

# WestConnex M4-M5 Link Ambient air quality monitoring results

**November 2017**

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## GLOSSARY

Term	Description
CH <sub>4</sub>	Methane
CO	Carbon monoxide
NMHC	Non-methane hydrocarbons
NO	Nitric oxide
NO <sub>2</sub>	Nitrogen dioxide
NO <sub>x</sub>	Oxides of nitrogen
O <sub>3</sub>	Ozone
ppb	Parts per billion
ppm	Parts per million
PM <sub>10</sub>	Airborne particulate matter with an aerodynamic diameter of less than 10 µm
PM <sub>2.5</sub>	Airborne particulate matter with an aerodynamic diameter of less than 2.5 µm
THC	Total hydrocarbons
µg/m <sup>3</sup>	Micrograms per cubic metre

## 1 Introduction: Understanding local air quality

WestConnex is undertaking air quality monitoring within local areas in close proximity to the proposed M4-M5 Link motorway. Monitoring stations have been established to measure the existing air quality conditions. The data collected through our monitoring program provides a baseline for the current air quality conditions along the project corridor. The data is being collected as part of the environmental assessment process for the M4-M5 Link project.

## 2 Monitoring air quality

To support the development and assessment of the M4-M5 Link, three ambient air quality monitoring stations have been established along the project corridor. Data from these three stations supplements the multiple long-term monitoring stations operated by NSW Office of Environment and Heritage and Roads and Maritime Services. Air quality specialists have been commissioned to operate and maintain the monitoring network during the planning phase of the project. A map of the monitoring station locations across the M4-M5 Link project area is provided below in **Figure 1**. It should be noted that the site at Haberfield was decommissioned on 20 November 2017, and no data was collected from this time onwards.

**Figure 1** M4-M5 Link air quality monitoring station locations



### 3 Monitoring methodology

Air quality monitoring is undertaken in accordance with Australian standards and guidelines. Specific pollutants are monitored and reported against the relevant air quality goals in the National Environment Protection Measure (Ambient Air Quality). Meteorological conditions are also monitored locally to give a greater understanding of the conditions that may influence air quality outcomes. For more information on the pollutants measured and monitoring methodology visit [www.westconnex.com.au](http://www.westconnex.com.au).

A data verification process is carried out to ensure high quality data capture. The data verification process includes:

- Removal of clearly incorrect data
- Corrections for instrument drift
- Corrections for offsets
- Removal of data acquired during calibration periods
- Removal of data during servicing, maintenance and equipment breakdown periods.

The above process can cause data gaps, and may be one reason why there is some data missing in the graphs provided.

The instruments measuring pollutants are subject to some variability and the results should be read within this context.

## 4 Results

A summary of air quality results from the M4-M5 Link monitoring network is provided below. Results of CO, NO<sub>2</sub>, PM<sub>10</sub> and PM<sub>2.5</sub> concentrations are provided and results are also represented graphically. The solid red line in each of the figures corresponds to the respective criteria or advisory reporting standard for that pollutant as stated in the NSW *Approved Methods* (NSW DEC, 2005).

Data from the M4-M5 Link air quality monitoring sites were compared to the free, 24 hour average data available from the NSW Office of Environment and Heritage (OEH) web site. Data were obtained for the OEH sites Chullora, Rozelle and Earlwood and the results are shown in **Section 4.5**.

### 4.1 Ramsay Street, Haberfield

A summary of the air quality results from the Ramsay Street monitoring station in Haberfield is provided in Table 1. It should be noted that the site was decommissioned on 20 November 2017, and no data was collected from this time onwards.

**Table 1 Ramsay Street summary statistics for air pollutants**

Statistics	CO (ppm) 8 hour rolling average values	NO <sub>2</sub> (ppb) 1 hour average values	PM <sub>10</sub> (µg/m <sup>3</sup> ) 24 hour average values	PM <sub>2.5</sub> (µg/m <sup>3</sup> ) 24 hour average values
Standard	9	120	50	25
Average value	0.2	9.1	13.3	5.7
Maximum value	0.5	34.3	23.3	10.2
Minimum value	0.1	0.1	9.0	2.7

**Note:** All monitoring instruments have an uncertainty associated with each measurement. This is normally described as  $\pm$  a specific value. Due to this, negative values could be reported at very low ambient concentrations.

### Reporting

Data availability was greater than 95% for the majority of air quality parameters. Reduced data capture for PM instruments was due to a number of readings for PM<sub>2.5</sub> higher than PM<sub>10</sub> between 5<sup>th</sup> and 8<sup>th</sup> October, which were invalidated as part of our QA process. The instruments were inspected by a Pacific Environment technician after a high rainfall event occurred during this time; no ongoing issues were identified with the instruments or shelter.

No exceedances in air quality criteria were observed across the November monitoring period.

It should be noted that a WestConnex construction compound was established adjacent to the monitoring site during early July 2016. This compound was removed and adjacent construction activities ceased during August 2017, though no observable impacts were noted to the data in this reporting period.

## 4.2 City West Link, Rozelle

A summary of the air quality results from the City West Link monitoring station in Rozelle is provided in **Table 2**.

**Table 2 City West Link summary statistics for air pollutants**

Statistics	CO (ppm) 8 hour rolling average values	NO <sub>2</sub> (ppb) 1 hour average values	PM <sub>10</sub> (µg/m <sup>3</sup> ) 24 hour average values	PM <sub>2.5</sub> (µg/m <sup>3</sup> ) 24 hour average values
Standard	9	120	50	25
Average value	0.4	15.6	18.7	6.4
Maximum value	0.6	51.1	28.2	9.5
Minimum value	0.2	-3.1	12.1	3.5

**Note:** All monitoring instruments have an uncertainty associated with each measurement. This is normally described as  $\pm$  a specific value. Due to this, negative values could be reported at very low ambient concentrations.

## Reporting

Data availability was greater than 80% for the majority of air quality parameters. Reduced data capture during the reporting period was due to a persistent fault with the site power, which led to the circuit breaker tripping on several occasions. It is suspected that this fault may be triggered by extremely heavy rainfall. A Pacific Environment technician and electrical subcontractor performed an inspection of the site in the previous reporting period (26<sup>th</sup> October) and further investigations into improving the structure and electrical connections are continuing.

The power issue resulted in a data gap for VOCs between 16 and 23 November. The instrument was inspected by a Pacific Environment technician on 17 November and replaced on 20 November.

No exceedances in air quality parameters were observed during the November monitoring period at Rozelle monitoring site.

### 4.3 St Peters Public School, St Peters

A summary of the air quality results from the St Peter Public School monitoring station in St Peters is provided in **Table 3**.

**Table 3 St Peters summary statistics for air pollutants**

Statistics	CO (ppm) 8 hour rolling average values	NO <sub>2</sub> (ppb) 1 hour average values	PM <sub>10</sub> (µg/m <sup>3</sup> ) 24 hour average values	PM <sub>2.5</sub> (µg/m <sup>3</sup> ) 24 hour average values
Standard	9	120	50	25
Average value	0.3	7.7	20.3	5.3
Maximum value	1.8	29.6	30.0	8.9
Minimum value	0.0	0.6	12.8	2.1

**Note:** All monitoring instruments have an uncertainty associated with each measurement. This is normally described as  $\pm$  a specific value. Due to this, negative values could be reported at very low ambient concentrations.

### Reporting

Data availability was greater than 95% for the majority of air quality parameters.

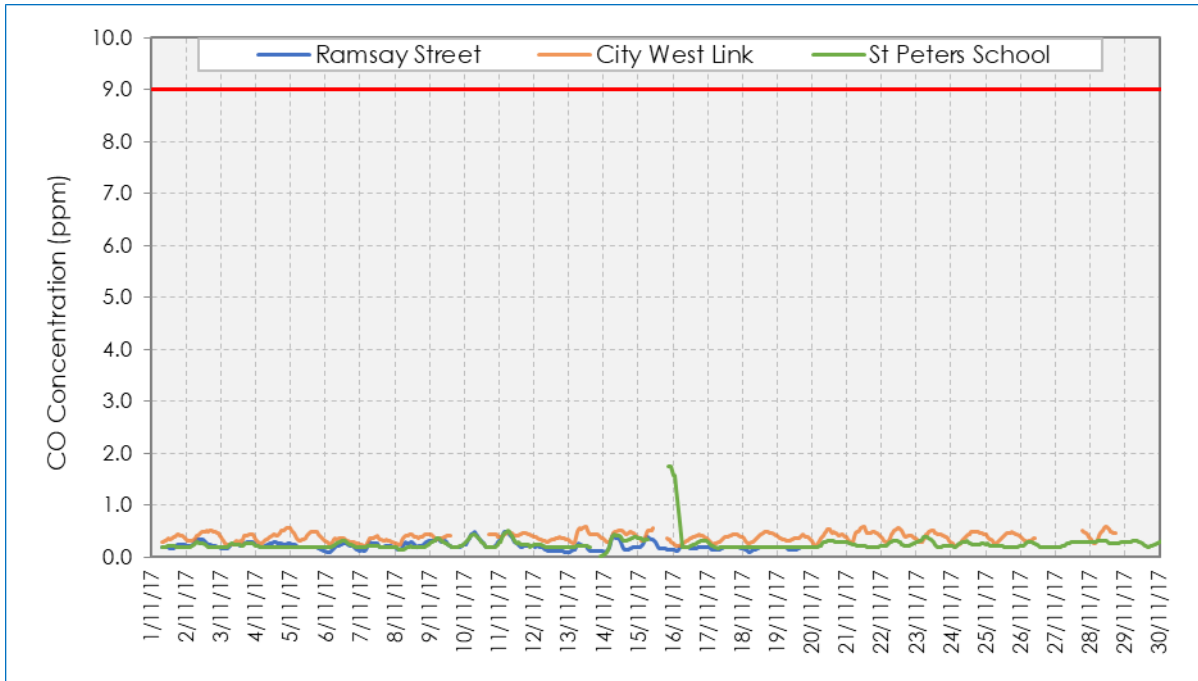
No exceedances in air quality parameters were observed during the November monitoring period at St Peters monitoring site.



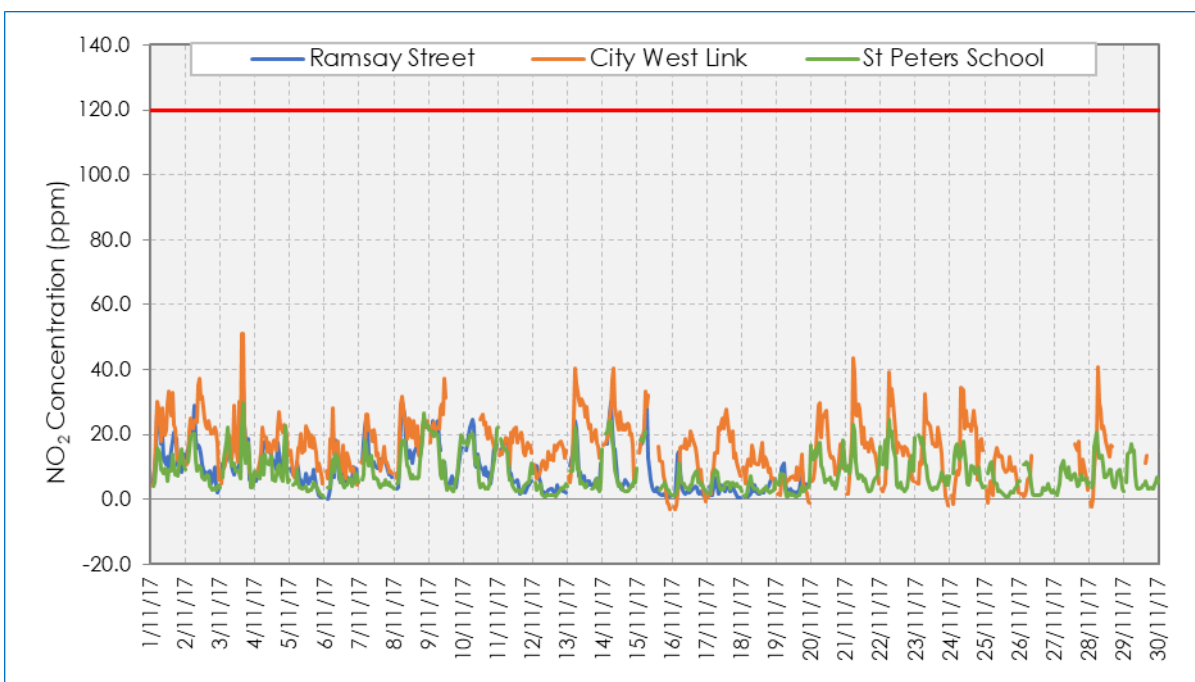
#### 4.4 Time series

The time series for the various pollutants during the reporting period are provided below. Pollutant concentrations are also averaged over the periods stated for short-term air quality criteria in the NSW Approved Methods. Where appropriate, the corresponding criterion is shown as a solid red line. It should be noted that Site 01 (Ramsey Street) was decommissioned on 20 November 2017.

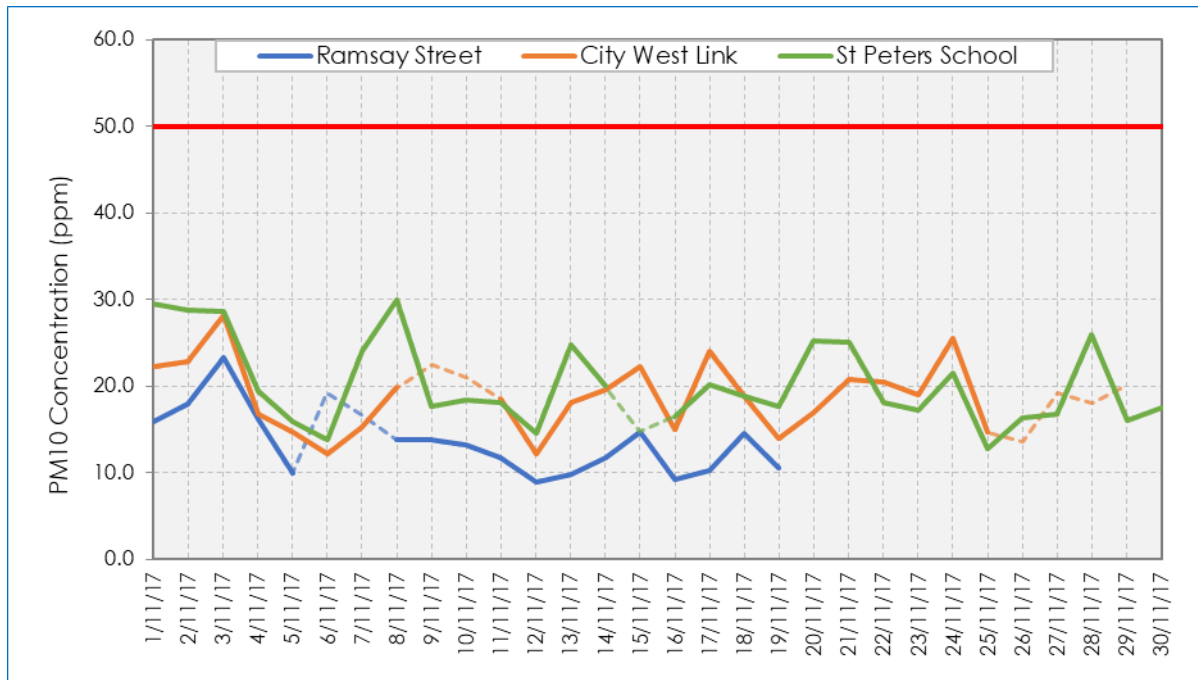
**Figure 2 CO concentrations at M4-M5 Link sites (eight hour rolling average)**



**Figure 3 NO<sub>2</sub> concentrations at M4-M5 Link sites (one hour average)**

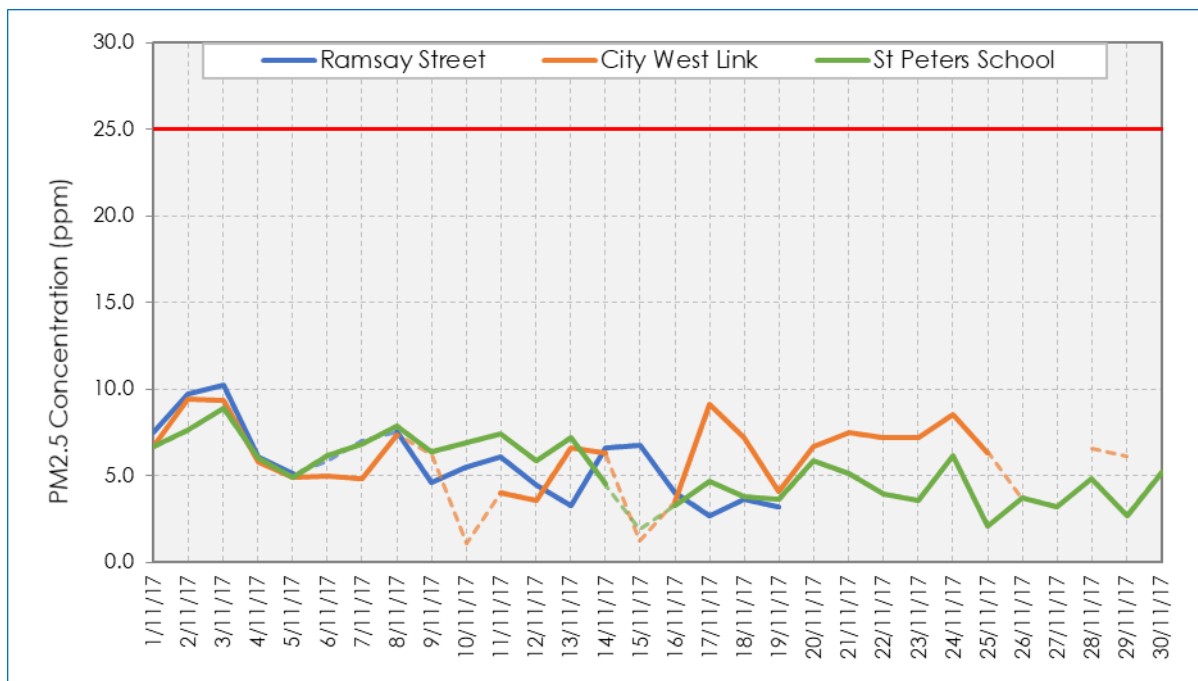


**Figure 4 PM<sub>10</sub> concentrations at M4-M5 Link sites (24 hour average)**



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available

**Figure 5 PM<sub>2.5</sub> concentrations at M4-M5 Link sites (24 hour average)**

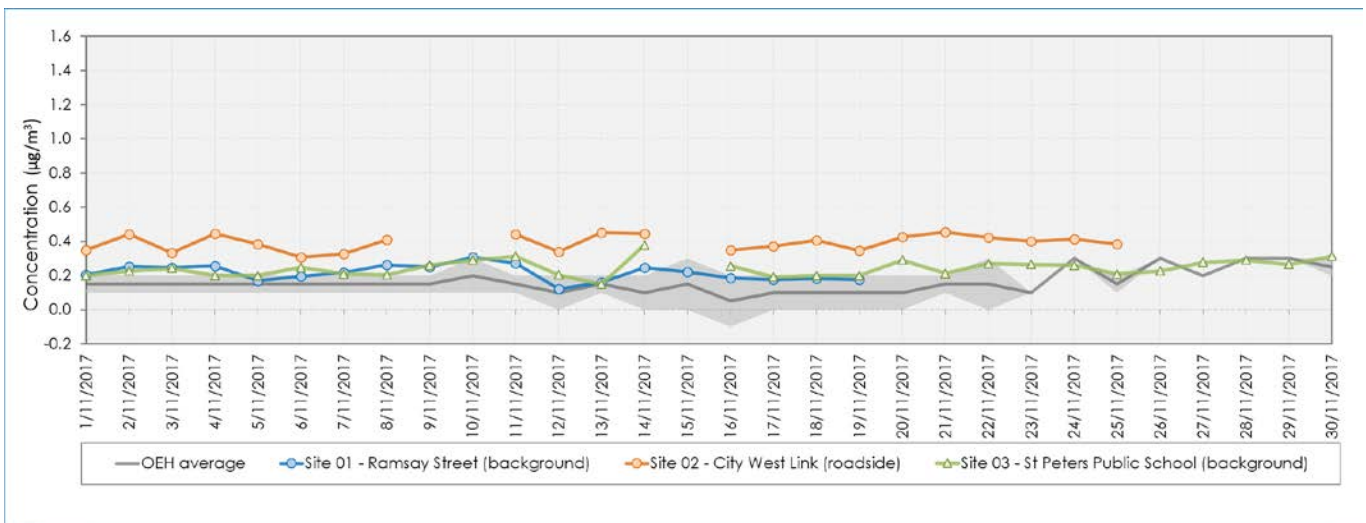


Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available

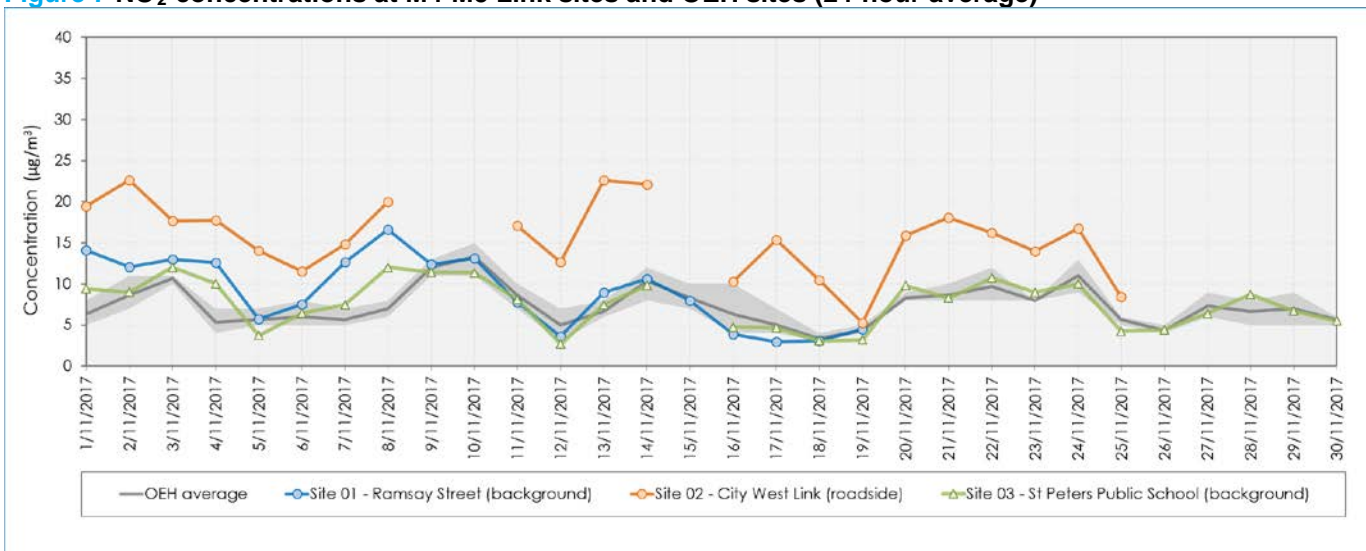
#### 4.5 Comparison with data from OEH monitoring sites

The following graphs show the comparison – as time series of 24-hour averages - between the particulate concentrations at the M4-M5 Link sites and those at the OEH sites. The OEH data are shown as average values for the Chullora, Rozelle and Earlwood sites, with the grey shaded area giving the range of values across the three sites (i.e. the graphs show the maximum, average and minimum values for the three OEH sites). It should be noted that concentrations will vary between the WestConnex sites and OEH due to the differing nature of the sites (e.g. roadside vs background). It should be noted that Site 01 (Ramsey Street) was decommissioned on 20 November 2017.

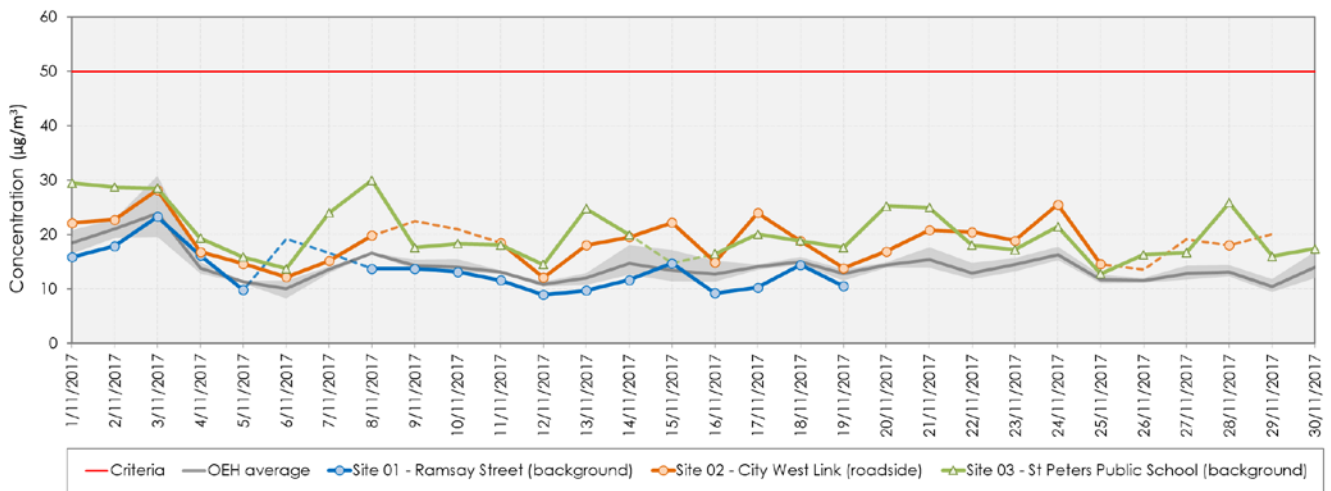
**Figure 6 CO concentrations at M4-M5 Link sites and OEH sites (24-hour average)**



**Figure 7 NO<sub>2</sub> concentrations at M4-M5 Link sites and OEH sites (24-hour average)**

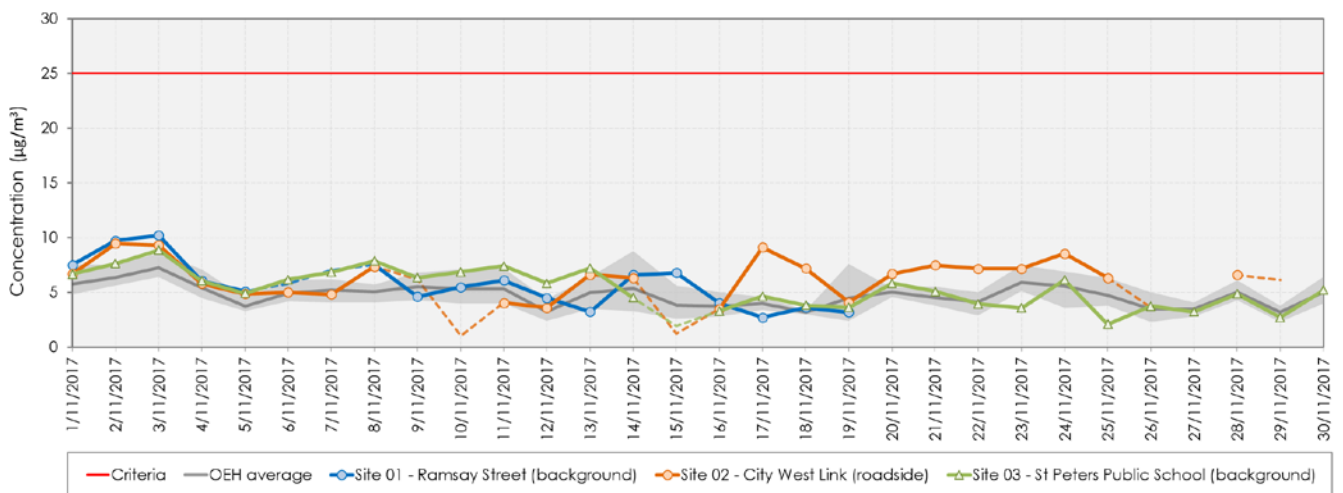


**Figure 8 PM<sub>10</sub> concentrations at M4-M5 Link sites and OEH sites (24-hour average)**



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.

**Figure 9 PM<sub>2.5</sub> concentrations at M4-M5 Link sites and OEH sites (24-hour average)**



Note: Dashed line denotes results where less than 75% of the expected samples in the averaging period are available.