

# Dust Deposition Construction Monitoring Report:

28 May 2021 – 27 November 2021

M4-M5 Link Mainline Tunnels

**WestConnex** M4-M5 Link Tunnels



THIS PAGE HAS BEEN LEFT INTENTIONALLY BLANK

# Document Control

## Approval and authorisation

<b>Title</b>	M4-M5 Link Mainline Tunnels Dust Deposition Construction Monitoring Report: 28 May 2021 – 27 November 2021
<b>Document No/Ref</b>	M4M5-LSBJ-PRW-EN-GE01-RPT-0072-00
<b>Document Path</b>	

## Version control

Revision	Date	Description
00	30 November 2021	Report developed for distribution

## Internal review

	Name	Position	Date	Signed/Authorised
Originator(s)		Environmental Coordinator	15/12/2021	
Review		Environment Manager	15/12/21	
Authorised		Project Director	15 DEC '21	

# Contents

<b>Abbreviations/Glossary .....</b>	<b>v</b>
<b>1 Introduction .....</b>	<b>1</b>
1.1 Background .....	1
1.2 Project Description.....	2
1.3 Purpose of this report.....	4
<b>2 Monitoring Results.....</b>	<b>5</b>
2.1 Performance Criteria.....	5
2.1.1 Monthly exceedance.....	5
2.1.2 Annual exceedance .....	6
<b>3 Management Response .....</b>	<b>7</b>
3.1 Sydney Weather Trends .....	7
3.1.1 OEH & Linkt (M4 and M8) Air Quality Data .....	7

## Tables

Table 1-1 CoA requirements for this CMR.....	4
Table 1-2 Reporting Requirements .....	4
Table 2-1 Annualised Average Dust Values (g/m <sup>2</sup> ) November 2019 - October 2020 .....	7
Table 3-1 Monthly Dust Exceedance Management Responses .....	16

## Figures

Figure 2-1 Monthly Depositional Dust Results by Site .....	5
Figure 2-2 Annual Depositional Dust Results by Site May 2020 - April 2021 .....	6
Figure 3-1 Map of Sydney air quality monitoring stations .....	9
Figure 3-2 Rainfall at Sydney Airport.....	10
Figure 3-3 Rainfall at Rose Bay (Royal Sydney Golf Club) replacement for Sydney (Observation Hill) .....	11
Figure 3-4 Rainfall at Canterbury Racecourse .....	12
Figure 3-5 Poor Air Quality days (top) and recent increases due to hazard reduction burns .....	13
Figure 3-6 Monthly average PM10 values and recent NEPH values affected by backburning.....	14
Figure 3-7 Stacked project wide dust levels are lower following rain and implementation of mitigation measures.....	15

## Abbreviations/Glossary

Abbreviation	Expanded text
AQI	Air Quality Index
ASBJV	Acciona Samsung Bouygues Joint Venture
CEMP	Construction Environmental Management Plan
CMR	Construction Monitoring Report
CSSI	Critical State Significant Infrastructure
CoA	Conditions of approval
DDMP	Dust Deposition Monitoring Program
EIS	Environmental Impact Statement
EP&A Act	<i>Environmental Planning and Assessment Act 1979 (NSW)</i>
Linkt	Toll road network operated by Transurban
Minister, the	Minister of the NSW Department of Planning and Environment (or delegate)
NATA	National Association of Testing Authorities
NSW	New South Wales
NZS	New Zealand Standard
OEH	Office of Environment and Heritage
PBR	Pymont Bridge Road civil and tunnel site
PREW	Parramatta Road East and West civil sites
Project, the	M4-M5 Link Mainline Tunnels
SPI	St Peters Interchange
SPIR	Submissions and Preferred Infrastructure Report
SSI	State Significant Infrastructure
TfNSW	Transport for NSW
WCX	WestConnex Transurban

# 1 Introduction

## 1.1 Background

WestConnex is one of the NSW Government's key infrastructure projects which aims to ease congestion, create jobs and connect communities. The 33-kilometre WestConnex motorway will link Sydney's west and south-west with the Sydney Central Business District, Sydney Airport and Port Botany. WestConnex is one component of an integrated solution to meet Sydney's growing transport and infrastructure needs and is consistent with NSW Government transport and planning policies and strategies.

The project was declared by Ministerial Order to be State Significant Infrastructure (SSI) and Critical State Significant Infrastructure (CSSI), under Section 5.12 (4) and Section 5.13 (previously referred to as 115U(4) and 115V prior to amendment of the *Environmental Planning and Assessment Act 1979* (EP&A Act)) as well as under clause 16 of the State Environmental Planning Policy (State and Regional Development) 2011. The project remains subject to assessment under the EP&A Act and requires the approval of the NSW Minister for Planning. The proposal is critical State significant infrastructure by virtue of Schedule 5, clause 4 of State Environmental Planning Policy (State and Regional Development) 2011.

An Environmental Impact Statement (EIS) (AECOM 2017) was prepared and placed on public exhibition from 18 August 2017 to 16 October 2017. Submissions were received from government, agencies, organisations and the public in response to the project. A Submissions and Preferred Infrastructure Report (SPIR) was prepared by Roads and Maritime in response to submissions received during the exhibition period. The Project was approved by the Minister for Planning on 17 April 2018.

Subsequently, a Project Modification report (AECOM, September 2018) was prepared and placed on public exhibition for 14 days from 12 September 2018. The Project Modification was approved by the Minister for Planning on 25 February 2019 and the Minister's conditions of approval were also modified.

A Modification Report for MOD 2 was prepared and placed on public exhibition by between 21 August 2019 to 25 September 2019. A Response to Submissions Report was prepared to respond to submissions received during the public exhibition period. This report and a Design Amendment Report were lodged with the Department of Planning, Industry and Environment (DPIE) in April 2020. The Modification was determined by the NSW Minister for Planning on 30 September 2020, along with modification to CoAs.

A Modification Report for MOD 3 was prepared and placed on public exhibition by between 20 November and 18 December 2019. A Response to Submissions Report was prepared to respond to submissions received during the public exhibition period. This report was lodged with DPIE in March 2020. The Modification was determined by the NSW Minister for Planning and Public Space on 28 July 2020, along with modification to CoAs.

A Modification Report for MOD 4 was prepared and lodged with DPIE in June 2020. The Modification was determined by DPIE on 28 July 2020, along with modification to CoAs.

A modification Report for MOD 5 was prepared and lodged with DPIE in October 2020. The Modification was determined by DPIE on 17 November 2020, along with modification to CoAs.

## 1.2 Project Description

The WestConnex M4-M5 Link project is being constructed in two stages:

- Stage 1 (the Project and subject of this document): M4-M5 Link Mainline tunnels
- Stage 2: Rozelle interchange.

WestConnex Transurban (WCX) has engaged Acciona Samsung Bouygues Joint Venture (ASBJV) formerly the Lendlease Samsung Bouygues Joint Venture, to design and construct Stage 1 of the project. The key features of the Mainline tunnel project include:

- Twin mainline motorway tunnels between the M4 East at Haberfield and the New M5 at St Peters. Each tunnel would be around 7.5 kilometres long and would generally accommodate up to four lanes of traffic in each direction
- Connections of the mainline tunnels to the M4 East project, comprising:
  - A tunnel-to-tunnel connection to the M4 East mainline stub tunnels east of Parramatta Road near Alt Street at Haberfield
  - Entry and exit ramp connections between the mainline tunnels and the Wattle Street interchange at Haberfield (which is currently being constructed as part of the M4 East project)
  - Minor physical integration works with the surface road network at the Wattle Street interchange including road pavement and line marking
- Connections of the mainline tunnels to the New M5 project, comprising:
  - A tunnel-to-tunnel connection to the New M5 mainline stub tunnels north of the Princes Highway near the intersection of Mary Street and Bakers Lane at St Peters
  - Entry and exit ramp connections between the mainline tunnels and the St Peters interchange at St Peters (which is currently being constructed as part of the New M5 project)
  - Minor physical integration works with the surface road network at the St Peters interchange including road pavement and line marking
- Construction of tunnel stubs to provide for future underground connection of the mainline tunnels to the Rozelle interchange and Iron Cove Link
- A motorway operations complex at St Peters (Campbell Road) (MOC5). The types of facilities that would be contained within the motorway operations complexes would include substations, water treatment plants, ventilation facilities and outlets (the Campbell Road ventilation facility), offices, on-site storage and parking for employees
- Tunnel ventilation systems, including ventilation supply and exhaust facilities, ventilation fans, ventilation outlets and ventilation tunnels
- Fitout (mechanical and electrical) of part of the Parramatta Road ventilation facility at Haberfield (which is currently being constructed as part of M4 East project) for use by the M4-M5 Link project
- Drainage infrastructure to collect surface and groundwater for treatment at dedicated facilities
- Water treatment would occur at the operational water treatment facility at the Campbell Road motorway operations complex (subject to future Modification)
- Ancillary infrastructure and operational facilities for electronic tolling and traffic control and signage (including electronic signage)

- Emergency access and evacuation facilities, including pedestrian and vehicular cross and long passages and fire and life safety systems
- Utility works, including protection and/or adjustment of existing utilities, removal of redundant utilities and installation of new utilities
- Temporary construction ancillary facilities to facilitate construction of the project at the following locations:
  - Northcote Street civil and tunnel site (C3a), Haberfield
  - Haberfield civil site (C2b), Haberfield
  - Parramatta Road East civil site (C3b), Haberfield
  - Parramatta Road West civil site (C1b), Ashfield
  - Wattle Street civil and tunnel site (C1a), Haberfield
  - Pyrmont Bridge Road tunnel site (C9), Camperdown/Annandale
  - Campbell Road civil and tunnel site (C10), St Peters

An overview of the project footprint and ancillary facilities is presented in the Construction Environmental Management Plan (CEMP). Further detail of the project description is presented in Section 1.3 of the CEMP.

### 1.3 Purpose of this report

This Dust Deposition Construction Monitoring Report (CMR) has been prepared to address Minister's Condition of Approval (CoA) C17 of the planning approval (refer to Table 1-1).

This CMR documents the dust deposition monitoring results recorded during the reporting period on the WestConnex M4-M5 Link Mainline Tunnels Project (the Project) from 28 May 2021 to 27 November 2021.

Monitoring was undertaken in accordance with the Dust Deposition Monitoring Program (DDMP) required under Condition of Approval C9(e) to monitor potential depositional dust impacts and the effectiveness of mitigation measures applied during construction of the Project.

Reporting requirements associated with the program for the construction phase of the project are presented in Dust Deposition Monitoring Program and are reproduced in Table 1-2.

**Table 1-1 CoA requirements for this CMR**

CoA no.	Requirement	Reference
C17	The results of the Construction Monitoring Programs must be submitted to the Secretary, and relevant regulatory authorities, for information in the form of a Construction Monitoring Report at the frequency identified in the relevant Construction Monitoring Program.	This Document

**Table 1-2 Reporting Requirements**

Schedule (during construction)	Requirements	Recipient (Relevant Authority)
Dust Deposition Monitoring Reports (every 6 months)	Data summary reports presenting tabulated dust deposition monitoring data collected during the reporting period. Dust deposition monitoring results will be presented, and performance criteria exceedances will be highlighted. Applicable management responses will be documented.	EPA DPIE

## 2 Monitoring Results

In accordance with the DDMP five depositional dust gauges were deployed at the following ancillary facilities:

- Northcote Street civil and tunnel site
- Parramatta Road East and West civil sites (PREW)
- Wattle Street civil and tunnel site
- Pyrmont Bridge Road tunnel site (PBR)
- Campbell Road civil and tunnel site

Dust gauges were collected and replaced monthly (every  $30 \pm 2$  days) and insoluble solids analysed by a National Association of Testing Authorities (NATA) accredited laboratory.

Depositional dust results for the reporting period are represented in Figure 2-1. Elevated monthly results above the target goal are discussed in Section 2.1.

Monitoring results for Wattle St is not considered representative of construction impacts. The results obtained at this location appear to be greatly affected by the passing traffic because dust generating construction activities at this location have been minimal during the reporting period.

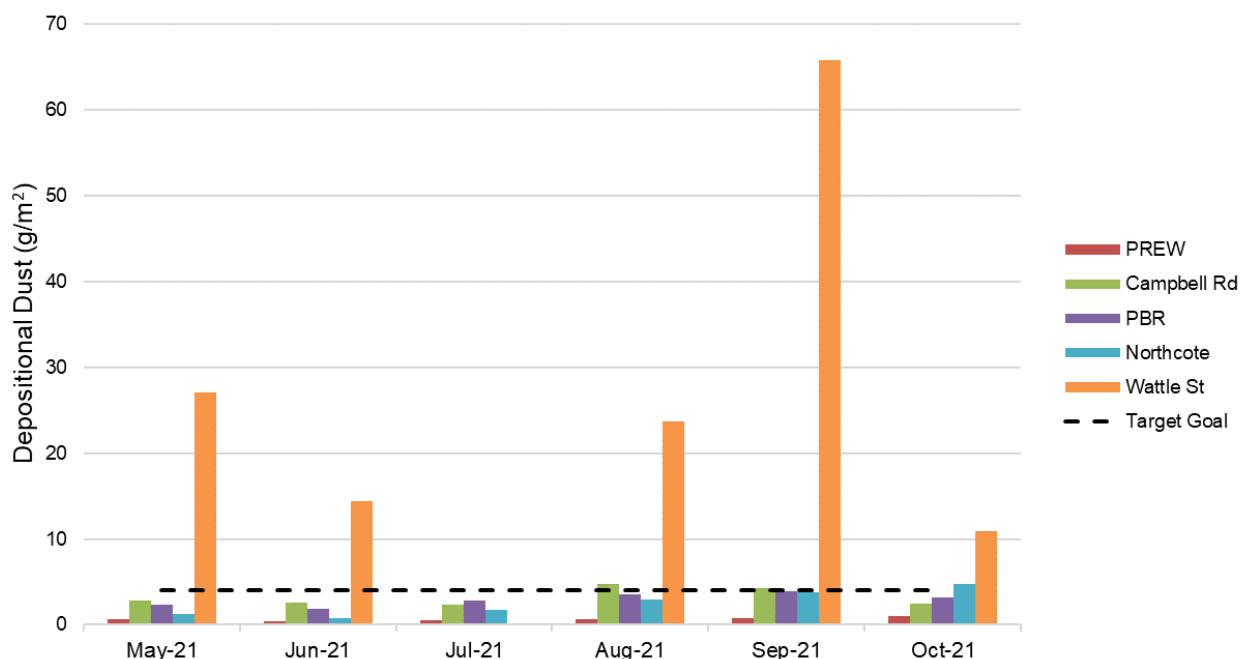


Figure 2-1 Monthly Depositional Dust Results by Site

### 2.1 Performance Criteria

#### 2.1.1 Monthly exceedance

There were 8 monthly dust results greater than  $4 \text{ g/m}^2$  target goal recorded across the Project during the reporting period (refer to Figure 2-1). While individually these are not considered to be an exceedance of the annual performance criteria (discussed in Section 2.1.2, below) an investigation

into site activities and surrounding air quality events was undertaken. However, it's clear that dust levels were generally below the trigger value throughout the 6-month period.

It is evident from Figure 2-2 that with the exception of Wattle St, the sites follow a trend, whether increasing or decreasing, and the trend is driven by wider environmental conditions such as drier periods or above average rainfall as well as events such as hazard reduction burns and poor air quality days as alerted by DPIE. This trend is validated by air quality data, particularly PM10 values recorded across Sydney, depicted in Figures 3-5 and 3-6.

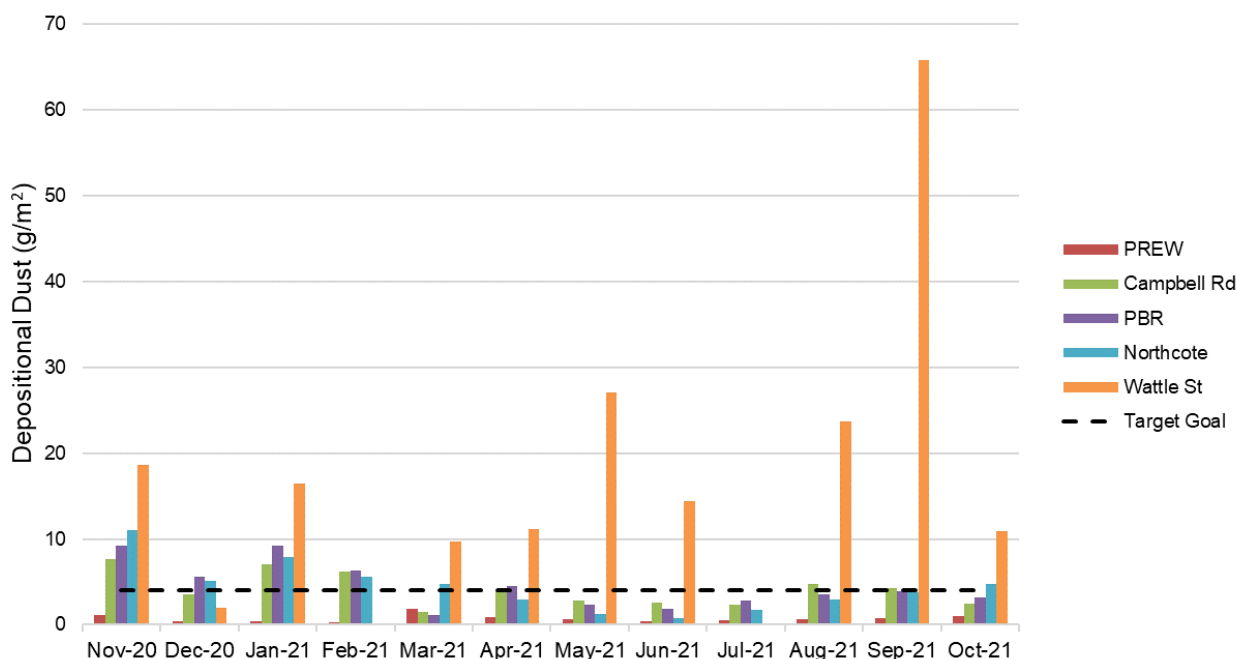
Management responses following monthly exceedances are discussed in Section 3. As discussed previously, investigations of monthly dust results are critical to ensure the annual performance criteria is met.

### 2.1.2 Annual exceedance

In accordance with the DDMP, monitoring results have been assessed against an annual maximum total deposited dust level of 4 g/m<sup>2</sup>/month. Table 2-1 displays both the average recorded over the previous six months and the annualised monthly averages over the 12 months from November 2020 to October 2021.

The performance criteria were exceeded at all sites across the project with the exception of PREW. However, during the six-month monitoring period all sites were compliant except Wattle St and as detailed further in Section 3, it is unlikely that the project's construction activities were the primary driver that led to these results.

Monthly contributions over the 12 months presented in Figure 2-2 show elevated values increasing at the end of 2020, before decreasing again in 2021 as regular rainfall returned. It is also pertinent to point out that the levels at each site are relatively close to each other in any given month.



**Figure 2-2 Annual Depositional Dust Results by Site November 2020 - October 2021**

**Table 2-1 Six Months and Annualised Average Dust Values (g/m<sup>2</sup>)**

Construction Site	PREW	Campbell Rd	PBR	Northcote	Wattle St
Six Months Average	0.67	3.22	2.95	2.56	28.28
Annualised Average	1.38	6.11	4.79	5.06	10.38

### 3 Management Response

Where elevated dust deposition results greater than 4 g/m<sup>2</sup> were recorded in a month (refer to Figure 2-1), a management response was triggered with the following investigated:

- Weather data and air quality incidents
- Site activities and works
- Dust mitigation measures being implemented on site
- Any other factors potentially contributing to the elevated result
- Management responses following monthly exceedances are summarised in Table 3-1.

#### 3.1 Sydney Weather Trends

Throughout the course of 2019 and 2020 weather continued to have a strong influence on air quality, site conditions and indeed the broader city of Sydney. From drought and dusty conditions to bushfires, then above average rainfall. Previous reports established the link between weather and dust levels.

The rainfall gauges adopted for the Project are Sydney Airport for Campbell Rd, Sydney (Observatory Hill) for PBR and Canterbury Racecourse for the Haberfield sites. Across these sites (refer Figure 3-2 to Figure 3-4) it is evident that Sydney received periods of dry weather punctuated by heavy and intense rainfall often in alternating months during 2021.

The start of 2021 saw below average to average rainfall that correlates with higher dust levels on site, followed by a period of above average rainfall and consistently lower dust levels that is supported by the data obtained from air quality monitoring stations across Sydney in Figure 3-5.

The NSW Office of Environment and Heritage (OEH) released numerous poor air quality forecast alerts throughout the last bushfire season which had an impact on dust levels. There was an increase in poor air quality alerts from August onwards during a relatively drier period that followed a wetter period in the first half of 2021. These poor air quality days are typically driven by less frequent rainfall and hazard reduction burns carried out within the greater Sydney region.

##### 3.1.1 OEH & Linkt (M4 and M8) Air Quality Data

Following increased dust results in August 2019, collecting and tracking the OEH Air Quality data commenced. Four sites surrounding the project were chosen for comparison being Randwick, Rozelle, Earlwood and Cook and Phillip, Sydney CBD (Refer to Figure 3-1). The Air Quality Index is used to release health alerts for degrading conditions across a range of variables at monitoring stations throughout Sydney and NSW. Examples of variables include Particles (PM10 and PM2.5 – smaller, invisible dust particles sourced from bushfires, emissions and smog), Visibility (NEPH), Nitrous oxides and Ozone. An AQI of 100-149 is classified as POOR, 150-199 is VERY POOR and 200 or greater is considered HAZARDOUS by OEH

The results of daily maximum PM10 particle levels to November 2021 shows the high number of poor air quality days in Sydney (refer figure 3-5) over the past 12 months particularly during dry periods and back burning towards the end of 2020, and then again in January and April 2021. A roughly 3-month period of good air quality followed prior to increased levels over the past couple of months. The monthly average PM10 values (figure 3-6) similarly trended down towards the middle of the year before rising again at the end of this reporting period. Analysis of the Linkt air quality data from neighbouring M4 and M8 tunnels in Haberfield and St Peters shows similar peaks in PM10 values during November and April, falling to the lowest values in mid-winter and increasing again from August.

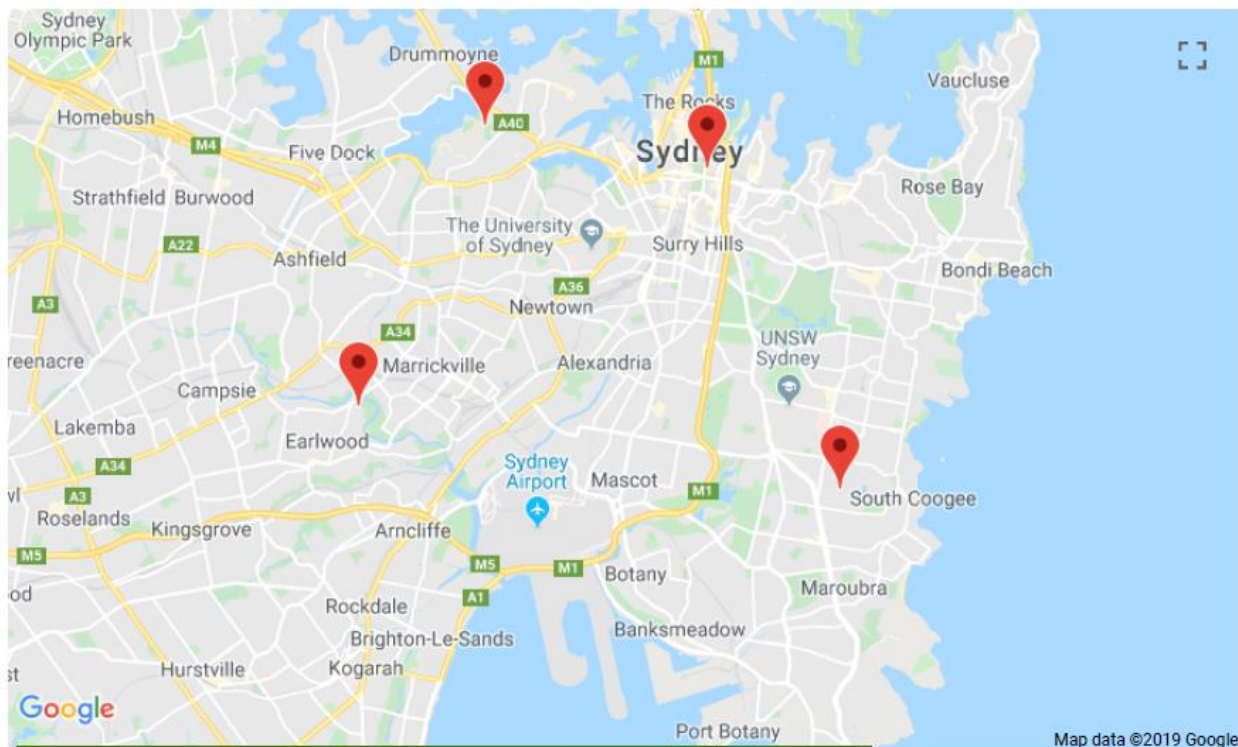
These background results continue to mirror the Project's site depositional dust data, where levels decreased in December and from February following rainfall (discussed in section 3.1) and then slightly increased once more during April backburning. Dust levels have trended downwards from January due to the increased rainfall and site mitigation measures. Figure 3.6 and Figure 3.7 show a clear link between OEH monitoring data and dust levels on the project, suggesting the non-project sources highly influenced dust depositional results.

Although the annualised average dust value displayed in Table 2-1 were exceeded at multiple sites due to non-project sources, apart from Wattle St, the project sites were compliant during the 6 months captured in this reporting period as the general air quality in the Sydney basin improved.

# Sydney air quality monitoring stations

Sydney is a large basin with complex topography. There are air quality monitoring stations in each of the topographic sub-regions (south-west, east and north-west).

*Click on a map pin to find out more about that air quality monitoring station.*



**Figure 3-1 Map of Sydney air quality monitoring stations**

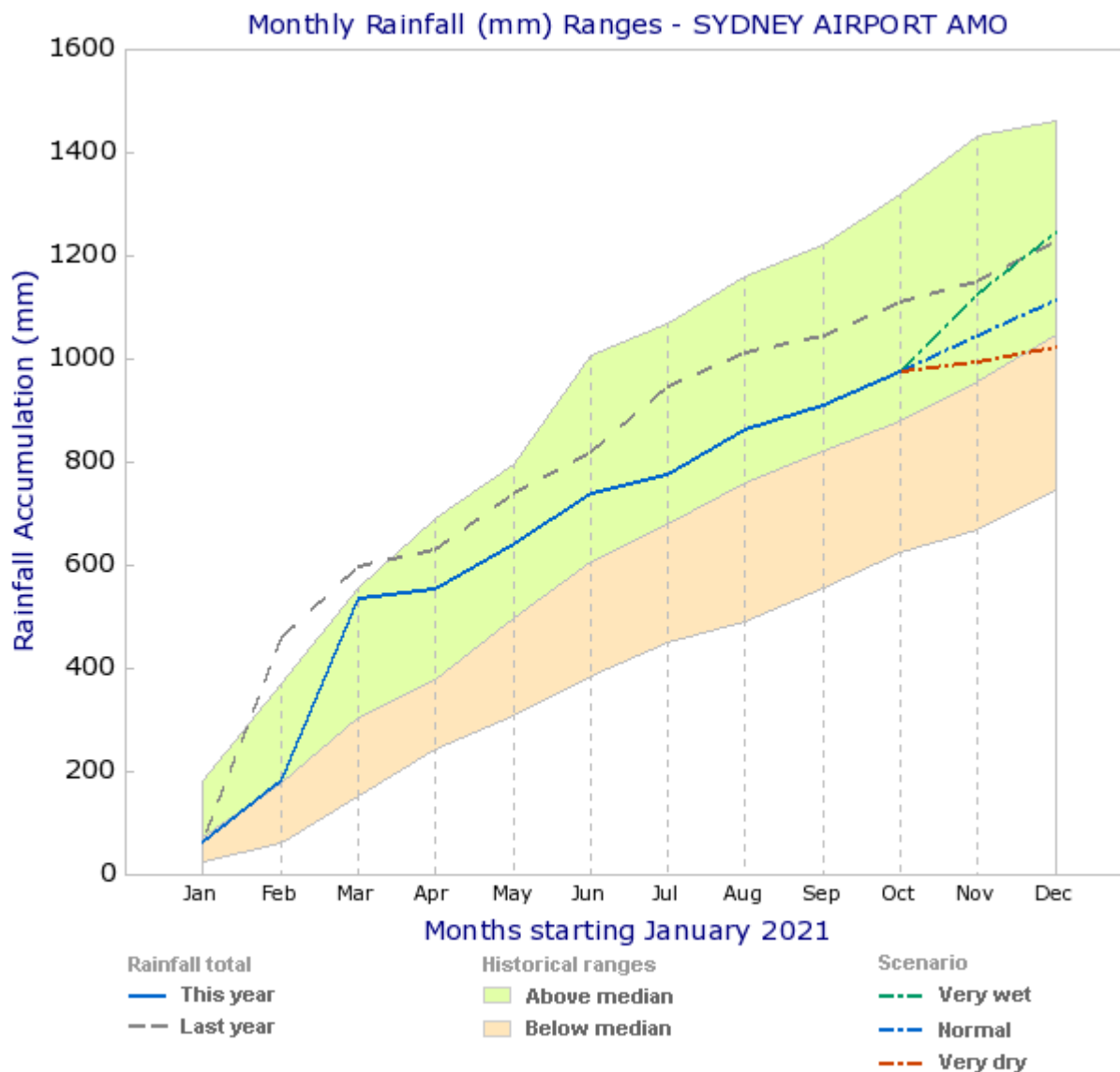


Figure 3-2 Rainfall at Sydney Airport

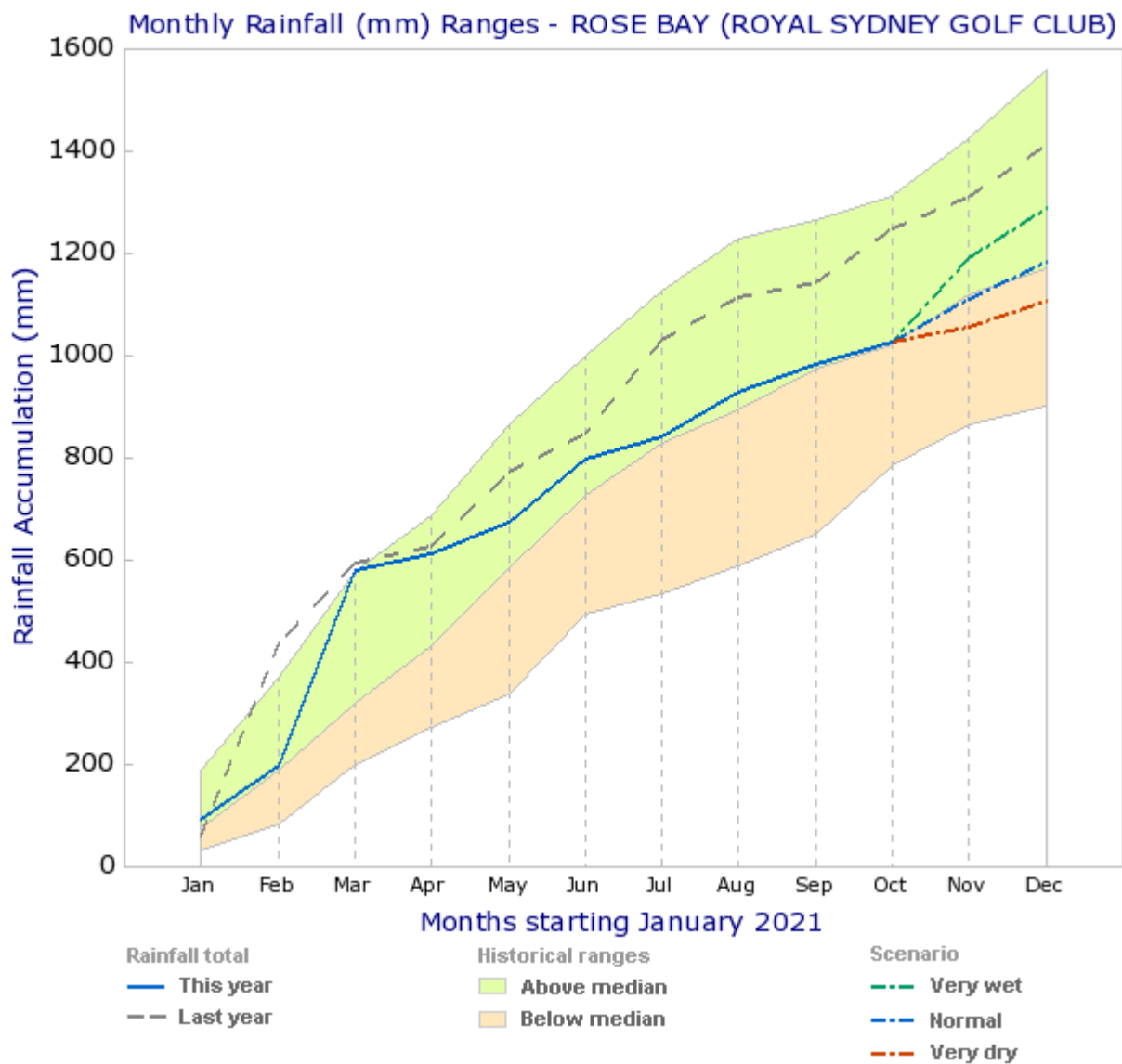


Figure 3-3 Rainfall at Rose Bay (Royal Sydney Golf Club) replacement for Sydney (Observation Hill)

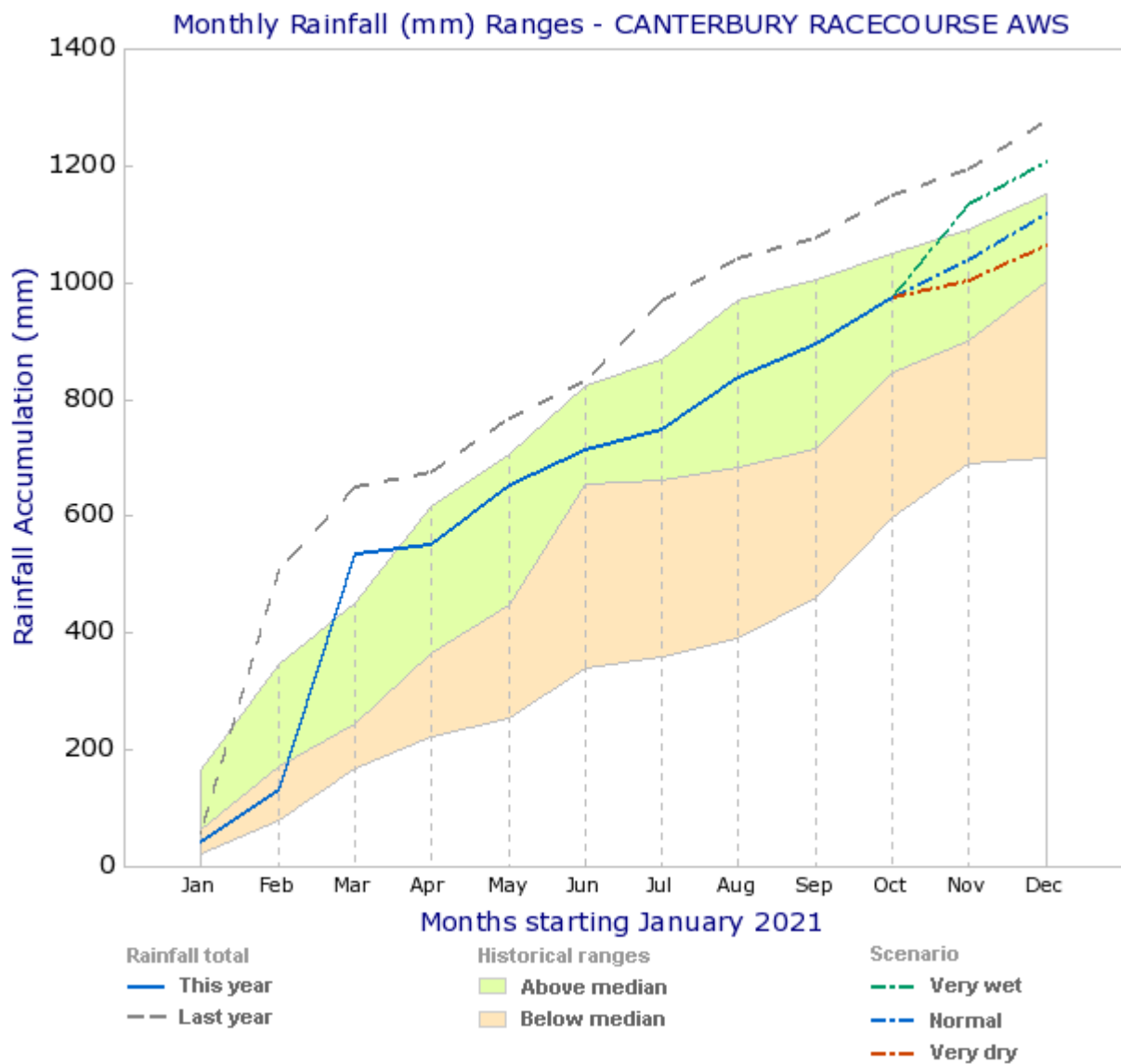
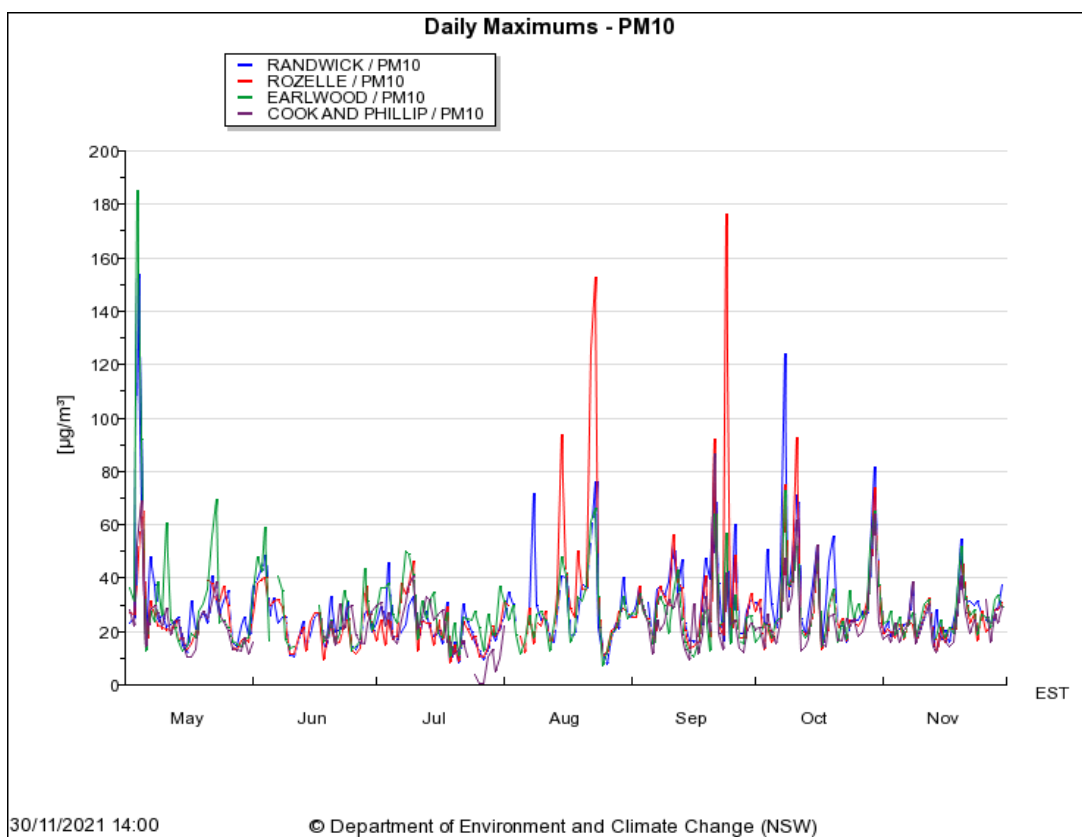
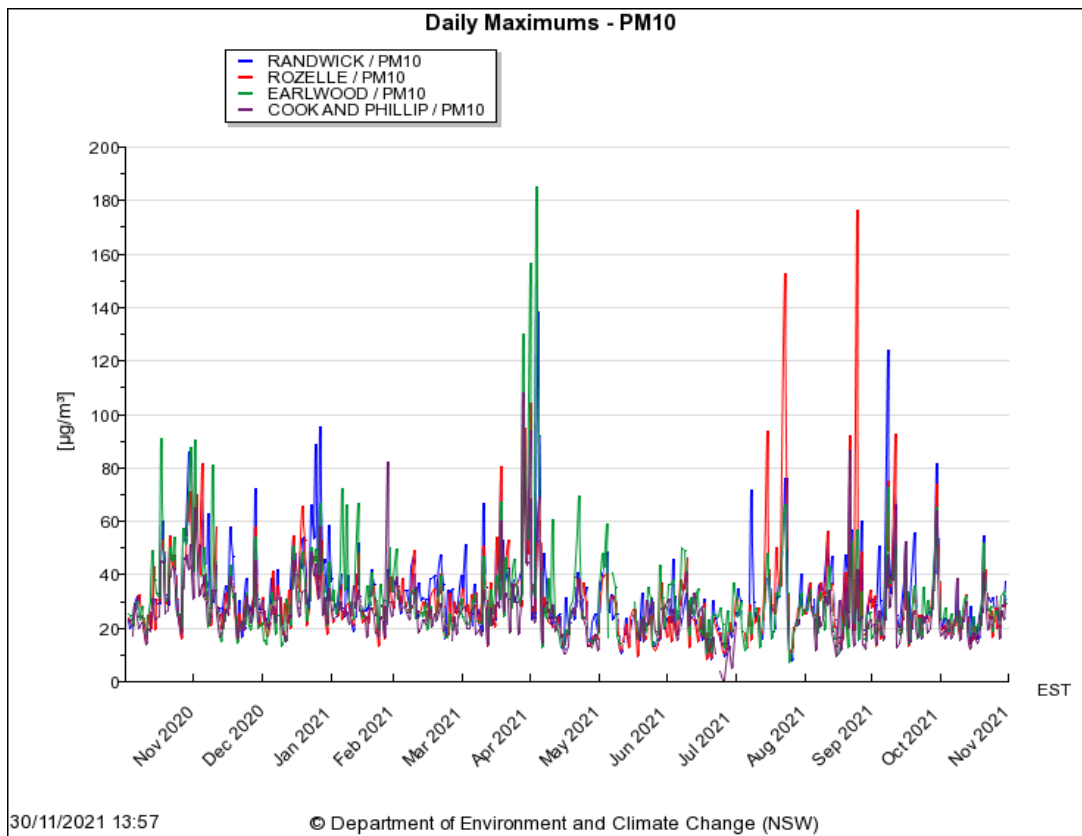
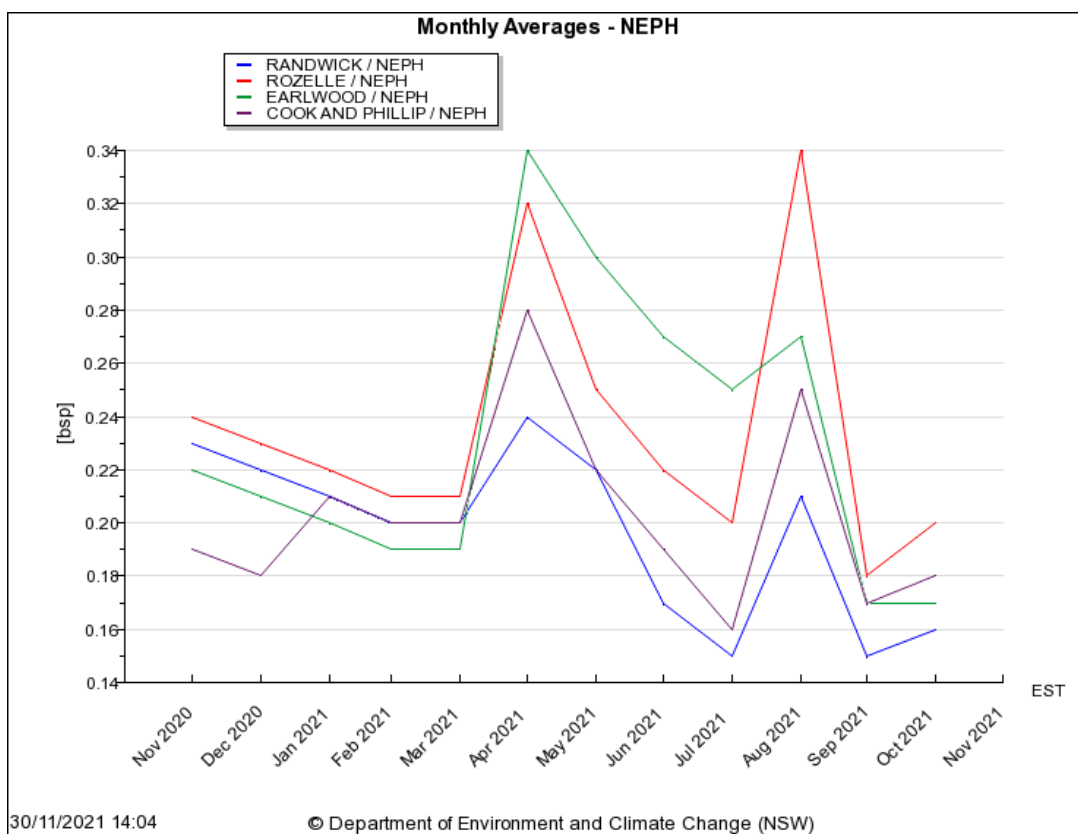
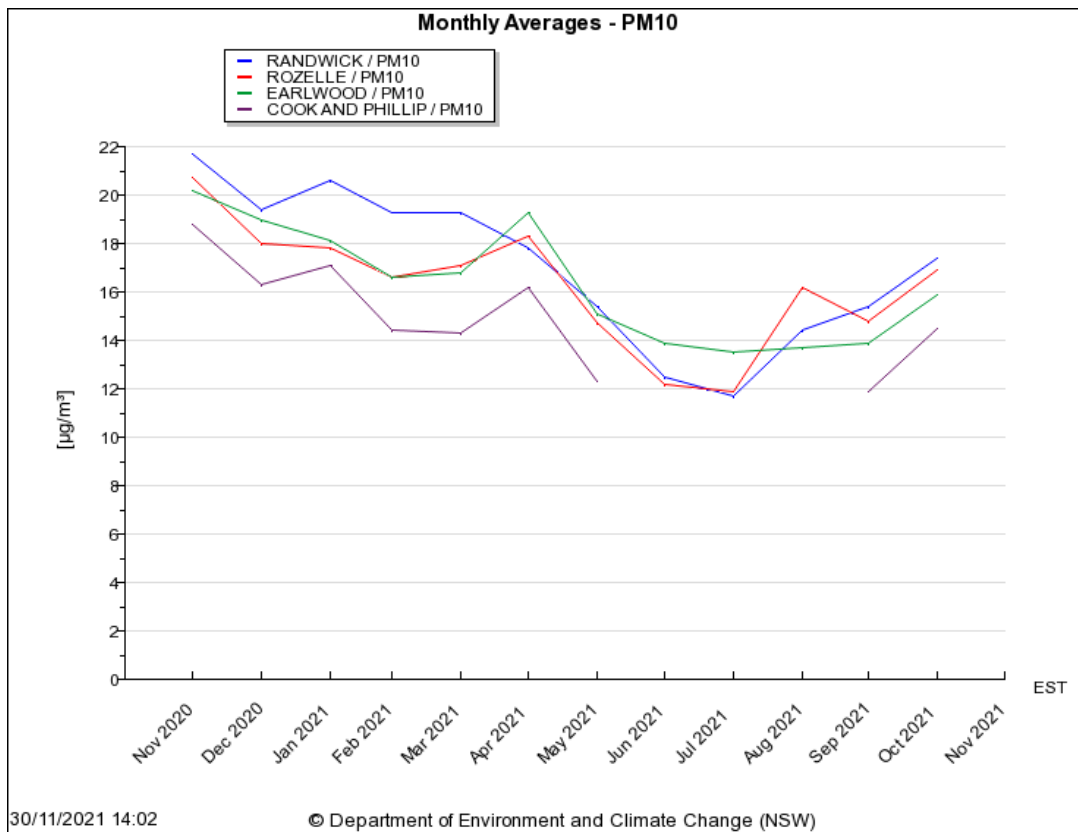


Figure 3-4 Rainfall at Canterbury Racecourse

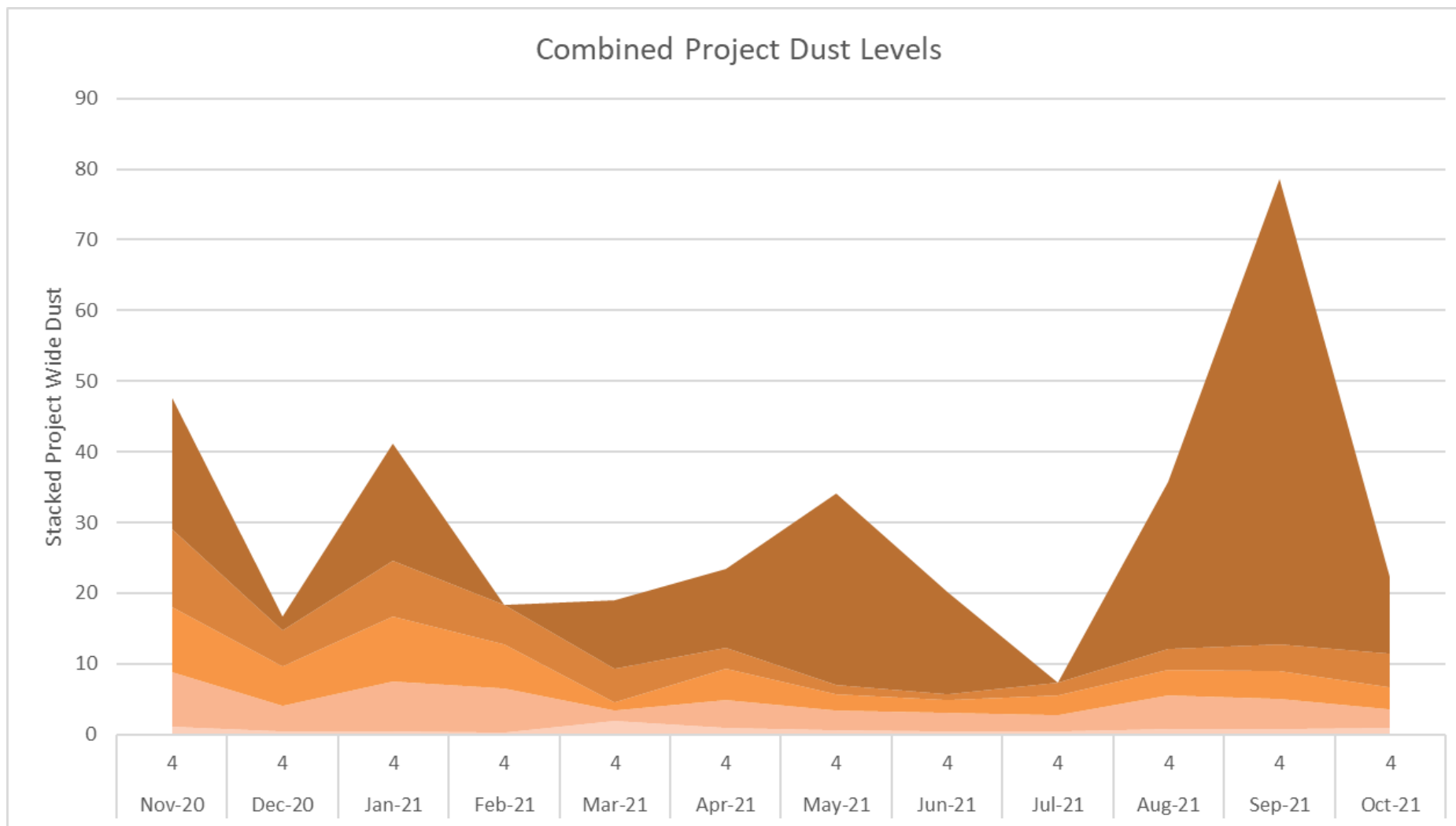


**Figure 3-5 Poor Air Quality days (top) and recent increases in previous 6 months**

Note: August, September and October line up with increases in depositional dust results



**Figure 3-6 Monthly average PM10 values and recent NEPH values**



**Figure 3-7 Combined project dust levels strengthen clear differences between successive months indicating project activities are not driving dust levels**

**Table 3-1 Monthly Dust Exceedance Management Responses**

Month Exceeding	Site	Deposited Dust (g/m <sup>2</sup> )	Investigation Findings	Management Response
May 2021	Wattle St	27.1	Wattle St M170 entry ramp not noted to be dusty during inspections.	Elevated dust results attributed to non-Project sources.
June 2021	Wattle St	14.4	Dust levels remain elevated but decreased on previous month.	Majority of project showing compliant dust levels with all sites trending down, month on month, no further response required.
August 2021	Campbell Rd	4.8	Inspection notes of sweeping and water cart use at SPI	Tracking OEH data continued to compare project levels to surrounding government monitoring sites.
	Wattle St	23.7	An increase in particulate matter is observed in government air quality monitoring	Toolbox delivered on air quality with encouragement for wheel washing and dust suppression to achieve project goal.
September 2021	Campbell Rd	4.3	Although elevated, dust levels have decreased following management response at SPI.  Tunnel access to Wattle St closed, ramp fitout (non dust generating) were the only activities taking place	Previously implemented management responses appeared to be working well.
	Wattle St	65.8		Inspections throughout September show low dust levels, wheel washing in action and minimal tracking onto Wattle St down to the intersection with Paramatta Road.
October 2021	Northcote St	4.7	Site management measures i.e., washing wheels, hosing down hardstand areas are working well to control dust as noted on inspections.  Focus on sweeping haul road to exit at Wattle St. Elevated dust results appear to be as a result of the location of the worksite and monitoring location, that is in the median of a major arterial road.	Northcote result is slightly elevated yet compliant on a monthly average over the previous 6 months and since the start of the year.
	Wattle St	10.9		The dust bottle at Wattle St is in the best albeit compromised position within site as while representative of dust at that point, does not accurately reflect at receiver impacts.