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**John Holland Rail Pty Ltd**

Document type  
**Report**

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**6 July 2021**

# TARAGO AIR QUALITY MONITORING REPORT **MAY 2021**

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Checked by **Martin Parsons**  
Approved by **Fiona Robinson**  
Description **Data collected during May 2021 for the air quality monitoring program at Tarago, NSW**

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## 1. OVERVIEW

Ramboll Australia Pty Ltd (Ramboll) has been commissioned by John Holland Rail Pty Ltd (JHR) to implement and maintain an air quality monitoring program to inform air quality impacts resulting from retained lead containing ore within the Goulburn - Bombala rail corridor in the Tarago Area. Impacts from lead have been observed in the railway corridor and surrounding areas, likely from historical spillage associated with loading of ore at the site (Ramboll, 2019). The location is shown on **Figure 2-1**.

Lead 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 1** 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.

JHR is implementing management measures to minimise dust generation at the site. The Interim Lead Management Plan (Ramboll, 2019) requires all stockpiles to be covered and water to be applied to materials to minimise dust generation. A dust mitigation program was undertaken for the project from 6 to 9 of April 2020 (Green Track Solutions, 2020). Approximately 8,210 L of acrylate-based polymer soil binding agent ('DirtGlue Regular') was applied. The key sections where product was applied were: Goulburn Street level crossing to 260 m north of the rail station platform (0.3 L/m<sup>2</sup>); eastern side of the service rail line adjacent to Goulburn Street and level crossing (surface application) and the hardstand area to the west of the rail section and surrounding area (0.27 L/m<sup>2</sup>). Approximately 4,160 L of a fluid dust suppressant, comprised of a blend of alkane and alkylated organic compounds ('DustLess'), was applied to the undisturbed area immediately to the west of the service rail corridor (0.5 L/m<sup>2</sup>) and the access road to the west of the hardstand area (surface application).

The focus of this air quality monitoring program is lead in particulate form, both for ambient airborne fractions and deposited dust. This program was commissioned during early April 2020 in Tarago, NSW. The monitoring program does not capture conditions prior to the dust mitigation project. This report comprises data collected during May 2021 and is compared against data collected in the previous months commencing from April 2020.

## 2. METHODOLOGY

### 2.1 Approach

The monitoring program consisted of three dust monitoring techniques and was interpreted in conjunction with meteorological data collected by the Department of Planning, Industry and Environment (DPIE) in Goulburn, approximately 38 km to the north-north-east.

The program is outlined in the following sections:

- Deposited dust and lead measured continuously throughout each month (Section 2.1.1);
- Total suspended particulates (TSP) including lead contained within the TSP measured for a 24-hour period completed every one day in six days (Section 2.1.2); and
- Particulates less than 10 microns in aerodynamic diameter (PM<sub>10</sub>) and less than 2.5 microns measured continuously throughout each month (PM<sub>2.5</sub>; Section 2.1.3).

Siting of all equipment was completed, as far as practicable, in accordance with the recommendations of *AS/NZS 3580.1.1 Guide to siting air monitoring equipment*. Locations of all equipment are shown in **Figure 2-1** and images of the monitoring equipment in-situ are shown in **Appendix 2**. Siting was weighed against technical and practical considerations and the fence is considered a minor obstruction to the contaminated site, where one of the instrument inlets is below the fence-line.

#### 2.1.1 Deposited dust and lead

Deposited dust is particulate matter that settles out of the air onto the ground or surfaces. It generally consists of larger, heavier particles from a local source and is considered a nuisance impact rather than a health concern. These particles contain a variety of components such as nitrates, sulphates, organic chemicals, metals, soil or dust particles and allergens.

For this study, sampling and analysis was conducted in accordance with the recommendations of *AS/NZS 3580.10.1 Determination of Particulate Matter – Deposited Matter – Gravimetric method*. Each gauge is installed to collect deposited matter in a glass bottle together with rainwater through a funnel over a period of 30 days +/- 2 days at a mounted height of approximately 2 m above ground surface. The samples are analysed for insoluble solids (including ash and combustible matter) and lead by inductively coupled plasma mass spectrometry (ICP-MS).

Four dust deposition gauges were placed to assess deposited dust and lead in residential areas east, west, and south-east of the source area and at 106 Goulburn Street (the nearest sensitive receptor).

#### 2.1.2 TSP and lead

TSP are solid particles and water droplets less than approximately 50 to 100 µm in aerodynamic diameter. This parameter is dominated by larger entrained particles which are generally considered a nuisance dust compared to finer particles such as PM<sub>10</sub> and PM<sub>2.5</sub> which are known to be hazardous to human health. The Australian Standard to measure lead in particulates (*AS/NZS.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.

Sampling and analysis for this program has been conducted in accordance with the Australian Standard. Calibration has been completed by Ramboll, consistent with the Australian Standard and manufacturers recommendations. The program utilises a high-volume air sampler (Hi-Vol

3000) with a TSP head, 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 filters are weighed following sampling to determine the weight of the particulate matter captured and further analysed for lead concentration using ICP-MS. To compare particulate lead to the air quality annual standard, lead sampling must be carried out for a period of 24 hours at least every sixth day, the approach applied for this program.

TSP including lead contained within the TSP were measured at 106 Goulburn Street identified as the nearest sensitive receptor to the source area.

### 2.1.3 Continuous PM<sub>10</sub> and PM<sub>2.5</sub>

PM<sub>10</sub> refers to particles of less than 10 microns in aerodynamic diameter, and PM<sub>2.5</sub> to those of less than 2.5 microns. These size fractions can be drawn into the respiratory system and can cause serious health effects, such as lung disease, asthma, heart attacks, respiratory and cardiovascular disease. As with other fractions of particulate matter, particles consist of a multitude of constituents from a range of local and regional sources.

For this program a particle counter (QAMS DMP 7000) is maintained to understand how concentrations of particulate matter vary over finer temporal scales. Whilst the focus of the program is on lead concentrations, PM<sub>10</sub> and PM<sub>2.5</sub> data from the particle counter provide a useful indication of concentrations over a day or week relative to prevailing meteorological conditions which can provide an indication of likely sources if needed. The instrument is configured to measure PM<sub>10</sub> and PM<sub>2.5</sub> at 5-minute intervals over the course of the program.

## 2.2 Regional meteorological monitoring

The Department of Planning, Industry and Environment (DPIE) maintains a state-wide network of air quality monitoring stations, including one commissioned in late 2019 in Goulburn, NSW. The station measures meteorological parameters, of which wind speed, wind direction, temperature, humidity, and rainfall are of interest to this program. One-hourly averaged data have been analysed to determine prevailing conditions.

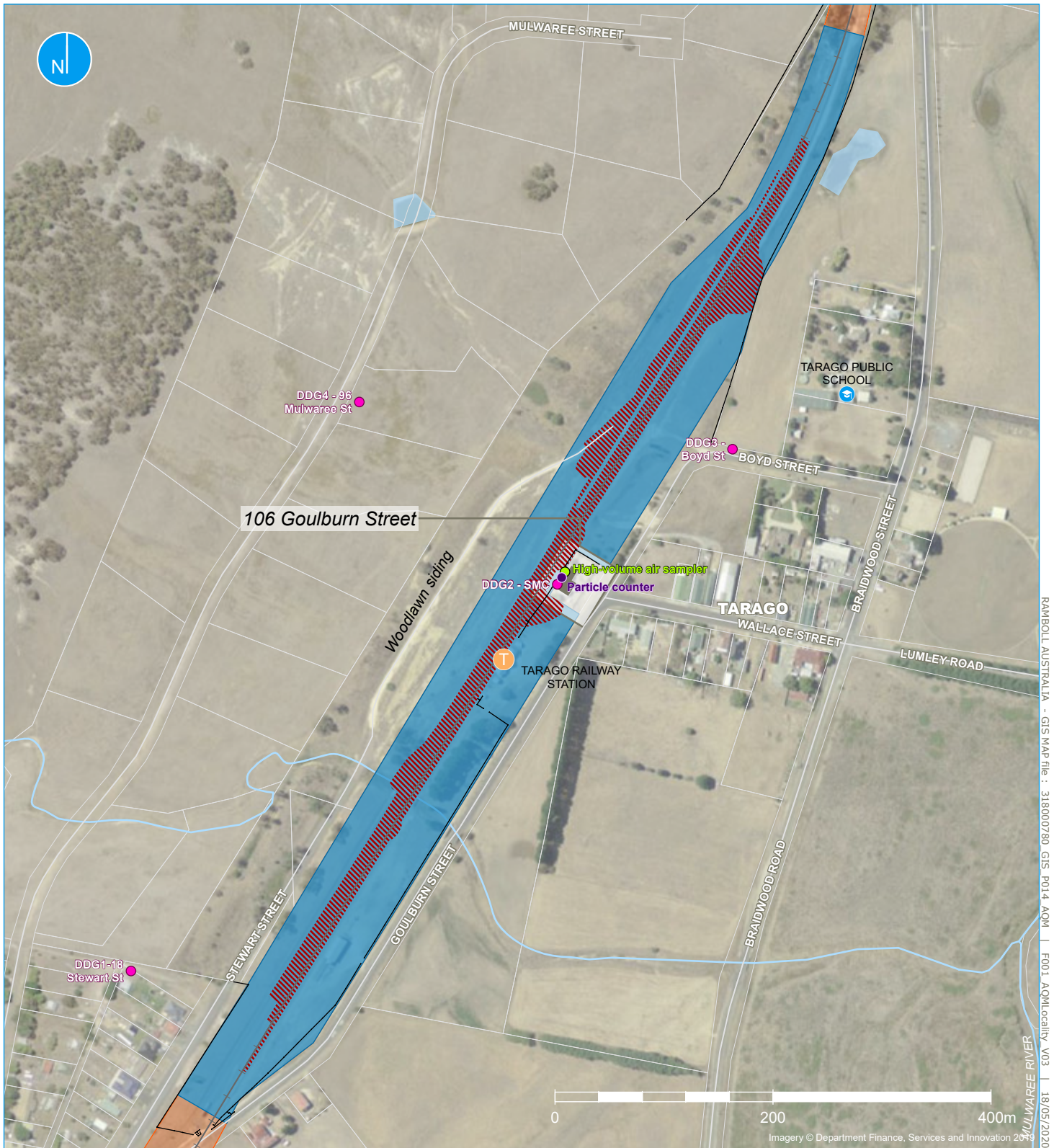
DPIE do not monitor lead routinely as part of their state-wide air quality monitoring program.

## 2.3 Relevant air quality criteria

Air quality criteria relevant to the program are presented in **Table 2-1**.

**Table 2-1: Air quality criteria relevant to JHR Tarago air quality monitoring program**

Pollutant	Averaging period	Criteria	Source
Lead	Annual	0.5 µg/m <sup>3</sup>	NEPC (1998)
TSP	Annual	90 µg/m <sup>3</sup>	NHMRC (1996)
PM <sub>2.5</sub>	24 hours	25 µg/m <sup>3</sup>	DoE (2016)
	Annual	8 µg/m <sup>3</sup>	DoE (2016)
PM <sub>10</sub>	24 hours	50 µg/m <sup>3</sup>	DoE (2016)
	Annual	25 µg/m <sup>3</sup>	DoE (2016)
Deposited dust	Annual	4 g/m <sup>2</sup> /month	NERDDC (1988)



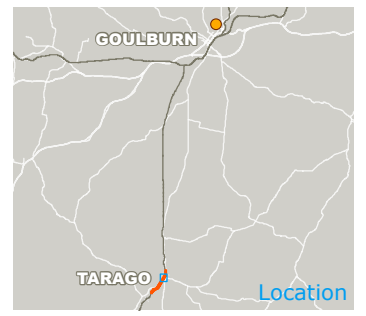
RAMBOLL AUSTRALIA - GIS MAP file : 318000780 GIS\_P01.4\_AQM | F001\_AQM\locality\_V03 | 18/05/2020

**Legend**

- Site boundary
- Rail corridor
- Rail corridor fence
- Area of lead contamination within the rail corridor

**Sampling locations**

- Deposited dust and lead (from dust deposition gauge)
- TSP and lead (from high volume air sampler)
- Continuous PM10 and PM2.5 (from particle counter)
- Regional meteorological monitoring station (see location inset)



**A4**  
1:5,000

Figure 2-1 | Tarago air quality monitoring locations

### 3. RESULTS

#### 3.1 Deposited dust and lead

No lead was measured above the detection limit (1 µg) at the four monitoring locations during May 2021. All locations measured deposited dust (insoluble solids) below the annual average criteria of 4 g/m<sup>2</sup>/month and the rolling annual average for each location remains under criteria.

**Table 3-1: Measured lead content in deposited dust and deposited dust at four properties around Tarago, NSW**

Month	DDG1, Stewart St		DDG2, Station Masters Cottage		DDG3, Boyd St		DDG4, Mulwaree St	
	Lead (µg)	Insoluble solids (g/m <sup>2</sup> /month)	Lead (µg)	Insoluble solids (g/m <sup>2</sup> /month)	Lead (µg)	Insoluble solids (g/m <sup>2</sup> /month)	Lead (µg)	Insoluble solids (g/m <sup>2</sup> /month)
April (1-4-2020 to 30-4-2020)	<0.01	1.0	<0.01	0.7	<0.01	0.6	<0.01	0.4
May (30-4-2020 to 1-6-2020)	<1	0.9	<1	0.4	<1	0.4	<1	0.3
June (1-6-2020 to 1-7-2020)	<1	0.9	<1	0.5	<1	1.3	<1	0.3
July (1-7-2020 to 13-08-2020)	<1	1.9	<1	0.8	<1	0.2	<1	0.7
August (13-08-2020 to 1-09-2020)	<1	0.5	<1	0.2	<1	0.2	<1	0.2
September (1-09-2020 to 30-09-2020)	<1	2.1	<1	1.2	<1	7.2 <sup>1</sup>	<1	0.8
October (30-09-2020 to 30-10-2020)	<1	3.0	<1	3.9	<1	1.4	<1	1.2
November (30-10-2020 to 1-12-2020)	<1	0.9	<1	1.4	<1	1.2	<1	0.6
December (1-12-2020 to 29-12-2020)	<1	2.3	<1	1.0	<1	4.0	<1	1.0
January (29-12-2020 to 28-01-2021)	<1	1.8	<1	4.3	<1	4.2 <sup>2</sup>	<1	1.5
February (28-01-2021 to 26-02-2021)	<1	1	<1	1.8	<1	8.8	<1	0.7
March (26-02-2021 to 29-03-2021)	<1	1.2	<1	1.2	<1	1.5	<1	0.2
April (29-03-2021 to 30-04-2021)	<1	1.6	<1	0.7	<1	3.4	<1	2
May (30-04-2021 to 1-06-2021)	<1	1.0	<1	0.4	<1	0.2	<1	0.4
<b>Rolling annual average</b>	<b>&lt;1</b>	<b>1.5</b>	<b>&lt;1</b>	<b>1.5</b>	<b>&lt;1</b>	<b>2.2</b>	<b>&lt;1</b>	<b>0.8</b>

Limit of reporting = 0.01 µg during April and 1 µg from May forward following change in laboratory facility completing analysis

<sup>1</sup> Sample invalidated – DDG3 September 2020 sample contaminated with animal faeces

<sup>2</sup> Sample invalidated – DDG3 January 2021 sample contaminated with spiders and insects



### 3.2 TSP and lead

Lead was detected in three TSP samples collected during May 2021, while two TSP samples (5 May 2021 and 23 May 2021) detected no lead above the laboratory limit of reporting (< 1 µg). In all cases where lead was detected the concentration was below the annual average criteria for lead (**Figure 3.1**). Similarly, TSP measured during the period was below the annual average criteria (**Figure 3.2**). When all measured data is considered together there is no linear relationship between lead and TSP. If the periods where lower concentrations of measured lead are isolated, there is a low to moderate correlation between these parameters (**Figure 3.3**). The days where higher lead was measured but without a corresponding relationship with TSP (i.e. the highest 16% of lead values selected for this analysis), suggest that operations or local activities disturbed local lead sources during these periods.

Lead concentrations measured during May 2021 remain low relative to April, September, October, and November 2020.

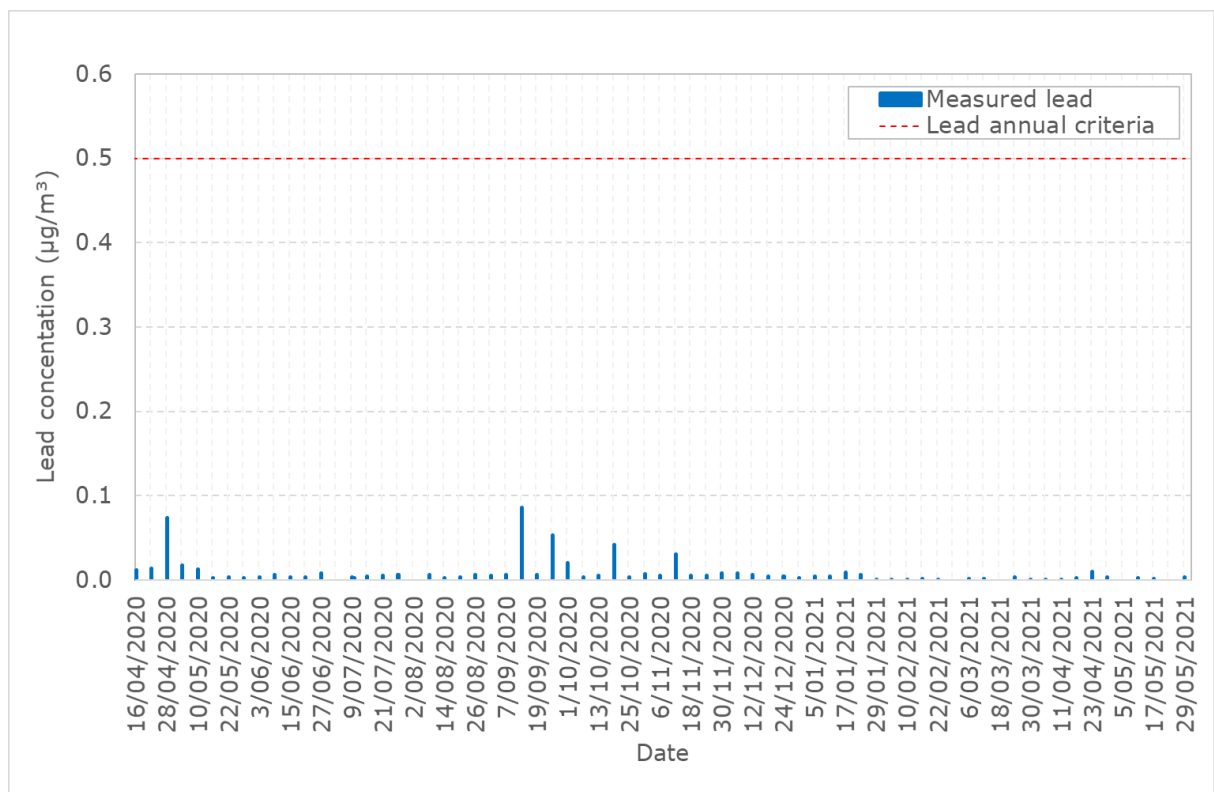


Figure 3.1: Measured 24-hour average lead concentration every one day in six since program commissioning

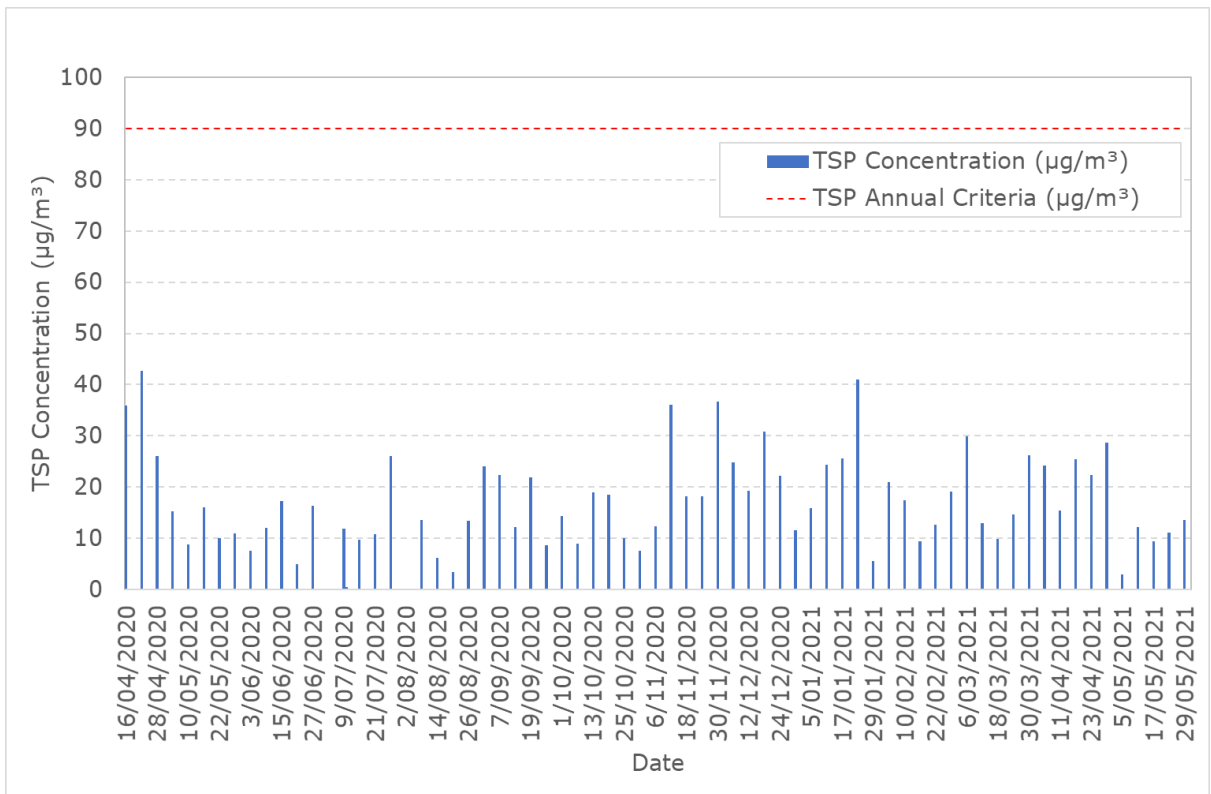


Figure 3.2: Measured 24-hour average TSP concentration every one day in six since program commissioning

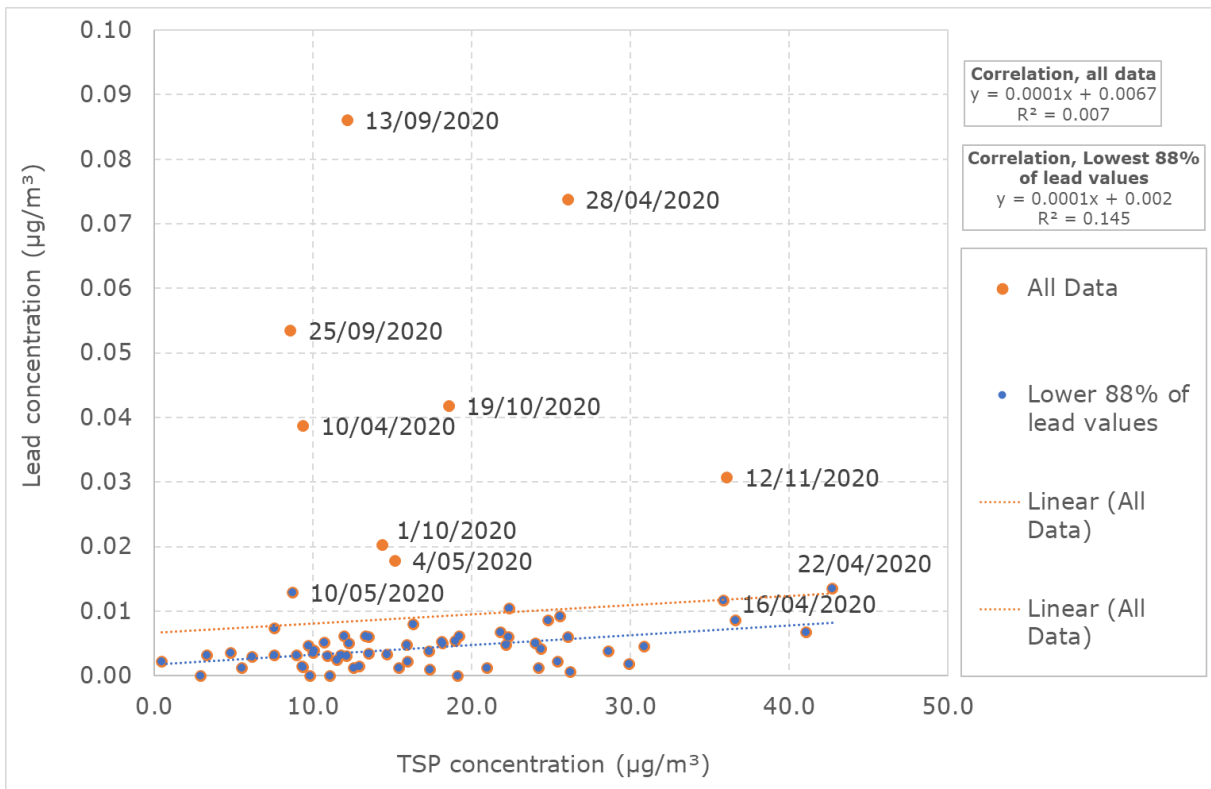
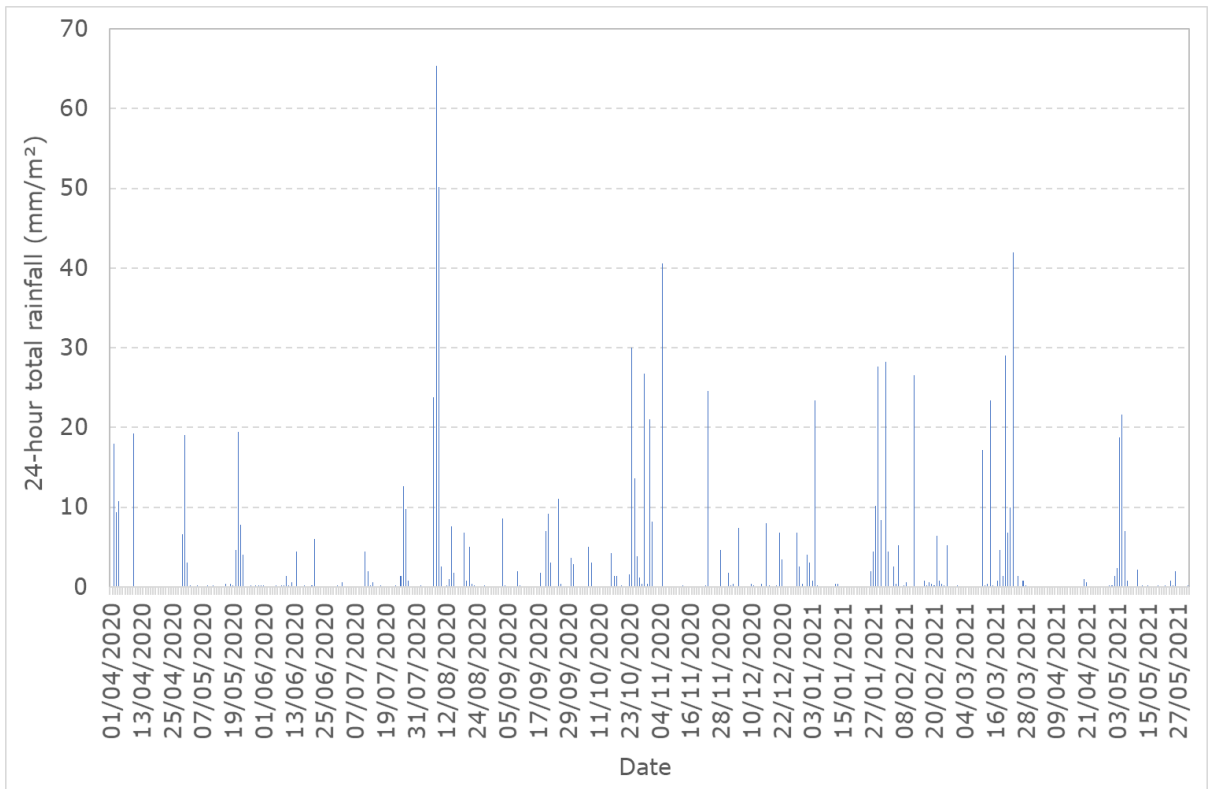


Figure 3.3: Correlation between TSP concentration and lead concentration from the same sample

Rainfall contributes to suppressing dust. Total daily rainfall from the Goulburn site during May is presented in **Figure 3.4**. May was a relatively dry month with a brief period of moderate rainfall at the beginning of the month.

Analysis of monitored meteorological data indicated that regional winds during May 2021 were predominantly from the west (**Figure 3.5**). There were few winds from other directions during this period. The monitoring location is influenced by sources in the direction of the rail corridor when winds prevail roughly in a 180° arc from the north, west and south.

Winds ranged in speed, where the strongest winds of 4 to 8 m/s prevailed from the west. Calm conditions have an important influence on pollutant dispersion in the atmosphere. Calm conditions can result in elevated concentrations of pollutants from low level fugitive sources near to the source. Conversely, higher wind speeds can also generate elevated concentrations of particulate matter through the wind erosion of sources.



**Figure 3.4: 24-hour total rainfall (mm/m²) measured in Goulburn during the monitoring period**

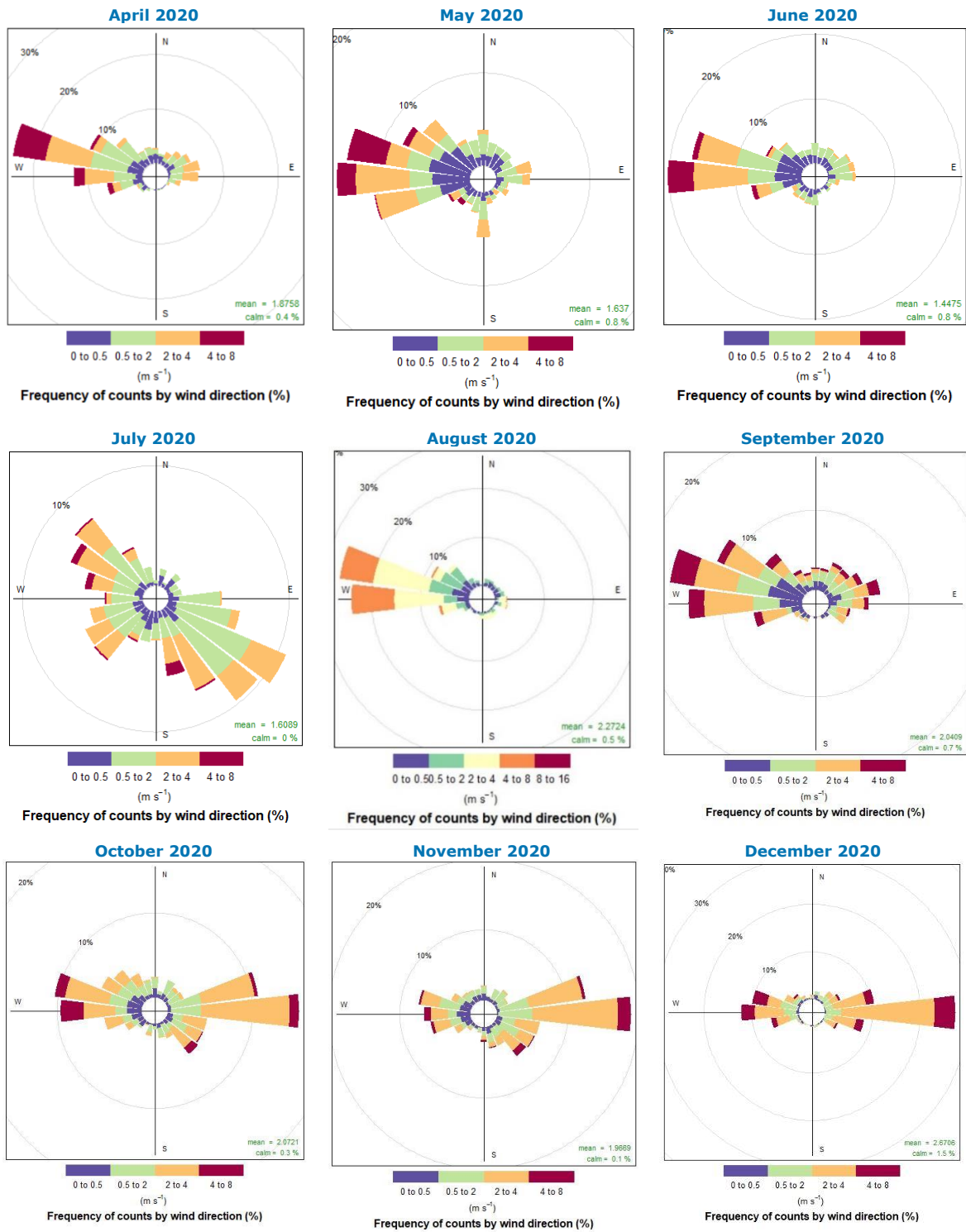
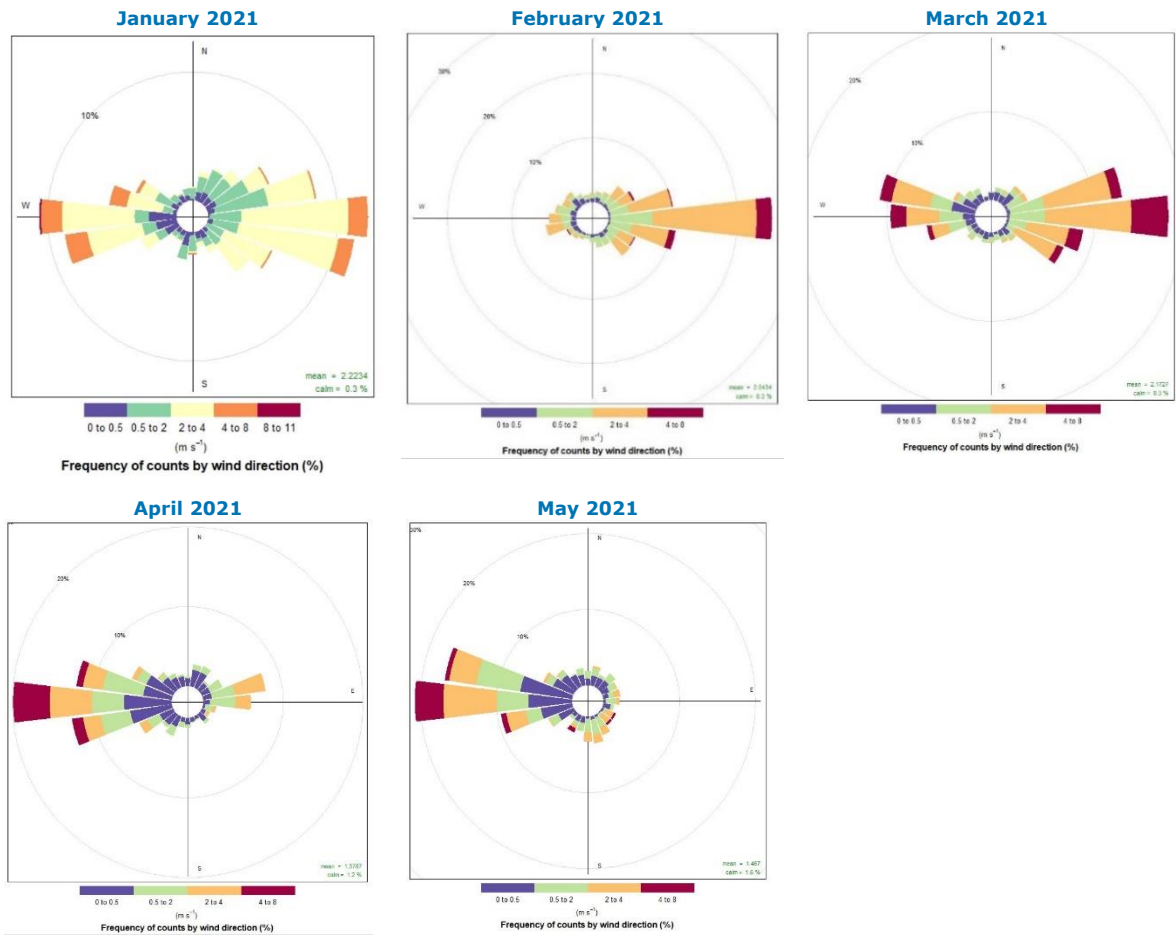


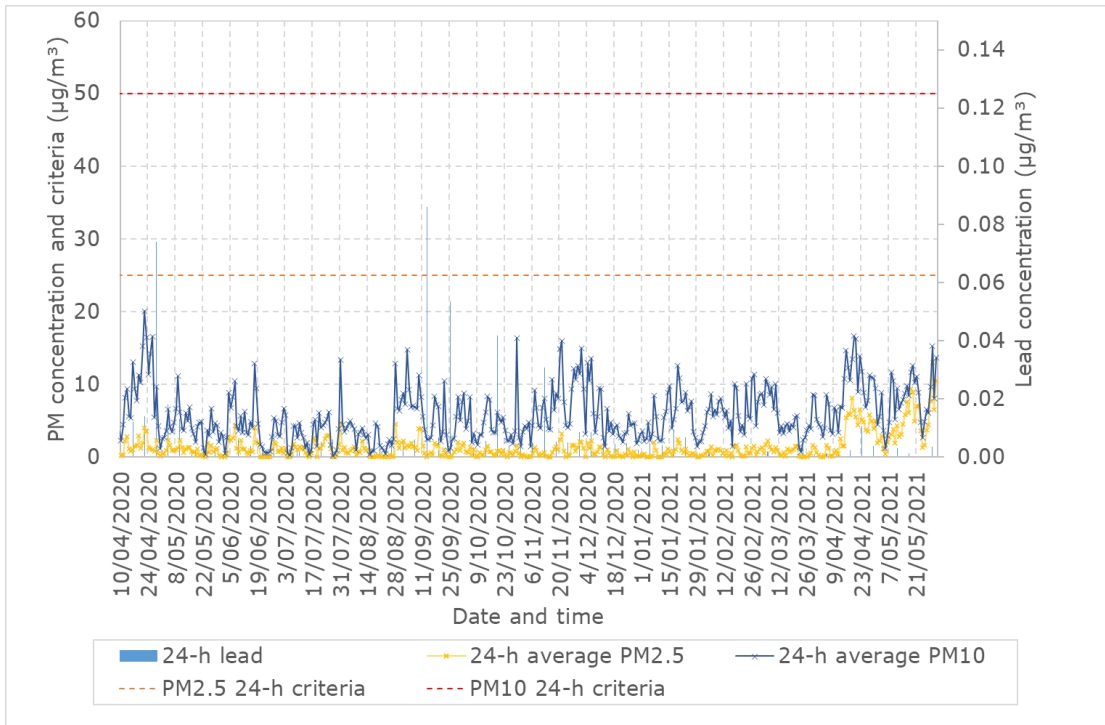
Figure 3.5: Prevailing regional hourly average wind speed and wind direction measured at Goulburn during each monitoring month during 2020



**Figure 3.6: Prevailing regional hourly average wind speed and wind direction measured at Goulburn during each monitoring month during 2021**

### 3.3 Continuous PM<sub>10</sub> and PM<sub>2.5</sub>

All PM<sub>10</sub> and PM<sub>2.5</sub> 24-hour average concentrations were below the air quality criteria at the Station Masters Cottage during April 2021 (**Figure 3.7**). There was no evident correlation between these smaller particulate size fractions and lead measured from TSP during April 2020 to May 2021.



**Figure 3.7: PM<sub>10</sub> and PM<sub>2.5</sub> 24-hour average measured during the program against the air quality criteria compared to measured lead concentrations from TSP**

## 4. SUMMARY

No lead was detected in deposited dust above the limit of reporting during monitoring undertaken for the month of May 2021 at the four measured locations around Tarago, NSW consistent with the monitoring results from April 2020 to April 2021. All deposited dust locations in May 2021 reported below the relevant criteria and the rolling average for each location remains below the annual average criteria. Lead was detected in all but two 24-hour average TSP samples, but in all cases where lead was detected the concentrations were below the annual average criterion. All 24-hour PM<sub>10</sub> and PM<sub>2.5</sub> averages were below the 24-hour average air quality criteria during April 2021.

Regional winds during May prevailed from the west. The TSP and lead monitoring location (Station Masters Cottage) is influenced by sources in the direction of the rail corridor when winds prevail roughly in a 180° arc from the north, west and south.

There was a low to moderate observable correlation between TSP and lead when considering the lowest 88% measured lead values. The outliers suggest local lead sources may have been disturbed during previous monitoring months. Decreasing lead concentrations with no corresponding decrease in TSP concentrations in more recent data suggests there is a lower fraction of lead in TSP in more recent data.

Further air quality monitoring is ongoing to assess impacts of broader weather conditions on entrainment of contaminated soil to air. Data collected to date indicates that dust concentrations are below the air quality criteria at all locations monitored.

## 5. LIMITATIONS

This document is issued in confidence to John Holland Rail for the purposes of assessing air quality impacts from lead containing ore within the Goulburn – Bombala rail corridor in the Tarago Area. It should not be used for any other purpose.

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## 6. REFERENCES

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## **APPENDIX 1 HISTORIC LEAD CONCENTRATIONS AROUND AUSTRALIA (NEPC, 2001)**

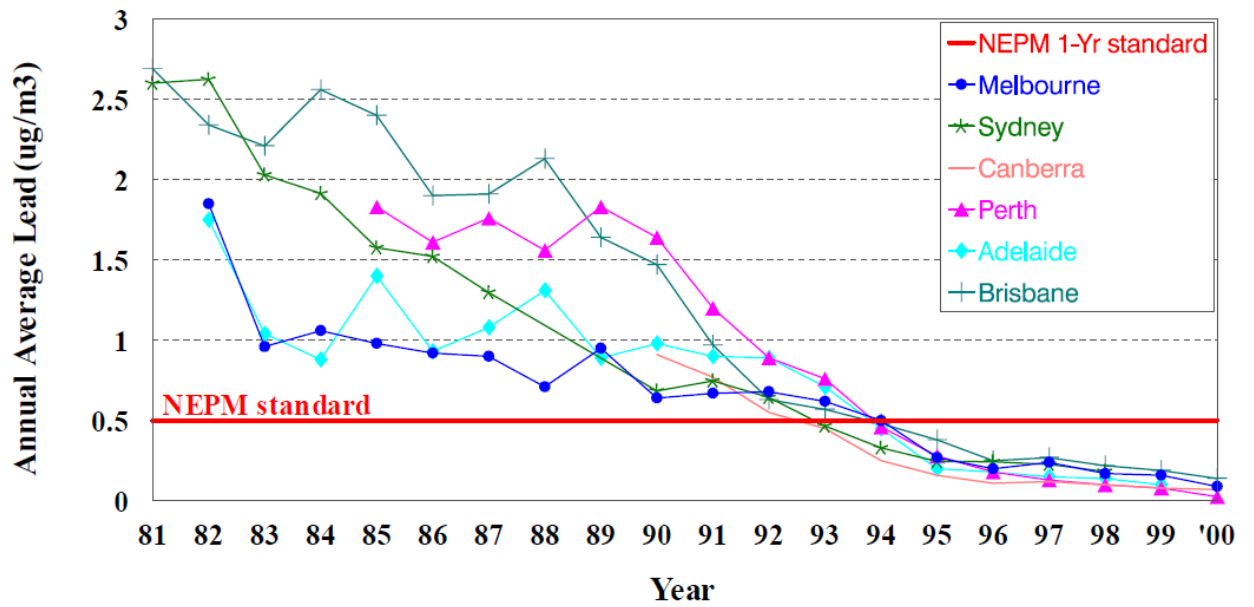


Figure A: Annual lead concentrations in Australian Capital Cities, 1981-2000 (NEPC, 2001)

## **APPENDIX 2 IMAGES OF AIR QUALITY MONITORING INSTRUMENTS IN-SITU**



**Figure B: Dust deposition gauge (DDG2), particle counter and high-volume air sampler at Station Masters Cottage, 106 Goulburn St, Tarago NSW**



**Figure C: Dust deposition gauge DDG1, 18 Stewart St, Tarago NSW; DDG3, Boyd St, Tarago NSW and DDG4, 96 Mulwaree St, Tarago NSW**

## **APPENDIX 3 LABORATORY REPORTS**

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



**NATA Accredited**  
**Accreditation Number 1261**  
**Site Number 18217**

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 and proficiency testing scheme providers  
 reports.

**Attention:** Greer Laing

**Report** 800957-A  
 Project name [TARAGO AQM](#)  
 Project ID [318000780-002](#)  
 Received Date Jun 04, 2021

Client Sample ID			DDG1 - 18 STEWART ST	DDG2 - SMC	DDG3 - BOYD ST	DDG4 - 96 MULWARE ST
Sample Matrix			Dust Deposition	Dust Deposition	Dust Deposition	Dust Deposition
Eurofins Sample No.			S21-Jn12962	S21-Jn12963	S21-Jn12964	S21-Jn12965
Date Sampled			Jun 01, 2021	Jun 01, 2021	Jun 01, 2021	Jun 01, 2021
Test/Reference	LOR	Unit				
Dust Deposition						
Combustible Solids	0.1	g/m2/mth	0.8	0.3	0.1	0.3
Soluble Solids	0.1	g/m2/mth	1.6	3.0	2.3	2.7
Total Solids Dried at 103–105°C	0.1	g/m2/mth	2.5	3.3	2.5	3.2
Volume (total)*	0.1	mL	1200	1300	1000	1100
Ash	0.1	g/m2/mth	0.1	0.1	0.1	0.1
Insoluble Solids	0.1	g/m2/mth	1.0	0.4	0.2	0.4
Heavy Metals						
Lead	1	Total ug	< 1	< 1	< 1	< 1

**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
Dust Deposition - Method: LTM-INO-4160 Determination of Dust Deposition of Ambient Air	Sydney	Jun 16, 2021	5 Days
Heavy Metals - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jun 07, 2021	180 Days



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Site # 23736

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Phone : 0800 856 450  
IANZ # 1290

ABN: 50 005 085 521 web: www.eurofins.com.au email: EnviroSales@eurofins.com

<b>Company Name:</b>	Ramboll Australia Pty Ltd	<b>Order No.:</b>		<b>Received:</b>	Jun 4, 2021 11:00 AM
<b>Address:</b>	Level 3/100 Pacific Highway North Sydney NSW 2060	<b>Report #:</b>	800957	<b>Due:</b>	Jun 11, 2021
<b>Project Name:</b>	TARAGO AQM	<b>Phone:</b>	02 9954 8118	<b>Priority:</b>	5 Day
<b>Project ID:</b>	318000780-002	<b>Fax:</b>	02 9954 8150	<b>Contact Name:</b>	Greer Laing

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Lead	Dust Deposition
Melbourne Laboratory - NATA Site # 1254 & 14271							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID		
1	DDG1 - 18 STEWART ST	Jun 01, 2021		Dust Deposition	S21-Jn12962	X	X
2	DDG2 - SMC	Jun 01, 2021		Dust Deposition	S21-Jn12963	X	X
3	DDG3 - BOYD ST	Jun 01, 2021		Dust Deposition	S21-Jn12964	X	X
4	DDG4 - 96 MULWARE ST	Jun 01, 2021		Dust Deposition	S21-Jn12965	X	X
<b>Test Counts</b>						4	4

## 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.

**\*\*NOTE:** pH duplicates are reported as a range NOT as RPD

### Units

**mg/kg:** milligrams per kilogram

**mg/L:** milligrams per litre

**ug/L:** micrograms per litre

**ppm:** Parts per million

**ppb:** Parts per billion

**%:** Percentage

**org/100mL:** Organisms per 100 millilitres

**NTU:** Nephelometric Turbidity Units

**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

### Terms

<b>Dry</b>	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
<b>LOR</b>	Limit of Reporting.
<b>SPIKE</b>	Addition of the analyte to the sample and reported as percentage recovery.
<b>RPD</b>	Relative Percent Difference between two Duplicate pieces of analysis.
<b>LCS</b>	Laboratory Control Sample - reported as percent recovery.
<b>CRM</b>	Certified Reference Material - reported as percent recovery.
<b>Method Blank</b>	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.
<b>Surr - Surrogate</b>	The addition of a like compound to the analyte target and reported as percentage recovery.
<b>Duplicate</b>	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
<b>USEPA</b>	United States Environmental Protection Agency
<b>APHA</b>	American Public Health Association
<b>TCLP</b>	Toxicity Characteristic Leaching Procedure
<b>COC</b>	Chain of Custody
<b>SRA</b>	Sample Receipt Advice
<b>QSM</b>	US Department of Defense Quality Systems Manual Version 5.3
<b>CP</b>	Client Parent - QC was performed on samples pertaining to this report
<b>NCP</b>	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.
<b>TEQ</b>	Toxic Equivalency Quotient

### QC - Acceptance Criteria

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%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

### 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. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. 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.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " - " in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

**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
Charl Du Preez	Senior Analyst-Inorganic (NSW)
John Nguyen	Senior Analyst-Metal (NSW)



**Glenn Jackson**  
**General Manager**

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



**NATA Accredited**  
**Accreditation Number 1261**  
**Site Number 18217**

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 and proficiency testing scheme providers  
 reports.

**Attention:** Greer Laing

**Report** 800966-A-V2  
 Project name TARAGO AQM  
 Project ID 318000780-002  
 Received Date Jun 04, 2021

Client Sample ID			HVS496	HVS497	HVS513	HVS523
Sample Matrix			Filter paper	Filter paper	Filter paper	Filter paper
Eurofins Sample No.			S21-Jn13118	S21-Jn13119	S21-Jn13120	S21-Jn13121
Date Sampled			May 05, 2021	May 11, 2021	May 17, 2021	May 23, 2021
Test/Reference	LOR	Unit				
<b>Heavy Metals</b>						
Lead	1	Total ug	< 1	4.9	2.1	< 1
Particulates - Final weighing	0.01	mg	2808.9	2811	2796.2	2813.6
Particulates - Initial weighing	0.01	mg	2804.1	2791.3	2780.9	2795.6

Client Sample ID			HVS502
Sample Matrix			Filter paper
Eurofins Sample No.			S21-Jn13122
Date Sampled			May 29, 2021
Test/Reference	LOR	Unit	
<b>Heavy Metals</b>			
Lead	1	Total ug	5.6
Particulates - Final weighing	0.01	mg	2802.1
Particulates - Initial weighing	0.01	mg	2780.1

**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 - Method: LTM-MET-3040 Metals in Waters, Soils & Sediments by ICP-MS	Sydney	Jun 11, 2021	180 Days
Particulates - Final weighing - Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).	Field	Jun 07, 2021	30 Days
Particulates - Initial weighing - Method: Filters weighed according to AS 3640 (Inhalable), AS 2985 (Respirable), AS4323.3 (Stack Filters) & QS-INS-4033 (HVAS - Non NATA Endorsed).	Field	Jun 11, 2021	30 Days

**Australia**

**Melbourne**  
6 Monterey Road  
Dandenong South VIC 3175  
Phone : +61 3 8564 5000  
NATA # 1261  
Site # 1254 & 14271

**Sydney**  
Unit F3, Building F  
16 Mars Road  
Lane Cove West NSW 2066  
Phone : +61 2 9900 8400  
NATA # 1261 Site # 18217

**Brisbane**  
1/21 Smallwood Place  
Murarrie QLD 4172  
Phone : +61 7 3902 4600  
NATA # 1261 Site # 20794

**Perth**  
46-48 Banksia Road  
Welshpool WA 6106  
Phone : +61 8 9251 9600  
NATA # 1261  
Site # 23736

**Newcastle**  
4/52 Industrial Drive  
Mayfield East NSW 2304  
PO Box 60 Wickham 2293  
Phone : +61 2 4968 8448  
NATA # 1261 Site # 25079

**New Zealand**

**Auckland**  
35 O'Rorke Road  
Penrose, Auckland 1061  
Phone : +64 9 526 45 51  
IANZ # 1327

**Christchurch**  
43 Detroit Drive  
Rolleston, Christchurch 7675  
Phone : 0800 856 450  
IANZ # 1290

<b>Company Name:</b>	Ramboll Australia Pty Ltd	<b>Order No.:</b>		<b>Received:</b>	Jun 4, 2021 11:00 AM
<b>Address:</b>	Level 3/100 Pacific Highway North Sydney NSW 2060	<b>Report #:</b>	800966	<b>Due:</b>	Jun 11, 2021
<b>Project Name:</b>	TARAGO AQM	<b>Phone:</b>	02 9954 8118	<b>Priority:</b>	5 Day
<b>Project ID:</b>	318000780-002	<b>Fax:</b>	02 9954 8150	<b>Contact Name:</b>	Greer Laing

**Eurofins Analytical Services Manager : Andrew Black**

Sample Detail						Lead	Particulates - Final weighing	Particulates - Initial weighing
Melbourne Laboratory - NATA Site # 1254 & 14271								
Sydney Laboratory - NATA Site # 18217						X		
Brisbane Laboratory - NATA Site # 20794								
Perth Laboratory - NATA Site # 23736								
Mayfield Laboratory - NATA Site # 25079								
External Laboratory								
No	Sample ID	Sample Date	Sampling Time	Matrix	LAB ID			
1	HVS496	May 05, 2021		Filter paper	S21-Jn13118	X	X	X
2	HVS497	May 11, 2021		Filter paper	S21-Jn13119	X	X	X
3	HVS513	May 17, 2021		Filter paper	S21-Jn13120	X	X	X
4	HVS523	May 23, 2021		Filter paper	S21-Jn13121	X	X	X
5	HVS502	May 29, 2021		Filter paper	S21-Jn13122	X	X	X
<b>Test Counts</b>						5	5	5

**Internal Quality Control Review and Glossary**
**General**

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**Quality Control Results**



**Comments**

V2- new version to amend sampling dates to match COC as per client request and internal error

**Sample Integrity**

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
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  
John Nguyen                      Senior Analyst-Metal (NSW)



**Glenn Jackson**  
**General Manager**

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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