Appendix BB

Air Quality Review

Landcom

15-Mar-2018

Air Quality Review

Cudgegong Road Station Precinct South

Air Quality Review

Cudgegong Road Station Precinct South

Client: Landcom

ABN: 79 268 260 688

Prepared by

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15-Mar-2018

Quality Information

Document Air Quality Review

Date 15-Mar-2018

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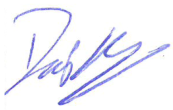
Reviewed by David Rollings

Revision History

Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
1	5-March-2018	For Review	David Rollings Associate Director - Air Quality	
2	12-Mar-2018	For Review	David Rollings Associate Director - Air Quality	
3	15-Mar-2018	Final	David Rollings Associate Director - Air Quality	

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Executive Summary

The NSW Government is currently building the Sydney Metro Northwest (SMNW) that is due to start operations in 2019. The SMNW is Stage 1 of the overall Sydney Metro project and involves the construction of eight new metro stations supporting infrastructure between Cudgegong Road and Epping and converting five existing stations between Epping and Chatswood. Stage 2 will deliver a new metro rail line from Chatswood through Sydney's CBD to Sydenham (Sydney Metro City and Southwest).

Landcom and the Sydney Metro Delivery Office (SMDO), part of Transport for NSW (TfNSW), are working in collaboration to develop walkable, attractive, mixed use places around the SMNW stations. This includes using the surplus government owned land located around the Cudgegong Road Station.

The subject site, the Cudgegong Road Station Precinct South, is located between Cudgegong Road, Tallawong Road, Schofields Road and the Metro corridor and comprises around 7.8ha of government owned land. It is within the southern part of the broader Cudgegong Road Station Precinct (Area 20) of the North West Priority Growth Area, a substantial land release area for homes and jobs in Sydney's northwest.

AECOM was engaged to undertake an Air Quality Impact Assessment to address the requirements of item 8 of the Cudgegong Road Station Precinct South - SEARs. The results of this assessment is that the general dispersion parameters such as meteorology, terrain and surrounding land use demonstrated that due to the general wind conditions of the area blowing parallel to or away from the Study Area and the lack of any complex terrain or additional sources of pollution, the site is adequately located to minimise air quality impacts as a result of both vehicle emissions from Windsor Road and odour associated with broiler farm operations located at Riverstone and Marsden Park approximately six kilometres to the west.

In conclusion, as current air quality meets relevant EPA criteria, in combination with the lack of any complex meteorology, terrain or major sources of pollution, there are no air quality issues requiring consideration in regard to the development within the Study Area.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) has been engaged by Landcom to undertake an Air Quality Study as part of the proposed Cudgegong Road Station Precinct South, in the Northwest Growth Centre of Sydney. The precinct is a proposed mixed use neighbourhood located a short walk from the new Metro Station at the end of the Sydney Metro Northwest line.

The scope of the assessment was as stated in item 8 of the SEARs:

"…*air quality impact assessment shall be conducted in accordance with relevant Environment Protection Authority guidelines identifying all potential sources of air and odour emissions from surrounding land uses and a description and appraisal of any mitigation and monitoring measures required*."

The scope of the assessment included the following:

- Identification of relevant ambient air quality criteria;
- Discussion of relevant development guidelines relevant to Air Quality Impact Assessment including the *DP&Es Development Near Rail Corridors and Busy Roads – Interim Guideline*;
- Discussion of local meteorology and climate conditions based on available Bureau of Meteorology (BoM) data;
- Discussion on existing air quality within the Study Area based on available Office of Environment and Heritage (OEH) data;
- Identification of potential sources of air and odour emissions from surrounding land uses;
- A qualitative odour impact assessment conducted in accordance with the *EPA's Technical framework: Assessment and management of odour from stationary sources in NSW* and *Technical Notes* (DEC 2006); and
- Provision of recommendations including any potential safeguards or monitoring that may be required.

2.0 Location

The Cudgegong Road Station Precinct South (herein referred to as the *Study Area*) is located at Rouse Hill, approximately 30 km northwest of the Sydney CBD, on the southern boundary of the Sydney Metro Northwest Cudgegong Road railway station currently under construction.

The under construction Sydney Metro Trains stabling facility is located immediately to the west, while the southern boundary abuts Schofields Road which is currently being upgraded to become a major east-west connection between Windsor Road and Richmond Road. Windsor Road is located approximately one kilometre to the east, the urban settlements of Kellyville Ridge and The Ponds to the south and southeast and rural allotments to the north and northwest. Three kilometres further to the west and northwest are the urban settlements of Riverstone and Schofields respectively.

3.0 Scope of Works

The Air Quality Impact Assessment was prepared with consideration given to the following guidelines:

- ***Development Near Rail Corridors and Busy Roads – Interim Guideline, 2008***. This document lists a range of measures that need to be considered and possibly implemented for developments to be constructed close to rail corridors and busy roads. This document outlines factors that may impact upon the proposal as well as possible design considerations and mitigation measures to be considered for the project.
- ***Approved Methods for the Modelling and Assessment of Air Pollutants in NSW, 2017***. This document was generally referenced as a source of factors needing to be considered when assessing air quality projects. It was not explicitly followed due to the nature of the qualitative assessment not requiring dispersion modelling, but was used as a general guidance document.

In addition to the guidelines outlined above, consideration was given to general factors affecting pollution dispersion such as:

- ***Analysis of meteorology***: Historical meteorological data, local to the Study Area, was obtained from the BoM in order to gauge and understand the meteorological conditions that can be expected at the site.
- ***Identification of other potentially contributing sources of pollution.*** Surrounding land use was examined to determine whether there are any other sources of pollution that may result in air quality and odour impacts. The potential impact of odour from surrounding broiler farms located approximately six kilometres west of the Study Area were assessed using the EPA's *Meat Chicken (Broiler) Farm Level 1 Odour Assessment Calculator*.

4.0 Development Near Rail Corridors and Busy Roads – Interim Guideline

The “Development Near Rail Corridors and Busy Roads – Interim Guideline” defines that air quality should become a design consideration when the site is:

- Within 10 metres of a congested collector road (traffic speeds of less than 40 km/hr at peak hour or a road grade > 4% or heavy vehicle percentage flows > 5%),
- Within 20 metres of a freeway or main road (with more than 2500 vehicles per hour, moderate congestions levels of less than 5% idle time and average speeds of greater than 40 km/hr),
- Within 60 metres of an area significantly impacted by existing sources of air pollution (road tunnel portals, major intersection / roundabouts, overpasses or adjacent major industrial sources), or
- As considered necessary by the approval authority based on consideration of site constraints, and associated air quality issues.

The *Guideline* provides the following recommended design considerations in regard to air quality should a site meet any of the criteria listed above:

- Minimising the formation of urban street canyons by having buildings of different heights, interspersed with open spaces can aid in promoting air flow. Urban Street Canyons can form when a street is flanked by buildings on both sides which have the potential to reduce pollution dispersion increasing the potential for higher pollution concentrations. Setting back the upper levels of multi-levelled buildings can also minimise build-up of air pollution.
- When planning the site it is recommended to use broad scale site planning principles to determine the position of certain buildings and their orientation to pollution sources. Areas such as bedrooms, outdoor spaces, childcare centres, hospitals and other sensitive uses should be located as far as is practical from a pollution source such as a road.
- For any development adjacent to roadway emission sources, openable windows should be considered in the design process i.e. openable windows not positioned adjacent to the source of pollution. When mechanical ventilation is favoured or proposed, the air intakes should be positioned so as to maximise the distance between the intake and the road as well as facing away from the source of pollution.
- Landscaping is a relevant design consideration that could include vegetative screens, barriers and earth mounds as a way to minimise any harmful impacts on local ambient air quality.

In addition, the *Guideline* provides a list of measures to be considered in the design of the development to minimise the potential for air quality impacts. When design features cannot eliminate an impact sufficiently, certain measures can be employed to mitigate many impacts. For buildings this primarily consists of internal ventilation options such as:

- Natural Ventilation through open windows to ensure pollution does not accumulate within a building. This presents the simplest and cheapest option to provide air flow throughout a building as it relies on natural pressure and temperature differences between the inside and outside of the building. However, when windows must be kept closed other ventilation systems can be utilised.
- Passive Acoustic ventilation is an option where ventilators are installed to maintain external airflow without the impact of external noise sources.
- Mechanical Ventilation may be considered where windows need to be kept closed and involves circulation of fresh air into the building using ducts and fans. This is an option to be considered as a means to ‘treat’ air through filtration (e.g. carbon filters) as it enters the building. Mechanical ventilation air inlet ports should be positioned as far from the source of pollution as is practical i.e. in this case to the south of the buildings. Any adopted ventilation systems must meet the requirements of the *Building Code of Australia* and *Australian Standard 1668 – The use of ventilation and air conditioning in buildings*.

5.0 Air Quality Criteria

5.1 Principal Pollutants of Concern

Given the nature of the local area, the principal pollutants of concern included in this assessment are fine particulate matter and nitrogen dioxide.

5.2 Fine Particulate Matter (PM_{10} and $PM_{2.5}$)

Particulate matter refers to the many types and sizes of particles suspended in the air we breathe.

Particles with an aerodynamic diameter less than or equal to 10 micrometres (PM_{10}) tend to remain suspended in the air for longer periods than larger particles and can penetrate human lungs.

Particulate matter is unique among atmospheric pollutants in that it is not defined on the basis of its chemical composition; it includes a broad range of chemical species. Particulate matter can be emitted from natural sources (bushfires, dust storms and pollens) or as a result of human activities such as combustion activities (motor vehicle emissions, power generation and incineration), excavation works, bulk material handling, crushing operations, unpaved roads and use of wood heaters.

Exposure to particulate matter has been linked to a variety of health effects, including respiratory problems (e.g. coughing, aggravated asthma, chronic bronchitis) and heart attacks. If the particles contain toxic materials (such as lead, cadmium, zinc) or live organisms (such as bacteria or fungi), toxic effects or infection can occur from the inhalation of the dust.

Fine particulates (those with diameters less than or equal to 2.5 micrometres, known as $PM_{2.5}$) are typically generated from vehicle exhaust, bushfires and some industrial activities, and can remain suspended in the air for days or weeks. As these fine particulates can travel further into human lungs than the larger particulates and are often made up of heavy metals and carcinogens, fine particulates are considered to pose a greater risk to health.

5.3 Nitrogen dioxide (NO_2)

Nitrogen dioxide is a brownish gas with a pungent odour. It exists in the atmosphere in equilibrium with nitric oxide. The mixture of these two gases is commonly referred to as oxides of nitrogen. Oxides of nitrogen are a product of combustion processes. In urban areas, motor vehicles and industrial combustion processes are the major sources of ambient oxides of nitrogen. Oxides of nitrogen can cause damage to the human respiratory tract, increasing a person's susceptibility to respiratory infections and asthma. Damage to plants can occur in environments with high oxides of nitrogen concentrations, especially in the presence of other pollutants such as ozone and sulphur dioxide. Oxides of nitrogen are the primary ingredients in the reactions that lead to photochemical smog formation.

5.4 Assessment Criteria

In order to determine the potential effects of general air quality in the air shed, ambient pollutant concentrations can be compared to relevant impact assessment criteria. In NSW, the criteria are specified in *Table 7.1; Impact assessment criteria* of the NSW Environment Protection Authority (EPA) *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (EPA, 2016) and represent maximum allowable pollution levels at the boundary of the premises. The criteria for the relevant pollutants of concern are reproduced in Table 1 below.

Table 1 Regulatory air quality criteria (μg/m³)

Pollutant of Concern	Standard μg/m³	Averaging Period	Agency
PM_{10}	50	24-hour	DoE (2016)
	25	Annual	DoE (2016)
$PM_{2.5}$	25	24 hour	DoE (2016)
	8	Annual	DoE (2016)
NO_2	246	1 hour	NEPC (1998)
	62	Annual	NEPC (1998)

DoE – Department of the Environment

NEPC – National Environment Protection Council

6.0 Air Quality Monitoring Data

The NSW Office of Environment and Heritage (OEH) operate several ambient air quality monitoring locations across the Sydney region. The location nearest to the Study Area, located at Vineyard 7 kilometres to the northwest, was decommissioned by the OEH in late 2016. The next nearest monitoring location currently operating is at Richmond 20 kilometres to the northwest. The data from these two sites for the four year period from 2014 to 2017 is summarised in the following sections.

6.1 Particulate Matter

6.1.1 Particulate Matter (PM_{10})

Tables 2 and **3** and Figure 1 present the PM_{10} data for the Vineyard and Richmond sites for the years 2014 to 2017.

Table 2 Ambient PM_{10} Concentrations 2014 – 2016 at Vineyard OEH monitoring location

Statistic	24 hour average PM_{10} Concentration - µg/m3			
	2014	2015	2016	2017
Maximum 24 hour concentration	41.9	59.0	105.4	-
24 hour Criterion	50			
24 hour exceedance count	0	1	4	-
Statistic	Annual average PM_{10} Concentration - µg/m3			
	2014	2015	2016	2017
Annual Average	16.3	15.9	17.0	-
Annual Average Criterion	25			

Table 3 Ambient PM_{10} Concentrations 2014 – 2017 at Richmond OEH monitoring location

Statistic	24 hour average PM_{10} Concentration - µg/m3			
	2014	2015	2016	2017
Maximum 24 hour concentration	40.0	49.3	102.8	51.5
24 hour Criterion	50			
24 hour exceedance count	0	0	2	1
Statistic	Annual average PM_{10} Concentration - µg/m3			
	2014	2015	2016	2017
Annual Average	15.4	12.8	16.0	16.0
Annual Average Criterion	25			

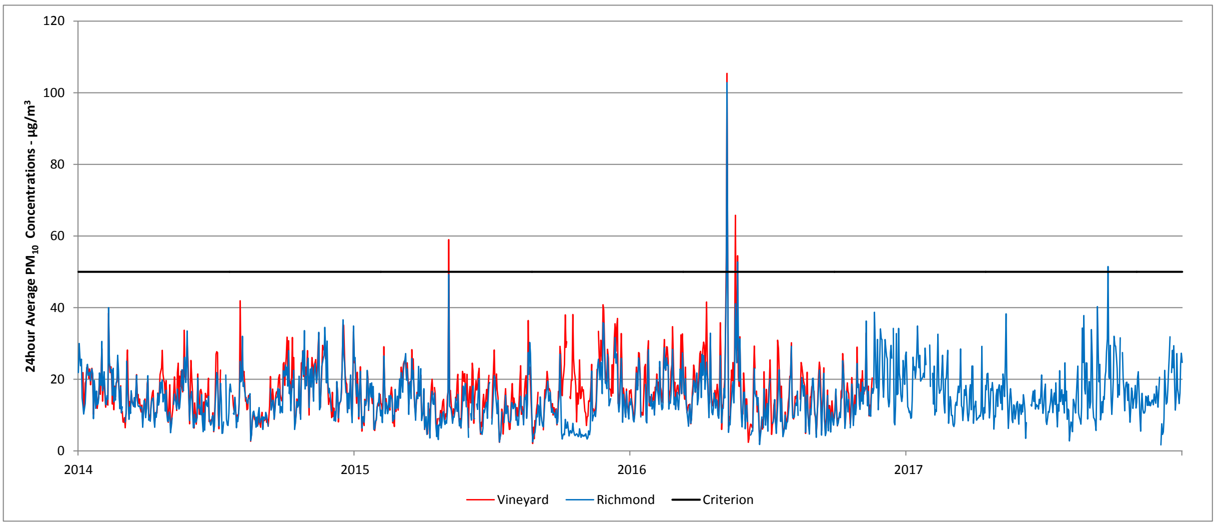

Figure 1 OEH Vineyard and Richmond PM_{10} 24 hour Average Monitoring Data – 2014-2017

The data shows no exceedances of the 24 hour criterion for 2014; one exceedance (6 May) at Vineyard in 2015; four exceedances (7, 8, 19, 22 May) at Vineyard and two (8, 22 May) at Richmond in 2016; and one exceedance (24 September) at Richmond in 2017. OEH *Annual Air Quality Statements* for 2016 and 2017 indicate that the 2016 and 2017 exceedances were all due to exceptional events which are defined as events related to bushfires, hazard reduction burns and dust storms.

Annual average values show a relatively small range across the years with all years below the annual average criterion.

6.1.2 Particulate Matter ($PM_{2.5}$)

Table 4 and Figure 2 present the $PM_{2.5}$ data for the Richmond site for the years 2014 to 2017. OEH air monitoring at the Vineyard did not include $PM_{2.5}$.

Table 4 Ambient $PM_{2.5}$ Concentrations 2014 – 2017 at Richmond OEH monitoring location

Statistic	24 hour average $PM_{2.5}$ Concentration - µg/m3			
	2014	2015	2016	2017
Maximum 24 hour concentration	24.7	24.5	83.4	34.3
24 hour Criterion	25			
24 hour exceedance count	0	0	6	3
Statistic	Annual average $PM_{2.5}$ Concentration - µg/m3			
	2014	2015	2016	2017
Annual Average	6.7	7.7	7.9	7.0
Annual Average Criterion	8			

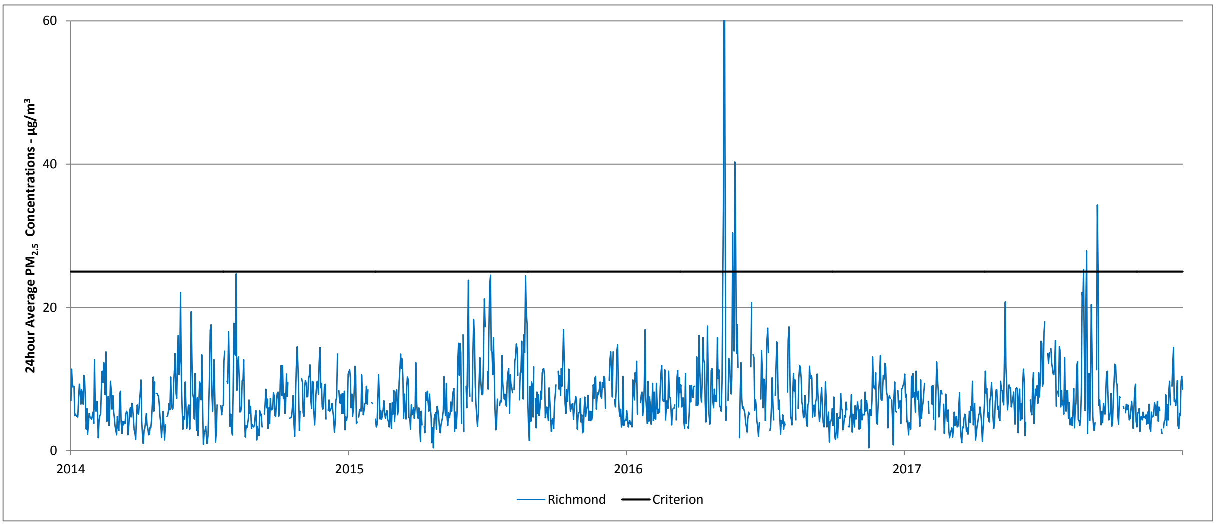

Figure 2 OEH Richmond $PM_{2.5}$ 24 hour Average Monitoring Data – 2014-2017

The data shows no exceedances of the 24 hour criterion for 2014 and 2015; six exceedances (7, 8, 9, 19, 22, 23 May) in 2016; and three exceedances (23, 28 August and 10 September) in 2017. OEH *Annual Air Quality Statements* for 2016 and 2017 indicate that these exceedances were all due to exceptional events which are defined as events related to bushfires, hazard reduction burns and dust storms.

Annual average values show a relatively small range across the years with all years below the annual average criterion.

In addition, in regard to the 24 hour criteria exceedances in May 2016**,** Figure 3 reproduced from the Medical Journal of Australia, *(https://www.mja.com.au/journal/2016/205/9/rapid-assessment-impact-hazard-reduction-burning-around-sydney-may-2016)* shows the extent of high ambient $PM_{2.5}$ associated with hazard reduction burning during the month of May 2016.

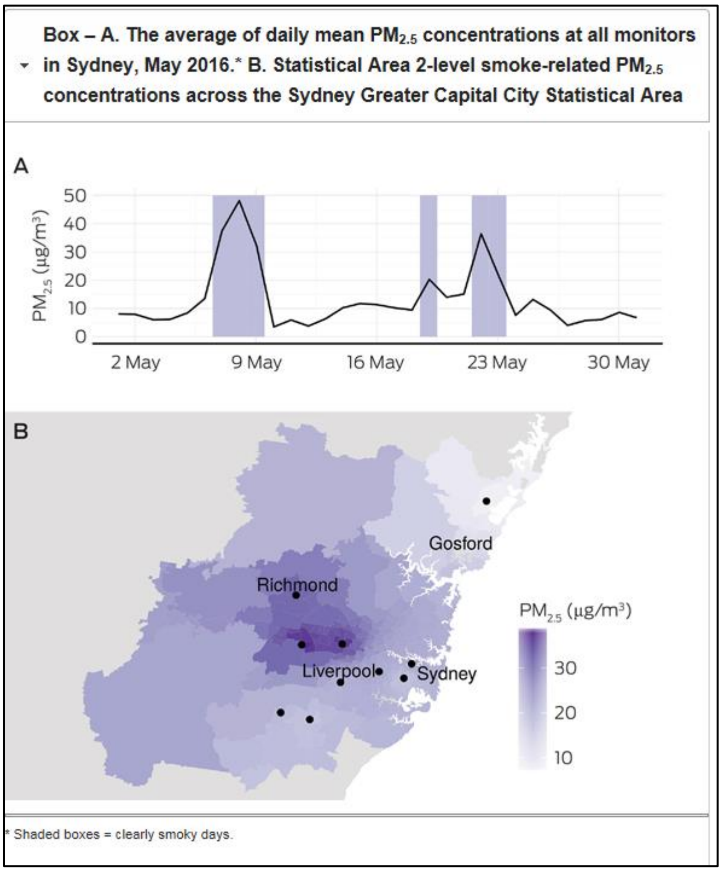

Figure 3 Smoke Related PM2.5 Concentrations in May 2016

6.1.3 Nitrogen Dioxide

Table 5, Table 6 and Figure 4 present the NO_2 data for the Vineyard and Richmond sites for the years 2014 to 2017.

Table 5 Ambient NO_2 Concentrations 2014 – 2016 at Vineyard OEH monitoring location

Statistic	1 hour average NO_2 Concentration - µg/m3			
	2014	2015	2016	2017
1hour Max	68	64	66	-
1hour Criterion	246			
Statistic	Annual average NO_2 Concentration - µg/m3			
	2014	2015	2016	2017
Annual Average	10	10	10	-
Annual Average Criterion	62			

Table 6 Ambient NO_2 Concentrations 2014 – 2017 at Richmond OEH monitoring location

Statistic	1 hour average NO_2 Concentration - µg/m3			
	2014	2015	2016	2017
1hour Max	57	49	62	53
1hour Criterion	246			
Statistic	**Annual average NO_2 Concentration - µg/m3**			
	2014	2015	2016	2017
Annual Average	8	8	8	10
Annual Average Criterion	62			

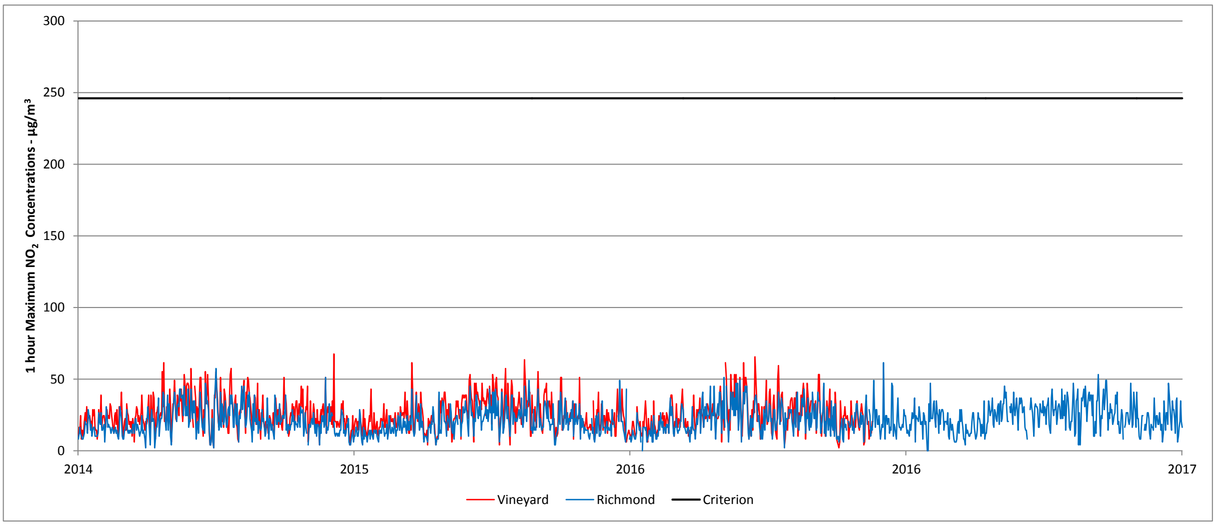

Figure 4 OEH Vineyard and Richmond NO_2 1 hour Maximum Monitoring Data – 2014-2017

The data shows no exceedances of the 24 hour or annual criteria for all years from 2014 to 2017 with all values less than a quarter of the relevant criteria.

7.0 Factors Affecting Pollution Dispersion

There are a range of factors affecting dispersion of pollution. The main parameters that are relevant to this study are:

- Meteorology;
- Terrain; and
- Existing sources of pollution.

The following sections analyse these factors in terms of their potential influence of air pollution dispersion around the study area.

7.1 Meteorology

Meteorology defines the direction of pollution transport along with the rate of mixing and hence dispersion in the atmosphere. An analysis of the meteorology aids in the understanding of whether pollution from a source is likely to influence a particular Study Area.

The Bureau of Meteorology (BOM) operates a network of monitoring stations around the state. Local meteorological data was taken from the monitoring location closest to the Study Area at Richmond.

Historical meteorological data including average temperatures; rainfall; relative humidity; wind speed and wind roses showing the average monthly wind conditions at 9am and 3pm were obtained from the BOM website (*http://www.bom.gov.au/climate/averages/tables/cw_067105.shtml; accessed 01 March 2018 (Richmond RAAF*). The Richmond RAAF weather station provided up to 24 years of temperature and rainfall data between 1993 and 2018 and 16 years of wind data between 1193 and 2010.

Meteorological data for Richmond is provided in Figure 5 to Figure 8 and Table 7. The warmest temperatures at Richmond occur in summer, with the average maximum temperature recorded in January (30.3^{o}C). July is the coldest month with an average minimum temperature of 3.6^{o}C. Rainfall is highest in February (mean rainfall of 115.5mm) and lowest in July (mean rainfall of 28.4mm). Annual average rainfall is 738.1mm. Wind data shows the following patterns:

- January to March - morning winds are light and predominantly from the south and southwest with calm conditions from 10 to 29%. Afternoon winds increase in strength changing to predominantly northeast, east and southeast with very low (1%) calm conditions.
- April to June - morning winds are light and variable with calm conditions from 27 to 42%. Afternoon winds increase in strength changing to predominantly from the northeast, east and southeast with very relatively low (3 to 6%) calm conditions.
- July to September, morning winds are light and variable with calm conditions from 15 to 40%. Afternoon winds increase in strength changing to predominantly from the west with relatively low (1 to 3%) calm conditions.
- October to December, morning winds are light and predominately from the north and south with calm conditions around 10%. Afternoon winds increase in strength changing to predominantly northeast, east and southeast with very low (1%) calm conditions.

The meteorological data indicates variable wind patterns throughout the year with summer easterly / winter westerly wind pattern. Given the predominant winds and the surrounding landuse, there are no indications of any potential air quality impacts on the Study Area due to prevailing meteorology.

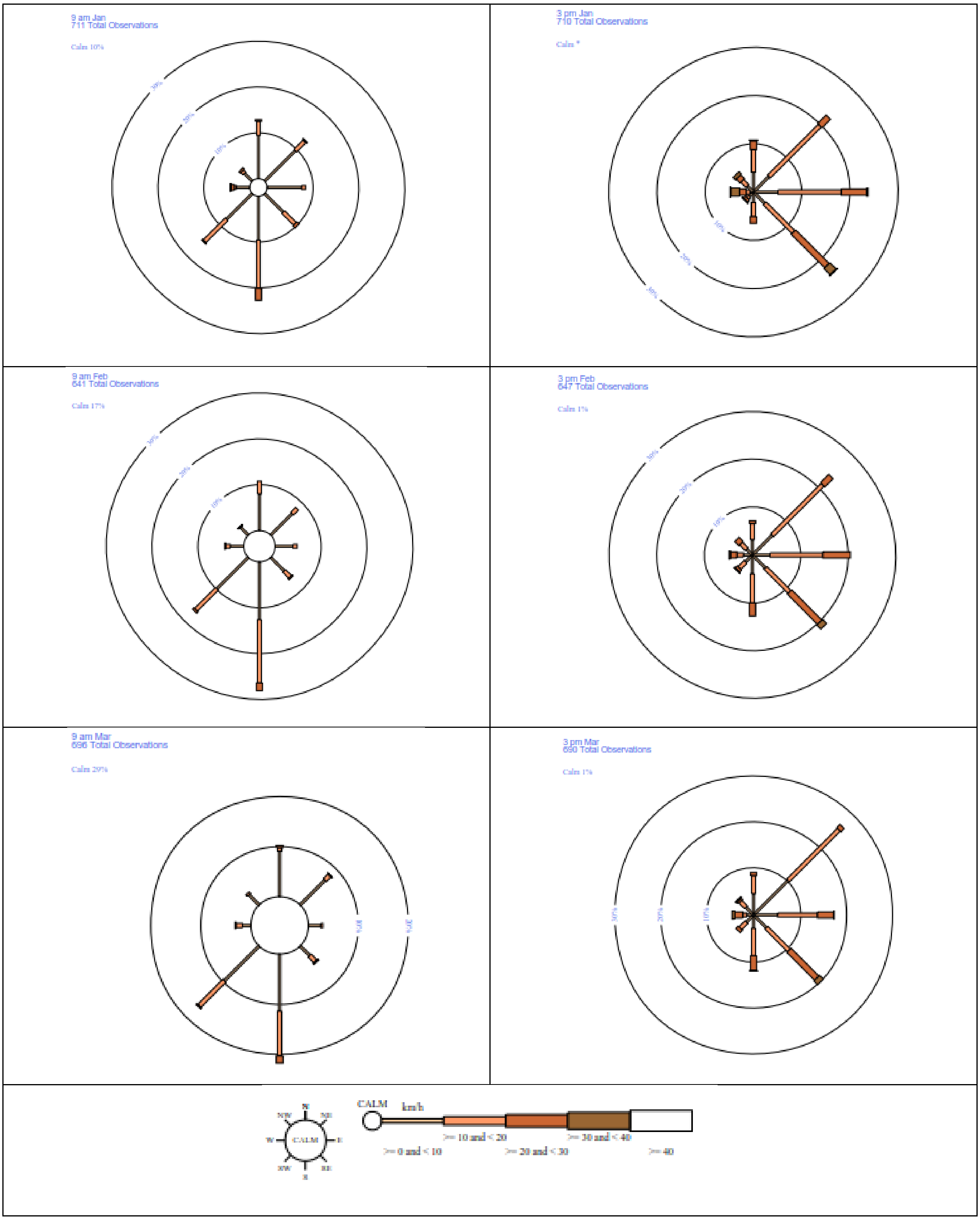

Figure 5 January to March 9 am and 3 pm Wind Roses - Richmond; 1993 – 2010

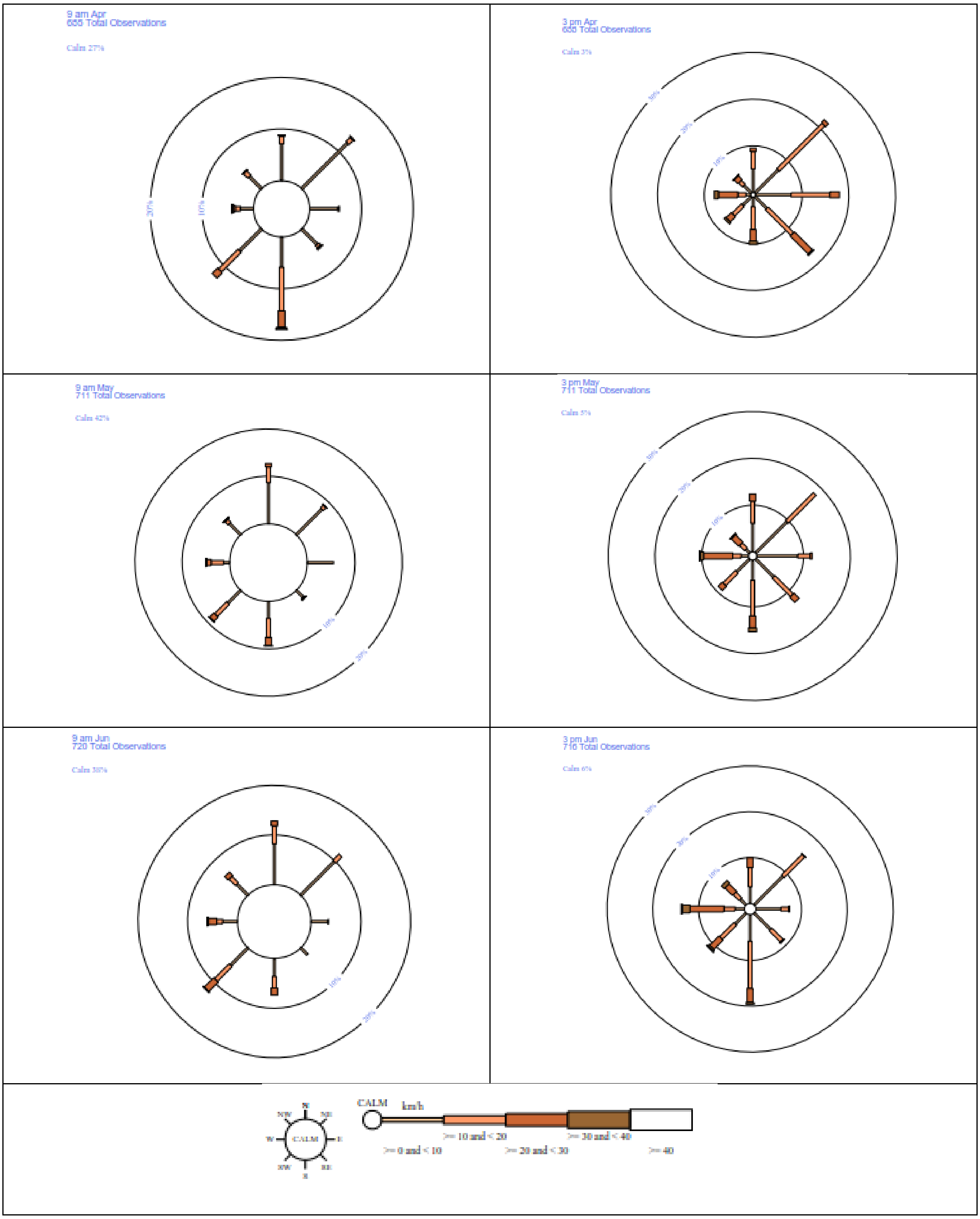

Figure 6 April to June 9 am and 3 pm Wind Roses - Richmond; 1993 – 2010

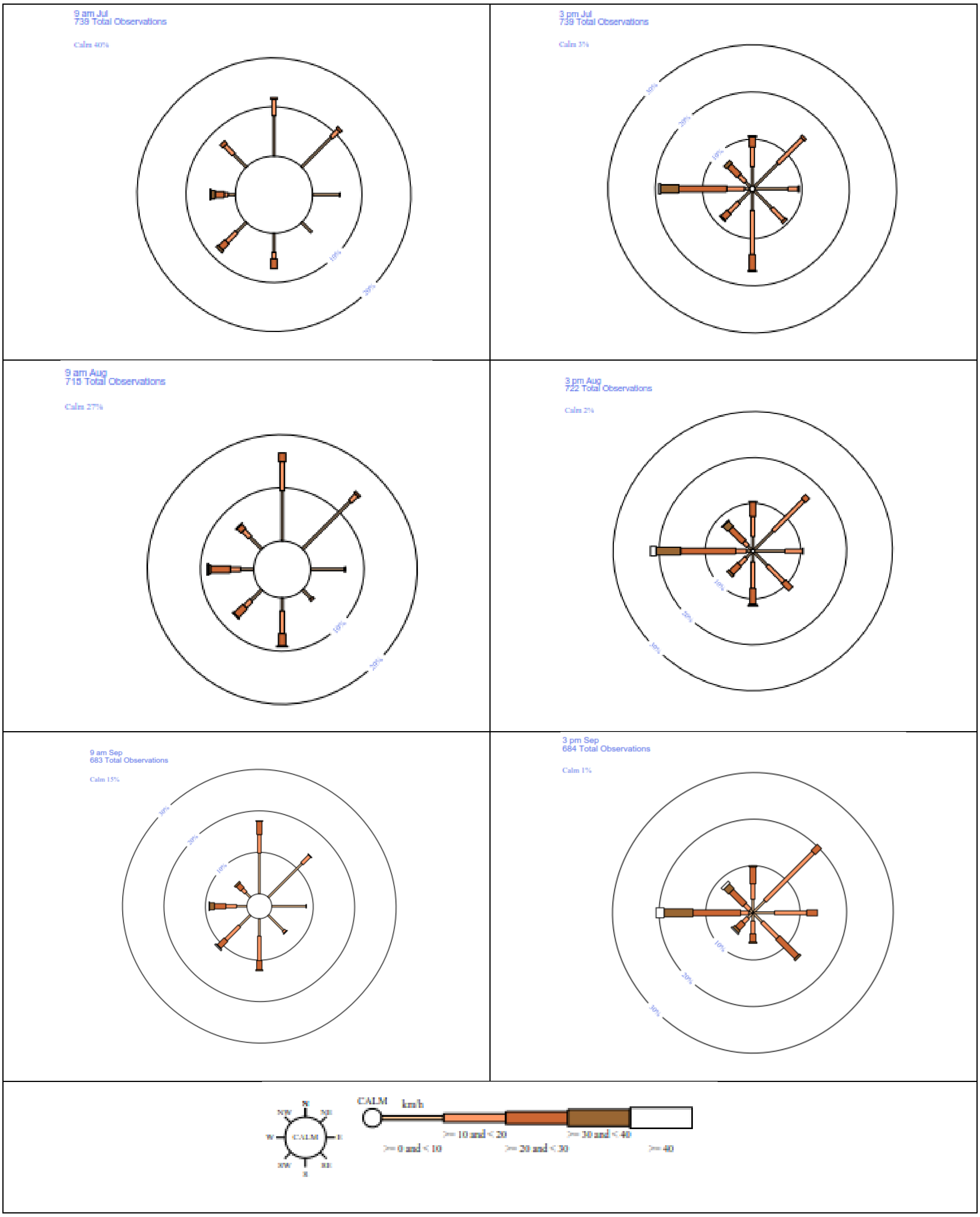

Figure 7 July to September 9 am and 3 pm Wind Roses - Richmond; 1993 – 2010

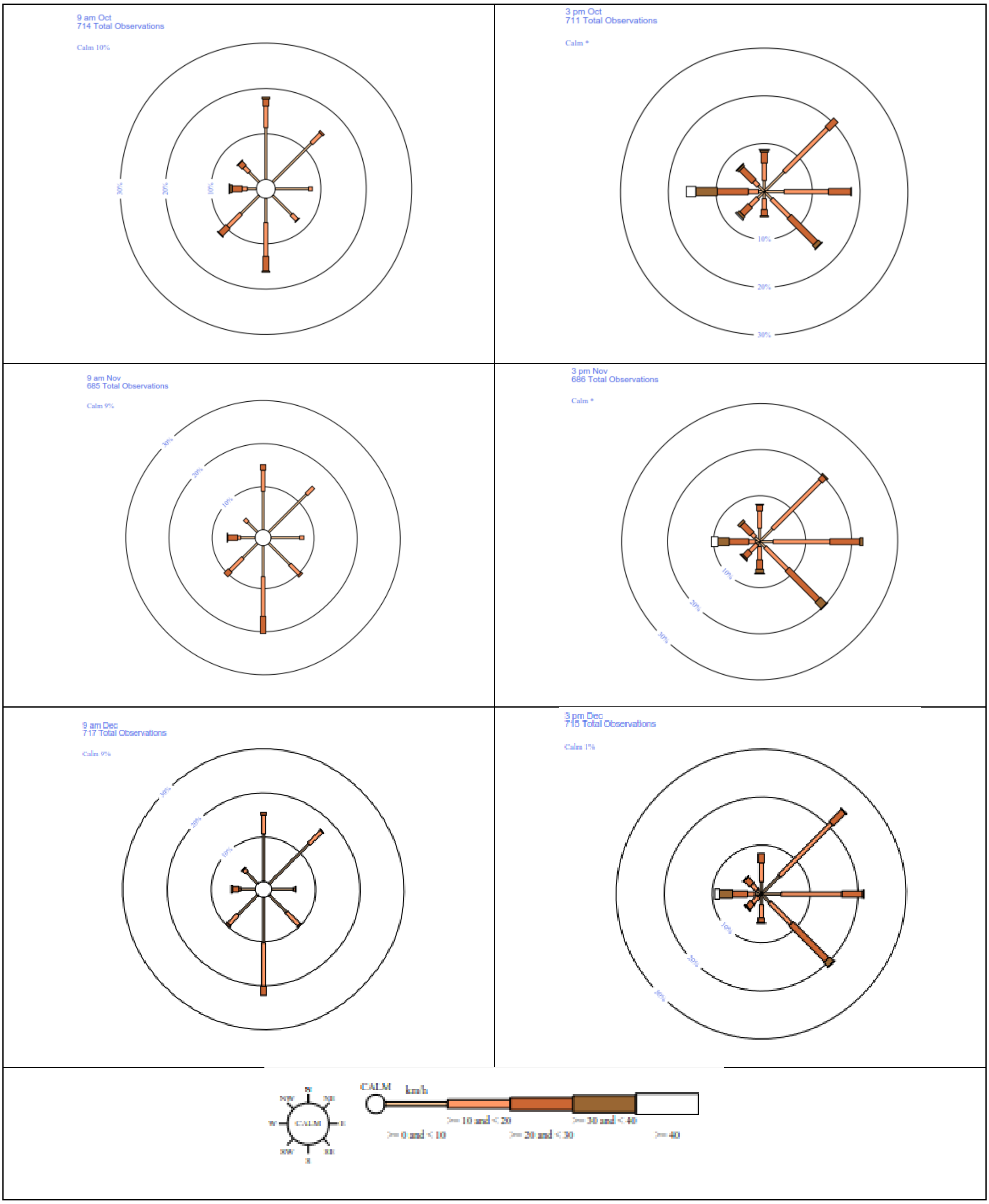

Figure 8 October to December 9 am and 3 pm Wind Roses - Richmond; 1993 – 2010

Table 7 - Climate Statistics, Richmond; 1993 – 2018

Statistics	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual	Years
Temperature														
Mean maximum temperature (°C)	30.3	29.2	27.0	24.0	20.8	18.0	17.6	19.7	22.8	25.4	27.0	28.9	24.2	24
Mean minimum temperature (°C)	17.7	17.8	15.8	11.6	7.6	5.3	3.6	4.4	8.0	11.1	14.2	16.2	11.1	23
Rainfall														
Mean rainfall (mm)	81.7	115.5	80.1	59.0	46.1	57.2	28.4	33.1	44.2	47.5	77.0	68.6	738.1	21
Decile 5 (median) rainfall (mm)	65.7	104.4	70.2	40.0	36.4	45.9	23.5	18.0	29.8	30.2	71.0	61.1	694.0	24
Mean number of days of rain ≥ 1 mm	7.7	8.3	8.0	6.1	5.2	5.7	4.0	3.5	4.5	5.4	7.5	6.8	72.7	23
9 am conditions														
Mean 9am temperature (°C)	22.1	21.3	19.1	17.0	13.1	10.0	8.9	11.4	15.4	18.3	19.2	20.9	16.4	17
Mean 9am relative humidity (%)	72	78	80	76	82	83	80	69	63	58	68	68	73	16
Mean 9am wind speed (km/h)	9.1	8.1	6.6	6.9	5.7	6.3	6.9	8.1	9.9	10.3	9.9	8.9	8.0	16
Calms 9am (%)	10	17	29	27	42	38	40	27	15	10	9	9	23	
3 pm conditions														
Mean 3pm temperature (°C)	28.5	27.4	25.8	23.0	19.7	17.0	16.5	18.7	21.5	23.5	25.2	27.5	22.9	17
Mean 3pm relative humidity (%)	47	52	52	49	53	53	48	39	39	40	46	44	47	16
Mean 3pm wind speed (km/h)	16.6	15.6	14.7	14.4	12.6	13.5	14.3	17.7	19.4	19.1	19.0	17.7	16.2	16
Calms 3pm (%)	<1	1	1	3	5	6	3	2	1	<1	<1	1	2	

http://www.bom.gov.au/climate/averages/tables/cw_067105.shtml; accessed 01 March 2018 (Richmond RAAF)

8.0 Terrain

The Study Area is situated in the north western hinterland of the Sydney basin. The terrain is generally flat with slightly undulating terrain sloping in a southeast to northwest direction. Two small creeks, Second Ponds Creek immediately to the east and First Ponds Creek 300 metres to the west of the Study Area, are both aligned in a north – south direction. The local relief between Windsor Road (located one km to the east) and the Study Area is minor and is not expected to influence air quality dispersion.

9.0 Landuse

The Study Area is situated in an area dominated by rural activities to the north and residential areas to the south. No major industrial or agricultural pollution sources are located in the proximity of the Study Area with minor road traffic and small rural farm operations the only possible pollution sources.

Historically the local area contained a number of chicken broiler farm operations with many of these farms decommissioned and/or demolished in recent years following the encroachment of urban settlement. Onsite visits confirmed that the nearest currently operational broiler farms are located in the Riverstone / Marsden Park area, approximately six kilometres to the west of the Study Area.

10.0 Odour

The EPA's *Meat Chicken (Broiler) Farm Level 1 Odour Assessment Calculator* is a qualitative assessment tool which provides an estimate of the potential odour impact from chicken broiler farms taking into account the following factors:

- Type and size of operation;
- Proposed management practices;
- Density of population likely to be impacted;
- Local topography (flat, undulating, high relief, low relief or drainage flows);
- Surrounding vegetation (none, light or heavy tree cover);
- Local meteorology (high, average or low frequency of winds toward sensitive receptor); and
- Possibility of cumulative impacts.

The tool can be used to either estimate the radius of potential odour impact from broiler farm operations, or conversely can be used to estimate the total number of broiler farms within a given radius likely to result in an odour impact at a specific location.

A total of four broiler farms operate in the Riverstone / Marsden Park area approximately six kilometres to the west of the Study Area. These operations contain a total of 19 sheds with an average of 19,000 birds per shed. Using this data, the *Level 1 Odour Assessment Calculator* indicates that threshold number of sheds containing 19,000 birds each likely to have an impact on the Study Area is 48, which is well above the 19 sheds in operation.

Therefore odours from the broiler operations in the Riverstone / Marsden Park area are unlikely to have an impact on the Study Area.

11.0 Recommendations and Conclusion

The main aim of this Air Quality Impact Assessment was to address the requirements of item 8 of the Cudgegong Road Station Precinct South - SEARs.

The general dispersion parameters such as meteorology, terrain and surrounding land use demonstrated that due to the general wind conditions of the area blowing parallel to or away from the Study Area and the lack of any complex terrain or additional sources of pollution, the site is adequately located to minimise air quality impacts as a result of both vehicle emissions from Windsor Road and odour associated with broiler farm operations located at Riverstone and Marsden Park approximately six kilometres to the west.

In conclusion, as current air quality meets relevant EPA criteria, in combination with the lack of any complex meteorology, terrain or major sources of pollution, there are no air quality issues requiring consideration in regard to the development within the Study Area.

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