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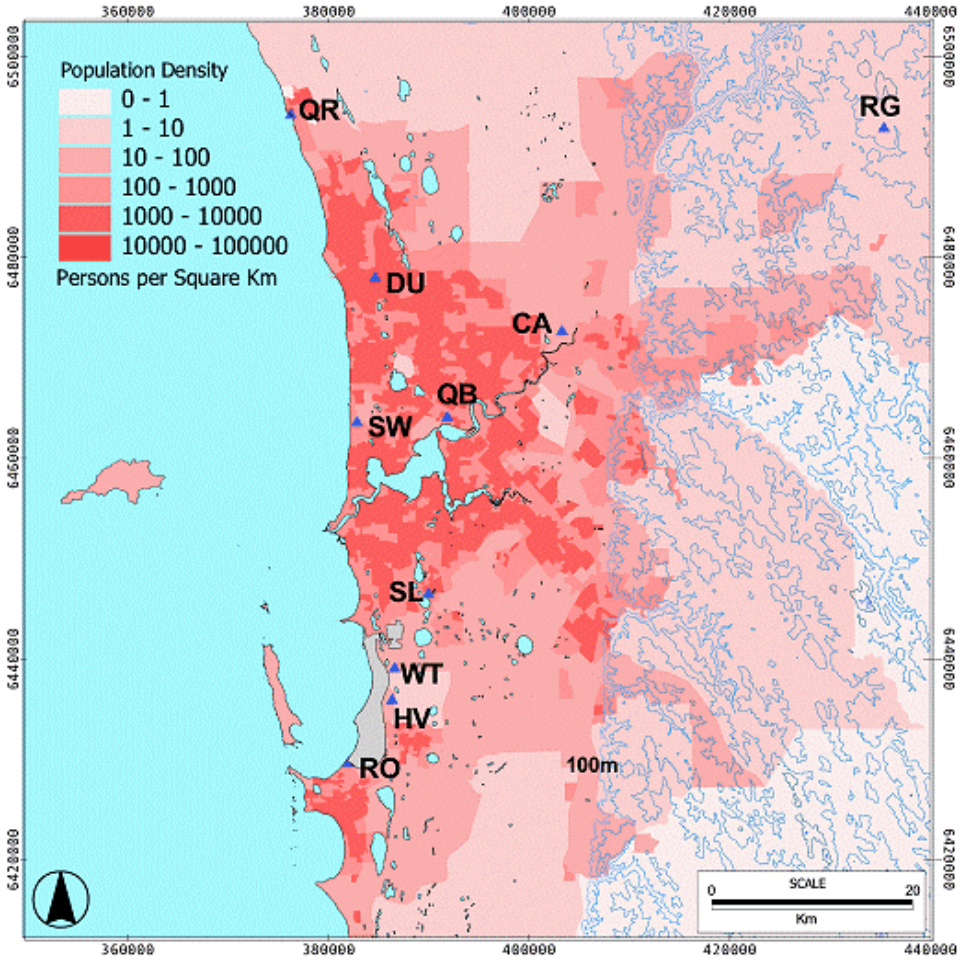
SECTION A – MONITORING SUMMARY

Current Monitoring Stations

The Department of Environment and Conservation (DEC) monitoring network shown in Figure A1 was the subject of careful design for the purposes of the Perth Photochemical Smog Study, the Perth Haze Study and the management of sulfur dioxide in the Kwinana area. The networks design was based on the knowledge of emissions sources, pollutant chemistry and important features of the meteorology. CSIRO Atmospheric Research provided advice on monitoring site locations for the Perth Photochemical Smog Study and Perth Haze Study. The Bunbury station shown in Figure A2 was established in the southwest of the state to monitor fuel reduction burns. The Geraldton station shown in Figure A3 was established in the midwest of the state to monitor wind blown crustal material and smoke from bushfires, hazard reduction or stubble burning and possibly home fires.
Table A1 indicates the pollutants monitored at each site in the Perth metropolitan and Bunbury region.



CA Caversham	**RO Rockingham**
DU Duncraig	**RG Rolling Green**
HV Hope Valley	**SL South Lake**
QB Queens Building	**SW Swanbourne**
QR Quinns Rock	**WT Wattleup**

Figure A1 - DEC air quality monitoring stations which are currently operating in the Perth metropolitan region.

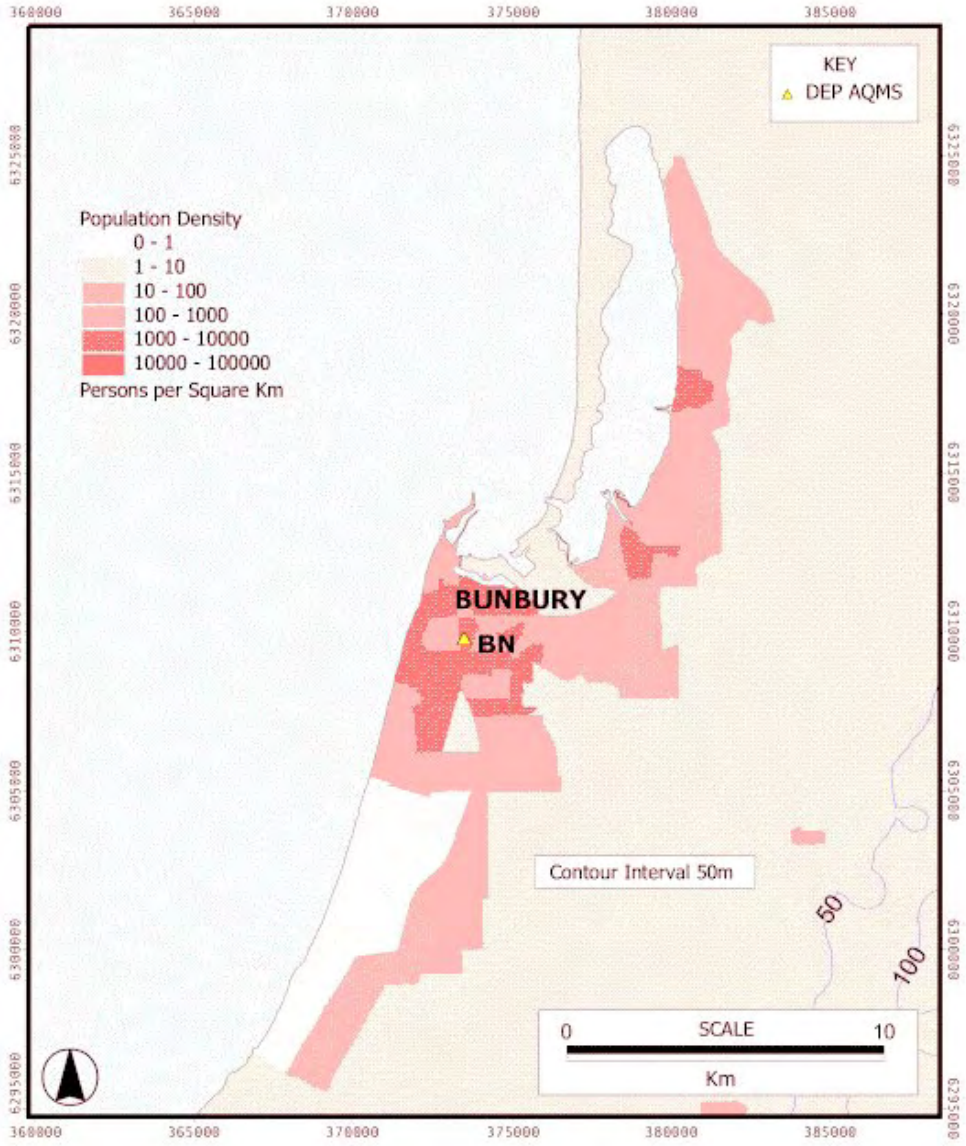


Figure A2 - DEC air quality monitoring stations which are currently operating in Bunbury

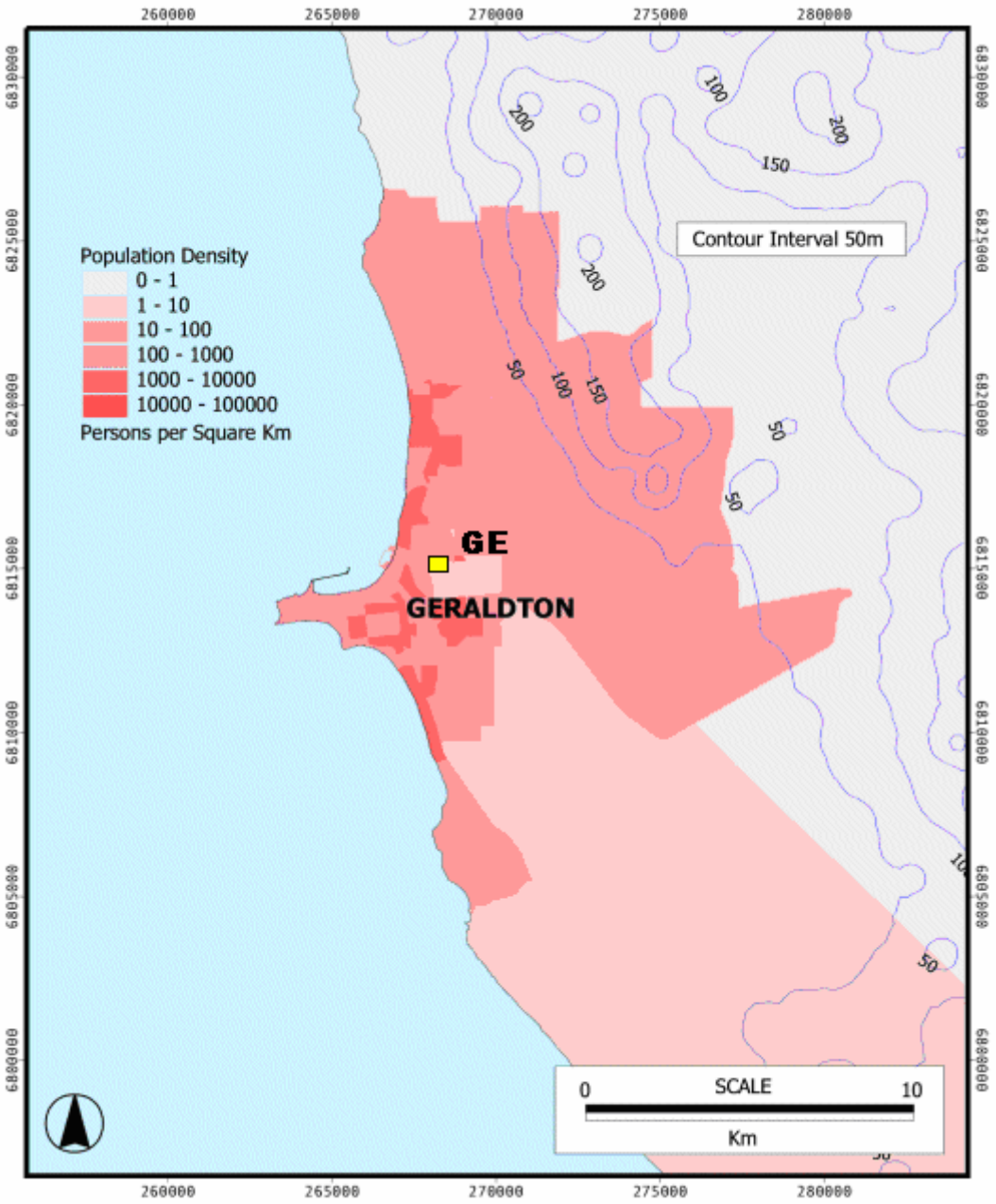


Figure A3 - DEC air quality monitoring stations which are currently operating in Geraldton

Table A1. Air quality parameters measured at DEC monitoring stations.

Monitoring Site	CO	O_3	NO_2	SO_2	lead	PM_{10} Hi-Vol	PM_{10} TEOM	$PM_{2.5}$ TEOM	Visibil-ity
BN Bunbury	03/99 to 04/02						06/99 to present	04/97 to present	02/97 to 06/05
CA Caversham	08/93 to present	11/89 to present	09/90 to present			05/93 to 08/05	01/04 to present	03/94 to 01/04	12/89 to 05/06
DU Duncraig	08/95 to present		08/95 to present			09/94 to 01/05	06/96 to present	01/95 to present	03/94 to 07/05
GE Geraldton							09/05 to present		
HV Hope Valley	01/90 to 03/91		12/89 to present	12/89 to present					01/89 to 09/05
QB Queens Building	08/89 to present		01/90 to present		01/90 to 12/01	01/90 to present			01/90 to 07/05
QR Quinns Rock		11/92 to present	11/92 to present					07/06 to present	12/95 to 06/06
RO Rockingham		12/95 to present	12/95 to present	07/88 to present					
RG Rolling Green		01/93 to present	01/93 to present						
SL South Lake	03/00 to present	03/00 to present	03/00 to present	03/00 to present			03/00 to present	04/06 to present	03/00 to 09/05
SW Swanbourne	01/93 to 05/95	01/93 to present	03/93 to present			03/94 to 04/06		06/94 to 07/95	06/94 to 07/03
WT Wattleup				01/88 to present					

The grey font indicates those pollutants that are no longer monitored at that site.

Table A2. Monitoring in Western Australia.

Site:	CO	O_3	NO_2	SO_2	Pb	PM_{10}
BN – Bunbury						C
CA - Caversham	DEC	T	T			P
DU - Duncraig	P/T		DEC			T
GE – Geraldton						C
HV – Hope Valley			DEC	DEC		
QB - Queens Building	P		DEC		$P^{(1)}$	DEC
QR - Quinns Rock		DEC	DEC			
RG - Rolling Green		DEC	DEC			
RO - Rockingham		DEC	DEC	DEC		
SL - South Lake	P	P	P	T		P
SW - Swanbourne		P	P			DEC
WT - Wattleup				DEC		

Key to symbols:
P – performance monitoring station
$P^{(1)}$ – performance monitoring for lead was removed on 31 December 2001 after the annual average concentration reduced to less than 10% of the NEPM standard in accordance with the WA Monitoring Plan.
C – Campaign Monitoring
T – trend performance monitoring station
DEC – station will be maintained by DEC for the foreseeable future

Table A3. Stations site compliance with AS 2922 - 1987

	Height above ground	Min. distance to support structures	Clear sky angle of 120°	Unrestricted airflow of 270°/360°	20m from trees	No boilers or incinerators nearby	Minimum distance from road or traffic	Sample line material	Sample line length	Comments
Perth Region										
Caversham	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Duncraig	☑	☑	☒	☑	☒	☑	☑	☑	☑	6 metres to medium sized trees and presence of power pole.
Hope Valley	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Queens Building	☑	☒	☒	☒	☑	☑	☒	☑	☑	City canyon with high traffic volume.
Quinns Rocks	☑	☑	☑	☑	☒	☑	☑	☑	☑	15 metres to small to medium size trees. Surrounding area dominated by low scrub.
Rockingham	☑	☑	☑	☑	☒	☑	☑	☑	☑	12 metres to trees. Northern vector dominated by grain storage facility.
Rolling Green	☑	☑	☑	☑	☑	☑	☑	☑	☑	
South Lake	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Swanbourne	☑	☑	☑	☑	☑	☑	☑	☑	☑	
Wattleup	☑	☑	☑	☑	☒	☑	☑	☑	☑	10 metres to medium to large eucalyptus trees.
Southwest Region										
Bunbury	☑	☑	☑	☑	☒	☑	☑	☑	☑	15 metres to small to medium eucalyptus trees.
Midwest Region										
Geraldton	☑	☑	☑	☑	☑	☑	☑	☑	☑	

Carbon Monoxide

Duncraig is an upper bound site for monitoring the combined effects of emissions from vehicles on the nearby Mitchell Freeway and domestic wood fires. The site is about 200 metres from the freeway; hence it is well beyond the distance of roadside measurement. By Perth's standards the site is representative of dense population. The site lies in a dunal depression through which the freeway passes, hence the effect of stable air pooling in the depression is likely to lead to elevated concentrations. This feature would be found in many other places across the coastal plain.

South Lake lies in a growing urban area and is likely to see increasing levels of CO from wood fires in particular. It is not as close as Duncraig to major roads and is therefore more typical of a population-average site.

Caversham is located in a region of low population density and so is not considered as a performance monitoring station.

The DEC maintains the Queens Buildings station as a performance monitoring station to provide an upper bound measurement of motor vehicle emitted CO, and to track the improving compliance with the NEPM. It is not nominated as a trend site since it does

not fit the normal pattern of a generally representative upper bound for community exposure (GRUB) or population-average monitoring site.

In summary, WA maintains performance monitoring of CO at Duncraig, South Lake and Queens Buildings. Duncraig and South Lake are also nominated as trend stations.

Photochemical Oxidants as Ozone

Statistics for the coastal sites of Quinns Rocks, Swanbourne and Rockingham indicate there is little difference between each station over the long term. Swanbourne was selected as a performance monitoring station while maintaining monitoring stations at Quinns Rocks and at or near Rockingham for the foreseeable future, as resources allow.

Given its location, there is reason to be confident that Caversham represents an upper bound, middle distance, inland site. Accordingly Caversham was selected as a performance monitoring station site.

South Lake is the third performance monitoring station. It has the following desirable attributes:

- it provides spatial spread of stations (it will measure ozone returning on shore in the southern part of the metropolitan area);
- it is a moderate distance inland in a growing urban area, hence it is well classed as a population average station;
- it may occasionally detect the interactions of O_3-rich air with the NO_x-rich plumes from Kwinana industry (potentially giving elevated NO_2 concentrations);

Caversham, Swanbourne and South Lake are all nominated as trend stations.

The DEC also maintains the stations at Quinns Rocks and Rolling Green for the foreseeable future as part of its wider ozone network.

Nitrogen Dioxide

The Queens Buildings site located within the CBD provides an upper limit for NO_2.

For purposes of scientific understanding, NO_x is currently being monitored at all stations where O_3 is monitored. Caversham, Swanbourne and South Lake were therefore chosen as performance monitoring stations for NO_2 as these provide a good spatial distribution.

Caversham, Swanbourne and South Lake are also trend stations.

The DEC will continue to measure NO_2 at Quinns Rocks, Rolling Green and Duncraig for the foreseeable future as part of its wider network. The DEC will also continue to measure NO_2 at Queens Buildings in order to determine the long-term trend.

Sulfur Dioxide

WA operates one performance monitoring station at South Lake for sulfur dioxide, while maintaining a source management network which includes Hope Valley, Wattleup and Rockingham.

South Lake is an upper bound performance monitoring station for sulfur dioxide, and a trend station. The South Lake site is near the southern extent of the main urban population and downwind of Kwinana in sea breeze conditions.

Lead

Since 1995, lead levels at Queens Buildings in the Perth CBD have been below 60 % of the NEPM standard of 0.5 ug/m^3. In 2001, the average lead level in Perth was 0.022 ug/m^3 representing less than 5% of the NEPM standard. In accordance with NEPM (Ambient Air Quality) Technical Paper No. 4, Screening Procedures, and the WA Monitoring Plan, a performance monitoring station for lead has not been maintained since 2001.

Particles as PM_{10}

Duncraig is an upper bound performance monitoring station site for PM_{10} caused by the combination of vehicle and home fire emissions during strongly stable meteorological conditions. Likewise, the site at South Lake measures significant PM_{10} concentrations from wood fires.

Duncraig and South Lake are all nominated as trend stations.

Campaign monitoring commenced at Geraldton during September 2005.

Status of NATA Accreditation

WA is still working towards achieving NATA accreditation as discussed in the WA Monitoring Plan, and hence the data within this report only meets Department of Environment and Conservation quality standards.

SECTION B – ASSESSMENT OF COMPLIANCE WITH STANDARDS AND GOALS

Table B1. 2005 compliance summary for carbon monoxide

AAQ NEPM Standard
9.0 ppm (8-hour average)

Regional Performance Monitoring Station	Data availability rates (% of hours)					Number of exceedances (days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Perth Region							
Caversham (North East Metro)	99.8	99.7	99.6	94.1	98.3	0	met
Duncraig (North Metro)	95	99.5	99.8	99.7	98.5	0	met
Queens Building (CBD)	99.4	99.8	99.7	99.8	99.7	0	met
South Lake (South East Metro)	89.5	99.3	99.1	99.5	96.9	0	met

Performance against the standards and goal: "met", "not met", "not demonstrated"

Table B2. 2005 compliance summary for nitrogen dioxide

AAQ NEPM Standard
0.12 ppm (1-hour average)
0.03 ppm (1-year average)

Regional Performance Monitoring Station	Data availability rates (% of hours)					Annual mean (ppm)	Number of exceedances (days)	Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual			1-hour	1-year
Perth Region									
Caversham (North East Metro)	99.8	99.9	99.5	94.1	98.3	0.006	0	met	met
Duncraig (North Metro)	87.6	99.4	99.8	99.7	96.7	0.008	0	met	met
Hope Valley (South Metro)	98.1	99.2	99.8	99.6	99.2	0.005	0	met	met
Queens Building (CBD)	56.9	99.8	99.7	99.8	89.2	0.017	0	not demonstrated	not demonstrated
Quinns Rocks (Outer North Coast)	99.4	94.1	96.2	98.1	96.9	0.003	0	met	met
Rockingham (South Coast)	99.3	97.9	99.5	99.7	99.1	0.006	0	met	met
Rolling Green (Outer East Rural)	92.7	99.4	99.6	99.8	97.9	0.002	0	met	met
South Lake (South East Metro)	88.6	81.1	99.1	79.4	87.1	0.008	0	met	met
Swanbourne (Inner West Coast)	95	99.4	99.7	90.9	96.2	0.005	0	met	met

Performance against the standards and goal: "met", "not met", "not demonstrated"

Table B3. 2005 compliance summary for ozone

AAQ NEPM Standard
0.10 ppm (1-hour average)
0.08 ppm (4-hour average)

Regional Performance Monitoring Station	Data availability rates (% of hours)					Number of Exceedances (days)		Performance against the standards and goal	
	Q1	Q2	Q3	Q4	Annual	1-hour	4-hour	1-hour	4-hour
Perth Region									
Caversham (North East Metro)	99.6	99.7	99.5	98.4	99.3	0	0	met	met
Quinns Rocks (Outer North Coast)	99.4	98.9	95.8	98.1	98	0	0	met	met
Rockingham (South Coast)	99.3	97.9	99.5	99.7	99.1	0	0	met	met
Rolling Green (Outer East Rural)	92.7	99.4	99.7	99.8	97.9	0	0	met	met
South Lake (South East Metro)	89.5	99.3	99.7	99.5	97	0	0	met	met
Swanbourne (Inner West Coast)	95.3	99.5	99.8	91.2	96.4	0	0	met	met

Performance against the standards and goal: "met", "not met", "not demonstrated"

Table B4. 2005 compliance summary for sulfur dioxide

AAQ NEPM Standard
0.20 ppm (1-hour average)
0.08 ppm (24-hour average)
0.02 ppm (1-year average)

Regional Performance Monitoring Station	Data availability rates (% of hours)					Annual mean	Number of Exceedances (days)		Performance against the standards and goal		
	Q1	Q2	Q3	Q4	Annual	(ppm)	1-hour	24-hour	1-hour	24-hour	1-y
Perth Region											
Hope Valley (South Metro)	98.1	99.2	99.8	99.8	99.2	0.001	0	0	met	met	met
Rockingham (South Coast)	99.4	98	99.5	99.7	99.2	0.001	0	0	met	met	met
South Lake (South East Metro)	89.5	99.3	99	99.5	96.9	0.001	0	0	met	met	met
Wattleup (South Metro)	99.3	99.8	99.8	99.8	99.7	0.002	0	0	met	met	met

Performance against the standards and goal: "met", "not met", "not demonstrated"

Table B5. 2005 compliance summary for particles as PM_{10}

AAQ NEPM Standard
50 ug/m^3 (24-hour average)

Regional Performance Monitoring Station	Data availability rates (% of days)					Number of exceedances (Days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Perth Region							
Caversham (North East Metro)	99.8	93.7	99.6	99.5	98.2	1	met
Duncraig (North Metro)	95.1	99.6	99.5	99.8	98.5	1	met
South Lake (South East Metro)	98.7	99	98	99.6	98.8	3	met
Southwest Region							
Bunbury	99.9	96.7	100	99.9	99.1	3	met
Midwest Region							
Geraldton	0	0	10.4	99.7	27.7	2	not demonstrated

Performance against the standards and goal: "met", "not met", "not demonstrated"

Table B6. 2005 compliance summary for particles as $PM_{2.5}$

AAQ NEPM Advisory Standard
25 ug/m^3 (24-hour average)

Regional Performance Monitoring Station	Data availability rates (% of days)					Number of exceedances (Days)	Performance against the standards and goal
	Q1	Q2	Q3	Q4	Annual		
Perth Region							
Caversham (North East Metro)	0	0	0	0	0	0	N/A
Duncraig (North Metro)	95.2	99.8	99.5	99.6	98.6	0	N/A
Southwest Region							
Bunbury	99.7	96.6	100	99.7	99	5	N/A

Performance against the standards and goal: "met", "not met", "not demonstrated"

SECTION C – ANALYSIS OF AIR QUALITY MONITORING

Carbon Monoxide

The NEPM standard for carbon monoxide of 9.0 ppm averaged over 8 hours was not exceeded at any site during 2005. The NEPM goal of no more than 1 exceedance at each site was met. Table C1 contains the summary statistics for daily peak 8-hour CO in Western Australia.

Table C1. 2005 summary statistics for daily peak 8-hour carbon monoxide

AAQ NEPM Standard
9.0 ppm (8-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd Highest (ppm)	2nd Highest (date)	2nd Highest (time)
Perth Region							
Caversham (North East Metro)	98.3	1.3	19/01/2005	0300	1.0	12/08/2005	0200
Duncraig (North Metro)	98.5	3.3	18/07/2005	0400	3.3	18/06/2005	0200
Queens Building (CBD)	99.7	4.2	18/06/2005	0200	3.9	17/02/2005	0300
South Lake (South East Metro)	96.9	2.9	18/06/2005	0200	2.7	14/06/2005	0100

Nitrogen Dioxide

The NEPM standard for nitrogen dioxide of 0.12 ppm averaged over 1 hour and the 0.03 ppm annual average were not exceeded at any site during 2005. The NEPM goal of no more than 1 exceedance at each site was met. Table C2 contains the summary statistics for daily peak 1-hour NO_2 in Western Australia.

Table C2. 2005 summary statistics for daily peak 1-hour nitrogen dioxide

AAQ NEPM Standard
0.12 ppm (1-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd Highest (ppm)	2nd Highest (date)	2nd Highest (time)
Perth Region							
Caversham (North East Metro)	98.3	0.048	22/03/2005	2000	0.045	06/04/2005	2000
Duncraig (North Metro)	96.7	0.051	22/03/2005	2100	0.048	23/03/2005	2100
Hope Valley (South Metro)	99.2	0.035	17/03/2005	2300	0.035	05/04/2005	2100
Queens Building (CBD)	89.2	0.113	27/06/2005	1000	0.087	20/10/2005	1400
Quinns Rocks (Outer North Coast)	96.9	0.041	17/05/2005	1900	0.031	04/03/2005	0100
Rockingham (South Coast)	99.1	0.045	29/05/2005	1900	0.040	15/04/2005	2100
Rolling Green (Outer East Rural)	97.9	0.029	15/04/2005	2000	0.027	08/03/2005	0800
South Lake (South East Metro)	87.1	0.052	17/01/2005	2100	0.051	28/09/2005	1300
Swanbourne (Inner West Coast)	96.2	0.039	22/03/2005	2200	0.039	17/03/2005	2300

Photochemical Smog as Ozone

The NEPM standard for ozone of 0.10 ppm averaged over 1 hour was not exceeded at any site during 2005. The NEPM goal of no more than 1 exceedance at each site was met. Table C3 contains the summary statistics for daily peak 1-hour O_3 in Western Australia.

Table C3. 2005 summary statistics for daily peak 1-hour ozone

AAQ NEPM Standard
0.10 ppm (1-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd Highest (ppm)	2nd Highest (date)	2nd Highest (time)
Perth Region							
Caversham (North East Metro)	99.3	0.094	21/01/2005	1300	0.092	20/01/2005	1300
Quinns Rocks (Outer North Coast)	98	0.095	20/01/2005	1200	0.087	21/01/2005	1100
Rockingham (South Coast)	99.1	0.081	23/03/2005	1400	0.079	17/01/2005	1600
Rolling Green (Outer East Rural)	97.9	0.079	18/01/2005	1300	0.076	12/01/2005	1500
South Lake (South East Metro)	97	0.080	22/03/2005	1500	0.077	14/02/2005	1300
Swanbourne (Inner West Coast)	96.4	0.076	19/01/2005	1200	0.074	17/01/2005	2100

The NEPM standard for ozone of 0.08 ppm averaged over 4 hours was not exceeded at any site during 2005. The NEPM goal of no more than 1 exceedance at each site was met. Table C4 contains the summary statistics for daily peak 4-hour O_3 in Western Australia.

Table C4. 2005 summary statistics for daily peak 4-hour ozone

AAQ NEPM Standard
0.08 ppm (4-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd Highest (ppm)	2nd Highest (date)	2nd Highest (time)
Perth Region							
Caversham (North East Metro)	99.3	0.069	18/12/2005	1400	0.064	14/02/2005	1600
Quinns Rocks (Outer North Coast)	98	0.070	20/01/2005	1500	0.068	14/02/2005	1600
Rockingham (South Coast)	99.1	0.075	17/01/2005	1700	0.072	23/03/2005	1600
Rolling Green (Outer East Rural)	97.9	0.068	18/01/2005	1500	0.068	18/12/2005	1800
South Lake (South East Metro)	97	0.070	14/02/2005	1500	0.065	22/03/2005	1600
Swanbourne (Inner West Coast)	96.4	0.066	19/01/2005	1300	0.066	17/01/2005	2300

Sulfur Dioxide

The NEPM standard for sulfur dioxide of 0.20 ppm averaged over 1 hour was not exceeded at any site during 2005. The NEPM goal of no more than 1 exceedance at each site was met. Table C5 contains the summary statistics for daily peak 1-hour SO_2 in Western Australia.

Table C5. 2005 summary statistics for daily peak 1-hour sulfur dioxide

AAQ NEPM Standard
0.20 ppm (1-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd Highest (ppm)	2nd Highest (date)	2nd Highest (time)
Perth Region							
Hope Valley (South Metro)	99.2	0.074	02/09/2005	1400	0.058	17/12/2005	1100
Rockingham (South Coast)	99.2	0.041	19/07/2005	1200	0.038	16/08/2005	0700
South Lake (South East Metro)	96.9	0.046	25/04/2005	1600	0.039	23/01/2005	1700
Wattleup (South Metro)	99.7	0.120	12/01/2005	1400	0.072	14/04/2005	1600

The NEPM standard for sulfur dioxide of 0.08 ppm averaged over 24 hours was not exceeded at any site during 2005. The NEPM goal of no more than 1 exceedance at each site was met. Table C6 contains the summary statistics for daily peak 24-hour SO_2 in Western Australia.

Table C6. 2005 summary statistics for 24-hour sulfur dioxide

AAQ NEPM Standard
0.08 ppm (24-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ppm)	Highest (date)	Highest (time)	2nd Highest (ppm)	2nd Highest (date)	2nd Highest (time)
Perth Region							
Hope Valley (South Metro)	99.2	0.011	02/09/2005	2400	0.008	05/12/2005	2400
Rockingham (South Coast)	99.2	0.009	18/05/2005	2400	0.007	15/08/2005	2400
South Lake (South East Metro)	96.9	0.007	25/04/2005	2400	0.007	18/12/2005	2400
Wattleup (South Metro)	99.7	0.014	12/01/2005	2400	0.010	23/12/2005	2400

Particles as PM_{10}

The NEPM standard for particles as PM_{10} of 50 μg/m^3 averaged over 24 hours was exceeded during 2005 once at Caversham (76.8 μg/m^3 on 19/01/2005), once at Duncraig (59.2 μg/m^3 on 19/01/2005), three times at South Lake (98.8 μg/m^3 on 16/01/2005, 58.4 μg/m^3 on 17/01/2005 and 59.9 μg/m^3 on 20/01/2005), three times at Bunbury (52.4 μg/m^3 on 17/04/2005, 50.5 μg/m^3 on 15/04/2005 and 63.3 μg/m^3 on 16/04/2005) and twice at Geraldton (52.9 μg/m^3 on 26/11/2005 and 61.3 μg/m^3 on 31/12/2005). Attachments 2 to 8 contain descriptions of the circumstances that led to each exceedance. The NEPM goal of no more than 5 exceedance was met at all sites except Geraldton where the goal was not demonstrated due to a lack of data. Table C7 contains the summary statistics for daily peak 24-hour PM_{10} in Western Australia.

Table C7. 2005 summary statistics for 24-hour particles as PM_{10}

AAQ NEPM Standard
50 ug/m^3 (24-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ug/m^3)	Highest (date)	Highest (time)	6th Highest (ug/m^3)	6th Highest (date)	6th Highest (time)
Perth Region							
Caversham [2] (North East Metro)	98.2	76.8	19/01/2005	2400	39.1	21/01/2005	2400
Duncraig [2] (North Metro)	98.5	59.2	19/01/2005	2400	32.6	11/01/2005	2400
Queens Buildings [1] (CBD)	100	60.5	22/01/2005	2400	31/2	02/08/2005	2400
South Lake [2] (South East Metro)	98.8	98.8	16/01/2005	2400	40.6	10/02/2005	2400
Swanbourne [1] (Inner West Coast)	100	41.7	22/01/2005	2400	28.2	14/08/2005	2400
Southwest Region							
Bunbury [2]	99.1	63.3	16/04/2005	2400	34.1	05/12/2005	2400
Midwest Region							
Geraldton	27.7	61.3	31/12/2005	2400	34.9	18/11/2005	2400

1 – High volume samplers operating 1 day in every six.
2 – Tapered Element Oscillating Microbalance (TEOM) operating continuously (unadjusted)

Particles as $PM_{2.5}$

The NEPM advisory standard for particles as $PM_{2.5}$ of 25 micrograms per cubic metre averaged over 24 hours was exceeded once at Duncraig (40.6 ug/m^3 on 19/01/2005) during 2005 three times at Bunbury (34.1 ug/m^3 on 17/01/2005, 40.8 ug/m^3 on 15/04/2005 and 64.2 µg/m^3 on 16/04/2005). Attachments 3, 4 and 6 contain descriptions of the circumstances that led to the exceedances. Table C8 contains the summary statistics for daily peak 24-hour $PM_{2.5}$ in Western Australia.

Table C8. 2005 summary statistics for 24-hour particles as $PM_{2.5}$

AAQ NEPM Advisory Standard
25 ug/m^3 (24-hour average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	Highest (ug/m^3)	Highest (date)	Highest (time)	6th Highest (ug/m^3)	6th Highest (date)	6th Highest (time)
Perth Region							
Caversham[1] (North East Metro)	0	0.0	01/01/2005	2400	0.0	01/01/2005	2400
Duncraig [1] (North Metro)	98.6	40.6	19/01/2005	2400	16.1	20/01/2005	2400
Southwest Region							
Bunbury[1]	99	64.2	16/04/2005	2400	20.7	06/04/2005	2400

1 - Tapered Element Oscillating Microbalance (TEOM) operating continuously (unadjusted)

The NEPM advisory standard for particles as $PM_{2.5}$ of 8 micrograms per cubic metre averaged over one year was exceeded during 2005 at Bunbury (8.6 µg/m^3).

Table C9. 2005 summary statistics for annual particles as $PM_{2.5}$

AAQ NEPM Advisory Standard
8 ug/m^3 (annual average)

Regional Performance Monitoring Station	Data Recovery Rates (%)	annual average (ug/m^3)
Perth Region		
Caversham[1] (North East Metro)	0	0.0
Duncraig [1] (North Metro)	98.6	7.8
Southwest Region		
Bunbury[1]	99	8.6

1 - Tapered Element Oscillating Microbalance (TEOM) operating continuously (unadjusted)

SECTION D – DATA ANALYSIS

Maxima and Percentiles by Pollutant in 2005

Table D1. 2005 percentiles of daily peak 1-hour carbon monoxide concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth Region								
Caversham (North East Metro)	98.3	1.3	0.9	0.8	0.7	0.6	0.4	0.2
Duncraig (North Metro)	98.5	3.3	2.7	2.2	1.7	1.2	0.6	0.3
Queens Building (CBD)	99.7	4.2	2.7	2.0	1.6	1.4	1.1	0.8
South Lake (South East Metro)	96.9	2.9	2.5	2.0	1.6	1.1	0.5	0.3

Table D2. 2005 percentiles of daily peak 1-hour nitrogen dioxide concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth Region								
Caversham (North East Metro)	98.3	0.048	0.040	0.034	0.031	0.027	0.022	0.016
Duncraig (North Metro)	96.7	0.051	0.039	0.036	0.032	0.030	0.026	0.020
Hope Valley (South Metro)	99.2	0.035	0.030	0.027	0.025	0.023	0.018	0.012
Queens Building (CBD)	89.2	0.113	0.072	0.058	0.051	0.045	0.037	0.031
Quinns Rocks (Outer North Coast)	96.9	0.041	0.031	0.030	0.027	0.024	0.017	0.012
Rockingham (South Coast)	99.1	0.045	0.038	0.036	0.032	0.030	0.025	0.017
Rolling Green (Outer East Rural)	97.9	0.029	0.025	0.023	0.020	0.017	0.012	0.008
South Lake (South East Metro)	87.1	0.052	0.043	0.039	0.033	0.028	0.023	0.019
Swanbourne (Inner West Coast)	96.2	0.039	0.037	0.033	0.029	0.026	0.022	0.016

Table D3. 2005 percentiles of daily peak 1-hour ozone concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth Region								
Caversham (North East Metro)	99.3	0.094	0.078	0.063	0.054	0.043	0.034	0.029
Quinns Rocks (Outer North Coast)	98	0.095	0.068	0.063	0.055	0.045	0.037	0.033
Rockingham (South Coast)	99.1	0.081	0.064	0.056	0.044	0.040	0.035	0.031
Rolling Green (Outer East Rural)	97.9	0.079	0.071	0.064	0.058	0.050	0.038	0.032
South Lake (South East Metro)	97	0.080	0.062	0.056	0.049	0.041	0.033	0.029
Swanbourne (Inner West Coast)	96.4	0.076	0.066	0.061	0.051	0.043	0.037	0.033

Table D4. 2005 percentiles Percentiles of daily peak 4-hour ozone concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth Region								
Caversham (North East Metro)	99.3	0.069	0.055	0.052	0.046	0.039	0.032	0.028
Quinns Rocks (Outer North Coast)	98	0.070	0.058	0.057	0.047	0.041	0.036	0.031
Rockingham (South Coast)	99.1	0.075	0.061	0.052	0.042	0.038	0.034	0.029
Rolling Green (Outer East Rural)	97.9	0.068	0.060	0.058	0.049	0.044	0.034	0.030
South Lake (South East Metro)	97	0.070	0.053	0.052	0.042	0.037	0.031	0.027
Swanbourne (Inner West Coast)	96.4	0.066	0.058	0.052	0.044	0.039	0.035	0.032

Table D5. 2005 percentiles of daily peak 1-hour sulfur dioxide concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth Region								
Hope Valley (South Metro)	0.074	0.047	0.036	0.027	0.019	0.010	0.004	0.074
Rockingham (South Coast)	0.041	0.024	0.022	0.017	0.010	0.004	0.001	0.041
South Lake (South East Metro)	0.046	0.033	0.030	0.022	0.017	0.006	0.002	0.046
Wattleup (South Metro)	0.120	0.058	0.045	0.037	0.026	0.014	0.005	0.120

Table D6. 2005 percentiles of daily peak 24-hour sulfur dioxide concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)	75th percentile (ppm)	50th percentile (ppm)
Perth Region								
Hope Valley (South Metro)	99.2	0.011	0.007	0.005	0.004	0.003	0.002	0.001
Rockingham (South Coast)	99.2	0.009	0.006	0.004	0.003	0.002	0.001	0.001
South Lake (South East Metro)	96.9	0.007	0.006	0.004	0.004	0.002	0.001	0.001
Wattleup (South Metro)	99.7	0.014	0.008	0.006	0.005	0.004	0.002	0.001

Table D7. 2005 percentiles of daily peak 24-hour particles as PM_{10} concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)	75th percentile ($\mu g/m^3$)	50th percentile ($\mu g/m^3$)
Perth Region								
Caversham (North East Metro)	98.2	76.8	41.4	37.1	32.2	28.1	21.2	15.0
Duncraig (North Metro)	98.5	59.2	34.8	30.7	26.7	23.9	19.0	14.5
South Lake (South East Metro)	98.8	98.8	46.1	39.6	33.6	28.7	21.7	15.8
Southwest Region								
Bunbury	99.1	63.3	37.9	33.3	27.5	24.9	20.1	15.7
Midwest Region								
Geraldton	27.7	61.3	52.9	47.0	34.8	31.6	25.3	18.6

Table D8. 2005 percentiles of daily peak 24-hour particles as $PM_{2.5}$ concentrations

Regional Performance Monitoring Station	Data availability rates (%)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)	75th percentile ($\mu g/m^3$)	50th percentile ($\mu g/m^3$)
Perth Region								
Caversham (North East Metro)	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Duncraig (North Metro)	98.6	40.6	17.3	15.0	13.1	11.4	8.8	7.2
Southwest Region								
Bunbury	99	64.2	26.9	19.1	15.4	12.1	9.3	7.3

Maxima and Percentiles by Site 1996 to 2005

Table D9. Daily peak 8-hour carbon monoxide at Caversham (1996-2005)
Trend station/region: Caversham AAQ NEPM Standard
9.0 ppm (8-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.5	0	2.7	2.0	1.7	1.2	0.8
1997	97.6	0	2.3	1.6	1.3	1.0	0.9
1998	98.0	0	1.7	1.3	1.2	1.0	0.8
1999	99.6	0	1.6	1.2	1.1	0.8	0.6
2000	99.3	0	1.4	1.0	1.0	0.8	0.6
2001	99.6	0	1.5	1.3	1.2	1.0	0.9
2002	98.1	0	1.3	1.0	0.9	0.8	0.7
2003	95.7	0	1.1	0.9	0.8	0.7	0.6
2004	96.2	0	1.3	0.9	0.9	0.7	0.5
2005	98.3	0	1.3	0.9	0.8	0.7	0.6

Table D10. Daily peak 8-hour carbon monoxide at Duncraig (1996-2005)
Trend station/region: Duncraig AAQ NEPM Standard
9.0 ppm (8-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	96.4	0	7.2	6.1	4.7	3.3	2.1
1997	98.0	0	6.8	5.2	4.8	3.9	2.4
1998	98.4	0	6.1	4.9	4.3	3.0	2.0
1999	96.9	0	6.6	4.5	4.2	2.8	2.0
2000	98.7	0	4.8	3.5	3.0	2.3	1.6
2001	99.5	0	5.9	4.7	4.2	3.1	2.6
2002	96.6	0	5.4	3.7	3.6	2.6	1.8
2003	97.8	0	4.1	3.1	2.8	2.0	1.5
2004	99.1	0	4.5	3.2	2.7	2.1	1.2
2005	98.5	0	3.3	2.7	2.2	1.7	1.2

Table D11. Daily peak 8-hour carbon monoxide at Queens Building (1996-2005)
Trend station/region: Queens Building AAQ NEPM Standard 9.0 ppm (8-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.0	0	7.2	6.4	5.6	4.9	4.3
1997	99.2	0	5.6	5.0	4.8	4.2	3.8
1998	98.5	0	6.1	5.3	4.7	3.9	3.6
1999	99.4	0	5.0	4.3	4.0	3.6	3.1
2000	98.7	0	4.3	3.5	3.3	3.0	2.7
2001	99.6	0	4.8	3.9	3.1	2.5	2.4
2002	96.8	0	4.7	2.7	2.5	2.2	2.0
2003	95.9	0	2.8	2.2	2.2	2.0	1.8
2004	99.5	0	2.8	2.1	2.0	1.7	1.6
2005	99.7	0	4.2	2.7	2.0	1.6	1.4

Table D12. Daily peak 8-hour carbon monoxide at South Lake (1996-2005)
Trend station/region: South Lake AAQ NEPM Standard 9.0 ppm (8-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	82.3	0	3.6	2.2	2.1	1.8	1.6
2001	99.6	0	4.0	3.5	3.1	2.3	1.7
2002	97.6	0	3.2	2.8	2.4	1.9	1.3
2003	98.9	0	3.1	2.5	2.3	1.7	1.3
2004	99.5	0	3.5	2.3	2.1	1.5	1.0
2005	96.9	0	2.9	2.5	2.0	1.6	1.1

Table D13. Daily peak 1-hour nitrogen dioxide at Caversham (1996-2005)
Trend station/region: Caversham AAQ NEPM Standard 0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.1	0	0.045	0.036	0.034	0.030	0.026
1997	99.3	0	0.051	0.041	0.034	0.028	0.026
1998	99.0	0	0.051	0.038	0.034	0.031	0.028
1999	99.6	0	0.038	0.031	0.030	0.028	0.025
2000	99.3	0	0.044	0.035	0.033	0.030	0.028
2001	99.4	0	0.045	0.037	0.033	0.029	0.027
2002	99.5	0	0.055	0.035	0.033	0.031	0.028
2003	95.7	0	0.043	0.037	0.034	0.031	0.028
2004	98.9	0	0.046	0.036	0.033	0.029	0.028
2005	98.3	0	0.048	0.040	0.034	0.031	0.027

Table D14. Daily peak 1-hour nitrogen dioxide at Duncraig (1996-2005)

Trend station/region: Duncraig — AAQ NEPM Standard 0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	97.6	0	0.043	0.035	0.035	0.028	0.025
1997	98.3	0	0.046	0.039	0.035	0.029	0.027
1998	98.5	0	0.065	0.040	0.037	0.031	0.028
1999	93.5	0	0.049	0.035	0.032	0.030	0.027
2000	98.7	0	0.050	0.035	0.033	0.031	0.029
2001	99.5	0	0.041	0.038	0.035	0.032	0.030
2002	97.1	0	0.049	0.040	0.037	0.034	0.031
2003	97.4	0	0.057	0.042	0.037	0.033	0.031
2004	94.5	0	0.043	0.037	0.035	0.031	0.029
2005	96.7	0	0.051	0.039	0.036	0.032	0.030

Table D15. Daily peak 1-hour nitrogen dioxide at Hope Valley (1996-2005)

Trend station/region: Hope valley — AAQ NEPM Standard 0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.6	0	0.045	0.034	0.028	0.023	0.019
1997	99.0	0	0.033	0.028	0.027	0.024	0.021
1998	97.0	0	0.044	0.029	0.027	0.024	0.020
1999	98.8	0	0.032	0.028	0.026	0.024	0.022
2000	99.6	0	0.033	0.030	0.028	0.025	0.023
2001	99.6	0	0.033	0.031	0.030	0.027	0.025
2002	99.6	0	0.039	0.033	0.030	0.028	0.024
2003	94.6	0	0.039	0.034	0.028	0.024	0.021
2004	99.6	0	0.034	0.032	0.028	0.024	0.021
2005	99.2	0	0.035	0.030	0.027	0.025	0.023

Table D16. Daily peak 1-hour nitrogen dioxide at Queens Building (1996-2005)

Trend station/region: Queens Building — AAQ NEPM Standard 0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	46.6	0	0.093	0.079	0.077	0.060	0.050
1997	99.4	0	0.098	0.077	0.074	0.063	0.056
1998	99.5	0	0.093	0.085	0.077	0.068	0.058
1999	99.4	0	0.073	0.063	0.061	0.054	0.047
2000	98.6	0	0.073	0.068	0.065	0.056	0.049
2001	99.5	0	0.082	0.065	0.064	0.058	0.055
2002	99.0	0	0.091	0.077	0.072	0.060	0.055
2003	95.9	1	0.121	0.075	0.067	0.058	0.055
2004	99.5	0	0.075	0.070	0.064	0.058	0.050
2005	89.2	0	0.113	0.072	0.058	0.051	0.045

Table D17. Daily peak 1-hour nitrogen dioxide at Quinns Rocks (1996-2005)
Trend station/region: Quinns Rocks AAQ NEPM Standard
0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	94.8	0	0.036	0.029	0.028	0.023	0.020
1997	99.5	0	0.039	0.028	0.026	0.024	0.022
1998	96.7	0	0.041	0.033	0.029	0.026	0.024
1999	98.5	0	0.034	0.030	0.029	0.025	0.023
2000	98.7	0	0.045	0.032	0.031	0.028	0.025
2001	96.4	0	0.036	0.033	0.031	0.027	0.026
2002	99.5	0	0.037	0.031	0.030	0.028	0.026
2003	97.4	0	0.035	0.032	0.030	0.027	0.025
2004	90.8	0	0.041	0.032	0.030	0.028	0.025
2005	96.9	0	0.041	0.031	0.030	0.027	0.024

Table D18. Daily peak 1-hour nitrogen dioxide at Rockingham (1996-2005)
Trend station/region: Rockingham AAQ NEPM Standard
0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	97.3	0	0.041	0.031	0.030	0.027	0.024
1997	85.1	0	0.033	0.030	0.029	0.026	0.024
1998	99.2	0	0.043	0.031	0.028	0.026	0.024
1999	93.5	0	0.030	0.029	0.028	0.025	0.024
2000	99.4	0	0.048	0.041	0.039	0.036	0.032
2001	98.9	0	0.046	0.040	0.038	0.035	0.033
2002	99.6	0	0.042	0.039	0.038	0.035	0.032
2003	98.4	0	0.051	0.040	0.036	0.034	0.032
2004	99.4	0	0.055	0.043	0.039	0.035	0.031
2005	99.1	0	0.045	0.038	0.036	0.032	0.030

Table D19. Daily peak 1-hour nitrogen dioxide at Rolling Green (1996-2005)
Trend station/region: Rolling Green AAQ NEPM Standard
0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	65.1	0	0.022	0.018	0.017	0.015	0.013
1997	64.1	0	0.035	0.019	0.018	0.017	0.014
1998	95.7	0	0.029	0.021	0.019	0.017	0.014
1999	98.7	0	0.024	0.017	0.016	0.015	0.012
2000	97.1	0	0.027	0.021	0.019	0.015	0.014
2001	99.1	0	0.026	0.021	0.020	0.017	0.015
2002	97.6	0	0.025	0.022	0.020	0.017	0.015
2003	94.0	0	0.032	0.020	0.017	0.016	0.015
2004	95.6	0	0.025	0.023	0.021	0.018	0.016
2005	97.9	0	0.029	0.025	0.023	0.020	0.017

Table D20. Daily peak 1-hour nitrogen dioxide at South Lake (1996-2005)
Trend station/region: South Lake AAQ NEPM Standard
0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	81.3	0	0.041	0.035	0.032	0.031	0.029
2001	99.2	0	0.039	0.032	0.030	0.029	0.027
2002	95.5	0	0.048	0.035	0.032	0.030	0.028
2003	98.9	0	0.048	0.039	0.038	0.030	0.028
2004	98.4	0	0.043	0.038	0.036	0.032	0.029
2005	87.1	0	0.052	0.043	0.039	0.033	0.028

Table D21. Daily peak 1-hour nitrogen dioxide at Swanbourne (1996-2005)
Trend station/region: Swanbourne AAQ NEPM Standard
0.12 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.6	0	0.046	0.037	0.033	0.028	0.025
1997	98.4	0	0.040	0.034	0.031	0.029	0.027
1998	93.5	0	0.051	0.036	0.033	0.030	0.028
1999	95.3	0	0.037	0.034	0.033	0.031	0.028
2000	98.0	0	0.045	0.038	0.036	0.034	0.030
2001	87.4	0	0.037	0.034	0.032	0.031	0.030
2002	92.1	0	0.051	0.040	0.036	0.031	0.029
2003	99.2	0	0.048	0.036	0.034	0.031	0.029
2004	70.2	0	0.042	0.039	0.035	0.032	0.028
2005	96.2	0	0.039	0.037	0.033	0.029	0.026

Table D22. Daily peak 1-hour ozone at Caversham (1996-2005)
Trend station/region: Caversham AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.4	2	0.114	0.085	0.075	0.061	0.049
1997	99.1	0	0.100	0.095	0.083	0.058	0.047
1998	99.2	1	0.112	0.085	0.076	0.058	0.049
1999	99.5	1	0.101	0.083	0.075	0.061	0.048
2000	99.3	0	0.084	0.069	0.064	0.054	0.046
2001	99.6	0	0.099	0.072	0.067	0.051	0.044
2002	99.6	0	0.091	0.074	0.065	0.057	0.048
2003	93.8	0	0.083	0.070	0.062	0.052	0.044
2004	98.9	0	0.079	0.070	0.062	0.052	0.045
2005	99.3	0	0.094	0.078	0.063	0.054	0.043

Table D23. Daily peak 1-hour ozone at Quinns Rocks (1996-2005)
Trend station/region: Quinns Rocks AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.0	0	0.084	0.072	0.070	0.055	0.046
1997	99.4	1	0.106	0.076	0.067	0.060	0.052
1998	98.5	0	0.080	0.072	0.070	0.058	0.049
1999	98.6	1	0.105	0.070	0.068	0.058	0.046
2000	98.7	0	0.078	0.069	0.067	0.055	0.045
2001	99.5	0	0.073	0.065	0.058	0.049	0.042
2002	99.5	0	0.079	0.069	0.060	0.055	0.046
2003	86.1	0	0.086	0.060	0.057	0.049	0.045
2004	97.9	0	0.079	0.064	0.060	0.056	0.046
2005	98.0	0	0.095	0.068	0.063	0.055	0.045

Table D24. Daily peak 1-hour ozone at Rockingham (1996-2005)
Trend station/region: Rockingham AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	97.2	0	0.091	0.067	0.060	0.048	0.041
1997	83.8	0	0.078	0.063	0.056	0.045	0.039
1998	99.0	0	0.082	0.065	0.060	0.051	0.043
1999	99.0	0	0.076	0.067	0.060	0.050	0.040
2000	99.4	0	0.083	0.077	0.063	0.050	0.040
2001	99.1	0	0.076	0.057	0.050	0.042	0.037
2002	99.6	0	0.079	0.067	0.057	0.050	0.043
2003	98.4	0	0.064	0.053	0.050	0.045	0.039
2004	99.1	1	0.102	0.067	0.059	0.048	0.040
2005	99.1	0	0.081	0.064	0.056	0.044	0.040

Table D25. Daily peak 1-hour ozone at Rolling Green (1996-2005)
Trend station/region: Rolling Green AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.2	2	0.104	0.096	0.084	0.065	0.051
1997	63.9	1	0.134	0.091	0.077	0.069	0.059
1998	99.5	1	0.109	0.085	0.077	0.063	0.056
1999	98.8	0	0.096	0.080	0.073	0.064	0.052
2000	97.1	0	0.092	0.072	0.065	0.058	0.049
2001	99.0	0	0.097	0.080	0.068	0.051	0.044
2002	99.6	0	0.091	0.080	0.068	0.059	0.049
2003	94.3	0	0.087	0.076	0.071	0.059	0.049
2004	97.9	1	0.101	0.076	0.071	0.060	0.049
2005	97.9	0	0.079	0.071	0.064	0.058	0.050

Table D26. Daily peak 1-hour ozone at South Lake (1996-2005)

Trend station/region: South Lake

AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	83.3	0	0.077	0.061	0.053	0.043	0.038
2001	99.6	0	0.079	0.062	0.054	0.044	0.038
2002	99.5	0	0.067	0.062	0.054	0.049	0.043
2003	99.1	0	0.071	0.061	0.055	0.048	0.041
2004	99.0	0	0.076	0.061	0.057	0.047	0.041
2005	97.0	0	0.080	0.062	0.056	0.049	0.041

Table D27. Daily peak 1-hour ozone at Swanbourne (1996-2005)

Trend station/region: Swanbourne

AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.2	0	0.089	0.072	0.066	0.056	0.044
1997	98.1	1	0.109	0.069	0.064	0.056	0.046
1998	98.4	0	0.081	0.070	0.064	0.052	0.046
1999	96.6	0	0.088	0.069	0.064	0.054	0.042
2000	98.0	0	0.079	0.069	0.064	0.053	0.043
2001	98.7	0	0.074	0.064	0.059	0.048	0.040
2002	95.9	0	0.081	0.063	0.057	0.051	0.046
2003	99.7	0	0.082	0.060	0.052	0.045	0.041
2004	99.4	0	0.077	0.065	0.059	0.049	0.042
2005	96.4	0	0.076	0.066	0.061	0.051	0.043

Table D28. Daily peak 4-hour ozone at Caversham (1996-2005)

Trend station/region: Caversham

AAQ NEPM Standard
0.08 ppm (4-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.4	1	0.090	0.072	0.062	0.052	0.045
1997	99.1	3	0.084	0.071	0.063	0.050	0.042
1998	99.2	2	0.087	0.068	0.061	0.050	0.043
1999	99.5	0	0.080	0.071	0.064	0.052	0.043
2000	99.3	0	0.058	0.056	0.054	0.047	0.041
2001	99.6	0	0.079	0.062	0.055	0.045	0.039
2002	99.6	0	0.068	0.065	0.058	0.049	0.042
2003	93.8	0	0.069	0.058	0.054	0.046	0.039
2004	98.9	0	0.067	0.057	0.052	0.047	0.040
2005	99.3	0	0.069	0.055	0.052	0.046	0.039

Table D29. Daily peak 4-hour ozone at Quinns Rocks (1996-2005)
Trend station/region: Quinns Rocks AAQ NEPM Standard 0.08 ppm (4-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.0	0	0.075	0.062	0.054	0.049	0.041
1997	99.4	1	0.100	0.065	0.060	0.053	0.044
1998	98.5	0	0.077	0.061	0.060	0.050	0.042
1999	98.6	1	0.083	0.061	0.057	0.051	0.042
2000	98.7	0	0.072	0.064	0.059	0.048	0.041
2001	99.5	0	0.066	0.057	0.051	0.044	0.039
2002	99.5	0	0.069	0.057	0.053	0.048	0.041
2003	86.1	0	0.071	0.055	0.051	0.043	0.040
2004	97.9	0	0.068	0.059	0.055	0.048	0.041
2005	98.0	0	0.070	0.058	0.057	0.047	0.041

Table D30. Daily peak 4-hour ozone at Rockingham (1996-2005)
Trend station/region: Rockingham AAQ NEPM Standard 0.08 ppm (4-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	97.2	1	0.085	0.061	0.056	0.042	0.039
1997	83.8	0	0.069	0.055	0.050	0.042	0.035
1998	99.0	0	0.074	0.062	0.051	0.046	0.039
1999	99.0	0	0.067	0.060	0.055	0.045	0.038
2000	99.4	0	0.078	0.069	0.059	0.046	0.037
2001	99.1	0	0.071	0.053	0.045	0.039	0.036
2002	99.6	0	0.071	0.058	0.050	0.047	0.039
2003	98.4	0	0.059	0.049	0.048	0.041	0.037
2004	99.1	0	0.079	0.060	0.052	0.045	0.038
2005	99.1	0	0.075	0.061	0.052	0.042	0.038

Table D31. Daily peak 4-hour ozone at Rolling Green (1996-2005)
Trend station/region: Rolling Green AAQ NEPM Standard 0.08 ppm (4-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.2	5	0.085	0.082	0.070	0.053	0.043
1997	63.9	2	0.124	0.077	0.070	0.058	0.051
1998	99.5	2	0.095	0.069	0.066	0.052	0.048
1999	98.8	0	0.077	0.070	0.059	0.055	0.046
2000	97.1	0	0.075	0.059	0.055	0.047	0.041
2001	99.0	2	0.094	0.067	0.058	0.046	0.038
2002	99.6	0	0.071	0.065	0.061	0.052	0.043
2003	94.3	0	0.075	0.063	0.060	0.053	0.043
2004	97.9	0	0.077	0.064	0.061	0.051	0.042
2005	97.9	0	0.068	0.060	0.058	0.049	0.044

Table D32. Daily peak 4-hour ozone at South Lake (1996-2005)
Trend station/region: South Lake

AAQ NEPM Standard
0.08 ppm (4-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	83.3	0	0.067	0.051	0.045	0.037	0.035
2001	99.6	0	0.076	0.053	0.048	0.039	0.035
2002	99.5	0	0.058	0.053	0.050	0.044	0.039
2003	99.1	0	0.063	0.052	0.048	0.043	0.037
2004	99.0	0	0.064	0.053	0.049	0.042	0.035
2005	97.0	0	0.070	0.053	0.052	0.042	0.037

Table D33. Daily peak 1-hour ozone at Swanbourne (1996-2005)
Trend station/region: Swanbourne

AAQ NEPM Standard
0.10 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	98.2	1	0.081	0.066	0.056	0.048	0.039
1997	98.1	1	0.104	0.060	0.055	0.049	0.041
1998	98.4	0	0.078	0.060	0.054	0.047	0.040
1999	96.6	0	0.074	0.060	0.056	0.048	0.039
2000	98.0	0	0.073	0.065	0.057	0.047	0.039
2001	98.7	0	0.069	0.055	0.049	0.041	0.037
2002	95.9	0	0.066	0.056	0.054	0.047	0.041
2003	99.7	0	0.066	0.054	0.047	0.041	0.037
2004	99.4	0	0.067	0.057	0.054	0.044	0.038
2005	96.4	0	0.066	0.058	0.052	0.044	0.039

Table D34. Daily peak 1-hour sulfur dioxide at Hope Valley (1996-2005)
Trend station/region: Hope Valley

AAQ NEPM Standard
0.20 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.5	0	0.076	0.053	0.043	0.033	0.024
1997	97.4	0	0.047	0.040	0.031	0.023	0.016
1998	97.5	0	0.061	0.035	0.031	0.024	0.017
1999	98.7	0	0.064	0.036	0.029	0.019	0.014
2000	99.4	0	0.079	0.051	0.036	0.020	0.014
2001	99.6	0	0.044	0.029	0.025	0.019	0.013
2002	99.6	0	0.058	0.048	0.032	0.024	0.017
2003	94.1	0	0.060	0.041	0.031	0.024	0.017
2004	99.6	0	0.061	0.045	0.040	0.031	0.022
2005	99.2	0	0.074	0.047	0.036	0.027	0.019

Table D35. Daily peak 1-hour sulfur dioxide at Rockingham (1996-2005)
Trend station/region: Rockingham AAQ NEPM Standard 0.20 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	97.0	0	0.057	0.050	0.038	0.025	0.016
1997	88.1	0	0.039	0.028	0.018	0.013	0.008
1998	96.9	0	0.047	0.029	0.022	0.017	0.010
1999	99.0	0	0.047	0.027	0.024	0.016	0.011
2000	98.8	0	0.034	0.021	0.017	0.010	0.006
2001	99.2	0	0.028	0.023	0.019	0.010	0.006
2002	99.6	0	0.035	0.021	0.017	0.009	0.006
2003	98.3	0	0.026	0.020	0.016	0.010	0.006
2004	99.4	0	0.039	0.021	0.018	0.011	0.006
2005	99.2	0	0.041	0.024	0.022	0.017	0.010

Table D36. Daily peak 1-hour sulfur dioxide at South Lake (1996-2005)
Trend station/region: South Lake AAQ NEPM Standard 0.20 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	82.5	0	0.042	0.027	0.024	0.019	0.013
2001	99.6	0	0.046	0.027	0.023	0.018	0.013
2002	97.4	0	0.043	0.036	0.026	0.020	0.015
2003	98.9	0	0.038	0.028	0.026	0.020	0.015
2004	99.5	0	0.042	0.028	0.024	0.019	0.013
2005	96.9	0	0.046	0.033	0.030	0.022	0.017

Table D37. Daily peak 1-hour sulfur dioxide at Wattleup (1996-2005)
Trend station/region: Wattleup AAQ NEPM Standard 0.20 ppm (1-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	96.7	0	0.082	0.049	0.044	0.033	0.026
1997	91.9	0	0.065	0.047	0.039	0.026	0.018
1998	94.4	0	0.061	0.043	0.040	0.027	0.020
1999	99.3	0	0.060	0.033	0.030	0.022	0.017
2000	99.7	0	0.046	0.034	0.027	0.022	0.016
2001	99.7	0	0.074	0.032	0.027	0.021	0.017
2002	99.0	0	0.081	0.039	0.030	0.023	0.019
2003	97.5	0	0.062	0.032	0.028	0.023	0.018
2004	97.7	0	0.076	0.044	0.041	0.030	0.021
2005	99.7	0	0.120	0.058	0.045	0.037	0.026

Table D38. Daily peak 24-hour sulfur dioxide at Hope Valley (1996-2005)

Trend station/region: Hope Valley — AAQ NEPM Standard 0.08 ppm (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	99.5	0	0.008	0.006	0.005	0.004	0.003
1997	97.4	0	0.005	0.005	0.004	0.003	0.002
1998	97.5	0	0.008	0.006	0.004	0.003	0.002
1999	98.7	0	0.007	0.004	0.003	0.003	0.002
2000	99.4	0	0.007	0.005	0.003	0.003	0.002
2001	99.6	0	0.004	0.004	0.003	0.002	0.002
2002	99.6	0	0.007	0.006	0.004	0.003	0.002
2003	94.1	0	0.006	0.005	0.004	0.003	0.002
2004	99.6	0	0.009	0.006	0.006	0.004	0.003
2005	99.2	0	0.011	0.007	0.005	0.004	0.003

Table D39. Daily peak 24-hour sulfur dioxide at Rockingham (1996-2005)

Trend station/region: Rockingham — AAQ NEPM Standard 0.08 ppm (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	97.0	0	0.022	0.010	0.008	0.005	0.003
1997	88.1	0	0.014	0.005	0.004	0.003	0.003
1998	96.9	0	0.009	0.006	0.005	0.003	0.002
1999	99.0	0	0.016	0.008	0.006	0.004	0.002
2000	98.8	0	0.012	0.003	0.003	0.002	0.001
2001	99.2	0	0.009	0.004	0.003	0.002	0.001
2002	99.6	0	0.006	0.002	0.002	0.002	0.001
2003	98.3	0	0.005	0.003	0.003	0.002	0.001
2004	99.4	0	0.006	0.003	0.003	0.002	0.001
2005	99.2	0	0.009	0.006	0.004	0.003	0.002

Table D40. Daily peak 24-hour sulfur dioxide at South Lake (1996-2005)

Trend station/region: South Lake — AAQ NEPM Standard 0.08 ppm (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	82.5	0	0.004	0.003	0.003	0.003	0.002
2001	99.6	0	0.006	0.004	0.003	0.002	0.002
2002	97.4	0	0.006	0.005	0.004	0.003	0.002
2003	98.9	0	0.006	0.005	0.004	0.003	0.002
2004	99.5	0	0.005	0.004	0.004	0.003	0.002
2005	96.9	0	0.007	0.006	0.004	0.004	0.002

Table D41. Daily peak 24-hour sulfur dioxide at Wattleup (1996-2005)
Trend station/region: Wattleup AAQ NEPM Standard 0.08 ppm (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. (ppm)	99th percentile (ppm)	98th percentile (ppm)	95th percentile (ppm)	90th percentile (ppm)
1996	96.7	0	0.011	0.009	0.009	0.007	0.006
1997	91.9	0	0.010	0.006	0.005	0.004	0.003
1998	94.4	0	0.008	0.006	0.005	0.004	0.003
1999	99.3	0	0.007	0.005	0.005	0.004	0.003
2000	99.7	0	0.006	0.004	0.004	0.003	0.002
2001	99.7	0	0.009	0.005	0.004	0.003	0.003
2002	99.0	0	0.008	0.005	0.005	0.004	0.003
2003	97.5	0	0.006	0.005	0.005	0.004	0.003
2004	97.7	0	0.009	0.007	0.005	0.004	0.003
2005	99.7	0	0.014	0.008	0.006	0.005	0.004

Table D42. Daily peak 24-hour particles as PM_{10} at Caversham (1996-2005)
Trend station/region: Caversham AAQ NEPM Standard 50 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	0.0	0	-	-	-	-	-
2001	0.0	0	-	-	-	-	-
2002	0.0	0	-	-	-	-	-
2003	0.0	0	-	-	-	-	-
2004	93.2	1	58.0	39.0	34.4	29.7	25.4
2005	98.2	1	76.8	41.4	37.1	32.2	28.1

Table D43. Daily peak 24-hour particles as PM_{10} at Duncraig (1996-2005)
Trend station/region: Duncraig AAQ NEPM Standard 50 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	44.9	0	37.7	36.4	33.4	27.5	25.2
1997	60.8	4	56.2	50.2	46.5	37.3	30.7
1998	98.4	1	68.9	39.2	35.8	29.7	26.5
1999	97.2	0	35.2	32.0	29.3	25.3	22.4
2000	76.5	0	29.8	28.0	25.2	24.0	22.2
2001	99.5	1	53.6	34.3	31.9	27.5	23.4
2002	97.6	1	54.0	37.5	30.8	26.4	24.2
2003	99.1	1	66.7	33.7	31.0	28.3	25.5
2004	99.0	0	45.1	30.9	30.2	27.6	24.1
2005	98.5	1	59.2	34.8	30.7	26.7	23.9

Table D44. Daily peak 24-hour particles as PM_{10} at South Lake (1996-2005)
Trend station/region: South Lake AAQ NEPM Standard 50 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	82.7	0	39.6	33.2	30.6	29.3	26.0
2001	99.1	1	56.7	37.3	33.2	27.7	25.3
2002	99.3	2	82.6	45.8	38.8	32.8	27.9
2003	95.8	0	44.5	40.1	36.3	32.4	28.2
2004	98.8	1	50.5	35.8	32.8	30.2	26.2
2005	98.8	3	98.8	46.1	39.6	33.6	28.7

Table D45. Daily peak 24-hour particles as PM_{10} at Bunbury (1996-2005)
Trend station/region: Bunbury AAQ NEPM Standard 50 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	52.3	0	40.0	33.8	30.8	27.7	24.6
2000	99.5	0	42.4	33.8	31.0	28.4	24.8
2001	99.6	1	57.6	41.0	37.5	29.3	26.8
2002	99.5	0	42.5	38.9	32.9	29.5	27.1
2003	99.2	1	54.5	34.2	33.3	30.2	26.3
2004	92.4	4	99.5	51.8	38.2	29.9	26.3
2005	99.1	3	63.3	37.9	33.3	27.5	24.9

Table D46. Daily peak 24-hour particles as PM_{10} at Geraldton (1996-2005)
Trend station/region: Bunbury AAQ NEPM Standard 50 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	0.0	0	-	-	-	-	-
1997	0.0	0	-	-	-	-	-
1998	0.0	0	-	-	-	-	-
1999	0.0	0	-	-	-	-	-
2000	0.0	0	-	-	-	-	-
2001	0.0	0	-	-	-	-	-
2002	0.0	0	-	-	-	-	-
2003	0.0	0	-	-	-	-	-
2004	0.0	0	-	-	-	-	-
2005	27.7	2	61.3	52.9	47.0	34.8	31.6

Table D47. Daily peak 24-hour particles as $PM_{2.5}$ at Caversham (1996-2005)

Trend station/region: Caversham — AAQ NEPM Advisory Standard 25 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	98.1	1	37.6	19.7	17.2	13.9	12.0
1997	92.1	1	28.1	22.1	18.0	14.2	12.5
1998	97.6	0	21.2	16.5	14.9	12.8	10.9
1999	98.2	0	20.3	14.3	13.6	12.4	10.9
2000	93.7	0	20.1	16.5	14.8	11.9	10.5
2001	97.2	1	31.8	15.9	15.1	12.9	11.3
2002	99.6	1	25.7	16.2	15.0	13.4	12.0
2003	98.6	1	27.3	16.3	14.4	13.4	11.6
2004	5.3	0	16.5	15.7	14.9	12.6	10.4
2005	0.0	0	-	-	-	-	-

Table D48. Daily peak 24-hour particles as $PM_{2.5}$ at Duncraig (1996-2005)

Trend station/region: Duncraig — AAQ NEPM Advisory Standard 25 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	98.3	4	30.1	24.8	22.2	17.6	14.2
1997	86.1	15	44.2	39.2	35.6	24.0	18.2
1998	98.2	3	31.8	23.9	21.2	17.1	15.2
1999	96.9	2	26.3	21.3	17.3	14.5	12.4
2000	79.2	0	22.2	17.1	15.0	13.4	11.5
2001	93.8	4	27.0	25.5	22.6	16.1	13.4
2002	98.9	1	28.3	20.3	17.4	15.7	13.3
2003	98.4	1	25.2	19.2	16.1	14.9	13.1
2004	99.2	0	24.4	17.9	15.6	14.1	11.6
2005	98.6	3	40.6	17.3	15.0	13.1	11.4

Table D49. Daily peak 24-hour particles as $PM_{2.5}$ at Bunbury (1996-2005)

Trend station/region: Bunbury — AAQ NEPM Advisory Standard 25 ug/m3 (24-hour average)

Year	Data Recovery (%)	No. of exceedances (days)	Max conc. ($\mu g/m^3$)	99th percentile ($\mu g/m^3$)	98th percentile ($\mu g/m^3$)	95th percentile ($\mu g/m^3$)	90th percentile ($\mu g/m^3$)
1996	0.0	0	-	-	-	-	-
1997	78.9	5	35.4	26.4	24.3	20.7	17.1
1998	99.5	3	33.2	22.8	20.0	16.1	13.6
1999	88.9	1	30.0	21.7	18.4	15.0	12.9
2000	99.6	3	29.2	23.3	20.4	16.0	13.7
2001	92.7	2	47.3	19.6	17.4	15.4	13.1
2002	99.5	4	36.1	24.5	20.2	15.7	14.0
2003	98.9	3	37.6	20.7	18.3	15.7	13.1
2004	98.0	5	94.8	31.7	21.5	15.8	13.2
2005	99.0	5	64.2	26.9	19.1	15.4	12.1

Maxima by Pollutant 1996 to 2005

Table D50. Annual daily peak 8-hour carbon monoxide concentrations (ppm) for 1996-2005

AAQ NEPM Standard
9.0 ppm (8-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	2.7	2.3	1.7	1.6	1.4	1.5	1.3	1.1	1.3	1.3
Duncraig (North Metro)	7.2	6.8	6.1	6.6	4.8	5.9	5.4	4.1	4.5	3.3
Queens Building (CBD)	7.2	5.6	6.1	5.0	4.3	4.8	4.7	2.8	2.8	4.2
South Lake (South East Metro)	-	-	-	-	3.6	4.0	3.2	3.1	3.5	2.9

Highlighted cells indicate NEPM exceedances.

Table D51. Annual daily peak 1-hour nitrogen dioxide concentrations (ppm) for 1996-2005

AAQ NEPM Standard
0.12 ppm (1-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	0.045	0.051	0.051	0.038	0.044	0.045	0.055	0.043	0.046	0.048
Duncraig (North Metro)	0.043	0.046	0.065	0.049	0.050	0.041	0.049	0.057	0.043	0.051
Hope Valley (South Metro)	0.045	0.033	0.044	0.032	0.033	0.033	0.039	0.039	0.034	0.035
Queens Building (CBD)	0.093	0.098	0.093	0.073	0.073	0.082	0.091	0.121	0.075	0.113
Quinns Rocks (Outer North Coast)	0.036	0.039	0.041	0.034	0.045	0.036	0.037	0.035	0.041	0.041
Rockingham (South Coast)	0.041	0.033	0.043	0.030	0.048	0.046	0.042	0.051	0.055	0.045
Rolling Green (Outer East Rural)	0.022	0.035	0.029	0.024	0.027	0.026	0.025	0.032	0.025	0.029
South Lake (South East Metro)	-	-	-	-	0.041	0.039	0.048	0.048	0.043	0.052
Swanbourne (Inner West Coast)	0.046	0.040	0.051	0.037	0.045	0.037	0.051	0.048	0.042	0.039

Highlighted cells indicate NEPM exceedances.

Table D52. Annual daily peak 1-hour ozone concentrations (ppm) for 1996-2005

AAQ NEPM Standard
0.10 ppm (1-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	0.114	0.100	0.112	0.101	0.084	0.099	0.091	0.083	0.079	0.094
Quinns Rocks (Outer North Coast)	0.084	0.106	0.080	0.105	0.078	0.073	0.079	0.086	0.079	0.095
Rockingham (South Coast)	0.091	0.078	0.082	0.076	0.083	0.076	0.079	0.064	0.102	0.081
Rolling Green (Outer East Rural)	0.104	0.134	0.109	0.096	0.092	0.097	0.091	0.087	0.101	0.079
South Lake (South East Metro)	-	-	-	-	0.077	0.079	0.067	0.071	0.076	0.080
Swanbourne (Inner West Coast)	0.089	0.109	0.081	0.088	0.079	0.074	0.081	0.082	0.077	0.076

Highlighted cells indicate NEPM exceedances.

Table D53. Annual daily peak 4-hour ozone concentrations (ppm) for 1996-2005

AAQ NEPM Standard
0.08 ppm (4-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	0.090	0.084	0.087	0.080	0.058	0.079	0.068	0.069	0.067	0.069
Quinns Rocks (Outer North Coast)	0.075	0.100	0.077	0.083	0.072	0.066	0.069	0.071	0.068	0.070
Rockingham (South Coast)	0.085	0.069	0.074	0.067	0.078	0.071	0.071	0.059	0.079	0.075
Rolling Green (Outer East Rural)	0.085	0.124	0.095	0.077	0.075	0.094	0.071	0.075	0.077	0.068
South Lake (South East Metro)	-	-	-	-	0.067	0.076	0.058	0.063	0.064	0.070
Swanbourne (Inner West Coast)	0.081	0.104	0.078	0.074	0.073	0.069	0.066	0.066	0.067	0.066

Highlighted cells indicate NEPM exceedances.

Table D54. Annual daily peak 1-hour sulfur dioxide concentrations (ppm) for 1996-2005

AAQ NEPM Standard
0.20 ppm (1-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Hope Valley (South Metro)	0.076	0.047	0.061	0.064	0.079	0.044	0.058	0.060	0.061	0.074
Rockingham (South Coast)	0.057	0.039	0.047	0.047	0.034	0.028	0.035	0.026	0.039	0.041
South Lake (South East Metro)	-	-	-	-	0.042	0.046	0.043	0.038	0.042	0.046
Wattleup (South Metro)	0.082	0.065	0.061	0.060	0.046	0.074	0.081	0.062	0.076	0.120

Highlighted cells indicate NEPM exceedances.

Table D55. Annual daily peak 24-hour sulfur dioxide concentrations (ppm) for 1996-2005

AAQ NEPM Standard
0.08 ppm (24-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Hope Valley (South Metro)	0.008	0.005	0.008	0.007	0.007	0.004	0.007	0.006	0.009	0.011
Rockingham (South Coast)	0.022	0.014	0.009	0.016	0.012	0.009	0.006	0.005	0.006	0.009
South Lake (South East Metro)	-	-	-	-	0.004	0.006	0.006	0.006	0.005	0.007
Wattleup (South Metro)	0.011	0.010	0.008	0.007	0.006	0.009	0.008	0.006	0.009	0.014

Highlighted cells indicate NEPM exceedances.

Table D56. Annual daily peak 24-hour particles as PM_{10} concentrations (ug/m^3) for 1996-2005

AAQ NEPM Standard
50 ug/m3 (24-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	-	-	-	-	-	-	-	-	58.0	76.8
Duncraig (North Metro)	37.7	56.2	68.9	35.2	29.8	53.6	54.0	66.7	45.1	59.2
South Lake (South East Metro)	-	-	-	-	39.6	56.7	82.6	44.5	50.5	98.8
Southwest Region										
Bunbury	-	-	-	40.0	42.4	57.6	42.5	54.5	99.5	63.3
Midwest Region										
Geraldton	-	-	-	-	-	-	-	-	-	61.3

Highlighted cells indicate NEPM exceedances.

Table D57. Annual daily peak 24-hour particles as $PM_{2.5}$ concentrations (ug/m^3) for 1996-2005

AAQ NEPM Advisory Standard
25 ug/m3 (24-hour average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	37.6	28.1	21.2	20.3	20.1	31.8	25.7	27.3	16.5	-
Duncraig (North Metro)	30.1	44.2	31.8	26.3	22.2	27.0	28.3	25.2	24.4	40.6
Southwest Region										
Bunbury	-	35.4	33.2	30.0	29.2	47.3	36.1	37.6	94.8	64.2

Highlighted cells indicate NEPM exceedances.

Table D58. Annual averaged particles as $PM_{2.5}$ concentrations (ug/m^3) for 1996-2005

AAQ NEPM Advisory Standard
8 ug/m3 (annual average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Caversham (North East Metro)	7.8	7.6	7.0	7.2	7.4	7.6	8.1	8.0	7.6	-
Duncraig (North Metro)	9.7	12.3	10.4	8.6	8.0	8.6	9.2	8.9	7.9	7.8
Southwest Region										
Bunbury	-	10.5	9.2	9.3	9.3	8.7	9.0	8.6	9.2	8.6

Highlighted cells indicate NEPM exceedances.

Table D59. Annual averaged lead concentrations (ug/m^3) for 1996-2005

AAQ NEPM Advisory Standard
0.50 ug/m3 (annual average)

Regional Performance Monitoring Station	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Perth Region										
Queens Building (CBD)	0.18	0.13	0.10	0.08	0.03	0.02	-	-	-	-

Monitoring for lead ceased at the end of 2001.

ATTACHMENT 1 – Graphical Trends

This attachment provides graphical representations of tables D8 to D44 of Section D. Each graph show the maximum, 99th percentile, 98th percentile, 95th percentile and 90th percentile of daily maximum concentration for all pollutants monitored by the Department of Environment and Conservation in Western Australia. The nominated percentiles can also be expressed as an Nth highest concentration. Based on 100% data recovery and a normal year (i.e. 365 days), the following table gives each percentile an equivalent Nth highest ordinal value. The bracketed numbers represent the exact (as calculated) value of the ordinal number.

Percentile	Nth highest
100	1 (maximum)
99	5 (4.65)
98	8 (8.3)
95	19 (19.25)
90	38 (37.5)

Carbon Monoxide

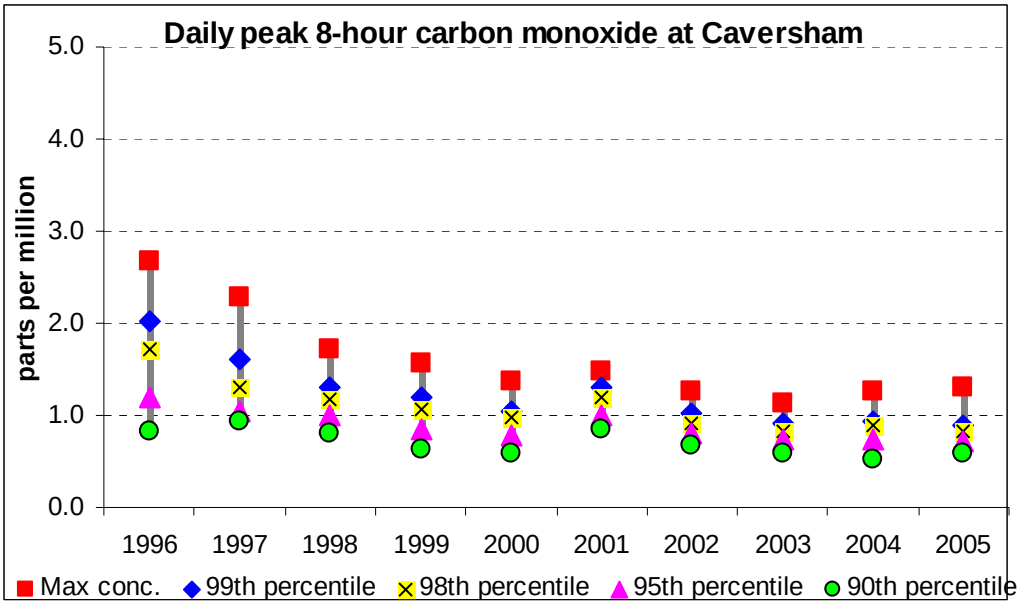


Figure A1-1 - 8-hour carbon monoxide at Caversham

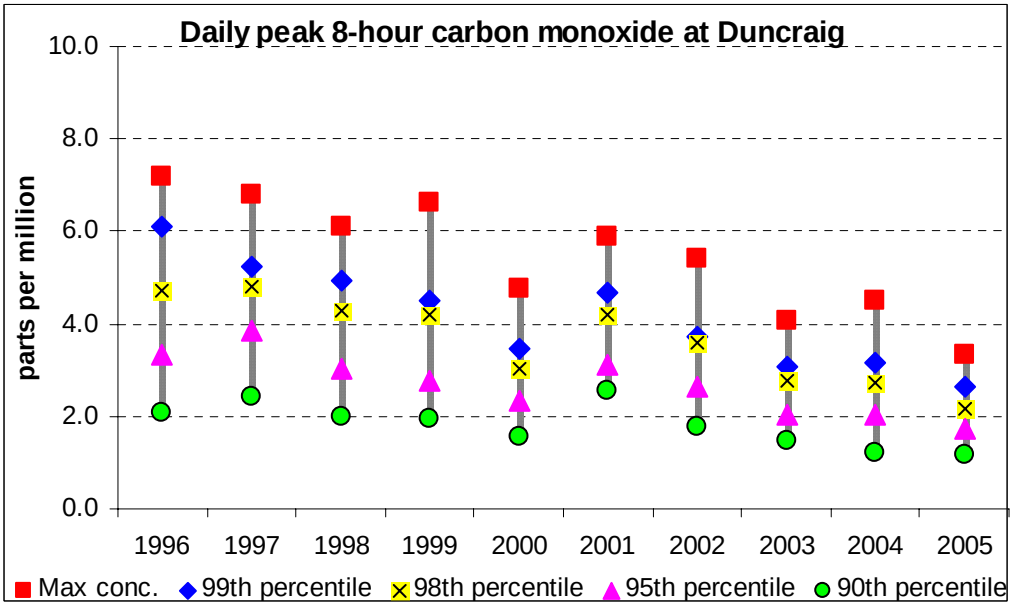


Figure A1-2 - 8-hour carbon monoxide at Duncraig

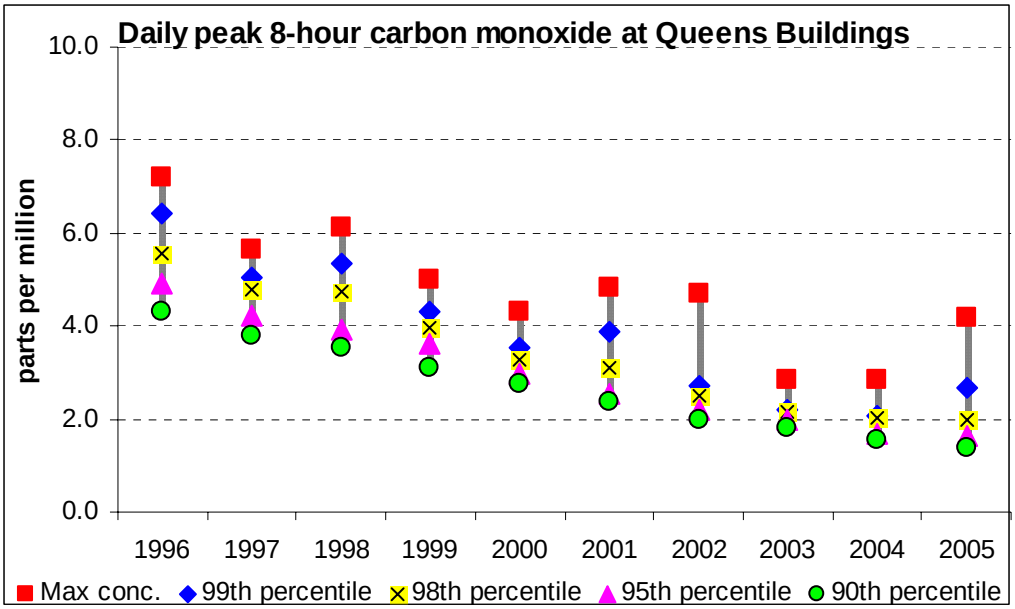


Figure A1-3 - 8-hour carbon monoxide at Queens Buildings

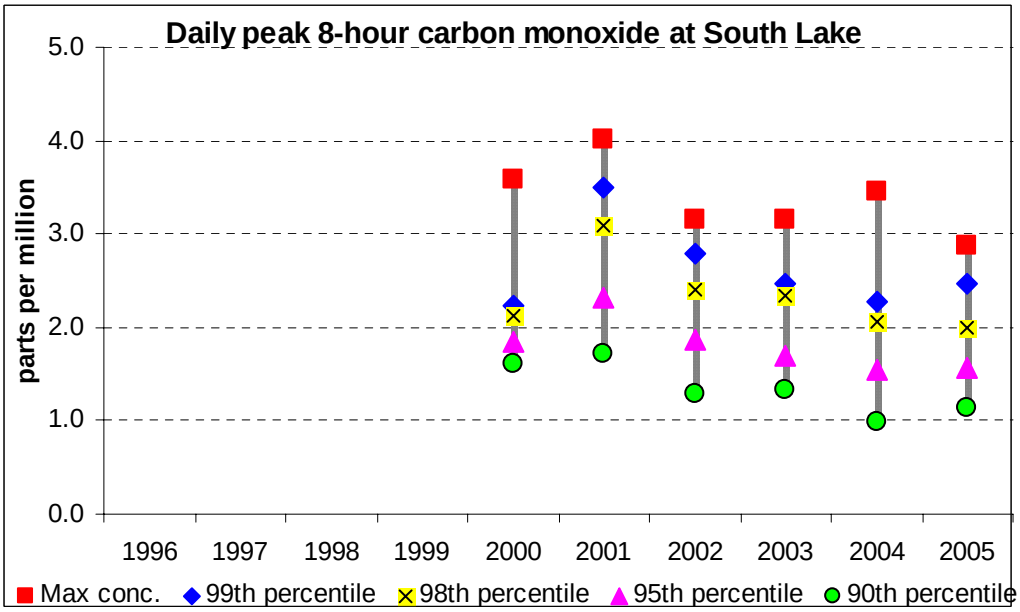


Figure A1-4 - 8-hour carbon monoxide at South Lake

Nitrogen Dioxide

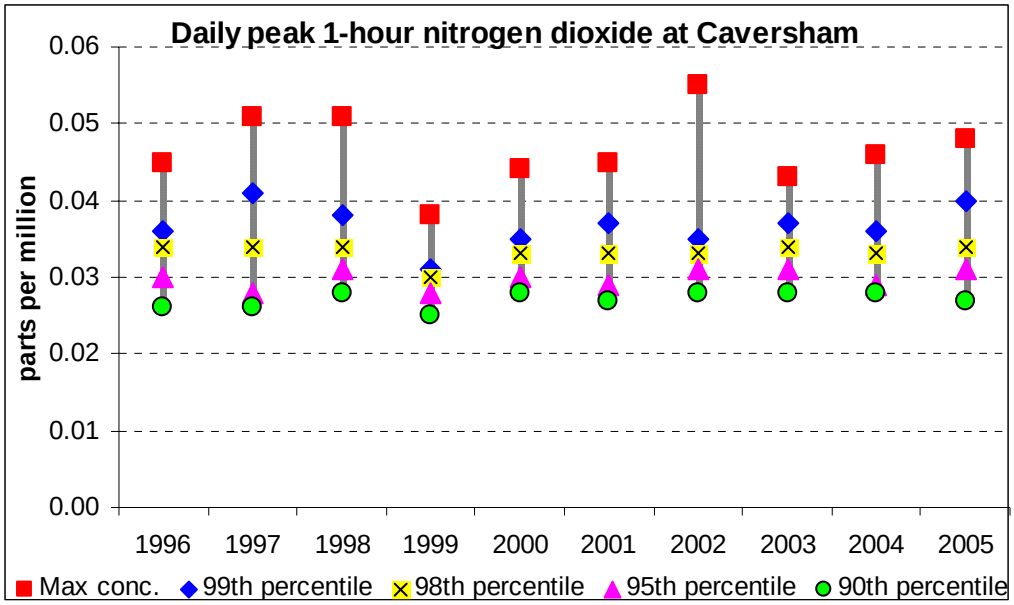


Figure A1-5 - 1-hour nitrogen dioxide at Caversham

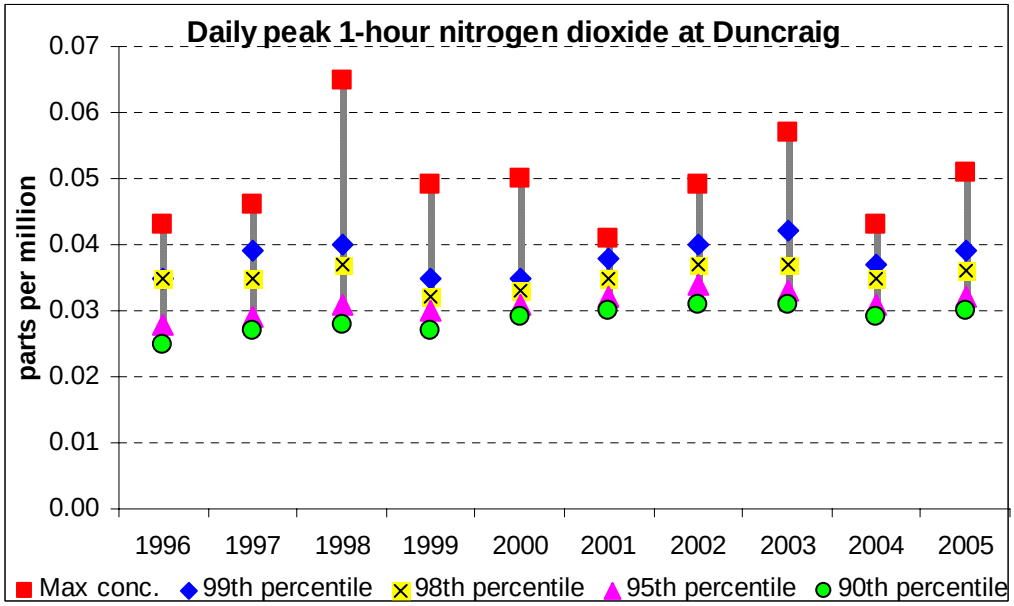


Figure A1-6 - 1-hour nitrogen dioxide at Duncraig

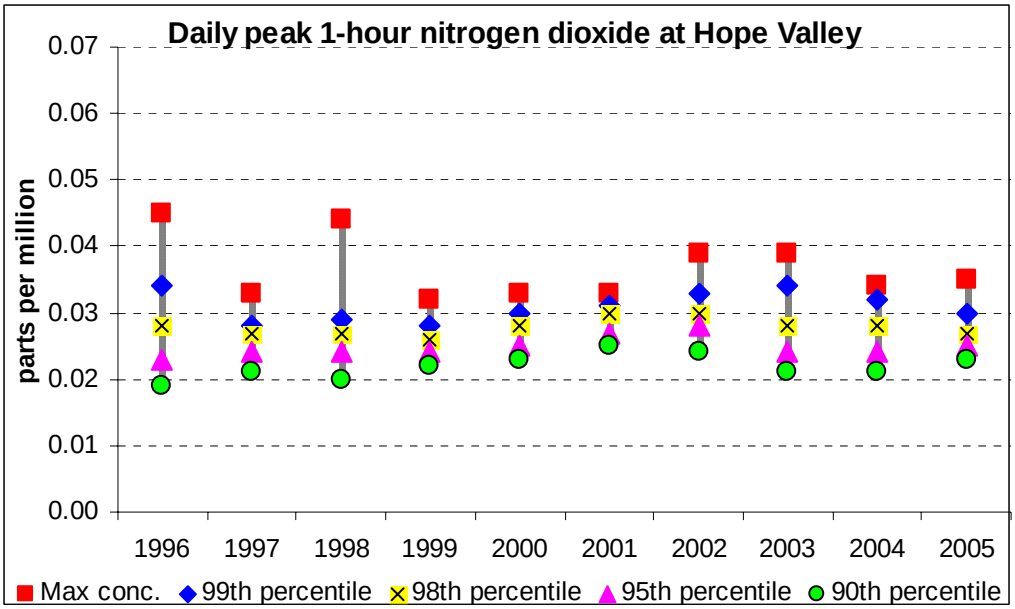


Figure A1-7 - 1-hour nitrogen dioxide at Hope Valley

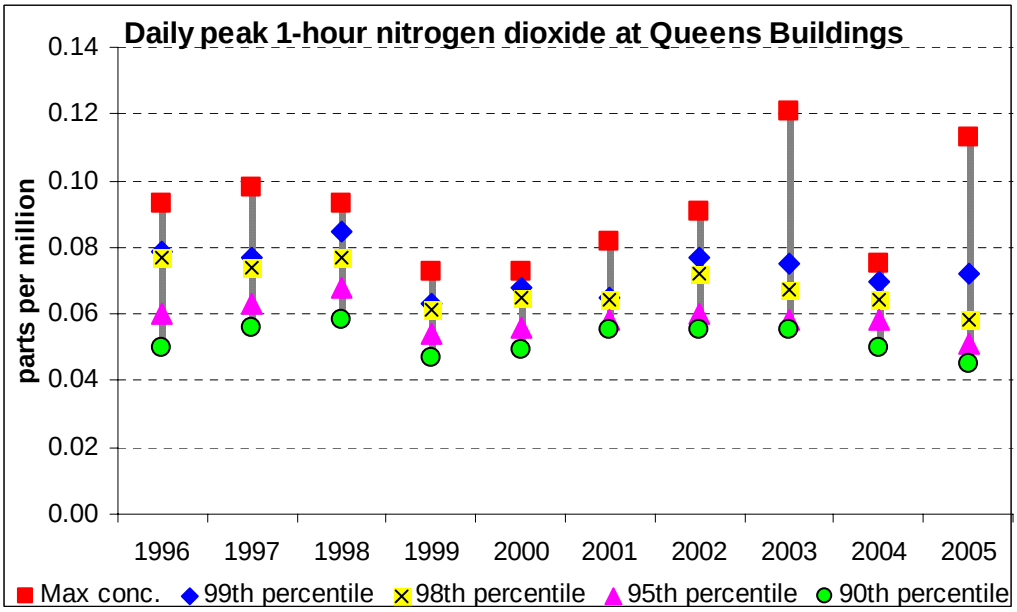


Figure A1-8 - 1-hour nitrogen dioxide at Queens Buildings

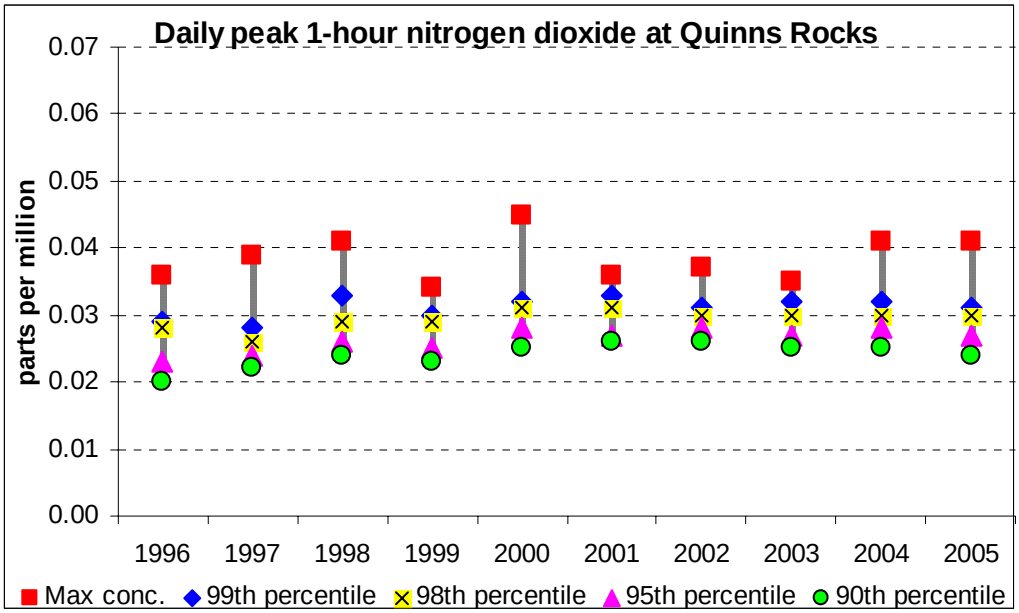


Figure A1-9 - 1-hour nitrogen dioxide at Quinns Rocks

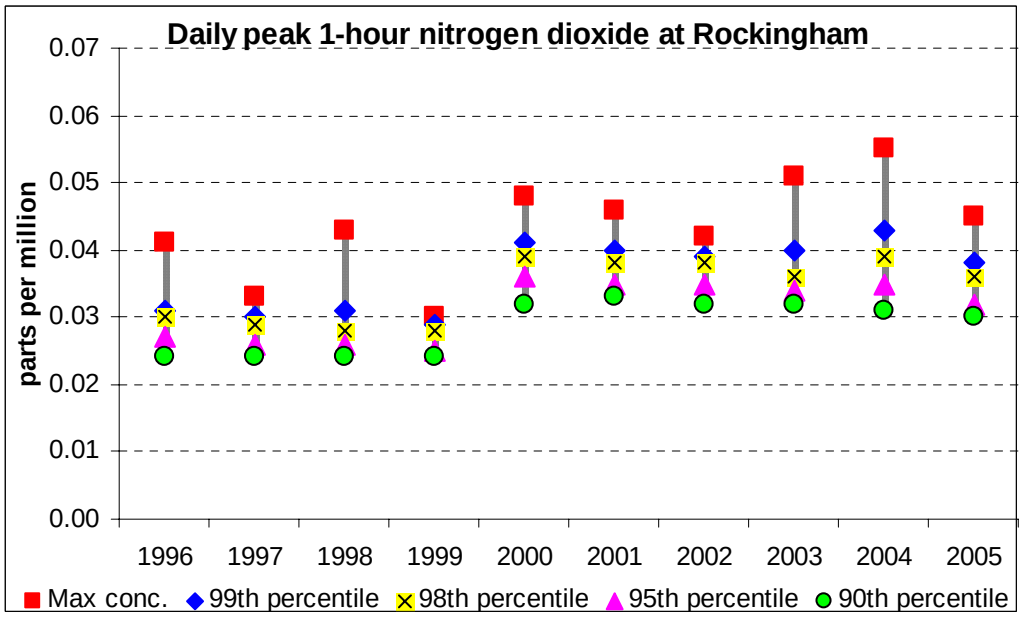


Figure A1-10 - 1-hour nitrogen dioxide at Rockingham

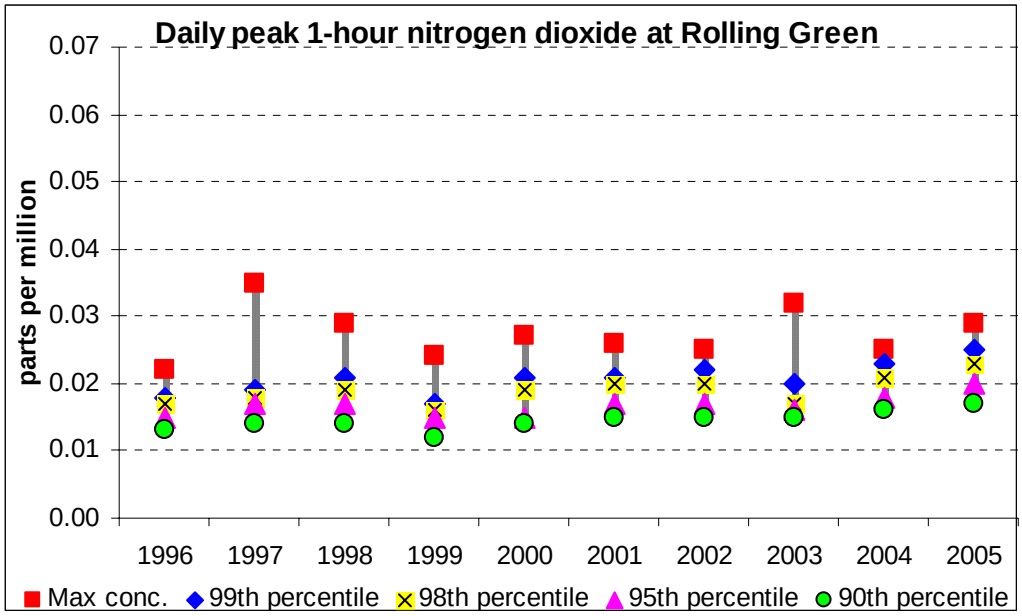


Figure A1-11 - 1-hour nitrogen dioxide at Rolling Green

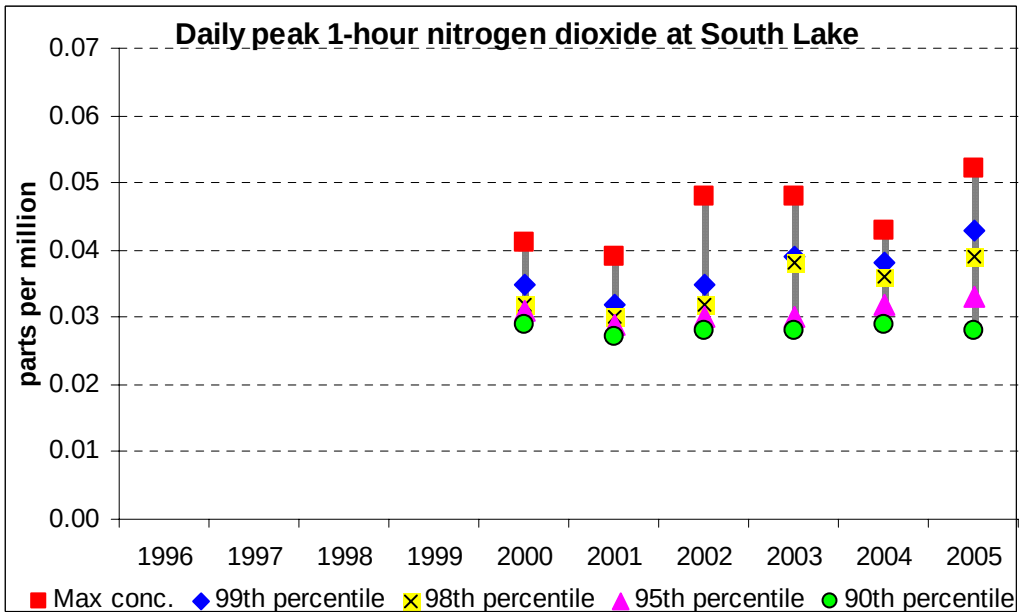


Figure A1-12 - 1-hour nitrogen dioxide at South Lake

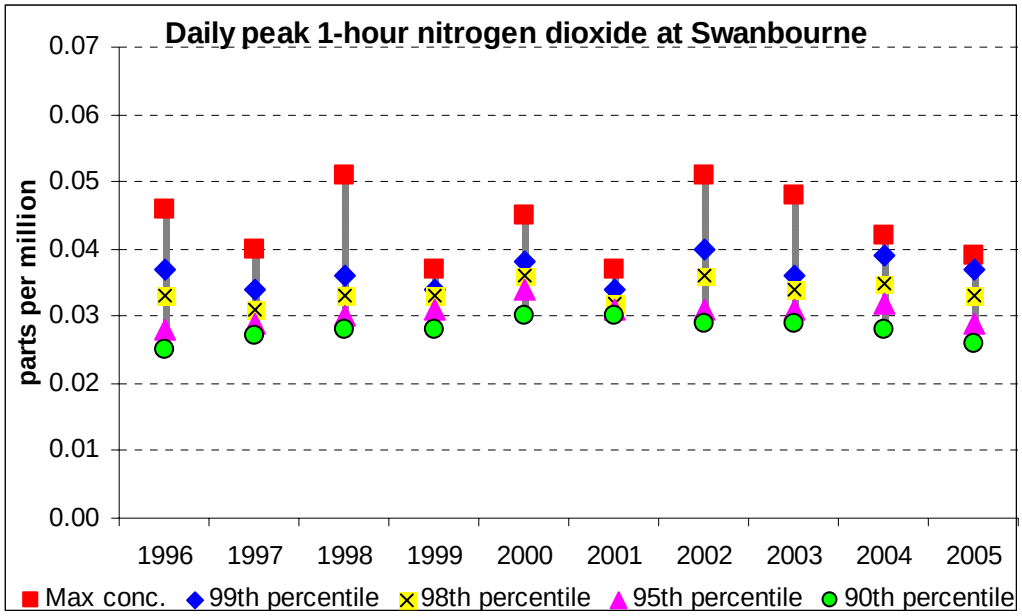


Figure A1-13 - 1-hour nitrogen dioxide at Swanbourne

Ozone

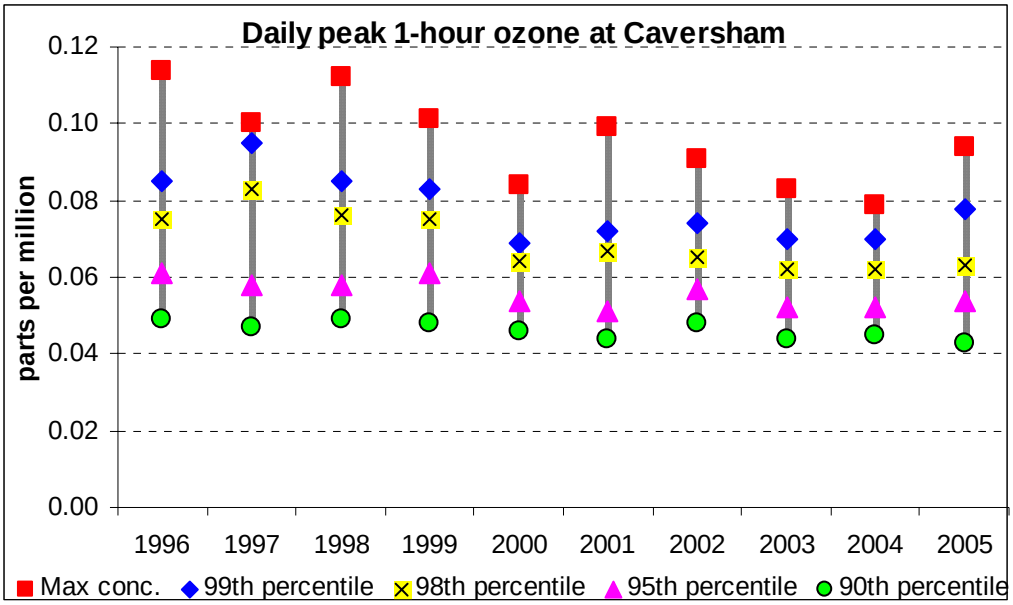


Figure A1-14 - 1-hour ozone at Caversham

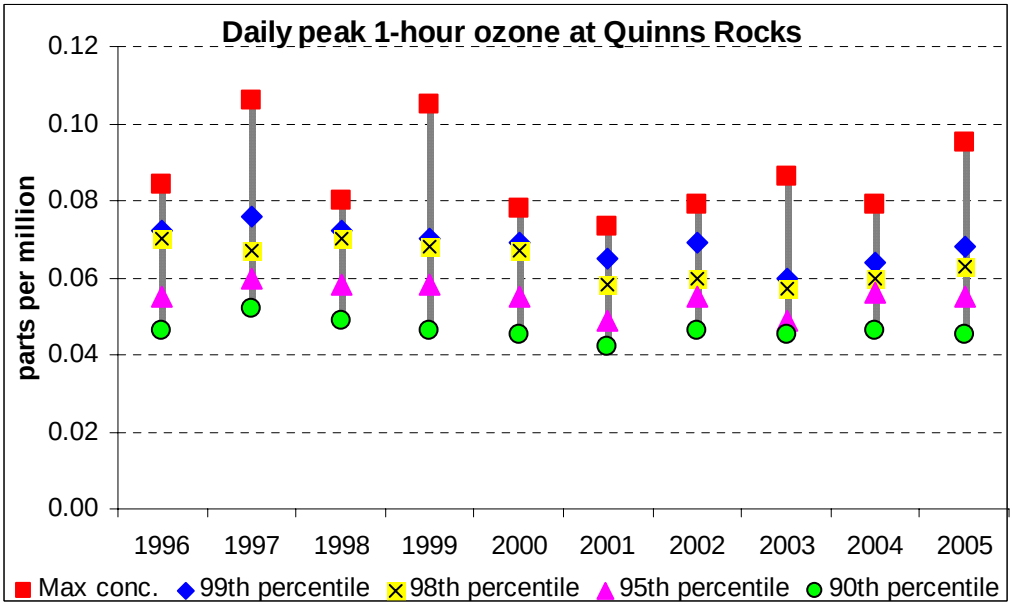


Figure A1-15 - 1-hour ozone at Quinns Rocks

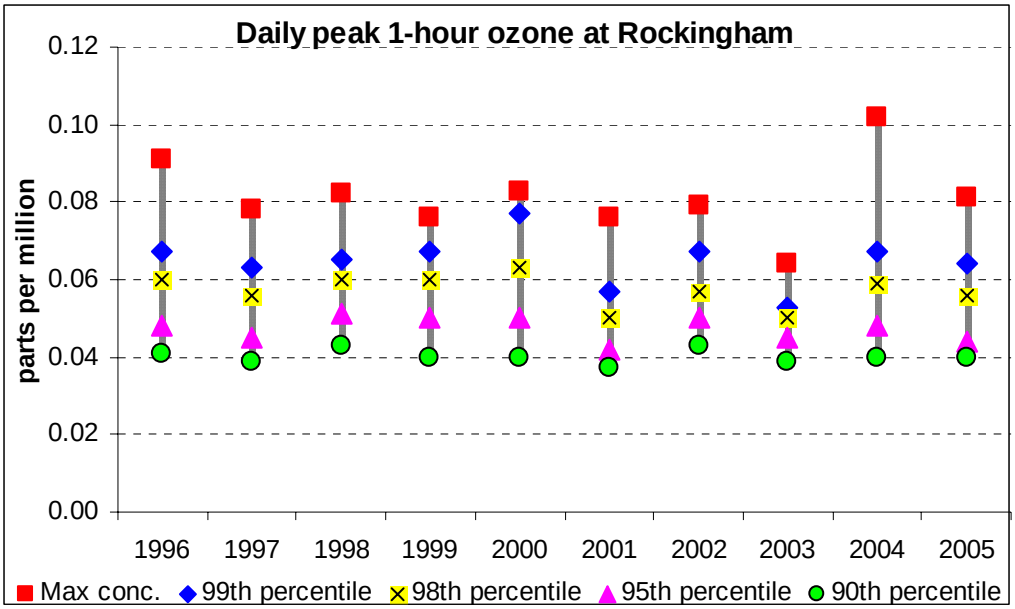


Figure A1-16 - 1-hour ozone at Rockingham

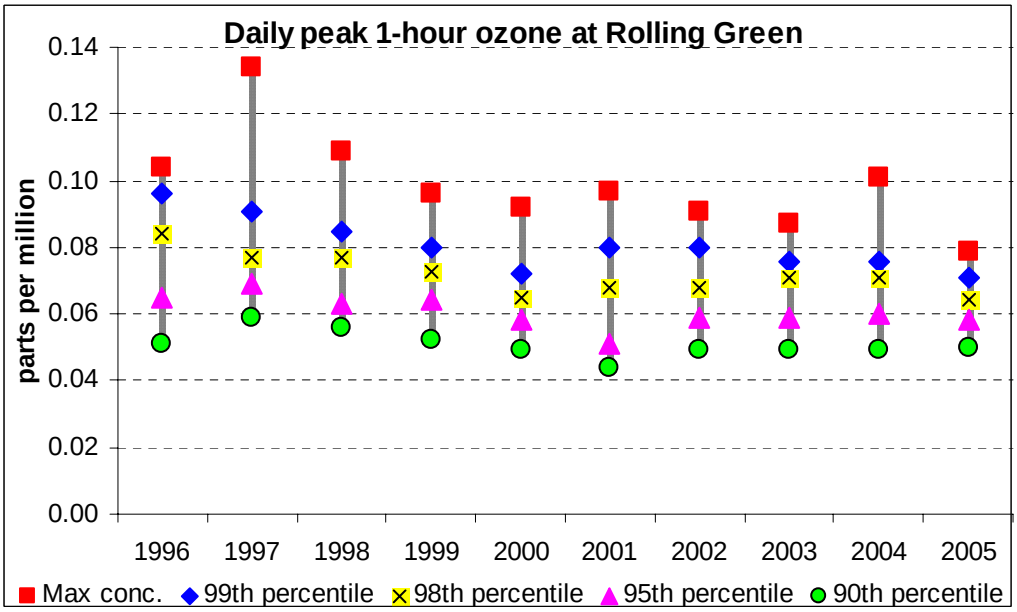


Figure A1-17 - 1-hour ozone at Rolling Green

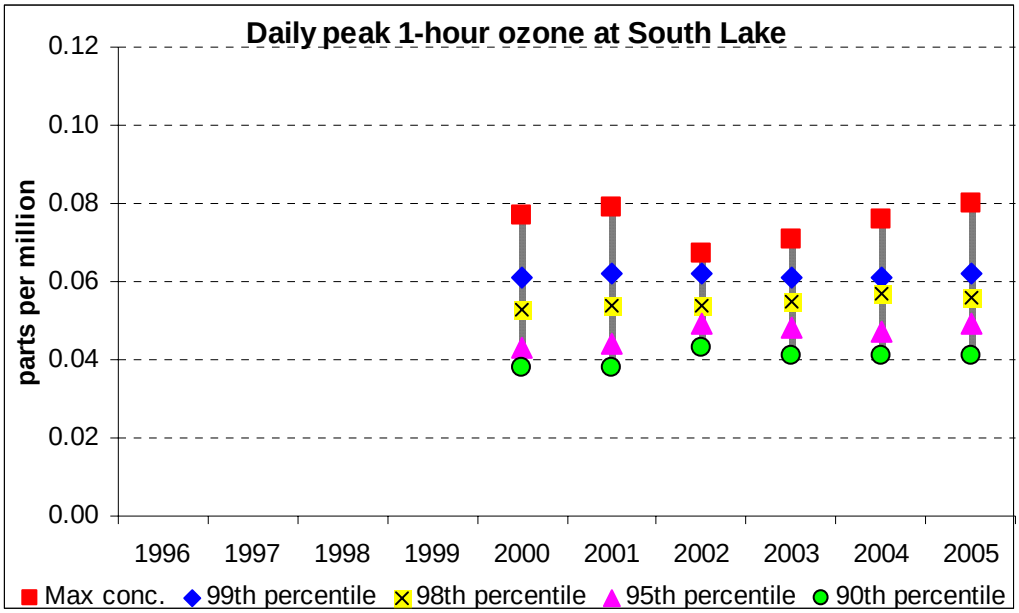


Figure A1-18 - 1-hour ozone at South Lake

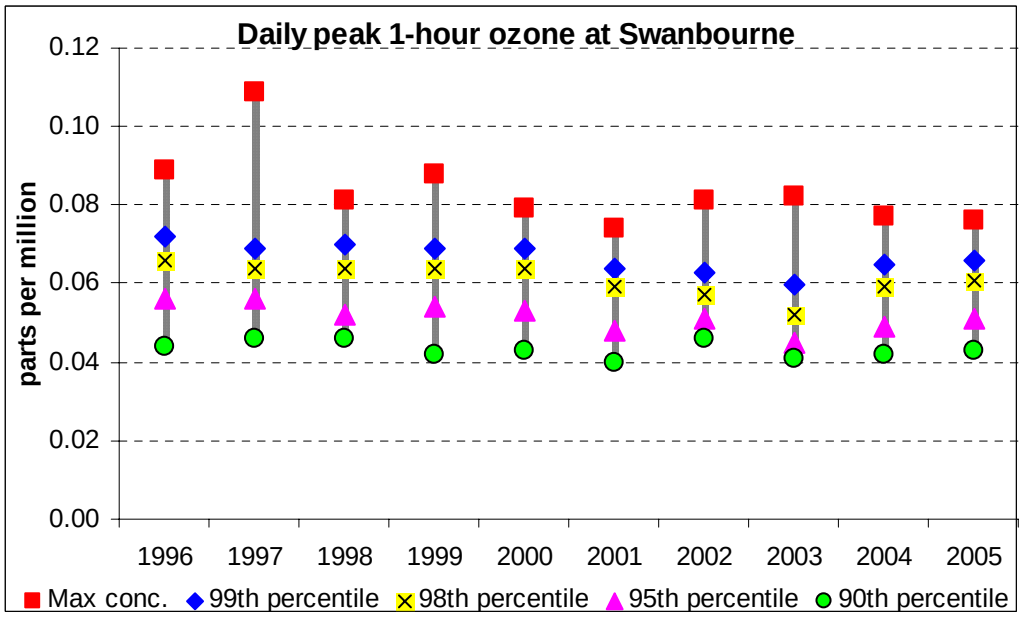


Figure A1-19 - 1-hour ozone at Swanbourne

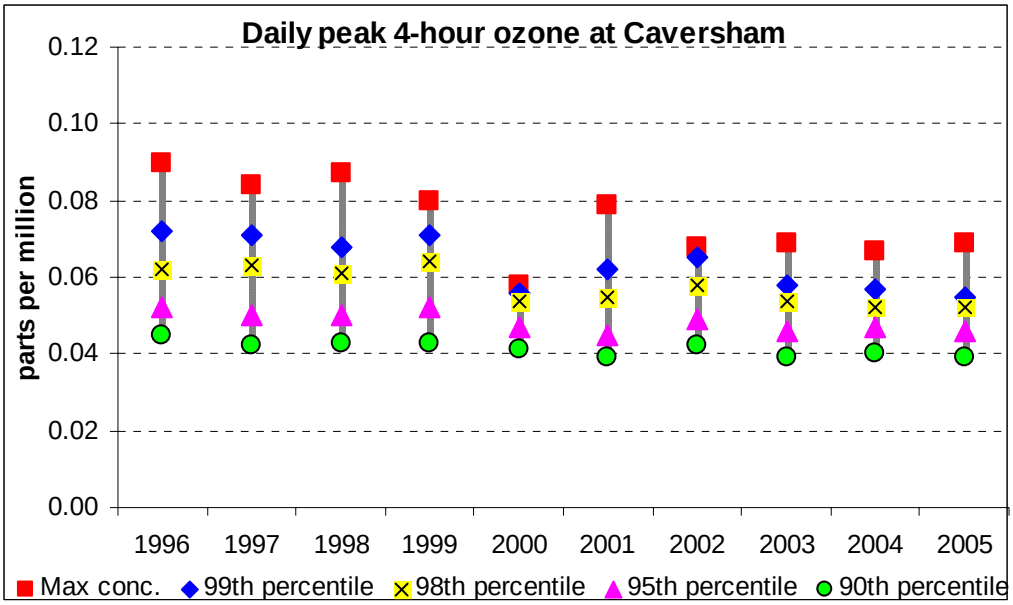


Figure A1-20 - 4-hour ozone at Caversham

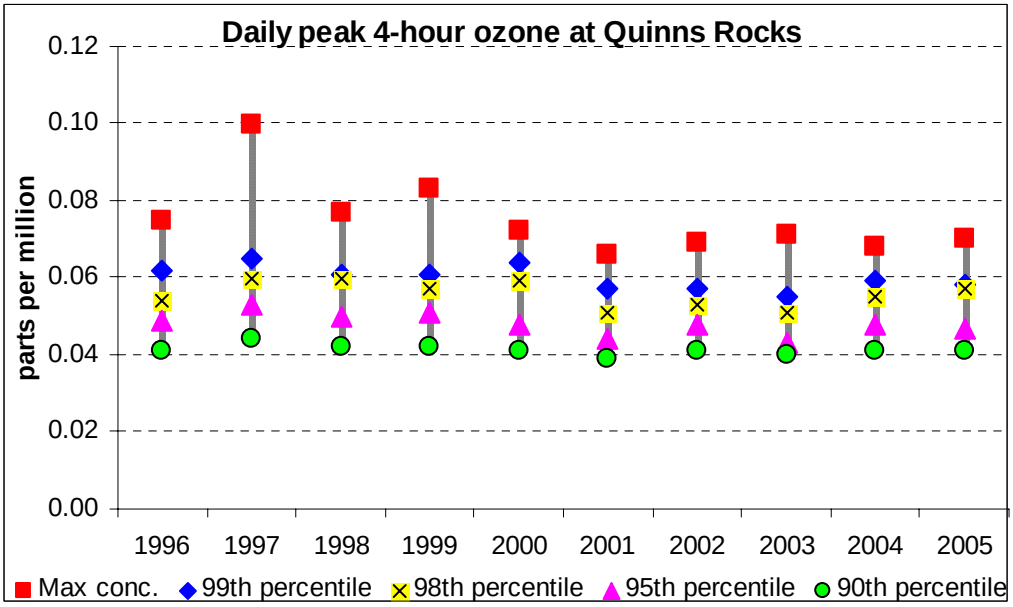


Figure A1-21 - 4-hour ozone at Quinns Rocks

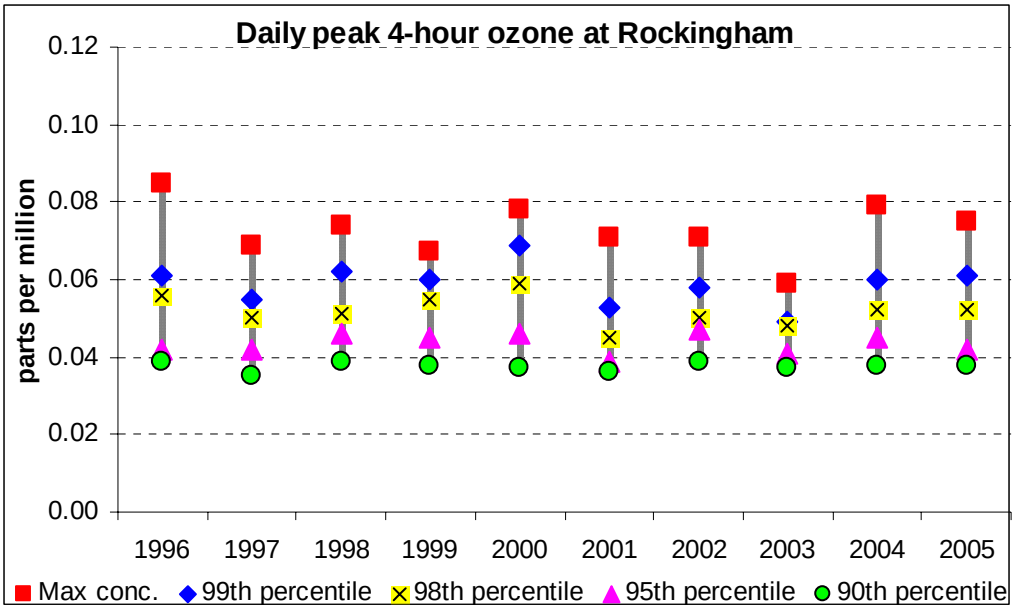


Figure A1-22 - 4-hour ozone at Rockingham

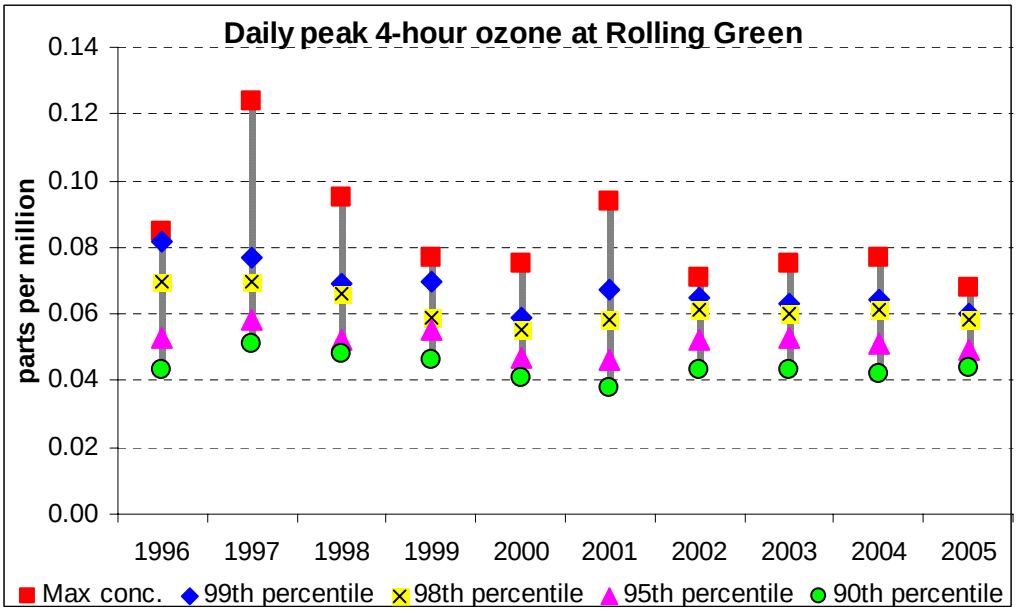


Figure A1-23 - 4-hour ozone at Rolling Green

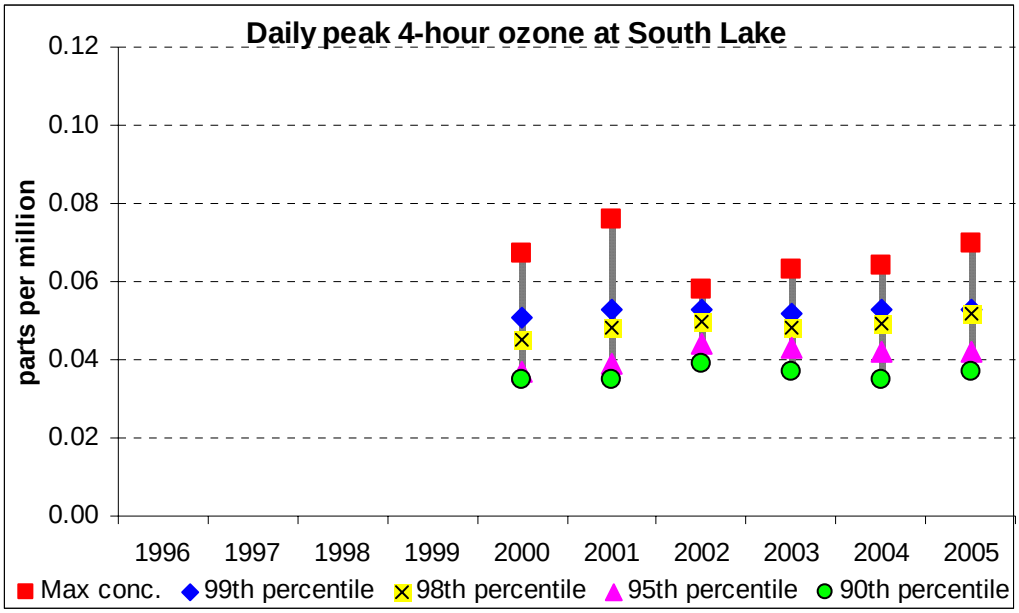


Figure A1-24 - 4-hour ozone at South Lake

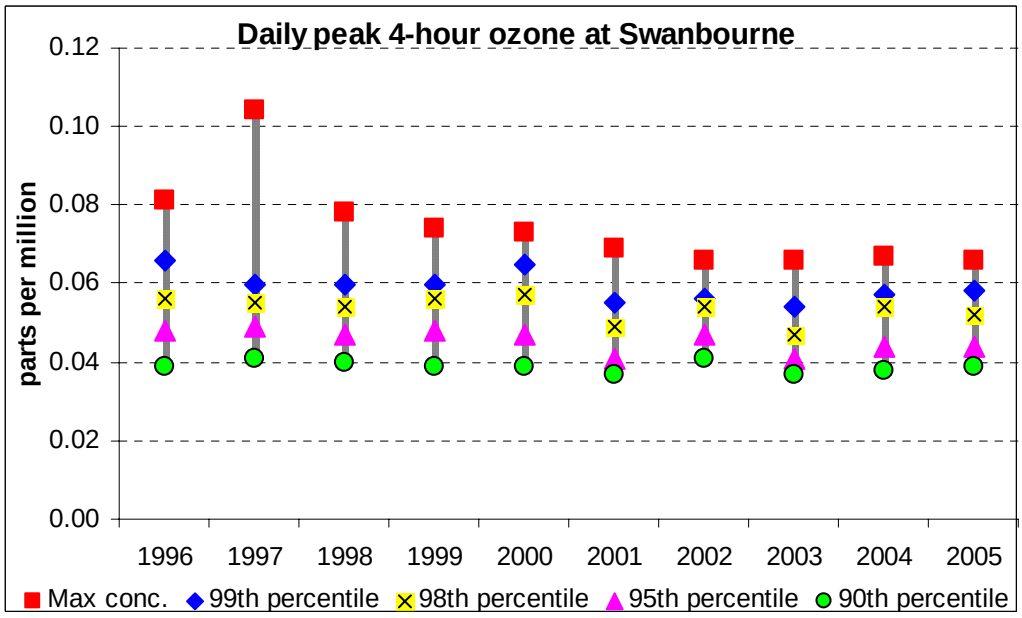


Figure A1-25 - 4-hour ozone at Swanbourne

Sulfur Dioxide

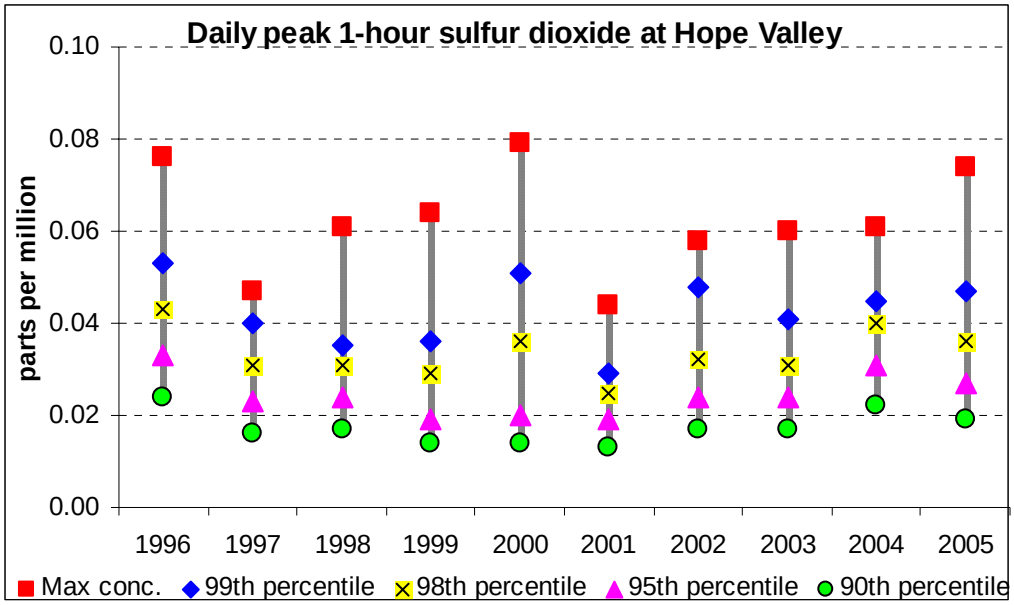


Figure A1-26 - 1-hour sulfur dioxide at Hope valley

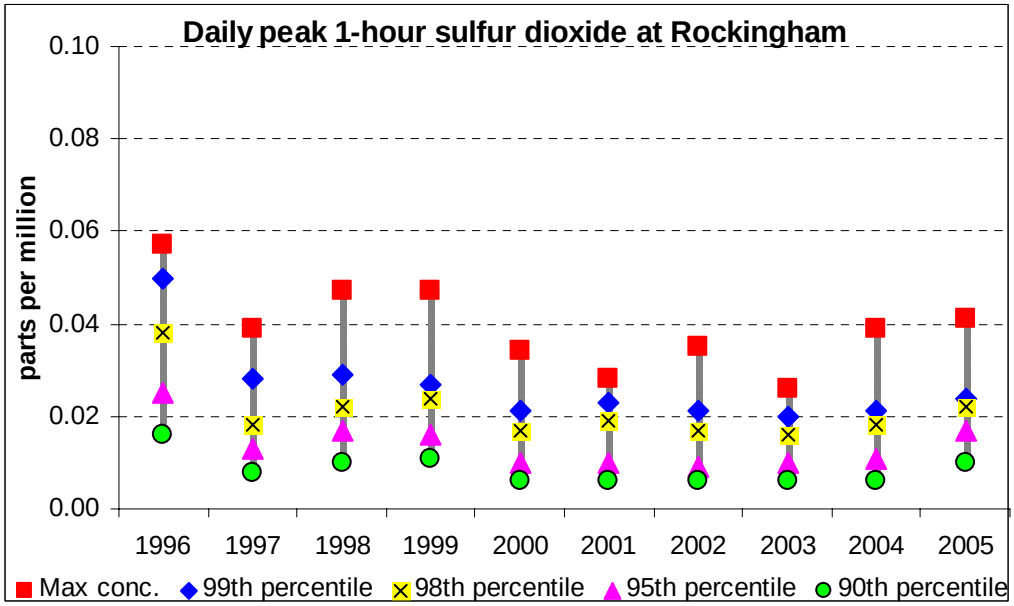


Figure A1-27 - 1-hour sulfur dioxide at Rockingham

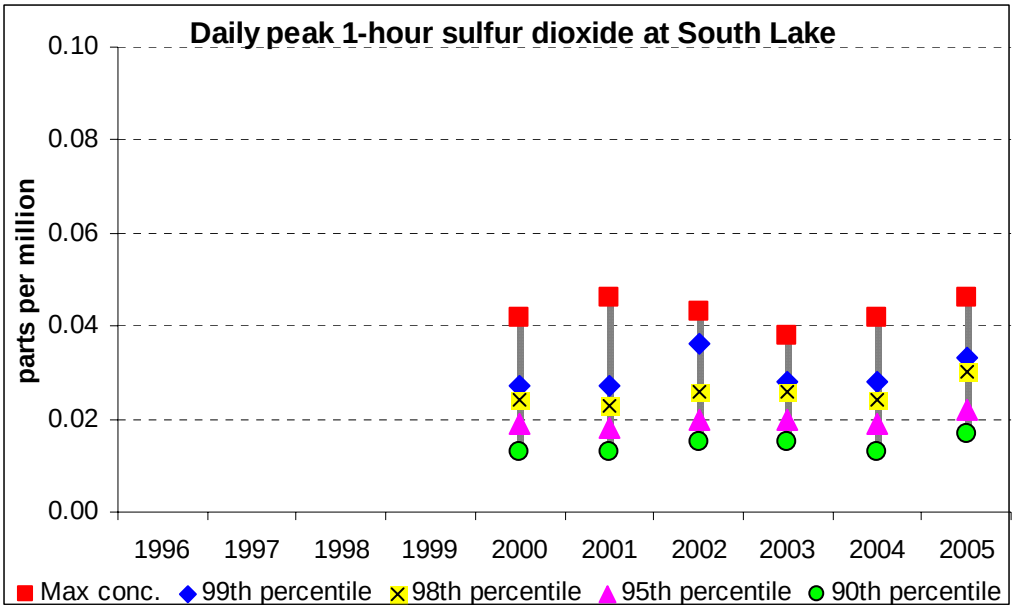


Figure A1-28 - 1-hour sulfur dioxide at South Lake

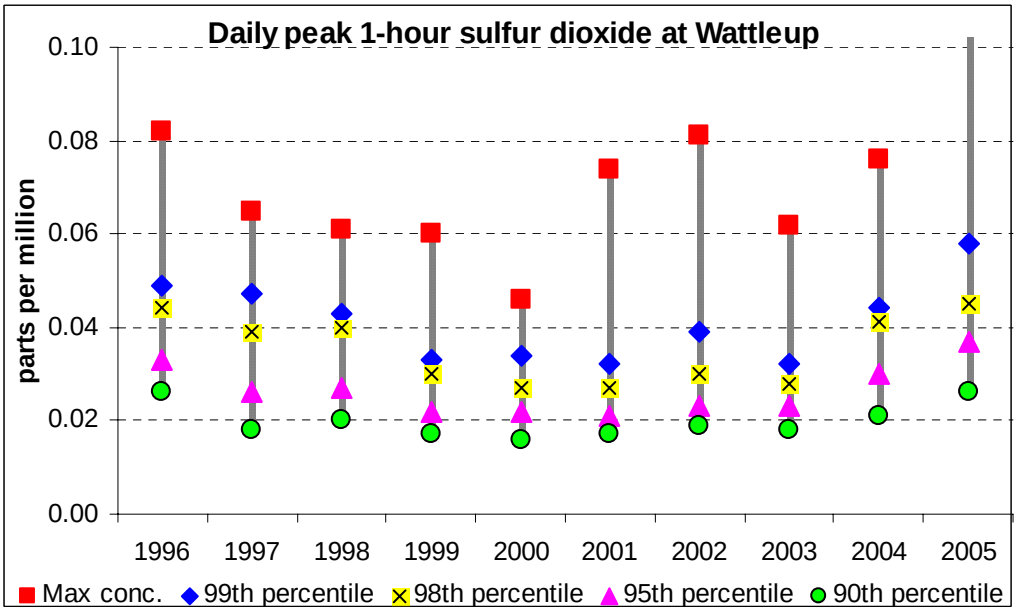


Figure A1-29 - 1-hour sulfur dioxide at Wattleup

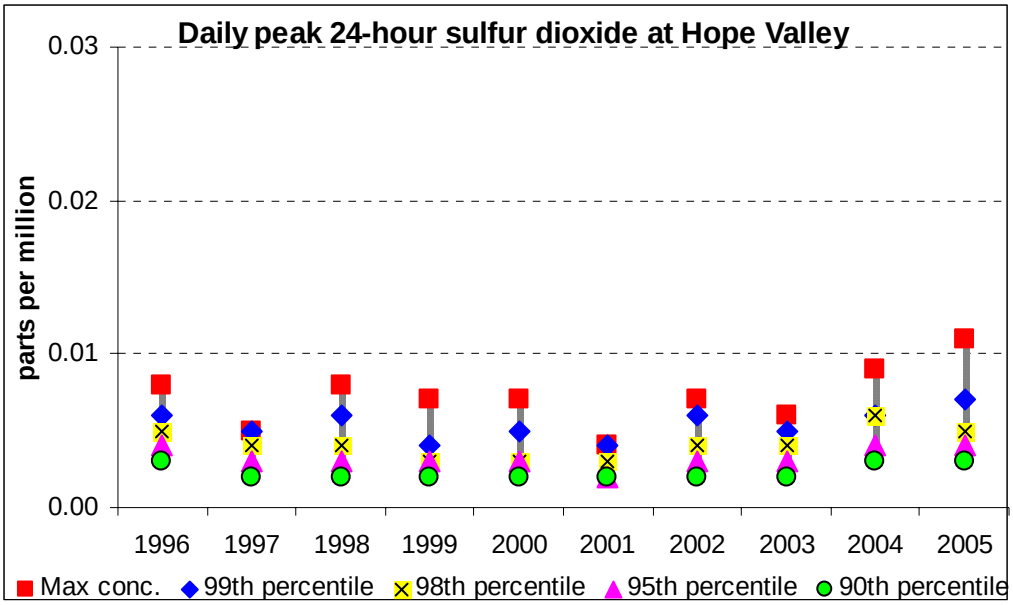


Figure A1-30 - 24-hour sulfur dioxide at Hope Valley

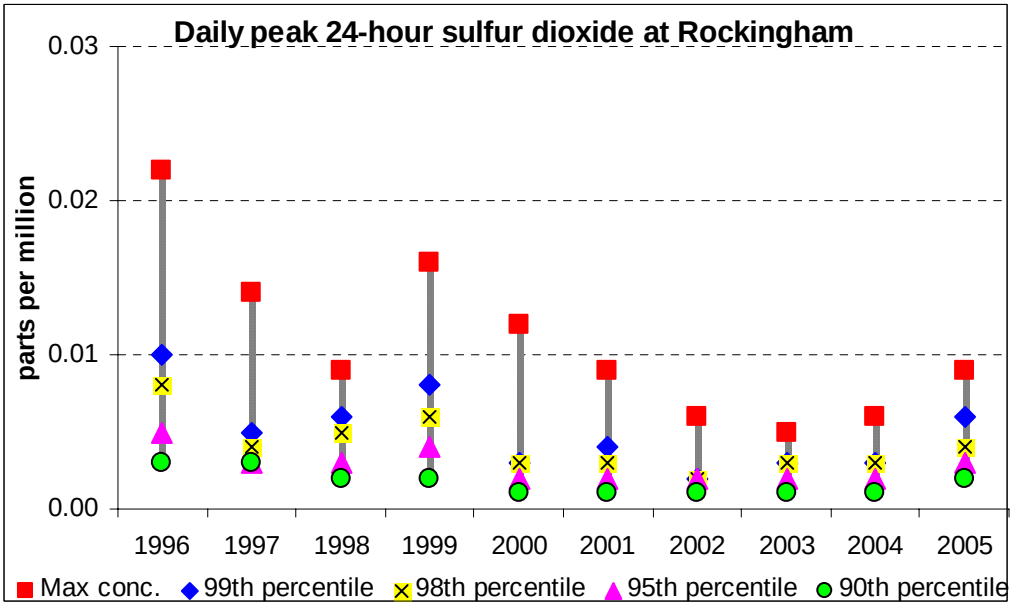


Figure A1-31 - 24-hour sulfur dioxide at Rockingham

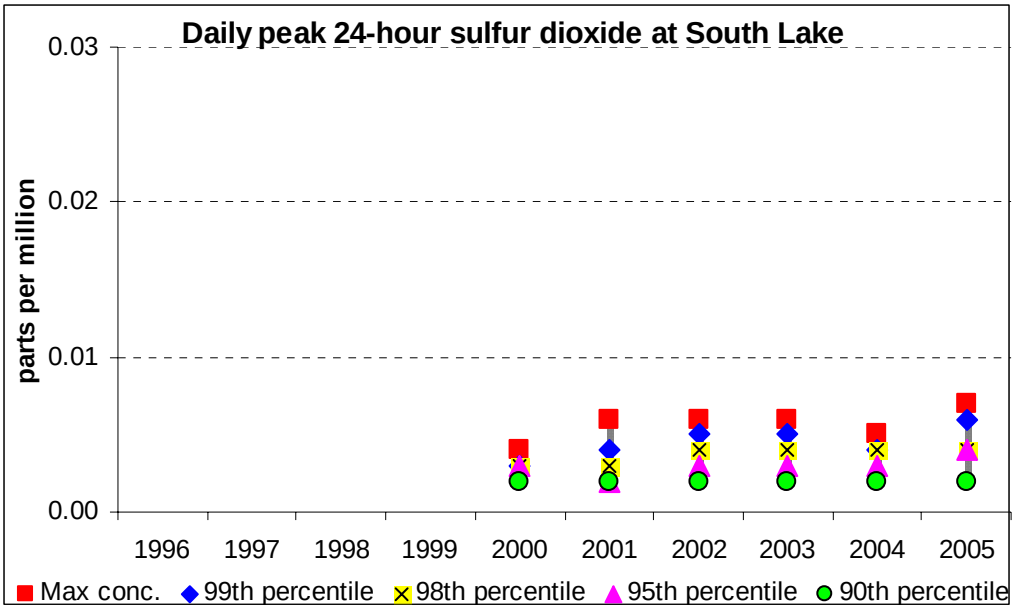


Figure A1-32 - 24-hour sulfur dioxide at South Lake

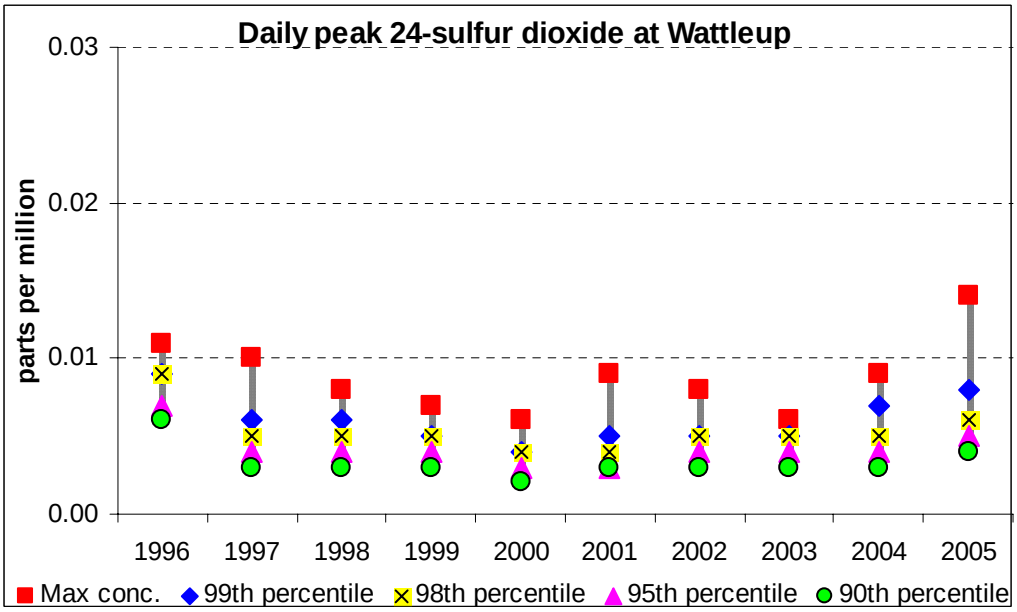


Figure A1-33 - 24-hour sulfur dioxide at Wattleup

Particles as PM_{10}

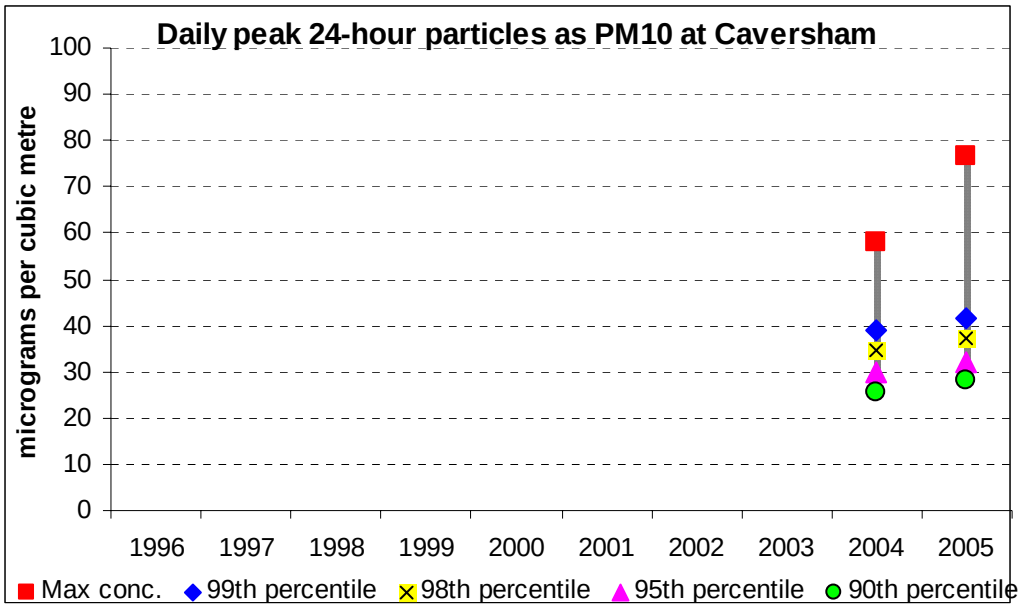


Figure A1-34 - 24-hour PM_{10} at Caversham

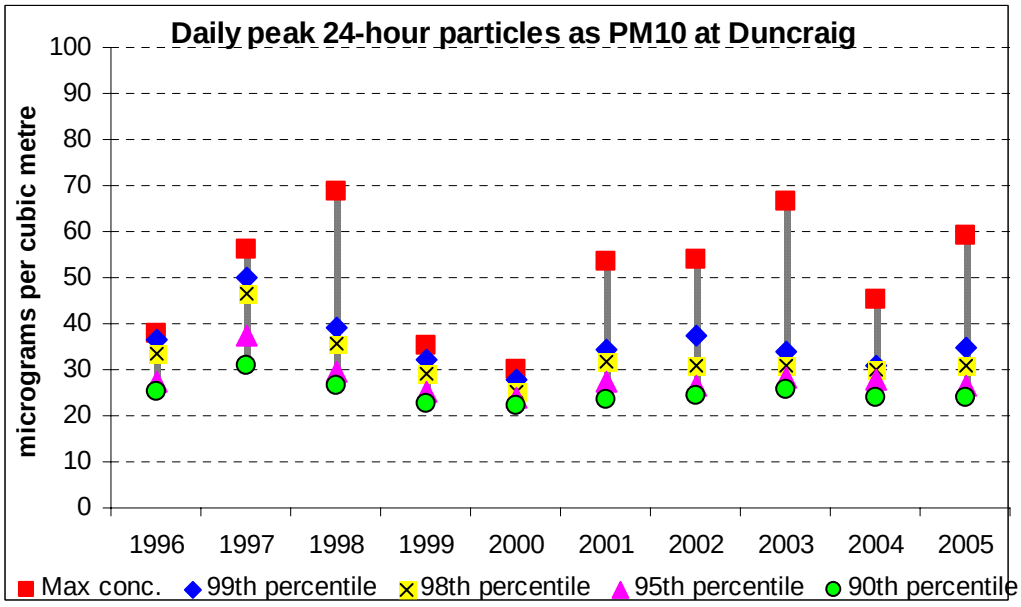


Figure A1-35 - 24-hour PM_{10} at Duncraig

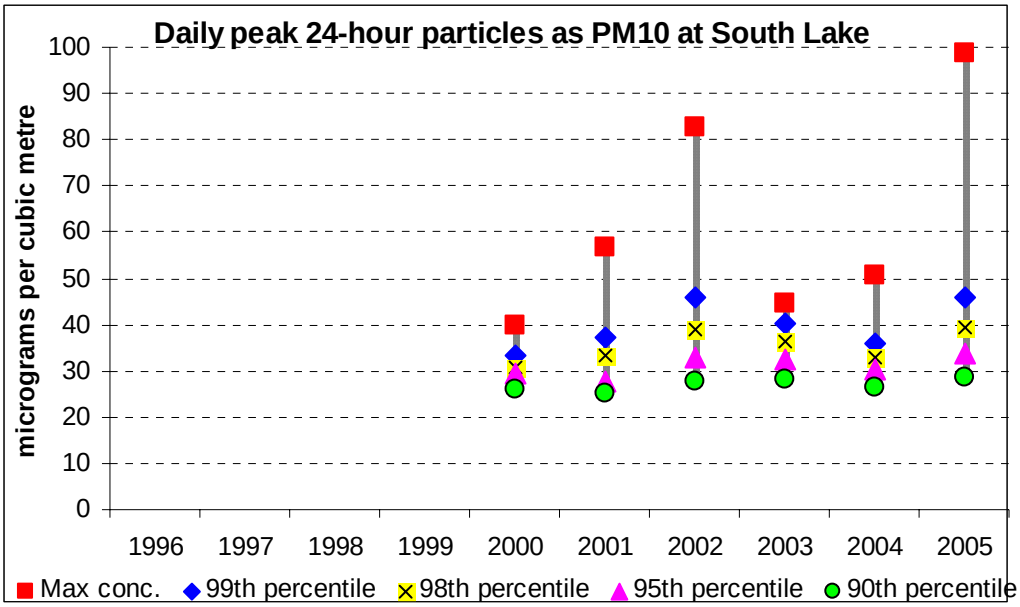


Figure A1-36 - 24-hour PM_{10} at South Lake

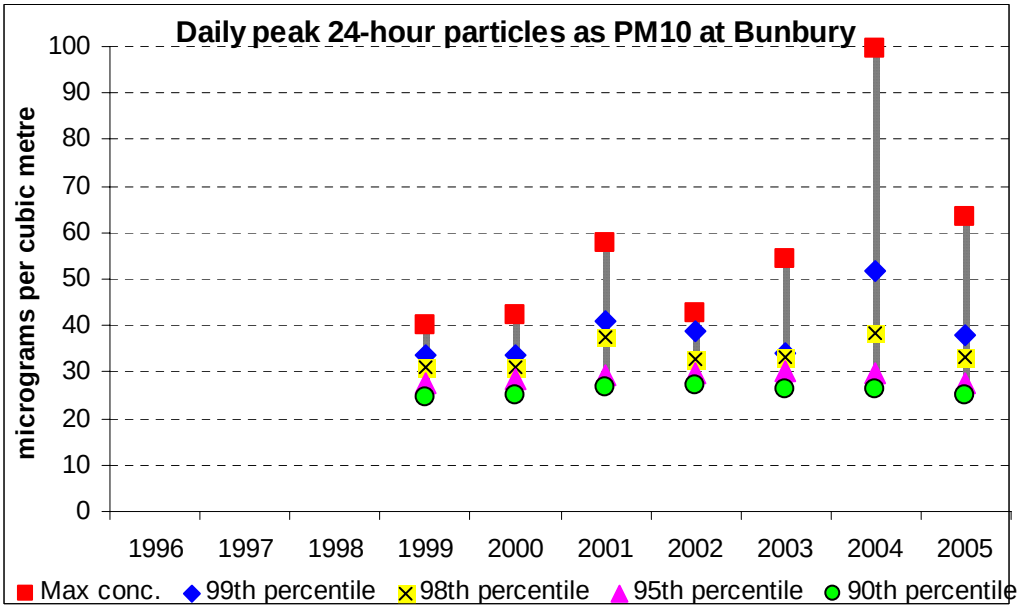


Figure A1-37 - 24-hour PM_{10} at Bunbury

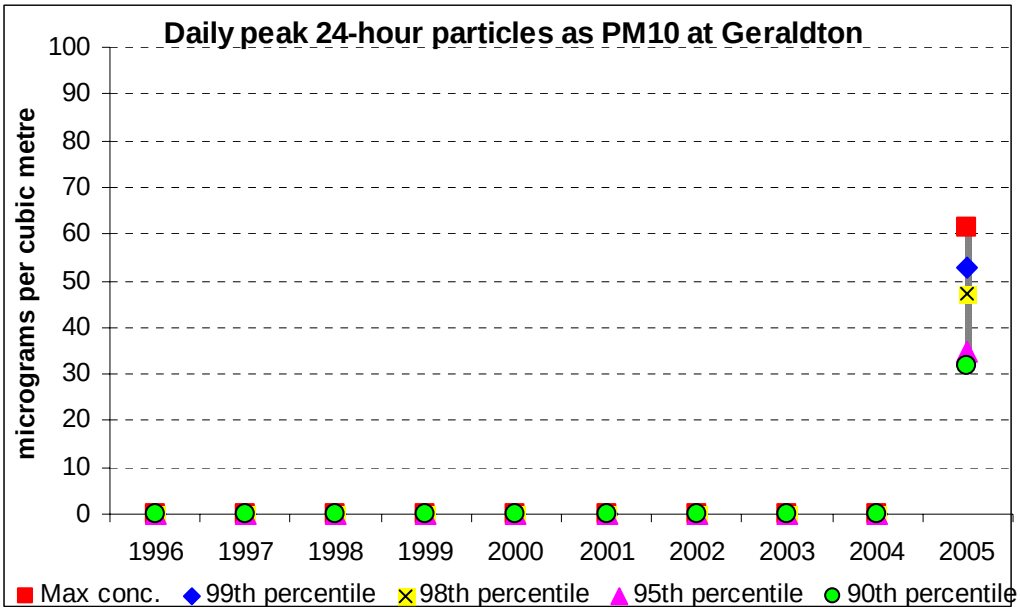


Figure A1-38 - 24-hour PM_{10} at Geraldton

Particles as $PM_{2.5}$

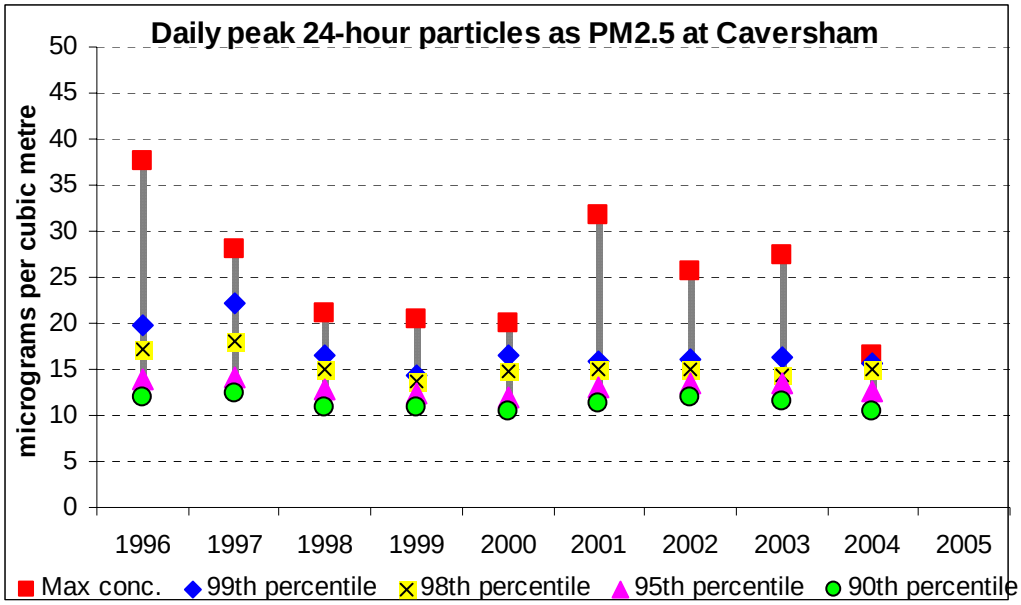


Figure A1-39 - 24-hour $PM_{2.5}$ at Caversham

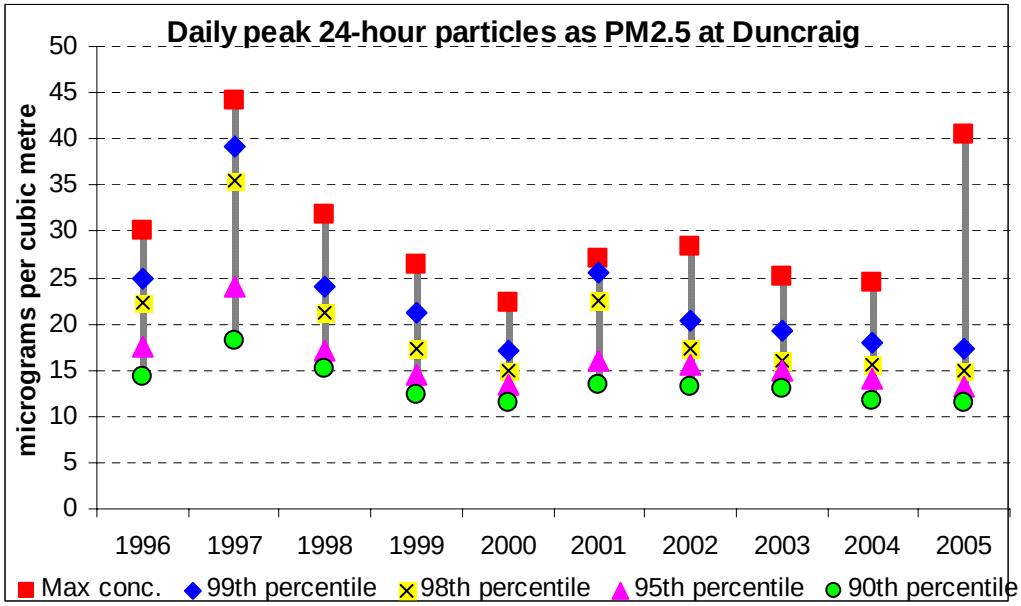


Figure A1-40 - 24-hour $PM_{2.5}$ at Duncraig

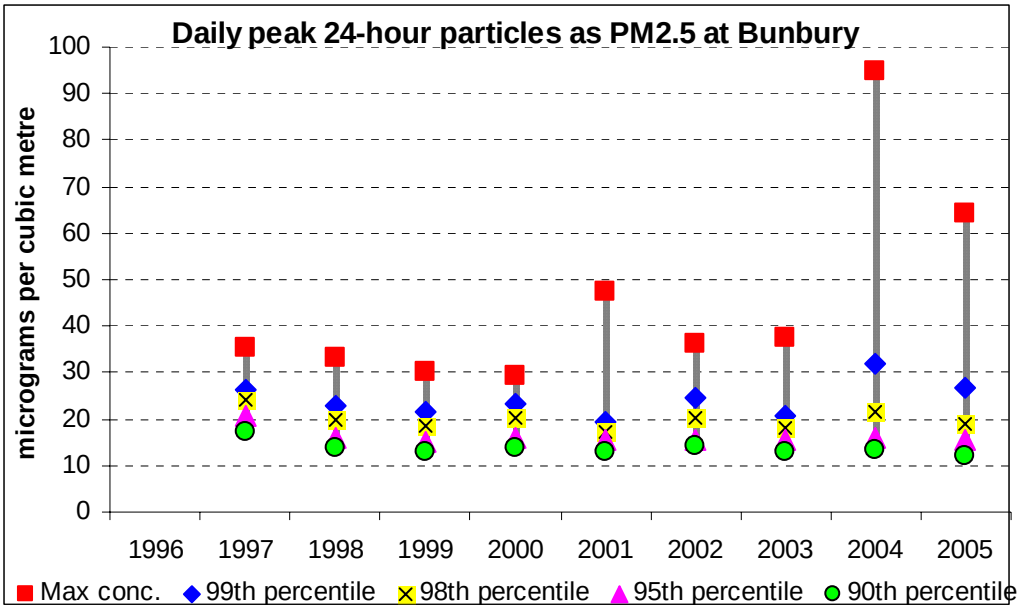
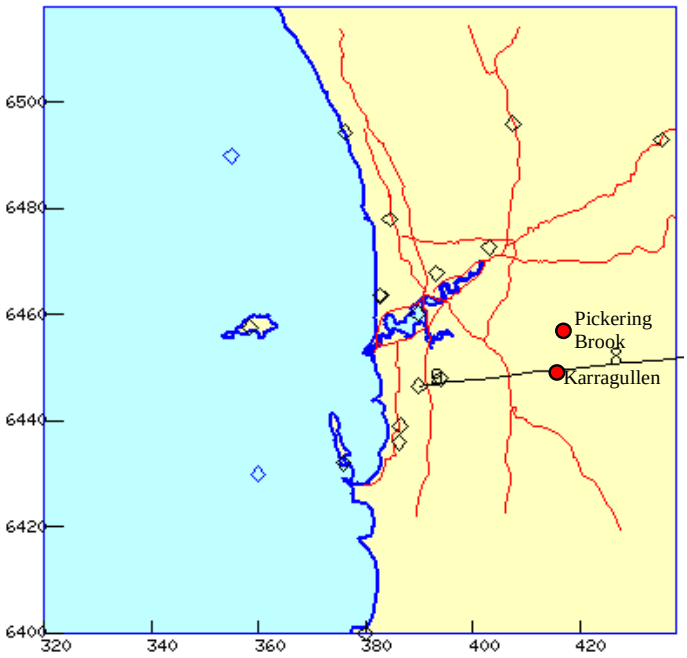


Figure A1-41 - 24-hour $PM_{2.5}$ at Bunbury

Attachment 2 – PM_{10} Exceedance on 16th January 2005



Back trajectory to (389.9,6446.6) (SLAL00) over a period of 120 minutes, ending at 0900 on 16/01/2005

Back trajectory from South Lake over a period of 1-hour.

Pollutant

PM_{10}

Monitoring Site

South Lake

Highest Concentration

98.8 µg/m^3

Averaging Period

24 hours

NEPM Standard

50 µg/m^3

Description of Event

Description of Event

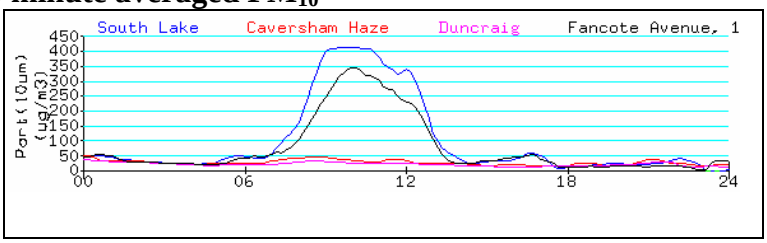
Bushfire in the Perth Eastern suburbs. See ABC news item at http://www.abc.net.au/news/newsitems/200501/s1282733.htm and reproduced on the following page.

Concentrations reached in µg/m^3.

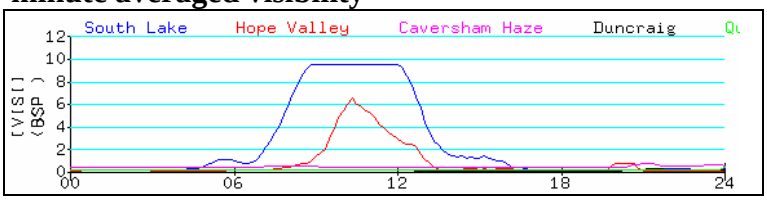
SITE	PM_{10}	$PM_{2.5}$
BN	29.0	9.6
CA	27.3	-
DU	21.6	8.1
SL	**98.8**	-

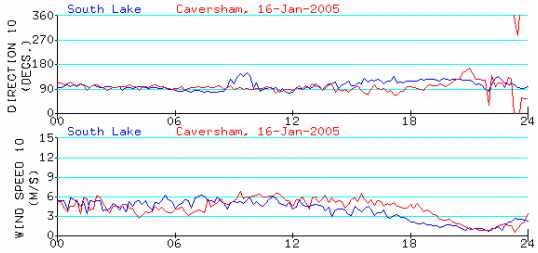
Wind direction was Easterly throughout the day.

60 minute averaged PM_{10}



60 minute averaged visibility





Photograph taken approximately 3pm 16/01/05 at Towncenter Drive, Thornlie.

ABC Online

Nervous night for WA firefighters. 16/01/2005. ABC News Online

[This is the print version of story http://www.abc.net.au/news/newsitems/200501/s1282733.htm]

Last Update: Monday, January 17, 2005. 0:12am (AEDT)

Nervous night for WA firefighters

Firefighters in Western Australia are working to contain a blaze expected to threaten residents overnight in Pickering Brook and Karagullen, on Perth's eastern outskirts.

A total of 10 fires, believed to have been deliberately lit, are burning around Perth.

The Department of Conservation and Land Management (CALM) says its priority is to construct breaks to hold the head fire before it reaches the outskirts of Pickering Brook.

CALM spokesman Kevin Vear says once the head fire is contained, resources will be diverted to the north and east flanks.

"Night time gives us the advantage of cooler temperatures," he said.

"In this case the winds are going to be slightly less and they continue in a reasonably favourable direction for us in terms of attacking it during the night."

Earlier, residents began evacuating in the areas of Boya and Karagullen, where there had been reports of damage to some houses and vehicles.

CALM's Nigel Higgs says they expect the fire in Karagullen, which has burnt out 3,000 hectares, to continue burning through the night.

"We would hope to have it under control by tomorrow but that's going to depend on the winds and just generally how the fire behaves over the next couple of hours," he said.

Fires have also been reported in the Glen Forest nature reserve and Helena Valley.

Mr Higgs urged residents in the area to stay alert.

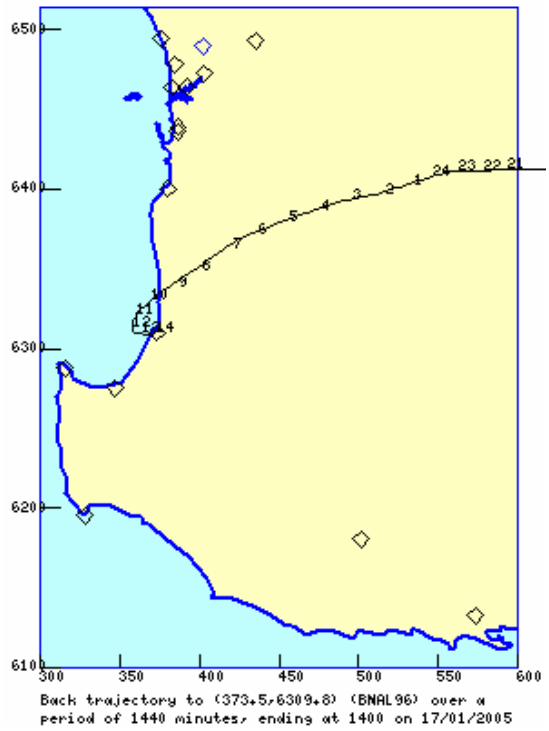
"If they're not confident with dealing with the fire, they should leave early," he said.

An information line has been set up for residents in the area.

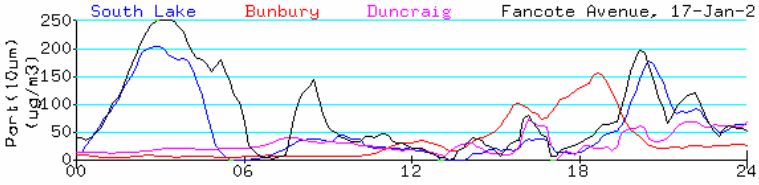
The number is 1300 657 209.

Supplementary news items available at
http://www.abc.net.au/news/newsitems/200501/s1282658.htm and
http://www.abc.net.au/news/newsitems/200501/s1282886.htm.

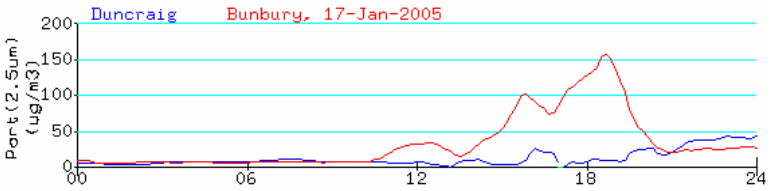
Attachment 3 – PM_{10} & $PM_{2.5}$ Exceedances on 17th January 2005



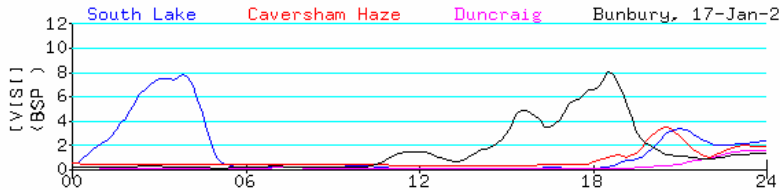
60 minute averaged PM_{10}



60 minute averaged $PM_{2.5}$



60 minute averaged visibility



Pollutant

PM_{10} & $PM_{2.5}$

Monitoring Site

South Lake & Bunbury

Highest Concentration

58.4 µg/m^3 – South Lake (PM_{10})
52.4 µg/m^3 – Bunbury (PM_{10})
34.1 µg/m^3 – Bunbury ($PM_{2.5}$)

Averaging Period

24 hours

NEPM Standard

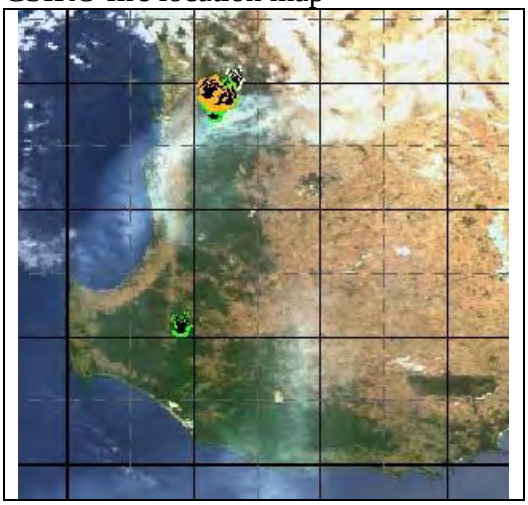
PM_{10} – 50.0 ug/m^3
$PM_{2.5}$ – 25.0 ug/m^3 (advisory)

Description of Event

Bushfire in the Perth Eastern suburbs.
Concentrations reached in µg/m^3.

SITE	PM_{10}	$PM_{2.5}$
BN	**52.4**	**34.1**
CA	40.2	-
DU	30.8	13.1
SL	**58.4**	-

CSIRO fire location map



Fire location map obtained from http://www.sentinel.csiro.au/mapping/viewer.htm.

ABC Online

Fresh outbreaks test Perth firefighters. 18/01/2005. ABC News Online

[This is the print version of story
http://www.abc.net.au/news/newsitems/200501/s1283653.htm]

Last Update: Tuesday, January 18, 2005. 7:06am (AEDT)

Fresh outbreaks test Perth firefighters

Firefighters are working to contain a fresh outbreak in the massive bushfire burning in the hills east of Perth.

Nigel Higgs from the Department of Conservation and Land Management says emergency crews are working hard to stop the new flare-up.

"While things are safe on the western sectors near Pickering Brook and Karagullen, the main concern now is to the north-east where the fire has crossed the Helena River, south of the Mundairing Weir," he said.

Merv Austic from Western Australia's Fire and Emergency Services Authority says despite a cool change overnight, dry conditions on the ground continue to hamper firefighters.

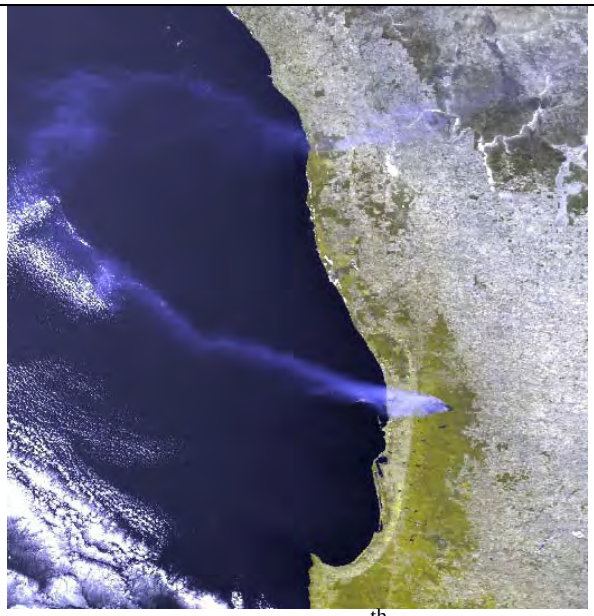
"It's still proving to be a very difficult fire to combat," he said.

Additional volunteers are being brought in from regional centres hundreds of kilometres away to relieve exhausted crews.

Some crews have been operating for more than 30 hours straight.

Residents in the community of Pickering Brook have been told to prepare to defend their homes again, as south-west winds strengthen during the morning.

Attachment 4 - PM_{10} & $PM_{2.5}$ Exceedances on 19th January 2005



Satellite Image taken on 19th January 2005.

Photograph reproduced by permission of Department of Land Information, Satellite Remote Sensing Services.

Pollutant

PM_{10}, $PM_{2.5}$

Monitoring Site

Caversham and Duncraig

Highest Concentration

76.8 µg/m^3 – Caversham (PM_{10})
59.2 µg/m^3 – Duncraig (PM_{10})
40.6 µg/m^3 – Duncraig ($PM_{2.5}$)

Averaging Period

24 hours

NEPM Standard

PM_{10} – 50.0 ug/m^3
$PM_{2.5}$ – 25.0 ug/m^3 (advisory)

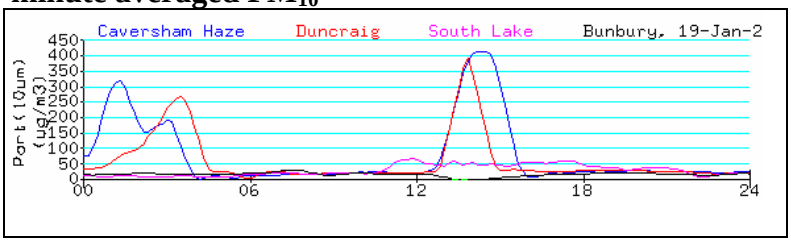
Description of Event

Bushfire burning in the Perth Eastern suburbs since Sunday 16th January 2005.

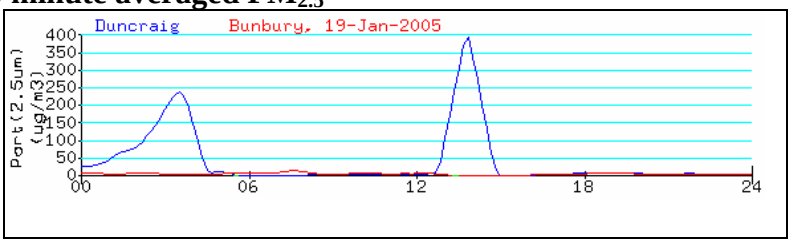
19th January 2005 particle levels

SITE	PM_{10}	$PM_{2.5}$
BN	16.3	4.6
CA	**76.8**	-
DU	**59.2**	**40.6**
SL	29.6	-

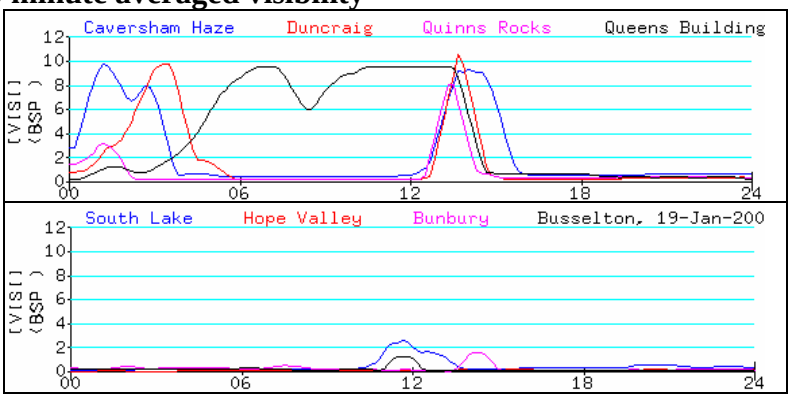
60 minute averaged PM_{10}



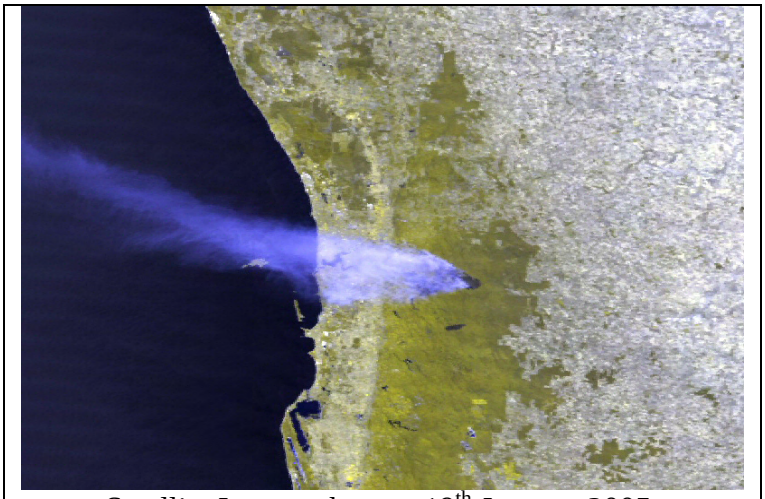
60 minute averaged $PM_{2.5}$



60 minute averaged visibility



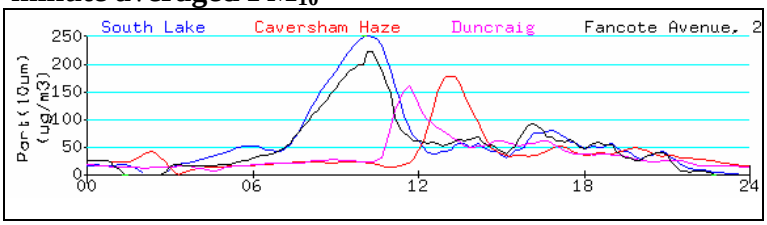
Attachment 5 – PM_{10} Exceedances on 20th January 2005



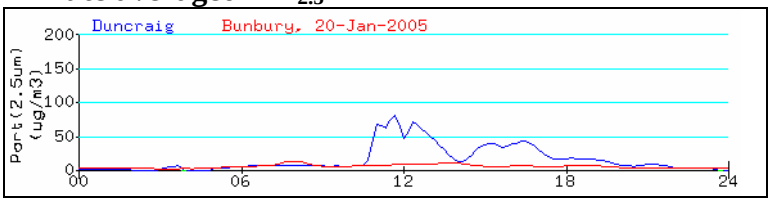
Satellite Image taken on 19th January 2005.

Photograph reproduced by permission of Department of Land Information, Satellite Remote Sensing Services.

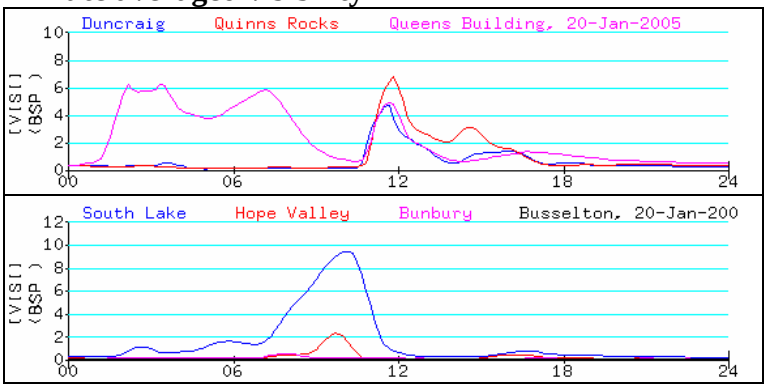
60 minute averaged PM_{10}



60 minute averaged $PM_{2.5}$



60 minute averaged visibility



Pollutant

PM_{10}

Monitoring Site

South Lake

Highest Concentration

59.9 ug/m^3

Averaging Period

24 hours

NEPM Standard

PM_{10} – 50.0 ug/m^3
$PM_{2.5}$ – 25.0 ug/m^3 (advisory)

Description of Event

Bushfire burning in the Perth Eastern suburbs since Sunday 16th January 2005.

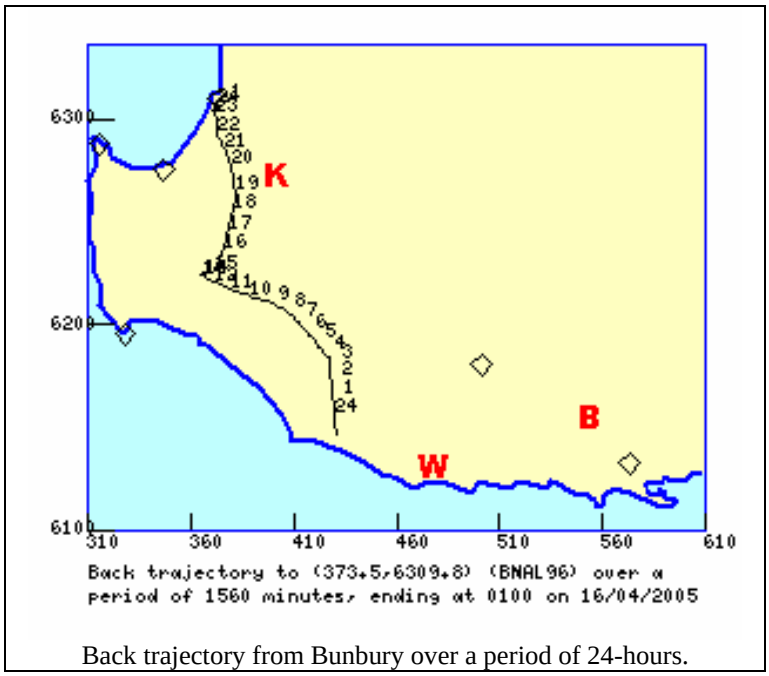
20th January 2005 particle levels

SITE	PM_{10}	$PM_{2.5}$
CA	37.5	-
DU	36.1	16.1
SL	**59.9**	-
BN	19.0	6.0

Concentrations given in µg/m^3.

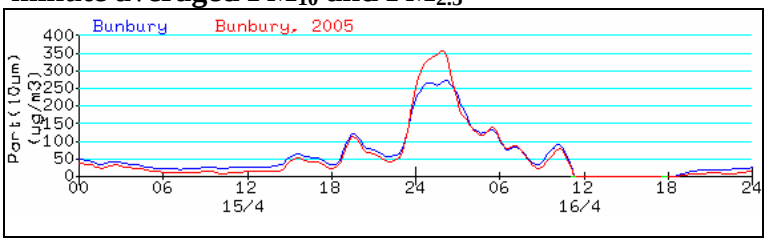
NOTE:
Caversham nephelometer has developed a fault and is currently off line.

Attachment 6 – PM_{10} & $PM_{2.5}$ Exceedances on 15-16 April 2005

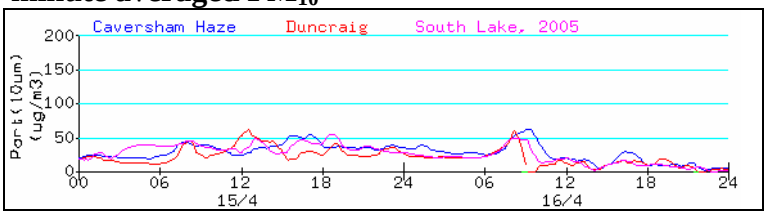


Back trajectory from Bunbury over a period of 24-hours.

60 minute averaged PM_{10} and $PM_{2.5}$



60 minute averaged PM_{10}



Pollutant

PM_{10}, $PM_{2.5}$

Monitoring Site

Bunbury

Highest Concentration

Bunbury	PM_{10}	$PM_{2.5}$
15/04/05	50.5	40.8
16/04/05	63.3	64.2

Averaging Period

24 hours

NEPM Standard

PM_{10} – 50.0 ug/m^3
$PM_{2.5}$ – 25.0 ug/m^3 (advisory)

Description of Event

Controlled burns in the southwest on 14/04/2005 at Kirup (4500Ha) and Walpole (2000Ha) and 15/04/2005 at Kirup (1000Ha), Walpole (2000Ha) and Mt. Barker (8000Ha) caused exceedances of the NEPM standard for PM_{10} and the NEPM advisory standard for $PM_{2.5}$ at Bunbury during two days.

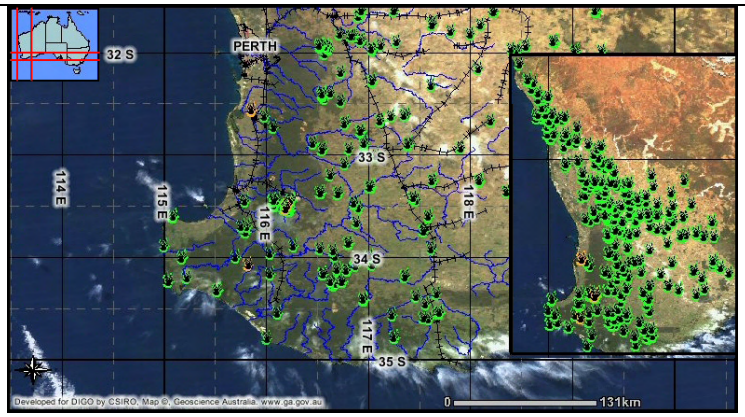
Bunbury	PM_{10}	$PM_{2.5}$
15/04/05	50.5	40.8
16/04/05	63.3	64.2

Concentrations given in µg/m^3.

Perth metropolitan particle levels were elevated, but remained below the relevant standards.

SITE	PM_{10}	$PM_{2.5}$
CA	33.6/22.7	-/-
DU	27.7/15.4	15.3/9.2
SL	35.7/16.8	-/-

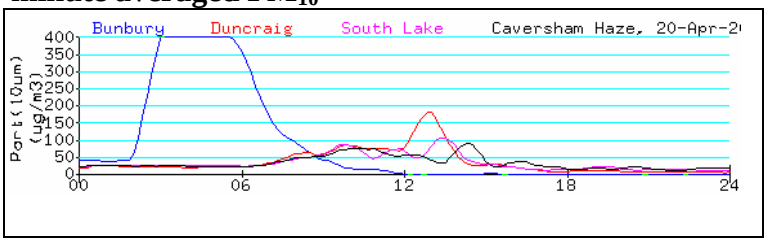
Attachment 7 – PM_{10} Exceedance on 20th April 2005



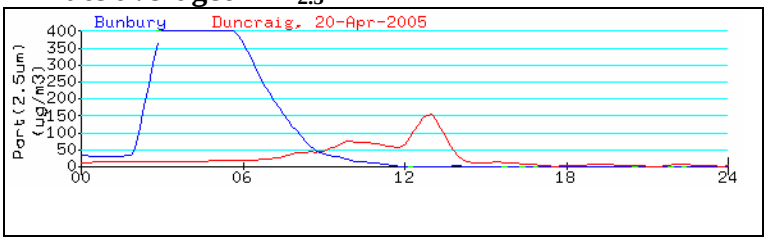
CSIRO hot-spot mapping indicates that there are numerous fires throughout the southwest.

(http://www.sentinel.csiro.au/mapping/viewer.htm).

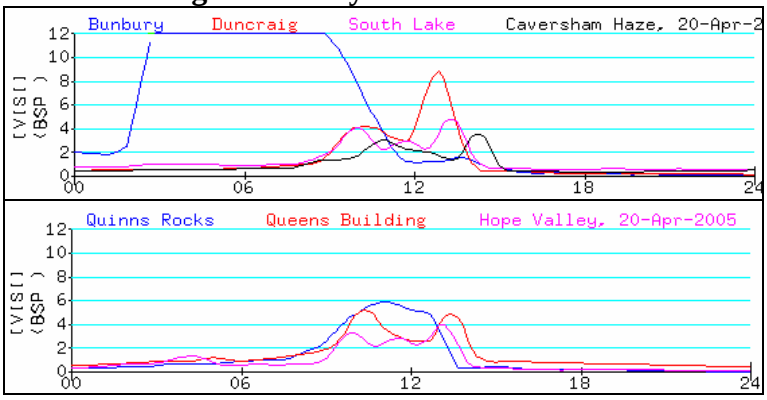
60 minute averaged PM_{10}



60 minute averaged $PM_{2.5}$



60 minute averaged visibility



NOTE: The data for PM_{10} and $PM_{2.5}$ is calculated using data from midnight to 12 noon. The data after 12 noon was removed due to excessive pressure drop across the TEOM filter due to excessive particle load. This event is not included in the tables presented in the body of this document.

Pollutant

PM_{10}

Monitoring Site

Bunbury

Highest Concentration

83.4 µg/m^3 – PM_{10}
86.1 µg/m^3 – $PM_{2.5}$

Averaging Period

24 hours

NEPM Standard

PM_{10} – 50.0 ug/m^3
$PM_{2.5}$ – 25.0 ug/m^3 (advisory)

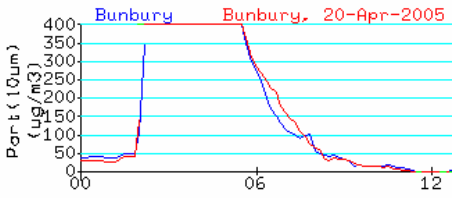
Description of Event

The smoke was the result of fuel reduction burning by private property owners and fire suppression work undertaken by local Bushfire Brigades and Department of Conservation and Land Management.

Particle levels µg/m^3.

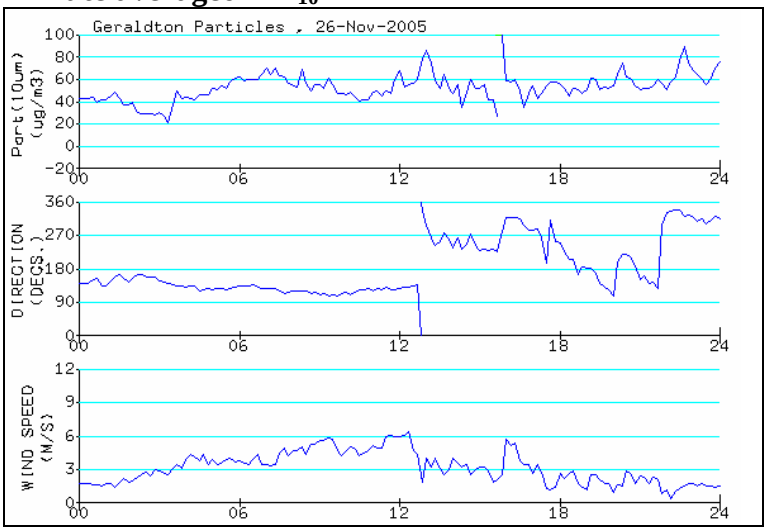
SITE	PM_{10}	$PM_{2.5}$
CA	33.7	-
DU	36.6	27.2
SL	34.2	-
BN	**83.4**	**86.1**

NOTE: The **$PM_{2.5}$** concentration is greater than the **PM_{10}** concentration. This may be due to some form of hysteresis in the **$PM_{2.5}$** TEOM as shown in the 10-minute averaged plot below.

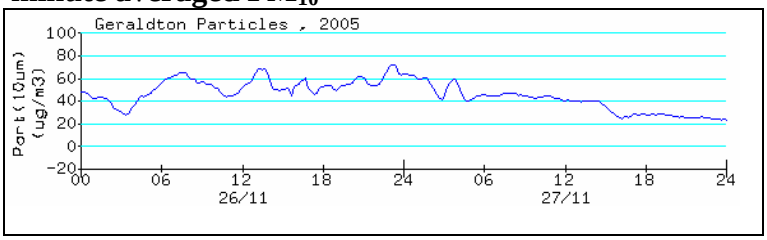


Attachment 8 – PM_{10} Exceedance on 26th November 2005

10 minute averaged PM_{10}



60 minute averaged PM_{10}



Pollutant

PM_{10}

Monitoring Site

Geraldton

Highest Concentration

52.9 µg/m^3 – PM_{10}

Averaging Period

24 hours

NEPM Standard

PM_{10} – 50.0 ug/m^3

Description of Event

Following advice received from Paul Anderson from the Geraldton DEC.

"A large area around the monitor was grassed (and exposed sand) and was cut by tractor mowers around that time. This generally causes large amounts of localised dust."

Attachment 9 – PM_{10} Exceedance on 31st December 2005

Pollutant

PM_{10}

Monitoring Site

Geraldton

Highest Concentration

61.3 µg/m^3 – PM_{10}

Averaging Period

24 hours

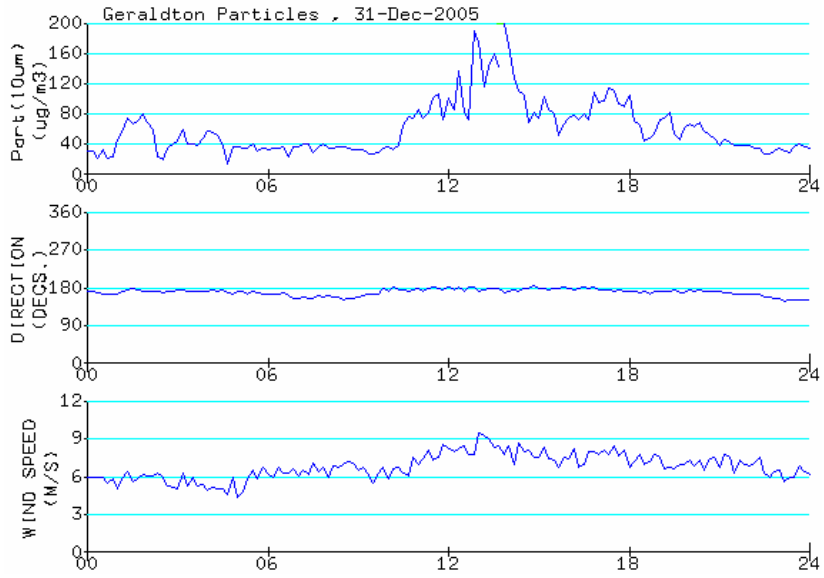
NEPM Standard

PM_{10} – 50.0 ug/m^3

Description of Event

High winds with possible scrub fire to the south.

10 minute averaged PM_{10}



60 minute averaged PM_{10}