total ug	54000	68000	71000	64000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	19	24	25	21
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	4.1	5.0	5.8	7.6
Iron	10	Total ug	560	730	680	640
Lead	1	Total ug	11	12	13	19
Manganese	1.0	Total ug	15	18	17	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.5	1.8	2.2	1.7
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	21	27	25	21
Zinc	1	Total ug	41000	51000	53000	47000
Particulates - Initial weighing	0.01	mg	2689	2686.9	2680.6	2673

Client Sample ID			AQM 4 - HVS2023	AQM 4 - HVS2049	AQM 4 - HVS2036	AQM 4 - HVS2005
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S23-Au0012245	S23-Au0012246	S23-Au0012247	S23-Au0012248
Date Sampled			Jul 24, 2023	Jul 18, 2023	Jul 12, 2023	Jul 06, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	40	6.5	4.7	4.7
Barium	1.0	Total ug	55000	64000	17000	35000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	20	21	16	17
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	6.7	3.5	2.6	2.0
Iron	10	Total ug	1000	690	490	420
Lead	1	Total ug	13	11	8.9	7.4
Manganese	1.0	Total ug	24	17	13	11
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.9	1.8	1.0	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	37	23	19	17
Zinc	1	Total ug	41000	46000	32000	32000
Particulates - Initial weighing	0.01	mg	2682.9	2696.7	2704.4	2675

Client Sample ID			AQM 5 - HVS2027	AQM 5 - HVS1961	AQM 5 - HVS2050	AQM 5 - HVS2035
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Au0012249**	**S23-Au0012250**	**S23-Au0012251**	**S23-Au0012252**
Date Sampled			**Jul 30, 2023**	**Jul 24, 2023**	**Jul 18, 2023**	**Jul 12, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.3	4.3	4.3	4.2
Barium	1.0	Total ug	31000	35000	22000	31000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	12	15	15	16
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.3	2.1	2.0	2.0
Iron	10	Total ug	290	440	390	420
Lead	1	Total ug	6.7	6.7	7.1	7.2
Manganese	1.0	Total ug	7.9	11	10	11
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	1.1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	11	21	15	17
Zinc	1	Total ug	22000	29000	30000	30000
Particulates - Initial weighing	0.01	mg	2662.1	2657	2688.2	2701.7

Client Sample ID			AQM 5 - HVS1998	BLANK - HVS2045
Sample Matrix			**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Au0012253**	**S23-Au0012254**
Date Sampled			**Jul 06, 2023**	**Aug 04, 2023**
Test/Reference	LOR	Unit		
Heavy Metals				
Arsenic	1.0	Total ug	4.9	3.4
Barium	1.0	Total ug	36000	36000
Cadmium	0.5	Total ug	< 0.5	< 0.5
Chromium	1.0	Total ug	18	13
Cobalt	1.0	Total ug	< 1	< 1
Copper	1.0	Total ug	6.1	1.1
Iron	10	Total ug	380	260
Lead	1	Total ug	7.3	4.8
Manganese	1.0	Total ug	11	7.1
Mercury	0.1	Total ug	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1
Nickel	1.0	Total ug	1.1	< 1
Selenium	1.0	Total ug	< 1	< 1
Titanium	1.0	Total ug	15	11
Zinc	1	Total ug	33000	25000
Particulates - Initial weighing	0.01	mg	2690.5	2699.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Melbourne	Aug 14, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Initial weighing	Field	Aug 04, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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VIC 3175	VIC 3216	NSW 2145	ACT 2911	QLD 4172	Tel: +61 2 4968 8448
Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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IANZ# 1327	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
Report #: 1013996
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Aug 4, 2023 12:45 PM
Due: Aug 11, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																	
1	AQM 1 - HVS2031	Jul 30, 2023		Filter paper	S23-Au0012229	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS1965	Jul 24, 2023		Filter paper	S23-Au0012230	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS2046	Jul 18, 2023		Filter paper	S23-Au0012231	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	AQM 1 - HVS2021	Jul 12, 2023		Filter paper	S23-Au0012232	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	AQM 1 - HVS2006	Jul 06, 2023		Filter paper	S23-Au0012233	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	AQM 2 - HVS2030	Jul 30, 2023		Filter paper	S23-Au0012234	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	AQM 2 - HVS1967	Jul 24, 2023		Filter paper	S23-Au0012235	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	AQM 2 - HVS2047	Jul 18, 2023		Filter paper	S23-Au0012236	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
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IANZ# 1327	IANZ# 1290	IANZ# 1402

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North Sydney
NSW 2060

Project Name: CAPTAINS FLAT MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
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Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Aug 4, 2023 12:45 PM
Due: Aug 11, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	AQM 2 - HVS2038	Jul 12, 2023		Filter paper	S23-Au0012237	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	AQM 2 - HVS2007	Jul 06, 2023		Filter paper	S23-Au0012238	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	AQM 3 - HVS2029	Jul 30, 2023		Filter paper	S23-Au0012239	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	AQM 3 - HVS1963	Jul 24, 2023		Filter paper	S23-Au0012240	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	AQM 3 - HVS2048	Jul 18, 2023		Filter paper	S23-Au0012241	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	AQM 3 - HVS2037	Jul 12, 2023		Filter paper	S23-Au0012242	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	AQM 3 - HVS1997	Jul 06, 2023		Filter paper	S23-Au0012243	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	AQM 4 - HVS2028	Jul 30, 2023		Filter paper	S23-Au0012244	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	AQM 4 - HVS2023	Jul 24, 2023		Filter paper	S23-Au0012245	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 4 -	Jul 18, 2023		Filter paper	S23-Au0012246	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Company Name: Ramboll Australia Pty Ltd
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Project Name: CAPTAINS FLAT MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
Report #: 1013996
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Aug 4, 2023 12:45 PM
Due: Aug 11, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 4 - HVS2049	Jul 18, 2023		Filter paper	S23-Au0012246																	
19	AQM 4 - HVS2036	Jul 12, 2023		Filter paper	S23-Au0012247	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	AQM 4 - HVS2005	Jul 06, 2023		Filter paper	S23-Au0012248	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	AQM 5 - HVS2027	Jul 30, 2023		Filter paper	S23-Au0012249	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	AQM 5 - HVS1961	Jul 24, 2023		Filter paper	S23-Au0012250	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	AQM 5 - HVS2050	Jul 18, 2023		Filter paper	S23-Au0012251	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	AQM 5 - HVS2035	Jul 12, 2023		Filter paper	S23-Au0012252	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	AQM 5 - HVS1998	Jul 06, 2023		Filter paper	S23-Au0012253	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	BLANK - HVS2045	Aug 04, 2023		Filter paper	S23-Au0012254	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	Total ug	< 1			1.0	Pass	
Barium	Total ug	< 1			1.0	Pass	
Cadmium	Total ug	< 0.5			0.5	Pass	
Chromium	Total ug	< 1			1.0	Pass	
Cobalt	Total ug	< 1			1.0	Pass	
Copper	Total ug	< 1			1.0	Pass	
Iron	Total ug	< 10			10	Pass	
Lead	Total ug	< 1			1	Pass	
Manganese	Total ug	< 1			1.0	Pass	
Mercury	Total ug	< 0.1			0.1	Pass	
Molybdenum	Total ug	< 1			1	Pass	
Nickel	Total ug	< 1			1.0	Pass	
Selenium	Total ug	< 1			1.0	Pass	
Titanium	Total ug	< 1			1.0	Pass	
Zinc	Total ug	< 1			1	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Caitlin Breeze	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1084583-A**
Project name Captains Flat Lead Management Plan
Project ID 318001553
Received Date Apr 05, 2024

Client Sample ID			**AQM 1 - HVS3333**	**AQM 1 - HVS3339**	**AQM 1 - HVS3345**	**AQM 1 - HVS3350**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011129**	**S24-Ap0011130**	**S24-Ap0011131**	**S24-Ap0011132**
Date Sampled			**Apr 01, 2024**	**Mar 26, 2024**	**Mar 20, 2024**	**Mar 14, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.5	4.6	4.3	5.5
Barium	1.0	Total ug	39000	33000	33000	42000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	18	19	17	22
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	3.2	2.4	2.3	4.8
Iron	10	Total ug	680	560	470	730
Lead	1	Total ug	9.4	7.5	6.9	9.8
Manganese	1.0	Total ug	15	12	12	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.6	1.5	1.3	2.0
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	18	14	11	18
Zinc	1	Total ug	30000	30000	31000	38000
Particulates - Final weighing	0.01	mg	2682.3	2659.5	2671	2675.1
Particulates - Initial weighing	0.01	mg	2650.2	2639.4	2650.4	2646.4

Client Sample ID			**AQM 1 - HVS3361**	**AQM 1 - HVS3365**	**AQM 1 - HVS3328**	**AQM 1 - HVS3286**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011133**	**S24-Ap0011134**	**S24-Ap0011135**	**S24-Ap0011136**
Date Sampled			**Mar 08, 2024**	**Mar 02, 2024**	**Feb 25, 2024**	**Feb 13, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.0	4.6	5.6	4.6
Barium	1.0	Total ug	33000	37000	42000	36000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	17	19	25	19
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.3	2.7	5.2	3.2
Iron	10	Total ug	630	700	580	630

Client Sample ID			AQM 1 - HVS3361	AQM 1 - HVS3365	AQM 1 - HVS3328	AQM 1 - HVS3286
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011133**	**S24-Ap0011134**	**S24-Ap0011135**	**S24-Ap0011136**
Date Sampled			**Mar 08, 2024**	**Mar 02, 2024**	**Feb 25, 2024**	**Feb 13, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	8.9	8.8	10	9.8
Manganese	1.0	Total ug	13	15	14	16
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.5	1.5	2.2	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	16	16	16	15
Zinc	1	Total ug	31000	34000	39000	33000
Particulates - Final weighing	0.01	mg	2684.4	2743.5	2664.4	2670.9
Particulates - Initial weighing	0.01	mg	2656.6	2720.8	2647.2	2649.8

Client Sample ID			AQM 1 - HVS3309	AQM 2 - HVS3373	AQM 2 - HVS3340	AQM 2 - HVS3346
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011137**	**S24-Ap0011138**	**S24-Ap0011139**	**S24-Ap0011140**
Date Sampled			**Feb 07, 2024**	**Apr 01, 2024**	**Mar 26, 2024**	**Mar 20, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.2	4.5	5.1	5.5
Barium	1.0	Total ug	18000	34000	37000	40000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	21	18	19	22
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.3	6.9	2.4	2.1
Iron	10	Total ug	470	670	650	560
Lead	1	Total ug	7.3	9.7	10	9.0
Manganese	1.0	Total ug	12	14	14	14
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.4	1.7	2.8	1.6
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	13	18	21	16
Zinc	1	Total ug	36000	31000	34000	40000
Particulates - Final weighing	0.01	mg	2670.8	2718.8	2657.8	2668.4
Particulates - Initial weighing	0.01	mg	2658.8	2689.6	2631.5	2646.4

Client Sample ID			AQM 2 - HVS3351	AQM 2 - HVS3360	AQM 2 - HVS3366	AQM 2 - HVS3329
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011141**	**S24-Ap0011142**	**S24-Ap0011143**	**S24-Ap0011144**
Date Sampled			**Mar 14, 2024**	**Mar 08, 2024**	**Mar 02, 2024**	**Feb 25, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.1	5.7	5.4	5.4
Barium	1.0	Total ug	35000	35000	40000	39000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	19	22	22	20
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.4	2.6	2.8	5.1
Iron	10	Total ug	680	790	750	800
Lead	1	Total ug	21	14	10	55
Manganese	1.0	Total ug	15	17	16	13
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.7	1.9	1.8	1.6
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	18	23	19	18
Zinc	1	Total ug	32000	40000	40000	36000
Particulates - Final weighing	0.01	mg	2667.4	2682.1	2726.1	2678.3
Particulates - Initial weighing	0.01	mg	2637.5	2650	2704	2656

Client Sample ID			AQM 2 - HVS3375	AQM 2 - HVS3285	AQM 2 - HVS3310	AQM 3 - HVS3374
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011145**	**S24-Ap0011146**	**S24-Ap0011147**	**S24-Ap0011148**
Date Sampled			**Feb 19, 2024**	**Feb 13, 2024**	**Feb 07, 2024**	**Apr 01, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.3	4.9	4.7	6.5
Barium	1.0	Total ug	39000	36000	33000	35000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	21	19	18	24
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.6	3.2	1.8	2.3
Iron	10	Total ug	500	700	450	850
Lead	1	Total ug	9.6	9.1	7.1	10
Manganese	1.0	Total ug	12	17	10	19
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.6	1.8	1.3	1.9
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	13	21	13	26
Zinc	1	Total ug	36000	33000	32000	40000
Particulates - Final weighing	0.01	mg	2679.7	2679.1	2662.8	2711.2
Particulates - Initial weighing	0.01	mg	2669.9	2645.8	2647	2681.8

Client Sample ID			AQM 3 - HVS3341	AQM 3 - HVS3347	AQM 3 - HVS3352	AQM 3 - HVS3362
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011149**	**S24-Ap0011150**	**S24-Ap0011151**	**S24-Ap0011152**
Date Sampled			**Mar 26, 2024**	**Mar 20, 2024**	**Mar 14, 2024**	**Mar 08, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.6	4.5	5.0	4.9
Barium	1.0	Total ug	36000	35000	17000	36000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	18	18	20	20
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.8	2.2	3.0	2.4
Iron	10	Total ug	610	490	810	790
Lead	1	Total ug	8.4	7.9	12	10
Manganese	1.0	Total ug	14	12	19	18
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.4	1.5	1.9	1.7
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	20	14	25	25
Zinc	1	Total ug	33000	32000	34000	33000
Particulates - Final weighing	0.01	mg	2661.1	2674.1	2689.9	2695.4
Particulates - Initial weighing	0.01	mg	2636.8	2653.3	2653.7	2662.3

Client Sample ID			AQM 3 - HVS3367	AQM 3 - HVS3330	AQM 3 - HVS3276	AQM 3 - HVS3284
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011153**	**S24-Ap0011154**	**S24-Ap0011155**	**S24-Ap0011156**
Date Sampled			**Mar 02, 2024**	**Feb 25, 2024**	**Feb 19, 2024**	**Feb 13, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.8	4.1	6.0	5.7
Barium	1.0	Total ug	36000	37000	41000	39000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	19	17	21	22
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	3.2	1.5	1.9	2.7
Iron	10	Total ug	870	490	750	770
Lead	1	Total ug	13	7.4	11	9.9
Manganese	1.0	Total ug	20	11	13	19
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	1.1	< 1
Nickel	1.0	Total ug	1.7	1.4	2.5	1.7
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	27	14	15	18
Zinc	1	Total ug	33000	27000	39000	36000
Particulates - Final weighing	0.01	mg	2740.5	2668.6	2651.4	2668.6
Particulates - Initial weighing	0.01	mg	2707.9	2649.9	2637.2	2642.8

Client Sample ID			AQM 3 - HVS3311	AQM 4 - HVS3375	AQM 4 - HVS3342	AQM 4 - HVS3348
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011157**	**S24-Ap0011158**	**S24-Ap0011159**	**S24-Ap0011160**
Date Sampled			**Feb 07, 2024**	**Apr 01, 2024**	**Mar 26, 2024**	**Mar 20, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.9	3.8	2.8	3.3
Barium	1.0	Total ug	26000	33000	25000	31000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	11	15	11	13
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.0	1.4	1.1	< 1
Iron	10	Total ug	280	520	370	350
Lead	1	Total ug	4.4	5.7	4.3	4.8
Manganese	1.0	Total ug	6.3	12	8.3	9.0
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.1	1.2	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	8.5	15	13	10
Zinc	1	Total ug	19000	26000	19000	24000
Particulates - Final weighing	0.01	mg	2669.2	2704.5	2676.3	2673.9
Particulates - Initial weighing	0.01	mg	2652.7	2669.9	2648.8	2648.5

Client Sample ID			AQM 4 - HVS3353	AQM 4 - HVS3363	AQM 4 - HVS3266	AQM 4 - HVS3332
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011161**	**S24-Ap0011162**	**S24-Ap0011163**	**S24-Ap0011164**
Date Sampled			**Mar 14, 2024**	**Mar 08, 2024**	**Mar 02, 2024**	**Feb 25, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.6	3.1	3.6	2.9
Barium	1.0	Total ug	32000	30000	30000	29000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	13	13	15	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.2	2.5	1.6	2.2
Iron	10	Total ug	950	740	570	320
Lead	1	Total ug	8.0	6.5	5.7	4.5
Manganese	1.0	Total ug	21	24	13	7.3
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.5	1.7	1.2	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	20	21	16	9.3
Zinc	1	Total ug	23000	22000	22000	21000
Particulates - Final weighing	0.01	mg	2756.4	2862	2693.1	2674.5
Particulates - Initial weighing	0.01	mg	2664.7	2656.1	2661.4	2651.5

Client Sample ID			AQM 4 - HVS3277	AQM 4 - HVS3283	AQM 4 - HVS3312	AQM 5 - HVS3376
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011165**	**S24-Ap0011166**	**S24-Ap0011167**	**S24-Ap0011168**
Date Sampled			**Feb 19, 2024**	**Feb 13, 2024**	**Feb 07, 2024**	**Apr 01, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.7	4.2	4.0	4.1
Barium	1.0	Total ug	37000	24000	36000	33000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	14	16	17	16
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.6	1.6	1.4	1.5
Iron	10	Total ug	340	500	400	640
Lead	1	Total ug	5.4	6.1	6.1	6.6
Manganese	1.0	Total ug	9.0	13	10	13
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.0	1.2	1.1	1.3
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	8.9	13	8.8	18
Zinc	1	Total ug	28000	28000	30000	28000
Particulates - Final weighing	0.01	mg	2673.1	2696.8	2670.5	2715.9
Particulates - Initial weighing	0.01	mg	2650	2660.1	2638.5	2677.7

Client Sample ID			AQM 5 - HVS3343	AQM 5 - HVS3322	AQM 5 - HVS3354	AQM 5 - HVS3364
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011169**	**S24-Ap0011170**	**S24-Ap0011171**	**S24-Ap0011172**
Date Sampled			**Mar 26, 2024**	**Mar 20, 2024**	**Mar 14, 2024**	**Mar 08, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.6	3.5	5.5	4.4
Barium	1.0	Total ug	25000	32000	36000	33000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	11	14	20	17
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.2	1.9	2.3	2.6
Iron	10	Total ug	420	470	770	720
Lead	1	Total ug	4.3	5.7	10	9.0
Manganese	1.0	Total ug	8.4	11	18	17
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.1	1.1	2.0	1.6
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	14	11	28	22
Zinc	1	Total ug	19000	26000	36000	30000
Particulates - Final weighing	0.01	mg	2687.8	2667.6	2703.5	2691.5
Particulates - Initial weighing	0.01	mg	2662.1	2644.7	2670	2655.4

Client Sample ID			AQM 5 - HVS3267	AQM 5 - HVS3331	AQM 5 - HVS3278	AQM 5 - HVS3282
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S24-Ap0011173**	**S24-Ap0011174**	**S24-Ap0011175**	**S24-Ap0011176**
Date Sampled			**Mar 02, 2024**	**Feb 25, 2024**	**Feb 19, 2024**	**Feb 13, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.8	4.4	6.3	5.4
Barium	1.0	Total ug	9700	35000	39000	26000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	18	17	24	21
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.5	2.8	3.0	2.5
Iron	10	Total ug	780	460	540	730
Lead	1	Total ug	7.2	7.2	9.2	9.2
Manganese	1.0	Total ug	18	11	14	18
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.4	1.4	1.8	1.8
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	24	13	15	21
Zinc	1	Total ug	32000	30000	33000	37000
Particulates - Final weighing	0.01	mg	2678.6	2656.5	2660	2692
Particulates - Initial weighing	0.01	mg	2650.2	2635	2640.4	2663.6

Client Sample ID			AQM 5 - HVS3261
Sample Matrix			**Filter paper**
Eurofins Sample No.			**S24-Ap0011177**
Date Sampled			**Feb 07, 2024**
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic	1.0	Total ug	4.0
Barium	1.0	Total ug	37000
Cadmium	0.5	Total ug	< 0.5
Chromium	1.0	Total ug	19
Cobalt	1.0	Total ug	< 1
Copper	1.0	Total ug	1.9
Iron	10	Total ug	350
Lead	1	Total ug	5.4
Manganese	1.0	Total ug	8.3
Mercury	0.1	Total ug	< 0.1
Molybdenum	1	Total ug	< 1
Nickel	1.0	Total ug	1.5
Selenium	1.0	Total ug	< 1
Titanium	1.0	Total ug	8.8
Zinc	1	Total ug	27000
Particulates - Final weighing	0.01	mg	2795.3
Particulates - Initial weighing	0.01	mg	2776.5

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8	Melbourne	Apr 11, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Melbourne	Apr 11, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Apr 05, 2024	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Apr 05, 2024	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: Captains Flat Lead Management Plan
Project ID: 318001553

Order No.: 318001553
Report #: 1084583
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Apr 5, 2024 8:18 AM
Due: Apr 12, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	AQM 1 - HVS3333	Apr 01, 2024		Filter paper	S24-Ap0011129	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS3339	Mar 26, 2024		Filter paper	S24-Ap0011130	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS3345	Mar 20, 2024		Filter paper	S24-Ap0011131	X	X	X	X	X	X	X	X	X	X
4	AQM 1 - HVS3350	Mar 14, 2024		Filter paper	S24-Ap0011132	X	X	X	X	X	X	X	X	X	X
5	AQM 1 - HVS3361	Mar 08, 2024		Filter paper	S24-Ap0011133	X	X	X	X	X	X	X	X	X	X
6	AQM 1 - HVS3365	Mar 02, 2024		Filter paper	S24-Ap0011134	X	X	X	X	X	X	X	X	X	X
7	AQM 1 - HVS3328	Feb 25, 2024		Filter paper	S24-Ap0011135	X	X	X	X	X	X	X	X	X	X
8	AQM 1 - HVS3286	Feb 13, 2024		Filter paper	S24-Ap0011136	X	X	X	X	X	X	X	X	X	X

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: Captains Flat Lead Management Plan
Project ID: 318001553

Order No.: 318001553
Report #: 1084583
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Apr 5, 2024 8:18 AM
Due: Apr 12, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
9	AQM 1 - HVS3309	Feb 07, 2024		Filter paper	S24-Ap0011137	X	X	X	X	X	X	X	X	X	X
10	AQM 2 - HVS3373	Apr 01, 2024		Filter paper	S24-Ap0011138	X	X	X	X	X	X	X	X	X	X
11	AQM 2 - HVS3340	Mar 26, 2024		Filter paper	S24-Ap0011139	X	X	X	X	X	X	X	X	X	X
12	AQM 2 - HVS3346	Mar 20, 2024		Filter paper	S24-Ap0011140	X	X	X	X	X	X	X	X	X	X
13	AQM 2 - HVS3351	Mar 14, 2024		Filter paper	S24-Ap0011141	X	X	X	X	X	X	X	X	X	X
14	AQM 2 - HVS3360	Mar 08, 2024		Filter paper	S24-Ap0011142	X	X	X	X	X	X	X	X	X	X
15	AQM 2 - HVS3366	Mar 02, 2024		Filter paper	S24-Ap0011143	X	X	X	X	X	X	X	X	X	X
16	AQM 2 - HVS3329	Feb 25, 2024		Filter paper	S24-Ap0011144	X	X	X	X	X	X	X	X	X	X
17	AQM 2 - HVS3375	Feb 19, 2024		Filter paper	S24-Ap0011145	X	X	X	X	X	X	X	X	X	X
18	AQM 2 -	Feb 13, 2024		Filter paper	S24-Ap0011146	X	X	X	X	X	X	X	X	X	X

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Due: Apr 12, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
18	AQM 2 - HVS3285	Feb 13, 2024		Filter paper	S24-Ap0011146										
19	AQM 2 - HVS3310	Feb 07, 2024		Filter paper	S24-Ap0011147	X	X	X	X	X	X	X	X	X	X
20	AQM 3 - HVS3374	Apr 01, 2024		Filter paper	S24-Ap0011148	X	X	X	X	X	X	X	X	X	X
21	AQM 3 - HVS3341	Mar 26, 2024		Filter paper	S24-Ap0011149	X	X	X	X	X	X	X	X	X	X
22	AQM 3 - HVS3347	Mar 20, 2024		Filter paper	S24-Ap0011150	X	X	X	X	X	X	X	X	X	X
23	AQM 3 - HVS3352	Mar 14, 2024		Filter paper	S24-Ap0011151	X	X	X	X	X	X	X	X	X	X
24	AQM 3 - HVS3362	Mar 08, 2024		Filter paper	S24-Ap0011152	X	X	X	X	X	X	X	X	X	X
25	AQM 3 - HVS3367	Mar 02, 2024		Filter paper	S24-Ap0011153	X	X	X	X	X	X	X	X	X	X
26	AQM 3 - HVS3330	Feb 25, 2024		Filter paper	S24-Ap0011154	X	X	X	X	X	X	X	X	X	X
27	AQM 3 -	Feb 19, 2024		Filter paper	S24-Ap0011155	X	X	X	X	X	X	X	X	X	X

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NSW 2060

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Fax: 02 9954 8150

Received: Apr 5, 2024 8:18 AM
Due: Apr 12, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
	HVS3276														
28	AQM 3 - HVS3284	Feb 13, 2024		Filter paper	S24-Ap0011156	X	X	X	X	X	X	X	X	X	X
29	AQM 3 - HVS3311	Feb 07, 2024		Filter paper	S24-Ap0011157	X	X	X	X	X	X	X	X	X	X
30	AQM 4 - HVS3375	Apr 01, 2024		Filter paper	S24-Ap0011158	X	X	X	X	X	X	X	X	X	X
31	AQM 4 - HVS3342	Mar 26, 2024		Filter paper	S24-Ap0011159	X	X	X	X	X	X	X	X	X	X
32	AQM 4 - HVS3348	Mar 20, 2024		Filter paper	S24-Ap0011160	X	X	X	X	X	X	X	X	X	X
33	AQM 4 - HVS3353	Mar 14, 2024		Filter paper	S24-Ap0011161	X	X	X	X	X	X	X	X	X	X
34	AQM 4 - HVS3363	Mar 08, 2024		Filter paper	S24-Ap0011162	X	X	X	X	X	X	X	X	X	X
35	AQM 4 - HVS3266	Mar 02, 2024		Filter paper	S24-Ap0011163	X	X	X	X	X	X	X	X	X	X
36	AQM 4 - HVS3332	Feb 25, 2024		Filter paper	S24-Ap0011164	X	X	X	X	X	X	X	X	X	X

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Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: Captains Flat Lead Management Plan
Project ID: 318001553

Order No.: 318001553
Report #: 1084583
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Apr 5, 2024 8:18 AM
Due: Apr 12, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
37	AQM 4 - HVS3277	Feb 19, 2024		Filter paper	S24-Ap0011165	X	X	X	X	X	X	X	X	X	X
38	AQM 4 - HVS3283	Feb 13, 2024		Filter paper	S24-Ap0011166	X	X	X	X	X	X	X	X	X	X
39	AQM 4 - HVS3312	Feb 07, 2024		Filter paper	S24-Ap0011167	X	X	X	X	X	X	X	X	X	X
40	AQM 5 - HVS3376	Apr 01, 2024		Filter paper	S24-Ap0011168	X	X	X	X	X	X	X	X	X	X
41	AQM 5 - HVS3343	Mar 26, 2024		Filter paper	S24-Ap0011169	X	X	X	X	X	X	X	X	X	X
42	AQM 5 - HVS3322	Mar 20, 2024		Filter paper	S24-Ap0011170	X	X	X	X	X	X	X	X	X	X
43	AQM 5 - HVS3354	Mar 14, 2024		Filter paper	S24-Ap0011171	X	X	X	X	X	X	X	X	X	X
44	AQM 5 - HVS3364	Mar 08, 2024		Filter paper	S24-Ap0011172	X	X	X	X	X	X	X	X	X	X
45	AQM 5 - HVS3267	Mar 02, 2024		Filter paper	S24-Ap0011173	X	X	X	X	X	X	X	X	X	X
46	AQM 5 -	Feb 25, 2024		Filter paper	S24-Ap0011174	X	X	X	X	X	X	X	X	X	X

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Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

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Address: Level 3/100 Pacific Highway
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NSW 2060

Project Name: Captains Flat Lead Management Plan
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Received: Apr 5, 2024 8:18 AM
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Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
	HVS3331														
47	AQM 5 - HVS3278	Feb 19, 2024		Filter paper	S24-Ap0011175	X	X	X	X	X	X	X	X	X	X
48	AQM 5 - HVS3282	Feb 13, 2024		Filter paper	S24-Ap0011176	X	X	X	X	X	X	X	X	X	X
49	AQM 5 - HVS3261	Feb 07, 2024		Filter paper	S24-Ap0011177	X	X	X	X	X	X	X	X	X	X
Test Counts						49	49	49	49	49	49	49	49	49	49

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. Unless otherwise stated, all soil/sediment/solid results are reported on a dry weight basis.
3. Unless otherwise stated, all biota/food results are reported on a wet weight basis on the edible portion.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds where annotated.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with **blue** colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the sampling date; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is seven days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony Forming Unit	**Colour:** Pt-Co Units (CU)	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 6.0
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 50 – 150%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 6.0, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Lead	Total ug	< 1			1	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
North Sydney
NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1032616-A**
Project name CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001553
Received Date Oct 06, 2023

Client Sample ID			**AQM 1 - HVS3067**	**AQM 1 - HVS3053**	**AQM 1 - HVS3047**	**AQM 2 - HVS3008**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Oc0014613**	**S23-Oc0014614**	**S23-Oc0014615**	**S23-Oc0014616**
Date Sampled			**Sep 10, 2023**	**Sep 16, 2023**	**Sep 22, 2023**	**Sep 10, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.0	5.3	4.2	4.5
Barium	1.0	Total ug	36000	39000	38000	39000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	16	20	16	17
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.6	5.8	1.4	2.1
Iron	10	Total ug	340	1200	490	420
Lead	1	Total ug	6.4	15	6.4	13
Manganese	1.0	Total ug	11	27	13	11
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.2	2.0	1.3	1.3
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	13	32	20	16
Zinc	1	Total ug	26000	30000	27000	28000
Particulates - Final weighing	0.01	mg	2772.7	2808.2	2806.1	2698.9
Particulates - Initial weighing	0.01	mg	2726.7	2755.4	2772.8	2686.5

Client Sample ID			**AQM 2 - HVS3051**	**AQM 2 - HVS3046**	**AQM 2 - HVS3034**	**AQM 3 - HVS3005**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Oc0014617**	**S23-Oc0014618**	**S23-Oc0014619**	**S23-Oc0014620**
Date Sampled			**Sep 16, 2023**	**Sep 22, 2023**	**Sep 28, 2023**	**Sep 10, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.9	5.1	5.7	4.7
Barium	1.0	Total ug	37000	11000	35000	39000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	19	18	20	18
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	3.0	2.9	5.5	2.0
Iron	10	Total ug	860	610	1000	480

Client Sample ID			AQM 2 - HVS3051	AQM 2 - HVS3046	AQM 2 - HVS3034	AQM 3 - HVS3005
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Oc0014617**	**S23-Oc0014618**	**S23-Oc0014619**	**S23-Oc0014620**
Date Sampled			**Sep 16, 2023**	**Sep 22, 2023**	**Sep 28, 2023**	**Sep 10, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	14	19	30	8.5
Manganese	1.0	Total ug	21	14	25	13
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.9	1.4	1.9	1.5
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	27	27	35	18
Zinc	1	Total ug	29000	28000	32000	30000
Particulates - Final weighing	0.01	mg	2796.7	2806.7	2836.3	2711.3
Particulates - Initial weighing	0.01	mg	2749	2778.8	2767.5	2690.3

Client Sample ID			AQM 3 - HVS3033	AQM 3 - HVS3044	AQM 3 - HVS3035	AQM 4 - HVS3001
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Oc0014621**	**S23-Oc0014622**	**S23-Oc0014623**	**S23-Oc0014624**
Date Sampled			**Sep 16, 2023**	**Sep 22, 2023**	**Sep 28, 2023**	**Sep 10, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.5	4.3	5.4	4.9
Barium	1.0	Total ug	16000	38000	35000	43000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	8.7	17	20	19
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.7	2.0	3.1	2.4
Iron	10	Total ug	430	590	720	520
Lead	1	Total ug	7.2	9.4	9.8	8.7
Manganese	1.0	Total ug	12	14	17	14
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	1.3	1.7	1.3
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	12	28	27	22
Zinc	1	Total ug	16000	27000	32000	31000
Particulates - Final weighing	0.01	mg	2854	2809.3	2807.9	2719.8
Particulates - Initial weighing	0.01	mg	2777.1	2775.5	2777.5	2675.9

Client Sample ID			AQM 4 - HVS3032	AQM 4 - HVS3045	AQM 4 - HVS3036	AQM 5 - HVS3003
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Oc0014625**	**S23-Oc0014626**	**S23-Oc0014627**	**S23-Oc0014628**
Date Sampled			**Sep 16, 2023**	**Sep 22, 2023**	**Sep 28, 2023**	**Sep 10, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.6	5.1	5.7	2.8
Barium	1.0	Total ug	44000	41000	49000	21000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	18	18	22	10
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.8	1.8	3.4	1.1
Iron	10	Total ug	950	590	770	230
Lead	1	Total ug	6.9	7.9	8.7	3.7
Manganese	1.0	Total ug	21	16	19	6.1
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.5	1.3	2.6	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	25	27	30	8.8
Zinc	1	Total ug	32000	30000	36000	19000
Particulates - Final weighing	0.01	mg	2824.7	2825.8	2802.9	2708.4
Particulates - Initial weighing	0.01	mg	2772.7	2774.5	2770.9	2689.8

Client Sample ID			AQM 5 - HVS3011	AQM 5 - HVS3052	AQM 5 - HVS3037	BLANK - HVS3072
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Oc0014629**	**S23-Oc0014630**	**S23-Oc0014631**	**S23-Oc0014632**
Date Sampled			**Sep 16, 2023**	**Sep 22, 2023**	**Sep 28, 2023**	**Oct 06, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.6	2.2	2.7	2.6
Barium	1.0	Total ug	23000	20000	21000	21000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	9.9	8.2	10	9.9
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.4	1.0	1.1	< 1
Iron	10	Total ug	430	220	300	170
Lead	1	Total ug	4.4	3.2	4.1	3.5
Manganese	1.0	Total ug	11	6.2	8.2	4.7
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	12	11	12	6.1
Zinc	1	Total ug	17000	15000	17000	17000
Particulates - Final weighing	0.01	mg	2733.1	2806.7	2799.8	2792.1
Particulates - Initial weighing	0.01	mg	2674	2773.6	2764.3	2791.8

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8	Melbourne	Oct 16, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Melbourne	Oct 16, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Oct 09, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Oct 09, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

Eurofins ARL Pty Ltd
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IANZ# 1327	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
Report #: 1032616
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Oct 6, 2023 6:32 PM
Due: Oct 13, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	AQM 1 - HVS3067	Sep 10, 2023		Filter paper	S23-Oc0014613	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS3053	Sep 16, 2023		Filter paper	S23-Oc0014614	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS3047	Sep 22, 2023		Filter paper	S23-Oc0014615	X	X	X	X	X	X	X	X	X	X
4	AQM 2 - HVS3008	Sep 10, 2023		Filter paper	S23-Oc0014616	X	X	X	X	X	X	X	X	X	X
5	AQM 2 - HVS3051	Sep 16, 2023		Filter paper	S23-Oc0014617	X	X	X	X	X	X	X	X	X	X
6	AQM 2 - HVS3046	Sep 22, 2023		Filter paper	S23-Oc0014618	X	X	X	X	X	X	X	X	X	X
7	AQM 2 - HVS3034	Sep 28, 2023		Filter paper	S23-Oc0014619	X	X	X	X	X	X	X	X	X	X
8	AQM 3 - HVS3005	Sep 10, 2023		Filter paper	S23-Oc0014620	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Order No.: 318001553
Report #: 1032616
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Received: Oct 6, 2023 6:32 PM
Due: Oct 13, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
9	AQM 3 - HVS3033	Sep 16, 2023		Filter paper	S23-Oc0014621	X	X	X	X	X	X	X	X	X	X
10	AQM 3 - HVS3044	Sep 22, 2023		Filter paper	S23-Oc0014622	X	X	X	X	X	X	X	X	X	X
11	AQM 3 - HVS3035	Sep 28, 2023		Filter paper	S23-Oc0014623	X	X	X	X	X	X	X	X	X	X
12	AQM 4 - HVS3001	Sep 10, 2023		Filter paper	S23-Oc0014624	X	X	X	X	X	X	X	X	X	X
13	AQM 4 - HVS3032	Sep 16, 2023		Filter paper	S23-Oc0014625	X	X	X	X	X	X	X	X	X	X
14	AQM 4 - HVS3045	Sep 22, 2023		Filter paper	S23-Oc0014626	X	X	X	X	X	X	X	X	X	X
15	AQM 4 - HVS3036	Sep 28, 2023		Filter paper	S23-Oc0014627	X	X	X	X	X	X	X	X	X	X
16	AQM 5 - HVS3003	Sep 10, 2023		Filter paper	S23-Oc0014628	X	X	X	X	X	X	X	X	X	X
17	AQM 5 - HVS3011	Sep 16, 2023		Filter paper	S23-Oc0014629	X	X	X	X	X	X	X	X	X	X
18	AQM 5 -	Sep 22, 2023		Filter paper	S23-Oc0014630	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
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Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
18	AQM 5 - HVS3052	Sep 22, 2023		Filter paper	S23-Oc0014630										
19	AQM 5 - HVS3037	Sep 28, 2023		Filter paper	S23-Oc0014631	X	X	X	X	X	X	X	X	X	X
20	BLANK - HVS3072	Oct 06, 2023		Filter paper	S23-Oc0014632	X	X	X	X	X	X	X	X	X	X
Test Counts						20	20	20	20	20	20	20	20	20	20

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	Total ug	< 1			1.0	Pass	
Cadmium	Total ug	< 0.5			0.5	Pass	
Chromium	Total ug	< 1			1.0	Pass	
Cobalt	Total ug	< 1			1.0	Pass	
Copper	Total ug	< 1			1.0	Pass	
Iron	Total ug	< 10			10	Pass	
Lead	Total ug	< 1			1	Pass	
Manganese	Total ug	< 1			1.0	Pass	
Mercury	Total ug	< 0.1			0.1	Pass	
Molybdenum	Total ug	< 1			1	Pass	
Nickel	Total ug	< 1			1.0	Pass	
Selenium	Total ug	< 1			1.0	Pass	
Titanium	Total ug	< 1			1.0	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Adam Bateup	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
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NSW 2060

NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Attention: **Stephen Maxwell**

Report **1024109-A**
Project name CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001553
Received Date Sep 07, 2023

Client Sample ID			**AQM 1 - HVS2087**	**AQM 1 - HVS1952**	**AQM 1 - HVS3002**	**AQM 1 - HVS3023**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015172**	**S23-Se0015173**	**S23-Se0015174**	**S23-Se0015175**
Date Sampled			**Aug 05, 2023**	**Aug 11, 2023**	**Aug 17, 2023**	**Aug 23, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.9	1.7	1.7	1.4
Barium	1.0	Total ug	17000	13000	15000	13000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	6.7	6.0	5.9	5.2
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	< 1	1.5	1.1	< 1
Iron	10	Total ug	160	140	140	110
Lead	1	Total ug	3.0	2.9	2.8	2.2
Manganese	1.0	Total ug	4.7	4.1	4.0	3.2
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	6.3	6.0	5.4	5.7
Zinc	1	Total ug	13000	9100	11000	9800
Particulates - Final weighing	0.01	mg	2703.6	2676	2687.8	2763.7
Particulates - Initial weighing	0.01	mg	2691.2	2663.7	2675.7	2755.9

Client Sample ID			**AQM 1 - HVS3031**	**AQM 1 - HVS3006**	**AQM 2- HVS2086**	**AQM 2- HVS1953**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015176**	**S23-Se0015177**	**S23-Se0015178**	**S23-Se0015179**
Date Sampled			**Aug 29, 2023**	**Sep 04, 2023**	**Aug 05, 2023**	**Aug 11, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.4	1.5	1.4	3.1
Barium	1.0	Total ug	12000	14000	15000	13000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	4.9	5.0	5.7	5.3
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	< 1	2.1	1.4	1.2
Iron	10	Total ug	140	200	210	180
Lead	1	Total ug	2.4	7.8	4.9	4.0

Client Sample ID			AQM 1 - HVS3031	AQM 1 - HVS3006	AQM 2- HVS2086	AQM 2- HVS1953
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015176**	**S23-Se0015177**	**S23-Se0015178**	**S23-Se0015179**
Date Sampled			**Aug 29, 2023**	**Sep 04, 2023**	**Aug 05, 2023**	**Aug 11, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Manganese	1.0	Total ug	4.1	5.9	5.2	4.0
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	5.7	6.1	7.4	7.9
Zinc	1	Total ug	8500	10000	11000	9700
Particulates - Final weighing	0.01	mg	2809.6	2804.2	2702.8	2696.2
Particulates - Initial weighing	0.01	mg	2774.4	2688.7	2681.7	2674.8

Client Sample ID			AQM 2- HVS3010	AQM 2- HVS3022	AQM 2- HVS3030	AQM 2- HVS3007
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015180**	**S23-Se0015181**	**S23-Se0015182**	**S23-Se0015183**
Date Sampled			**Aug 17, 2023**	**Aug 23, 2023**	**Aug 29, 2023**	**Sep 04, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.3	2.1	1.5	2.0
Barium	1.0	Total ug	19000	20000	15000	19000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	7.6	7.7	5.7	7.3
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.6	1.1	1.1	1.9
Iron	10	Total ug	270	190	190	250
Lead	1	Total ug	5.1	3.5	2.8	5.6
Manganese	1.0	Total ug	5.5	4.7	4.9	6.2
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	1.1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	9.4	7.7	8.4	9.4
Zinc	1	Total ug	14000	14000	11000	14000
Particulates - Final weighing	0.01	mg	2686.1	2767.7	2794.3	2703.9
Particulates - Initial weighing	0.01	mg	2673	2759.9	2767.4	2680.1

Client Sample ID			AQM 3-HSV2088	AQM 3-HSV2016	AQM 3-HSV2054	AQM 3-HSV3021
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S23-Se0015184	S23-Se0015185	S23-Se0015186	S23-Se0015187
Date Sampled			Aug 05, 2023	Aug 11, 2023	Aug 17, 2023	Aug 23, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.7	1.9	2.3	1.8
Barium	1.0	Total ug	25000	15000	22000	17000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	10	5.9	8.2	6.7
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.4	1.5	1.2	1.2
Iron	10	Total ug	240	160	220	140
Lead	1	Total ug	11	3.4	3.7	3.0
Manganese	1.0	Total ug	6.8	4.3	5.9	4.2
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	9.2	6.9	10	7.7
Zinc	1	Total ug	19000	11000	16000	12000
Particulates - Final weighing	0.01	mg	2693.6	2693.8	2714.4	2776.8
Particulates - Initial weighing	0.01	mg	2676.3	2675.7	2694.3	2759

Client Sample ID			AQM 3-HSV3029	AQM 3-HSV3004	AQM 4-HSV2090	AQM 4-HSV2017
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S23-Se0015188	S23-Se0015189	S23-Se0015190	S23-Se0015191
Date Sampled			Aug 29, 2023	Sep 04, 2023	Aug 05, 2023	Aug 11, 2023
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	2.3	3.3	1.7	3.6
Barium	1.0	Total ug	21000	28000	17000	25000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	8.2	11	6.3	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	3.3	2.6	< 1	1.8
Iron	10	Total ug	270	460	170	300
Lead	1	Total ug	5.6	11	2.7	12
Manganese	1.0	Total ug	7.4	11	5.0	8.7
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	11	17	7.0	11
Zinc	1	Total ug	15000	20000	12000	18000
Particulates - Final weighing	0.01	mg	2791.4	2729.9	2702.2	2753.7
Particulates - Initial weighing	0.01	mg	2751.8	2687.3	2685.5	2684.1

Client Sample ID			AQM 4-HSV2055	AQM 4-HSV3020	AQM 4-HSV3028	AQM 4-HSV3000
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015192**	**S23-Se0015193**	**S23-Se0015194**	**S23-Se0015195**
Date Sampled			**Aug 17, 2023**	**Aug 23, 2023**	**Aug 29, 2023**	**Sep 04, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	8.2	2.3	2.5	2.0
Barium	1.0	Total ug	21000	19000	18000	17000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	7.6	7.7	7.9	6.9
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.7	1.2	1.8	1.8
Iron	10	Total ug	250	180	310	340
Lead	1	Total ug	4.6	3.9	4.4	4.8
Manganese	1.0	Total ug	7.3	5.4	8.6	9.0
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	2.5
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	8.9	8.5	12	13
Zinc	1	Total ug	15000	14000	13000	13000
Particulates - Final weighing	0.01	mg	2750.8	2776	2843	2741.1
Particulates - Initial weighing	0.01	mg	2688.3	2753.8	2770	2673.3

Client Sample ID			AQM 5-HSV2089	AQM 5-HSV2018	AQM 5-HSV3015	AQM 5-HSV3019
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015196**	**S23-Se0015197**	**S23-Se0015198**	**S23-Se0015199**
Date Sampled			**Aug 05, 2023**	**Aug 11, 2023**	**Aug 17, 2023**	**Aug 23, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.6	3.5	2.4	2.3
Barium	1.0	Total ug	15000	22000	21000	21000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	5.7	7.8	8.1	8.5
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.2	2.6	2.6	1.9
Iron	10	Total ug	160	240	230	170
Lead	1	Total ug	3.7	4.7	4.2	3.4
Manganese	1.0	Total ug	4.7	6.5	6.2	5.1
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	5.8	11	9.9	8.1
Zinc	1	Total ug	11000	15000	15000	15000
Particulates - Final weighing	0.01	mg	2698.7	2717.6	2704.2	2772.6
Particulates - Initial weighing	0.01	mg	2679.8	2688.7	2669.4	2756.7

Client Sample ID			AQM 5-HSV3027	AQM 5-HSV2092	BLANK-HVS1966
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**S23-Se0015200**	**S23-Se0015201**	**S23-Se0015202**
Date Sampled			**Aug 29, 2023**	**Sep 04, 2023**	**Sep 07, 2023**
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	1.0	Total ug	1.1	1.8	2.2
Barium	1.0	Total ug	9900	18000	24000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	4.2	6.4	8.9
Cobalt	1.0	Total ug	< 1	< 1	< 1
Copper	1.0	Total ug	1.2	1.7	1.2
Iron	10	Total ug	170	320	190
Lead	1	Total ug	2.3	4.3	3.9
Manganese	1.0	Total ug	4.4	8.3	5.2
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1
Titanium	1.0	Total ug	8.3	13	8.0
Zinc	1	Total ug	7200	13000	17000
Particulates - Final weighing	0.01	mg	2797	2737.5	2667.1
Particulates - Initial weighing	0.01	mg	2747.7	2682.1	2664.9

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Heavy Metals	Melbourne	Sep 07, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Sep 07, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Sep 07, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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Tel: +61 3 8564 5000	Tel: +61 3 8564 5000	Tel: +61 2 9900 8400	Tel: +61 2 6113 8091	Tel: +61 7 3902 4600	NATA# 1261
NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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IANZ# 1327	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.:
Report #: 1024109
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Sep 7, 2023 3:50 PM
Due: Sep 13, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
External Laboratory																						
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**																	
1	AQM 1 - HVS2087	Aug 05, 2023		Filter paper	S23-Se0015172	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS1952	Aug 11, 2023		Filter paper	S23-Se0015173	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS3002	Aug 17, 2023		Filter paper	S23-Se0015174	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
4	AQM 1 - HVS3023	Aug 23, 2023		Filter paper	S23-Se0015175	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
5	AQM 1 - HVS3031	Aug 29, 2023		Filter paper	S23-Se0015176	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
6	AQM 1 - HVS3006	Sep 04, 2023		Filter paper	S23-Se0015177	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
7	AQM 2- HVS2086	Aug 05, 2023		Filter paper	S23-Se0015178	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
8	AQM 2- HVS1953	Aug 11, 2023		Filter paper	S23-Se0015179	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	

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Report #: 1024109
Phone: 02 9954 8118
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Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
9	AQM 2-HVS3010	Aug 17, 2023		Filter paper	S23-Se0015180	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
10	AQM 2-HVS3022	Aug 23, 2023		Filter paper	S23-Se0015181	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
11	AQM 2-HVS3030	Aug 29, 2023		Filter paper	S23-Se0015182	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
12	AQM 2-HVS3007	Sep 04, 2023		Filter paper	S23-Se0015183	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
13	AQM 3-HSV2088	Aug 05, 2023		Filter paper	S23-Se0015184	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
14	AQM 3-HSV2016	Aug 11, 2023		Filter paper	S23-Se0015185	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
15	AQM 3-HSV2054	Aug 17, 2023		Filter paper	S23-Se0015186	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
16	AQM 3-HSV3021	Aug 23, 2023		Filter paper	S23-Se0015187	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
17	AQM 3-HSV3029	Aug 29, 2023		Filter paper	S23-Se0015188	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 3-	Sep 04, 2023		Filter paper	S23-Se0015189	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	Site# 25079 & 25289
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Due: Sep 13, 2023
Priority: 5 Day
Contact Name: Stephen Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
18	AQM 3-HSV3004	Sep 04, 2023		Filter paper	S23-Se0015189																	
19	AQM 4-HSV2090	Aug 05, 2023		Filter paper	S23-Se0015190	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
20	AQM 4-HSV2017	Aug 11, 2023		Filter paper	S23-Se0015191	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
21	AQM 4-HSV2055	Aug 17, 2023		Filter paper	S23-Se0015192	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
22	AQM 4-HSV3020	Aug 23, 2023		Filter paper	S23-Se0015193	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
23	AQM 4-HSV3028	Aug 29, 2023		Filter paper	S23-Se0015194	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
24	AQM 4-HSV3000	Sep 04, 2023		Filter paper	S23-Se0015195	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
25	AQM 5-HSV2089	Aug 05, 2023		Filter paper	S23-Se0015196	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
26	AQM 5-HSV2018	Aug 11, 2023		Filter paper	S23-Se0015197	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
27	AQM 5-	Aug 17, 2023		Filter paper	S23-Se0015198	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

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Sample Detail						Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Iron	Lead	Manganese	Mercury	Molybdenum	Nickel	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Zinc
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
	HSV3015																					
28	AQM 5-HSV3019	Aug 23, 2023		Filter paper	S23-Se0015199	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
29	AQM 5-HSV3027	Aug 29, 2023		Filter paper	S23-Se0015200	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
30	AQM 5-HSV2092	Sep 04, 2023		Filter paper	S23-Se0015201	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
31	BLANK-HVS1966	Sep 07, 2023		Filter paper	S23-Se0015202	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Test Counts						31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31	31

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**µg/L:** micrograms per litre
ppm: parts per million	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit		

Terms

APHA	American Public Health Association
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment however free tributyltin was measured and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should be used as a guide only and may be different when site specific Sampling Analysis and Quality Plan (SAQP) have been implemented

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR: No Limit

Results between 10-20 times the LOR: RPD must lie between 0-50%

Results >20 times the LOR: RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.4 where no positive PFAS results have been reported have been reviewed and no data was affected.

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	Total ug	< 1			1.0	Pass	
Barium	Total ug	< 1			1.0	Pass	
Cadmium	Total ug	< 0.5			0.5	Pass	
Chromium	Total ug	< 1			1.0	Pass	
Cobalt	Total ug	< 1			1.0	Pass	
Copper	Total ug	< 1			1.0	Pass	
Iron	Total ug	< 10			10	Pass	
Lead	Total ug	< 1			1	Pass	
Manganese	Total ug	< 1			1.0	Pass	
Mercury	Total ug	0.1			0.1	Pass	
Molybdenum	Total ug	< 1			1	Pass	
Nickel	Total ug	< 1			1.0	Pass	
Selenium	Total ug	< 1			1.0	Pass	
Titanium	Total ug	< 1			1.0	Pass	
Zinc	Total ug	< 1			1	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
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Attention: **Stephen Maxwell**

Report **1052412-A**
Project name CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID 318001553
Received Date Dec 11, 2023

Client Sample ID			**AQM 1 - HVS3099**	**AQM 1 - HVS3128**	**AQM 1 - HVS3143**	**AQM 1 - HVS3156**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0021983**	**N23-De0021984**	**N23-De0021985**	**N23-De0021986**
Date Sampled			**Dec 07, 2023**	**Dec 07, 2023**	**Dec 07, 2023**	**Dec 07, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.9	3.5	4.1	4.5
Barium	1.0	Total ug	28000	34000	10000	11000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	15	15	17	19
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.6	2.1	2.3	3.6
Iron	10	Total ug	310	360	420	520
Lead	1	Total ug	5.3	5.9	6.1	8.9
Manganese	1.0	Total ug	9.6	12	13	14
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.1	1.3	1.7	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	12	17	20	23
Zinc	1	Total ug	27000	25000	28000	30000
Particulates - Final weighing	0.01	mg	2746.1	2796.8	2787.1	2804.9
Particulates - Initial weighing	0.01	mg	2732.1	2776.9	2765.5	2780.2

Client Sample ID			**AQM 1 - HVS3165**	**AQM 2 - HVS3101**	**AQM 2 - HVS3135**	**AQM 2 - HVS3142**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0021987**	**N23-De0021988**	**N23-De0021989**	**N23-De0021990**
Date Sampled			**Dec 07, 2023**	**Dec 07, 2023**	**Nov 27, 2023**	**Nov 21, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.0	3.3	4.0	4.1
Barium	1.0	Total ug	11000	10000	13000	14000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	20	13	17	17
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.0	1.7	2.4	1.7
Iron	10	Total ug	470	310	470	430

Client Sample ID			AQM 1 - HVS3165	AQM 2 - HVS3101	AQM 2 - HVS3135	AQM 2 - HVS3142
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0021987**	**N23-De0021988**	**N23-De0021989**	**N23-De0021990**
Date Sampled			**Dec 07, 2023**	**Dec 07, 2023**	**Nov 27, 2023**	**Nov 21, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Lead	1	Total ug	7.2	6.7	7.1	7.6
Manganese	1.0	Total ug	15	8.8	12	13
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.8	1.4	1.4	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	22	12	23	21
Zinc	1	Total ug	33000	24000	30000	29000
Particulates - Final weighing	0.01	mg	2777.4	2735.6	2784.3	2778
Particulates - Initial weighing	0.01	mg	2758.2	2721.5	2764.6	2757.7

Client Sample ID			AQM 2 - HVS3148	AQM 2 - HVS3155	AQM 3 - HVS3097	AQM 3 - HVS3129
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0021991**	**N23-De0021992**	**N23-De0021993**	**N23-De0021994**
Date Sampled			**Nov 15, 2023**	**Dec 09, 2023**	**Dec 03, 2023**	**Nov 27, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	4.4	3.8	4.2	5.5
Barium	1.0	Total ug	7700	21000	10000	36000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	18	15	17	23
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.9	1.9	2.3	2.0
Iron	10	Total ug	410	370	420	490
Lead	1	Total ug	9.6	6.2	6.5	8.2
Manganese	1.0	Total ug	12	11	12	16
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.1	1.3	1.4	1.5
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	20	15	19	23
Zinc	1	Total ug	31000	29000	28000	30000
Particulates - Final weighing	0.01	mg	2775.2	2793.4	2723.2	2789.9
Particulates - Initial weighing	0.01	mg	2756.6	2775	2709	2770.3

Client Sample ID			AQM 3 - HVS3141	AQM 3 - HVS3147	AQM 4 - HVS3103	AQM 4 - HVS3131
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0021995**	**N23-De0021996**	**N23-De0021997**	**N23-De0021998**
Date Sampled			**Nov 21, 2023**	**Nov 15, 2023**	**Dec 03, 2023**	**Nov 27, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.5	4.0	3.9	2.8
Barium	1.0	Total ug	50000	14000	6900	15000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	22	17	14	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.0	2.3	1.9	1.1
Iron	10	Total ug	480	430	310	240
Lead	1	Total ug	7.9	6.5	4.9	3.5
Manganese	1.0	Total ug	15	12	9.9	7.7
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.5	1.4	1.3	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	20	16	11	9.5
Zinc	1	Total ug	37000	28000	24000	19000
Particulates - Final weighing	0.01	mg	2792.7	2785.3	2747.4	2798.5
Particulates - Initial weighing	0.01	mg	2770.8	2764.4	2723.3	2770.8

Client Sample ID			AQM 4 - HVS3140	AQM 4 - HVS3146	AQM 4 - HVS3153	AQM 5 - HVS3095
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0021999**	**N23-De0022000**	**N23-De0022001**	**N23-De0022002**
Date Sampled			**Nov 21, 2023**	**Nov 15, 2023**	**Nov 09, 2023**	**Dec 03, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	5.5	3.4	3.6	3.0
Barium	1.0	Total ug	12000	8600	19000	14000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	20	13	14	11
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	2.4	1.2	1.6	1.9
Iron	10	Total ug	500	340	310	230
Lead	1	Total ug	6.3	4.4	4.6	3.8
Manganese	1.0	Total ug	15	10	9.9	7.3
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.4	< 1	1.1	1.1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	18	14	13	7.9
Zinc	1	Total ug	33000	23000	22000	20000
Particulates - Final weighing	0.01	mg	2793.2	2786.7	2803.9	2736.8
Particulates - Initial weighing	0.01	mg	2758.8	2761.3	2778.5	2720

Client Sample ID			AQM 5 - HVS3130	AQM 5 - HVS3139	AQM 5 - HVS3145	AQM 5 - HVS3152
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N23-De0022003**	**N23-De0022004**	**N23-De0022005**	**N23-De0022006**
Date Sampled			**Nov 27, 2023**	**Nov 21, 2023**	**Nov 15, 2023**	**Nov 09, 2023**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	3.4	3.1	3.3	2.6
Barium	1.0	Total ug	12000	7600	9100	15000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	13	11	13	10
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.6	1.1	1.3	1.3
Iron	10	Total ug	320	280	330	230
Lead	1	Total ug	4.8	4.1	4.7	3.8
Manganese	1.0	Total ug	10	8.9	10	7.0
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	1.3	< 1	1.8	1.4
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	14	12	15	8.6
Zinc	1	Total ug	23000	20000	22000	17000
Particulates - Final weighing	0.01	mg	2792.6	2793.1	2778.5	2785.5
Particulates - Initial weighing	0.01	mg	2772	2770	2757	2766.2

Client Sample ID			BLANK - HVS3109
Sample Matrix			**Filter paper**
Eurofins Sample No.			**N23-De0022007**
Date Sampled			**Dec 08, 2023**
Test/Reference	LOR	Unit	
Heavy Metals			
Arsenic	1.0	Total ug	2.8
Barium	1.0	Total ug	19000
Cadmium	0.5	Total ug	< 0.5
Chromium	1.0	Total ug	11
Cobalt	1.0	Total ug	< 1
Copper	1.0	Total ug	< 1
Iron	10	Total ug	190
Lead	1	Total ug	3.4
Manganese	1.0	Total ug	5.7
Mercury	0.1	Total ug	< 0.1
Molybdenum	1	Total ug	< 1
Nickel	1.0	Total ug	1.2
Selenium	1.0	Total ug	< 1
Titanium	1.0	Total ug	6.2
Zinc	1	Total ug	19000
Particulates - Final weighing	0.01	mg	2719.8
Particulates - Initial weighing	0.01	mg	2714.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8	Melbourne	Dec 20, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Melbourne	Dec 20, 2023	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Dec 11, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Dec 11, 2023	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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Company Name: Ramboll Australia Pty Ltd Newcastle
Address: Level 3/100 Pacific Highway
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NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
Report #: 1052412
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 11, 2023 8:00 AM
Due: Dec 18, 2023
Priority: 5 Day
Contact Name: Sam Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	AQM 1 - HVS3099	Dec 03, 2023		Filter paper	N23-De0021983	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS3128	Nov 27, 2023		Filter paper	N23-De0021984	X	X	X	X	X	X	X	X	X	X
3	AQM 1 - HVS3143	Nov 21, 2023		Filter paper	N23-De0021985	X	X	X	X	X	X	X	X	X	X
4	AQM 1 - HVS3156	Nov 15, 2023		Filter paper	N23-De0021986	X	X	X	X	X	X	X	X	X	X
5	AQM 1 - HVS3165	Nov 09, 2023		Filter paper	N23-De0021987	X	X	X	X	X	X	X	X	X	X
6	AQM 2 - HVS3101	Dec 03, 2023		Filter paper	N23-De0021988	X	X	X	X	X	X	X	X	X	X
7	AQM 2 - HVS3135	Nov 27, 2023		Filter paper	N23-De0021989	X	X	X	X	X	X	X	X	X	X
8	AQM 2 - HVS3142	Nov 21, 2023		Filter paper	N23-De0021990	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd Newcastle
Address: Level 3/100 Pacific Highway
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NSW 2060

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Order No.: 318001553
Report #: 1052412
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 11, 2023 8:00 AM
Due: Dec 18, 2023
Priority: 5 Day
Contact Name: Sam Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
9	AQM 2 - HVS3148	Nov 15, 2023		Filter paper	N23-De0021991	X	X	X	X	X	X	X	X	X	X
10	AQM 2 - HVS3155	Dec 09, 2023		Filter paper	N23-De0021992	X	X	X	X	X	X	X	X	X	X
11	AQM 3 - HVS3097	Dec 03, 2023		Filter paper	N23-De0021993	X	X	X	X	X	X	X	X	X	X
12	AQM 3 - HVS3129	Nov 27, 2023		Filter paper	N23-De0021994	X	X	X	X	X	X	X	X	X	X
13	AQM 3 - HVS3141	Nov 21, 2023		Filter paper	N23-De0021995	X	X	X	X	X	X	X	X	X	X
14	AQM 3 - HVS3147	Nov 15, 2023		Filter paper	N23-De0021996	X	X	X	X	X	X	X	X	X	X
15	AQM 4 - HVS3103	Dec 03, 2023		Filter paper	N23-De0021997	X	X	X	X	X	X	X	X	X	X
16	AQM 4 - HVS3131	Nov 27, 2023		Filter paper	N23-De0021998	X	X	X	X	X	X	X	X	X	X
17	AQM 4 - HVS3140	Nov 21, 2023		Filter paper	N23-De0021999	X	X	X	X	X	X	X	X	X	X
18	AQM 4 -	Nov 15, 2023		Filter paper	N23-De0022000	X	X	X	X	X	X	X	X	X	X

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ABN: 50 005 085 521

Melbourne	Geelong	Sydney	Canberra	Brisbane	Newcastle
6 Monterey Road	19/8 Lewalan Street	179 Magowar Road	Unit 1,2 Dacre Street	1/21 Smallwood Place	1/2 Frost Drive
Dandenong South	Grovedale	Girraween	Mitchell	Murarrie	Mayfield West
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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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NATA# 2377
Site# 2370

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NZBN: 9429046024954

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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd Newcastle
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Order No.: 318001553
Report #: 1052412
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Dec 11, 2023 8:00 AM
Due: Dec 18, 2023
Priority: 5 Day
Contact Name: Sam Maxwell

Project Name: CAPTAINS FLAT LEAD MANAGEMENT PLAN
Project ID: 318001553

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
18	AQM 4 - HVS3146	Nov 15, 2023		Filter paper	N23-De0022000										
19	AQM 4 - HVS3153	Nov 09, 2023		Filter paper	N23-De0022001	X	X	X	X	X	X	X	X	X	X
20	AQM 5 - HVS3095	Dec 03, 2023		Filter paper	N23-De0022002	X	X	X	X	X	X	X	X	X	X
21	AQM 5 - HVS3130	Nov 27, 2023		Filter paper	N23-De0022003	X	X	X	X	X	X	X	X	X	X
22	AQM 5 - HVS3139	Nov 21, 2023		Filter paper	N23-De0022004	X	X	X	X	X	X	X	X	X	X
23	AQM 5 - HVS3145	Nov 15, 2023		Filter paper	N23-De0022005	X	X	X	X	X	X	X	X	X	X
24	AQM 5 - HVS3152	Nov 09, 2023		Filter paper	N23-De0022006	X	X	X	X	X	X	X	X	X	X
25	BLANK - HVS3109	Dec 08, 2023		Filter paper	N23-De0022007	X	X	X	X	X	X	X	X	X	X
26	AQM 3 - HVS3154	Nov 09, 2023		Filter paper	N23-De0022108	X	X	X	X	X	X	X	X	X	X
Test Counts						26	26	26	26	26	26	26	26	26	26

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Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank							
Heavy Metals							
Arsenic	Total ug	< 1			1.0	Pass	
Barium	Total ug	< 1			1.0	Pass	
Cadmium	Total ug	< 0.5			0.5	Pass	
Chromium	Total ug	< 1			1.0	Pass	
Cobalt	Total ug	< 1			1.0	Pass	
Copper	Total ug	< 1			1.0	Pass	
Iron	Total ug	< 10			10	Pass	
Lead	Total ug	< 1			1	Pass	
Manganese	Total ug	< 1			1.0	Pass	
Mercury	Total ug	< 0.1			0.1	Pass	
Molybdenum	Total ug	< 1			1	Pass	
Nickel	Total ug	< 1			1.0	Pass	
Selenium	Total ug	< 1			1.0	Pass	
Titanium	Total ug	< 1			1.0	Pass	
Zinc	Total ug	< 1			1	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Emily Rosenberg	Senior Analyst-Metal
Mary Makarios	Senior Analyst-Metal

Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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Ramboll Australia Pty Ltd
Level 3/100 Pacific Highway
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NATA Accredited
Accreditation Number 1261
Site Number 1254

Accredited for compliance with ISO/IEC 17025 – Testing
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Attention: **Stephen Maxwell**

Report **1065994-A**
Project name Captain Flat Lead Management Plan
Project ID 318001553
Received Date Feb 07, 2024

Client Sample ID			**AQM 1 - HVS3247**	**AQM 1 - HVS3265**	**AQM 2 - HVS3248**	**AQM 2 - HVS3264**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N24-Fe0014334**	**N24-Fe0014335**	**N24-Fe0014336**	**N24-Fe0014337**
Date Sampled			**Jan 26, 2024**	**Feb 01, 2024**	**Jan 26, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.6	2.1	1.4	1.1
Barium	1.0	Total ug	17000	20000	14000	10000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	8.2	9.2	7.2	5.5
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	1.6	1.3	< 1	< 1
Iron	10	Total ug	230	280	180	160
Lead	1	Total ug	3.4	4.4	2.8	2.9
Manganese	1.0	Total ug	5.1	6.6	4.7	4.0
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	4.5	6.5	4.1	4.7
Zinc	1	Total ug	12000	16000	10000	7800
Particulates - Final weighing	0.01	mg	2790.4	2669.3	2793.1	2816.2
Particulates - Initial weighing	0.01	mg	2764.1	2645.8	2765.7	2792.1

Client Sample ID			**AQM 3 - HVS3081**	**AQM 3 - HVS3263**	**AQM 4 - HVS3102**	**AQM 4 - HVS3250**
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N24-Fe0014338**	**N24-Fe0014339**	**N24-Fe0014340**	**N24-Fe0014341**
Date Sampled			**Jan 26, 2024**	**Feb 01, 2024**	**Jan 26, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Arsenic	1.0	Total ug	1.4	1.4	1.5	1.4
Barium	1.0	Total ug	12000	13000	13000	14000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	5.7	6.3	5.5	6.8
Cobalt	1.0	Total ug	< 1	< 1	< 1	< 1
Copper	1.0	Total ug	< 1	1.1	1.1	< 1
Iron	10	Total ug	180	240	180	220
Lead	1	Total ug	2.6	3.8	2.1	2.4

Client Sample ID			AQM 3 - HVS3081	AQM 3 - HVS3263	AQM 4 - HVS3102	AQM 4 - HVS3250
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N24-Fe0014338**	**N24-Fe0014339**	**N24-Fe0014340**	**N24-Fe0014341**
Date Sampled			**Jan 26, 2024**	**Feb 01, 2024**	**Jan 26, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit				
Heavy Metals						
Manganese	1.0	Total ug	5.2	6.9	5.3	5.5
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1	< 1
Titanium	1.0	Total ug	5.6	6.5	5.8	5.8
Zinc	1	Total ug	9000	9800	9600	11000
Particulates - Final weighing	0.01	mg	2757.3	2812.4	2759.7	2799.6
Particulates - Initial weighing	0.01	mg	2720.1	2775.6	2717	2767.3

Client Sample ID			AQM 5 - HVS3252	AQM 5 - HVS3262	BLANK HVS3249
Sample Matrix			**Filter paper**	**Filter paper**	**Filter paper**
Eurofins Sample No.			**N24-Fe0014342**	**N24-Fe0014343**	**N24-Fe0014344**
Date Sampled			**Jan 26, 2024**	**Feb 01, 2024**	**Feb 01, 2024**
Test/Reference	LOR	Unit			
Heavy Metals					
Arsenic	1.0	Total ug	1.7	1.6	1.5
Barium	1.0	Total ug	15000	15000	17000
Cadmium	0.5	Total ug	< 0.5	< 0.5	< 0.5
Chromium	1.0	Total ug	7.7	7.5	8.1
Cobalt	1.0	Total ug	< 1	< 1	< 1
Copper	1.0	Total ug	2.4	1.5	< 1
Iron	10	Total ug	220	240	130
Lead	1	Total ug	2.7	3.4	2.4
Manganese	1.0	Total ug	5.7	6.4	3.3
Mercury	0.1	Total ug	< 0.1	< 0.1	< 0.1
Molybdenum	1	Total ug	< 1	< 1	< 1
Nickel	1.0	Total ug	< 1	< 1	< 1
Selenium	1.0	Total ug	< 1	< 1	< 1
Titanium	1.0	Total ug	4.8	6.4	3.8
Zinc	1	Total ug	11000	11000	13000
Particulates - Final weighing	0.01	mg	2806.9	2801.3	2774.6
Particulates - Initial weighing	0.01	mg	2774.5	2772.1	2769.9

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Metals M8	Melbourne	Feb 07, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Heavy Metals	Melbourne	Feb 07, 2024	28 Days
- Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS			
Particulates - Final weighing	Field	Feb 07, 2024	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters)			
Particulates - Initial weighing	Field	Feb 07, 2024	30 Days
- Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).			

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
Site# 1254	Site# 25403	Site# 18217	Site# 25466	Site# 20794	Site# 25079 & 25289

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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd Newcastle
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: Captain Flat Lead Management Plan
Project ID: 318001553

Order No.: 318001553
Report #: 1065994
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 7, 2024 8:00 AM
Due: Feb 14, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
External Laboratory															
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**										
1	AQM 1 - HVS3247	Jan 26, 2024		Filter paper	N24-Fe0014334	X	X	X	X	X	X	X	X	X	X
2	AQM 1 - HVS3265	Feb 01, 2024		Filter paper	N24-Fe0014335	X	X	X	X	X	X	X	X	X	X
3	AQM 2 - HVS3248	Jan 26, 2024		Filter paper	N24-Fe0014336	X	X	X	X	X	X	X	X	X	X
4	AQM 2 - HVS3264	Feb 01, 2024		Filter paper	N24-Fe0014337	X	X	X	X	X	X	X	X	X	X
5	AQM 3 - HVS3081	Jan 26, 2024		Filter paper	N24-Fe0014338	X	X	X	X	X	X	X	X	X	X
6	AQM 3 - HVS3263	Feb 01, 2024		Filter paper	N24-Fe0014339	X	X	X	X	X	X	X	X	X	X
7	AQM 4 - HVS3102	Jan 26, 2024		Filter paper	N24-Fe0014340	X	X	X	X	X	X	X	X	X	X
8	AQM 4 - HVS3250	Feb 01, 2024		Filter paper	N24-Fe0014341	X	X	X	X	X	X	X	X	X	X

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NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261	NATA# 1261
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IANZ# 1327	IANZ# 1308	IANZ# 1290	IANZ# 1402

Company Name: Ramboll Australia Pty Ltd Newcastle
Address: Level 3/100 Pacific Highway
North Sydney
NSW 2060

Project Name: Captain Flat Lead Management Plan
Project ID: 318001553

Order No.: 318001553
Report #: 1065994
Phone: 02 9954 8118
Fax: 02 9954 8150

Received: Feb 7, 2024 8:00 AM
Due: Feb 14, 2024
Priority: 5 Day
Contact Name: Stephen Maxwell

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Barium	Cobalt	Iron	Manganese	Molybdenum	Particulates - Final weighing	Particulates - Initial weighing	Selenium	Titanium	Metals M8
Melbourne Laboratory - NATA # 1261 Site # 1254						X	X	X	X	X	X	X	X	X	X
9	AQM 5 - HVS3252	Jan 26, 2024		Filter paper	N24-Fe0014342	X	X	X	X	X	X	X	X	X	X
10	AQM 5 - HVS3262	Feb 01, 2024		Filter paper	N24-Fe0014343	X	X	X	X	X	X	X	X	X	X
11	BLANK HVS3249	Feb 01, 2024		Filter paper	N24-Fe0014344	X	X	X	X	X	X	X	X	X	X
Test Counts						11	11	11	11	11	11	11	11	11	11

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follow guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013. They are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry weight basis unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion unless otherwise stated.
4. For CEC results where the sample's origin is unknown or environmentally contaminated, the results should be used advisedly.
5. Actual LORs are matrix dependent. Quoted LORs may be raised where sample extracts are diluted due to interferences.
6. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
7. SVOC analysis on waters is performed on homogenised, unfiltered samples unless noted otherwise.
8. Samples were analysed on an 'as received' basis.
9. Information identified in this report with blue colour indicates data provided by customers that may have an impact on the results.
10. This report replaces any interim results previously issued.

Holding Times

Please refer to the 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours before sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and despite any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling; therefore, compliance with these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether, the holding time is 7 days; however, for all other VOCs, such as BTEX or C6-10 TRH, the holding time is 14 days.

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ppm:** parts per million
µg/L: micrograms per litre	**ppb:** parts per billion	**%:** Percentage
org/100 mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100 mL:** Most Probable Number of organisms per 100 millilitres
CFU: Colony forming unit	**Colour:** Pt-Co Units	

Terms

APHA	American Public Health Association
CEC	Cation Exchange Capacity
COC	Chain of Custody
CP	Client Parent - QC was performed on samples pertaining to this report
CRM	Certified Reference Material (ISO17034) - reported as percent recovery.
Dry	Where moisture has been determined on a solid sample, the result is expressed on a dry weight basis.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
LOR	Limit of Reporting.
LCS	Laboratory Control Sample - reported as percent recovery.
Method Blank	In the case of solid samples, these are performed on laboratory-certified clean sands and in the case of water samples, these are performed on de-ionised water.
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC represents the sequence or batch that client samples were analysed within.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
SRA	Sample Receipt Advice
Surr - Surrogate	The addition of a similar compound to the analyte target is reported as percentage recovery. See below for acceptance criteria.
TBTO	Tributyltin oxide (*bis*-tributyltin oxide) - individual tributyltin compounds cannot be identified separately in the environment; however, free tributyltin was measured, and its values were converted stoichiometrically into tributyltin oxide for comparison with regulatory limits.
TCLP	Toxicity Characteristic Leaching Procedure
TEQ	Toxic Equivalency Quotient or Total Equivalence
QSM	US Department of Defense Quality Systems Manual Version 5.4
US EPA	United States Environmental Protection Agency
WA DWER	Sum of PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC - Acceptance Criteria

The acceptance criteria should only be used as a guide and may be different when site-specific Sampling Analysis and Quality Plan (SAQP) have been implemented.

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is ≤30%; however, the following acceptance guidelines are equally applicable:

Results <10 times the LOR:	No Limit
Results between 10-20 times the LOR:	RPD must lie between 0-50%
Results >20 times the LOR:	RPD must lie between 0-30%

NOTE: pH duplicates are reported as a range, not as RPD

Surrogate Recoveries: Recoveries must lie between 20-130% for Speciated Phenols & 50-150% for PFAS. SVOCs recoveries 20 – 150%, VOC recoveries 70 – 130%

PFAS field samples containing surrogate recoveries above the QC limit designated in QSM 5.4, where no positive PFAS results have been reported or reviewed, and no data was affected.

QC Data General Comments

1. Where a result is reported as less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown are not data from your samples.
3. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling. Therefore, laboratory analysis is unlikely to be completed within holding time.Analysis will begin as soon as possible after sample receipt.
4. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of recovery, the term "INT" appears against that analyte.
5. For Matrix Spikes and LCS results, a dash "-" in the report means that the specific analyte was not added to the QC sample.
6. Duplicate RPDs are calculated from raw analytical data; thus, it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1	Result 2	RPD	Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Heavy Metals									
Arsenic			Total ug	< 1			1.0	Pass	
Cadmium			Total ug	< 0.5			0.5	Pass	
Chromium			Total ug	< 1			1.0	Pass	
Cobalt			Total ug	< 1			1.0	Pass	
Copper			Total ug	< 1			1.0	Pass	
Iron			Total ug	< 10			10	Pass	
Lead			Total ug	< 1			1	Pass	
Manganese			Total ug	< 1			1.0	Pass	
Mercury			Total ug	< 0.1			0.1	Pass	
Molybdenum			Total ug	< 1			1	Pass	
Nickel			Total ug	< 1			1.0	Pass	
Selenium			Total ug	< 1			1.0	Pass	
Titanium			Total ug	< 1			1.0	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
Heavy Metals				Result 1					
Lead	M24-Fe0025004	NCP	%	89			75-125	Pass	
Mercury	M24-Fe0025004	NCP	%	86			75-125	Pass	
Nickel	M24-Fe0025004	NCP	%	90			75-125	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
Heavy Metals				Result 1	Result 2	RPD			
Lead	M24-Fe0025004	NCP	Total ug	< 0.01	< 0.01	<1	30%	Pass	
Mercury	M24-Fe0025004	NCP	Total ug	< 0.001	< 0.001	<1	30%	Pass	
Nickel	M24-Fe0025004	NCP	Total ug	< 0.01	< 0.01	<1	30%	Pass	

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	N/A
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

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Glenn Jackson
Managing Director

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

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