Sydney Swans Limited

Sydney Swans HQ Air Quality

Air quality assessment

April 2019

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Overview

GHD has prepared an air quality assessment for the proposed extension and alterations to the Sydney Swans Headquarters and Community Centre project at the Royal Hall of Industries. This air quality assessment was prepared in support of an Environmental Impact Statement (EIS) for SSD 9726 and to address the Secretary's Environmental Assessment Requirements (SEARs).

This air quality assessment assesses the construction and operation of the proposed extension and alterations and supplies appropriate mitigation measures to minimise off site impacts.

1.2 Scope of works

GHD has undertaken the following works as part of this air quality assessment:

- Information regarding to the construction methodology and any operational sources of air emissions provided by the client was reviewed
- Sensitive receptors were identified, local meteorology and existing air quality environment were reviewed
- Short term construction impacts (dust) were assessed
- A review of operational air quality including traffic emissions, odour and emissions from the café and rooftop plant and equipment was undertaken
- A report summarising the assessment was prepared

1.3 Secretary's Environmental Assessment Requirements SSD 9726

The specific Secretary's Environmental Assessment Requirements (SEARs) addressed in this report are summarised in Table 1-1.

Table 1-1 Secretary's Environmental Assessment Requirements

Assessment requirements	Section(s) of this report where addressed
7. Environmental Amenity The EIS shall address how the proposal achieves a high level of environmental amenity, both internally and on the surrounding area, including air quality.	Section 5 and Section 6
10. Construction The EIS shall include a Construction Pedestrian and Traffic Management Plan addressing: • Potential impacts of the construction on surrounding areas and the public realm with respect to air quality and odour impacts, dust and particle emissions.	Section 5
Plans and Documents	Entire report

In addition, the EIS must include the following: • Air quality assessment	

1.4 Limitations

This report: has been prepared by GHD for Sydney Swans Limited and *may only be used and relied on by Sydney Swans Limited for the purpose agreed between GHD and the Sydney Swans Limited as set out in section 1.2 of this report.*

GHD otherwise disclaims responsibility to any person other than Sydney Swans Limited arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (section 1.5 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Sydney Swans Limited and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1.5 Assumptions

The following assumptions have been made in this air quality assessment:

- Site plans, the construction methodology and operational processes of the Hall have been provided to GHD by APP, Aurecon and Douglas Partners.
- Construction modelling was undertaken assuming plant and equipment throughputs provided by Douglas Partners
- Operational air quality impacts were assessed based on a description of operational air quality sources provided by APP and Aurecon
- Modelling assumptions are provided in section 5.1.1

2. Existing environment

2.1 Project site

The project site is located at 1 Driver Ave, Moore Park within the City of Sydney local government are (LGA). Hordon Pavilion boarders the site to the North, EQ carpark is to the East and active recreation areas are to the South and West (Centennial Parklands Sports Centre and Moore Park).

The location of the project site and surrounding areas is shown in Figure 2-1.

2.2 Sensitive receptors

The Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016) defines sensitive receptors as locations where people are likely to work or reside and may include a dwelling, school, hospital, office or recreation area. The location of the nearest identified sensitive receptors to the site are provided in Table 2-1 and shown in Figure 2-1.

Table 2-1 Sensitive receptors locations

Receptor	X Coordinate (m)	Y Coordinate (m)	Description	Direction from site	Approximate distance from site (m)
R01	335793	6248132	Hordern Pavilion	N	40
R02	335873	6248155	Backyard Burger Kitchen	NNE	75
R03	335879	6248117	PJ Gallaghers Irish Pub EQ	NE	50
R04	335879	6248052	Wilson Parking	E	40
R05	335909	6247976	Budapest Riding School	SE	40
R06	335793	6247913	Centennial Parklands Sports Centre	S	50
R07	335745	6248053	Moore Park	W	25

Figure 2-1 Site and sensitive receptor locations

2.3 Existing air quality

The NSW Office of Environmental Heritage (OEH) operates ambient air quality monitoring stations in selected areas around NSW. The nearest station to the site is the Randwick station which is approximately 4.5 kilometres southeast from the site. Background pollutant concentration for 2014 (2014 is the modelled year, further discussion on modelled year is provided in section 5.1.1) from the Randwick station are presented in Table 2-2.

Table 2-2 Background pollutant concentrations

Pollutant	Averaging period	Recorded concentrations at Randwick OEH station (2014, µg/m^3)
PM_{10}	24 hours (Maximum)	46.1
	Annual	18.1

The adopted background concentrations for the modelled year is presented in Table 2-3. Historical air quality data is limited, so daily background TSP and $PM_{2.5}$ data has been scaled off PM_{10} measurements. A TSP to PM_{10} ratio of 2:1 was assumed. Review of recent particulate measurements from the Randwick monitoring station resulted in a $PM_{10}/PM_{2.5}$ ratio of 3.03. This ratio has been used to scale $PM_{2.5}$ concentrations for the modelled year.

Table 2-3 Adopted background concentrations

Pollutant	averaging period	Adopted background concentration (µg/m^3)
TSP	Annual Maximum	36.3
PM_{10}	24 hour maximum	46.1
	Annual Maximum	18.1
$PM_{2.5}$	24 hour maximum	15.2
	Annual Maximum	5.7

3. Air quality criteria

3.1 Legislative and policy context to the assessment

The relevant legislation and government guidance for the air quality assessment of the project are:

- Protection of the Environment Operations Act 1997
- Protection of the Environment Operations (Clean Air) Regulation 2010
- Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA, 2016) (Approved Methods)

The Protection of the Environment Operations (POEO) Act 1997 provides the statutory framework for managing pollution in NSW, including the procedures for issuing licences for environmental protection on aspects such as waste, air, water and noise pollution control. Companies and property owners are legally bound to control emissions from construction sites under the POEO Act. Activities undertaken onsite must not contribute to environmental degradation, and pollution and air emissions must not exceed the standards.

The Protection of the Environment Operations (Clean Air) Regulation 2010 (the Clean Air Regulation) provides regulatory measures to control emissions from motor vehicles, fuels, and industry. The project would be operated to ensure it complies with the Clean Air Regulation.

The Approved Methods lists the statutory methods for modelling and assessing emissions of air pollutants from stationary sources in NSW. It considers the above-mentioned legislation and constructs pollutant assessment criteria.

3.2 Project impact assessment criteria

Assessment criteria has been taken from the Approved Methods. These criteria should be met at existing or future off-site sensitive receptors. The assessment criteria is provided as cumulative impacts, where the predicted impact of the project (incremental) is added to the existing levels (background) in order to assess the pollutants impacts. To determine the level of air quality impacts, emissions from the project must be assessed against the assessment criteria as shown in Table 3-1.

Table 3-1 Air quality impact assessment criteria

Pollutant	Averaging period	Percentile	Assessment criteria ($\mu g/m^3$)
TSP (total suspended particulates)	Annual	100th	90
PM_{10}	24 hour	100th	50
	Annual	100th	25
$PM_{2.5}$	24 hour	100th	25
	Annual	100th	8
CO	1 hour	100th	30000
	8 hour	100th	10000
NO_2	1 hour	100th	246
	Annual	100th	62
SO_2	1 hour	100th	570
	24 hour	100th	228
	Annual	100th	60

4. Project emissions

4.1 Emissions overview

Air quality may be impacted by a number of pollutants, each of which has different emission sources and effects on human health and the environment. This air quality assessment focuses on the highest-risk impacts with the potential to occur during the construction and operation of the project.

This section details the estimated air emissions from the construction and operation of the project.

4.2 Construction

Dust and particulate matter was identified as the primary emission to air during the construction of the project.

Other air emissions such as combustion products (e.g. vehicle exhaust) will also be present within the project site. Combustion engine emission sources are expected to be discontinuous, transient and mobile as trucks and other conduct work around the site. Due to the small number of on site combustion emissions sources and nature of their emissions, the potential impact from these emissions is considered to be negligible.

Particulate (PM_{10} and $PM_{2.5}$) emissions associated with exhausts from mobile plant and stationary engines are accounted for in the emission factors for earthmoving and handling used in the air quality assessment. Therefore, combustion vehicle exhaust emissions have not been considered further in this assessment.

Construction activities that generate dust include demolition, excavation, earthworks and the handling and transfer of earth and other material. The key features of the project that could generate particulates include:

- Extension to the southern end of the Royal Hall of Industries including demolition and rebuilding the southern end and excavation for pools.
- Internal refitting of the Royal Hall of Industries. This includes demolition and excavation works inside the existing hall.

Proposed site plans including a description of construction works are supplied in Appendix A.

Emissions factor were taken from *National Pollutant Inventory Emissions Estimation Technique Manual for Mining version 3.1 (2012)* which includes emissions factors for general earthworks as well as crushing of materials. Predicted dust emissions were calculated based on the expected plant and equipment throughputs (e.g. tonnes per hour) provided by APP, Aurecon and Douglas Partners.

One worst case construction scenario was considered. The construction scenario assumed outdoor excavation and internal demolition works would occur simultaneously. The modelled emission rates for the construction scenario are presented in Table 4-1. The emissions rates for outdoor excavation works assumed:

- 200 tonnes of material excavated per day. Advice from Douglas Partners stated that excavation works would be highly variable resulting in between 20 and 200 tonnes of material excavated per day. The model conservatively assumed the maximum amount (200 tonnes) of material would be excavated each day.
- use of dust suppressant water sprays achieve a 50% reduction (2 litres/m^2/h)

The emissions rates for internal works assumed:

- a maximum of 100 tonnes of material undergoing primary crushing per day. It is acknowledged that a crusher may not be used for any of the internal works but similar worst-case emissions may result from breaking/cutting concrete, removal of walls and moving material around
- The enclosed hall would reduce dust generation by 70%

Table 4-1 Construction emission rates

Location	Emission rate		
	TSP	PM_{10}	$PM_{2.5}$
Outdoor Excavator works ($g/s/m^2$)	0.000033	0.000016	0.0000024
Internal works (g/s)	0.1515	0.0152	0.0023

4.3 Operation

The operation of the Sydney Swans Headquarters and Community Centre at the Royal Hall of Industries will in air quality emissions. This section identifies and assesses the air quality emissions sources from the operation of the hall.

4.3.1 Building emissions

The operation of any building would result in emission of various air quality pollutants. The hall will be equipped with general air relief and ventilation systems in areas including the office, kitchen, gym and pool. A gas fired hot water flue discharge system will be installed. All exhaust air from the hall will be ducted and discharged in accordance to the Building Code of Australia (National Construction Code Building Code of Australia, The Australian Building Codes Board) requirements.

Other plant and equipment likely to produce exhaust emissions including the cooling tower, Air Handling Unit (AHU) and fans that are to be located on the roof of the hall.

4.3.2 Café

The café will operate as a small scale commercial kitchen. It will be equipped with a range hood and ventilation exhaust system to capture cooking odours and fumes. All captured cooking fumes with be treated using a filtration system appropriate to the cooking processes being undertaken. The treated fumes will be discharged from an exhaust stack located on the roof.

As the design is in its early stages, the exact specifications of the café ventilation exhaust system have not yet been selected. It is assumed that an appropriated system will be selected during the detailed design process and that adequate buffer distances will be considered when locating the roof mounted stack.

4.3.3 Traffic

The operation of the hall Headquarters and community centre would increase road traffic along the nearby roadways and result combustion engine pollutant concentrations. The traffic study prepared by GTA Consultants (NSW) Pty Ltd for Sydney Swans Limited (2019) predicted an increase of 78 vehicle movements (by car) per day resultant from the project. This is inconsequential in comparison to the existing road traffic movements along Lang Rd and Anzac

Pde. According to the NSW Transport Roads & Maritime Services (RMS) Traffic Volume Viewer, Anzac Pde experiences over 40,000 vehicle movements per day.

5. Impact assessment

This section presents the predicted air quality impacts from the construction and operation of the project.

5.1 Construction impact assessment

5.1.1 Modelling methodology

Atmospheric dispersion modelling was carried out using the CALPUFF dispersion model. CALPUFF is a non-steady-state, Lagrangian puff dispersion model. It is accepted for use by the OEH and NSW EPA for application in environments where wind patterns and plume dispersion is strongly influenced by complex terrain, the land-sea interface or where there is a high frequency of stable calm night-time conditions.

All model settings were selected based on the recommendations provided in the *Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the 'Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia (2011)*.

The CALPUFF model was run for a one year period (named the 'representative year'). The representative year was chosen through analysis of meteorology from the years from 2012 to 2016. The analysis shows that the year 2014 is the most 'normal' year based on a review of temperature, wind speed and wind direction. Meteorological characteristics of the 2014 year closely followed the average of all years from 2012 to 2016 suggesting 2014 represents a typical year. 2014 was selected as the modelled representative year.

A TAPM and subsequent CALMET run for the representative year was undertaken to produce a 3D gridded matrix of meteorology parameters that was inputted into CALPUFF. A summary of the CALMET model parameter is provided in Table 5-1.

Table 5-1 Summary of CALMET model parameters

Parameter	Value
Modelled period	1 January 2014 to 31 December 2014
Mode	Hybrid (NOOBS = 1)
UTM zone	56
Domain origin (south-west corner)	Easting: 321.847 km Northing: 6233.687 km
Domain size	110 x 110 at 0.2 km resolution (22.0 km x 22.0 km)
Number of vertical levels	11
Vertical levels (m)	20, 40, 60, 90, 120, 180, 250, 500, 1000, 2000, 3000
CALMET settings for hybrid mode Settings selected in accordance with (OEH, 2011)	TERRAD = 10.0 km RMAX1 = 10.0 km RMAX2 = 10.0 km RMIN = 0.1 km R1 = 5.0 km R2 = 5.0 km
Initial guess field	TAPM .m3d file used as an initial guess field for CALMET.
Surface data	Sydney Airport AMO E: 331.173 km N: 6242.272 km

Parameter	Value
Upper air data	No site specific upper air data is utilised. Upper air data is included within the TAPM .m3d initial guess field.
Land use and terrain data	Land use data was manually developed through assessment of aerial imagery to accurately reflect the land use in the area. High-resolution terrain data was sourced from the STRM 1-second (~30 m) database.

The annual wind rose at the project site for the modelled year is shown in Figure 5-1. It shows the following features:

- Winds are predominantly from the southwest
- Light winds (< 2 m/s) are primarily from the south and southeast
- Strong winds (> 6 m/s) are predominantly from the southwest and east
- The average wind speed in 3.05 m/s. Calms occur 1.45% of the time.

Worst case air quality impacts typically occur during calms or light winds which exhibit poor dispersion qualities. This leads to plumes containing high pollutant concentrations travelling offsite with the potential to impact nearby receptors. Light winds are primarily from the south and southeast. Consequently, it is expected that the worst impacted receptors are located to the north and northwest of the site.

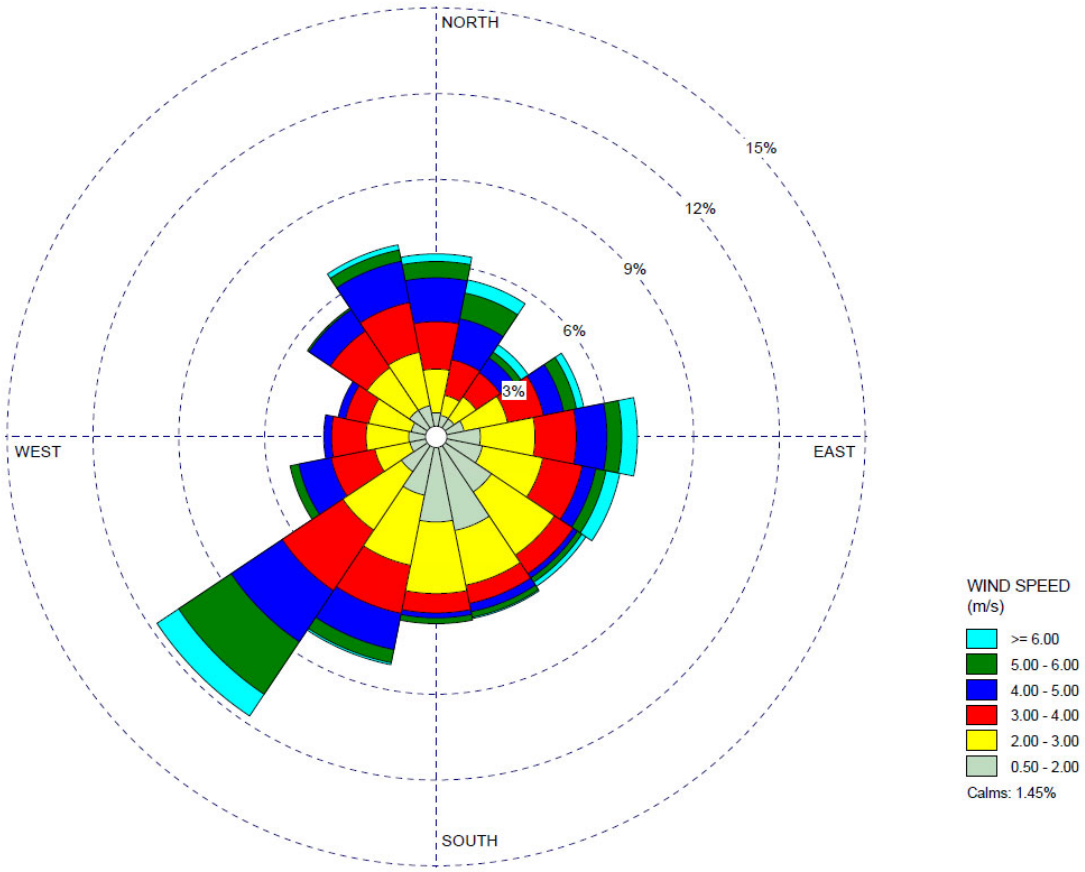


Figure 5-1 Wind rose from CALMET at site location for 2014

Modelling assumptions

The following assumptions were applied to the construction model:

- The outdoor excavation works was modelled as an area source
- Internal works was modelled as a volume source
- Emission rates and assumptions are provided in section 4.2.
- All emissions sources were modelled as active from 7 am to 6 pm.

5.1.2 Construction impacts

One worst case construction scenario was modelled. The predicted incremental particulate concentrations at each receptor are presented in Table 5-2. No incremental exceedances of the assessment criteria were predicted.

Table 5-2 Predicted incremental particulate concentrations

Receptor	Predicted incremental concentrations (µg/m^3)				
	$PM_{2.5}$		PM_{10}		TSP
	Daily	Annual	Daily	Annual	Annual
Assessment criteria	25	8	50	25	90
R01	1.6	0.2	8.2	1.1	7.3
R02	0.6	0.1	4.3	0.4	1.7
R03	0.5	0.1	3.3	0.4	1.7
R04	0.6	0.1	4.5	0.8	3.6
R05	0.7	0.1	5.2	0.6	2.0
R06	1.5	0.2	11.8	1.5	4.5
R07	1.4	0.2	10.7	1.5	9.3

The predicted cumulative concentrations using conservative assumptions at each receptor is presented in Table 5-3. Cumulative annual concentrations were calculated by adding the measured annual background concentration (shown in Table 2-2) to the predicted incremental annual concentration. Cumulative daily concentrations were calculated by conducting a contemporaneous assessment. The contemporaneous assessment added the predicted incremental daily concentrations to the corresponding measured daily concentrations for every day of the modelled year. The cumulative daily concentrations in Table 5-3 are the maximum predicted contemporaneous concentrations over the entire modelled year. One exceedance of the daily PM_{10} criteria is predicted (highlighted). The exceedance is attributed to a high background concentration (the exceedance is composed of an incremental impact of 4.4 µg/m^3 and a background concentration of 46.1 µg/m^3). All other pollutants are predicted to comply with the assessment criteria.

Table 5-3 Predicted cumulative particulate concentrations

Receptor	Predicted cumulative concentrations (µg/m^3)				
	$PM_{2.5}$		PM_{10}		TSP
	Daily	Annual	Daily	Annual	Annual
Assessment criteria	25	8	50	25	90
R01	15.8	5.9	50.5	19.2	43.5
R02	15.2	5.8	46.3	18.5	38.0
R03	15.2	5.8	46.2	18.5	37.9
R04	15.2	5.8	46.1	18.9	39.8
R05	15.2	5.8	46.1	18.8	38.3
R06	15.2	5.9	46.1	19.6	40.7
R07	15.5	6.0	49.9	19.6	45.6

Contour plots showing daily PM_{10} and $PM_{2.5}$ dispersion are shown in Figure 5-2 and Figure 5-3 respectively.

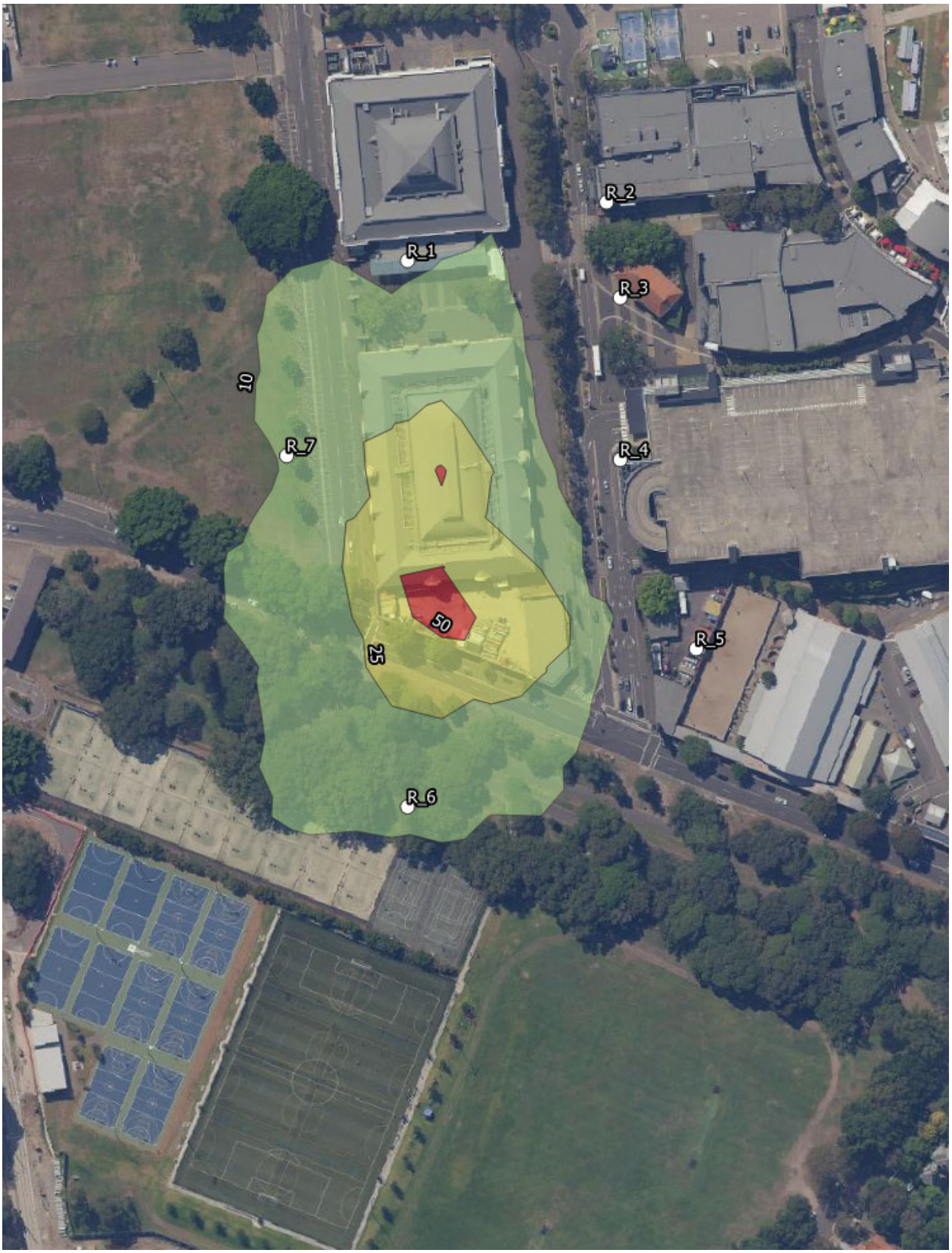


Figure 5-2 Predicted incremental 24 hour PM_{10} concentrations (µg/m^3)

Figure 5-3 Predicted incremental 24 hour $PM_{2.5}$ concentrations (µg/m^3)

5.2 Operation impact assessment

There is potential for off site air quality impacts from building emissions, café emissions and increased traffic movements.

5.2.1 Building emissions

As this is a new facility, exact pollutant emissions from the ventilation systems, gas fired hot water flue discharge system, cooling tower and Air Handling Unit (AHU) cannot be measured. The hall is a relatively small facility and would be designed using established technologies to manage air quality emissions.

Assuming all hall discharge points will be installed and operated in accordance with the Building Code of Australia requirements, hall emissions are considered insignificant and not expected to impact any nearby sensitive receptors.

5.2.2 Café

If the site uses appropriate management practices, along with best practice odour emission controls however, no significant odour and smoke emissions will result from the activity. As such, dispersion modelling has not been undertaken, however relevant odour mitigation has been recommended in Section 6.2 to be incorporated to manage odour at the source as per guidance in the Technical framework – Assessment and management of odour from stationary sources in NSW (November 2006).

The café would be equipped with an appropriately sized range hood and exhaust extraction system to capture and treat all cooking odour and fumes. The treated air would be released from a rooftop stack to disperse pollutants in an effective manner.

Assuming an appropriated exhaust system will be selected including the use of filters and a stack to treat and disperse cooking fumes is installed, air pollutant emissions from the café are deemed minor and not expected to impact nearby sensitive receptors.

5.2.3 Traffic

The operation of the hall Headquarters and community centre would have an insignificant effect on total vehicle movements along the nearby roadways. It is estimated that the project would increase vehicle movements by approximately 0.2%. This is expected to have a negligible impact on ambient combustion pollutant concentrations.

Due to the relatively low number of extra vehicle movements the operation of the hall would incur, no air quality impacts from additional traffic are expected.

6. Mitigation

6.1 Construction

Incremental project impacts (impacts due to construction of the site) are considered minor. The predicted incremental impacts during construction of the project are significantly below the assessment criteria as shown in Table 5-2.

There is one predicted cumulative exceedance of the daily PM_{10} criteria. This exceedance is attributed to high background concentrations recorded at Randwick OEH monitoring station. The exceedance is composed of an incremental impact of 4.4 µg/m^3 and a background concentration of 46.1 µg/m^3.

The following mitigation measures are recommended for the betterment of site air quality and to reduce the impact of site activities on nearby sensitive receptors:

- Use water sprays (2 Litres/m^2/h) to reduce dust generation in areas where significant earthworks is being undertaken
- Water material prior to it being loaded for on-site haulage, where appropriate
- Cover all trucks hauling material on the way to the site and maintain a reasonable amount of vertical space between the top of the load and top of the trailer
- Cease dust generating works during periods of inclement weather (visible plumes of dust are observed blowing from site in the direction of sensitive receptors)

These measures will assist in reducing impacts on all areas off-site.

6.2 Operation

No adverse impacts are expected from the operation of the hall assuming it is operated in accordance to the Building Code of Australia requirements and the recommendations provided below. It is assumed that all duct work and discharge points from the building would be installed in accordance to the Building Code of Australia requirements and an appropriate cooking fumes exhaust extraction system is installed in the café. This would ensure all building exhaust and cooking fumes are properly treated and released from the hall in a manner that reduces their potential impact on nearby receptors.

General mitigation measures to control emissions from food outlets are supplied in the Local Government Air Quality Toolkit for Food Outlets (NSW EPA). These measure should be incorporated into the design of the café. They include:

- capturing the cooking fumes at source
- removing oil and grease by filtration, impingement or scrubbing
- modifying the method of cooking, where feasible
- dispersing emissions through a stack
- separating the source from receptors
- good housekeeping, to avoid odours typically associated with a build-up of rancid fats and putrefaction of foods and food wastes, and
- regular cleaning and maintenance of filters

7. Conclusion

GHD has undertaken an air quality assessment for the construction and operation of the project.

One worst case construction scenario was modelled. The model predicted low site specific incremental impacts. One cumulative exceedance of the daily PM_{10} criteria was predicted. This exceedance was attributed to high background concentrations recorded from the Randwick OEH monitoring station. All other pollutants were predicted to be below the assessment criteria.

A qualitative operational air quality was undertaken. No significant operation air quality emission sources were identified, consequently no ait quality impacts are expected form the operation of the project.

Mitigation measures were supplied to reduce air quality impacts from the construction and operation of the project.

Assuming the supplied mitigation measures are considered throughout the construction and operation of the project, the project is considered to comply from an air quality perspective.

8. References

GTA Consultants (NSW) Pty Ltd, 2019, Sydney Swans Headquarters Royal Hall of Industries Transport Assessment

National Pollutant Inventory, Emission estimation technique manual for Mining Version 3.1 (2012), Australian government, Department of Sustainability, Environment, Water, Population and Communities

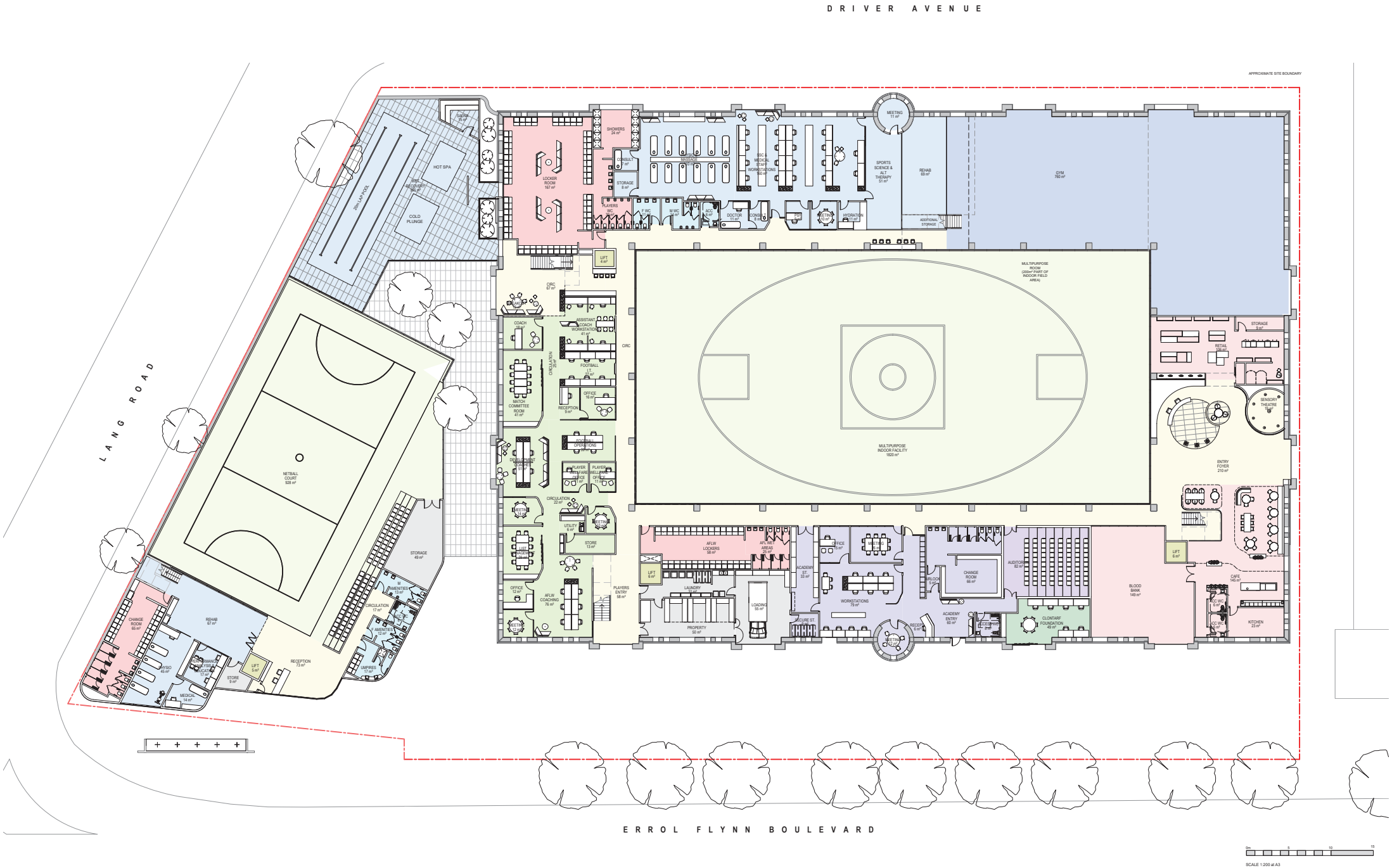
NSW EPA. (2016). *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales*. NSW Government Gazette of 26 August 2005, minor revisions Novemeber 2016. Sydney, NSW: Department of Environment and Conservation NSW (DEC).

OEH NSW. (2011). *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'.* Sydney: NSW Office of Environment and Heritage.

Appendices

Appendix A – Site plans

 18/12/2018 1:41:13 PM



POPULOUS®

Sydney Swans HQ & Community Centre
15-7401-00

GROUND FLOOR OPTION 1

SK.02.0010
DATE: 18/12/18
DRAWN BY: POP

REV: G
DESCRIPTION: FOR INFORMATION
DRAWING SCALE: 1 : 200 @A1

 18/12/2018 1:42:00 PM

SCALE 1:200 at A3

POPULOUS

Sydney Swans HQ & Community Centre
15-7401-00

LEVEL 01 OPTION 1

SK.02.0110
DATE: 18/12/18
DRAWN BY: POP

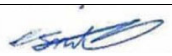
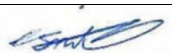
REV: F
DESCRIPTION: FOR INFORMATION
DRAWING SCALE: 1 : 200 @A1

GHD

Level 15
133 Castlereagh Street
T: 61 2 9239 7100 F: 61 2 9239 7199 E: sydmail@ghd.com

21-SO1-2082948327-1/https://projects.ghd.com/oc/sydney2/sydneyswanshqairqual/Delivery/Documents/2128125_REP_Air Quality Assessment.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	N Spurrett	E Smith		E Smith		17/04/2019

www.ghd.com