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NSW Annual Compliance Report 2015

National Environment Protection (Ambient Air Quality) Measure

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Acronyms, abbreviations and glossary

Following is a list of acronyms, abbreviations and terms used in this report.

AAQ NEPM	Ambient Air Quality National Environment Protection Measure
Ambient air	The external air environment (does not include the air environment inside buildings or structures)
AQMN	Air Quality Monitoring Network
ARS	Advisory Reporting Standard
AS	Australian Standards
BAM	Beta attenuation monitor
CO	Carbon monoxide
EPA	Environment Protection Authority
FRM	Federal Reference Method (USEPA)
GMR	Greater Metropolitan Region
ICP-AES	Inductively coupled plasma – atomic emission spectroscopy
LBL	Load Based Licensing
Monitoring station	A facility for measuring the concentration of one or more pollutants in the ambient air in a region or sub-region
NATA	National Association of Testing Authorities
NEPC	National Environment Protection Council
NEPM	National Environment Protection Measure
NLAQMN	Newcastle Local Air Quality Monitoring Network
NO_2	Nitrogen dioxide
NO_x	Oxides of nitrogen
O_3	Ozone
OEH	Office of Environment and Heritage (NSW)
Pb	Lead
$PM_{2.5}$	Particulate matter with an aerodynamic diameter of 2.5 microns or less
PM_{10}	Particulate matter with an aerodynamic diameter of 10 microns or less
ppm	Parts per million– parts of pollutant per million parts of air by volume
RAAS™	Reference Ambient Air Sampler
SO_2	Sulfur dioxide
TEOM	Tapered Element Oscillating Microbalance
USEPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram of pollutant (1 millionth of a gram) per cubic metre of air, referenced to a temperature of 0°C and an absolute pressure of 101.325 kPa
UHAQMN	Upper Hunter Air Quality Monitoring Network
VOCs	Volatile organic compounds – compounds that vaporise (i.e. become a gas) at normal atmospheric temperatures

Overview

This report is required under clause 18 of the National Environment Protection (Ambient Air Quality) Measure (AAQ NEPM). It presents NSW air quality monitoring data for the 2015 calendar year and assesses them against the requirements of the AAQ NEPM. These data are also routinely available on the NSW Office of Environment and Heritage (OEH) website.

The AAQ NEPM establishes:

- requirements for monitoring air quality
- air quality standards that are levels of specified pollutants against which air quality can be assessed
- a goal that the air quality standards are met by 2008 to the extent specified in the NEPM. Recognising that certain events can affect air quality, the NEPM specifies a maximum number of days on which it is permissible to exceed the standard.

In 2016, AAQ NEPM introduced the following additional air quality **standards**:

- Annual average for PM_{10} of 25.0µg/m^3.
- Annual average for $PM_{2.5}$ of 8.0µg/m^3 (previously an Advisory Reporting Standard)
- Daily average for $PM_{2.5}$ of 25.0µg/m^3 (previously an Advisory Reporting Standard)

In 2016, AAQ NEPM introduced and changed the following air quality **goals**:

- Particles as PM_{10} and $PM_{2.5}$ shall have no allowable exceedances for the daily and yearly standard.

In 2016, AAQ NEPM introduced a definition for an exceptional event which can be used for the purpose of reporting compliance against PM_{10} and $PM_{2.5}$ standards and goals.

> **Exceptional event** means a fire or dust occurrence that adversely affects air quality at a particular location, and causes an exceedance of 1 day average standards in excess of normal historical fluctuations and background levels, and is directly related to: bushfire; jurisdiction authorised hazard reduction burning; or continental scale windblown dust.

Air quality monitoring in the AAQ NEPM monitoring network (a subset of OEH's total ambient air quality monitoring network) was performed in accordance with the NSW AAQ NEPM Monitoring Plan, AAQ NEPM Technical Papers and the OEH's National Association of Testing Authorities (NATA) accreditation. Note that monitoring for lead (Pb) ceased in 2004 because ambient concentrations were extremely low.

During 2015, all designated NSW NEPM stations monitoring ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) complied with the NEPM. However, selected stations did not comply with the NEPM for particles.

Ozone

During 2015, all designated NSW NEPM stations monitoring ozone (O_3) complied with the NEPM.

Particulates

PM_{10}

To comply with the 24-hour NEPM goal for particles as PM_{10}, **no exceedances** of the 24-hour standard of 50.0µg/m^3 is allowed, unless determined as an exceptional event (see previous page for the definition of an exceptional event). During 2015, **Newcastle and Wagga Wagga North** were the only stations that did not comply with this goal, recording one day above the NEPM standard.

To comply with the annual NEPM goal for particles as PM_{10} the annual average must be less than 25.0µg/m^3. All monitoring sites complied with this goal.

$PM_{2.5}$

To comply with the 24-hour NEPM goal for particles as $PM_{2.5}$, no exceedances of the 24-hour standard of 25.0µg/m^3 is allowed, unless determined as an exceptional event (see previous page for the definition of an exceptional event). During 2015, Liverpool and Earlwood were the only stations that did not comply with this goal with each monitoring site recording one day above the standard. Since 2012, Beta Attenuation Monitors (BAMs) have been deployed for $PM_{2.5}$ monitoring throughout the entire OEH monitoring network.

To comply with the annual NEPM goal for particles as $PM_{2.5}$ the annual average must be less than 8.0µg/m^3. Liverpool and Earlwood sites were the only sites that did not comply with this goal.

Section A – Monitoring summary

Current AAQ NEPM Monitoring network

The NSW AAQ NEPM Monitoring Plan gives details of the monitoring that NSW performs to assess compliance with the AAQ NEPM. The majority of monitoring occurs in the highly populated regions of Sydney, Newcastle and Wollongong, which contain over 60% of the NSW population. Campaign monitoring is also performed in a number of rural population centres.

The AAQ NEPM monitoring network is part of an overall 43 station air monitoring network operated by the Office of Environment and Heritage (OEH). The AAQ NEPM network is designed to characterise general air quality and frequently will pick up individual pollutant events. This approach ensures that there is adequate coverage of the populated areas and of the broad differences in pollutant distribution within a region. The choice of stations in each region was made to optimise both population coverage and representation of the occurrences of higher pollutant concentrations.

Types of monitoring stations

OEH characterises the air quality to which the general population is exposed in a region by monitoring all air pollutants of interest at a network of **trend** stations. These stations capture the majority of pollution events that occur from time to time, but their role is supplemented by that of additional permanent upper bound stations (**performance** stations) where selected pollutants are monitored to ensure that all major pollutant events are captured and reported. **Campaign monitoring** is also done in regional centres at Albury, Wagga Wagga North, Bathurst and Tamworth.

In total, the AAQ NEPM network in NSW currently monitors pollutants at 22 stations (Table 1 and Figures 1 and 2). The eight trend stations monitor the majority of pollutants and the six performance stations monitor selected individual pollutants. Selected pollutants are monitored on a campaign basis at a further eight stations in Sydney, the Central Coast, the Lower Hunter and regional NSW.

In addition, OEH maintains a number of air quality monitoring stations that are not designated for NEPM reporting, and some stations designated as NEPM stations for particular pollutants are not designated for other pollutants. For instance, St Marys is designated as an NEPM station for ozone, but nitrogen dioxide and PM_{10} are also measured at this station.

The Upper Hunter Air Quality Monitoring Network (UHAQMN) was established in 2010 through government and industry collaboration. There are 14 monitoring sites located in strategic locations, including the major population centres of Singleton and Muswellbrook. All monitoring sites measure particulates (PM_{10}), and some also measure $PM_{2.5}$, sulfur dioxide (SO_2) and oxides of nitrogen (NO_x).

The Newcastle Local Air Quality Monitoring Network (NLAQMN) started operation in October 2014. Three monitoring sites (Carrington, Mayfield & Stockton) have been established in the immediate vicinity of the Newcastle industrial precinct. Both the

UHAQMN and the NLAQMN are established in legislation; they are operated for industry-related purposes and are not designed for NEPM reporting purposes.

The networks are both funded by industry and operated and maintained by the OEH. Data for both networks are freely available from the OEH website at Upper Hunter monitoring reports and Newcastle Local Air Quality Monitoring Network - Map.

Data from stations designated as non-NEPM stations for a particular pollutant are not presented in this report.

New sites and site closures during 2015

No changes were made to the AAQ NEPM network during 2015.

Table 1. NSW AAQ NEPM monitoring network

Station	Station type[1]	Year est.	No. of parameters	Ozone	NO_2	PM_{10}	$PM_{2.5}$	CO	SO_2
Sydney									
Bringelly	T	1992	4	X	X	X			X
Camden[2]	P	2012	5	X	X	X	X	X	
Campbelltown West[3]	T	2012	5	X	X	X		X	X
Chullora	T	2003	6	X	X	X	X	X	X
Earlwood	C	1998	1				X		
Liverpool	C	1990	5	X	X	X	X	X	
Oakdale	P	1996	2	X		X			
Prospect[4]	T	2007	5	X	X	X		X	X
Richmond	T	1992	5	X	X	X	X		X
Rozelle	T	1978	4	X	X	X		X	
St Marys	P	1992	1	X					
Central Coast									
Wyong[2]	P	2012	6	X	X	X	X	X	X
Lower Hunter									
Beresfield	C	1993	2			X	X		
Newcastle	T	1992	5	X	X	X		X	X
Wallsend	C	1992	4	X	X		X		X
Illawarra									
Albion Park South	P	2005	4	X	X	X			X
Kembla Grange	P	1994	2	X		X			
Wollongong	T	1993	6	X	X	X	X	X	X
Regional NSW									
Albury	C	2000	1			X			
Bathurst[5]	C	2000	1			X			
Tamworth	C	2000	1			X			
Wagga Wagga North	C	2011	1			X			

1 P denotes performance; T denotes trend; C denotes campaign
2 New station opened in September–October 2012
3 Replaced the Macarthur trend station from September 2012
4 Replaced Blacktown station from 2007
5 Bathurst ozone analyser was removed in August 2007 after completion of the ozone monitoring campaign program.

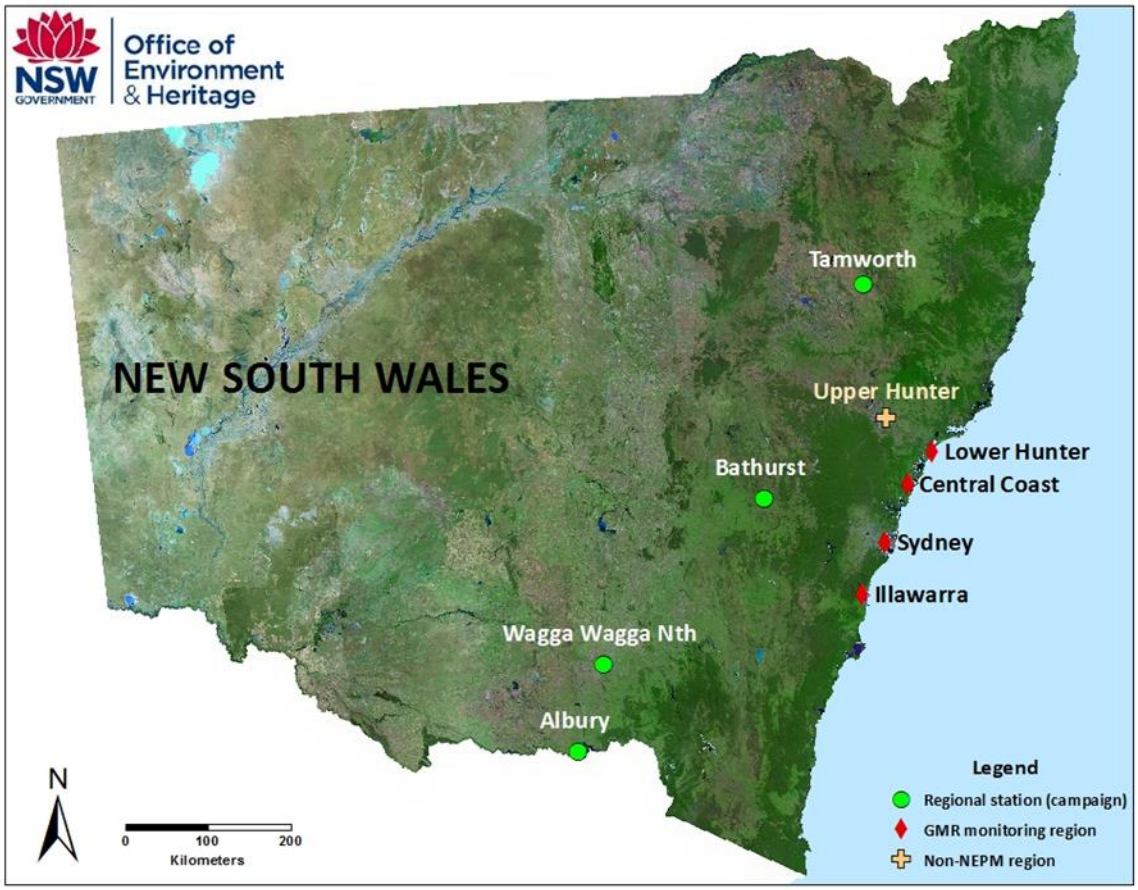

Figure 1. Ambient air quality monitoring regions, including regional NSW (four campaign-type stations) and the Greater Metropolitan Region or GMR (Sydney, Illawarra, Central Coast, Lower Hunter and the Upper Hunter). All regions except for the Upper Hunter include NEPM-designated stations.

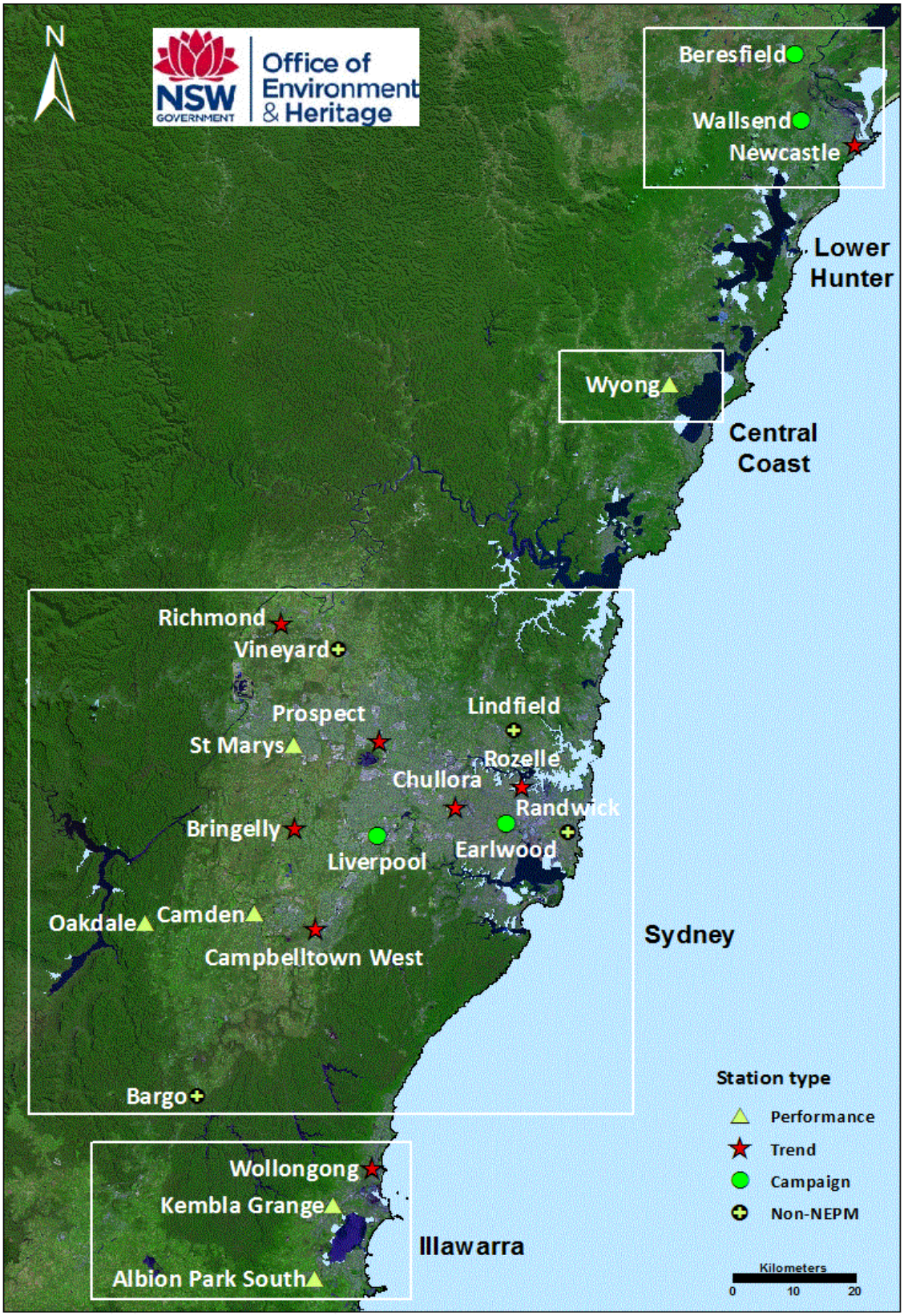

Figure 2. Ambient air quality monitoring stations in the NSW Greater Metropolitan Region, including designated NEPM stations

Station siting and exposure

All stations within the network, with the exception of Chullora, Earlwood, Rozelle and Tamworth, meet all of the AAQ NEPM siting and exposure criteria (see Table 2 for further details).

Table 2. Stations not complying with all siting and exposure criteria

Station	Siting criteria not met	Comments
Chullora	Less than 20 m from trees	Trees have grown since establishment of station
Earlwood	Clear sky angle <120°. Less than 20 m from trees	Trees have grown since establishment of station
Rozelle	Clear sky angle <120°. Less than 20 m from trees	Trees have grown since establishment of station
Tamworth	Less than 20 m from trees	Best location in urban area specifically targeted for monitoring

Monitoring methods

The NSW network comprises instruments that are in accordance with the relevant Australian standard (see Table 3 for further details). Note that, in the case of PM_{10}, the tapered element oscillating microbalance (TEOM) method is used for NEPM monitoring and reporting. PM_{10} data from the TEOM are presented as measured, incorporating the USEPA equivalency correction factors and unadjusted for temperature. Beta Attenuation Monitor (BAM) are used to measure $PM_{2.5}$.

Table 3. Instruments used in NSW for NEPM monitoring

Pollutant	Standard	Title	Method used
Carbon monoxide	AS3580.7.1	Ambient Air – Determination of Carbon Monoxide – Direct Reading Instrument Method	Gas filter correlation/ infra-red
Nitrogen dioxide	AS3580.5.1	Ambient Air – Determination of Oxides of Nitrogen – Chemiluminescence Method	Gas-phase chemiluminescence
Photochemical oxidant (ozone)	AS3580.6.1	Ambient Air – Determination of Ozone – Direct Reading Instrument Method	Non-dispersive ultra-violet
Sulfur dioxide	AS3580.4.1	Ambient Air – Determination of Sulfur Dioxide – Direct Reading Instrument Method	Pulsed fluorescence
Lead[1]	AS2800	Ambient Air – Determination of Particulate Lead – High Volume Sampler – Gravimetric Method	Atomic absorption
Particles as PM_{10}	AS3580.9.8	Determination of Suspended Particulate Matter – PM_{10} continuous direct mass method using a TEOM	Tapered element oscillating microbalance (TEOM)[2]
Particles as $PM_{2.5}$	AS/NZS 3580.9.12	Determination of Suspended Particulate Matter - $PM_{2.5}$ Beta Attenuation Monitors	Beta attenuation monitor (BAM)[3]
	AS/NZS 3580.9.10	Determination of Suspended Particulate Matter – $PM_{2.5}$ low volume sampler – Gravimetric method	FRM Partisol[4]
			FRM Reference Ambient Air Sampler (RAAS)™[4]

1 No longer measured in NSW
2 Instrument output conforms to USEPA equivalence designation (offset 3.0, scaling factor 1.03)
3 TEOM monitors at all sites were replaced by BAM $PM_{2.5}$ monitors (Federal Equivalent Method) during 2012. Before this, TEOMs were modified for use in the $PM_{2.5}$ Equivalence Program and at the monitoring stations, in accordance with NEPM Technical Paper on Monitoring for Particles as PM2.5.
4 Both Partisol and RAAST™ are FRMs: https://www3.epa.gov/ttn/amtic/files/ambient/criteria/reference-equivalent-methods-list.pdf

NATA accreditation

As required under Clause 12 of the AAQ NEPM, OEH is accredited by NATA for the measurement of all AAQ NEPM parameters (accreditation number 14209). The last reassessment of the Air Quality Monitoring Laboratory and associated monitoring stations by NATA was completed in November 2015.

Pollutant screening criteria

Clause 14(2) of the AAQ NEPM allows for fewer **performance** monitoring stations where it can be demonstrated that pollutant levels are reasonably expected to be consistently lower than the AAQ NEPM standards. These screening criteria have been used for carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide and lead at several regions in NSW. More detailed information regarding screening of pollutants for specific regions is given in the NSW AAQ NEPM Monitoring Plan.

Section B – Assessment of compliance with standards and goals

Assessment against standards and goals

Air quality is assessed against the standards and goals as specified in Schedule 2 of the AAQ NEPM. The **standards** (column 3, Table 4) against which air quality is assessed are concentrations in parts per million (ppm) or micrograms per cubic metre (µg/m^3).

The **goal** of the AAQ NEPM is to achieve the standards as assessed in accordance with the monitoring protocol within 10 years of commencement (i.e. 2008) to the extent specified in Schedule 2 of the AAQ NEPM. The extent is expressed as a maximum allowable number of exceedances per year, for each standard (column 4, Table 4).

In accordance with Clause 18 of the National environment protection protocol, for the purpose of reporting compliance against PM_{10} and $PM_{2.5}$ for both the 1 day average and 1 year average standards, jurisdictions shall **exclude monitoring data** that has been determined as being directly associated with an **exceptional event**. An exceptional event is defined on page 1.

Table 4. NEPM standards and goals specified in Schedule 2 of the AAQ NEPM

Pollutant	Averaging period	AAQ NEPM standard (maximum concentration)	AAQ NEPM goal (maximum number of allowable exceedances)
Carbon monoxide	8-hour rolling average	9.0 ppm	1 day a year
Nitrogen dioxide	1-hour average	0.120 ppm	1 day a year
	1-year average	0.030 ppm	None
Photochemical oxidants – as ozone	1-hour average	0.100 ppm	1 day a year
	4-hour rolling average	0.080 ppm	1 day a year
Sulfur dioxide	1-hour average	0.200 ppm	1 day a year
	1-day average	0.080 ppm	1 day a year
	1-year average	0.020 ppm	None
Particles as PM_{10}	1-day average	50.0 µg/m^3	None
	1-year average	25.0 µg/m^3	None
Particles as $PM_{2.5}$	1-day average	25.0 µg/m^3	None
	1-year average	8.0 µg/m^3	None
Lead	1-day average	0.50 µg/m^3	None

Tables 5 to 10a summarise compliance with the AAQ NEPM standards and goals. The following are given for each pollutant monitored at each monitoring station:

- data availability rate (quarterly and annual)
- the annual mean (where an annual standard exists)
- an assessment of compliance, including the number of days when standards were exceeded.

Categories used to assess compliance

The categories MET, NOT MET and ND are used to indicate assessment of compliance.

A station's performance is assessed as **complying with the NEPM (i.e. 'MET')** if the number of exceedances is no more than the number specified in Schedule 2 of the AAQ NEPM and data availability was at least 75% in each quarter.

The station is assessed as **not complying with the NEPM (i.e. 'NOT MET')** if there is more than the number of exceedances specified in Schedule 2 of the AAQ NEPM, even if the data availability rates meet the 75% requirement.

A station's performance is assessed as **'NOT DEMONSTRATED' (ND)** if it has data availability rates less than 75% in any quarter, even if it records no exceedances or the number of exceedence days is allowable. This may be due to instrument failures, temporary closures for upgrading, or closures to allow relocation of the station.

A region demonstrates compliance with the NEPM either when all stations in the region demonstrate compliance or when the region meets approved **pollutant screening criteria**.

Calculation and reporting methods

The calculation and reporting methods used comply with the requirements described in *National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 8: Annual Reports* (NEPC Peer Review Committee 2002). Daily averages are calculated by using hours 1 to 24, as described in *National Environment Protection (Ambient Air Quality) Measure Technical Paper No. 5: Data Collection and Handling* (NEPC Peer Review Committee 2001).

An internal correction factor for USEPA equivalency has been applied to PM_{10} TEOM data, but there has been no subsequent treatment or temperature adjustment. $PM_{2.5}$ measurements were made by using BAMs (a Federal Equivalent Method). In this report, pre-2012 $PM_{2.5}$ data collected by using TEOMs do not include the internal correction for USEPA PM_{10} equivalency or any subsequent treatment or adjustment for temperature.

All days where a particular standard for a pollutant were exceeded are listed. Also listed are the stations that recorded exceedances of the standard on that day and (for

averaging periods of less than 24 hours) the number of daily averaging periods in which the standard was exceeded.

Where possible, a brief comment is given for particular pollution events. Events that have been clearly influenced by extraordinary natural events, such as bushfires and dust storms, are highlighted and these events are now defined as exceptional events. Note that the absence of a comment does not necessarily indicate the absence of such influences; instead, no clear information may be available. In some cases it is likely that there has been an influence of a pollution event, however this cannot be established.

Data losses during 2015

All monitoring stations complied with the data coverage requirement (at least 75% per quarter), with the exception of $PM_{2.5}$ monitoring at Wollongong, where only 71.4% data was available for the 2nd quarter, due to intermittent instrument alarms.

Carbon monoxide

Table 5. 2015 Compliance summary for CO in NSW

AAQ NEPM standard and goal
9.0 ppm (8-hour average, 1 day/year)

Region/ Performance monitoring station	Data availability rate (% of hours)					Number of exceedences (days)	Performance against the standard and goal
	Q1	Q2	Q3	Q4	Annual		
Sydney							
Camden	100.0	98.1	100.0	92.4	97.6	0	Met
Campbelltown West	97.5	95.1	97.6	94.4	96.2	0	Met
Chullora	96.0	99.6	99.9	94.2	97.4	0	Met
Liverpool	89.2	94.9	96.7	82.5	90.8	0	Met
Prospect	98.0	94.9	96.6	98.9	98.4	0	Met
Rozelle	87.8	99.3	95.3	97.0	94.9	0	Met
Central Coast							
Wyong	99.0	98.7	99.4	97.1	98.5	0	Met
Illawarra							
Wollongong	99.0	98.0	97.2	98.9	97.9	0	Met
Lower Hunter							
Newcastle	83.7	85.8	98.9	99.3	92.0	0	Met

During 2015 no exceedances of the carbon monoxide standard were recorded in NSW (Table 5). Compliance with the AAQ NEPM goal for carbon monoxide was demonstrated at all sites in the Sydney, Central Coast, Illawarra and Lower Hunter regions.

Nitrogen dioxide

Table 6. 2015 Compliance summary for NO_2 in NSW

AAQ NEPM standards and goals
0.120 ppm (1-hour average, 1 day/year)
0.030 ppm (Annual average)

Region/ Performance monitoring station	Data availability rate (% of hours)					Number of exceedances (days)	Annual mean (ppm)	Performance against standards and goals	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Sydney									
Bringelly	91.6	92.4	92.5	94.7	92.8	0	0.004	Met	Met
Camden	95.7	94.0	95.6	85.1	92.6	0	0.004	Met	Met
Campbelltown West	93.3	91.3	92.8	89.7	91.8	0	0.010	Met	Met
Chullora	92.1	95.2	95.4	93.1	94.0	0	0.013	Met	Met
Liverpool	87.1	90.4	92.1	92.0	90.4	0	0.010	Met	Met
Prospect	93.4	95.6	91.8	94.7	93.8	0	0.011	Met	Met
Richmond	95.0	91.3	94.5	82.2	90.8	0	0.004	Met	Met
Rozelle	90.0	95.3	88.5	91.5	91.3	0	0.011	Met	Met
Central Coast									
Wyong	93.2	94.7	95.2	92.2	93.8	0	0.005	Met	Met
Illawarra									
Albion Park South	86.2	92.7	95.5	91.8	91.6	0	0.003	Met	Met
Wollongong	93.3	92.3	90.5	94.7	92.7	0	0.008	Met	Met
Lower Hunter									
Newcastle	92.5	93.9	93.7	95.2	93.8	0	0.007	Met	Met
Wallsend	94.5	93.6	95.0	90.4	93.4	0	0.008	Met	Met

During 2015 no exceedances of the nitrogen dioxide 1-hour and annual standards were recorded in NSW (Table 6). Compliance with the AAQ NEPM goal for nitrogen dioxide was demonstrated at all sites in the Sydney, Central Coast, Illawarra and Lower Hunter regions.

Ozone

Table 7. 2015 Compliance summary for O_3 (ozone) in NSW

AAQ NEPM standards and goals
0.100 ppm (1-hour average, 1 day/year)
0.080 ppm (4-hour average, 1 day/year)

Region/ Performance monitoring station	Data availability rate (% of hours)					Number of exceedances (days)		Performance against standards and goals	
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
Sydney									
Bringelly	93.4	90.2	93.6	95.3	93.1	0	0	Met	Met
Camden	95.8	93.4	95.6	92.7	94.3	0	0	Met	Met
Campbelltown West	93.4	91.3	93.4	89.8	92.0	0	0	Met	Met
Chullora	92.3	95.6	94.4	93.1	93.8	0	0	Met	Met
Liverpool	87.1	92.6	93.3	92.7	91.5	0	0	Met	Met
Oakdale	93.4	95.4	91.8	94.0	93.7	0	0	Met	Met
Prospect	94.4	95.7	94.0	92.9	94.2	0	0	Met	Met
Richmond	95.0	91.5	94.5	91.9	93.2	0	0	Met	Met
Rozelle	90.0	95.4	93.0	93.1	92.9	0	0	Met	Met
St Marys	92.4	93.6	92.3	93.6	93.0	0	0	Met	Met
Central Coast									
Wyong	95.0	84.6	95.1	93.2	92.0	0	1	Met	Met
Illawarra									
Albion Park South	86.2	93.7	95.5	91.8	91.8	0	0	Met	Met
Kembla Grange	94.7	93.9	95.4	95.0	94.7	1	0	Met	Met
Wollongong	94.6	95.2	94.6	94.7	94.8	0	1	Met	Met
Lower Hunter									
Newcastle	92.4	94.0	94.4	95.2	94.0	0	0	Met	Met
Wallsend	94.5	93.7	95.0	93.8	94.2	0	0	Met	Met

During 2015, ozone levels above the 1-hour standard were recorded on one day in Illawarra, and levels above the 4-hour standard were recorded on one day at two monitoring stations in the Central Coast and Illawarra. (Table 7).

Compliance with the AAQ NEPM goal for ozone was demonstrated at all sites in the Sydney, Central Coast, Illawarra and Lower Hunter regions.

Sulfur dioxide

Table 8. 2015 Compliance summary for SO_2 in NSW

AAQ NEPM standards and goals
0.200 ppm (1-hour average, 1 day/year)
0.080 ppm (24-hour average, 1 day/year)
0.020 ppm (1-year average)

Region/ Performance monitoring station	Data availability rate (% of hours)					Number of exceedences (days)		Annual mean (ppm)	Performance against standards and goals		
	Q1	Q2	Q3	Q4	Annual	1-hour	24-hour		1-hour	24-hour	1-year
Sydney											
Bringelly	92.3	93.5	92.2	93.8	92.9	0	0	0.000	Met	Met	Met
Campbelltown West	92.4	90.6	93.2	90.9	91.7	0	0	0.000	Met	Met	Met
Chullora	92.2	95.6	95.4	90.7	93.5	0	0	0.001	Met	Met	Met
Prospect	94.4	95.7	93.7	94.7	94.6	0	0	0.001	Met	Met	Met
Richmond	95.0	91.5	93.3	90.6	92.6	0	0	0.000	Met	Met	Met
Central Coast											
Wyong	91.9	94.8	91.9	93.2	92.9	0	0	0.001	Met	Met	Met
Illawarra											
Albion Park South	86.3	90.4	95.5	90.9	90.8	0	0	0.001	Met	Met	Met
Wollongong	87.6	93.7	93.4	84.2	89.7	0	0	0.001	Met	Met	Met
Lower Hunter											
Newcastle	92.5	94.1	94.6	93.3	93.6	0	0	0.001	Met	Met	Met
Wallsend	87.7	86.2	93.8	93.5	90.3	0	0	0.001	Met	Met	Met

During 2015 no exceedences of the sulfur dioxide 1-hour, 24-hour and annual standards were recorded in NSW (Table 8). Compliance with the AAQ NEPM goal for sulfur dioxide was demonstrated at all sites in the Sydney, Central Coast, Illawarra and Lower Hunter regions.

Particles as PM_{10}

Table 9. 2015 Compliance summary for PM_{10} in NSW

AAQ NEPM standard and goal
50.0 µg/m³ (24-hour average, 0 days/year)
25.0 µg/m³ (Annual average)

Region/ Performance monitoring station	Data availability rate (% of days)					Number of exceedences (days)		Annual mean (µg/m³)	Performance against standards and goals	
	Q1	Q2	Q3	Q4	Annual	Not related to excepti onal event	Exception -al events		24 hour	1-year
Sydney										
Bringelly	100.0	97.8	100.0	98.9	99.2	0	1	15.8	Met	Met
Camden	100.0	97.8	100.0	97.8	98.9	0	1	13.9	Met	Met
Campbelltown West	100.0	90.1	98.9	94.6	95.9	0	1	15.6	Met	Met
Chullora	95.6	100.0	100.0	96.7	98.1	0	1	17.5	Met	Met
Liverpool	90.0	95.6	98.9	95.7	95.1	0	1	18.5	Met	Met
Oakdale	97.8	100.0	97.8	100.0	98.9	0	1	11.4	Met	Met
Prospect	88.9	94.5	100.0	96.7	95.1	0	1	17.6	Met	Met
Richmond	100.0	93.4	96.7	96.7	96.7	0	0	12.8	Met	Met
Rozelle	94.4	96.7	94.6	100.0	96.4	0	1	16.7	Met	Met
Central Coast										
Wyong	98.9	98.9	97.8	100.0	98.9	0	1	14.9	Met	Met
Illawarra										
Albion Park South	86.7	97.8	100.0	95.7	95.1	0	0	14.0	Met	Met
Kembla Grange	98.9	100.0	100.0	97.8	99.2	0	1	17.8	Met	Met
Wollongong	97.8	98.9	100.0	100.0	99.2	0	0	16.9	Met	Met
Lower Hunter										
Beresfield	100.0	93.4	100.0	97.8	97.8	0	2	18.8	Met	Met
Newcastle	100.0	97.8	98.9	97.8	98.6	**1**	2	21.4	**Not Met**	Met
Regional										
Albury	100.0	93.4	97.8	91.3	95.6	0	2	14.6	Met	Met
Bathurst	100.0	100.0	100.0	97.8	99.5	0	2	13.4	Met	Met
Tamworth	100.0	97.8	97.8	100.0	98.9	0	1	14.1	Met	Met
Wagga Wagga North	100.0	95.6	97.8	100.0	98.4	**1**	6	19.9	**Not Met**	Met

Bold font indicates that AAQ NEPM goal was not met. See Table 20 for details of exceptional events.

During 2015, the AAQ NEPM goal for 24-hour PM_{10} of zero days per year was **not met by Newcastle and Wagga Wagga North**. All sites met the AAQ NEPM annual mean standard for PM_{10} of 25µg/m³. A dust storm on the 5 and 6 May 2015 contributed to exceedances in all the Sydney sites (except Richmond), Wyong, Lower Hunter, Bathurst, Tamworth, Albury and Wagga Wagga North. See Table 20 for details of further exceptional events.

Particles as $PM_{2.5}$

Table 10. 2015 Compliance summary for $PM_{2.5}$ in NSW

AAQ NEPM standard and goal
25.0 µg/m³ (24-hour average, 0 days/year)
8.0 µg/m³ (Annual average)

Region/ Performance monitoring station	Data availability rate (% of days)					Number of exceedences (days)		Annual mean (µg/m³)	Performance against standards and goals	
	Q1	Q2	Q3	Q4	Annual	Not related to exceptional event	Exceptional events		24 hour	1-year
Sydney										
Camden	100.0	95.6	100.0	97.8	98.4	0	0	6.2	Met	Met
Chullora	92.2	96.7	100.0	96.7	96.4	0	1	8.0	Met	Met
Earlwood	92.2	98.9	96.7	85.9	93.4	**1**	1	**8.5**	**Not Met**	**Not Met**
Liverpool	90.0	92.3	98.9	95.7	94.2	**1**	1	**8.5**	**Not Met**	**Not Met**
Richmond	92.2	91.2	93.5	93.5	92.6	0	0	7.7	Met	Met
Central Coast										
Wyong	98.9	93.4	97.8	98.9	97.3	0	0	5.2	Met	Met
Illawarra										
Wollongong	85.6	**71.4**	90.2	79.3	81.6	0	1	7.6	**ND**	**ND**
Lower Hunter										
Beresfield	100.0	86.8	93.5	94.6	93.7	0	1	7.3	Met	Met
Wallsend	94.4	97.8	97.8	93.5	95.9	0	0	7.3	Met	Met

Bold font indicates that AAQ NEPM goal was not met. See Table 20 for details of exceptional events.

During 2015, the AAQ NEPM goal for 24-hour $PM_{2.5}$ of zero days per year was **not met by Earlwood and Liverpool** monitoring sites. **Earlwood and Liverpool** also recorded annual average $PM_{2.5}$ levels above the NEPM standard of 8.0µg/m³. Earlwood and Liverpool recorded the equal highest annual average (8.5µg/m³).

Whereas the above data (Table 10) were collected using BAM, Table 10a presents $PM_{2.5}$ data that were measured by using a Federal Reference Method (FRM). NSW OEH performs FRM measurements at its Chullora station only. The differences in $PM_{2.5}$ annual averages between BAM and FRM reflect inter-method differences, as FRM provides only one sample in three days whereas BAM provides continuous data.

Table 10a. Summary of $PM_{2.5}$ concentrations in NSW (2015) – FRM method

AAQ NEPM Standard and goal
25.0 µg/m^3 (24-hour average 0 days/year)
8.0 µg/m^3 (Annual average)

Region/Performance monitoring station	Data availability rate[1] (% of days)					Number of exceedances (days)	Annual mean (µg/m^3)
	Q1	Q2	Q3	Q4	Annual		
Sydney							
Chullora	80.0	82.4	81.5	78.3	80.6	1	6.9

[1] Data availability rates are based on a 1-day-in-3 sampling regime.

Lead

The primary source of lead in air was eliminated with the complete ban on lead in petrol. Changes to fuel formulation brought marked reductions in the levels of lead in the atmosphere. Annual averages throughout NSW were typically less than 0.03 µg/m^3, with many 24-hour average samples below the minimum detection limit for lead (0.007 µg/m^3 using ICP-AES (inductively coupled plasma – atomic emission spectroscopy). Since 2002 the highest annual average recorded in NSW has been only 18% of the standard (0.09 µg/m^3 at Wallsend in 2003).

OEH phased out ambient lead monitoring for the AAQ NEPM during 2004. The case for cessation of lead monitoring was approved by the National Environment Protection Council (NEPC).

Section C – Analysis of air quality

Data availability rates

Data availability rates are presented as either percentages of valid data or numbers of valid days.

When presented as a percentage, the value is the number of averaging periods in which the data are valid, divided by the total number of averaging periods in the year (or quarter, as appropriate).

When presented as the number of valid days, the value represents the number of days during the year when at least 75% of averaging periods during the day are valid. A valid day has at least 18 valid hours. If we hypothesize that on each day throughout the year we had **exactly** 18 valid hours, then annual data availability would be 75%. The number of valid days would be 365.

Calibration hour

For gaseous pollutants, the calibration hour is included in the calculation of data availability rates.

OEH does daily automated instrument calibration checks for carbon monoxide, nitrogen dioxide, ozone and sulfur dioxide during the early morning; hourly data obtained during the calibration check are considered invalid for reporting purposes. Hence for these pollutants the maximum number of valid 1-hour averages in a day is 23. However, all calculations for data availability given in this report **include** the invalid calibration hour (i.e. calculations assume that there are 24 **possible** valid hours in a day). Therefore, for gaseous pollutants, the maximum annual 1-hour data availability can be only 96%.

Data availability rates of reporting periods

Each reporting period (e.g. quarter) and NEPM standard averaging period has at least a 75% data availability rate.

For example, the carbon monoxide NEPM standard is based on 8-hour rolling averages. A valid hour is calculated as the average of the valid 1-hour averages over the preceding eight hours, when at least six of those hours (75%) hold valid data.

Data availability rates for pollutants reported against more than one standard

For pollutants reported against more than one AAQ NEPM standard, data availability rates may not be the same for each standard.

For instance, when ozone is measured, one hour of each day is lost during calibration checks. This affects data availability rates for reporting against the 1-hour standard for the associated hour, but it may not affect data availability rates for

reporting against the 4-hour standard. Thus the maximum data availability rate is only 96% for the 1-hour standard, but it can be 100% for the 4-hour standard.

Daily maxima

As an NEPM requirement for standards with averaging periods of less than 24 hours, the daily maxima are reported **regardless of the number of valid hours in the day**.

As example, the highest 1-hour daily average for NO_2 during a given year at a site may have occurred on a day on which the 75% data requirement was not met. In reporting percentile distributions of the annual 1-hour maxima for the site, however, at least 75% of valid hours must be available for the associated day. If not, the subsequent day that has the highest 1-hour daily average from the year's dataset and meets the 75% data requirement will be used.

Air quality data tables

Tables 11 to 21a summarise the air quality data for each indicator and their relationships to the AAQ NEPM standards.

Carbon monoxide

Table 11. Summary for CO: Daily maximum rolling 8-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (ppm)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Camden	97.6	351	0.5	05/07/2015 09:00	0.5	23/06/2015 10:00
Campbelltown West	96.2	343	1.0	29/05/2015 02:00	0.9	22/08/2015 02:00
Chullora	97.4	351	1.4	06/07/2015 02:00	1.3	10/07/2015 03:00
Liverpool	90.8	325	1.8	28/06/2015 02:00	1.6	24/06/2015 02:00
Prospect	98.4	355	1.5	26/05/2015 02:00	1.4	14/06/2015 02:00
Rozelle	94.9	342	1.1	26/05/2015 02:00	1.1	10/07/2015 04:00
Central Coast						
Wyong	98.5	355	0.4	30/05/2015 02:00	0.4	22/07/2015 02:00
Illawarra						
Wollongong	97.9	351	0.8	30/06/2015 02:00	0.8	25/06/2015 02:00
Lower Hunter						
Newcastle	92.0	318	1.5	07/06/2015 02:00	1.4	23/07/2015 02:00

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Carbon monoxide (CO) levels in all regions were substantially below the AAQ NEPM carbon monoxide eight hour rolling average standard (Table 11). The highest recorded reading was at Liverpool (1.8ppm) which was 20% of the NEPM standard.

Nitrogen dioxide

Table 12. Summary for NO_2: Daily maximum 1-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (ppm)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Bringelly	92.8	353	0.027	11/06/2015 18:00	0.026	15/04/2015 19:00
Camden	92.6	350	0.026	11/06/2015 19:00	0.022	04/05/2015 19:00
Campbelltown West	91.8	345	0.062	06/10/2015 22:00	0.050	07/10/2015 00:00
Chullora	94.0	356	0.054	19/11/2015 21:00	0.052	06/10/2015 21:00
Liverpool	90.4	340	0.060	05/10/2015 20:00	0.050	06/10/2015 20:00
Prospect	93.8	356	0.053	19/11/2015 23:00	0.051	20/11/2015 01:00
Richmond	90.8	340	0.024	20/08/2015 20:00	0.024	18/12/2015 22:00
Rozelle	91.3	346	0.060	05/10/2015 23:00	0.050	19/11/2015 21:00
Central Coast						
Wyong	93.8	356	0.032	28/04/2015 04:00	0.030	28/06/2015 18:00
Illawarra						
Albion Park South	91.6	344	0.047	06/10/2015 18:00	0.037	16/10/2015 13:00
Wollongong	92.7	352	0.060	06/10/2015 20:00	0.046	05/10/2015 20:00
Lower Hunter						
Newcastle	93.8	356	0.044	05/10/2015 20:00	0.040	19/11/2015 22:00
Wallsend	93.4	354	0.042	05/10/2015 20:00	0.036	16/04/2015 19:00

AAQ NEPM standard: 0.120 ppm (1-hour average)

Nitrogen dioxide (NO_2) levels in all regions were below the AAQ NEPM 1-hour nitrogen dioxide standard (Table 12). The highest recorded reading was at Campbelltown West (0.062ppm) which was 52% of the NEPM standard.

Ozone

Table 13. Summary for O_3: Daily maximum 1-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (ppm)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Bringelly	93.1	355	0.087	19/11/2015 15:00	0.087	19/12/2015 15:00
Camden	94.3	357	0.086	19/12/2015 15:00	0.077	10/11/2015 16:00
Campbelltown West	92.0	343	0.086	09/01/2015 14:00	0.085	20/12/2015 12:00
Chullora	93.8	355	0.093	06/10/2015 17:00	0.089	20/12/2015 13:00
Liverpool	91.5	348	0.087	20/12/2015 13:00	0.083	19/12/2015 14:00
Oakdale	93.7	354	0.084	19/12/2015 16:00	0.080	18/12/2015 17:00
Prospect	94.2	357	0.085	20/11/2015 12:00	0.080	06/10/2015 18:00
Richmond	93.2	350	0.094	20/12/2015 12:00	0.087	20/11/2015 11:00
Rozelle	92.9	354	0.099	06/10/2015 16:00	0.098	20/11/2015 12:00
St Marys	93.0	352	0.082	20/11/2015 11:00	0.082	19/11/2015 14:00
Central Coast						
Wyong	92.0	347	0.097	06/10/2015 13:00	0.073	05/10/2015 17:00
Illawarra						
Albion Park South	91.8	345	0.079	01/12/2015 15:00	0.075	19/12/2015 12:00
Kembla Grange	94.7	360	**0.104**	19/12/2015 13:00	0.082	01/12/2015 14:00
Wollongong	94.8	362	0.092	06/10/2015 18:00	0.082	01/12/2015 15:00
Lower Hunter						
Newcastle	94.0	357	0.074	05/10/2015 16:00	0.066	20/11/2015 15:00
Wallsend	94.2	357	0.071	06/10/2015 13:00	0.068	09/12/2015 17:00

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 14. Summary for O_3: Daily maximum rolling 4-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (ppm)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Bringelly	97.0	354	0.078	19/11/2015 16:00	0.077	20/12/2015 14:00
Camden	98.4	357	0.072	19/12/2015 16:00	0.072	20/12/2015 15:00
Campbelltown West	95.8	343	0.079	20/12/2015 15:00	0.070	19/12/2015 15:00
Chullora	97.9	355	0.078	20/12/2015 14:00	0.078	19/11/2015 17:00
Liverpool	95.2	349	0.077	20/12/2015 14:00	0.072	19/12/2015 15:00
Oakdale	97.7	355	0.070	17/10/2015 16:00	0.070	10/12/2015 17:00
Prospect	98.2	358	0.070	20/11/2015 13:00	0.067	10/11/2015 17:00
Richmond	97.1	350	0.074	04/03/2015 18:00	0.073	15/12/2015 16:00
Rozelle	96.7	353	0.079	06/10/2015 17:00	0.071	20/11/2015 14:00
St Marys	94.9	349	0.071	19/11/2015 15:00	0.067	20/12/2015 14:00
Central Coast						
Wyong	95.6	349	**0.091**	06/10/2015 15:00	0.066	05/10/2015 19:00
Illawarra						
Albion Park South	95.7	345	0.075	01/12/2015 16:00	0.066	19/11/2015 18:00
Kembla Grange	98.8	360	0.079	19/12/2015 14:00	0.075	01/12/2015 16:00
Wollongong	98.4	359	**0.083**	06/10/2015 18:00	0.077	01/12/2015 17:00
Lower Hunter						
Newcastle	97.4	356	0.066	05/10/2015 18:00	0.062	20/11/2015 15:00
Wallsend	98.2	357	0.062	20/12/2015 15:00	0.062	06/10/2015 15:00

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 0.080 ppm (rolling 4-hour average)

Ozone events in the Sydney and Illawarra regions are highly variable in terms of both frequency and severity. This is largely the result of the annual variability in meteorological conditions, which strongly affects measures of frequency but can also have some influence on measures of peak concentration. In the Sydney region, emissions of ozone precursors (nitrogen oxides [NOx] and volatile organic compounds [VOCs]) are sufficient to generate concentrations of ozone well above the AAQ NEPM standards (EPA Emissions Inventory 2008).

During 2015, the 1-hour and 1-hour NEPM ozone standards were respectively exceeded on one day (Tables 13 to 16). A rare early season coastal ozone event on 6 October 2015 which impacted coastal monitoring sites and resulted in the Wyong and Wollongong monitoring sites exceeding the four-hour NEPM ozone standard. There was also an exceedance of the 1-hour NEPM ozone standard at Kembla Grange on 19 October 2015.

Ozone levels in Sydney and the Lower Hunter were below the AAQ NEPM 1-hour and 4-hour ozone standard (Table 14).

Table 15. Days when O_3 1-hour AAQ NEPM standard was exceeded

Date	Stations where standard exceeded	Comments[1]
19/12/2015	Kembla Grange	Due to high temperature above 30°C during daytime.

[1] Events that can be clearly identified as influencing pollution levels

Table 16. Days when O_3 4-hour AAQ NEPM standard was exceeded

Date	Stations where standard exceeded	Comments[1]
06/10/2015	Wyong, Wollongong	Hot northerly winds with temperatures reaching 33ºC. This was a rare early season coastal ozone event.

[1] Events that can be clearly identified as influencing pollution levels

Sulfur dioxide

Table 17. Summary for SO_2: Daily maximum 1-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (ppm)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Bringelly	92.9	353	0.007	31/10/2015 09:00	0.006	17/02/2015 09:00
Campbelltown West	91.7	342	0.011	18/12/2015 20:00	0.009	25/11/2015 17:00
Chullora	93.5	353	0.014	01/10/2015 12:00	0.012	25/11/2015 16:00
Prospect	94.6	359	0.027	09/01/2015 20:00	0.019	27/02/2015 11:00
Richmond	92.6	347	0.032	07/09/2015 17:00	0.015	18/12/2015 22:00
Central Coast						
Wyong	92.9	352	0.069	08/12/2015 09:00	0.036	02/11/2015 03:00
Illawarra						
Albion Park South	90.8	341	0.036	16/10/2015 13:00	0.035	06/10/2015 18:00
Wollongong	89.7	341	0.019	20/03/2015 10:00	0.018	02/11/2015 23:00
Lower Hunter						
Newcastle	93.6	355	0.036	03/10/2015 12:00	0.035	10/11/2015 08:00
Wallsend	90.3	339	0.034	26/05/2015 17:00	0.031	03/10/2015 10:00

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 18. Summary for SO_2: Maximum 24-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum value (ppm)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Bringelly	96.7	353	0.001	18/12/2015	0.001	17/02/2015
Campbelltown West	93.7	342	0.002	18/12/2015	0.002	18/03/2015
Chullora	96.7	353	0.003	25/11/2015	0.003	18/12/2015
Prospect	98.4	359	0.003	18/12/2015	0.003	18/03/2015
Richmond	95.1	347	0.003	18/12/2015	0.003	07/09/2015
Central Coast						
Wyong	96.4	352	0.009	08/12/2015	0.004	23/01/2015
Illawarra						
Albion Park South	93.4	341	0.007	20/12/2015	0.007	16/10/2015
Wollongong	93.4	341	0.004	20/03/2015	0.004	07/10/2015
Lower Hunter						
Newcastle	97.3	355	0.007	04/06/2015	0.007	10/07/2015
Wallsend	92.9	339	0.007	03/10/2015	0.005	26/05/2015

AAQ NEPM standard: 0.080 ppm (24-hour average)

Sulphur Dioxide (SO_2) levels in all regions were substantially below the AAQ NEPM 1-hour and 24-hour sulphur dioxide standards (Tables 17 and 18). The highest recorded 1-hour reading was at Wyong (0.069ppm) which was 32% of the standard. The highest recorded 24-hour average was at Wyong (0.009ppm) which was 11% of the standard. No particular station stood out in terms of annual averages (see Table 8).

Particles as PM_{10}

Table 19. Summary for PM_{10}: Maximum 24-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (µg/m³)			
			Highest	Date of highest	6th highest	Date of 6th highest
Sydney						
Bringelly	99.2	362	**57.0**	06/05/2015	34.9	07/10/2015
Camden	98.9	361	**62.4**	06/05/2015	31.5	21/08/2015
Campbelltown West	95.9	350	**69.7**	06/05/2015	36.2	15/09/2015
Chullora	98.1	358	**64.6**	06/05/2015	33.9	14/12/2015
Liverpool	95.1	347	**68.6**	06/05/2015	35.2	23/01/2015
Oakdale	98.9	361	**61.7**	06/05/2015	28.3	12/12/2015
Prospect	95.1	347	**68.7**	06/05/2015	34.7	14/12/2015
Richmond	96.7	353	49.3	06/05/2015	27.5	19/08/2015
Rozelle	96.4	352	**60.3**	06/05/2015	33.2	19/11/2015
Central Coast						
Wyong	98.9	361	**58.6**	06/05/2015	33.2	02/01/2015
Illawarra						
Albion Park South	95.1	347	41.2	26/11/2015	33.9	22/08/2015
Kembla Grange	99.2	362	**62.8**	26/11/2015	42.9	25/11/2015
Wollongong	99.2	362	45.8	06/05/2015	37.8	09/01/2015
Lower Hunter						
Beresfield	97.8	357	**64.9**	06/05/2015	39.4	07/10/2015
Newcastle	98.6	360	**70.4**	06/05/2015	44.4	06/10/2015
Regional						
Albury	95.6	349	**92.5**	05/05/2015	31.6	06/10/2015
Bathurst	99.5	363	**94.6**	06/05/2015	34.5	18/03/2015
Tamworth	98.9	361	**52.7**	06/05/2015	29.6	07/10/2015
Wagga Wagga North	98.4	359	**145.1**	05/05/2015	**56.1**	20/12/2015

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

A total of 16 out of the 19 monitoring sites exceeded the AAQ NEPM 24-hour average PM_{10} standard with the **exceptions being Richmond, Albion Park South and Wollongong** (Tables 19). The highest recorded 24-hour reading was at Wagga Wagga North (145.1µg/m³) which is 290% of the standard.

A large scale dust storm on the 5th and 6th May 2015 contributed to exceedances in all the Sydney sites (except Richmond), Wyong, Lower Hunter, Bathurst, Tamworth, Albury and Wagga Wagga North. Such a ‘dust event’, and also events like hazard reductions burns and bushfires have been identified as an ‘exceptional event’ and are **not included** in assessing if a site has ‘Met’ the NEPM requirements of 0 days/year. See Table 20 for details on how these ‘exceptional events’ impacted pollution levels.

Table 20. Days when PM_{10} 24-hour AAQ NEPM standard was exceeded

Date	Stations where standard exceeded	Comments[1]
02/04/2015	Wagga Wagga North	A number of grass & forest fires to the northwest, southwest & northeast of the monitoring site occurred on the day.
12/04/2015	Wagga Wagga North	Due to broad-scale agricultural activities. *(NSW Air Quality Statement 2015)*
05/05/2015	Albury, Wagga Wagga North	Result of a statewide dust storm that originated from the Victorian Mallee and Southern NSW regions and travelled throughout NSW during the 5 & 6 May. *(NSW Air Quality Statement 2015)*
06/05/2015	Bathurst, Beresfield, Bringelly, Camden, Campbelltown West, Chullora, Liverpool, Newcastle, Oakdale, Prospect, Rozelle, Tamworth, Wagga Wagga North, Wyong	Result of a statewide dust storm that originated from the Victorian Mallee and Southern NSW regions and travelled throughout NSW during the 5 & 6 May (*NSW Air Quality Statement 2015).*
19/11/2015	Wagga Wagga North	**Not related to an exceptional event**.
25/11/2015	Bathurst, Newcastle	Moderate size grass fires occurred to the west of Bathurst monitoring site. **Newcastle was not related to an exceptional event**.
26/11/2015	Beresfield, Kembla Grange, Newcastle	This is due to bushfires in the Illawarra and Hunter Valley. *(NSW Air Quality Statement 2015)*
15/12/2015	Wagga Wagga North	Possible effect of a 5-hectare grass fire which occurred to the northwest of the monitoring site.
20/12/2015	Albury, Wagga Wagga North	Possible effect of 140 hectares of grass fire approximately 200 km west of Wagga-Wagga North site & 200 km northwest of Albury site.

[1] ***All comments describe exceptional events unless otherwise identified.***

Exceptional events that can be clearly identified as influencing pollution levels and **are not included** when assessing against PM_{10} standards and goals. An ***Exceptional event*** means a fire or dust occurrence that adversely affects air quality at a particular location, and causes an exceedance of 1 day average standards in excess of normal historical fluctuations and background levels, and is directly related to: bushfire; jurisdiction authorised hazard reduction burning; or continental scale windblown dust.

Events **not related to an 'exceptional event'** are shown in **bold text and highlighted in yellow** and are **included** when assessing against PM_{10} standards and goals.

Particles as $PM_{2.5}$

Table 21. Summary of $PM_{2.5}$: Maximum 24-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Number of valid days	Maximum values (µg/m³)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Camden	98.4	359	25.0	22/08/2015	20.7	21/08/2015
Chullora	96.4	352	**37.2**	21/08/2015	18.4	05/07/2015
Earlwood	93.4	341	**28.0**	21/08/2015	**25.1**	30/06/2015
Liverpool	94.2	344	**32.2**	21/08/2015	**30.2**	07/06/2015
Richmond	92.6	338	24.5	06/07/2015	24.4	21/08/2015
Central Coast						
Wyong	97.3	355	13.2	09/03/2015	13.1	20/11/2015
Illawarra						
Wollongong	81.6	298	**31.6**	21/08/2015	21.2	26/11/2015
Lower Hunter						
Beresfield	93.7	342	**25.9**	21/08/2015	20.2	20/08/2015
Wallsend	95.9	350	24.0	22/08/2015	22.0	07/06/2015

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Chullora, Earlwood, Liverpool, Wollongong and Beresfield exceeded the AAQ NEPM 24-hour average $PM_{2.5}$ standards (Table 21). The highest recorded 24-hour reading was at Chullora (37.2µg/m³) which is 149% of the standard.

Table 21a presents FRM data for Chullora, the only station where these measurements are performed. Data from BAM and FRM may demonstrate inter-method differences owing to differences in sampling strategies.

Table 21a. Summary of $PM_{2.5}$: Maximum 24-hour average concentrations (2015) – FRM method

Region/ Performance monitoring station	Data availability rate[1] (%)	Number of valid days	Maximum values (µg/m³)			
			Highest	Date of highest	2nd highest	Date of 2nd highest
Sydney						
Chullora	80.6	98	**38.6**	21/08/2015	13.8	28/06/2015

[1] Data availability rates are based on a 1-day-in-3 sampling regime.

Table 22. Days above the 24-hour $PM_{2.5}$ AAQ NEPM standard (2015)

Date	Stations where standard exceeded	Comments[1]
07/06/2015	Liverpool	**Not related to an exceptional event.**
30/06/2015	Earlwood	**Not related to an exceptional event.**
21/08/2015	Beresfield, Chullora, Earlwood, Liverpool, Wollongong	Result of smoke from a number of hazard reduction burns.

[1] ***All comments describe exceptional events unless otherwise identified.***

Exceptional events that can be clearly identified as influencing pollution levels and **are not included** when assessing against $PM_{2.5}$ standards and goals. An ***Exceptional event*** means a fire or dust occurrence that adversely affects air quality at a particular location, and causes an exceedance of one day average standards in excess of normal historical fluctuations and background levels, and is directly related to: bushfire; jurisdiction authorised hazard reduction burning; or continental scale windblown dust.

Events **not related to an 'exceptional event'** are shown in **bold text and highlighted in yellow** and are **included** when assessing against $PM_{2.5}$ standards and goals.

Assessment of progress towards achieving the goal

The Ambient Air Quality NEPM goal is a driver for NSW air quality improvement strategies and a benchmark against which progress in managing air quality can be assessed.

In NSW, the Office of Environment and Heritage (OEH) operates the NSW air quality monitoring network. The NSW Environment Protection Authority (EPA) develops and implements regulation, policies and programs to achieve Air NEPM goals and protect public health.

Air quality management in the Sydney Greater Metropolitan Region and regional NSW

The EPA delivers a number of actions that target the pollutants of most concern in NSW, namely particles in the Greater Metropolitan Region (GMR) and some regional centres, and ground-level ozone by targeting precursor emissions. These actions are designed to improve knowledge about air emissions, air quality and the impacts of air pollution, inform and engage the community and other stakeholders, and reduce air quality impacts from industry, vehicles and commercial and domestic activities.

The following outlines the key mechanisms for managing particles and ozone and the activities implemented in 2015.

Air Emissions Inventory

The Air Emissions Inventory for the NSW GMR is a detailed snapshot of major sources of air pollution. It estimates emissions of over 1000 substances released to the atmosphere from natural and human-made sources within the NSW GMR. Detailed inventory data are available in a series of technical reports on the 2008 Calendar Year Air Emissions Inventory webpage. Compilation of an updated Inventory for the 2013 calendar year continued through 2015, with publication planned in 2017.

The community can access air emissions inventory information about local sources of air pollution via the Air Emissions in my Community web tool. The tool presents aggregated data and charts for different geographic areas down to local council and postcode level.

Health Research

In 2015, the NSW EPA and Ministry of Health commissioned new health research under a Memorandum of Understanding with the independent Centre for Air Quality and Health Research and Evaluation (CAR). CAR undertook a comprehensive review of international and Australian evidence related to the health effects of exposure to outdoor (ambient) particulate matter from a range of sources.

The Review of the health impacts of emission sources, types and levels of particulate matter in air pollution in ambient air in NSW, published in December 2015, found that exposure to levels of particles that currently exist in NSW will have measurable adverse impacts on health, particularly in vulnerable people such as individuals with chronic respiratory and cardiovascular diseases, the elderly and children, and that exposure of the NSW population to all particle pollution, regardless of source, should be minimised by reducing ambient particle levels as low as possible.

Industry emissions

In 2015, the EPA continued to implement its regulatory responsibilities, including licensing scheduled industry activities and conducting compliance and enforcement programs. The *Protection of the Environment Operations Act 1997,* the Protection of the Environment Operations (Clean Air) Regulation 2010 and the Protection of the Environment Operations (General) Regulation 2009 set the framework for managing air pollution from major industries in NSW.

Under the Protection of the Environment Operations (General) Regulation 2009, the EPA commenced a risk-based licensing system 1 June 2015. A risk-based approach ensures that all environment protection licensees receive a level of regulation based on the level of risk they pose to human health and the environment.

The EPA's Load Based Licensing (LBL) scheme sets limits on the pollutant loads emitted by holders of environment protection licences and links licence fees to pollutant emissions. In 2015, the EPA continued to progress a review of the Load LBL scheme, which aims to improve the scheme's efficiency and effectiveness.

Non-road diesel and marine emissions

In February 2015, the EPA released the Diesel and marine emissions management strategy, setting out NSW actions to address emissions from non-road diesel equipment used in EPA-licensed activities such as coal mining, equipment used by government agencies or their contractors, diesel locomotives operating in NSW and containerised and bulk cargo and cruise shipping at NSW ports.

Non-road diesel equipment and plant

In December 2015 the EPA released the final report; NSW Coal Mining Benchmarking Study – Best-practice measures for reducing non-road diesel exhaust emissions. This project assessed practices at EPA-licensed coal mines to manage non-road diesel equipment particle emissions and considered the costs and benefits of options available to reduce emissions. The report recommended that Pollution Reduction Programs (PRP) be issued to all 64 licensed coal mines in NSW, requiring a best practice determination of measures to reduce particle emissions. A draft PRP is under development by the EPA.

The NSW EPA partnered with the Infrastructure Sustainability Council of Australia (ISCA) in 2015 to develop case studies for best-practice approaches to manage diesel emissions and improve air quality for those who live and work near construction projects. Government and private sector case studies were published on the EPA's website in May 2016. Actions showcased included procuring low emission equipment, retrofitting in service equipment with technology to reduce diesel emissions and providing driver awareness training.

Throughout 2015 the EPA supported the implementation of the NSW Government Resource Efficiency Policy (GREP), administered by NSW OEH. The GREP includes requirements to address non-road diesel engine emissions through government procurement and contracts.

Locomotives

In 2015, the EPA completed a pilot project with rail industry partners to evaluate the emission reduction and fuel outcomes from retrofitting emission upgrade kit technology on Electro-Motive Diesel (EMD) locomotives during scheduled engine rebuilds. The impacts of emission upgrade kits were measured on two diesel locomotives operating in NSW. The results demonstrated PM and NO_x emissions reduction conformant with US Tier 0+ emission standards for remanufactured locomotives. Results of Diesel locomotive Tier 0+ emissions upgrade project will inform policy development for management of emissions from locomotives operating in NSW.

Review of regulatory framework for the NSW operational rail sector

Consultation was ongoing in 2015 for the review of regulatory options for the NSW operational rail sector. An assessment of options concluded that the most effective and practical approach to regulating environmental impacts from rail operations is to license both railway system operators and rolling stock operators, under the *Protection of the Environment Operations Act 1997,* for the activities under their respective control. This would make rolling stock operators, including the operators of diesel locomotives, directly accountable to the EPA for their environmental performance.

Shipping: In 2015 the NSW Government introduced new requirements for cruise ships to use low sulfur fuel while operating in Sydney Harbour.

The Australian Government subsequently amended the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983,* rendering the NSW low sulfur requirements for cruise ships inoperative. NSW is working with the Commonwealth and seeking amendments to the *Protection of the Sea (Prevention of Pollution from Ships) Act 1983* to allow NSW low sulfur requirements to operate.

Cruise lines whose ships regularly visit Sydney Harbour have agreed to comply voluntarily with the NSW low sulfur fuel requirements whilst at berth in Sydney Harbour.

Vehicle and fuel emissions

Smoky vehicle program: The EPA operates a smoky vehicle compliance program that targets vehicles emitting excessive air impurities. In 2015, EPA officers issued over 90 penalty notices to the owners of vehicles found to be emitting excessive air impurities. In addition, the EPA issued over 780 letters to the owners of vehicles reported by members of the community, advising the vehicle owners to have the vehicles inspected and repaired if necessary.

In 2015, the NSW Roads and Maritime Services and the EPA continued the smoky vehicle enforcement program, targeting heavy vehicles emitting excessive smoke in Sydney's M5 East Tunnel.

Vapour recovery at service stations

The EPA manages the implementation of Vapour Recovery (VR) requirements at service stations in the Newcastle, Central Coast Sydney and Wollongong Metropolitan Areas, and Illawarra and Lower Hunter regions. Around 1130 service stations were required to install or upgrade Stage 1 vapour recovery equipment (VR1), which captures vapours displaced from underground storage tanks when they are refilled, by 1 January 2015. Approximately 96% of these service stations have installed VR1 technology.

By 1 January 2017, medium to large service stations with a petrol throughput of 3.5 to 12 million litres per year, located in the Sydney Metropolitan Area and/or any 'new or modified' service stations, must install stage 2 equipment, which captures vapours when vehicles are re-filled at the dispenser. Eleven large service stations in the greater metropolitan area with a petrol throughput of more than 12 million litres per year have installed both VR1 and VR2 control equipment. Over 2015, the EPA continued to work with industry stakeholders and target compliance action to maximise uptake of VR2 technology by 1 January 2017.

Summer low-volatility petrol

To manage ozone formation in the Sydney region, regulatory requirements limit petrol volatility to 62 kilopascals (a measure of vapour pressure) over the summer period from 15 November to 15 March each year. Petrol importers and blenders must test and report to the EPA on batch volatility. The petrol volatility limits reduce VOC emissions in the Sydney region by about 4000 tonnes each summer.

National Vehicle and fuel Standards

The Commonwealth Government is responsible for national fuel and vehicle emission standards. NSW supports early adoption of Euro 6/VI standards (light vehicle/heavy vehicle standards) to reduce motor vehicle pollution and harmonising Australian fuel quality standards with European standards to reduce levels of sulfur in fuel. In 2015, NSW made a submission on the Fuel Quality Standards Act Review to provide evidence of the benefits of tighter fuel standards for NSW.

Wood smoke management

From March to May 2015, the EPA consulted on the draft *Protection of the Environment Operations (Clean Air) Amendment (Heaters and Fireplaces) Regulation 2015,* to mandate new national emissions and efficiency standards for solid fuel burning heaters from 1 November 2016.

In 2015, the EPA undertook the Upper Hunter Wood Smoke Community Research Project*,* to understand residents' attitudes towards wood heaters, with the final report released in April 2016. The research has informed the 2016 winter wood smoke reduction program in Muswellbrook and Singleton. The program includes community education and provides incentives to replace old wood heaters with alternative forms of heating and flue cleaning.

Hunter Air Quality management

In 2015, the EPA continued its Dust Stop program to reduce dust from coal mining activities in 2015. This program is estimated to have reduced wheel-generated PM10 emissions from open-cut mines by 20,000 tonnes a year.

In February 2015, sampling concluded for the Lower Hunter Particle Characterisation Study. This study was designed to provide the local community with robust information about the composition and sources of fine particles in the lower Hunter region, and of particles as PM2.5 and PM10 in areas near the Port of Newcastle. It was complemented by the Lower Hunter Dust Deposition Study, conducted in cooperation with the community to improve knowledge of coarser dust particles that settle out of the air. Findings of both studies are available on the EPA Lower Hunter Air Quality Studies web page.

The EPA also continued to engage with Hunter stakeholders and community about air quality issues through the Newcastle Community Consultative Committee on the Environment (NCCCE) and the Upper Hunter Air Quality Advisory Committee.

Investigation of emissions in the Hunter rail corridor continued in 2015. Professor Louise Ryan reported on further analysis of Australian Rail Track Corporation (ARTC) data on particulate emissions in the rail corridor. She found elevated particle levels associated with trains were likely due to particles on the tracks being stirred up by passing trains. In September 2015, the Government asked the NSW Chief Scientist & Engineer to review rail coal dust emissions management practices in the NSW coal chain. She presented her Initial Report in November 2015 and her final report, recommending further locally focussed monitoring, in August 2016.

Section D – Data analysis

The following section (Tables 23 to 149) provides a **basic statistical summary**, using percentiles, for each station and for each AAQ NEPM standard. Percentiles for daily maximum values are presented by using valid days only to calculate these statistics.

Stations with two years or more of data, **trend data**, in the form of annual maxima, are provided for each standard for each pollutant. Trend data are presented if any monitoring of a particular pollutant occurred at a station in a given year and the annual data availability rate for the pollutant was at least 15% at that station.

Carbon monoxide

Statistical summary for 2015

Table 23. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations (2015)

Region/ Performance monitoring station	Data availability rate (%)	Maximum (ppm)	Percentile (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Camden	97.6	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.1
Campbelltown West	96.2	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3
Chullora	97.4	1.4	1.3	1.2	1.0	0.8	0.5	0.4	0.3
Liverpool	90.8	1.8	1.6	1.4	1.2	0.9	0.6	0.4	0.3
Prospect	98.4	1.5	1.3	1.3	0.9	0.7	0.3	0.2	0.1
Rozelle	94.9	1.1	1.1	1.0	0.8	0.7	0.5	0.3	0.2
Central Coast									
Wyong	98.5	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1
Illawarra									
Wollongong	97.9	0.8	0.7	0.7	0.6	0.5	0.4	0.3	0.2
Lower Hunter									
Newcastle	92.0	1.5	1.3	1.2	1.0	0.9	0.6	0.5	0.3

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Trend analysis

Table 24. Daily maximum rolling 8-hour average concentrations for CO (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Camden	–	–	–	–	–	–	0.3	1.9	0.6	0.5
Chullora	2.3	1.8	1.6	2.6	2.3	1.5	2.0	2.5	1.7	1.4
Liverpool	2.1	2.1	2.4	2.2	2.1	2.4	1.9	2.1	2.2	1.8
Macarthur/Campbelltown West*	1.8	1.8	0.9	0.8	0.9	1.1	0.7*	3.0*	0.9*	1.0*
Prospect	--	2.0	1.5	2.3	1.9	1.7	1.8	1.6	1.3	1.5
Rozelle	2.0	1.8	1.5	2.3	1.8	1.4	2.2	1.8	1.1	1.1
Central Coast										
Wyong	--	--	--	--	--	--	0.4	0.8	0.5	0.4
Illawarra										
Wollongong	1.5	1.5	1.3	1.3	1.5	1.2	1.2	2.7	0.9	0.8
Lower Hunter										
Newcastle	2.2	1.7	2.0	1.9	1.4	1.5	1.3	1.4	2.4	1.5

* Campbelltown West has replaced Macarthur as the active station since 2012.
AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Statistical summaries for multiple years, by station

Table 25. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	--	--	--	--	--	--	--	--	--	--
2007	78.5	0	2.0	1.7	1.5	1.3	1.1	0.6	0.3	0.2
2008	91.7	0	1.5	1.3	1.2	1.0	0.9	0.6	0.3	0.1
2009	97.5	0	2.3	2.1	1.8	1.3	1.1	0.7	0.5	0.3
2010	95.8	0	1.9	1.7	1.4	1.2	1.0	0.7	0.5	0.4
2011	95.6	0	1.7	1.5	1.4	1.1	1.0	0.6	0.4	0.3
2012	96.8	0	1.8	1.7	1.4	1.0	0.8	0.6	0.4	0.3
2013	94.7	0	1.6	1.4	1.2	0.9	0.7	0.4	0.2	0.1
2014	96.8	0	1.3	1.1	1.0	0.8	0.6	0.4	0.2	0.1
2015	98.4	0	1.5	1.3	1.3	0.9	0.7	0.3	0.2	0.1

* Blacktown station closed pending relocation to Prospect
AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 26. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Camden

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	21.0	0	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.1
2013	99.0	0	1.9	0.9	0.6	0.4	0.4	0.2	0.2	0.1
2014	98.2	0	0.6	0.4	0.4	0.4	0.3	0.2	0.2	0.1
2015	97.6	0	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.1

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 27. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.7	0	2.3	1.6	1.4	1.2	1.0	0.7	0.4	0.3
2007	90.7	0	1.8	1.6	1.4	1.2	1.0	0.5	0.3	0.2
2008	92.9	0	1.6	1.3	1.2	1.0	0.8	0.5	0.3	0.2
2009	96.1	0	2.6	2.2	1.6	1.3	1.0	0.7	0.4	0.3
2010	98.0	0	2.3	1.8	1.5	1.2	0.9	0.7	0.5	0.4
2011	98.3	0	1.5	1.4	1.3	1.2	1.0	0.6	0.4	0.3
2012	97.7	0	2.0	1.6	1.2	1.1	0.9	0.6	0.5	0.4
2013	97.3	0	2.5	1.7	1.2	1.1	0.9	0.6	0.4	0.3
2014	97.9	0	1.7	1.3	1.1	0.9	0.8	0.5	0.4	0.3
2015	97.4	0	1.4	1.3	1.2	1.0	0.8	0.5	0.4	0.3

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 28. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Liverpool

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.4	0	2.1	1.8	1.7	1.5	1.3	0.9	0.5	0.3
2007	94.7	0	2.1	1.9	1.7	1.3	1.1	0.7	0.4	0.2
2008	88.0	0	2.4	2.1	1.8	1.6	1.3	0.7	0.4	0.2
2009	92.4	0	2.2	1.9	1.7	1.5	1.2	0.8	0.5	0.3
2010	98.6	0	2.1	1.9	1.7	1.4	1.1	0.7	0.5	0.4
2011	97.9	0	2.4	2.1	1.8	1.5	1.2	0.7	0.5	0.4
2012	97.4	0	1.9	1.7	1.6	1.3	1.1	0.7	0.5	0.4
2013	98.7	0	2.1	1.9	1.8	1.4	1.1	0.7	0.5	0.3
2014	96.9	0	2.2	1.9	1.7	1.4	1.0	0.6	0.4	0.3
2015	90.8	0	1.8	1.6	1.4	1.2	0.9	0.6	0.4	0.3

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 29. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.2	0	1.8	1.6	1.5	0.6	0.4	0.3	0.2	0.2
2007	94.0	0	1.8	1.7	1.1	0.6	0.5	0.4	0.3	0.2
2008	97.3	0	0.9	0.6	0.6	0.5	0.4	0.3	0.2	0.1
2009	95.1	0	0.8	0.8	0.7	0.6	0.6	0.4	0.4	0.2
2010	96.1	0	0.9	0.8	0.8	0.6	0.5	0.4	0.4	0.3
2011	95.3	0	1.1	0.8	0.7	0.6	0.5	0.4	0.3	0.3
2012*	55.0	0	0.7	0.6	0.6	0.5	0.5	0.4	0.3	0.3
2013*	98.6	0	3.0	0.8	0.7	0.5	0.5	0.3	0.1	0.0
2014*	97.9	0	0.9	0.9	0.8	0.7	0.6	0.4	0.3	0.3
2015*	96.2	0	1.0	0.9	0.8	0.7	0.6	0.5	0.4	0.3

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 30. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Rozelle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.6	0	2.0	1.6	1.4	1.2	0.9	0.6	0.4	0.3
2007	96.1	0	1.8	1.7	1.3	0.9	0.8	0.5	0.3	0.2
2008	94.4	0	1.5	1.3	1.2	1.1	0.9	0.5	0.3	0.2
2009	95.6	0	2.3	1.5	1.4	1.2	1.0	0.7	0.5	0.4
2010	93.6	0	1.8	1.5	1.4	1.1	0.9	0.7	0.5	0.4
2011	96.6	0	1.4	1.2	1.1	0.9	0.8	0.5	0.4	0.3
2012	96.9	0	2.2	1.3	1.2	1.0	0.8	0.6	0.5	0.4
2013	93.8	0	1.8	1.2	1.1	0.9	0.7	0.5	0.3	0.2
2014	99.0	0	1.1	1.0	0.9	0.8	0.6	0.4	0.3	0.2
2015	94.9	0	1.1	1.1	1.0	0.8	0.7	0.5	0.3	0.2

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 31. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	20.1	0	0.4	0.4	0.4	0.3	0.2	0.2	0.1	0.1
2013	98.7	0	0.8	0.4	0.3	0.3	0.3	0.2	0.1	0.1
2014	97.8	0	0.5	0.4	0.4	0.3	0.3	0.2	0.1	0.1
2015	98.5	0	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.1

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 32. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.6	0	1.5	1.3	1.2	1.0	0.9	0.6	0.4	0.3
2007	90.7	0	1.5	1.3	1.1	1.0	0.8	0.6	0.4	0.2
2008	94.0	0	1.3	0.9	0.9	0.8	0.7	0.5	0.3	0.2
2009	82.1	0	1.3	1.1	1.1	1.0	0.8	0.5	0.4	0.2
2010	98.4	0	1.5	1.2	1.1	0.9	0.8	0.6	0.5	0.4
2011	97.2	0	1.2	1.1	1.0	0.9	0.7	0.6	0.4	0.3
2012	96.5	0	1.2	1.1	1.0	0.8	0.7	0.5	0.4	0.3
2013	97.3	0	2.7	0.8	0.8	0.7	0.5	0.4	0.3	0.2
2014	98.4	0	0.9	0.8	0.8	0.7	0.6	0.4	0.3	0.2
2015	97.9	0	0.8	0.7	0.7	0.6	0.5	0.4	0.3	0.2

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Table 33. Statistical summary for CO: Daily maximum rolling 8-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.7	0	2.2	1.6	1.5	1.0	0.8	0.4	0.3	0.2
2007	43.4	0	1.7	1.6	1.5	1.1	0.8	0.5	0.2	0.1
2008	96.1	0	2.0	1.5	1.4	1.2	1.0	0.6	0.4	0.3
2009	84.3	0	1.9	1.6	1.4	1.1	0.9	0.6	0.4	0.3
2010	87.5	0	1.4	1.2	1.1	0.9	0.6	0.4	0.3	0.2
2011	98.8	0	1.5	1.2	1.0	0.7	0.5	0.3	0.1	0.1
2012	94.3	0	1.3	1.3	1.1	0.8	0.6	0.3	0.1	0.0
2013	98.3	0	1.4	1.0	1.0	0.8	0.5	0.3	0.1	0.1
2014	89.4	0	2.4	1.6	1.1	0.9	0.7	0.4	0.3	0.1
2015	92.0	0	1.5	1.3	1.2	1.0	0.9	0.6	0.5	0.3

AAQ NEPM standard: 9.0 ppm (rolling 8-hour average)

Nitrogen dioxide

Statistical summary

Table 34. Statistical summary for NO_2: Daily maximum 1-hour average concentrations (2015)

Region/Performance monitoring station	Data availability rate (%)	Maximum (ppm)	Percentile (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	92.8	0.027	0.023	0.021	0.017	0.015	0.012	0.009	0.006
Camden	92.6	0.026	0.021	0.021	0.018	0.016	0.012	0.009	0.006
Campbelltown West	91.8	0.062	0.048	0.043	0.036	0.033	0.027	0.021	0.016
Chullora	94.0	0.054	0.051	0.042	0.037	0.034	0.029	0.024	0.018
Liverpool	90.4	0.060	0.046	0.038	0.034	0.031	0.026	0.021	0.015
Prospect	93.8	0.053	0.043	0.039	0.036	0.034	0.028	0.022	0.016
Richmond	90.8	0.024	0.022	0.021	0.019	0.017	0.012	0.009	0.007
Rozelle	91.3	0.060	0.045	0.038	0.034	0.031	0.027	0.021	0.014
Central Coast									
Wyong	93.8	0.032	0.027	0.026	0.024	0.022	0.018	0.013	0.009
Illawarra									
Albion Park South	91.6	0.047	0.032	0.026	0.022	0.016	0.012	0.008	0.004
Wollongong	92.7	0.060	0.036	0.035	0.032	0.029	0.024	0.018	0.013
Lower Hunter									
Newcastle	93.8	0.044	0.034	0.033	0.030	0.027	0.023	0.018	0.010
Wallsend	93.4	0.042	0.033	0.031	0.027	0.025	0.020	0.016	0.012

AAQ NEPM standard: 0.120 ppm (1-hour average)

Trend analysis

Table 35. Maximum 1-hour average concentrations for NO_2 (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Prospect	–	0.049	0.048	0.051	0.043	0.039	0.050	0.049	0.047	0.053
Bringelly	0.040	0.044	0.033	0.034	0.037	0.029	0.038	0.037	0.025	0.027
Camden	–	–	–	–	–	–	0.022	0.036	0.032	0.026
Chullora	0.066	0.049	0.044	0.052	0.057	0.051	0.059	0.055	0.064	0.054
Liverpool	0.053	0.053	0.046	0.053	0.053	0.046	0.046	0.056	0.044	0.060
Macarthur/ Campbelltown West*	0.066	0.047	0.044	0.048	0.042	0.045	0.049*	0.054*	0.055*	0.062*
Richmond	0.044	0.029	0.027	0.030	0.033	0.029	0.046	0.032	0.028	0.024
Rozelle	0.057	0.050	0.040	0.049	0.049	0.050	0.062	0.070	0.055	0.060
Central Coast										
Wyong	–	–	–	–	–	–	0.029	0.041	0.034	0.032
Illawarra										
Albion Park South	0.051	0.045	0.029	0.052	0.041	0.040	0.037	0.039	0.038	0.047
Wollongong	0.050	0.043	0.046	0.048	0.052	0.043	0.049	0.050	0.038	0.060
Lower Hunter										
Newcastle	0.042	0.032	0.033	0.043	0.038	0.038	0.038	0.042	0.046	0.044
Wallsend	0.037	0.035	0.031	0.040	0.038	0.037	0.034	0.043	0.034	0.042

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 36. Annual average concentrations for NO_2 (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Prospect	–	0.012	0.010	0.011	0.012	0.010	0.010	0.011	0.010	0.011
Bringelly	0.006	0.006	0.005	0.004	0.005	0.005	0.005	0.005	0.004	0.004
Camden	–	–	–	–	–	–	0.005	0.004	0.004	0.004
Chullora	0.014	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
Liverpool	0.013	0.012	0.011	0.010	0.011	0.010	0.009	0.011	0.010	0.010
Macarthur/ Campbelltown West*	0.011	0.011	0.010	0.009	0.009	0.008	0.008	0.010*	0.010*	0.010*
Richmond	0.006	0.006	0.005	0.005	0.005	0.005	0.005	0.005	0.004	0.004
Rozelle	0.013	0.012	0.011	0.011	0.011	0.011	0.012	0.011	0.011	0.011
Central Coast										
Wyong	–	–	–	–	–	–	0.004	0.005	0.005	0.005
Illawarra										
Albion Park South	0.005	0.004	0.004	0.003	0.003	0.002	0.004	0.004	0.004	0.003
Wollongong	0.009	0.009	0.009	0.010	0.009	0.008	0.009	0.008	0.008	0.008
Lower Hunter										
Newcastle	0.008	0.007	0.007	0.008	0.008	0.007	0.008	0.008	0.007	0.007
Wallsend	0.009	0.008	0.007	0.008	0.009	0.008	0.008	0.008	0.008	0.008

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.030 ppm (Annual average)

Statistical summaries for multiple years, by station

Table 37. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006*	–	–	–	–	–	–	–	–	–	–
2007	64.7	0	0.049	0.044	0.042	0.037	0.034	0.029	0.025	0.020
2008	59.5	0	0.048	0.037	0.036	0.034	0.031	0.026	0.019	0.015
2009	84.6	0	0.051	0.040	0.039	0.035	0.032	0.027	0.022	0.017
2010	82.0	0	0.043	0.039	0.038	0.033	0.031	0.027	0.023	0.017
2011	94.6	0	0.039	0.038	0.035	0.032	0.029	0.025	0.020	0.015
2012	92.7	0	0.050	0.043	0.037	0.034	0.030	0.026	0.021	0.015
2013	88.8	0	0.049	0.044	0.041	0.037	0.033	0.029	0.022	0.014
2014	92.2	0	0.047	0.045	0.040	0.034	0.032	0.027	0.022	0.017
2015	93.8	0	0.053	0.043	0.039	0.036	0.034	0.028	0.022	0.016

*Blacktown station closed pending relocation to Prospect.
AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 38. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Bringelly

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.0	0	0.040	0.036	0.032	0.026	0.022	0.018	0.014	0.010
2007	92.2	0	0.044	0.033	0.029	0.024	0.022	0.016	0.012	0.009
2008	86.3	0	0.033	0.027	0.024	0.020	0.018	0.014	0.011	0.007
2009	77.9	0	0.034	0.027	0.025	0.022	0.018	0.013	0.010	0.006
2010	87.4	0	0.037	0.029	0.027	0.022	0.019	0.015	0.011	0.009
2011	87.4	0	0.029	0.024	0.023	0.019	0.017	0.013	0.010	0.007
2012	89.7	0	0.038	0.027	0.025	0.022	0.018	0.015	0.011	0.007
2013	92.9	0	0.037	0.025	0.022	0.019	0.016	0.013	0.010	0.007
2014	91.2	0	0.025	0.025	0.023	0.020	0.016	0.013	0.009	0.007
2015	92.8	0	0.027	0.023	0.021	0.017	0.015	0.012	0.009	0.006

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 39. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Camden

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	20.0	0	0.022	0.022	0.022	0.020	0.017	0.012	0.009	0.007
2013	94.1	0	0.036	0.024	0.020	0.018	0.015	0.013	0.010	0.007
2014	92.8	0	0.032	0.024	0.022	0.018	0.016	0.013	0.010	0.007
2015	92.6	0	0.026	0.021	0.021	0.018	0.016	0.012	0.009	0.006

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 40. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	91.7	0	0.066	0.052	0.046	0.041	0.037	0.031	0.025	0.019
2007	90.3	0	0.049	0.047	0.045	0.038	0.035	0.029	0.024	0.017
2008	88.9	0	0.044	0.041	0.040	0.037	0.034	0.029	0.024	0.018
2009	90.5	0	0.052	0.044	0.041	0.036	0.033	0.028	0.023	0.018
2010	86.5	0	0.057	0.042	0.040	0.036	0.032	0.028	0.023	0.017
2011	93.2	0	0.051	0.046	0.043	0.037	0.034	0.029	0.024	0.018
2012	93.6	0	0.059	0.049	0.047	0.041	0.037	0.030	0.024	0.019
2013	92.2	0	0.055	0.051	0.047	0.043	0.038	0.031	0.026	0.019
2014	92.9	0	0.064	0.050	0.044	0.040	0.036	0.030	0.025	0.019
2015	94.0	0	0.054	0.051	0.042	0.037	0.034	0.029	0.024	0.018

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 41. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Liverpool

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.7	0	0.053	0.049	0.047	0.041	0.035	0.029	0.024	0.018
2007	90.5	0	0.053	0.046	0.039	0.035	0.032	0.028	0.023	0.017
2008	84.7	0	0.046	0.040	0.037	0.033	0.030	0.027	0.021	0.016
2009	85.3	0	0.053	0.044	0.042	0.034	0.030	0.025	0.020	0.015
2010	92.0	0	0.053	0.044	0.041	0.035	0.030	0.026	0.022	0.017
2011	92.0	0	0.046	0.039	0.038	0.032	0.030	0.025	0.020	0.015
2012	90.1	0	0.046	0.039	0.036	0.032	0.030	0.025	0.020	0.014
2013	92.2	0	0.056	0.047	0.040	0.037	0.034	0.028	0.024	0.017
2014	91.0	0	0.044	0.041	0.038	0.034	0.031	0.027	0.022	0.017
2015	90.4	0	0.060	0.046	0.038	0.034	0.031	0.026	0.021	0.015

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 42. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	93.9	0	0.066	0.049	0.048	0.043	0.036	0.030	0.024	0.018
2007	90.2	0	0.047	0.043	0.041	0.037	0.033	0.028	0.023	0.018
2008	89.0	0	0.044	0.041	0.039	0.035	0.032	0.026	0.021	0.016
2009	91.0	0	0.048	0.044	0.040	0.035	0.031	0.025	0.020	0.016
2010	90.4	0	0.042	0.039	0.036	0.032	0.029	0.025	0.020	0.015
2011	92.9	0	0.045	0.039	0.037	0.033	0.029	0.024	0.019	0.014
2012*	52.2	0	0.038	0.034	0.033	0.031	0.027	0.023	0.018	0.013
2013*	94.9	0	0.054	0.043	0.042	0.038	0.035	0.029	0.023	0.017
2014*	93.8	0	0.055	0.044	0.041	0.038	0.032	0.027	0.022	0.017
2015*	91.8	0	0.062	0.048	0.043	0.036	0.033	0.027	0.021	0.016

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 43. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Richmond

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	91.4	0	0.044	0.036	0.033	0.027	0.024	0.020	0.015	0.011
2007	89.1	0	0.029	0.028	0.026	0.023	0.021	0.017	0.012	0.009
2008	86.9	0	0.027	0.024	0.023	0.021	0.019	0.015	0.011	0.008
2009	91.4	0	0.030	0.027	0.026	0.023	0.020	0.016	0.012	0.009
2010	87.9	0	0.033	0.025	0.024	0.021	0.020	0.015	0.012	0.008
2011	94.4	0	0.029	0.026	0.024	0.021	0.019	0.015	0.011	0.008
2012	93.1	0	0.046	0.042	0.028	0.021	0.019	0.015	0.011	0.007
2013	92.5	0	0.032	0.024	0.023	0.021	0.018	0.015	0.011	0.007
2014	93.3	0	0.028	0.022	0.021	0.020	0.017	0.013	0.009	0.007
2015	90.8	0	0.024	0.022	0.021	0.019	0.017	0.012	0.009	0.007

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 44. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Rozelle

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.9	0	0.057	0.050	0.044	0.038	0.035	0.030	0.025	0.017
2007	89.2	0	0.050	0.043	0.040	0.038	0.033	0.028	0.023	0.015
2008	79.1	0	0.040	0.037	0.036	0.033	0.031	0.027	0.022	0.015
2009	86.1	0	0.049	0.039	0.036	0.033	0.031	0.026	0.021	0.015
2010	79.6	0	0.049	0.039	0.037	0.034	0.031	0.028	0.022	0.015
2011	90.9	0	0.050	0.043	0.041	0.035	0.031	0.028	0.022	0.014
2012	92.1	0	0.062	0.049	0.046	0.038	0.034	0.028	0.022	0.017
2013	91.5	0	0.070	0.048	0.045	0.038	0.035	0.029	0.023	0.016
2014	93.9	0	0.055	0.042	0.037	0.033	0.032	0.027	0.022	0.016
2015	91.3	0	0.060	0.045	0.038	0.034	0.031	0.027	0.021	0.014

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 45. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	18.9	0	0.029	0.028	0.025	0.023	0.018	0.015	0.012	0.009
2013	94.7	0	0.041	0.037	0.029	0.026	0.024	0.019	0.014	0.010
2014	94.3	0	0.034	0.032	0.029	0.025	0.023	0.019	0.013	0.010
2015	93.8	0	0.032	0.027	0.026	0.024	0.022	0.018	0.013	0.009

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 46. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Albion Park South

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	78.9	0	0.051	0.042	0.034	0.027	0.022	0.016	0.011	0.007
2007	93.0	0	0.045	0.034	0.031	0.027	0.021	0.015	0.010	0.006
2008	55.9	0	0.029	0.026	0.025	0.021	0.018	0.014	0.009	0.004
2009	91.3	0	0.052	0.038	0.033	0.024	0.022	0.014	0.009	0.004
2010	87.5	0	0.041	0.030	0.027	0.023	0.019	0.013	0.008	0.004
2011	89.1	0	0.040	0.030	0.027	0.021	0.016	0.012	0.007	0.003
2012	86.1	0	0.037	0.034	0.028	0.023	0.020	0.014	0.008	0.004
2013	92.4	0	0.039	0.036	0.030	0.025	0.019	0.013	0.010	0.006
2014	95.1	0	0.038	0.028	0.026	0.021	0.018	0.013	0.009	0.006
2015	91.6	0	0.047	0.032	0.026	0.022	0.016	0.012	0.008	0.004

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 47. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	87.8	0	0.050	0.045	0.041	0.035	0.031	0.025	0.020	0.015
2007	89.6	0	0.043	0.038	0.037	0.032	0.029	0.025	0.020	0.014
2008	83.1	0	0.046	0.037	0.036	0.033	0.030	0.026	0.020	0.014
2009	70.1	0	0.048	0.044	0.037	0.034	0.030	0.025	0.019	0.013
2010	87.1	0	0.052	0.042	0.037	0.033	0.028	0.024	0.020	0.015
2011	90.8	0	0.043	0.039	0.037	0.031	0.029	0.024	0.019	0.013
2012	90.5	0	0.049	0.040	0.039	0.034	0.030	0.025	0.018	0.013
2013	89.2	0	0.050	0.048	0.043	0.035	0.031	0.026	0.020	0.014
2014	92.6	0	0.038	0.037	0.036	0.032	0.029	0.024	0.018	0.014
2015	92.7	0	0.060	0.036	0.035	0.032	0.029	0.024	0.018	0.013

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 48. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	89.2	0	0.042	0.035	0.033	0.031	0.028	0.024	0.018	0.010
2007	40.6	0	0.032	0.031	0.029	0.026	0.025	0.021	0.015	0.009
2008	82.8	0	0.033	0.030	0.029	0.027	0.026	0.021	0.016	0.010
2009	89.5	0	0.043	0.037	0.032	0.029	0.027	0.022	0.016	0.010
2010	85.9	0	0.038	0.032	0.031	0.029	0.028	0.023	0.017	0.011
2011	90.7	0	0.038	0.034	0.033	0.029	0.027	0.023	0.017	0.010
2012	92.6	0	0.038	0.035	0.033	0.031	0.029	0.025	0.018	0.011
2013	95.0	0	0.042	0.039	0.036	0.033	0.029	0.025	0.019	0.011
2014	93.4	0	0.046	0.037	0.035	0.031	0.028	0.023	0.017	0.010
2015	93.8	0	0.044	0.034	0.033	0.030	0.027	0.023	0.018	0.010

AAQ NEPM standard: 0.120 ppm (1-hour average)

Table 49. Statistical summary for NO_2: Annual daily maximum 1-hour average concentrations. Station: Wallsend

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.1	0	0.037	0.035	0.034	0.030	0.027	0.023	0.018	0.013
2007	93.9	0	0.035	0.032	0.031	0.029	0.026	0.022	0.016	0.011
2008	87.1	0	0.031	0.029	0.028	0.026	0.023	0.020	0.015	0.010
2009	83.8	0	0.040	0.033	0.031	0.027	0.025	0.021	0.016	0.011
2010	86.1	0	0.038	0.033	0.032	0.028	0.026	0.022	0.017	0.012
2011	90.7	0	0.037	0.032	0.029	0.027	0.026	0.021	0.016	0.011
2012	94.1	0	0.034	0.030	0.029	0.027	0.025	0.021	0.016	0.012
2013	91.8	0	0.043	0.033	0.030	0.027	0.024	0.021	0.016	0.012
2014	94.6	0	0.034	0.033	0.030	0.027	0.025	0.021	0.015	0.012
2015	93.4	0	0.042	0.033	0.031	0.027	0.025	0.020	0.016	0.012

AAQ NEPM standard: 0.120 ppm (1-hour average)

Ozone

Statistical summary

Table 50. Statistical summary for O_3: Daily maximum 1-hour average concentrations (2015)

Region/Performance monitoring station	Data availability rate (%)	Maximum (ppm)	Percentile (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	93.1	0.087	0.078	0.072	0.065	0.055	0.040	0.029	0.026
Camden	94.3	0.086	0.075	0.074	0.067	0.054	0.040	0.030	0.027
Campbelltown West	92.0	0.086	0.077	0.073	0.062	0.053	0.037	0.028	0.025
Chullora	93.8	0.093	0.085	0.072	0.056	0.047	0.035	0.028	0.024
Liverpool	91.5	0.087	0.079	0.072	0.062	0.052	0.037	0.027	0.023
Oakdale	93.7	0.084	0.079	0.072	0.060	0.053	0.040	0.030	0.026
Prospect	94.2	0.085	0.075	0.071	0.062	0.052	0.039	0.028	0.025
Richmond	93.2	0.094	0.083	0.066	0.056	0.050	0.040	0.030	0.027
Rozelle	92.9	0.099	0.068	0.057	0.051	0.040	0.031	0.027	0.023
St Marys	93.0	0.082	0.078	0.073	0.061	0.055	0.041	0.030	0.026
Central Coast									
Wyong	92.0	0.097	0.068	0.060	0.051	0.042	0.034	0.029	0.025
Illawarra									
Albion Park South	91.8	0.079	0.065	0.060	0.048	0.041	0.033	0.029	0.026
Kembla Grange	94.7	**0.104**	0.073	0.065	0.051	0.040	0.032	0.028	0.025
Wollongong	94.8	0.092	0.075	0.070	0.050	0.042	0.033	0.028	0.024
Lower Hunter									
Newcastle	94.0	0.074	0.061	0.055	0.048	0.043	0.033	0.028	0.024
Wallsend	94.2	0.071	0.065	0.061	0.050	0.044	0.034	0.027	0.024

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 51. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations (2015)

Region/Performance monitoring station	Data availability rate (%)	Maximum (ppm)	Percentile (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	97.0	0.078	0.065	0.062	0.057	0.050	0.037	0.029	0.025
Camden	98.4	0.072	0.067	0.064	0.058	0.048	0.037	0.029	0.025
Campbelltown West	95.8	0.079	0.067	0.064	0.056	0.046	0.035	0.027	0.023
Chullora	97.9	0.078	0.069	0.063	0.052	0.042	0.033	0.026	0.022
Liverpool	95.2	0.077	0.065	0.061	0.054	0.047	0.034	0.026	0.022
Oakdale	97.7	0.070	0.069	0.062	0.054	0.047	0.038	0.029	0.025
Prospect	98.2	0.070	0.063	0.061	0.056	0.048	0.036	0.027	0.023
Richmond	97.1	0.074	0.067	0.059	0.051	0.045	0.037	0.029	0.025
Rozelle	96.7	0.079	0.060	0.050	0.046	0.036	0.029	0.026	0.022
St Marys	94.9	0.071	0.065	0.064	0.055	0.049	0.038	0.029	0.025
Central Coast									
Wyong	95.6	**0.091**	0.059	0.054	0.045	0.040	0.032	0.027	0.024
Illawarra									
Albion Park South	95.7	0.075	0.061	0.054	0.044	0.037	0.032	0.028	0.025
Kembla Grange	98.8	0.079	0.071	0.057	0.046	0.037	0.031	0.027	0.024
Wollongong	98.4	**0.083**	0.066	0.064	0.048	0.039	0.031	0.027	0.023
Lower Hunter									
Newcastle	97.4	0.066	0.054	0.050	0.045	0.038	0.032	0.026	0.023
Wallsend	98.2	0.062	0.058	0.052	0.045	0.041	0.031	0.026	0.022

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM Standard: 0.080 ppm (rolling 4-hour average)

Trend analysis

Table 52. Maximum 1-hour average concentrations for O_3 (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Prospect		0.089	**0.107**	**0.126**	**0.104**	**0.126**	0.080	**0.111**	**0.103**	0.085
Bringelly	**0.119**	**0.111**	0.093	**0.120**	**0.104**	**0.125**	0.088	**0.108**	**0.124**	0.087
Camden							0.095	**0.110**	**0.123**	0.086
Chullora	**0.117**	0.088	0.080	**0.154**	0.083	**0.114**	0.080	**0.105**	0.079	0.093
Liverpool	**0.128**	**0.116**	0.098	**0.151**	0.091	**0.103**	0.079	**0.117**	**0.103**	0.087
Macarthur/ Campbelltown West*	**0.128**	**0.121**	0.085	**0.116**	**0.119**	**0.131**	0.079	0.094*	**0.124***	0.086*
Oakdale	**0.109**	**0.142**	0.093	**0.128**	0.099	**0.126**	0.089	0.095	**0.110**	0.084
Richmond	**0.108**	**0.134**	0.078	**0.102**	0.089	**0.116**	0.085	0.095	0.090	0.094
Rozelle	0.093	0.088	0.056	0.083	0.073	0.093	0.069	0.073	0.067	0.099
St Marys	**0.124**	**0.123**	0.096	**0.132**	0.095	**0.136**	0.085	**0.110**	**0.100**	0.082
Central Coast										
Wyong							0.078	0.079	0.076	0.097
Illawarra										
Albion Park South	0.096	0.092	0.062	**0.102**	0.093	**0.118**	0.067	**0.120**	0.094	0.079
Kembla Grange	0.093	0.093	0.072	**0.103**	0.081	**0.121**	0.068	**0.126**	0.094	**0.104**
Wollongong	0.096	0.077	0.067	0.083	0.082	0.084	0.065	**0.112**	0.077	0.092
Lower Hunter										
Newcastle	0.068	0.053	0.064	0.073	0.086	0.066	0.071	0.081	0.065	0.074
Wallsend	0.086	0.070	0.057	0.086	0.067	0.071	0.080	0.084	0.087	0.071

* Replaced the Macarthur trend station from September 2012
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 53. Maximum rolling 4-hour average concentrations for O_3 (ppm)

Region/ Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Prospect		**0.085**	**0.096**	**0.100**	**0.097**	**0.114**	0.073	**0.104**	**0.097**	0.070
Bringelly	**0.110**	**0.095**	0.078	**0.108**	**0.089**	**0.118**	0.072	**0.102**	**0.113**	0.078
Camden							**0.084**	**0.090**	**0.110**	0.072
Chullora	**0.104**	0.074	0.074	**0.112**	0.072	**0.096**	0.068	**0.094**	0.073	0.078
Liverpool	**0.124**	**0.094**	**0.089**	**0.103**	**0.081**	**0.095**	0.071	**0.110**	**0.087**	0.077
Macarthur/Campbell-town West*	**0.117**	**0.101**	0.070	**0.097**	**0.103**	**0.122**	0.073	**0.082***	**0.111***	0.079*
Oakdale	**0.085**	**0.116**	0.075	**0.108**	**0.088**	**0.098**	**0.081**	**0.081**	**0.088**	0.070
Richmond	**0.095**	**0.121**	0.067	**0.090**	**0.082**	**0.088**	0.070	0.076	0.073	0.074
Rozelle	**0.082**	0.075	0.048	0.073	0.067	0.080	0.054	0.063	0.060	0.079
St Marys	**0.109**	**0.105**	**0.082**	**0.106**	**0.083**	**0.121**	0.072	**0.101**	**0.085**	0.071
Central Coast										
Wyong							0.066	0.072	0.069	**0.091**
Illawarra										
Albion Park South	0.077	0.080	0.055	**0.083**	0.073	**0.099**	0.064	**0.100**	0.079	0.075
Kembla Grange	**0.081**	**0.082**	0.066	**0.090**	0.078	**0.105**	0.061	**0.103**	0.080	0.079
Wollongong	**0.086**	0.073	0.063	0.074	0.073	0.078	0.061	**0.091**	0.068	**0.083**
Lower Hunter										
Newcastle	0.064	0.047	0.058	0.067	0.076	0.063	0.057	0.075	0.056	0.066
Wallsend	0.066	0.068	0.054	0.076	0.063	0.059	0.070	0.078	0.065	0.062

* Replaced the Macarthur trend station from September 2012
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 0.080 ppm (rolling 4-hour average)

Statistical summaries for multiple years, by station

Table 54. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006*	–	**–**	**–**	–	–	–	–	–	–	–
2007	73.3	0	0.089	0.069	0.066	0.061	0.052	0.039	0.030	0.024
2008	89.5	1	**0.107**	0.084	0.063	0.052	0.045	0.035	0.027	0.023
2009	93.3	**3**	**0.126**	0.099	0.086	0.070	0.061	0.041	0.032	0.026
2010	88.7	**2**	**0.104**	0.082	0.072	0.062	0.050	0.038	0.030	0.023
2011	95.2	1	**0.126**	0.086	0.068	0.057	0.046	0.034	0.028	0.023
2012	91.8	0	0.080	0.076	0.069	0.061	0.050	0.039	0.028	0.023
2013	91.5	1	**0.111**	0.084	0.070	0.062	0.053	0.042	0.031	0.026
2014	93.4	1	**0.103**	0.088	0.079	0.065	0.053	0.041	0.031	0.027
2015	94.2	0	0.085	0.075	0.071	0.062	0.052	0.039	0.028	0.025

*Blacktown station closed pending relocation to Prospect
Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 55. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Bringelly

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.1	**6**	**0.119**	**0.107**	0.095	0.071	0.057	0.044	0.033	0.027
2007	92.1	**4**	**0.111**	**0.103**	0.079	0.069	0.058	0.044	0.033	0.028
2008	89.8	0	0.093	0.083	0.071	0.055	0.051	0.039	0.030	0.026
2009	90.8	**4**	**0.120**	**0.102**	0.089	0.072	0.062	0.041	0.030	0.026
2010	89.2	**2**	**0.104**	0.081	0.075	0.061	0.052	0.040	0.031	0.026
2011	88.5	**2**	**0.125**	0.087	0.080	0.065	0.055	0.038	0.030	0.026
2012	93.0	0	0.088	0.075	0.072	0.060	0.049	0.040	0.030	0.026
2013	94.8	1	**0.108**	0.085	0.081	0.062	0.053	0.040	0.031	0.026
2014	93.4	**2**	**0.124**	0.089	0.080	0.064	0.056	0.041	0.032	0.028
2015	93.1	0	0.087	0.078	0.072	0.065	0.055	0.040	0.029	0.026

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 56. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Camden

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	20.3	0	0.095	0.094	0.091	0.078	0.068	0.053	0.041	0.031
2013	93.1	1	**0.110**	0.098	0.079	0.069	0.056	0.042	0.031	0.027
2014	94.4	**2**	**0.123**	0.099	0.085	0.067	0.056	0.042	0.033	0.028
2015	94.3	0	0.086	0.075	0.074	0.067	0.054	0.040	0.030	0.027

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 57. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.3	1	**0.117**	0.078	0.073	0.058	0.049	0.037	0.030	0.024
2007	93.0	0	0.088	0.069	0.064	0.054	0.044	0.036	0.029	0.024
2008	93.9	0	0.080	0.064	0.057	0.049	0.042	0.032	0.027	0.022
2009	92.7	**2**	**0.154**	0.089	0.077	0.061	0.050	0.035	0.027	0.023
2010	93.1	0	0.083	0.067	0.062	0.050	0.043	0.031	0.026	0.023
2011	94.2	1	**0.114**	0.073	0.061	0.052	0.043	0.032	0.025	0.021
2012	94.2	0	0.080	0.065	0.055	0.047	0.040	0.031	0.026	0.021
2013	94.8	1	**0.105**	0.072	0.066	0.052	0.045	0.035	0.028	0.023
2014	94.7	0	0.079	0.071	0.061	0.055	0.045	0.033	0.027	0.024
2015	93.8	0	0.093	0.085	0.072	0.056	0.047	0.035	0.028	0.024

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 58. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Liverpool

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	91.4	**4**	**0.128**	**0.105**	0.090	0.069	0.054	0.040	0.030	0.025
2007	90.3	**2**	**0.116**	0.086	0.078	0.062	0.052	0.039	0.029	0.024
2008	87.1	0	0.098	0.074	0.065	0.057	0.046	0.035	0.028	0.023
2009	88.9	**2**	**0.151**	0.092	0.088	0.068	0.052	0.038	0.029	0.024
2010	94.2	0	0.091	0.078	0.069	0.057	0.047	0.035	0.028	0.023
2011	94.1	1	**0.103**	0.080	0.071	0.057	0.046	0.032	0.025	0.022
2012	92.4	0	0.079	0.068	0.065	0.054	0.047	0.035	0.028	0.022
2013	94.2	1	**0.117**	0.086	0.074	0.060	0.050	0.040	0.030	0.025
2014	93.6	1	**0.103**	0.084	0.073	0.062	0.052	0.038	0.030	0.026
2015	91.5	0	0.087	0.079	0.072	0.062	0.052	0.037	0.027	0.023

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 59. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.3	**8**	**0.128**	**0.116**	0.103	0.074	0.059	0.044	0.032	0.027
2007	90.6	**3**	**0.121**	0.098	0.089	0.071	0.059	0.042	0.032	0.027
2008	93.6	0	0.085	0.081	0.072	0.059	0.052	0.037	0.031	0.027
2009	92.3	**7**	**0.116**	0.108	0.102	0.078	0.062	0.043	0.032	0.028
2010	93.9	1	**0.119**	0.090	0.083	0.065	0.054	0.040	0.032	0.028
2011	93.6	**2**	**0.131**	0.096	0.084	0.067	0.054	0.037	0.030	0.026
2012	52.6	0	0.079	0.074	0.068	0.057	0.047	0.034	0.028	0.025
2013	93.9	0	0.094	0.085	0.076	0.061	0.049	0.037	0.029	0.025
2014	91.8	1	**0.124**	0.087	0.076	0.060	0.052	0.038	0.030	0.026
2015	92.0	0	0.086	0.077	0.073	0.062	0.053	0.037	0.028	0.025

* Replaced the Macarthur trend station from September 2012
Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 60. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Oakdale

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	87.9	1	**0.109**	0.089	0.083	0.070	0.060	0.048	0.035	0.030
2007	87.6	**4**	**0.142**	**0.104**	0.092	0.071	0.060	0.044	0.034	0.030
2008	92.5	0	0.093	0.070	0.065	0.058	0.050	0.039	0.032	0.027
2009	85.9	**6**	**0.128**	**0.106**	0.093	0.078	0.058	0.042	0.032	0.029
2010	94.2	0	0.099	0.090	0.080	0.066	0.055	0.039	0.033	0.029
2011	95.0	**3**	**0.126**	0.084	0.075	0.063	0.051	0.039	0.031	0.027
2012	92.7	0	0.089	0.078	0.072	0.056	0.048	0.039	0.030	0.027
2013	94.0	0	0.095	0.085	0.078	0.063	0.055	0.041	0.032	0.027
2014	94.5	1	**0.110**	0.090	0.079	0.066	0.054	0.042	0.032	0.028
2015	93.7	0	0.084	0.079	0.072	0.060	0.053	0.040	0.030	0.026

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 61. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Richmond

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.8	**2**	**0.108**	0.088	0.077	0.069	0.058	0.046	0.035	0.029
2007	91.1	1	**0.134**	0.086	0.075	0.068	0.058	0.045	0.034	0.029
2008	90.6	0	0.078	0.066	0.061	0.053	0.045	0.036	0.030	0.026
2009	90.1	1	**0.102**	0.086	0.078	0.066	0.058	0.043	0.034	0.029
2010	93.2	0	0.089	0.078	0.071	0.060	0.052	0.040	0.032	0.028
2011	94.3	1	**0.116**	0.077	0.067	0.058	0.048	0.037	0.031	0.026
2012	92.9	0	0.085	0.070	0.065	0.056	0.047	0.039	0.031	0.026
2013	94.3	0	0.095	0.071	0.070	0.061	0.054	0.043	0.034	0.027
2014	94.3	0	0.090	0.085	0.074	0.062	0.054	0.042	0.033	0.029
2015	93.2	0	0.094	0.083	0.066	0.056	0.050	0.040	0.030	0.027

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 62. Statistical summary for O_3: Annual daily maximum 1-hour average concentration. Station: Rozelle

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.2	0	0.093	0.069	0.063	0.052	0.042	0.032	0.027	0.023
2007	92.0	0	0.088	0.058	0.050	0.046	0.041	0.033	0.027	0.023
2008	92.8	0	0.056	0.050	0.046	0.042	0.038	0.030	0.026	0.022
2009	92.6	0	0.083	0.068	0.060	0.050	0.042	0.032	0.028	0.023
2010	89.1	0	0.073	0.057	0.055	0.047	0.040	0.033	0.029	0.025
2011	93.3	0	0.093	0.066	0.053	0.044	0.038	0.031	0.026	0.023
2012	94.8	0	0.069	0.057	0.052	0.045	0.042	0.034	0.029	0.024
2013	92.4	0	0.073	0.063	0.054	0.046	0.041	0.033	0.029	0.025
2014	94.8	0	0.067	0.065	0.055	0.046	0.040	0.033	0.028	0.025
2015	92.9	0	0.099	0.068	0.057	0.051	0.040	0.031	0.027	0.023

AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 63. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: St Marys

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.6	**3**	**0.124**	0.091	0.078	0.067	0.056	0.043	0.032	0.027
2007	92.2	**3**	**0.123**	0.093	0.077	0.065	0.057	0.044	0.033	0.028
2008	92.7	0	0.096	0.076	0.060	0.053	0.048	0.038	0.031	0.026
2009	93.0	**5**	**0.132**	0.102	0.082	0.073	0.062	0.041	0.032	0.028
2010	93.5	0	0.095	0.083	0.073	0.064	0.053	0.040	0.032	0.027
2011	94.8	**3**	**0.136**	0.094	0.074	0.060	0.051	0.037	0.030	0.026
2012	93.3	0	0.085	0.074	0.069	0.058	0.049	0.038	0.030	0.025
2013	93.7	1	**0.110**	0.076	0.073	0.063	0.054	0.043	0.032	0.027
2014	94.2	0	0.100	0.089	0.078	0.066	0.055	0.043	0.033	0.029
2015	93.0	0	0.082	0.078	0.073	0.061	0.055	0.041	0.030	0.026

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 64. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	19.3	0	0.078	0.077	0.071	0.060	0.056	0.041	0.032	0.028
2013	92.2	0	0.079	0.070	0.061	0.053	0.044	0.037	0.030	0.026
2014	94.2	0	0.076	0.062	0.060	0.049	0.043	0.036	0.030	0.026
2015	92.0	0	0.097	0.068	0.060	0.051	0.042	0.034	0.029	0.025

AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 65. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Albion Park South

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	86.2	0	0.096	0.083	0.075	0.054	0.046	0.036	0.031	0.027
2007	91.4	0	0.092	0.071	0.060	0.051	0.042	0.035	0.031	0.028
2008	90.5	0	0.062	0.058	0.056	0.047	0.040	0.034	0.030	0.025
2009	93.2	1	**0.102**	0.075	0.070	0.053	0.044	0.037	0.034	0.030
2010	90.3	0	0.093	0.061	0.059	0.049	0.041	0.031	0.028	0.026
2011	89.6	1	**0.118**	0.071	0.059	0.046	0.038	0.032	0.028	0.024
2012	93.8	0	0.067	0.058	0.051	0.044	0.041	0.032	0.029	0.025
2013	93.2	**3**	**0.120**	0.094	0.064	0.053	0.044	0.035	0.031	0.027
2014	93.2	0	0.094	0.064	0.058	0.050	0.042	0.035	0.031	0.029
2015	91.8	0	0.079	0.065	0.060	0.048	0.041	0.033	0.029	0.026

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 66. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Kembla Grange

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.6	0	0.093	0.074	0.065	0.052	0.047	0.036	0.030	0.026
2007	94.1	0	0.093	0.076	0.063	0.049	0.043	0.034	0.031	0.027
2008	93.6	0	0.072	0.063	0.055	0.048	0.042	0.032	0.029	0.025
2009	87.5	1	**0.103**	0.083	0.070	0.052	0.044	0.035	0.031	0.027
2010	89.7	0	0.081	0.061	0.056	0.049	0.043	0.033	0.029	0.025
2011	94.4	1	**0.121**	0.073	0.063	0.052	0.042	0.034	0.030	0.026
2012	94.3	0	0.068	0.057	0.052	0.045	0.041	0.032	0.029	0.025
2013	93.8	**2**	**0.126**	0.081	0.063	0.048	0.043	0.034	0.030	0.025
2014	94.4	0	0.094	0.064	0.062	0.051	0.042	0.034	0.030	0.027
2015	94.7	1	**0.104**	0.073	0.065	0.051	0.040	0.032	0.028	0.025

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 67. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.6	0	0.096	0.073	0.064	0.054	0.047	0.036	0.030	0.026
2007	90.2	0	0.077	0.068	0.062	0.051	0.042	0.035	0.029	0.025
2008	94.0	0	0.067	0.062	0.056	0.048	0.043	0.033	0.029	0.025
2009	90.7	0	0.083	0.074	0.056	0.046	0.041	0.034	0.030	0.026
2010	91.8	0	0.082	0.067	0.062	0.052	0.043	0.034	0.029	0.025
2011	93.1	0	0.084	0.069	0.055	0.048	0.040	0.034	0.028	0.024
2012	94.9	0	0.065	0.062	0.054	0.047	0.039	0.031	0.027	0.024
2013	92.7	**2**	**0.112**	0.085	0.066	0.052	0.043	0.034	0.029	0.024
2014	94.3	0	0.077	0.061	0.055	0.048	0.041	0.033	0.029	0.026
2015	94.8	0	0.092	0.075	0.070	0.050	0.042	0.033	0.028	0.024

Bold font indicates AAQ NEPM standard and goal exceedances.
AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 68. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	93.7	0	0.068	0.063	0.060	0.047	0.042	0.035	0.029	0.024
2007	43.9	0	0.053	0.052	0.051	0.047	0.040	0.033	0.027	0.022
2008	89.9	0	0.064	0.054	0.049	0.044	0.039	0.034	0.028	0.024
2009	86.3	0	0.073	0.068	0.062	0.050	0.043	0.037	0.032	0.027
2010	89.1	0	0.086	0.069	0.060	0.049	0.041	0.036	0.031	0.027
2011	90.7	0	0.066	0.057	0.053	0.047	0.041	0.035	0.029	0.024
2012	94.3	0	0.071	0.057	0.052	0.046	0.041	0.033	0.028	0.024
2013	93.9	0	0.081	0.059	0.057	0.048	0.042	0.035	0.028	0.024
2014	93.7	0	0.065	0.060	0.054	0.046	0.040	0.034	0.030	0.026
2015	94.0	0	0.074	0.061	0.055	0.048	0.043	0.033	0.028	0.024

AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 69. Statistical summary for O_3: Annual daily maximum 1-hour average concentrations. Station: Wallsend

Year	Data availability rate (%)	Number of exceedances (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	93.2	0	0.086	0.070	0.062	0.051	0.045	0.036	0.029	0.024
2007	92.3	0	0.070	0.063	0.055	0.049	0.045	0.036	0.029	0.025
2008	91.9	0	0.057	0.054	0.052	0.044	0.040	0.033	0.028	0.023
2009	85.7	0	0.086	0.068	0.063	0.054	0.044	0.036	0.030	0.024
2010	88.3	0	0.067	0.065	0.056	0.047	0.040	0.034	0.029	0.024
2011	94.0	0	0.071	0.056	0.055	0.049	0.040	0.033	0.027	0.022
2012	94.7	0	0.080	0.064	0.055	0.050	0.043	0.034	0.028	0.023
2013	92.2	0	0.084	0.071	0.065	0.055	0.046	0.038	0.030	0.025
2014	94.7	0	0.087	0.064	0.057	0.050	0.044	0.036	0.030	0.026
2015	94.2	0	0.071	0.065	0.061	0.050	0.044	0.034	0.027	0.024

AAQ NEPM standard: 0.100 ppm (1-hour average)

Table 70. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006*	–	–	–	–	–	–	–	–	–	–
2007	75.1	1	**0.085**	0.063	0.060	0.055	0.048	0.036	0.028	0.023
2008	93.1	1	**0.096**	0.069	0.058	0.047	0.042	0.033	0.026	0.022
2009	95.7	**6**	**0.100**	**0.087**	0.074	0.063	0.053	0.039	0.030	0.024
2010	85.9	**2**	**0.097**	0.072	0.068	0.056	0.046	0.035	0.028	0.022
2011	99.3	**3**	**0.114**	0.077	0.061	0.051	0.043	0.032	0.026	0.022
2012	95.6	0	0.073	0.064	0.061	0.053	0.045	0.036	0.027	0.022
2013	95.2	1	**0.104**	0.072	0.064	0.056	0.048	0.038	0.030	0.024
2014	97.3	1	**0.097**	0.076	0.068	0.056	0.049	0.038	0.029	0.025
2015	98.2	0	0.070	0.063	0.061	0.056	0.048	0.036	0.027	0.023

*Blacktown station closed pending relocation to Prospect
Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (1-hour average)

Table 71. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Bringelly

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.1	**5**	**0.110**	**0.084**	0.077	0.062	0.051	0.041	0.031	0.026
2007	94.8	**4**	**0.095**	**0.083**	0.071	0.058	0.052	0.040	0.031	0.027
2008	93.6	0	0.078	0.071	0.061	0.050	0.046	0.036	0.029	0.025
2009	92.5	**5**	**0.108**	**0.085**	0.078	0.063	0.054	0.039	0.029	0.025
2010	85.2	**3**	**0.089**	0.072	0.066	0.055	0.047	0.037	0.030	0.025
2011	88.5	**2**	**0.118**	0.076	0.070	0.056	0.048	0.035	0.029	0.025
2012	97.0	0	0.072	0.066	0.062	0.054	0.046	0.037	0.029	0.025
2013	98.9	1	**0.102**	0.074	0.068	0.054	0.047	0.037	0.030	0.025
2014	97.2	**3**	**0.113**	0.078	0.070	0.056	0.049	0.038	0.031	0.026
2015	97.0	0	0.078	0.065	0.062	0.057	0.050	0.037	0.029	0.025

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 72. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Camden

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	21.1	1	**0.084**	**0.083**	0.074	0.069	0.059	0.048	0.038	0.029
2013	97.0	**4**	**0.090**	**0.085**	0.072	0.062	0.050	0.038	0.030	0.026
2014	98.3	**3**	**0.110**	0.080	0.071	0.058	0.050	0.040	0.032	0.027
2015	98.4	0	0.072	0.067	0.064	0.058	0.048	0.037	0.029	0.025

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 73. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.8	**2**	**0.104**	0.071	0.064	0.054	0.044	0.034	0.028	0.022
2007	97.1	0	0.074	0.065	0.057	0.051	0.041	0.033	0.027	0.022
2008	98.3	0	0.074	0.058	0.050	0.045	0.039	0.030	0.025	0.020
2009	96.8	**2**	**0.112**	0.075	0.070	0.056	0.045	0.033	0.026	0.021
2010	96.4	0	0.072	0.062	0.058	0.045	0.039	0.029	0.024	0.021
2011	97.1	1	**0.096**	0.067	0.056	0.047	0.038	0.030	0.023	0.020
2012	98.1	0	0.068	0.058	0.049	0.041	0.037	0.028	0.024	0.020
2013	98.7	1	**0.094**	0.061	0.055	0.048	0.042	0.032	0.026	0.022
2014	98.8	0	0.073	0.060	0.055	0.049	0.041	0.031	0.025	0.022
2015	97.9	0	0.078	0.069	0.063	0.052	0.042	0.033	0.026	0.022

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 74. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Liverpool

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	95.2	**4**	**0.124**	**0.088**	0.074	0.064	0.049	0.037	0.028	0.023
2007	92.3	**2**	**0.094**	0.074	0.067	0.057	0.046	0.035	0.028	0.022
2008	90.5	1	**0.089**	0.064	0.057	0.050	0.042	0.032	0.026	0.021
2009	92.5	**4**	**0.103**	**0.085**	0.077	0.057	0.046	0.035	0.028	0.022
2010	98.3	1	**0.081**	0.069	0.061	0.052	0.042	0.033	0.026	0.021
2011	97.3	1	**0.095**	0.068	0.060	0.051	0.042	0.030	0.024	0.020
2012	96.1	0	0.071	0.062	0.055	0.048	0.043	0.033	0.026	0.021
2013	98.2	1	**0.110**	0.070	0.065	0.055	0.044	0.036	0.028	0.023
2014	97.6	1	**0.087**	0.075	0.063	0.056	0.046	0.035	0.028	0.025
2015	95.2	0	0.077	0.065	0.061	0.054	0.047	0.034	0.026	0.022

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 75. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.5	**8**	**0.117**	**0.094**	0.085	0.066	0.054	0.040	0.030	0.025
2007	94.1	**7**	**0.101**	**0.084**	0.079	0.063	0.054	0.039	0.030	0.025
2008	97.9	0	0.070	0.065	0.063	0.054	0.047	0.035	0.030	0.025
2009	96.6	**9**	**0.097**	**0.090**	0.083	0.068	0.056	0.040	0.031	0.027
2010	98.0	1	**0.103**	0.075	0.073	0.057	0.049	0.038	0.031	0.027
2011	96.4	**2**	**0.122**	0.079	0.072	0.062	0.048	0.035	0.029	0.025
2012	54.7	0	0.073	0.062	0.059	0.052	0.043	0.031	0.027	0.023
2013	97.8	1	**0.082**	0.074	0.067	0.054	0.044	0.034	0.028	0.023
2014	95.4	**2**	**0.111**	0.078	0.066	0.054	0.046	0.035	0.029	0.025
2015	95.8	0	0.079	0.067	0.064	0.056	0.046	0.035	0.027	0.023

* Replaced the Macarthur trend station from September 2012
Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 76. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Oakdale

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	91.6	1	**0.085**	0.078	0.072	0.061	0.053	0.043	0.033	0.029
2007	91.0	**5**	**0.116**	**0.086**	0.077	0.063	0.053	0.042	0.033	0.029
2008	96.8	0	0.075	0.061	0.056	0.052	0.045	0.037	0.031	0.026
2009	89.9	**6**	**0.108**	**0.090**	0.080	0.064	0.053	0.040	0.032	0.029
2010	98.4	**2**	**0.088**	0.075	0.070	0.058	0.049	0.038	0.032	0.028
2011	99.2	**3**	**0.098**	0.074	0.066	0.057	0.047	0.036	0.030	0.026
2012	96.7	1	**0.081**	0.071	0.060	0.050	0.045	0.036	0.029	0.026
2013	97.9	1	**0.081**	0.069	0.068	0.057	0.050	0.039	0.031	0.026
2014	98.5	1	**0.088**	0.077	0.067	0.058	0.049	0.039	0.030	0.027
2015	97.7	0	0.070	0.069	0.062	0.054	0.047	0.038	0.029	0.025

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 77. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Richmond

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.3	**2**	**0.095**	0.078	0.072	0.061	0.052	0.042	0.034	0.027
2007	94.1	**3**	**0.121**	0.079	0.068	0.059	0.053	0.042	0.032	0.027
2008	94.5	0	0.067	0.060	0.055	0.048	0.041	0.034	0.029	0.024
2009	94.2	**3**	**0.090**	0.079	0.069	0.058	0.051	0.040	0.032	0.027
2010	97.3	1	**0.082**	0.067	0.061	0.054	0.047	0.037	0.031	0.026
2011	98.5	1	**0.088**	0.065	0.059	0.050	0.045	0.034	0.029	0.025
2012	96.6	0	0.070	0.061	0.056	0.050	0.044	0.036	0.030	0.025
2013	98.3	0	0.076	0.065	0.061	0.054	0.049	0.039	0.032	0.026
2014	98.3	0	0.073	0.068	0.065	0.057	0.049	0.039	0.032	0.028
2015	97.1	0	0.074	0.067	0.059	0.051	0.045	0.037	0.029	0.025

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 78. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Rozelle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.6	1	**0.082**	0.063	0.056	0.047	0.037	0.031	0.025	0.021
2007	93.7	0	0.075	0.054	0.046	0.042	0.037	0.031	0.026	0.021
2008	97.0	0	0.048	0.046	0.043	0.038	0.034	0.028	0.025	0.020
2009	94.8	0	0.073	0.059	0.054	0.044	0.037	0.031	0.026	0.022
2010	86.8	0	0.067	0.056	0.051	0.043	0.036	0.031	0.027	0.023
2011	97.1	0	0.080	0.058	0.049	0.041	0.035	0.029	0.024	0.021
2012	98.6	0	0.054	0.049	0.047	0.042	0.037	0.032	0.028	0.023
2013	96.0	0	0.063	0.051	0.045	0.041	0.037	0.031	0.027	0.023
2014	98.8	0	0.060	0.053	0.049	0.042	0.036	0.030	0.027	0.022
2015	96.7	0	0.079	0.060	0.050	0.046	0.036	0.029	0.026	0.022

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 79. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: St Marys

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.6	**4**	**0.109**	**0.084**	0.067	0.059	0.052	0.041	0.030	0.026
2007	93.1	**4**	**0.105**	**0.088**	0.069	0.058	0.051	0.040	0.031	0.026
2008	97.0	1	**0.082**	0.069	0.056	0.048	0.044	0.036	0.029	0.025
2009	97.2	**5**	**0.106**	**0.087**	0.073	0.063	0.055	0.039	0.031	0.026
2010	97.8	1	**0.083**	0.072	0.066	0.057	0.049	0.038	0.031	0.026
2011	98.8	**3**	**0.121**	0.080	0.063	0.054	0.047	0.034	0.028	0.024
2012	97.2	0	0.072	0.065	0.061	0.053	0.045	0.035	0.029	0.024
2013	97.6	**2**	**0.101**	0.068	0.063	0.057	0.048	0.040	0.030	0.025
2014	97.7	**2**	**0.085**	0.076	0.068	0.059	0.051	0.040	0.032	0.027
2015	94.9	0	0.071	0.065	0.064	0.055	0.049	0.038	0.029	0.025

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 80. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	20.1	0	0.066	0.066	0.065	0.057	0.050	0.039	0.031	0.027
2013	96.1	0	0.072	0.063	0.057	0.046	0.040	0.034	0.028	0.024
2014	98.1	0	0.069	0.058	0.055	0.046	0.039	0.033	0.029	0.025
2015	95.6	1	**0.091**	0.059	0.054	0.045	0.040	0.032	0.027	0.024

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 81. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Albion Park South

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	90.0	0	0.077	0.073	0.065	0.048	0.041	0.035	0.030	0.026
2007	94.6	0	0.080	0.061	0.057	0.046	0.039	0.033	0.030	0.026
2008	94.1	0	0.055	0.053	0.048	0.044	0.038	0.032	0.029	0.024
2009	95.4	1	**0.083**	0.066	0.060	0.048	0.041	0.036	0.033	0.028
2010	86.2	0	0.073	0.056	0.048	0.044	0.037	0.029	0.027	0.024
2011	85.7	**3**	**0.099**	0.061	0.052	0.042	0.034	0.031	0.027	0.023
2012	97.8	0	0.064	0.051	0.047	0.041	0.037	0.031	0.028	0.024
2013	97.1	**3**	**0.100**	0.074	0.056	0.047	0.041	0.034	0.029	0.026
2014	97.2	0	0.079	0.057	0.054	0.044	0.039	0.033	0.030	0.027
2015	95.7	0	0.075	0.061	0.054	0.044	0.037	0.032	0.028	0.025

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 82. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Kembla Grange

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.9	1	**0.081**	0.063	0.057	0.046	0.042	0.034	0.029	0.025
2007	97.8	1	**0.082**	0.065	0.059	0.046	0.040	0.033	0.029	0.025
2008	97.5	0	0.066	0.054	0.050	0.043	0.039	0.031	0.028	0.023
2009	90.1	**2**	**0.090**	0.075	0.065	0.046	0.040	0.033	0.029	0.026
2010	86.7	0	0.078	0.055	0.052	0.044	0.038	0.031	0.028	0.024
2011	98.4	**2**	**0.105**	0.066	0.057	0.048	0.038	0.033	0.029	0.025
2012	98.4	0	0.061	0.051	0.047	0.041	0.037	0.031	0.027	0.024
2013	97.8	**2**	**0.103**	0.070	0.057	0.044	0.039	0.032	0.029	0.024
2014	98.4	0	0.080	0.058	0.055	0.047	0.039	0.032	0.029	0.026
2015	98.8	0	0.079	0.071	0.057	0.046	0.037	0.031	0.027	0.024

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 83. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.6	1	**0.086**	0.066	0.055	0.048	0.042	0.033	0.028	0.024
2007	93.2	0	0.073	0.064	0.054	0.046	0.039	0.033	0.028	0.023
2008	97.9	0	0.063	0.056	0.051	0.043	0.040	0.031	0.027	0.023
2009	92.9	0	0.074	0.064	0.050	0.043	0.037	0.033	0.029	0.025
2010	94.9	0	0.073	0.061	0.055	0.046	0.039	0.032	0.027	0.024
2011	96.9	0	0.078	0.066	0.052	0.043	0.036	0.032	0.027	0.023
2012	98.9	0	0.061	0.055	0.050	0.042	0.038	0.030	0.026	0.023
2013	96.5	**2**	**0.091**	0.076	0.058	0.048	0.041	0.032	0.027	0.023
2014	98.2	0	0.068	0.059	0.051	0.044	0.039	0.031	0.028	0.025
2015	98.4	1	**0.083**	0.066	0.064	0.048	0.039	0.031	0.027	0.023

Bold font indicates AAQ NEPM standard and goal exceedences.
AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 84. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.9	0	0.064	0.057	0.053	0.043	0.038	0.033	0.028	0.022
2007	45.6	0	0.047	0.046	0.046	0.041	0.036	0.031	0.025	0.021
2008	93.8	0	0.058	0.049	0.046	0.040	0.037	0.032	0.027	0.022
2009	88.2	0	0.067	0.062	0.056	0.047	0.042	0.035	0.031	0.025
2010	85.1	0	0.076	0.062	0.054	0.045	0.040	0.034	0.029	0.025
2011	86.8	0	0.063	0.051	0.048	0.044	0.038	0.033	0.027	0.023
2012	97.8	0	0.057	0.049	0.048	0.043	0.039	0.032	0.027	0.022
2013	98.0	0	0.075	0.054	0.050	0.044	0.039	0.033	0.027	0.023
2014	97.0	0	0.056	0.054	0.048	0.042	0.037	0.032	0.028	0.024
2015	97.4	0	0.066	0.054	0.050	0.045	0.038	0.032	0.026	0.023

AAQ NEPM standard: 0.080 ppm (4-hour average)

Table 85. Statistical summary for O_3: Daily maximum rolling 4-hour average concentrations. Station: Wallsend

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.3	0	0.066	0.064	0.057	0.046	0.040	0.033	0.027	0.023
2007	95.1	0	0.068	0.057	0.050	0.045	0.041	0.034	0.028	0.023
2008	95.7	0	0.054	0.048	0.045	0.040	0.036	0.031	0.027	0.022
2009	89.2	0	0.076	0.063	0.058	0.046	0.040	0.034	0.028	0.023
2010	88.2	0	0.063	0.056	0.052	0.042	0.037	0.032	0.027	0.023
2011	95.8	0	0.059	0.053	0.050	0.045	0.037	0.031	0.025	0.021
2012	98.7	0	0.070	0.056	0.051	0.046	0.041	0.033	0.027	0.022
2013	96.1	0	0.078	0.063	0.057	0.049	0.042	0.036	0.029	0.024
2014	98.8	0	0.065	0.059	0.052	0.045	0.040	0.034	0.029	0.024
2015	98.2	0	0.062	0.058	0.052	0.045	0.041	0.031	0.026	0.022

AAQ NEPM standard: 0.080 ppm (4-hour average)

Sulfur dioxide

Statistical summary

Table 86. Statistical summary for SO_2: Daily maximum 1-hour average concentrations (2015)

Region/Performance monitoring station	Data availability rate (%)	Maximum (ppm)	Percentile (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	92.9	0.007	0.005	0.004	0.003	0.002	0.001	0.001	0.000
Campbelltown West	91.7	0.011	0.007	0.006	0.004	0.003	0.002	0.001	0.001
Chullora	93.5	0.014	0.010	0.008	0.005	0.004	0.003	0.001	0.001
Prospect	94.6	0.027	0.010	0.008	0.006	0.004	0.003	0.002	0.001
Richmond	92.6	0.032	0.011	0.006	0.005	0.003	0.002	0.001	0.000
Central Coast									
Wyong	92.9	0.069	0.029	0.022	0.015	0.009	0.004	0.001	0.000
Illawarra									
Albion Park South	90.8	0.036	0.018	0.017	0.013	0.010	0.004	0.001	0.000
Wollongong	89.7	0.019	0.017	0.013	0.011	0.009	0.005	0.002	0.001
Lower Hunter									
Newcastle	93.6	0.036	0.032	0.027	0.018	0.014	0.008	0.004	0.002
Wallsend	90.3	0.034	0.024	0.021	0.017	0.013	0.008	0.003	0.002

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 87. Statistical summary for SO_2: Daily 24-hour average concentrations (2015)

Region/Performance monitoring station	Data availability rate (%)	Maximum (ppm)	Percentile (ppm)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	96.7	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000
Chullora	96.7	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
Campbelltown West	93.7	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
Prospect	98.4	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
Richmond	95.1	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
Central Coast									
Wyong	96.4	0.009	0.003	0.003	0.002	0.002	0.001	0.000	0.000
Illawarra									
Albion Park South	93.4	0.007	0.006	0.004	0.003	0.002	0.001	0.000	0.000
Wollongong	93.4	0.004	0.004	0.003	0.002	0.002	0.001	0.000	0.000
Lower Hunter									
Newcastle	97.3	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
Wallsend	92.9	0.007	0.005	0.004	0.003	0.003	0.001	0.001	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Trend analysis

Table 88. Maximum 1-hour average concentrations for SO_2 (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Bringelly	0.009	0.017	0.019	0.012	0.008	0.011	0.015	0.011	0.009	0.007
Macarthur/ Campbelltown West*	0.010	0.015	0.015	0.010	0.010	0.014	0.006*	0.009*	0.012*	0.011*
Chullora	0.015	0.020	0.021	0.029	0.021	0.026	0.025	0.012	0.019	0.014
Prospect		0.022	0.014	0.017	0.018	0.014	0.012	0.020	0.019	0.027
Richmond	0.018	0.024	0.015	0.013	0.009	0.010	0.013	0.010	0.009	0.032
Central Coast										
Wyong							0.030	0.029	0.040	0.069
Illawarra										
Albion Park South	0.038	0.038	0.028	0.031	0.032	0.035	0.027	0.039	0.016	0.036
Wollongong	0.035	0.032	0.021	0.02	0.027	0.018	0.017	0.040	0.019	0.019
Lower Hunter										
Newcastle	0.034	0.043	0.033	0.039	0.027	0.033	0.034	0.052	0.064	0.036
Wallsend	0.058	0.039	0.044	0.044	0.031	0.044	0.035	0.050	0.046	0.034

* Replaced the Macarthur trend station from September 2012

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 89. Maximum 24-hour average concentrations for SO_2 (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Bringelly	0.002	0.003	0.003	0.003	0.002	0.002	0.002	0.002	0.003	0.001
Macarthur/ Campbelltown West*	0.003	0.004	0.004	0.004	0.003	0.002	0.002*	0.002*	0.004*	0.002*
Chullora	0.004	0.004	0.005	0.005	0.004	0.005	0.004	0.003	0.004	0.003
Prospect		0.005	0.004	0.003	0.004	0.003	0.003	0.004	0.005	0.003
Richmond	0.003	0.004	0.003	0.004	0.002	0.003	0.002	0.002	0.002	0.003
Central Coast										
Wyong							0.004	0.005	0.004	0.009
Illawarra										
Albion Park South	0.010	0.014	0.008	0.012	0.011	0.010	0.010	0.009	0.005	0.007
Wollongong	0.007	0.008	0.007	0.004	0.008	0.009	0.005	0.008	0.005	0.004
Lower Hunter										
Newcastle	0.009	0.012	0.008	0.010	0.005	0.009	0.007	0.007	0.006	0.007
Wallsend	0.009	0.007	0.007	0.007	0.007	0.007	0.005	0.005	0.008	0.007

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 90. Annual average concentrations for SO_2 (ppm)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Bringelly	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Macarthur/ Campbell-town West*	0.001	0.001	0.001	0.001	0.000	0.000	0.001*	0.001*	0.001*	0.000*
Chullora	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001
Prospect		0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001
Richmond	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Central Coast										
Wyong							0.001	0.001	0.001	0.001
Illawarra										
Albion Park South	0.001	0.001	0.001	0.001	0.001	0.001	0.000	0.001	0.001	0.001
Wollongong	0.001	0.001	0.000	0.000	0.001	0.001	0.001	0.001	0.001	0.001
Lower Hunter										
Newcastle	0.001	0.001	0.001	0.001	0.001	0.002	0.002	0.001	0.001	0.001
Wallsend	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	0.001	0.001

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.020 ppm (annual average)

Statistical summaries for multiple years, by station

Table 91. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Bringelly

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	91.4	0	0.009	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2007	84.2	0	0.017	0.009	0.007	0.005	0.004	0.002	0.001	0.000
2008	89.2	0	0.019	0.008	0.006	0.005	0.003	0.002	0.001	0.000
2009	84.6	0	0.012	0.008	0.005	0.004	0.003	0.001	0.000	0.000
2010	79.9	0	0.008	0.005	0.005	0.004	0.003	0.002	0.001	0.000
2011	88.9	0	0.011	0.005	0.005	0.003	0.003	0.002	0.001	0.000
2012	94.6	0	0.015	0.005	0.005	0.003	0.003	0.002	0.001	0.000
2013	94.5	0	0.011	0.008	0.006	0.004	0.003	0.002	0.001	0.001
2014	92.4	0	0.009	0.007	0.006	0.004	0.002	0.002	0.001	0.000
2015	92.9	0	0.007	0.005	0.004	0.003	0.002	0.001	0.001	0.000

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 92. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	93.2	0	0.010	0.008	0.006	0.005	0.004	0.002	0.001	0.001
2007	90.9	0	0.015	0.011	0.010	0.006	0.005	0.003	0.002	0.001
2008	92.1	0	0.015	0.013	0.009	0.006	0.004	0.003	0.001	0.001
2009	91.6	0	0.010	0.009	0.007	0.006	0.004	0.003	0.002	0.001
2010	92.9	0	0.010	0.006	0.006	0.005	0.004	0.002	0.001	0.001
2011	91.9	0	0.014	0.009	0.006	0.005	0.003	0.002	0.001	0.000
2012*	86.7	0	0.006	0.005	0.005	0.004	0.003	0.002	0.001	0.000
2013*	95.0	0	0.009	0.007	0.006	0.004	0.003	0.002	0.001	0.001
2014*	93.2	0	0.012	0.007	0.006	0.005	0.003	0.002	0.001	0.001
2015	91.7	0	0.011	0.007	0.006	0.004	0.003	0.002	0.001	0.001

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 93. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	93.9	0	0.015	0.013	0.011	0.009	0.007	0.004	0.003	0.002
2007	86.7	0	0.020	0.016	0.012	0.009	0.007	0.003	0.002	0.001
2008	77.5	0	0.021	0.018	0.012	0.007	0.006	0.004	0.002	0.001
2009	89.8	0	0.029	0.015	0.012	0.010	0.008	0.004	0.002	0.001
2010	92.1	0	0.021	0.015	0.014	0.010	0.007	0.004	0.002	0.001
2011	92.7	0	0.026	0.016	0.011	0.009	0.006	0.004	0.002	0.001
2012	93.6	0	0.025	0.011	0.008	0.007	0.005	0.003	0.002	0.001
2013	92.9	0	0.012	0.010	0.008	0.006	0.005	0.003	0.002	0.001
2014	94.7	0	0.019	0.010	0.009	0.007	0.005	0.003	0.001	0.001
2015	93.5	0	0.014	0.010	0.008	0.005	0.004	0.003	0.001	0.001

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 94. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2007	67.0	0	0.022	0.016	0.013	0.007	0.006	0.003	0.002	0.001
2008	85.1	0	0.014	0.011	0.010	0.008	0.005	0.003	0.002	0.001
2009	91.3	0	0.017	0.010	0.010	0.008	0.006	0.004	0.002	0.001
2010	88.9	0	0.018	0.013	0.011	0.008	0.006	0.004	0.002	0.001
2011	93.8	0	0.014	0.011	0.008	0.006	0.005	0.003	0.002	0.001
2012	91.3	0	0.012	0.008	0.007	0.006	0.004	0.003	0.002	0.001
2013	90.9	0	0.020	0.014	0.010	0.006	0.005	0.003	0.002	0.001
2014	91.5	0	0.019	0.013	0.012	0.008	0.005	0.003	0.002	0.001
2015	94.6	0	0.027	0.010	0.008	0.006	0.004	0.003	0.002	0.001

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 95. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Richmond

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	92.0	0	0.018	0.011	0.009	0.006	0.004	0.002	0.001	0.001
2007	91.0	0	0.024	0.008	0.007	0.005	0.004	0.002	0.001	0.000
2008	72.0	0	0.015	0.010	0.007	0.005	0.003	0.002	0.001	0.000
2009	89.5	0	0.013	0.010	0.009	0.006	0.004	0.002	0.001	0.000
2010	93.3	0	0.009	0.007	0.006	0.005	0.003	0.002	0.001	0.000
2011	94.5	0	0.010	0.008	0.005	0.004	0.003	0.002	0.001	0.000
2012	83.4	0	0.013	0.008	0.007	0.005	0.004	0.002	0.001	0.000
2013	94.2	0	0.010	0.008	0.007	0.005	0.004	0.002	0.001	0.000
2014	94.0	0	0.009	0.007	0.006	0.005	0.003	0.001	0.001	0.000
2015	92.6	0	0.032	0.011	0.006	0.005	0.003	0.002	0.001	0.000

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 96. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	19.3	0	0.030	0.030	0.027	0.018	0.013	0.005	0.002	0.001
2013	94.7	0	0.029	0.024	0.020	0.015	0.009	0.004	0.002	0.001
2014	93.7	0	0.040	0.023	0.019	0.014	0.010	0.005	0.001	0.000
2015	92.9	0	0.069	0.029	0.022	0.015	0.009	0.004	0.001	0.000

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 97. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Albion Park South

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	86.7	0	0.038	0.028	0.024	0.019	0.011	0.004	0.001	0.000
2007	83.1	0	0.038	0.033	0.031	0.019	0.013	0.006	0.001	0.000
2008	93.0	0	0.028	0.026	0.022	0.015	0.011	0.005	0.001	0.000
2009	85.4	0	0.031	0.027	0.023	0.018	0.013	0.005	0.001	0.000
2010	89.6	0	0.032	0.027	0.023	0.019	0.013	0.005	0.001	0.000
2011	87.4	0	0.035	0.024	0.022	0.017	0.009	0.004	0.000	0.000
2012	92.5	0	0.027	0.017	0.015	0.010	0.008	0.003	0.001	0.000
2013	89.6	0	0.039	0.022	0.017	0.012	0.009	0.004	0.001	0.000
2014	94.5	0	0.016	0.015	0.013	0.010	0.008	0.004	0.001	0.000
2015	90.8	0	0.036	0.018	0.017	0.013	0.010	0.004	0.001	0.000

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 98. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.5	0	0.035	0.020	0.018	0.015	0.012	0.007	0.004	0.001
2007	78.9	0	0.032	0.022	0.020	0.016	0.011	0.007	0.003	0.001
2008	78.2	0	0.021	0.019	0.015	0.012	0.009	0.006	0.002	0.000
2009	75.3	0	0.020	0.016	0.014	0.010	0.007	0.004	0.002	0.000
2010	88.4	0	0.027	0.018	0.015	0.013	0.011	0.006	0.003	0.001
2011	92.9	0	0.018	0.018	0.017	0.012	0.009	0.005	0.003	0.001
2012	94.9	0	0.017	0.016	0.014	0.010	0.008	0.004	0.002	0.001
2013	92.4	0	0.040	0.018	0.016	0.010	0.008	0.005	0.002	0.001
2014	92.7	0	0.019	0.017	0.016	0.012	0.009	0.005	0.003	0.001
2015	89.7	0	0.019	0.017	0.013	0.011	0.009	0.005	0.002	0.001

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 99. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	93.3	0	0.034	0.028	0.021	0.017	0.013	0.007	0.004	0.001
2007	44.5	0	0.043	0.032	0.025	0.021	0.014	0.008	0.005	0.003
2008	86.9	0	0.033	0.027	0.024	0.019	0.015	0.010	0.004	0.002
2009	69.7	0	0.039	0.033	0.027	0.021	0.015	0.008	0.005	0.002
2010	84.6	0	0.027	0.022	0.020	0.015	0.012	0.008	0.004	0.002
2011	90.7	0	0.033	0.027	0.023	0.017	0.014	0.008	0.005	0.001
2012	93.1	0	0.034	0.025	0.022	0.019	0.014	0.008	0.004	0.002
2013	95.1	0	0.052	0.030	0.024	0.017	0.015	0.009	0.004	0.002
2014	93.7	0	0.064	0.030	0.024	0.019	0.015	0.009	0.004	0.001
2015	93.6	0	0.036	0.032	0.027	0.018	0.014	0.008	0.004	0.002

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 100. Statistical summary for SO_2: Annual daily maximum 1-hour average concentrations. Station: Wallsend

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.5	0	0.058	0.027	0.025	0.021	0.016	0.011	0.005	0.002
2007	83.9	0	0.039	0.032	0.027	0.022	0.018	0.010	0.005	0.002
2008	91.3	0	0.044	0.032	0.026	0.021	0.018	0.011	0.006	0.002
2009	67.2	0	0.044	0.028	0.025	0.019	0.014	0.009	0.005	0.001
2010	70.3	0	0.031	0.022	0.020	0.017	0.014	0.009	0.004	0.001
2011	93.7	0	0.044	0.031	0.024	0.018	0.014	0.008	0.004	0.001
2012	95.1	0	0.035	0.021	0.020	0.016	0.013	0.008	0.004	0.002
2013	92.2	0	0.050	0.028	0.021	0.016	0.012	0.007	0.004	0.002
2014	93.7	0	0.046	0.030	0.022	0.018	0.015	0.009	0.004	0.002
2015	90.3	0	0.034	0.024	0.021	0.017	0.013	0.008	0.003	0.002

AAQ NEPM standard: 0.200 ppm (1-hour average)

Table 101. Statistical summary for SO_2: 24-hour average concentrations. Station: Bringelly

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	95.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2007	86.8	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2008	92.3	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	-0.001
2009	87.1	0	0.003	0.002	0.001	0.001	0.001	0.000	0.000	-0.001
2010	85.8	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2011	94.8	0	0.002	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2012	98.4	0	0.002	0.002	0.001	0.001	0.001	0.001	0.000	0.000
2013	98.6	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2014	96.2	0	0.003	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2015	96.7	0	0.001	0.001	0.001	0.001	0.001	0.000	0.000	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 102. Statistical summary for SO_2: 24-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2007	94.8	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2008	97.0	0	0.004	0.003	0.003	0.002	0.002	0.001	0.000	0.000
2009	95.9	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.001
2010	97.0	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2011	96.2	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2012*	89.6	0	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2013*	99.2	0	0.002	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2014*	96.4	0	0.004	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2015*	93.7	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000

* Replaced the Macarthur trend station from September 2012
AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 103. Statistical summary for SO_2: 24-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of Exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.4	0	0.004	0.004	0.003	0.003	0.002	0.002	0.001	0.001
2007	89.3	0	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2008	80.9	0	0.005	0.004	0.003	0.002	0.002	0.001	0.001	0.000
2009	94.5	0	0.005	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2010	96.2	0	0.004	0.004	0.003	0.003	0.002	0.001	0.001	0.000
2011	96.7	0	0.005	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2012	97.0	0	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2013	97.3	0	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2014	98.6	0	0.004	0.003	0.002	0.002	0.001	0.001	0.000	0.000
2015	96.7	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 104. Statistical summary for SO_2: 24-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006*										
2007	67.1	0	0.005	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2008	89.9	0	0.004	0.003	0.003	0.002	0.001	0.001	0.000	0.000
2009	96.4	0	0.003	0.003	0.002	0.002	0.002	0.001	0.000	0.000
2010	96.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.001	0.000
2011	97.8	0	0.003	0.003	0.002	0.002	0.001	0.001	0.001	0.000
2012	94.5	0	0.003	0.002	0.002	0.002	0.002	0.001	0.001	0.000
2013	93.4	0	0.004	0.003	0.002	0.002	0.002	0.001	0.001	0.000
2014	94.5	0	0.005	0.003	0.002	0.002	0.002	0.001	0.001	0.000
2015	98.4	0	0.003	0.003	0.002	0.002	0.001	0.001	0.000	0.000

* Blacktown station closed pending relocation
AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 105. Statistical summary for SO_2: 24-hour average concentrations. Station: Richmond

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	95.9	0	0.003	0.002	0.002	0.002	0.001	0.001	0.000	0.000
2007	94.5	0	0.004	0.002	0.002	0.001	0.001	0.000	0.000	0.000
2008	74.9	0	0.003	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2009	93.7	0	0.004	0.003	0.002	0.001	0.001	0.000	0.000	0.000
2010	97.5	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2011	98.4	0	0.003	0.001	0.001	0.001	0.001	0.000	0.000	0.000
2012	86.3	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2013	98.1	0	0.002	0.002	0.002	0.001	0.001	0.001	0.000	0.000
2014	97.5	0	0.002	0.002	0.001	0.001	0.001	0.000	0.000	0.000
2015	95.1	0	0.003	0.002	0.002	0.001	0.001	0.001	0.000	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 106. Statistical summary for SO_2: 24-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2012	19.9	0	0.004	0.004	0.004	0.003	0.003	0.002	0.001	0.000
2013	98.1	0	0.005	0.004	0.003	0.002	0.002	0.001	0.000	0.000
2014	97.0	0	0.004	0.004	0.003	0.002	0.002	0.001	0.000	0.000
2015	96.4	0	0.009	0.003	0.003	0.002	0.002	0.001	0.000	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 107. Statistical summary for SO_2: 24-hour average concentrations. Station: Albion Park South

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	89.3	0	0.010	0.008	0.007	0.004	0.003	0.001	0.000	0.000
2007	83.8	0	0.014	0.011	0.008	0.004	0.003	0.001	0.000	0.000
2008	97.0	0	0.008	0.006	0.005	0.004	0.003	0.002	0.000	0.000
2009	88.5	0	0.012	0.009	0.008	0.006	0.004	0.002	0.000	0.000
2010	97.8	0	0.011	0.010	0.008	0.006	0.003	0.001	0.000	0.000
2011	94.8	0	0.010	0.007	0.006	0.004	0.002	0.001	0.000	0.000
2012	96.4	0	0.010	0.004	0.004	0.003	0.002	0.001	0.000	0.000
2013	93.4	0	0.009	0.007	0.005	0.003	0.002	0.001	0.000	0.000
2014	98.4	0	0.005	0.005	0.003	0.003	0.002	0.001	0.000	0.000
2015	93.4	0	0.007	0.006	0.004	0.003	0.002	0.001	0.000	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 108. Statistical summary for SO_2: 24-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.9	0	0.007	0.005	0.004	0.003	0.002	0.001	0.001	0.000
2007	79.2	0	0.008	0.006	0.005	0.003	0.002	0.002	0.001	0.000
2008	79.8	0	0.007	0.004	0.003	0.003	0.002	0.001	0.000	-0.001
2009	73.4	0	0.004	0.003	0.003	0.002	0.002	0.001	0.000	-0.001
2010	92.9	0	0.008	0.005	0.004	0.002	0.002	0.001	0.000	0.000
2011	96.7	0	0.009	0.004	0.003	0.003	0.002	0.001	0.000	0.000
2012	99.2	0	0.005	0.004	0.003	0.002	0.001	0.001	0.000	0.000
2013	96.4	0	0.008	0.004	0.003	0.002	0.002	0.001	0.000	0.000
2014	96.4	0	0.005	0.004	0.003	0.002	0.002	0.001	0.001	0.000
2015	93.4	0	0.004	0.004	0.003	0.002	0.002	0.001	0.000	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 109. Statistical summary for SO_2: 24-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.3	0	0.009	0.005	0.005	0.004	0.003	0.002	0.001	0.000
2007	45.8	0	0.012	0.012	0.007	0.005	0.003	0.002	0.001	0.000
2008	90.2	0	0.008	0.006	0.006	0.004	0.003	0.002	0.001	0.000
2009	73.4	0	0.010	0.008	0.006	0.004	0.004	0.002	0.001	0.000
2010	91.8	0	0.005	0.005	0.004	0.004	0.003	0.002	0.001	0.000
2011	98.9	0	0.009	0.006	0.005	0.005	0.004	0.002	0.001	0.000
2012	97.5	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.001
2013	98.6	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000
2014	97.8	0	0.006	0.005	0.004	0.004	0.003	0.002	0.001	0.000
2015	97.3	0	0.007	0.006	0.005	0.004	0.003	0.002	0.001	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Table 110. Statistical summary for SO_2: 24-hour average concentrations. Station: Wallsend

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (ppm)	Percentile (ppm)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.9	0	0.009	0.007	0.005	0.004	0.003	0.002	0.001	0.000
2007	83.6	0	0.007	0.006	0.006	0.005	0.004	0.002	0.001	0.000
2008	95.4	0	0.007	0.006	0.006	0.005	0.004	0.002	0.001	0.001
2009	68.2	0	0.007	0.006	0.006	0.004	0.003	0.002	0.001	0.000
2010	74.2	0	0.007	0.005	0.004	0.003	0.003	0.002	0.001	0.000
2011	99.5	0	0.007	0.005	0.005	0.003	0.002	0.001	0.001	0.000
2012	99.7	0	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.000
2013	96.2	0	0.005	0.004	0.004	0.003	0.002	0.002	0.001	0.000
2014	97.5	0	0.008	0.006	0.004	0.004	0.003	0.002	0.001	0.000
2015	92.9	0	0.007	0.005	0.004	0.003	0.003	0.001	0.001	0.000

AAQ NEPM standard: 0.080 ppm (24-hour average)

Particles as PM_{10}

Statistical summary

Table 111. Statistical summary for PM_{10}: 24-hour average concentrations (2015)

Region/Performance monitoring station	Data availability rate (%)	Maximum (µg/m³)	Percentile (µg/m³)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Bringelly	99.2	**57.0**	36.9	32.6	27.8	24.3	19.6	15.1	10.9
Camden	98.9	**62.4**	32.4	30.6	24.7	22.3	17.1	12.6	9.5
Campbelltown West	95.9	**69.7**	38.9	34.5	27.9	24.4	19.2	13.8	10.7
Chullora	98.1	**64.6**	46.0	32.2	29.4	26.3	21.7	16.3	12.7
Liverpool	95.1	**68.6**	36.7	34.4	31.1	28.4	23.1	17.2	12.8
Oakdale	98.9	**61.7**	29.7	27.3	22.4	20.0	14.5	10.0	7.2
Prospect	95.1	**68.7**	39.8	34.1	29.9	26.2	21.1	16.8	12.8
Richmond	96.7	49.3	32.2	27.3	25.6	21.8	16.1	12.0	8.2
Rozelle	96.4	**60.3**	37.1	32.6	29.5	25.5	20.4	15.4	11.9
Central Coast									
Wyong	98.9	**58.6**	34.5	33.0	27.0	24.4	18.3	13.0	10.2
Illawarra									
Albion Park South	95.1	41.2	38.1	33.4	27.8	22.2	17.6	12.5	8.9
Kembla Grange	99.2	**62.8**	45.0	42.1	34.5	28.7	22.1	16.5	11.2
Wollongong	99.2	45.8	38.1	37.1	32.3	27.4	21.6	15.3	10.8
Lower Hunter									
Beresfield	97.8	**64.9**	42.2	36.4	32.4	28.4	22.8	17.8	13.1
Newcastle	98.6	**70.4**	47.0	42.3	37.2	32.9	26.5	20.2	15.1
Regional NSW									
Albury	95.6	**92.5**	35.4	30.2	26.0	23.3	17.5	13.0	10.1
Bathurst	99.5	**94.6**	39.5	32.9	28.7	22.3	16.1	11.7	8.5
Tamworth	98.9	**52.7**	30.9	29.1	24.7	22.2	17.1	12.9	10.2
Wagga Wagga North	98.4	**145.1**	**72.4**	**51.3**	42.3	34.2	24.8	17.2	11.3

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Trend analysis

Table 112. Maximum 24-hour average concentrations for PM_{10} (µg/m^3)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Bringelly	**72.2**	**51.0**	**62.7**	**1683.9**	41.1	**86.0**	40.1	**97.2**	42.6	**57.0**
Camden	**--**	**--**	**--**	**--**	**--**	**--**	35.6	**97.5**	41.4	**62.4**
Macarthur/ Campbelltown West*	**92.3**	**53.1**	**65.5**	**1146.3**	**58.7**	38.1	33.9	**56.9***	49.4*	**69.7***
Chullora	**66.1**	**66.5**	44.3	**1474.7**	42.1	**65.2**	**52.4**	**69.4**	40.0	**64.6**
Liverpool	**75.2**	**53.1**	**53.8**	**1579.8**	41.1	**68.8**	42.5	**98.5**	40.8	**68.6**
Oakdale	**56.5**	49.2	**68.2**	**1528.3**	33.3	**54.7**	38.9	**99.0**	**56.3**	**61.7**
Prospect	**--**	46.3	41.8	**1680.3**	40.1	41.5	38.7	**81.8**	44.3	**68.7**
Richmond	**63.1**	43.0	39.0	**1637.3**	37.0	46.2	**99.2**	**104.6**	40.0	49.3
Rozelle	**50.3**	**54.4**	43.1	**1562.8**	37.6	39.4	40.7	**58.5**	43.8	**60.3**
Central Coast										
Wyong	**–**	**–**	**–**	**–**	**–**	**–**	37.4	**70.2**	41.9	**58.6**
Illawarra										
Albion Park South	**61.4**	**53.8**	**96.1**	**1359.6**	41.8	**51.0**	43.9	**69.0**	48.3	41.2
Kembla Grange	**86.0**	**59.2**	**100.8**	**1174.0**	47.5	**55.5**	**57.2**	**102.2**	**99.2**	**62.8**
Wollongong	**63.3**	**58.5**	**78.3**	**1145.4**	49.6	48.5	47.5	**93.8**	45.3	45.8
Lower Hunter										
Beresfield	**51.9**	**64.0**	**59.9**	**1999.0**	50.0	42.8	**50.8**	**55.3**	45.4	**64.9**
Newcastle	**51.2**	**58.1**	**54.4**	**2426.8**	**57.1**	49.2	48.7	**69.0**	**53.7**	**70.4**
Regional NSW										
Albury	**213.0**	**212.8**	**124.8**	**249.7**	**60.8**	28.0	**54.4**	**59.2**	**159.6**	**92.5**
Bathurst	**59.6**	**162.8**	**63.0**	**2114.4**	43.3	24.3	**55.5**	**145.0**	42.8	**94.6**
Tamworth	47.8	48.8	**100.4**	**1791.4**	29.1	**50.9**	**55.1**	47.5	**66.6**	**52.7**
Wagga Wagga/ Wagga Wagga North**	**188.3**	**110.3**	**294.9**	**297.4**	**64.9**	**56.3**	**67.2****	**110.7****	**88.2****	**145.1****

* Replaced the Macarthur trend station from September 2012
** Replaced the Wagga Wagga station in October 2011
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m^3 (24-hour average)

Table 113. Annual average concentrations for PM_{10} (µg/m^3)

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Bringelly	20.2	18.4	15.7	24.7	15.5	15.9	15.7	17.0	16.6	15.8
Camden							20.1	15.4	15.6	13.9
Macarthur/ Campbelltown West*	17.3	15.8	14.5	21.3	14.0	13.2	12.6*	15.5*	17.0*	15.6*
Chullora	21.9	19.5	19.5	**26.1**	17.7	19.8	18.1	18.3	18.1	17.5
Liverpool	21.6	18.9	17.6	**25.8**	17.0	18.1	19.8	21.0	19.1	18.5
Oakdale	14.0	12.8	12.3	20.1	10.7	10.7	11.7	13.6	13.1	11.4
Prospect	-	18.1	17.8	**25.9**	15.4	15.8	17.2	19.2	17.6	17.6
Richmond	17.4	14.9	13.0	21.5	13.1	13.2	15.1	17.3	15.4	12.8
Rozelle	20.5	18.1	17.3	24.8	16.1	16.6	16.9	18.3	17.9	16.7
Central Coast										
Wyong							21.9	16.6	15.1	14.9
Illawarra										
Albion Park South	17.2	15.6	14.8	22.0	14.0	13.6	13.6	14.7	16.2	14.0
Kembla Grange	20.9	19.3	18.4	24.1	17.7	16.8	18.3	18.5	17.3	17.8
Wollongong	20.2	19.7	17.8	24.0	17.8	17.0	18.0	17.6	17.7	16.9
Lower Hunter										
Beresfield	21.2	20.4	18.4	**28.9**	16.6	17.2	21.3	21.4	19.4	18.8
Newcastle	21.1	22.8	20.5	**31.9**	18.6	19.1	20.6	22.7	21.4	21.4
Regional NSW										
Albury	22.3	20.0	17.4	19.2	12.6	12.3	14.3	15.8	15.9	14.6
Bathurst	17.5	15.8	14.0	23.1	9.4	11.0	13.4	15.1	14.6	13.4
Tamworth	16.7	15.8	15.8	**27.2**	12.0	13.1	15.9	16.6	15.8	14.1
Wagga Wagga/ Wagga Wagga North**	**29.2**	**26.1**	**24.9**	**27.0**	**17.2**	15.0	18.8	22.1	20.7	19.9

* Replaced the Macarthur trend station from September 2012
** Replaced the Wagga Wagga station in October 2011
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m^3 (annual average)

Statistical summaries for multiple years, by station

Table 114. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Bringelly

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	88.8	3	**72.2**	**52.3**	42.6	33.4	29.3	25.0	19.0	14.5
2007	99.5	1	**51.0**	48.5	42.4	33.5	30.3	23.7	16.6	12.0
2008	97.0	1	**62.7**	35.2	33.0	28.6	24.6	19.3	14.4	10.6
2009	94.8	6	**1683.9**	**114.8**	47.4	37.1	31.9	22.8	17.0	12.4
2010	97.3	0	41.1	37.5	33.9	29.1	23.7	18.5	14.4	10.7
2011	98.9	2	**86.0**	41.5	36.5	30.7	25.0	18.9	14.3	10.6
2012	100.0	0	40.1	34.6	30.2	27.1	24.7	19.0	14.9	11.2
2013	99.5	3	**97.2**	46.1	35.9	30.4	26.9	20.9	15.1	11.5
2014	98.4	0	42.6	36.2	33.4	29.2	25.9	20.6	15.5	11.5
2015	99.2	1	**57.0**	36.9	32.6	27.8	24.3	19.6	15.1	10.9

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 115. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Camden

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2012	19.1	0	35.6	35.5	34.5	31.1	28.6	23.6	20.0	14.8
2013	98.9	2	**97.5**	40.9	34.3	30.6	25.9	18.8	13.5	9.7
2014	99.2	0	41.4	35.5	31.5	28.0	24.9	19.4	14.6	10.7
2015	98.9	1	**62.4**	32.4	30.6	24.7	22.3	17.1	12.6	9.5

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 116. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Macarthur/Campbelltown West*

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	100.0	4	**92.3**	**53.5**	34.5	31.0	26.2	22.4	15.6	11.5
2007	96.4	1	**53.1**	38.0	36.7	29.8	25.8	20.1	14.7	10.4
2008	99.5	1	**65.5**	33.2	30.7	27.6	23.3	17.5	13.7	9.9
2009	96.7	**7**	**1146.3**	**111.4**	**56.2**	35.5	29.6	21.2	15.5	10.5
2010	99.5	1	**58.7**	35.7	30.9	26.8	21.5	16.7	12.5	9.5
2011	98.4	0	38.1	31.9	28.5	23.0	20.6	16.0	12.1	8.9
2012*	54.6	0	33.9	28.3	26.3	21.8	18.8	15.6	12.2	8.8
2013*	99.2	1	**56.9**	36.9	32.0	29.4	25.7	18.9	14.1	10.5
2014*	91.8	0	49.4	36.6	33.8	30.1	26.2	20.7	16.0	12.2
2015*	95.9	1	**69.7**	38.9	34.5	27.9	24.4	19.2	13.8	10.7

* Replaced the Macarthur trend station from September 2012
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 117. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Chullora

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.0	3	**66.1**	49.2	38.6	34.4	31.1	26.4	21.3	16.5
2007	97.5	2	**66.5**	39.4	37.7	34.2	29.2	23.1	18.8	13.4
2008	97.0	0	44.3	38.8	36.5	33.0	30.2	23.7	18.6	13.9
2009	98.4	9	**1474.7**	**121.0**	**58.7**	38.1	32.7	25.0	19.9	14.8
2010	98.9	0	42.1	39.1	35.6	30.6	26.6	21.4	16.9	12.9
2011	99.2	7	**65.2**	**55.8**	49.0	38.1	30.7	23.1	18.1	13.6
2012	98.6	1	**52.4**	36.6	35.1	31.7	27.6	21.8	16.9	13.4
2013	99.5	4	**69.4**	**50.8**	39.0	32.3	28.0	21.6	17.1	13.0
2014	98.9	0	40.0	36.8	34.0	30.3	26.6	21.3	17.1	13.5
2015	98.1	1	**64.6**	46.0	32.2	29.4	26.3	21.7	16.3	12.7

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 118. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Liverpool

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	95.9	3	**75.2**	**50.5**	40.8	35.0	31.6	26.3	20.5	16.0
2007	95.3	1	**53.1**	41.3	39.1	35.9	30.3	23.7	17.6	12.8
2008	92.9	1	**53.8**	36.2	33.6	30.1	26.6	21.7	16.9	12.2
2009	93.7	8	**1579.8**	**114.8**	**59.5**	38.8	31.7	25.1	18.4	14.3
2010	97.3	0	41.1	35.3	33.0	29.9	26.2	20.4	16.2	12.0
2011	69.0	1	**68.8**	46.1	37.5	33.1	27.7	21.7	16.9	13.0
2012	97.0	0	42.5	39.3	37.7	35.1	30.8	24.4	18.8	13.7
2013	97.5	3	**98.5**	45.3	40.3	36.8	31.9	26.3	19.5	14.2
2014	97.5	0	40.8	39.2	36.6	32.9	30.1	23.7	17.9	13.6
2015	95.1	1	**68.6**	36.7	34.4	31.1	28.4	23.1	17.2	12.8

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 119. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Oakdale

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.4	1	**56.5**	35.8	33.9	28.6	23.6	17.8	12.6	8.5
2007	97.3	0	49.2	36.4	32.2	25.4	22.4	16.4	11.2	7.2
2008	96.7	1	**68.2**	33.9	31.0	27.0	21.3	15.5	10.7	7.2
2009	91.2	6	**1528.3**	**130.2**	48.4	30.6	25.5	19.5	12.7	7.5
2010	99.5	0	33.3	29.3	27.9	23.3	18.1	13.4	9.2	6.6
2011	99.5	1	**54.7**	28.1	24.9	21.3	17.3	13.1	9.6	6.9
2012	98.9	0	38.9	33.4	28.2	24.0	19.8	14.9	10.2	6.9
2013	100.0	4	**99.0**	**70.3**	31.6	27.7	22.5	16.8	11.3	7.9
2014	98.4	1	**56.3**	32.7	31.3	24.9	21.9	16.5	11.3	8.4
2015	98.9	1	**61.7**	29.7	27.3	22.4	20.0	14.5	10.0	7.2

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 120. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Prospect

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2007	82.7	0	46.3	43.3	41.6	33.4	28.1	21.9	16.8	12.4
2008	88.5	0	41.8	39.6	35.0	32.6	27.5	21.0	16.4	12.8
2009	96.4	**11**	**1680.3**	**135.3**	**60.7**	38.9	32.3	24.1	18.2	13.5
2010	97.5	0	40.1	31.7	30.1	26.7	22.8	18.7	14.9	11.2
2011	93.2	0	41.5	36.2	31.7	27.4	24.3	19.3	15.1	10.9
2012	94.3	0	38.7	34.8	33.8	29.3	26.5	20.5	16.3	13.0
2013	94.5	4	**81.8**	**51.2**	43.4	33.8	30.0	23.3	17.6	13.3
2014	93.4	0	44.3	35.4	34.3	30.2	25.6	21.1	16.8	12.7
2015	95.1	1	**68.7**	39.8	34.1	29.9	26.2	21.1	16.8	12.8

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 121. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Richmond

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.0	2	**63.1**	44.9	38.0	30.8	27.1	21.5	16.0	12.2
2007	98.4	0	43.0	34.4	33.4	28.6	24.3	18.6	13.6	10.0
2008	98.4	0	39.0	30.9	28.3	24.9	20.2	16.0	11.9	9.1
2009	95.9	6	**1637.3**	**121.7**	46.1	32.9	28.0	19.4	13.4	9.6
2010	96.2	0	37.0	30.2	26.9	24.6	20.6	15.9	12.0	9.2
2011	98.9	0	46.2	32.3	29.7	25.3	21.3	15.9	11.8	8.9
2012	95.9	3	**99.2**	43.7	33.8	28.6	24.8	17.6	12.9	10.2
2013	97.8	5	**104.6**	**69.9**	45.9	35.7	27.8	20.4	14.6	11.1
2014	96.7	0	40.0	34.5	32.7	26.4	23.7	19.2	14.2	10.7
2015	96.7	0	49.3	32.2	27.3	25.6	21.8	16.1	12.0	8.2

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 122. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Rozelle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.0	1	**50.3**	45.0	38.8	33.6	29.3	24.7	19.4	15.4
2007	97.5	1	**54.4**	38.2	36.1	30.7	27.1	21.7	17.2	13.2
2008	96.4	0	43.1	34.0	32.6	28.7	26.0	20.6	16.7	12.9
2009	95.3	8	**1562.8**	**128.5**	**55.8**	36.1	31.0	24.3	17.8	13.1
2010	98.9	0	37.6	31.1	29.3	26.8	24.3	19.6	15.6	12.1
2011	98.4	0	39.4	34.7	32.3	27.2	24.5	20.5	15.7	12.0
2012	99.5	0	40.7	35.4	32.1	29.4	25.6	20.3	15.7	12.3
2013	96.7	3	**58.5**	42.9	39.5	33.6	29.3	21.9	16.6	12.5
2014	96.7	0	43.8	39.4	37.7	30.4	26.6	21.4	16.9	12.8
2015	96.4	1	**60.3**	37.1	32.6	29.5	25.5	20.4	15.4	11.9

Bold font indicates values that exceed the AAQ NEPM standard.

AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 123. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Wyong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2012	19.9	0	37.4	37.2	35.4	31.3	30.4	26.9	21.7	17.1
2013	98.6	1	**70.7**	40.8	36.9	32.4	28.6	20.3	14.3	10.4
2014	98.6	0	41.9	37.4	35.2	28.0	24.2	18.4	13.7	10.1
2015	98.9	1	**58.6**	34.5	33.0	27.0	24.4	18.3	13.0	10.2

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 124. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Albion Park South

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	85.8	2	**61.4**	42.3	38.6	35.9	29.4	21.7	15.3	10.5
2007	88.5	1	**53.8**	42.6	37.8	33.4	28.4	20.8	13.6	8.7
2008	97.0	1	**96.1**	40.0	35.3	29.7	25.2	18.2	13.0	9.4
2009	99.5	9	**1359.6**	**73.0**	**50.7**	38.0	31.6	22.8	15.4	10.1
2010	96.7	0	41.8	37.2	35.6	29.0	24.7	18.4	11.6	8.6
2011	98.9	1	**51.0**	34.9	31.6	27.2	23.5	17.0	11.9	8.6
2012	98.4	0	43.9	36.0	32.7	26.9	22.9	16.7	11.9	8.6
2013	96.7	2	**69.0**	45.4	40.8	32.7	25.1	17.6	12.6	8.7
2014	99.7	0	48.3	39.7	35.9	30.0	25.9	20.0	15.1	10.8
2015	95.1	0	41.2	38.1	33.4	27.8	22.2	17.6	12.5	8.9

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 125. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Kembla Grange

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	99.2	9	**86.0**	**69.6**	**54.5**	40.4	34.5	26.0	18.7	13.0
2007	99.5	5	**59.2**	**50.5**	46.6	39.0	33.2	24.3	17.7	12.1
2008	98.6	4	**100.8**	**52.8**	42.0	33.3	30.3	23.4	16.7	11.1
2009	99.2	14	**1174.0**	**134.4**	**67.0**	42.5	34.0	25.5	18.0	11.5
2010	98.6	0	47.5	42.7	39.5	33.4	28.4	22.7	16.2	11.7
2011	98.9	1	**55.5**	45.9	39.7	33.6	29.1	21.1	15.0	9.9
2012	98.4	3	**57.2**	45.5	42.6	37.1	29.7	23.7	16.5	11.9
2013	99.7	4	**102.2**	**56.0**	46.7	37.4	31.2	23.0	15.9	11.9
2014	98.1	1	**99.2**	41.5	36.9	32.6	27.5	21.3	16.4	11.6
2015	99.2	1	**62.8**	45.0	42.1	34.5	28.7	22.1	16.5	11.2

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 126. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Wollongong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	96.4	4	**63.3**	**52.6**	46.7	37.5	32.3	25.1	18.5	13.0
2007	95.3	3	**58.5**	49.3	42.7	37.8	31.8	24.7	18.3	13.1
2008	94.5	1	**78.3**	41.0	36.8	31.2	28.7	21.5	16.3	12.1
2009	95.9	6	**1145.4**	**107.0**	49.5	40.3	34.7	24.5	18.8	12.6
2010	95.1	0	49.6	44.2	40.2	31.9	28.3	22.4	15.8	12.1
2011	96.7	0	48.5	42.4	37.7	32.6	26.3	21.0	15.8	11.4
2012	98.6	0	47.5	38.2	36.1	33.4	28.8	22.8	16.5	12.2
2013	98.9	6	**93.8**	**54.1**	49.3	37.2	29.7	20.9	15.3	10.5
2014	99.7	0	45.3	40.9	37.9	34.8	29.7	21.6	16.0	12.0
2015	99.2	0	45.8	38.1	37.1	32.3	27.4	21.6	15.3	10.8

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 127. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Beresfield

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	99th	98th	95th	90th	75th	50th
2006	96.4	2	**51.9**	44.5	43.2	36.8	34.2	26.7	18.7	14.6
2007	90.1	5	**64.0**	**55.1**	49.3	41.8	32.1	25.2	18.4	13.1
2008	95.4	5	**59.9**	**52.5**	38.3	32.3	27.3	21.5	16.9	13.4
2009	98.6	15	**1999.0**	**174.3**	**70.6**	47.7	35.3	26.2	18.4	14.2
2010	97.0	0	50.0	37.7	32.1	28.3	24.7	20.0	15.4	12.3
2011	95.1	0	42.8	39.9	35.8	29.3	25.5	21.3	16.1	12.5
2012	99.2	1	**50.8**	47.4	44.1	39.2	32.4	25.8	19.6	15.2
2013	95.9	5	**55.3**	**52.4**	44.3	38.0	34.5	26.5	19.1	14.8
2014	95.3	0	45.4	42.0	39.4	33.9	30.0	23.3	18.3	13.9
2015	97.8	2	**64.9**	42.2	36.4	32.4	28.4	22.8	17.8	13.1

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 128. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Newcastle

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	97.3	1	**51.2**	43.2	38.1	34.2	30.8	25.6	20.5	15.8
2007	47.1	3	**58.1**	**56.8**	49.9	39.5	33.6	26.8	21.5	17.2
2008	93.2	2	**54.4**	44.2	39.6	34.4	31.4	24.8	19.1	15.1
2009	93.2	13	**2426.8**	**119.5**	**71.2**	44.9	37.0	28.1	22.3	16.5
2010	96.2	1	**57.1**	38.7	34.7	30.3	27.3	23.1	17.9	13.7
2011	99.5	0	49.2	42.6	38.7	32.4	29.6	24.0	18.2	13.6
2012	98.9	0	48.7	43.3	41.8	36.2	32.5	26.0	18.8	14.4
2013	98.9	4	**69.0**	**50.5**	48.3	41.9	37.4	27.8	20.5	15.2
2014	98.6	2	**53.7**	48.1	40.5	35.7	31.8	25.6	20.5	15.8
2015	98.6	3	**70.4**	47.0	42.3	37.2	32.9	26.5	20.2	15.1

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 129. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Albury

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	87.9	14	**213.0**	**114.8**	**75.8**	48.1	35.4	24.0	17.8	13.3
2007	91.2	11	**212.8**	**117.3**	**91.5**	44.9	31.4	22.3	15.2	11.0
2008	96.4	8	**124.8**	**67.8**	**53.5**	40.2	29.7	20.7	14.3	9.9
2009	96.7	15	**249.7**	**144.0**	**102.0**	39.0	28.5	19.3	14.0	10.1
2010	99.5	2	**60.8**	45.1	31.6	24.1	19.4	14.6	11.2	8.6
2011	90.7	0	28.0	25.2	23.7	19.9	17.9	14.5	11.9	9.2
2012	92.1	1	**54.4**	38.7	32.3	25.8	21.3	16.7	12.8	10.2
2013	98.6	2	**59.2**	47.8	42.5	30.7	26.4	18.8	13.6	10.4
2014	98.9	5	**159.6**	**88.2**	37.8	29.4	22.8	17.4	13.4	10.5
2015	95.6	2	**92.5**	35.4	30.2	26.0	23.3	17.5	13.0	10.1

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 130. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Bathurst

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.6	3	**59.6**	46.0	44.3	35.2	28.6	22.3	15.4	11.5
2007	95.1	2	**162.8**	48.6	38.9	32.0	26.6	19.2	13.5	9.2
2008	94.8	1	**63.0**	40.8	35.9	28.8	24.1	16.9	12.3	8.8
2009	97.8	12	**2114.4**	**122.4**	**69.8**	36.9	26.8	20.3	13.8	9.0
2010	98.6	0	43.3	32.6	26.7	21.2	18.5	12.5	7.9	5.0
2011	97.3	0	24.3	23.2	21.1	18.6	17.5	13.8	10.3	7.8
2012	99.5	2	**55.5**	31.0	28.1	24.2	21.3	16.4	12.2	9.2
2013	99.7	3	**145.0**	46.9	43.7	32.4	25.3	17.3	12.7	9.4
2014	98.6	0	42.8	37.8	36.0	29.4	25.1	18.2	12.8	9.2
2015	99.5	2	**94.6**	39.5	32.9	28.7	22.3	16.1	11.7	8.5

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 131. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Tamworth

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	79.2	0	47.8	39.0	36.7	29.3	26.7	21.3	15.0	11.0
2007	73.7	0	48.8	42.3	34.5	30.3	26.2	19.4	14.7	10.1
2008	85.8	3	**100.4**	**52.0**	40.7	30.5	23.8	18.7	14.0	10.5
2009	96.7	17	**1791.4**	**235.9**	**120.7**	47.0	33.8	22.8	15.7	11.4
2010	98.4	0	29.1	26.5	24.6	21.8	18.4	14.7	11.2	8.3
2011	96.7	1	**50.9**	34.0	27.4	22.4	19.2	15.8	12.3	9.1
2012	98.9	1	**55.1**	47.0	38.0	27.8	24.3	19.5	14.3	10.7
2013	98.4	0	47.5	43.8	35.9	30.7	27.0	20.4	15.2	11.3
2014	99.5	1	**66.6**	36.5	34.5	27.6	24.7	19.3	14.9	10.9
2015	98.9	1	**52.7**	30.9	29.1	24.7	22.2	17.1	12.9	10.2

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Table 132. Statistical summary for PM_{10}: 24-hour average concentrations. Station: Wagga Wagga / Wagga Wagga North*

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	95.6	37	**188.3**	**110.0**	**86.8**	**61.1**	**50.7**	36.2	24.9	16.9
2007	97.5	34	**110.3**	**82.0**	**75.2**	**61.0**	47.5	33.0	21.7	14.8
2008	93.7	23	**294.9**	**70.6**	**62.6**	**53.2**	45.1	28.4	21.0	14.5
2009	82.5	21	**297.4**	**214.4**	**112.3**	**55.9**	46.2	30.6	19.8	12.4
2010	97.0	6	**64.9**	**52.1**	48.5	38.7	29.0	21.5	15.4	10.0
2011*	96.3	1	**56.3**	40.9	33	28.4	24.9	20.6	15.4	11.2
2012*	98.4	1	**67.2**	46.5	43.1	37.4	32.6	23.1	16.6	12.4
2013*	98.9	15	**110.7**	**67.9**	**57.8**	47.2	40.5	27.9	18.9	12.8
2014*	96.4	13	**88.2**	**59.3**	**55.1**	44.9	36.8	25.5	18.3	12.5
2015	98.4	7	**145.1**	**72.4**	**51.3**	42.3	34.2	24.8	17.2	11.3

* Replaced the Wagga Wagga station in October 2011.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 50.0 µg/m³ (24-hour average)

Particles as $PM_{2.5}$

The current USEPA-approved method for $PM_{2.5}$ compliance monitoring (also known as the Federal Reference Method, FRM) is a non-continuous (batch), one-day-in-three technique that requires pre- and post-laboratory weighing. As this involves a substantial delay in acquiring and reporting data, jurisdictions use continuous monitoring techniques for near-real-time reporting of air quality (e.g. by using TEOM or BAM monitors).

The Federal government's PM2.5 AAQ NEPM variation requires the reporting of all $PM_{2.5}$ data, including the compliance method (FRM) and the continuous monitoring technique used.

$PM_{2.5}$ data reporting before 2010

In all $PM_{2.5}$ reporting by NSW before 2010, continuous TEOM $PM_{2.5}$ data were recorded with the internal USEPA PM_{10} equivalency factors applied (of A = 3 and B = 1.03 where y = A + Bx). During 2010, all $PM_{2.5}$ data was recalculated by removing the PM_{10} equivalency factor (i.e., now A = 0 and B = 1). This approach harmonised NSW reporting of $PM_{2.5}$ with that of other Australian jurisdictions. All data included in this report, for all years, do not have any equivalency factors applied.

Continuous $PM_{2.5}$ monitoring techniques from 2012

During 2012, a staged rollout was undertaken to replace continuous TEOM $PM_{2.5}$ monitors with a USEPA-equivalent method, namely Beta Attenuation Monitors (BAMs). The BAM method differs from TEOM in terms of sample treatment, using lower temperatures intermittently to reduce moisture levels in the sample stream. This is intended to promote greater retention of volatile components adsorbed to the fine particulate matter.

Statistical summary: BAM method

Table 133. Statistical summary for $PM_{2.5}$: 24-hour average concentrations (2015) – continuous BAM method

Region/Performance monitoring station	Data availability rate (%)	Maximum (µg/m³)	Percentile (µg/m³)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Camden	98.4	25.0	17.3	13.4	11.2	10.2	7.9	5.8	3.8
Chullora	96.4	**37.2**	16.8	15.3	14.4	12.5	9.7	7.4	5.6
Earlwood	93.4	**28.0**	22.9	20.4	16.4	14.0	10.8	7.7	5.6
Liverpool	94.2	**32.2**	22.6	20.8	17.1	14.0	10.8	7.3	5.5
Richmond	92.6	24.5	23.4	18.2	15.0	13.1	9.6	6.9	5.0
Central Coast									
Wyong	97.3	13.2	11.7	10.6	9.1	8.0	6.4	4.8	3.6
Illawarra									
Wollongong	81.6	**31.6**	18.9	16.3	14.2	12.6	9.5	6.9	4.9
Lower Hunter									
Beresfield	93.7	**25.9**	19.7	16.5	13.4	12.4	9.3	6.6	4.7
Wallsend	95.9	24.0	21.9	17.2	14.2	12.3	9.3	6.3	4.6

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Trend data: TEOM and BAM methods

$PM_{2.5}$ TEOM 24-hour daily and annual averages provided in NEPM reports from 2009 onwards will differ from those reported previously, as the USEPA PM_{10} equivalence factors have been removed from all TEOM $PM_{2.5}$ data values; in reports published before 2009 these factors were included. Annual maximum 24-hour averages and annual averages for all stations are given below.

Table 134. Maximum 24-hour average concentrations for $PM_{2.5}$ (µg/m³): continuous TEOM and BAM* methods

Region/Performance monitoring station	2006	2007	2008	2009	2010	2011	2012*	2013*	2014*	2015*
Sydney										
Camden							19.5	**61.9**	18.5	25.0
Chullora	**32.8**	20.5	19.5	**183.2**	24.2	23.9	23.4	**49.1**	23.1	**37.2**
Earlwood	**29.1**	19.8	18.2	**186.7**	22.5	23.6	20.7	**37.3**	22.7	**28.0**
Liverpool	**48.1**	23.0	**32.2**	**268.1**	21.8	**38.0**	24.9	**73.8**	24.3	**32.2**
Richmond	**31.6**	21.1	17.7	**148.9**	20.8	**42.9**	**116.7**	**68.0**	24.7	24.5
Central Coast										
Wyong							14.7	**55.8**	19.7	13.2
Illawarra										
Wollongong	**26.6**	22.5	14.6	**241.0**	23.5	17.7	15.6	**88.4**	17.3	**31.6**
Lower Hunter										
Beresfield	24.9	23.0	16.9	**230.8**	**25.9**	18.8	22.4	**40.8**	19.0	**25.9**
Wallsend	**25.6**	18.2	22.8	**415.6**	18.8	16.2	16.2	**37.0**	18.0	24.0

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)
* BAM data

Table 135. Annual average concentrations for $PM_{2.5}$ (µg/m^3) – continuous TEOM and BAM* methods

Region/ Performance monitoring station	2006	2007	2008	2009	2010	2011	2012*	2013*	2014*	2015*
Sydney										
Camden								6.5	6.3	6.2
Chullora	7.2	6.4	5.9	7.1	5.7	5.9	6.0	**8.4**	**9.0**	8.0
Earlwood	6.9	5.9	5.5	6.8	5.7	5.4	5.6	7.9	7.8	**8.5**
Liverpool	**8.9**	7.2	6.5	**8.3**	6.3	5.9	**8.5**	**9.4**	**8.6**	**8.5**
Richmond	5.9	5.8	7.3	5.7	4.2	4.7	5.3	**8.3**	6.7	7.7
Central Coast										
Wyong							7.3	6.7	5.5	5.2
Illawarra										
Wollongong	6.4	6.0	5.3	7.1	5.1	4.6	4.6	7.7	7.0	7.6
Lower Hunter										
Beresfield	6.8	6.3	6.0	**8.5**	6.0	5.5	7.9	**8.2**	7.5	7.3
Wallsend	6.4	5.8	5.9	**8.1**	4.6	4.8	5.1	7.7	6.7	7.3

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 8.0 µg/m^3 (annual average)
* BAM data

Statistical summaries for multiple years, by station: TEOM and BAM methods

Table 136. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous BAM method. Station: Camden

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m^3)	Percentile (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2012	20.8	0	19.5	19.4	18.1	13.2	11.6	9.5	7.8	5.3
2013	99.7	3	**61.9**	24.8	16.7	13.2	10.9	8	5.5	3.8
2014	98.6	0	18.5	15.4	14.0	12.4	10.6	8.1	5.8	3.9
2015	98.4	0	25.0	17.3	13.4	11.2	10.2	7.9	5.8	3.8

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m^3 (24-hour average)

Table 137. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Chullora

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	94.2	2	**32.8**	17.2	14.7	13.2	11.5	8.8	6.4	4.7
2007	92.3	0	20.5	17.3	16.6	13.1	11.8	8.2	5.7	3.7
2008	96.7	0	19.5	16.8	14.5	12.1	9.9	7.6	5.4	3.7
2009	98.6	3	**183.2**	19.4	17.3	14.1	11.3	8.5	5.9	3.9
2010	93.7	0	24.2	19.2	15.4	11.9	10.0	7.3	5.0	3.4
2011	98.9	0	23.9	18.6	16.2	12.3	10.8	7.6	5.2	3.4
2012	97.0	0	23.4	17.6	14.5	12.1	9.9	7.5	5.3	3.7
2013	98.6	3	**49.1**	22.4	19.9	15.9	13.6	10.6	7.2	5.3
2014	89.0	0	23.1	20.5	18.3	16.3	14.1	10.9	8.2	6.2
2015	96.4	1	**37.2**	16.8	15.3	14.4	12.5	9.7	7.4	5.6

[1]TEOM was replaced by BAM on 14/12/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 138. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Earlwood

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.6	2	**29.1**	17.8	15.1	13.2	11.6	8.4	6.4	4.4
2007	96.7	0	19.8	16.8	15.6	12.3	10.5	7.8	5.2	3.3
2008	98.4	0	18.2	15.9	14.7	11.3	9.7	7.2	4.9	3.3
2009	75.6	1	**186.7**	22.5	18.9	13.9	11.3	8.2	5.3	3.4
2010	95.6	0	22.5	16.7	14.2	11.4	9.9	7.3	5.0	3.4
2011	96.2	0	23.6	18.4	15.8	12.7	10.5	6.9	4.5	2.8
2012	98.9	0	20.7	17.4	14.5	11.8	10.3	7.3	4.6	3.2
2013	91.2	4	**37.3**	**27.4**	20.8	16.6	13.5	9.8	6.6	4.7
2014	97.3	0	22.7	18.1	17.4	14.5	12.9	9.7	7.1	5.2
2015	93.4	2	**28.0**	22.9	20.4	16.4	14.0	10.8	7.7	5.6

[1]TEOM was replaced by BAM on 19/12/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 139. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Liverpool

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.6	3	**48.1**	22.2	18.5	15.9	14.2	11.0	8.2	5.9
2007	94.8	0	23.0	19.4	18.3	15.2	12.1	9.3	6.6	4.3
2008	92.3	1	**32.2**	16.6	14.8	12.2	10.6	8.4	5.8	4.0
2009	94.5	3	**268.1**	**25.2**	19.9	14.9	12.9	9.7	6.7	4.5
2010	95.9	0	21.8	17.7	15.6	13.2	11.0	8.1	5.6	3.9
2011	99.2	2	**38.0**	20.7	16.2	14.0	10.9	7.4	4.9	3.1
2012	85.8	0	24.9	21.5	19.5	15.2	13.9	10.8	7.6	5.7
2013	93.2	2	**73.8**	24.4	22.1	18.7	16.0	11.7	8.1	5.8
2014	97.0	0	24.3	20.4	19.1	16.1	14.4	10.8	7.6	5.7
2015	94.2	2	**32.2**	22.6	20.8	17.1	14.0	10.8	7.3	5.5

[1]TEOM was replaced by BAM on 2/3/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 140. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Richmond

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	84.9	1	**31.6**	18.5	13.3	10.9	9.3	7.3	5.3	3.8
2007	42.2	0	21.1	16.3	14.3	11.7	9.3	7.3	5.2	3.8
2008	98.9	0	17.7	15.6	13.8	12.3	10.5	8.6	6.8	5.6
2009	89.3	2	**148.9**	22.1	15.6	11.5	9.9	6.7	4.4	2.8
2010	97.3	0	20.8	14.3	12.3	9.4	7.9	5.7	3.5	2.1
2011	97.8	2	**42.9**	22.7	15.7	10.6	8.6	6.2	3.7	2.2
2012	94.3	2	**116.7**	18.0	14.8	11.0	9.4	6.7	4.1	2.6
2013	95.1	14	**68.0**	**40.8**	**31.4**	24.3	14.8	9.9	6.0	4.2
2014	95.9	0	24.7	18.1	16.4	13.3	11.5	8.4	6.0	4.4
2015	92.6	0	24.5	23.4	18.2	15.0	13.1	9.6	6.9	5.0

[1]TEOM was replaced by BAM on 7/9/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 141 Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous BAM method. Station: Wyong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2012	19.7	0	14.7	14.7	14.6	12.5	11.4	9.0	6.9	4.8
2013	94.2	1	**55.8**	20.7	16.7	12.6	11.0	8.1	5.8	4.1
2014	96.2	0	19.7	14.6	13.1	10.8	8.9	6.5	4.9	3.7
2015	97.3	0	13.2	11.7	10.6	9.1	8.0	6.4	4.8	3.6

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 142. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Wollongong

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	100.0	2	**26.6**	17.4	14.4	12.6	11.1	8.4	5.8	3.6
2007	98.4	0	22.5	18.5	16.3	13.7	11.1	7.7	5.2	3.2
2008	94.0	0	14.6	14.2	13.0	10.7	9.3	7.1	4.8	3.0
2009	96.2	3	**241.0**	23.0	19.3	14.9	12.1	8.2	5.6	3.4
2010	92.1	0	23.5	15.0	13.8	11.2	9.3	6.4	4.2	3.0
2011	96.4	0	17.7	16.0	14.1	11.2	8.8	6.4	3.8	2.4
2012	98.1	0	15.6	13.7	13.1	10.6	8.3	5.9	4.0	2.4
2013	94.8	4	**88.4**	**28.8**	21.5	15.5	12.8	9.2	6.4	4.6
2014	92.1	0	17.3	15.9	14.9	13.1	11.8	9.1	6.4	4.6
2015	81.6	1	**31.6**	18.9	16.3	14.2	12.6	9.5	6.9	4.9

[1]TEOM was replaced by BAM on 5/12/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 143. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Beresfield

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	98.9	0	24.9	17.8	15.5	13.3	11.4	8.6	5.9	4.3
2007	86.0	0	23.0	17.2	15.9	13.6	11.5	8.4	5.5	3.5
2008	91.5	0	16.9	15.1	14.1	11.8	9.9	7.7	5.7	3.7
2009	93.7	5	**230.8**	**34.6**	21.5	16.3	13.6	9.7	6.7	4.8
2010	97.3	1	**25.9**	15.2	13.6	11.6	9.9	7.4	5.4	3.9
2011	99.2	0	18.8	15.0	13.5	11.0	9.7	7.0	4.9	3.2
2012	93.4	0	22.4	21.0	18.1	14.4	12.7	9.9	7.1	5.3
2013	94.2	2	**40.8**	23.2	20.4	15.9	13.3	10.3	7.2	5.1
2014	96.2	0	19.0	17.1	16.3	13.9	12.1	9.4	6.9	5.0
2015	93.7	1	**25.9**	19.7	16.5	13.4	12.4	9.3	6.6	4.7

[1]TEOM was replaced by BAM on 29/11/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Table 144. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – continuous TEOM and BAM[1] methods. Station: Wallsend

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m³)	Percentile (µg/m³)						
				99th	98th	95th	90th	75th	50th	25th
2006	99.2	1	**25.6**	16.6	14.5	12.2	10.5	8.1	5.9	4.1
2007	92.3	0	18.2	15.3	14.9	12.3	10.1	7.5	5.1	3.3
2008	87.2	0	22.8	18.3	14.8	12.1	10.2	7.5	5.3	3.4
2009	88.8	5	**415.6**	**39.7**	21.0	14.5	12.5	8.4	5.6	3.9
2010	92.6	0	18.8	11.9	10.7	9.2	7.4	5.7	4.2	3.1
2011	100.0	0	16.2	13.9	12.3	10.9	8.8	6.2	4.2	2.7
2012	99.5	0	16.2	14.2	13.1	11.3	9.1	6.4	4.3	3.1
2013	96.2	6	**37.0**	**29.1**	22.5	16.6	13.1	9.6	6.2	4.5
2014	96.2	0	18.0	15.2	13.6	12.3	10.1	8.5	6.3	4.6
2015	95.9	0	24.0	21.9	17.2	14.2	12.3	9.3	6.3	4.6

[1]TEOM was replaced by BAM on 21/2/2012.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)

Statistical summary: FRM method

Table 145. Statistical summary for $PM_{2.5}$: 24-hour average concentrations (2015) – FRM method

Region/ Performance monitoring station	Data availability rate (%)	Maximum (µg/m³)	Percentile (µg/m³)						
			99th	98th	95th	90th	75th	50th	25th
Sydney									
Chullora	80.6	**38.6**	14.5	13.8	13.1	12.3	8.4	5.9	4.1

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)
Data availability rates are based on a one-day-in-three sampling regime.

Trend data: FRM method

Annual maximum 24-hour averages and annual averages for all stations are given below. Please note that monitoring using FRM technique ceased at Richmond in September 2007 because of technical issues. Please note that the data availability rates are based on a one-day-in-three sampling regime.

Table 146. Maximum 24-hour average concentrations for $PM_{2.5}$ (µg/m³) – FRM method

Region/ Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Chullora	**30.0**	19.2	22.1	**27.5**	**28.2**	16.7	14.6	**53.9**	18.9	**38.6**
Richmond[1]	**45.8**	18.3								

[1] Monitoring at Richmond ceased in 2007.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m³ (24-hour average)
Data are based on a one-day-in-three sampling regime.

Table 147. Annual average concentrations for $PM_{2.5}$ (µg/m^3) – FRM method

Region/ Performance monitoring station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Sydney										
Chullora	6.8	6.7	6.1	6.7	6.5	6.2	NA	7.2	7.2	6.9
Richmond[1]	6.5	6.6								

[1]Monitoring at Richmond ceased in 2007.
NA: Due to technical problems and problems with parts availability, an annual average was not able to be calculated.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 8.0 µg/m^3 (annual average)
Data are based on a one-day-in-three sampling regime.

Statistical summaries for multiple years, by station: FRM method

Table 148. Statistical summary for $PM_{2.5}$: 24-hour average concentrations – FRM method. Station: Chullora

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m^3)	Percentile (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2006	84.4	1	**30.0**	20.3	16.6	13.3	11.2	8.3	5.8	4.1
2007	80.3	0	19.2	15.5	14.6	13.8	11.4	8.2	5.8	4.0
2008	88.5	0	22.1	19.2	14.3	11.5	10.5	7.2	5.4	4.0
2009	87.6	2	**27.5**	**26.7**	19.1	13.1	11.3	9.1	5.4	3.8
2010	83.8	1	**28.2**	21.9	16.6	12.8	11.0	7.5	5.8	4.2
2011	77.9	0	16.7	16.3	15.5	13.9	12.5	7.5	5.4	3.8
2012	38.0	0	14.6	12.7	10.8	9.9	9.4	8.3	6.3	4.6
2013	65.8	2	**53.9**	**27.4**	24.4	13.3	12.3	8.5	5.4	4.1
2014	77.3	0	18.9	18.1	16.2	14.1	11.7	8.7	6.3	4.6
2015	80.6	1	**38.6**	14.3	13.8	13.0	12.3	8.4	5.9	4.1

Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m^3 (24-hour average)
Data availability rates are based on a one-day-in-three sampling regime.

Table 149. Statistical summary for $PM_{2.5}$:- 24-hour average concentrations – FRM. Station: Richmond[1]

Year	Data availability rate (%)	Number of exceedences (days)	Maximum (µg/m^3)	Percentile (µg/m^3)						
				99th	98th	95th	90th	75th	50th	25th
2005	69.7	2	**28.8**	**27.7**	21.3	13.3	11.5	7.5	5.0	3.3
2006	68.9	1	**45.8**	19.3	13.0	11.3	10.6	8.0	5.8	3.6
2007	49.2	0	18.3	16.8	15.7	15.4	11.8	8.8	5.6	3.6

[1]Monitoring at Richmond ceased in 2007.
Bold font indicates values that exceed the AAQ NEPM standard.
AAQ NEPM standard: 25.0 µg/m^3 (24-hour average)
Data availability rates are based on a one-day-in-three sampling regime.