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27 November 2018

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765

Maitland NSW 2320

Dear Chris

Environmental Monitoring for National Ceramic Industries Australia - October 2018

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during October 2018. 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 (PM_{10}) 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 – PM_{10} 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 (2007) – *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) *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 PM_{10} (particulate matter with an aerodynamic diameter of less than 10 μm) are:

- 50 $\mu g/m^3$ over a 24-hour period; and
- 30 $\mu g/m^3$ 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 $\mu g/m^3$ over a 24-hour period; and
- 1.7 $\mu g/m^3$ 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 µS/cm (Table 3.3.3 - NSW Lowland River).

3.0 Monitoring Results

Monitoring results for the month of October 2018 are presented in the attachments to this letter. Monitoring results for the preceding two months are also presented to demonstrate quarterly trends in results.

September PM_{10} monitoring results were below the consent 24 hour criterion of 50$\mu g/m^3$.

PM_{10} results at the South East location on 22 and 28 October were deemed to be not representative after results of <0.1 $\mu g/m^3$ were returned. Filter papers were likely damaged by ants observed on the papers at the time of collection.

The PM_{10} rolling annual average concentration at the South East site remains below the Project Approval annual criterion of 30 $\mu g/m^3$ with an average of 23.0 $\mu g/m^3$ recorded. The North West annual average is currently above the criteria. The North West annual average sits at 31.3 $\mu g/m^3$ following the completion of the October monitoring period, this is primarily due to elevated results recorded during July 2018.

Fluoride results for October 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. The pH measurement taken on 25 October was deemed not representative of conditions due to an error with the water quality meter. All remaining Pond 4 pH readings during October were within the ANZG 2018 pH guidelines. All Pond 4 EC readings taken during the October monitoring period were within the ANZG guidelines. 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 October site visits.

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

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

Yours faithfully,

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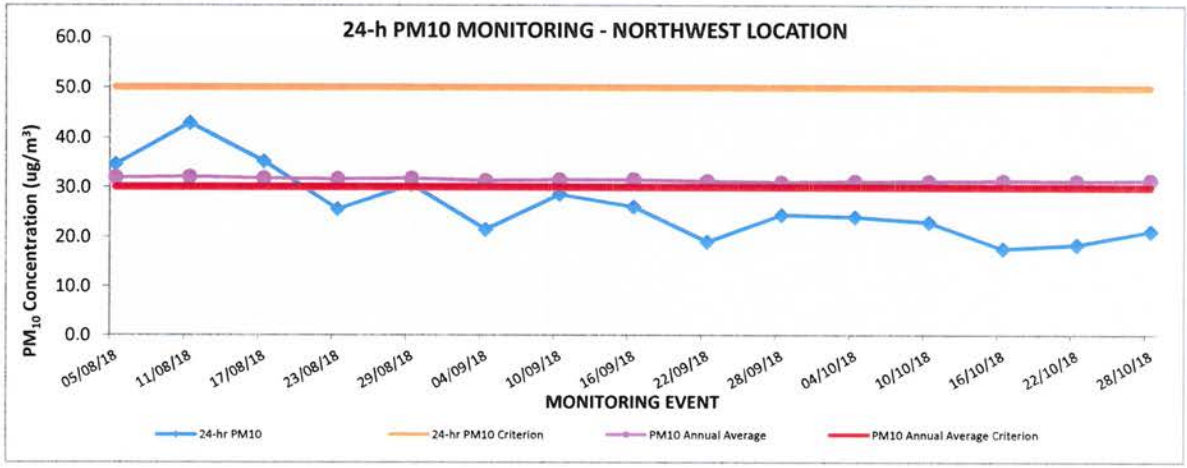
encl: Monitoring data tables and charts, wind rose

North West Monitoring Location - 24 hour PM10 Monitoring

North West - 24 hour PM10 Monitoring August 2018 to October 2018				
Monitoring Event	24-hr PM_{10} (µg/m3)	24-hr PM_{10} Criterion ($\mu g/m^3$)	PM_{10} Annual Average ($\mu g/m^3$)	PM_{10} Annual Average Criterion
5-Aug-18	34.6	50	**31.8**	30
11-Aug-18	43.0	50	**32.0**	30
17-Aug-18	35.2	50	**31.7**	30
23-Aug-18	25.6	50	**31.5**	30
29-Aug-18	30.6	50	**31.7**	30
4-Sep-18	21.5	50	**31.3**	30
10-Sep-18	28.6	50	**31.4**	30
16-Sep-18	26.1	50	**31.5**	30
22-Sep-18	19.0	50	**31.1**	30
28-Sep-18	24.4	50	**30.9**	30
4-Oct-18	24.0	50	**31.1**	30
10-Oct-18	22.9	50	**31.1**	30
16-Oct-18	17.6	50	**31.2**	30
22-Oct-18	18.4	50	**31.2**	30
28-Oct-18	21.1	50	**31.3**	30

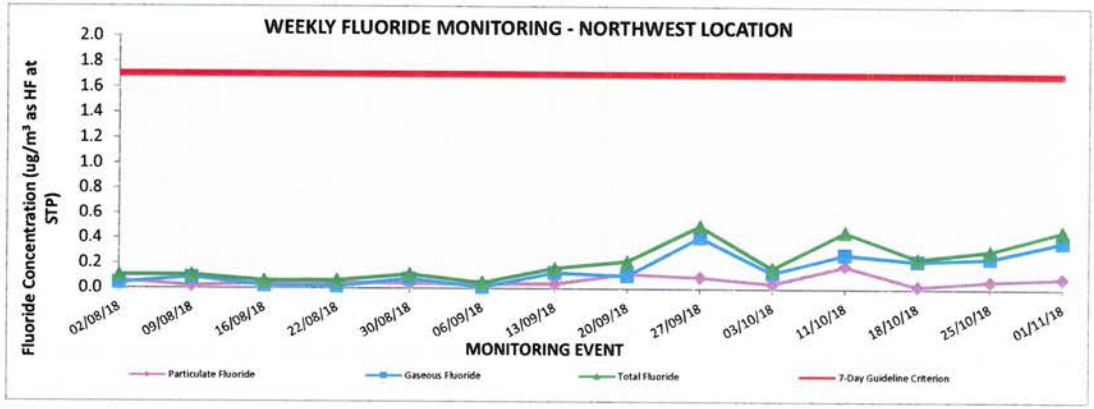
*Bold denotes exceedance



North West Monitoring Location - 7 Day Fluoride Monitoring

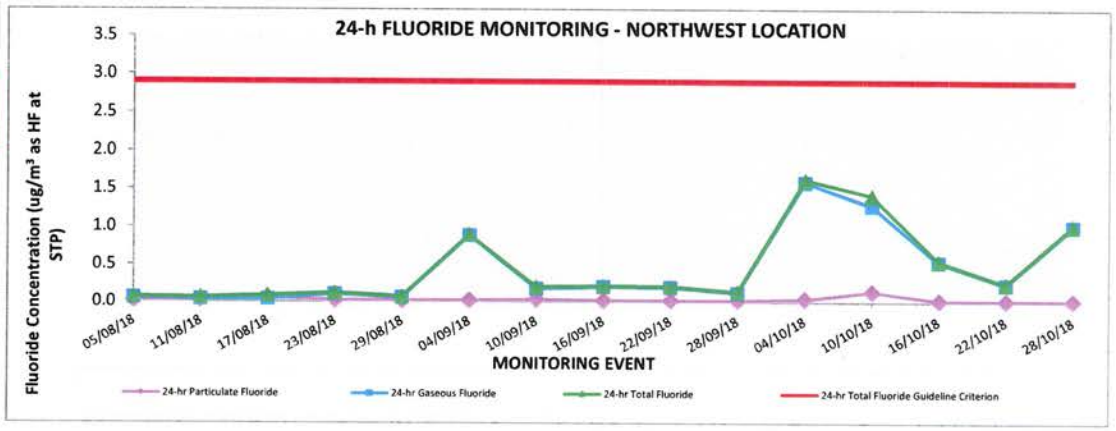
North West - 7 Day Fluoride Monitoring
August 2018 to November 2018

Monitoring Event	Particulate Fluoride ($\mu g/m^3$ as HF at STP)	Gaseous Fluoride ($\mu g/m^3$ as HF at STP)	Total Fluoride ($\mu g/m^3$ as HF at STP)	7-Day Guideline Criterion ($\mu g/m^3$ as HF at STP)
2-Aug-18	0.063	0.043	0.106	1.7
9-Aug-18	0.018	0.087	0.105	1.7
16-Aug-18	0.039	0.022	0.061	1.7
22-Aug-18	0.047	0.017	0.064	1.7
30-Aug-18	0.037	0.077	0.114	1.7
6-Sep-18	0.036	0.012	0.048	1.7
13-Sep-18	0.036	0.127	0.163	1.7
20-Sep-18	0.116	0.102	0.218	1.7
27-Sep-18	0.090	0.409	0.499	1.7
3-Oct-18	0.039	0.126	0.165	1.7
11-Oct-18	0.179	0.274	0.453	1.7
18-Oct-18	0.020	0.223	0.243	1.7
25-Oct-18	0.061	0.245	0.306	1.7
1-Nov-18	0.084	0.375	0.459	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

North West - 24 hour Fluoride Monitoring August 2018 to October 2018				
Monitoring Event	24-hr Particulate Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Gaseous Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride Guideline Criterion ($\mu g/m^3$ as HF at STP)
5-Aug-18	0.014	0.055	0.069	2.9
11-Aug-18	0.026	0.037	0.063	2.9
17-Aug-18	0.051	0.037	0.088	2.9
23-Aug-18	0.016	0.103	0.119	2.9
29-Aug-18	0.015	0.057	0.072	2.9
4-Sep-18	0.016	0.883	0.899	2.9
10-Sep-18	0.028	0.175	0.203	2.9
16-Sep-18	0.016	0.200	0.216	2.9
22-Sep-18	0.015	0.194	0.209	2.9
28-Sep-18	0.017	0.121	0.138	2.9
4-Oct-18	0.034	1.591	1.625	2.9
10-Oct-18	0.134	1.283	1.417	2.9
16-Oct-18	0.016	0.533	0.549	2.9
22-Oct-18	0.015	0.233	0.248	2.9
28-Oct-18	0.016	1.007	1.023	2.9

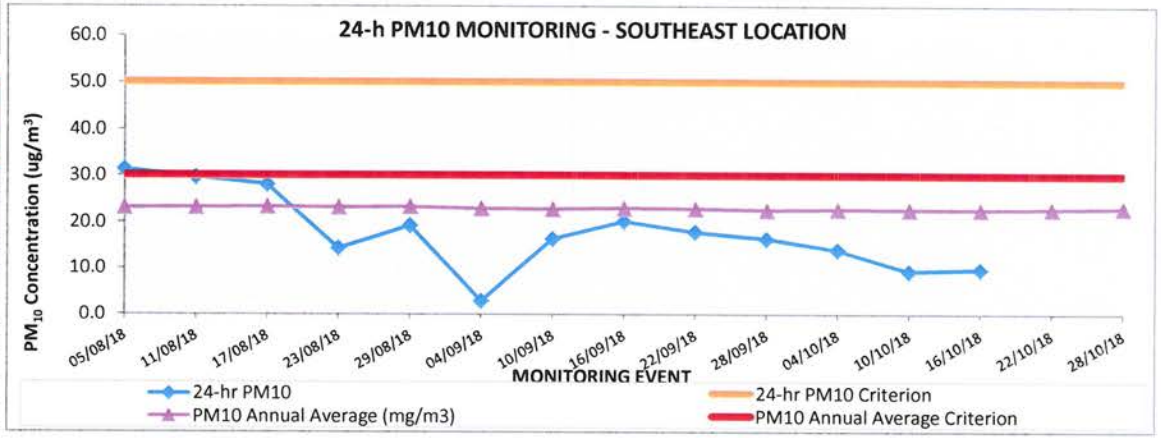


South East Monitoring Location - 24 hour PM10 Monitoring

South East - 24 hour PM10 Monitoring August 2018 to October 2018				
Monitoring Event	**24-hr PM_{10} ($\mu g/m^3$)**	**24-hr PM_{10} Criterion ($\mu g/m^3$)**	**PM_{10} Annual Average ($\mu g/m^3$)**	**PM_{10} Annual Average Criterion**
5-Aug-18	31.4	50	23.1	30
11-Aug-18	29.7	50	23.2	30
17-Aug-18	28.1	50	23.3	30
23-Aug-18	14.4	50	23.2	30
29-Aug-18	19.3	50	23.3	30
4-Sep-18	2.9	50	22.9	30
10-Sep-18	16.4	50	22.8	30
16-Sep-18	20.2	50	23.0	30
22-Sep-18	17.9	50	22.8	30
28-Sep-18	16.4	50	22.6	30
4-Oct-18	14.0	50	22.7	30
10-Oct-18	9.3	50	22.7	30
16-Oct-18	9.7	50	22.7	30
22-Oct-18	<0.1c	50	22.8	30
28-Oct-18	<0.1c	50	23.0	30

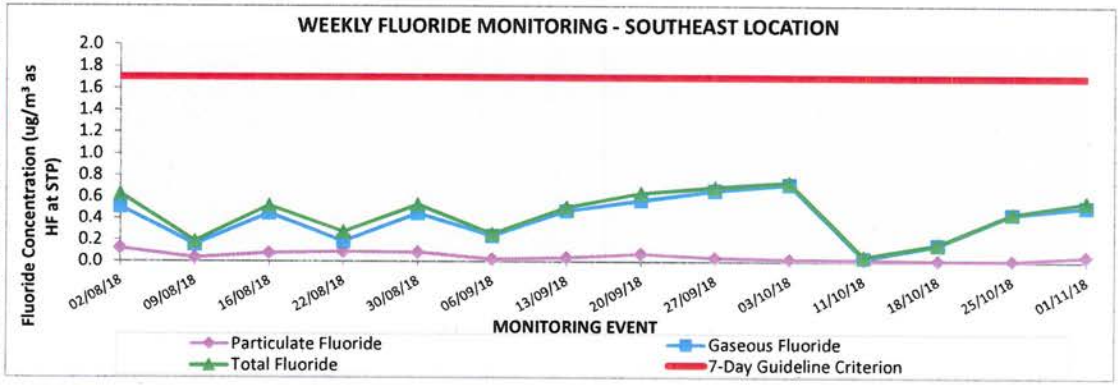
***Bold denotes exceedance**

****c = contaminated**



South East Monitoring Location - 7 Day Fluoride Monitoring

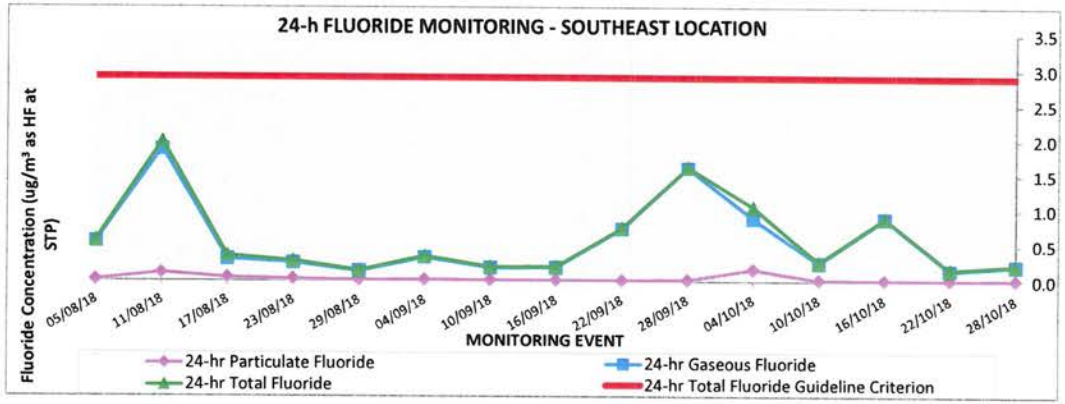
South East - 7 Day Fluoride Monitoring August 2018 to November 2018				
Monitoring Event	Particulate Fluoride ($\mu g/m^3$ as HF at STP)	Gaseous Fluoride ($\mu g/m^3$ as HF at STP)	Total Fluoride ($\mu g/m^3$ as HF at STP)	7-Day Guideline Criterion ($\mu g/m^3$ as HF at STP)
2-Aug-18	0.120	0.508	0.628	1.7
9-Aug-18	0.032	0.157	0.189	1.7
16-Aug-18	0.074	0.447	0.521	1.7
22-Aug-18	0.088	0.187	0.275	1.7
30-Aug-18	0.084	0.448	0.532	1.7
6-Sep-18	0.019	0.239	0.258	1.7
13-Sep-18	0.036	0.472	0.508	1.7
20-Sep-18	0.068	0.572	0.640	1.7
27-Sep-18	0.034	0.663	0.697	1.7
3-Oct-18	0.020	0.720	0.740	1.7
11-Oct-18	0.018	0.034	0.052	1.7
18-Oct-18	0.009	0.159	0.168	1.7
25-Oct-18	0.009	0.445	0.454	1.7
1-Nov-18	0.047	0.513	0.560	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

South East - 24 hour Fluoride Monitoring
August 2018 to October 2018

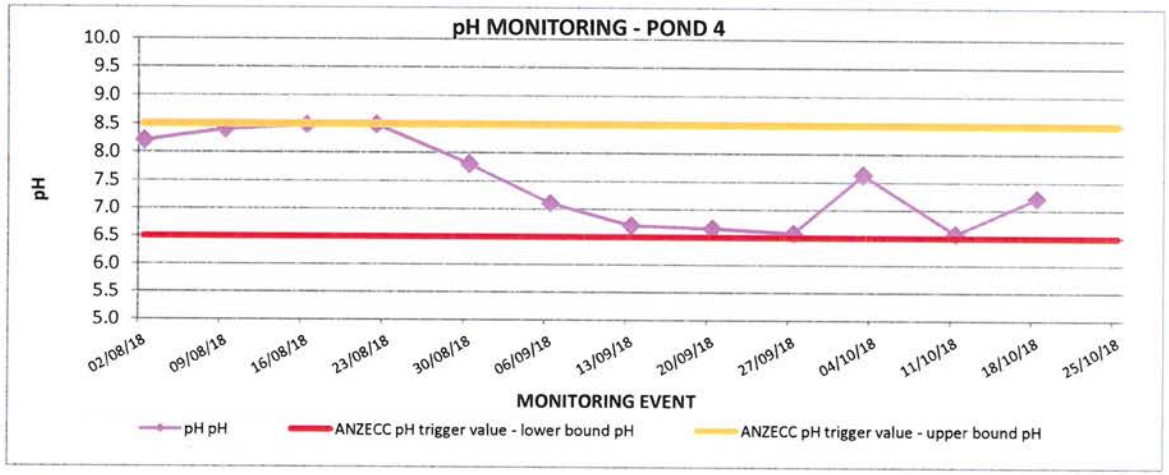
Monitoring Event	24-hr Particulate Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Gaseous Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride Guideline Criterion ($\mu g/m^3$ as HF at STP)
5-Aug-18	0.013	0.560	0.573	2.9
11-Aug-18	0.112	1.88	1.99	2.9
17-Aug-18	0.049	0.312	0.361	2.9
23-Aug-18	0.030	0.257	0.287	2.9
29-Aug-18	0.014	0.142	0.156	2.9
4-Sep-18	0.017	0.337	0.354	2.9
10-Sep-18	0.014	0.189	0.203	2.9
16-Sep-18	0.014	0.192	0.206	2.9
22-Sep-18	0.015	0.740	0.755	2.9
28-Sep-18	0.017	1.61	1.63	2.9
4-Oct-18	0.167	0.888	1.055	2.9
10-Oct-18	0.017	0.255	0.272	2.9
16-Oct-18	0.014	0.884	0.898	2.9
22-Oct-18	0.015	0.157	0.172	2.9
28-Oct-18	0.016	0.219	0.235	2.9



Pond 4 Monitoring Location - Weekly pH Monitoring

Pond 4 - Weekly pH Monitoring
August 2018 to October 2018

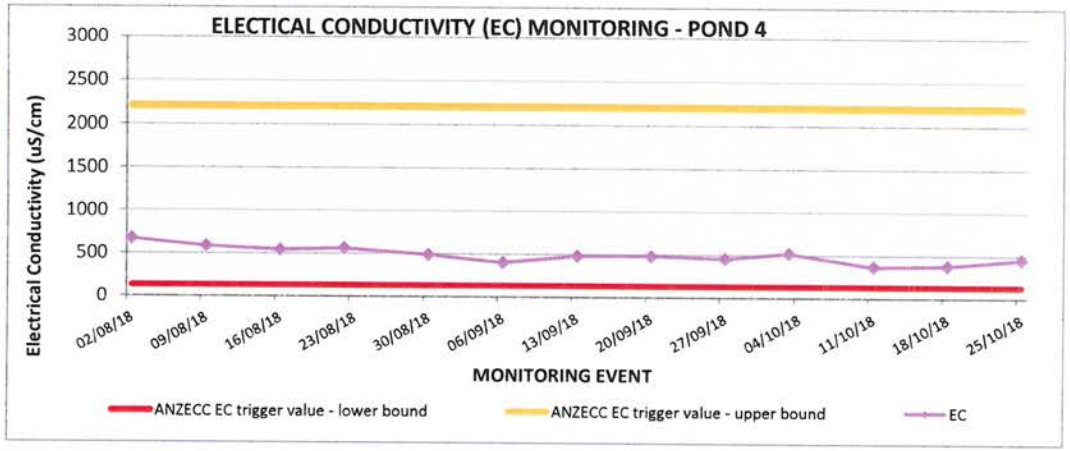
Monitoring Event	pH	ANZECC pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
2/08/2018	8.20	6.5	8.5	
9/08/2018	8.40	6.5	8.5	
16/08/2018	8.48	6.5	8.5	
22/08/2018	8.49	6.5	8.5	
30/08/2018	7.80	6.5	8.5	
6/09/2018	7.10	6.5	8.5	
13/09/2018	6.70	6.5	8.5	
20/09/2018	6.65	6.5	8.5	
27/09/2018	6.57	6.5	8.5	
3/10/2018	7.63	6.5	8.5	
11/10/2018	6.56	6.5	8.5	
18/10/2018	7.21	6.5	8.5	
25/10/2018	-	6.5	8.5	



Pond 4 Monitoring Location - Weekly EC Monitoring

Pond 4 - Weekly EC Monitoring
August 2018 to October 2018

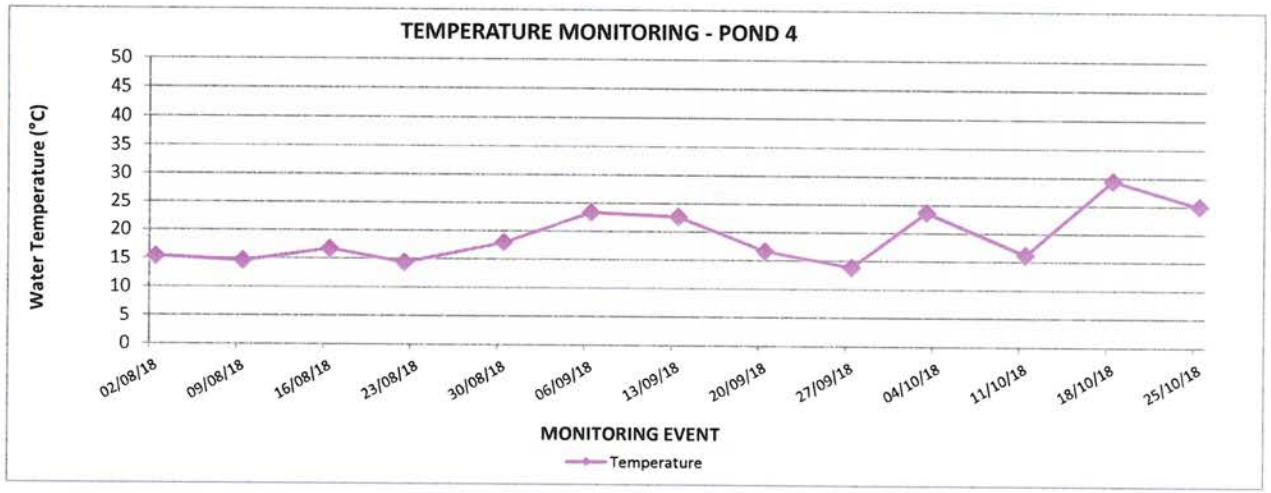
Monitoring Event	EC	ANZECC EC trigger value - lower bound	ANZECC EC trigger value - upper bound	Unable to Sample
	µS/cm	µS/cm	µS/cm	
2/08/2018	664	125	2200	
9/08/2018	579	125	2200	
16/08/2018	534	125	2200	
22/08/2018	553	125	2200	
30/08/2018	482	125	2200	
6/09/2018	395	125	2200	
13/09/2018	474	125	2200	
20/09/2018	477	125	2200	
27/09/2018	448	125	2200	
3/10/2018	513	125	2200	
11/10/2018	360	125	2200	
18/10/2018	372	125	2200	
25/10/2018	446	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
August 2018 to October 2018

Monitoring Event	Temperature °C	Unable to Sample
2/08/2018	15.3	
9/08/2018	14.5	
16/08/2018	16.7	
22/08/2018	14.3	
30/08/2018	17.9	
6/09/2018	23.3	
13/09/2018	22.6	
20/09/2018	16.6	
27/09/2018	13.8	
3/10/2018	23.6	
11/10/2018	16.1	
18/10/2018	29.4	
25/10/2018	24.9	

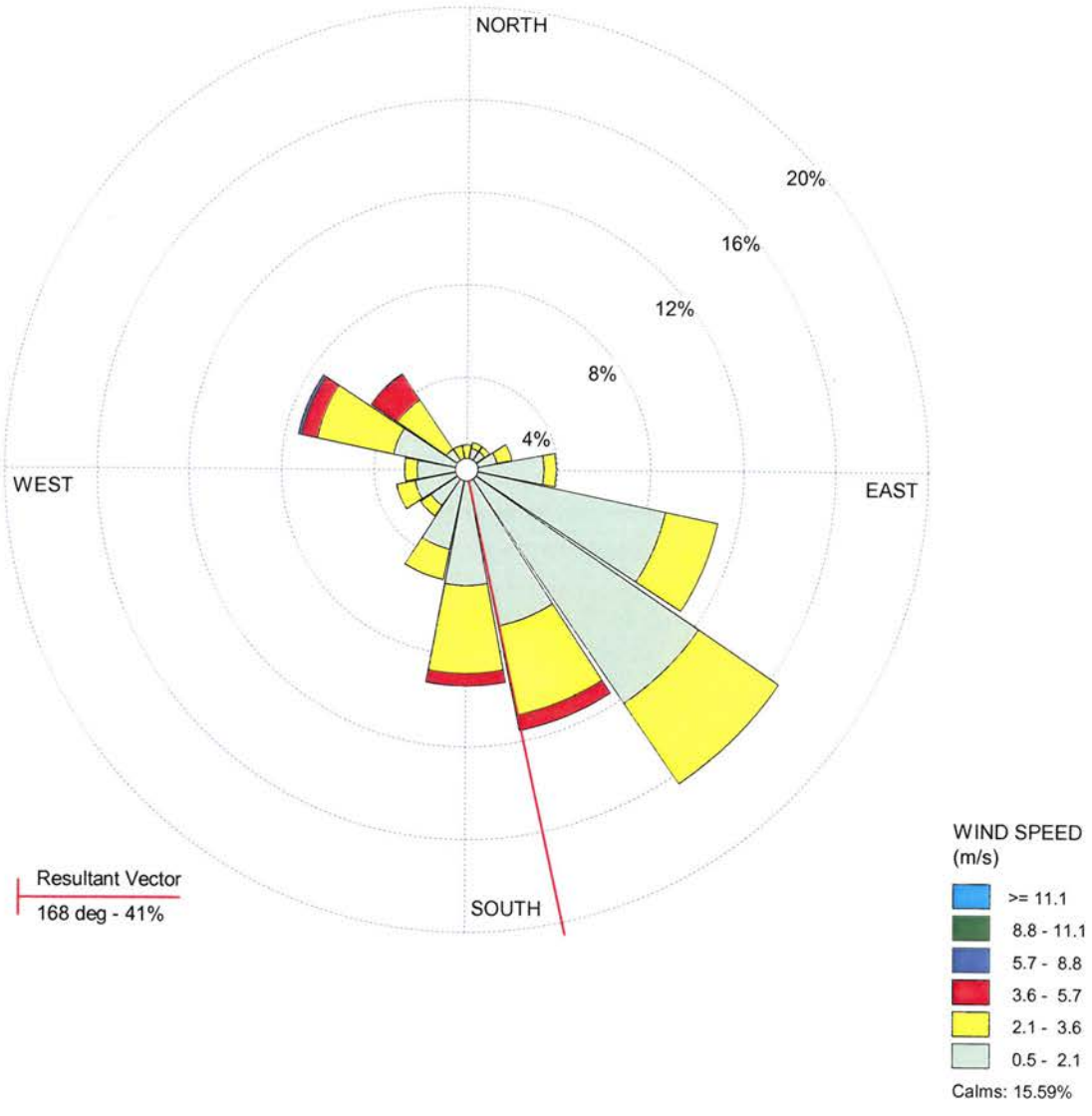


WIND ROSE PLOT:

NCIA - Meteorological Data
October Sampling Period - October 2018

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/10/2018 - 00:00** **End Date: 31/10/2018 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **15.59%**	TOTAL COUNT: **740 hrs.**	
	AVG. WIND SPEED: **1.51 m/s**	DATE: **2/11/2018**	PROJECT NO.: **60583731**