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3 July 2019

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

Dear Chris,

Environmental Monitoring for National Ceramic Industries Australia - May 2019

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during May 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 (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 (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 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 May 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.

The South East PM_{10} sample on 26 May was not logged after the sample was lost during the severe wind storms that occurred during that week. A catch-up sample was completed on 21 June 2019 and will be reported in the June report.

May PM_{10} monitoring results were below the consent 24 hour criterion of 50$\mu g/m^3$ with the exception of the North West sample on 26 May which returned a result of 58.3$\mu g/m^3$, above the assessment criteria.

For comparison, the EPA regional monitoring stations in the region also recorded above average PM_{10} concentrations on this day. On 26 May the EPA Beresfield monitoring station recorded a 24hr PM_{10} average of 28.1 $\mu g/m^3$ while the EPA Singleton monitoring station recorded a result of 29.8 $\mu g/m^3$. Both readings being the third highest 24hr concentrations recorded at these stations during May.

More importantly, meteorological data sourced from the on-site meteorological station shows strong north westerly winds for 26 May. Under these conditions the North West monitoring station is upwind of the NCIA site. A wind rose attached shows the meteorological data graphically and presents the wind direction as 'blowing from'.

In summary, the PM_{10} result recorded at the North West monitoring location on 26 May 2019 is likely to be significantly influenced by an upwind source and strong north westerly winds. Both the EPA Beresfield and Singleton stations recorded their third highest 24hr PM_{10} concentrations for May on this day indicating the potential for elevated PM_{10} levels. Importantly, the North West monitoring station was upwind of the NCIA site on this day meaning the NCIA facility is unlikely to have contributed to this result.

An Environmental Incident Report detailing these exceedances was submitted to Leah Cook (Department of Planning and Environment) on 18 June 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 $\mu g/m^3$ with an average of 21.4 $\mu g/m^3$ recorded. The North West annual average is currently above the criteria, sitting at 32.9 $\mu g/m^3$ following the completion of the May monitoring period. This is primarily due to elevated results recorded during July 2018 and February 2019.

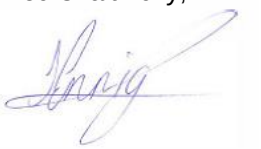
Fluoride results for May remain below the relevant assessment criteria at both the North West and South East monitoring sites with no exceedances of either the 24 hour or 7 day criteria this month.

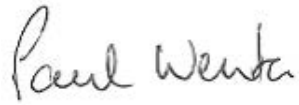
The adopted ANZG 2018 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. The pH measurement on 9 May was below the ANZG guideline with all remaining samples recorded above the ANZG guidelines however Pond 4 was not observed to be discharging at these times. All conductivity measurements were within the relevant ANZG guidelines for May. 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 May site visits.

Monitoring results and plots can be found attached including the wind rose for May. 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

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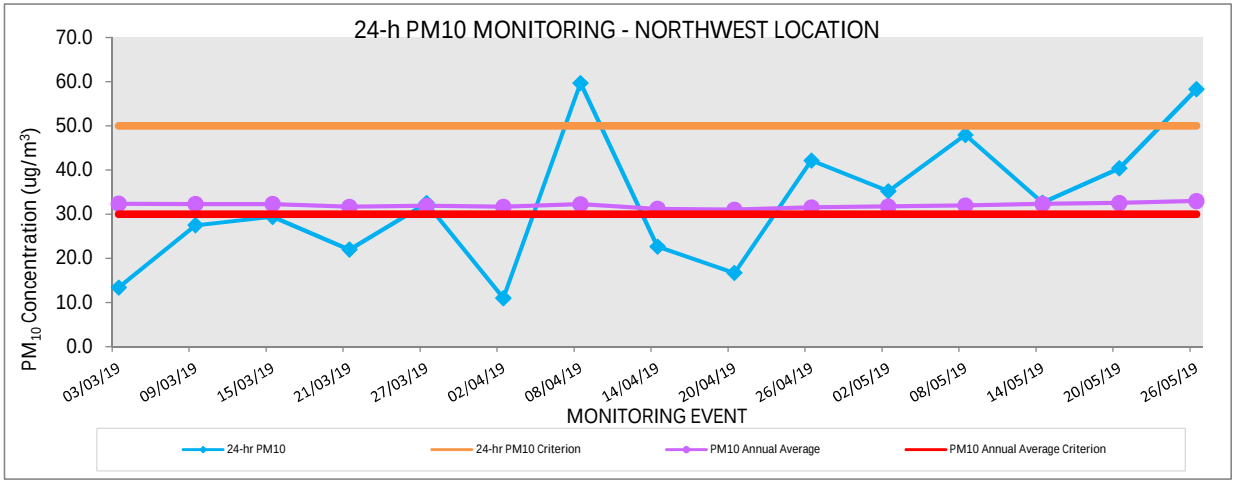
North West Monitoring Location - 24 hour PM10 Monitoring

North West - 24 hour PM10 Monitoring				
March 2019 to May 2019				
Monitoring Event	**24-hr PM_{10}**	**24-hr PM_{10} Criterion**	**PM_{10} Annual Average**	**PM_{10} Annual Average Criterion**
	(µg/m3)	**(µg/m^3)**	**(µg/m^3)**	
3-Mar-19	13.4	50	**32.4**	30
9-Mar-19	27.5	50	**32.3**	30
15-Mar-19	29.4	50	**32.3**	30
21-Mar-19	22.0	50	**31.7**	30
27-Mar-19	32.5	50	**31.9**	30
2-Apr-19	11.0	50	**31.7**	30
8-Apr-19	**59.7**	50	**32.2**	30
14-Apr-19	22.7	50	**31.2**	30
20-Apr-19	16.7	50	**31.0**	30
26-Apr-19	42.2	50	**31.5**	30
2-May-19	35.2	50	**31.7**	30
8-May-19	48.0	50	**32.0**	30
14-May-19	32.6	50	**32.3**	30
20-May-19	40.4	50	**32.5**	30
26-May-19	**58.3**	50	**33.0**	30

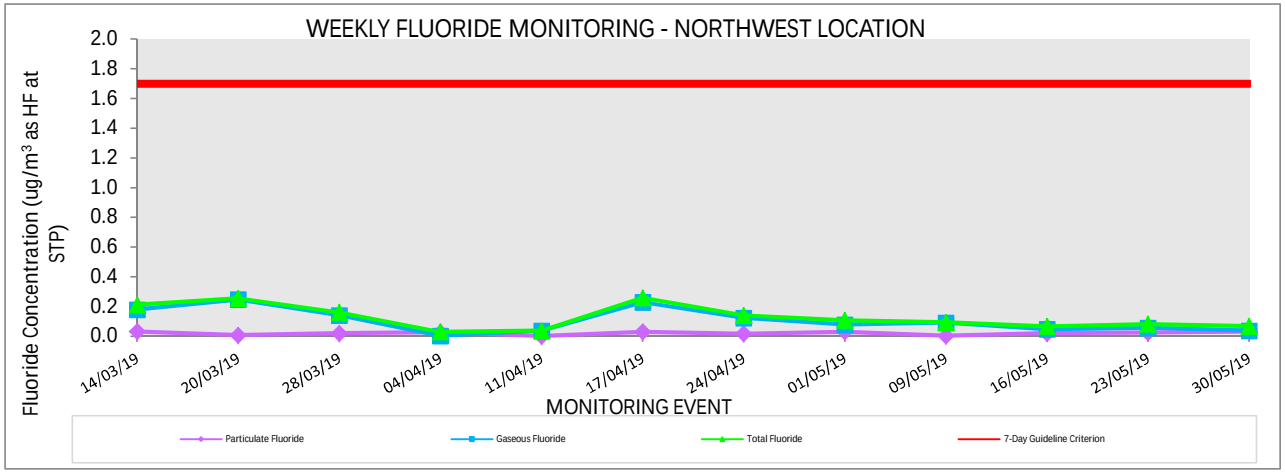
***Bold denotes exceedance**



North West Monitoring Location - 7 Day Fluoride Monitoring

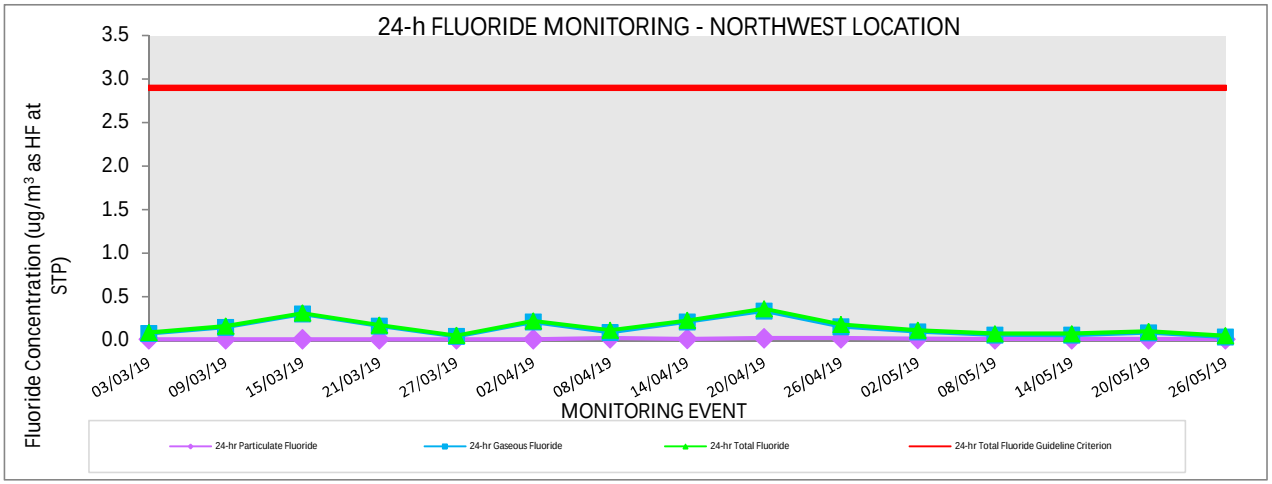
North West - 7 Day Fluoride Monitoring
March 2019 to May 2019

Monitoring Event		Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
Start Date	End Date	(µg/m^3 as HF at STP)	(µg/m^3 as HF at STP)	(µg/m^3 as HF at STP)	(µg/m^3 as HF at STP)
7-Mar-19	14-Mar-19	0.032	0.180	0.212	1.7
14-Mar-19	20-Mar-19	0.007	0.248	0.255	1.7
20-Mar-19	28-Mar-19	0.020	0.141	0.161	1.7
28-Mar-19	4-Apr-19	0.027	0.003	0.030	1.7
4-Apr-19	11-Apr-19	0.001	0.037	0.038	1.7
11-Apr-19	17-Apr-19	0.030	0.229	0.259	1.7
17-Apr-19	24-Apr-19	0.017	0.124	0.141	1.7
24-Apr-19	1-May-19	0.030	0.078	0.108	1.7
1-May-19	9-May-19	0.003	0.091	0.094	1.7
9-May-19	16-May-19	0.020	0.047	0.067	1.7
16-May-19	23-May-19	0.025	0.057	0.082	1.7
23-May-19	30-May-19	0.031	0.037	0.068	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

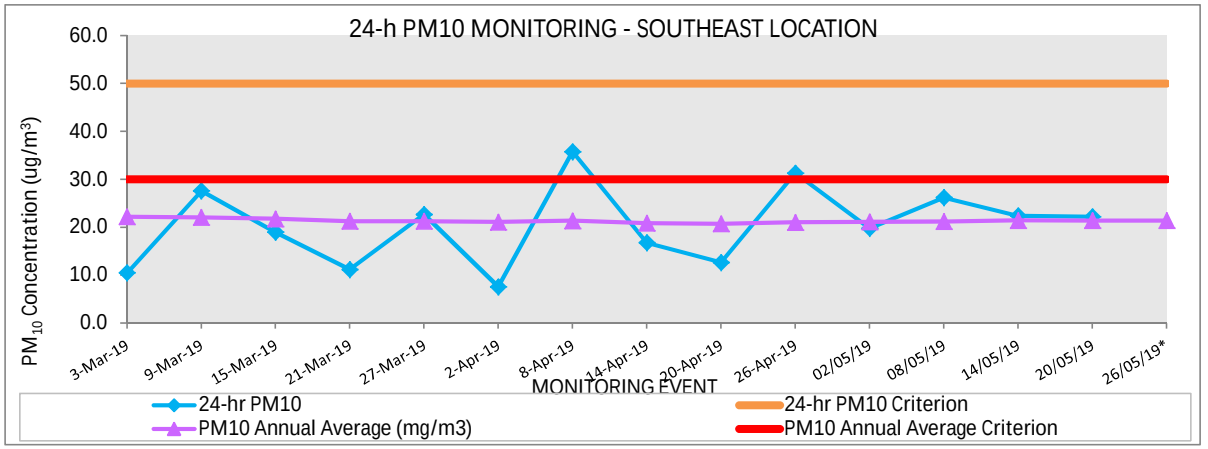
North West - 24 hour Fluoride Monitoring				
March 2019 to May 2019				
Monitoring Event	**24-hr Particulate Fluoride** ($\mu g/m^3$ as HF at STP)	**24-hr Gaseous Fluoride** ($\mu g/m^3$ as HF at STP)	**24-hr Total Fluoride** ($\mu g/m^3$ as HF at STP)	**24-hr Total Fluoride Guideline Criterion** ($\mu g/m^3$ as HF at STP)
3-Mar-19	0.012	0.078	0.090	2.9
9-Mar-19	0.012	0.151	0.163	2.9
15-Mar-19	0.012	0.302	0.314	2.9
21-Mar-19	0.012	0.164	0.176	2.9
27-Mar-19	0.012	0.045	0.057	2.9
2-Apr-19	0.012	0.211	0.223	2.9
8-Apr-19	0.026	0.091	0.117	2.9
14-Apr-19	0.016	0.213	0.229	2.9
20-Apr-19	0.026	0.337	0.363	2.9
26-Apr-19	0.026	0.157	0.183	2.9
2-May-19	0.018	0.098	0.116	2.9
8-May-19	0.015	0.062	0.077	2.9
14-May-19	0.015	0.061	0.076	2.9
20-May-19	0.015	0.087	0.102	2.9
26-May-19	0.015	0.038	0.053	2.9



South East Monitoring Location - 24 hour PM10 Monitoring

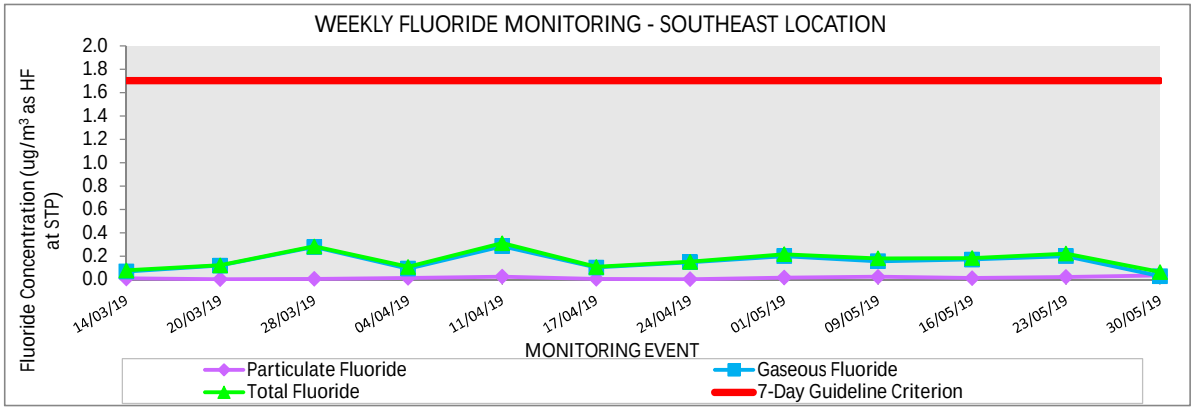
South East - 24 hour PM10 Monitoring				
March 2019 to May 2019				
Monitoring Event	**24-hr PM_{10} ($\mu g/m^3$)**	**24-hr PM_{10} Criterion ($\mu g/m^3$)**	**PM_{10} Annual Average ($\mu g/m^3$)**	**PM_{10} Annual Average Criterion**
3-Mar-19	10.5	50	22.2	30
9-Mar-19	27.6	50	22.1	30
15-Mar-19	19.0	50	21.8	30
21-Mar-19	11.2	50	21.2	30
27-Mar-19	22.7	50	21.3	30
2-Apr-19	7.6	50	21.1	30
8-Apr-19	35.8	50	21.4	30
14-Apr-19	16.8	50	20.8	30
20-Apr-19	12.7	50	20.7	30
26-Apr-19	31.3	50	21.0	30
02/05/19	19.8	50	21.1	30
08/05/19	26.2	50	21.2	30
14/05/19	22.4	50	21.4	30
20/05/19	22.2	50	21.4	30
26/05/19*	-	50	21.4	30

*Sample lost in severe winds



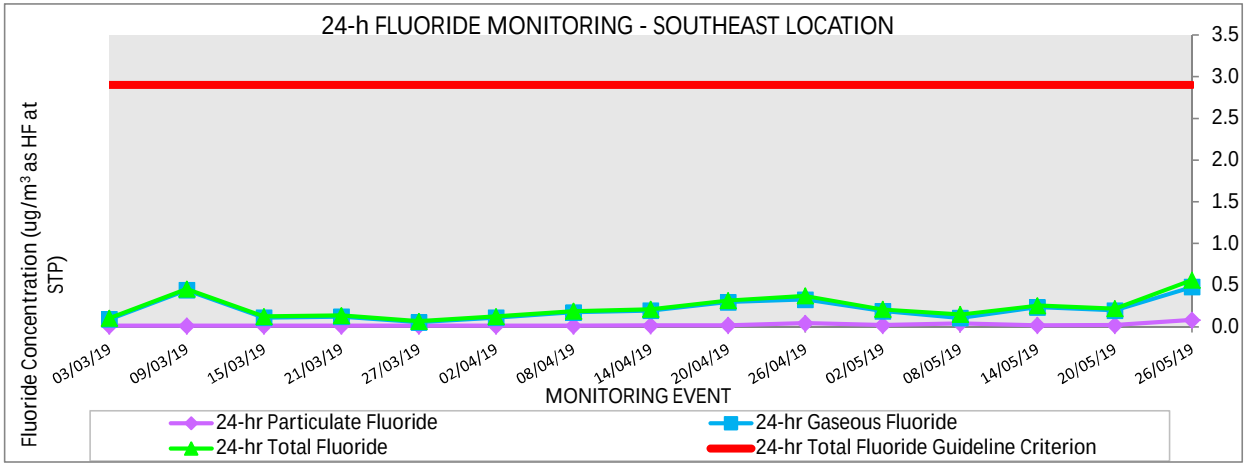
South East Monitoring Location - 7 Day Fluoride Monitoring

South East - 7 Day Fluoride Monitoring					
March 2019 to May 2019					
Monitoring Event		**Particulate Fluoride**	**Gaseous Fluoride**	**Total Fluoride**	**7-Day Guideline Criterion**
Start Date	**End Date**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**
7-Mar-19	14-Mar-19	0.010	0.069	0.079	1.7
14-Mar-19	20-Mar-19	0.003	0.119	0.122	1.7
20-Mar-19	28-Mar-19	0.006	0.278	0.284	1.7
28-Mar-19	4-Apr-19	0.014	0.094	0.108	1.7
4-Apr-19	11-Apr-19	0.025	0.286	0.311	1.7
11-Apr-19	17-Apr-19	0.006	0.103	0.109	1.7
17-Apr-19	24-Apr-19	0.003	0.149	0.152	1.7
24-Apr-19	1-May-19	0.017	0.200	0.217	1.7
1-May-19	9-May-19	0.024	0.157	0.181	1.7
9-May-19	16-May-19	0.013	0.171	0.184	1.7
16-May-19	23-May-19	0.022	0.201	0.223	1.7
23-May-19	30-May-19	0.036	0.029	0.065	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

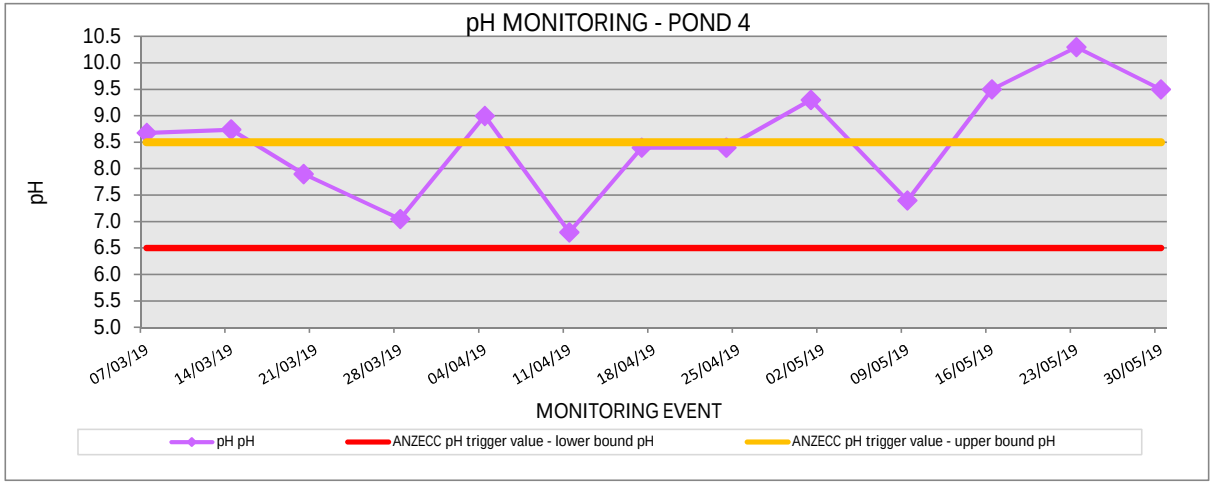
South East - 24 hour Fluoride Monitoring				
March 2019 to May 2019				
Monitoring Event	**24-hr Particulate Fluoride**	**24-hr Gaseous Fluoride**	**24-hr Total Fluoride**	**24-hr Total Fluoride Guideline Criterion**
	(µg/m³ as HF at STP)	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**	**(µg/m³ as HF at STP)**
3-Mar-19	0.013	0.093	0.106	2.9
9-Mar-19	0.013	0.441	0.454	2.9
15-Mar-19	0.013	0.111	0.124	2.9
21-Mar-19	0.014	0.122	0.136	2.9
27-Mar-19	0.013	0.055	0.068	2.9
2-Apr-19	0.013	0.111	0.124	2.9
8-Apr-19	0.013	0.175	0.188	2.9
14-Apr-19	0.017	0.195	0.212	2.9
20-Apr-19	0.020	0.297	0.317	2.9
26-Apr-19	0.044	0.328	0.372	2.9
2-May-19	0.022	0.190	0.212	2.9
8-May-19	0.041	0.108	0.149	2.9
14-May-19	0.019	0.236	0.255	2.9
20-May-19	0.021	0.197	0.218	2.9
26-May-19	0.083	0.479	0.562	2.9



Pond 4 Monitoring Location - Weekly pH Monitoring

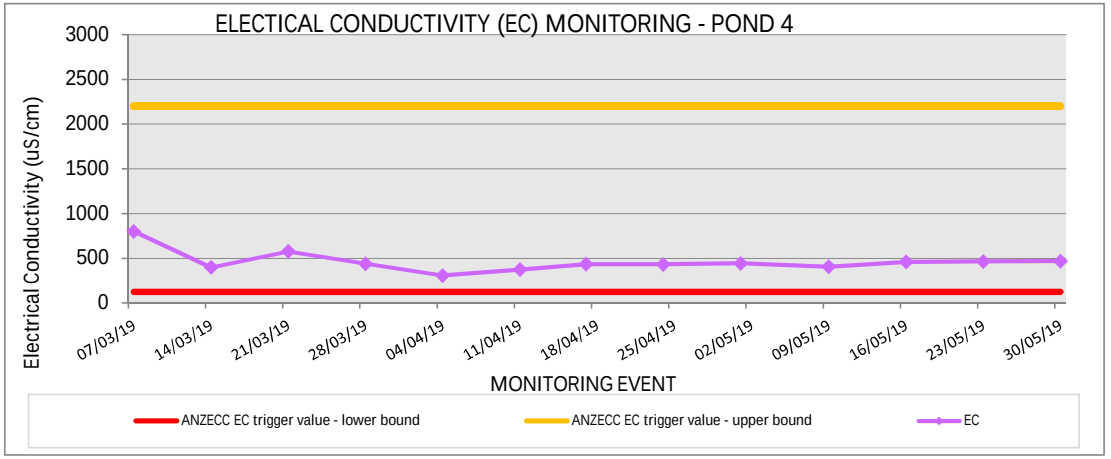
Pond 4 - Weekly pH Monitoring
March 2019 to May 2019

Monitoring Event	pH	ANZECC pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
7-Mar-19	8.68	6.5	8.5	
14-Mar-19	8.74	6.5	8.5	
20-Mar-19	7.90	6.5	8.5	
28-Mar-19	7.05	6.5	8.5	
4-Apr-19	9.00	6.5	8.5	
11-Apr-19	6.80	6.5	8.5	
17-Apr-19	8.40	6.5	8.5	
24-Apr-19	8.40	6.5	8.5	
1-May-19	9.30	6.5	8.5	
9-May-19	7.40	6.5	8.5	
16-May-19	9.50	6.5	8.5	
23-May-19	10.30	6.5	8.5	
30-May-19	9.50	6.5	8.5	



Pond 4 Monitoring Location - Weekly EC Monitoring

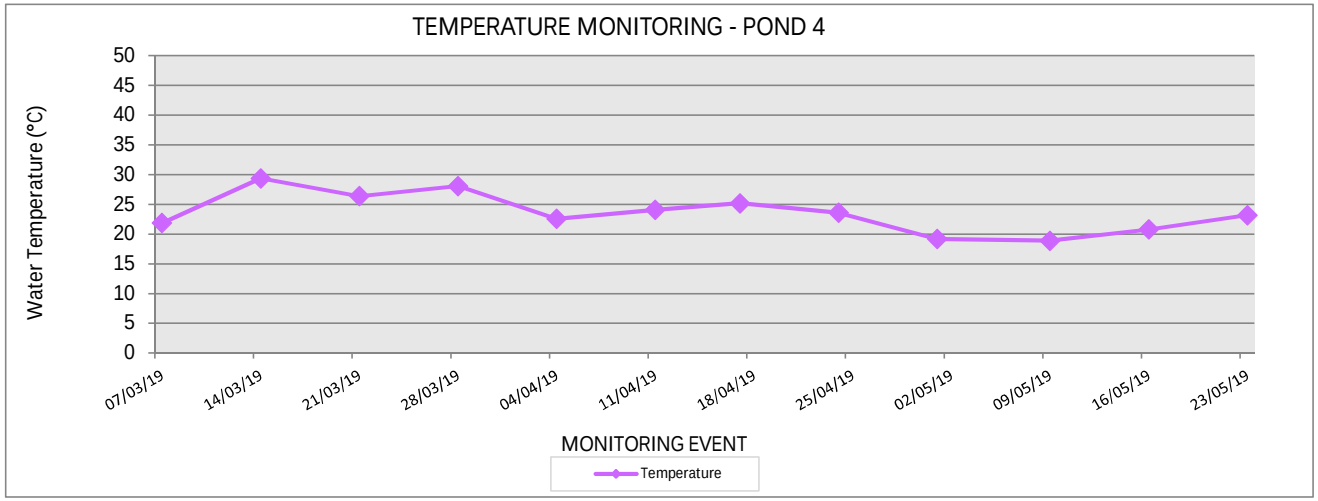
Pond 4 - Weekly EC Monitoring				
March 2019 to May 2019				
Monitoring Event	**EC**	**ANZECC EC trigger value - lower bound**	**ANZECC EC trigger value - upper bound**	**Unable to Sample**
	µS/cm	**µS/cm**	**µS/cm**	
7-Mar-19	802	125	2200	
14-Mar-19	399	125	2200	
21-Mar-19	578	125	2200	
28-Mar-19	440	125	2200	
4-Apr-19	309	125	2200	
11-Apr-19	375	125	2200	
17-Apr-19	435	125	2200	
24-Apr-19	433	125	2200	
1-May-19	445	125	2200	
9-May-19	406	125	2200	
16-May-19	460	125	2200	
23-May-19	465	125	2200	
30-May-19	470	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
March 2019 to May 2019

Monitoring Event	Temperature °C	Unable to Sample
7-Mar-19	21.9	
14-Mar-19	29.4	
21-Mar-19	26.4	
28-Mar-19	28.1	
4-Apr-19	22.6	
11-Apr-19	24.1	
17-Apr-19	25.2	
24-Apr-19	23.6	
1-May-19	19.2	
9-May-19	18.9	
16-May-19	20.8	
23-May-19	23.2	
30-May-19	15.2	

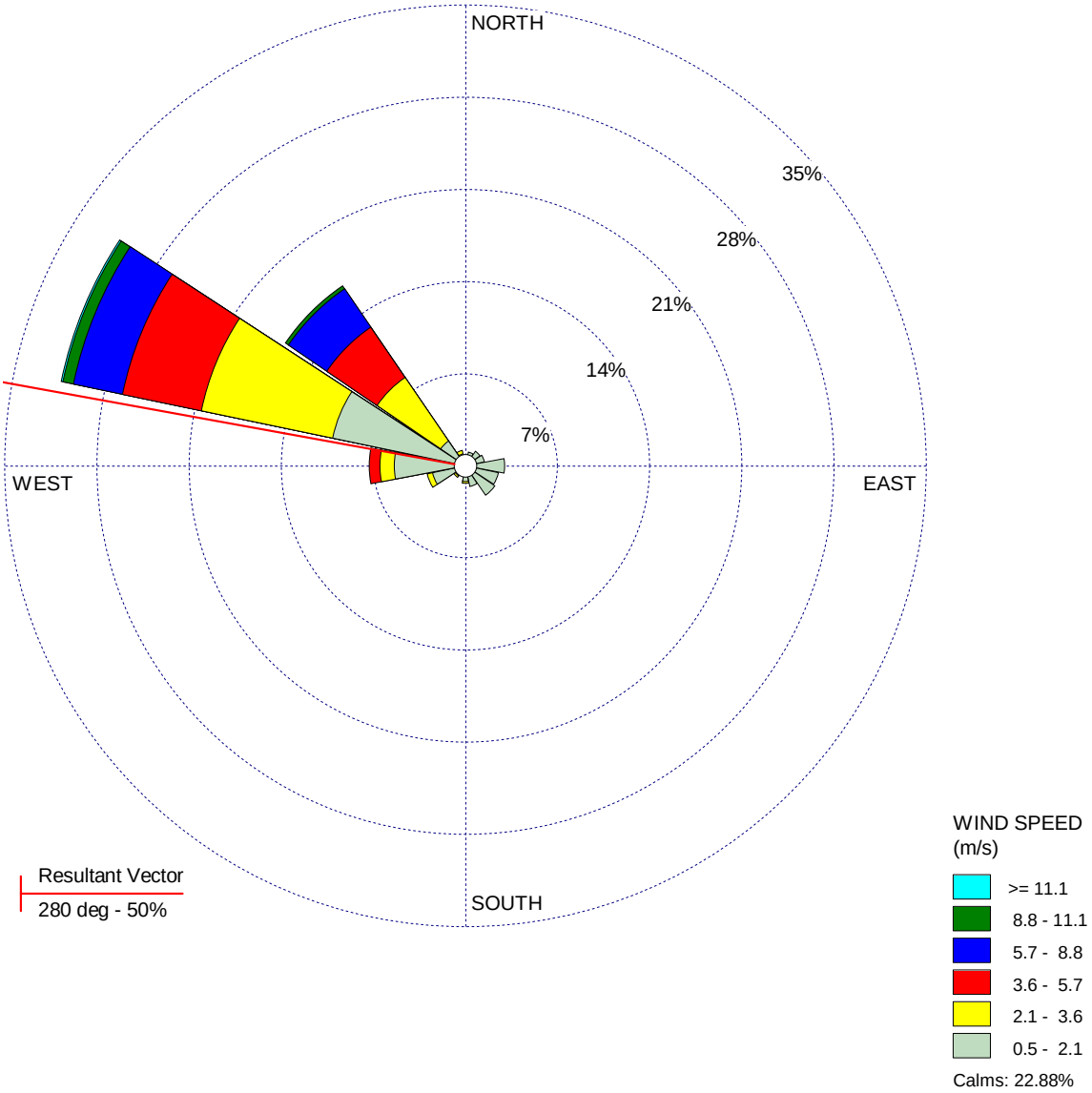


WIND ROSE PLOT:

NCIA - Meteorological Data
May Sampling Period - May 2019

DISPLAY:

Wind Speed
Direction (blowing from)



COMMENTS:	DATA PERIOD: **Start Date: 1/05/2019 - 01:00** **End Date: 31/05/2019 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **22.88%**	TOTAL COUNT: **738 hrs.**	
	AVG. WIND SPEED: **2.10 m/s**	DATE: **28/06/2019**	PROJECT NO.: **60583731**