

25 March 2019

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765
Maitland NSW 2320

Dear Chris,

Environmental Monitoring for National Ceramic Industries Australia - February 2019

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during February 2019. Sampling methodology and adopted assessment criteria are detailed below.

1.0 Sampling Methodology

Sampling was performed by AECOM Australia Pty Ltd (AECOM) and sample analysis was carried out by ALS NATA accredited laboratory. All sampling and analysis was carried out in accordance with Environmental Protection Authority (EPA) approved methods with reference to the following Australian Standards:

- Monitoring of fine suspended particulates (PM₁₀) on the EPA six day cycle in accordance with:
 - AS/NZS 3580.9.6 (2015) Methods for the Sampling and Analysis of Ambient Air – Determination of Suspended Particulate Matter – PM₁₀ High Volume Sampler with Size Selective Inlet - Gravimetric Method.
- Monitoring of fluorides in ambient air in accordance with:
 - AS/NZS 3580.13.2 (2013) Determination of fluorides—Gaseous and acid-soluble particulate fluorides—Manual, double filter paper sampling.
- Meteorological monitoring in accordance with:
 - AS 3580.1.1 (2016) – *Methods for sampling and analysis of ambient air – Part 1.1 – Guide to siting air monitoring equipment; and*
 - AS 3580.14 (2014) – *Methods for sampling and analysis of ambient air – Part 14: Meteorological monitoring for ambient air quality monitoring.*
- Monitoring of surface water quality in accordance with:
 - AS/NZS 5667.1:1998(R2016) *Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples; and*
 - AS/NZS 5667.4:1998(R2016) *Guidance on sampling from lakes, natural and manmade.*

2.0 Assessment Criteria

Suspended particulate loads are assessed against the impact assessment criteria defined in the Project Approval conditions (09_0006 – National Ceramic Industries Australia Tile Manufacturing Facility Expansion Project, 19 January 2012). The assessment criteria for PM₁₀ (particulate matter with an aerodynamic diameter of less than 10 µm) are:

- 50 µg/m³ over a 24-hour period; and
- 30 µg/m³ as an annual average.

Ambient fluoride concentrations are assessed against the guidelines defined in NSW EPA *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (NSW EPA (2016)). The NSW EPA impact assessment criteria for ambient fluoride are:

- 2.9 µg/m³ over a 24-hour period; and
- 1.7 µg/m³ over a 7-day period.

Surface waters are assessed in accordance with default trigger values for physical and chemical stressors for southeast Australia in the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018). These values are:

- pH in the range of 6.5 - 8.5 (Table 3.3.2 - NSW Lowland River); and
- Electrical conductivity (EC) in the range of 125 – 2200 $\mu\text{S}/\text{cm}$ (Table 3.3.3 - NSW Lowland River).

3.0 Monitoring Results

Monitoring results for the month of February 2019 are presented in the attachments to this letter. Monitoring results for the preceding two months are also presented to demonstrate quarterly trends in results.

February PM_{10} monitoring results were below the consent 24 hour criterion of $50\mu\text{g}/\text{m}^3$ with the following exceptions:

- 13 February 2019, North West monitoring station ($69.8\mu\text{g}/\text{m}^3$);
- 13 February 2019, South East monitoring station ($57.7\mu\text{g}/\text{m}^3$); and
- 19 February 2019, North West monitoring station ($73.4\mu\text{g}/\text{m}^3$).

Elevated PM_{10} readings were recorded at both the North West and South East monitoring locations on 13 February. Meteorological data sourced from the OEH Beresfield site shows strong South to South East winds on this day. Under these conditions only the North West (downwind) monitoring site would be expected to have elevated results if NCIA was the primary source of PM_{10} emissions. Elevated readings at the upwind monitor and data sourced from the Upper Hunter EPA ambient monitoring sites indicates regional PM_{10} concentrations were elevated on 13 February and the likely cause of exceedance at both locations.

Data from the Upper Hunter EPA monitoring sites indicates regional PM_{10} concentrations were also elevated on 19 February. Strong Easterly winds on this day show neither monitoring location was downwind of the NCIA site and that the elevated PM_{10} concentration recorded at the North West location is likely the result of elevated regional PM_{10} concentrations rather than the NCIA facility.

An Environmental Incident Report detailing these exceedances was submitted to Leah Cook (Department of Planning and Environment) on 13 March upon AECOM receiving the laboratory analysis results.

The PM_{10} rolling annual average concentration at the South East site remains below the Project Approval annual criterion of $30\mu\text{g}/\text{m}^3$ with an average of $22.6\mu\text{g}/\text{m}^3$ recorded. The North West annual average is currently above the criteria. The North West annual average sits at $32.4\mu\text{g}/\text{m}^3$ following the completion of the February monitoring period, this is primarily due to elevated results recorded during July 2018 and February 2019.

Fluoride results for February remain below the relevant assessment criteria at both the North West and South East monitoring sites with no exceedances of either the 24 hour or 7 day criteria this month.

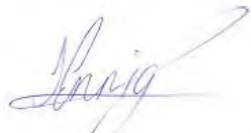
The adopted ANZG 2018 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. pH measurements on 8, 14, 21 and 28 February were over the ANZG guideline however Pond 4 was not observed to be discharging at these times. Water temperature was also measured weekly however no guideline is available for assessment. Pond 4 was not observed to be discharging during any of the February site visits.

Monitoring results and plots can be found attached including the wind rose for February. Laboratory certificates, field sheets and calibration data along with relevant meteorology data can be provided on request.

Meteorological data for February has been sourced from the OEH meteorological station in Beresfield for the period 1 to 14 February after a collection error resulted in no data able to be collected from NCIA's onsite station. The remainder of February meteorological data has been collected from NCIA's onsite station.

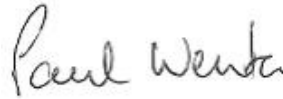
If you require any further information, please contact Simon Murphy on 0428 626 952.

Yours faithfully,



James Enright
Scientist – Compliance Services
james.enright@aecom.com

Direct Dial: +T +61 2 4911 4900
Direct Fax: +F +61 2 4911 4999



Paul Wenta
Principal Scientist - Air Quality
paul.wenta@aecom.com

Mobile: +61 438 670 281
Direct Dial: +61 2 4911 4855
Direct Fax: +61 2 4911 4999

encl: Monitoring data tables and charts, wind rose

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

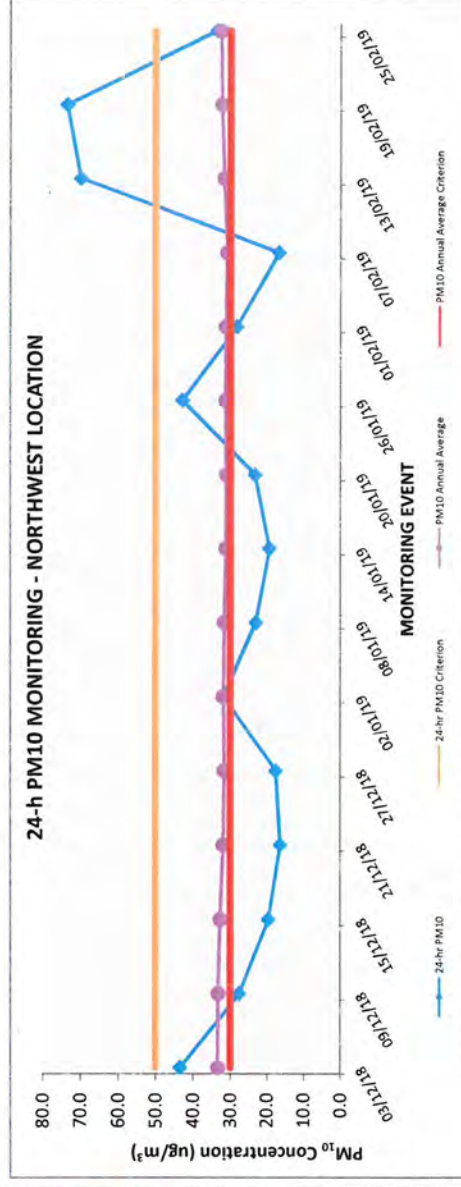
© AECOM Australia Pty Ltd (AECOM). All rights reserved.

AECOM has prepared this document for the sole use of the Client and for a specific purpose, each as expressly stated in the document. No other party should rely on this document without the prior written consent of AECOM. AECOM undertakes no duty, nor accepts any responsibility, to any third party who may rely upon or use this document. This document has been prepared based on the Client's description of its requirements and AECOM's experience, having regard to assumptions that AECOM can reasonably be expected to make in accordance with sound professional principles. AECOM may also have relied upon information provided by the Client and other third parties to prepare this document, some of which may not have been verified. Subject to the above conditions, this document may be transmitted, reproduced or disseminated only in its entirety.

North West Monitoring Location - 24 hour PM10 Monitoring

North West - 24 hour PM10 Monitoring				
December 2018 to February 2019				
Monitoring Event	24-hr PM ₁₀	24-hr PM ₁₀ Criterion	PM ₁₀ Annual Average	PM ₁₀ Annual Average Criterion
	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	($\mu\text{g}/\text{m}^3$)	
3-Dec-18	43.5	50	33.3	30
9-Dec-18	27.5	50	33.2	30
15-Dec-18	19.6	50	32.7	30
21-Dec-18	16.4	50	31.9	30
27-Dec-18	17.6	50	31.7	30
2-Jan-19	31.9	50	31.8	30
8-Jan-19	23.0	50	31.7	30
14-Jan-19	19.4	50	31.2	30
20-Jan-19	23.3	50	31.1	30
26-Jan-19	42.9	50	31.3	30
1-Feb-19	28.2	50	31.2	30
7-Feb-19	16.7	50	30.9	30
13-Feb-19	69.8	50	31.7	30
19-Feb-19	73.4	50	32.3	30
25-Feb-19	33.6	50	32.4	30

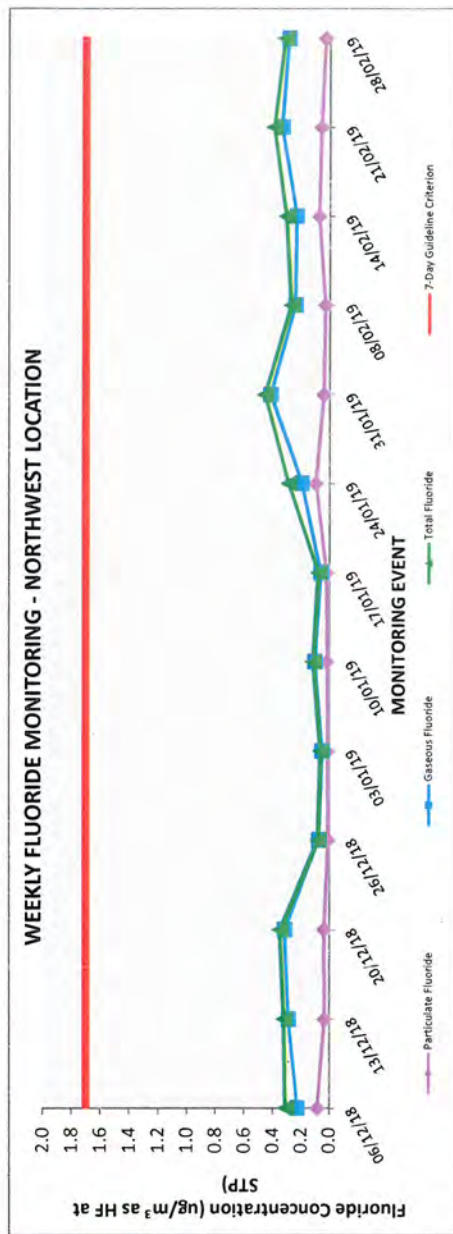
*Bold denotes exceedance



North West Monitoring Location - 7 Day Fluoride Monitoring

North West - 7 Day Fluoride Monitoring	
December 2018 to February 2019	

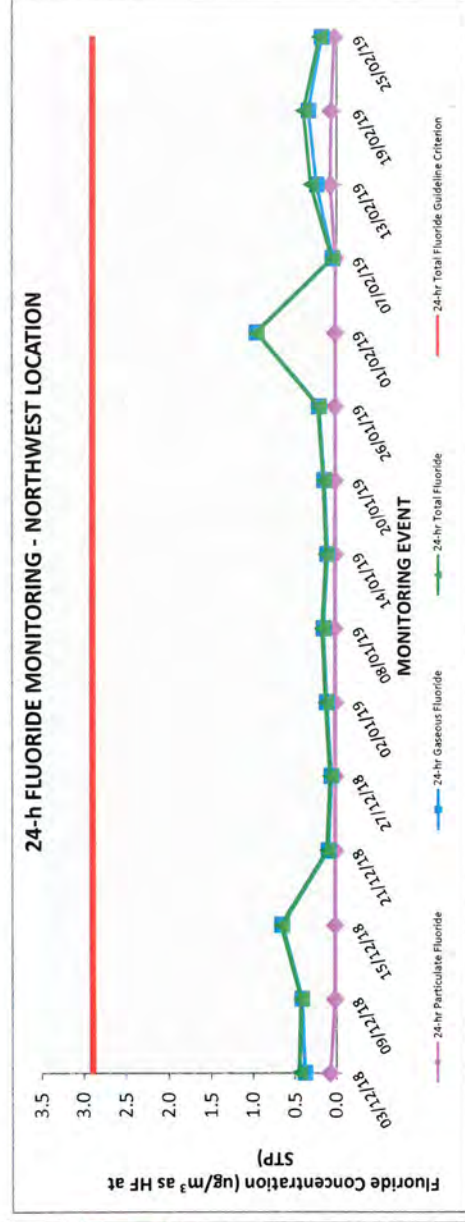
Monitoring Event	Particulate Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	Gaseous Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	Total Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	7-Day Guideline Criterion ($\mu\text{g}/\text{m}^3$ as HF at STP)
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
6-Dec-18	0.083	0.226	0.309	1.7
13-Dec-18	0.033	0.288	0.321	1.7
20-Dec-18	0.036	0.313	0.349	1.7
26-Dec-18	0.010	0.072	0.082	1.7
3-Jan-19	0.013	0.050	0.063	1.7
10-Jan-19	0.015	0.101	0.116	1.7
17-Jan-19	0.020	0.059	0.079	1.7
24-Jan-19	0.095	0.194	0.289	1.7
31-Jan-19	0.041	0.414	0.455	1.7
8-Feb-19	0.030	0.240	0.270	1.7
14-Feb-19	0.073	0.232	0.305	1.7
21-Feb-19	0.057	0.335	0.392	1.7
28-Feb-19	0.029	0.287	0.316	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

North West - 24 hour Fluoride Monitoring				
December 2018 to February 2019				

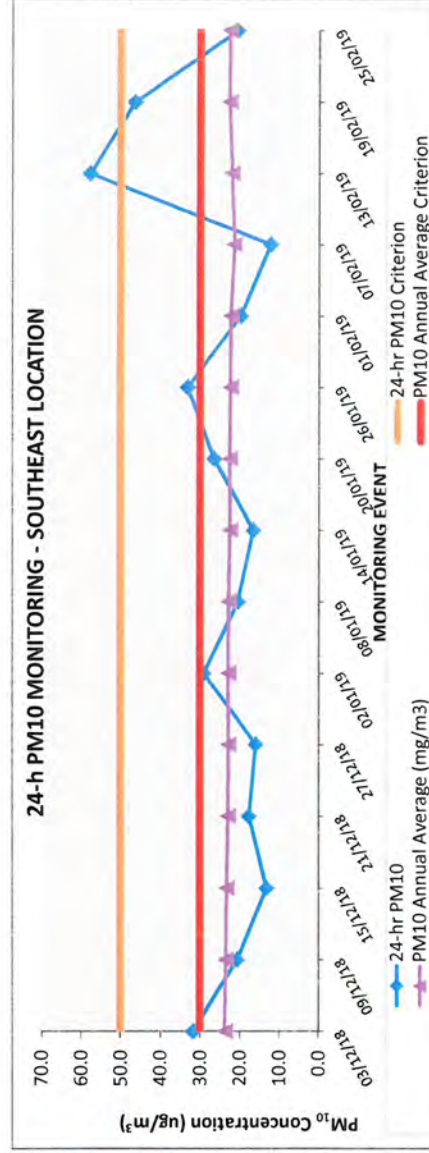
Monitoring Event	24-hr Particulate Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	24-hr Gaseous Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	24-hr Total Fluoride ($\mu\text{g}/\text{m}^3$ as HF at STP)	24-hr Total Fluoride Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
3-Dec-18	0.071	0.382	0.453	2.9
9-Dec-18	0.015	0.417	0.432	2.9
15-Dec-18	0.014	0.655	0.669	2.9
21-Dec-18	0.015	0.098	0.113	2.9
27-Dec-18	0.014	0.065	0.079	2.9
2-Jan-19	0.015	0.117	0.132	2.9
8-Jan-19	0.016	0.158	0.174	2.9
14-Jan-19	0.014	0.112	0.126	2.9
20-Jan-19	0.012	0.148	0.160	2.9
26-Jan-19	0.012	0.212	0.224	2.9
1-Feb-19	0.012	0.955	0.967	2.9
7-Feb-19	0.012	0.047	0.059	2.9
13-Feb-19	0.073	0.242	0.315	2.9
19-Feb-19	0.063	0.342	0.405	2.9
25-Feb-19	0.026	0.184	0.210	2.9



South East Monitoring Location - 24 hour PM10 Monitoring

South East - 24 hour PM10 Monitoring	
December 2018 to February 2019	

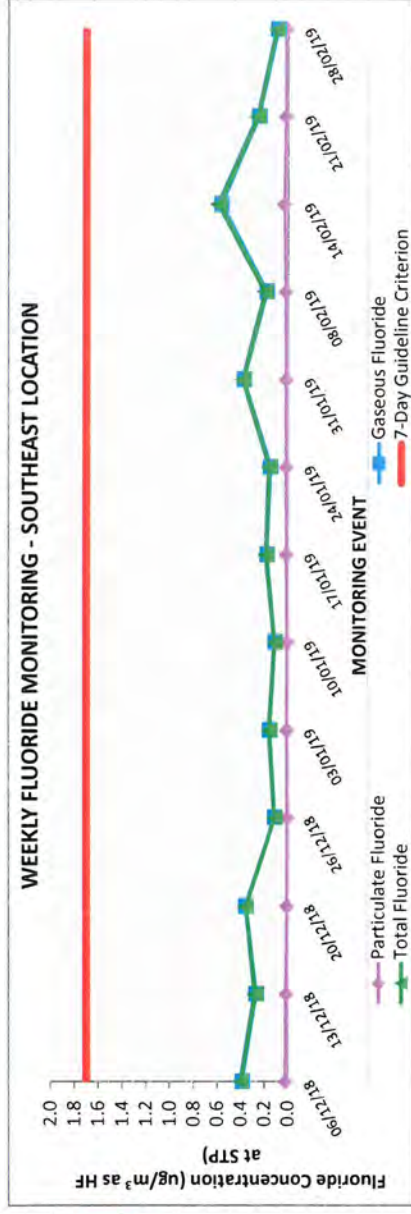
Monitoring Event	24-hr PM ₁₀	24-hr PM ₁₀ Criterion	PM ₁₀ Annual Average	PM ₁₀ Annual Average Criterion
	(µg/m ³)	(µg/m ³)	(µg/m ³)	
3-Dec-18	31.7	50	23.7	30
9-Dec-18	20.6	50	23.4	30
15-Dec-18	13.1	50	23.2	30
21-Dec-18	17.6	50	22.9	30
27-Dec-18	15.9	50	22.8	30
2-Jan-19	29.0	50	22.8	30
8-Jan-19	20.5	50	22.8	30
14-Jan-19	16.5	50	22.5	30
20-Jan-19	26.4	50	22.5	30
26-Jan-19	33.2	50	22.3	30
1-Feb-19	19.8	50	22.3	30
7-Feb-19	12.1	50	21.4	30
13-Feb-19	57.7	50	22.0	30
19-Feb-19	46.5	50	22.6	30
25-Feb-19	20.6	50	22.6	30



South East Monitoring Location - 7 Day Fluoride Monitoring

South East - 7 Day Fluoride Monitoring	
December 2018 to February 2019	

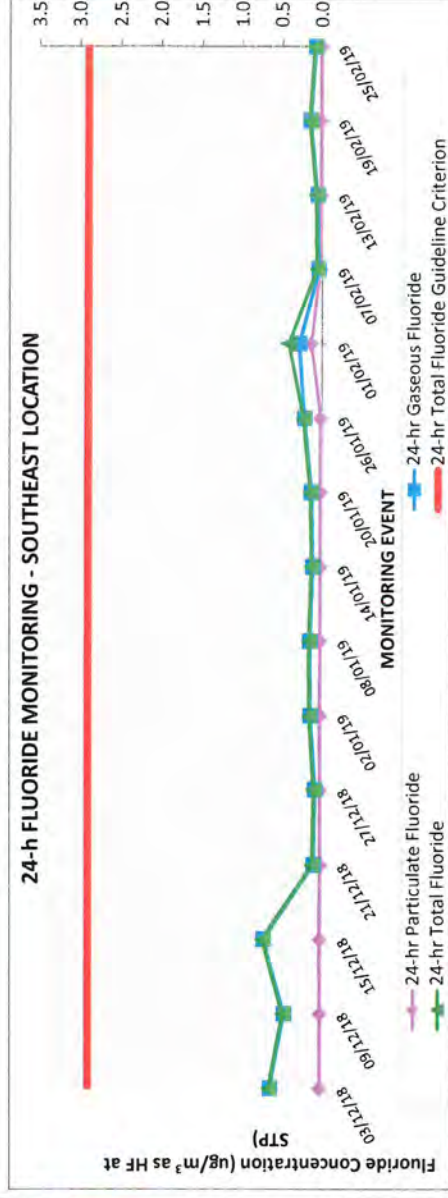
Monitoring Event	Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
6-Dec-18	0.020	0.384	0.404	1.7
13-Dec-18	0.013	0.267	0.280	1.7
20-Dec-18	0.007	0.352	0.359	1.7
26-Dec-18	0.004	0.112	0.116	1.7
3-Jan-19	0.008	0.155	0.163	1.7
10-Jan-19	0.006	0.110	0.116	1.7
17-Jan-19	0.012	0.178	0.190	1.7
24-Jan-19	0.015	0.148	0.163	1.7
31-Jan-19	0.015	0.371	0.386	1.7
8-Feb-19	0.018	0.179	0.197	1.7
14-Feb-19	0.031	0.563	0.594	1.7
21-Feb-19	0.017	0.246	0.263	1.7
28-Feb-19	0.017	0.085	0.102	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

South East - 24 hour Fluoride Monitoring	
December 2018 to February 2019	

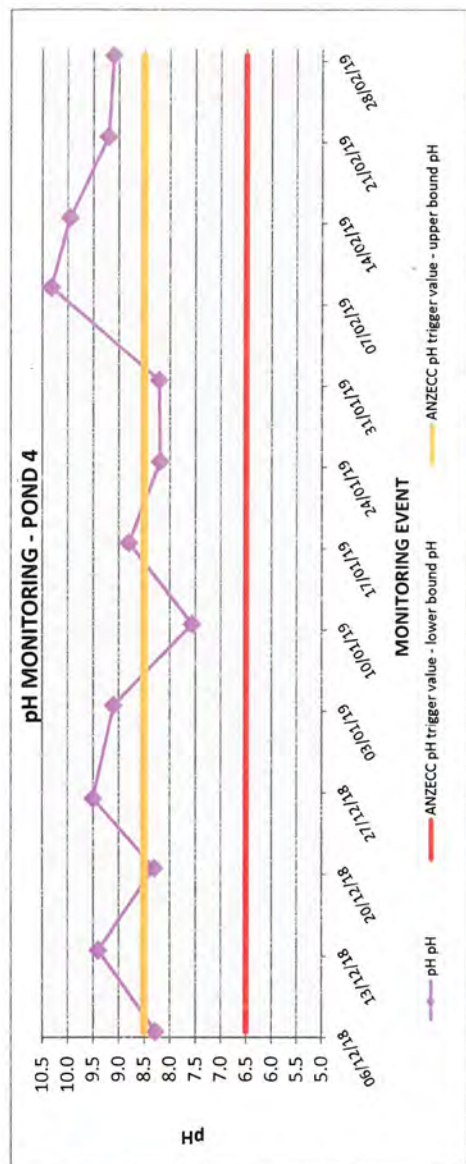
Monitoring Event	24-hr Particulate Fluoride	24-hr Gaseous Fluoride	24-hr Total Fluoride	24-hr Total Fluoride Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	HF at STP
3-Dec-18	0.015	0.647	0.662	2.9
9-Dec-18	0.014	0.471	0.485	2.9
15-Dec-18	0.017	0.725	0.742	2.9
21-Dec-18	0.014	0.101	0.115	2.9
27-Dec-18	0.015	0.085	0.100	2.9
2-Jan-19	0.017	0.140	0.157	2.9
8-Jan-19	0.016	0.145	0.161	2.9
14-Jan-19	0.015	0.114	0.129	2.9
20-Jan-19	0.013	0.131	0.144	2.9
26-Jan-19	0.012	0.220	0.232	2.9
1-Feb-19	0.134	0.288	0.422	2.9
7-Feb-19	0.024	0.043	0.067	2.9
13-Feb-19	0.012	0.064	0.076	2.9
19-Feb-19	0.011	0.148	0.159	2.9
25-Feb-19	0.012	0.086	0.098	2.9



Pond 4 Monitoring Location - Weekly pH Monitoring

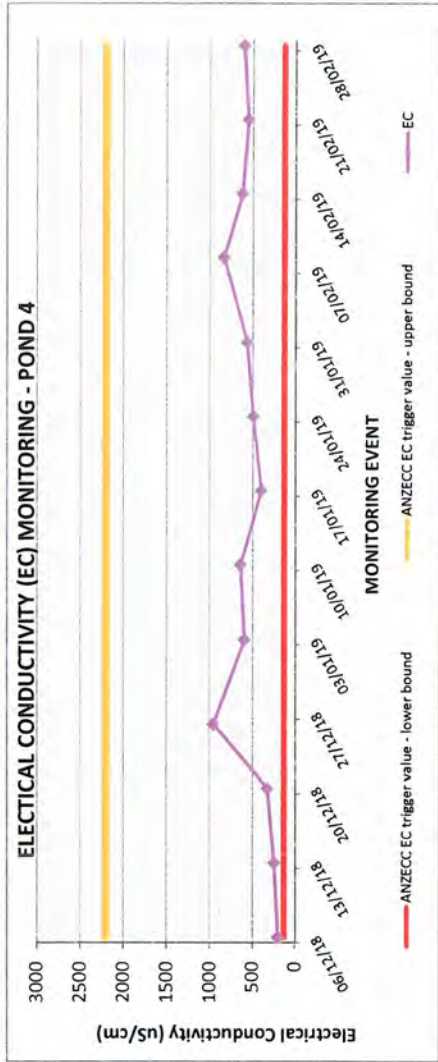
Pond 4 - Weekly pH Monitoring	
December 2018 to February 2019	

Monitoring Event	pH	ANZECC pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
6/12/2018	8.28	6.5	8.5	
13/12/2018	9.40	6.5	8.5	
20/12/2018	8.30	6.5	8.5	
26/12/2018	9.50	6.5	8.5	
3/01/2019	9.10	6.5	8.5	
10/01/2019	7.56	6.5	8.5	
17/01/2019	8.80	6.5	8.5	
24/01/2019	8.19	6.5	8.5	
31/01/2019	8.21	6.5	8.5	
8/02/2019	10.32	6.5	8.5	
14/02/2019	9.95	6.5	8.5	
21/02/2019	9.20	6.5	8.5	
28/02/2019	9.10	6.5	8.5	



Pond 4 Monitoring Location - Weekly EC Monitoring

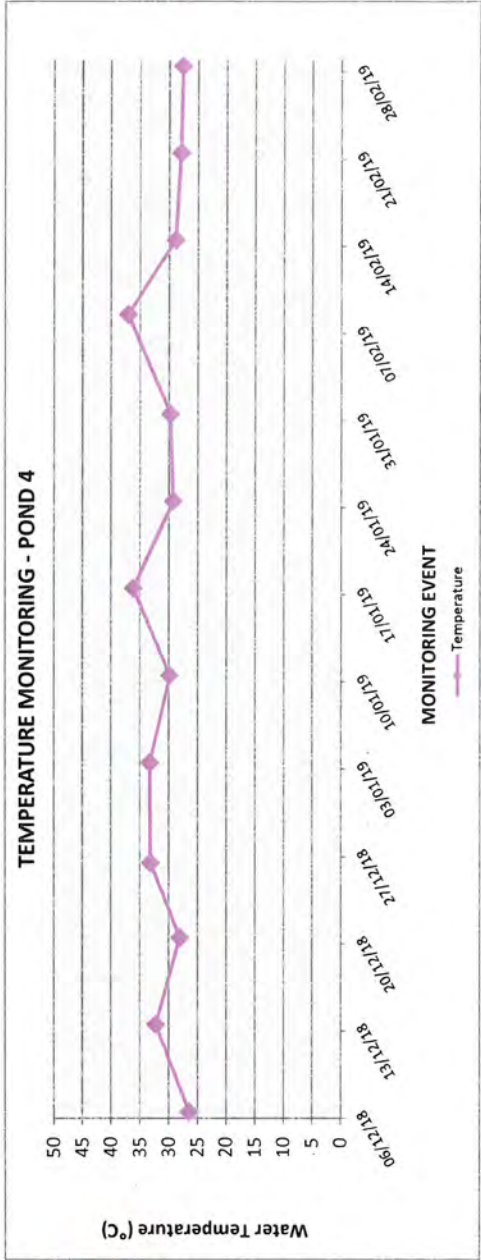
Pond 4 - Weekly EC Monitoring				
December 2018 to February 2019				
Monitoring Event	EC	ANZECC EC trigger value - lower bound	ANZECC EC trigger value - upper bound	Unable to Sample
	µS/cm	µS/cm	µS/cm	
6/12/2018	195	125	2200	
13/12/2018	242	125	2200	
20/12/2018	320	125	2200	
26/12/2018	954	125	2200	
3/01/2019	593	125	2200	
10/01/2019	637	125	2200	
17/01/2019	396	125	2200	
24/01/2019	491	125	2200	
31/01/2019	563	125	2200	
8/02/2019	836	125	2200	
14/02/2019	618	125	2200	
21/02/2019	547	125	2200	
28/02/2019	598	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
December 2018 to February 2019

Monitoring Event	Temperature °C	Unable to Sample
6/12/2018	26.4	
13/12/2018	32.2	
20/12/2018	28.0	
26/12/2018	33.1	
3/01/2019	33.2	
10/01/2019	29.8	
17/01/2019	36.1	
24/01/2019	29.2	
31/01/2019	29.7	
8/02/2019	37.0	
14/02/2019	28.8	
21/02/2019	27.9	
28/02/2019	27.6	

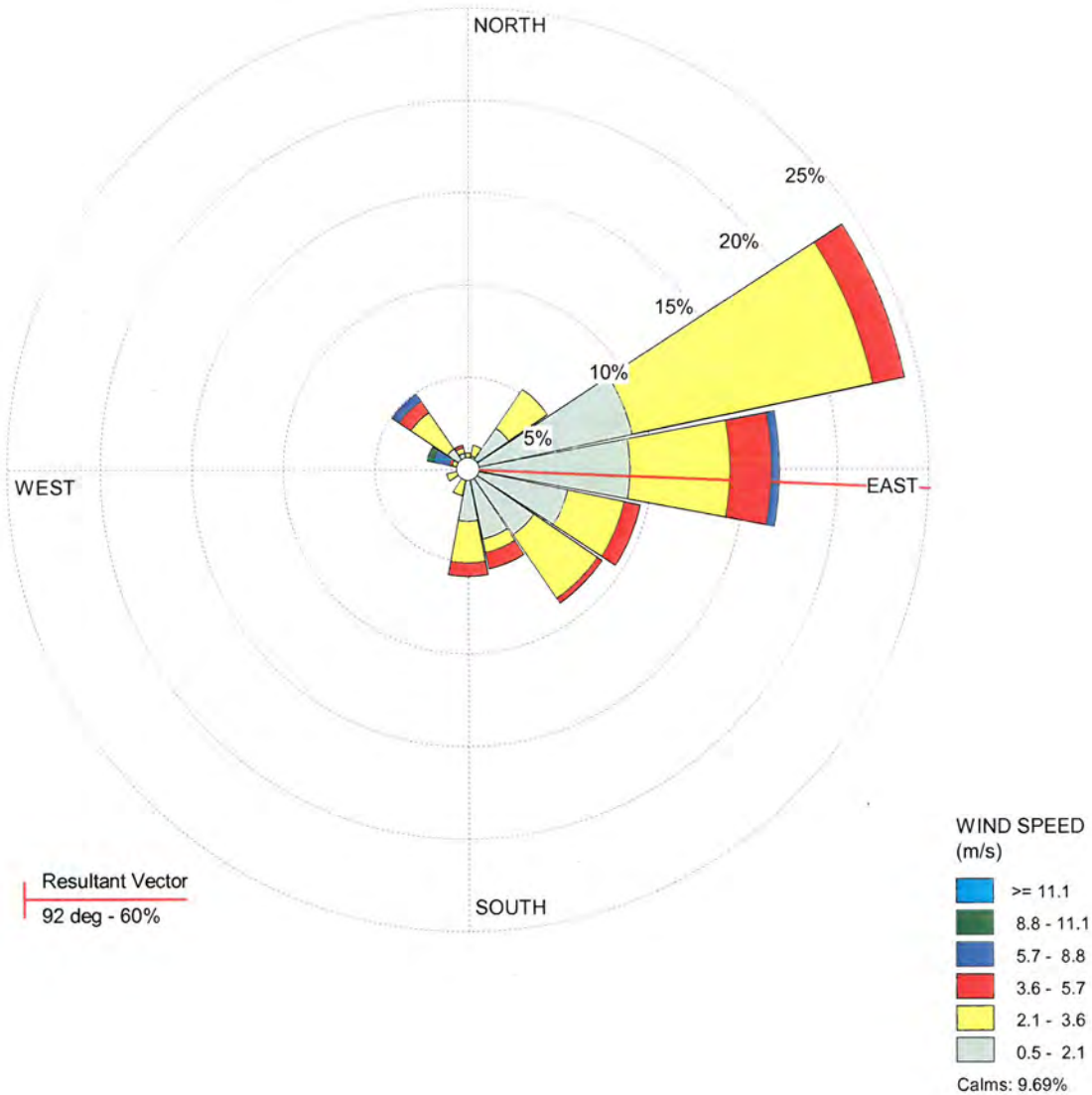


WIND ROSE PLOT:

NCIA - OEH / Onsite Meteorological Data
February Sampling Period - February 2019

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:

DATA PERIOD:

Start Date: 1/02/2019 - 01:00
End Date: 28/02/2019 - 23:00

COMPANY NAME:

MODELER:

CALM WINDS:

9.69%

TOTAL COUNT:

671 hrs.

AVG. WIND SPEED:

2.06 m/s

DATE:

18/03/2019

PROJECT NO.:

60583731