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Going Further in Managing Risk

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AIR MONITORING RISK ASSESSMENT
CRINGILA PUBLIC SCHOOL
35 SHEFFIELD STREET
CRINGILA NSW 2502

Interim Report
05/09/18 – 18/09/18

NSW Department of Education

Cringila Public School

35 Sheffield Street
Cringila NSW 2502

October 2018
C107826: J153825: RC/TO

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Document Control

Document Quality Management Details.		
Report Name:	AMR-IAQ-01 Air Monitoring Risk Assessment	
Site Details:	Cringila Public School, 35 Sheffield Street, Cringila NSW 2502	
Client Name:	NSW Department of Education	
Client Number:	C107826	
Signatures:	Prepared By:  Rowan Clark Property Risk Consultant	Authorised By:  Scott Mcilwain Regional Manager – ACT, Illawarra & Southern NSW

Issue Status

Version No.	Date	Creator	Reviewer	Comments
1	02/10/2018	Rowan Clark	Scott Mcilwain	

Document Circulation

No	Type	Customer Name	Position & Title
1	**Electronic**	NSW Department of Education	Greg Mott Senior Group Leader

Air Monitoring Risk Assessment - IAQ

Cringila Public School, 35 Sheffield Street, Cringila NSW 2502

Table of Contents

1. INTRODUCTION

At the request of the Department of Education, Greencap were engaged to undertake indoor air monitoring utilising real-time monitoring devices at Cringila Public School, 35 Sheffield Street Cringila NSW 2502. The aim of this monitoring program was primarily to investigate concerns raised by school employees and the Department of Education regarding the potential exposure to elevated concentrations of air pollutants, specifically carbon dioxide (CO_2), during the normal occupation of rooms within the school.

2. OBJECTIVES

Based on the correspondence provided by the NSW Department of Education, the objective of this assessment is to undertake an assessment of the indoor air quality to determine the concentration of CO2 within school buildings at Cringila Public School.

This report presents the results relating to the interim indoor air quality monitoring investigation carried out within the Staffroom (Room 7R0007) in Building B007 at Cringila Public School. The location of the monitoring is displayed in **Appendix A:** Site Map and Sample Locations.

3. ASSESSMENT CRITERIA

Carbon Dioxide (CO_2) measurements are compared against the ASHRAE Standard 62-2010 *Ventilation for Acceptable Indoor Air Quality* (American Society of Heating, Refrigeration and Air-Conditioning Engineers).

CO_2 measurements provide an indication of the adequacy of fresh air levels supplied to rooms within a building. A person's comfort and health may be affected by high concentrations of CO_2.

For the purpose of this assessment, the recorded CO_2 measurements will be referenced against the ASHRAE Guideline value of 1,000 parts per million (ppm). This criteria is set for human comfort factors and is deemed to be the most conservative level to adopt.

3.1 CARBON DIOXIDE (CO2)

CO_2 is a normal constituent of exhaled breath and is commonly measured as a screening tool to evaluate whether adequate volumes of fresh outdoor air are being introduced into indoor air.

The outdoor level of CO_2 usually ranges from 300 ppm to 400 ppm. The CO_2 level is usually greater inside a building than outside, even in buildings with few complaints about indoor air quality. If indoor carbon dioxide levels are more than 1,000 ppm, there is probably inadequate ventilation; and complaints such as headaches, fatigue, and eye and throat irritation may be prevalent.

4. INDOOR AIR QUALITY MONITORING METHODOLOGY

4.1 INDOOR AIR QUALITY MONITORING

Indoor air quality monitoring was conducted at a single location over the course of a school day to study the concentration of CO_2 within school buildings while they are occupied. Interim monitoring was conducted within the staffroom (7R000R), Building B007 at Cringila Public School.

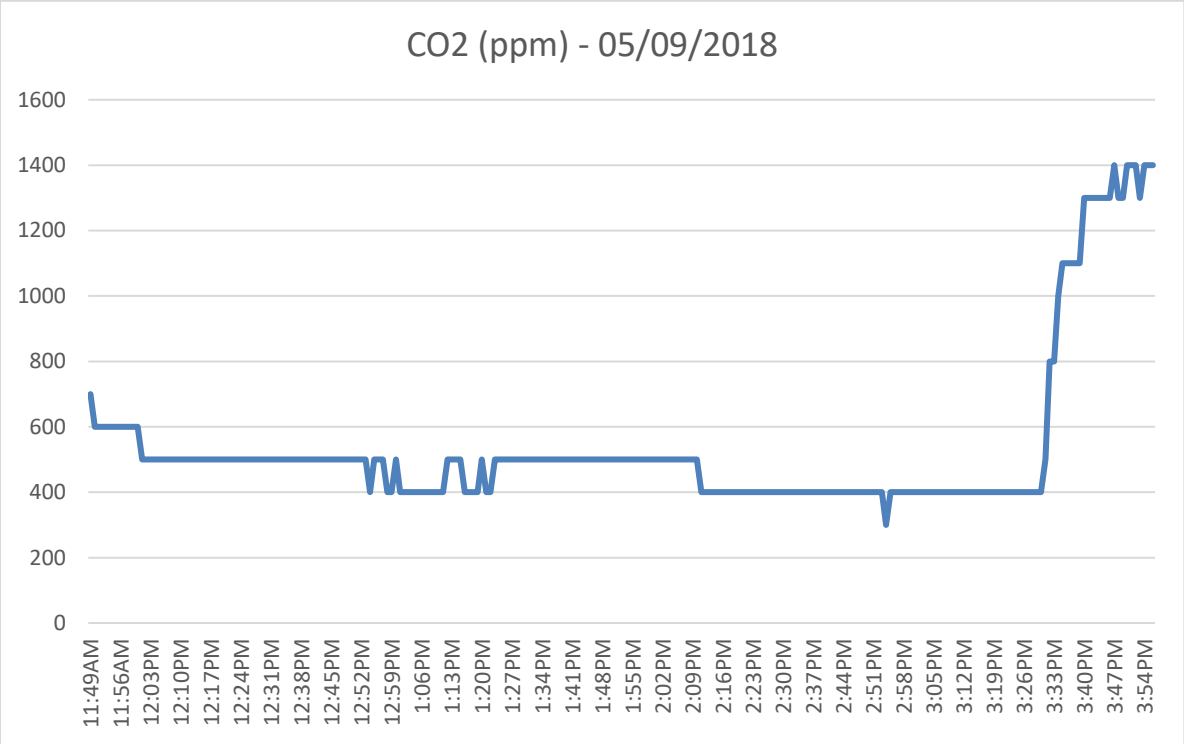
In this assessment, RAE Systems Multi RAE Gas Detectors were used with a specific sensor configuration to target CO_2 concentrations to be assessed against the adopted ASHRAE Guideline of 1,000 ppm as detailed above.

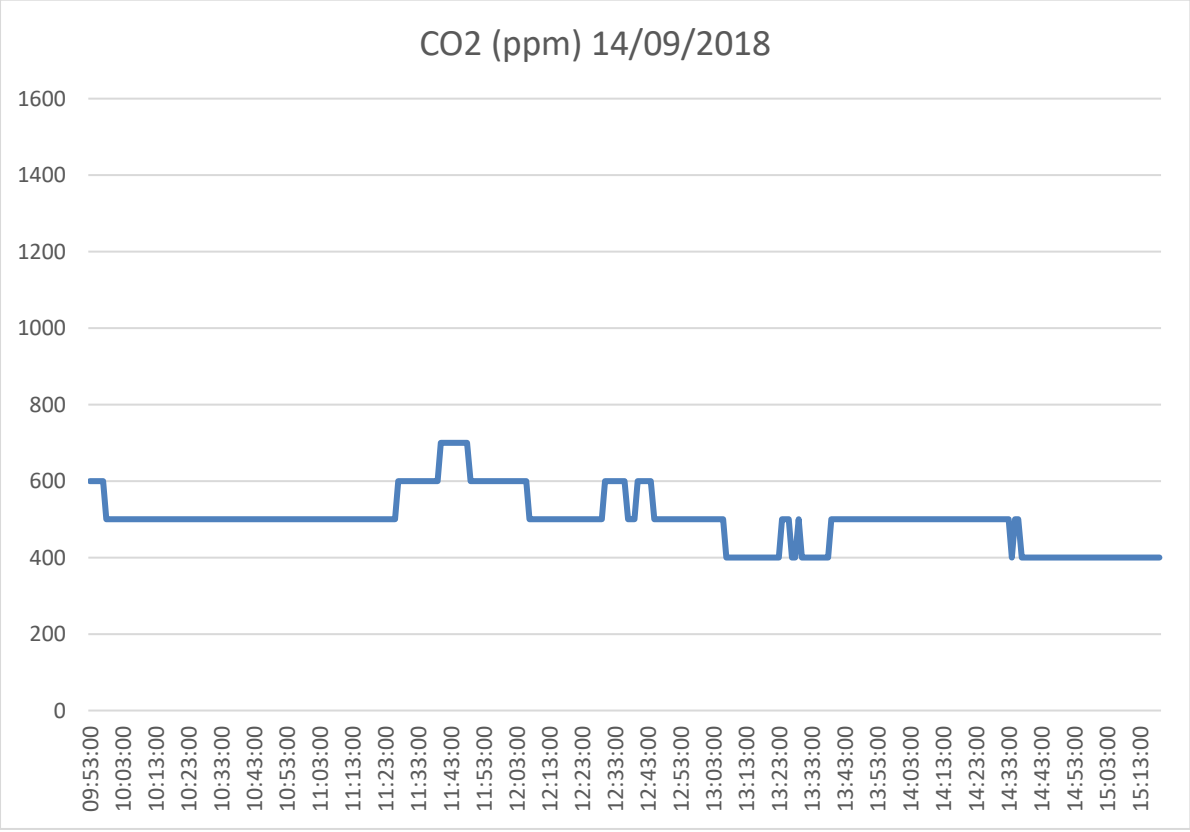
4.2 DATA ANALYSIS AND REPORTING

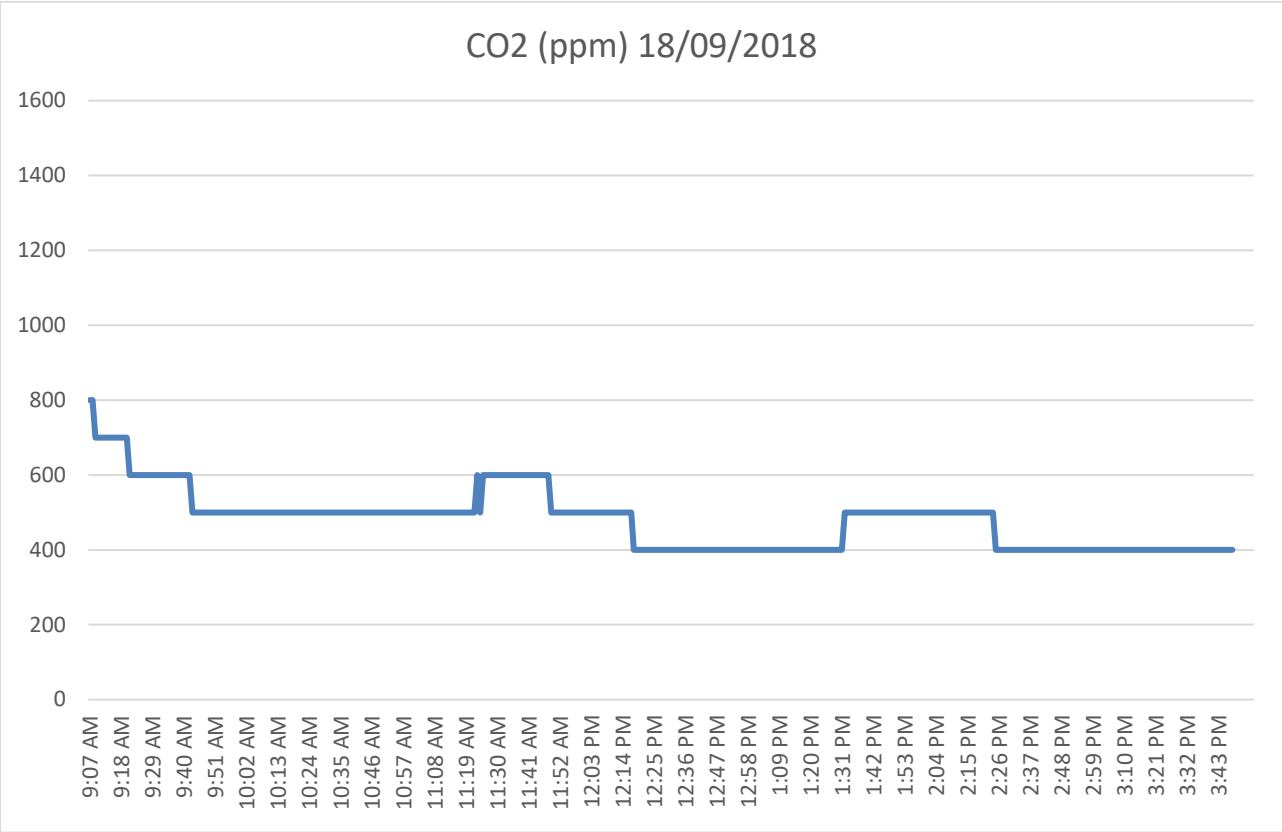
The units are configured to log data at one minute intervals and run throughout the course of the school day. Logged data was downloaded from the device and tabulated to present the results. Refer to **Section 4:** Indoor Air Quality Monitoring Results.

5. INDOOR AIR QUALITY MONITORING RESULTS

The CO_2 concentration results for the monitoring conducted between 05/09/2018 and 18/09/2018 are summarised below in Figure 1. Monitoring locations are displayed in **Appendix A**: Site Map and Sampling Locations.







6. DISCUSSION

Generally, the monitoring results for CO_2 within the staffroom at Cringila Public School were between 400 ppm and 800 ppm during the rounds of monitoring. All results were below the ASHRAE guideline level of 1,000 ppm with the exception of a peak reading of 1400 ppm recorded during monitoring on 5th September 2018. This reading elevated suddenly at the end of the monitoring shift. Anecdotal evidence suggests the spike is attributed to the use of a heater within the staffroom in the immediate vicinity of the monitoring device.

Trends of the monitoring data suggests that CO_2 concentration within the staffroom rises slightly, albeit below the adopted guideline value, in the middle of the day, which is most likely attributed to an increased number of staff occupying the room during these times.

It should be noted that the adopted ASHRAE Guideline of 1,000 ppm is set for comfort only. A time weighted average (TWA) of 5,000 ppm has been set by Safe Work Australia for health purposes.

It should be noted that short term static monitoring results cannot be compared to exposure monitoring criteria and therefore may be used as guidance only with regard to concentrations of CO_2 in the staffroom.

Adequate supply of fresh air is required to dilute CO_2 and other pollutants to acceptable levels for human comfort and health considerations.

This concludes the interim indoor air quality monitoring report for monitoring conducted between 5th September 2018 and 18th September 2018. It is recommended that interim assessments are continued in order to gain firm and reliable data sets regarding the concentration of CO_2 within indoor environments at the school whilst further investigation of the site is undertaken.

Air Monitoring Risk Assessment

Cringila Public School NW Hotspot – 35 Sheffield Street, Cringila NSW 2502

Appendix A: Site Map and Sampling Locations

Legend:

- Air monitor location
- North West Hotspot Investigation Area

Site	Cringila Public School
Area	Staffroom (Building B007)
Consultant	Rowan Clark/Tom Oyston
Date	Tuesday, 2 October 2018
Job Number	J153825
Report	AMR-IAQ-01
Version	1.0

Air Monitoring Risk Assessment

Cringila Public School NW Hotspot – 35 Sheffield Street, Cringila NSW 2502

Appendix B: Calibration Certificates

Calibration & Service Report
Gas Monitor

Company:	Active Environmental Solutions Hire	**Manufacturer:**	RAE Systems	**Serial #:**	MAA30042QB
Contact:	Aleks Todorovic	**Instrument:**	MultiRAE Lite	**Asset #:**	-
Address:	2 Merchant Avenue	**Model:**	PGM 6208	**Part #:**	-
	Thomastown Vic 3074	**Configuration:**	PID, OFCH	**Sold:**	-
Phone:	03 9464 2300 | **Fax**: 03 9464 3421	**Wireless:**	-	**Last Cal:**	-
Email:	Hire@aesoultions.com.au	**Network ID:**	-	**Job #:**	-
		Unit ID:	-	**Cal Spec:**	Std

Item	Test	Pass/Fail	Comments
Battery	Li Ion	✓	
Charger	Charger, Power supply	✓	
	Cradle	✓	
Pump	Flow	✓	>300 mL/min
Filter	Filter, fitting, etc	✓	
Alarms	Audible, visual, vibration	✓	
Display	Operation	✓	
PCB	Operation	✓	
Connectors	Condition	✓	
Firmware	Version	✓	1.40
Datalogger	Operation	✓	
Monitor Housing	Condition	✓	
Case	Condition/Type	✓	
Sensors			
Oxygen	O2	✓	
LEL	LEL	✓	
PID	10.6eV	✓	
Toxic 1	CO	✓	
Toxic 2	H2S	✓	
Toxic 3			
Toxic 4			
Toxic 5			

Engineer's Report

Setup, service and calibration for hire

Calibration Certificate

Sensor	Type	Serial No:	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
Oxygen	O2	03420555UC	Fresh Air	20.9%	WO163704-3		20.9%	
			Oxygen	18.0%				18.0%
LEL	LEL	03110703T9	Methane	2.5% (50% LEL)	WO163704-3		0	50%
PID	10.6eV	03A30381QB	Isobutylene	100ppm	689134		0	100ppm
Toxic 1	CO	03060033N5	Carbon Monoxide	50ppm	WO163704-3		0	50ppm
Toxic 2	H2S	03AR0216Q3	Hydrogen Sulfide	10ppm	WO163704-3		0	10ppm
Toxic 3								
Toxic 4								
Toxic 5								

Calibrated/Repaired by: William Pak

Date: 12.07.2018

Next due: 12.01.2019

Calibration & Service Report
Gas Monitor

Company:	Active Environmental Solutions Hire	**Manufacturer:**	RAE Systems	**Serial #:**	M01C005735
Contact:	Aleks Todorovic	**Instrument:**	MultiRAE Lite	**Asset #:**	-
Address:	2 Merchant Avenue	**Model:**	PGM 6208	**Part #:**	-
	Thomastown Vic 3074	**Configuration:**	NO, NO2, SO2, CO2	**Sold:**	-
Phone:	03 9464 2300 | **Fax**: 03 9464 3421	**Wireless:**	-	**Last Cal:**	-
Email:	Hire@aesoultions.com.au	**Network ID:**	-	**Job #:**	-
		Unit ID:	-	**Cal Spec:**	Std

Item	Test	Pass/Fail	Comments
Battery	Li Ion	✓	
Charger	Charger, Power supply	✓	
	Cradle	✓	
Pump	Flow	✓	>300 mL/min
Filter	Filter, fitting, etc	✓	
Alarms	Audible, visual, vibration	✓	
Display	Operation	✓	
PCB	Operation	✓	
Connectors	Condition	✓	
Firmware	Version	✓	1.40
Datalogger	Operation	✓	
Monitor Housing	Condition	✓	
Case	Condition/Type	✓	
Sensors			
Oxygen			
LEL			
PID			
Toxic 1	NO	✓	
Toxic 2	NO2	✓	
Toxic 3	SO2	✓	
Toxic 4	CO2	✓	
Toxic 5			

Engineer's Report

Setup, service and calibration for hire

Calibration Certificate

Sensor	Type	Serial No:	Span Gas	Concentration	Traceability Lot #	CF	Reading	
							Zero	Span
Oxygen								
LEL								
PID								
Toxic 1	NO	03740026U9	Nitric Oxide	25ppm	WO153855-2		0	25ppm
Toxic 2	NO2	03750052RC	Nitrogen Dioxide	5ppm	WO169855-1		0	5ppm
Toxic 3	SO2	03AF0109T5	Sulfur Dioxide	5ppm	WO155612-5		0	5ppm
Toxic 4	CO2	03610036QC	Carbon Monoxide	5000ppm	WO169824-1		0	5000ppm
Toxic 5								

Calibrated/Repaired by: William Pak

Date: 12.07.2018

Next due: 12.01.2019