AECOM Imagine it. Delivered.

AECOM Australia Pty Ltd
17 Warabrook Boulevard
Warabrook NSW 2304
PO Box 73
Hunter Region MC NSW 2310
Australia
www.aecom.com

+61 2 4911 4900 tel
+61 2 4911 4999 fax
ABN 20 093 846 925

17 May 2019

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

Dear Chris,

Environmental Monitoring for National Ceramic Industries Australia - April 2019

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

April 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 8 April which returned a result of 59.7$\mu g/m^3$, above the assessment criteria.

The EPA regional monitoring stations in the region also recorded elevated PM_{10} concentrations on this day. On 8 April the EPA Beresfield monitoring station recorded a 24hr PM_{10} average of 38.9 $\mu g/m^3$ while the EPA Singleton monitoring station recorded a result of 40.5 $\mu g/m^3$. Both being the maximum 24hr concentrations recorded at these stations during April.

Meteorological data sourced from the on-site meteorological station shows strong north westerly winds on this day. Under these conditions the North West monitoring station is upwind of the NCIA site.

Elevated upwind readings and data sourced from the nearest EPA ambient monitoring sites indicate regional PM_{10} concentrations were elevated on 8 April with this being the likely cause of the measured exceedance.

An Environmental Incident Report detailing these exceedances was submitted to Leah Cook (Department of Planning and Environment) on 9 May 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 21.0 $\mu g/m^3$ recorded. The North West annual average is currently above the criteria, sitting at 31.5 $\mu g/m^3$ following the completion of the April monitoring period. This is primarily due to elevated results recorded during July 2018 and February 2019.

Fluoride results for April 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 4 April was over the ANZG guideline however Pond 4 was not observed to be discharging at this time. All remaining pH and conductivity measurements were within the relevant ANZG guidelines for April. 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 April site visits.

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

James Enright

Scientist – Compliance Services
james.enright@aecom.com

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

Chad Whitburn

Compliance Services - Team Leader
Chad.Whitburn@aecom.com

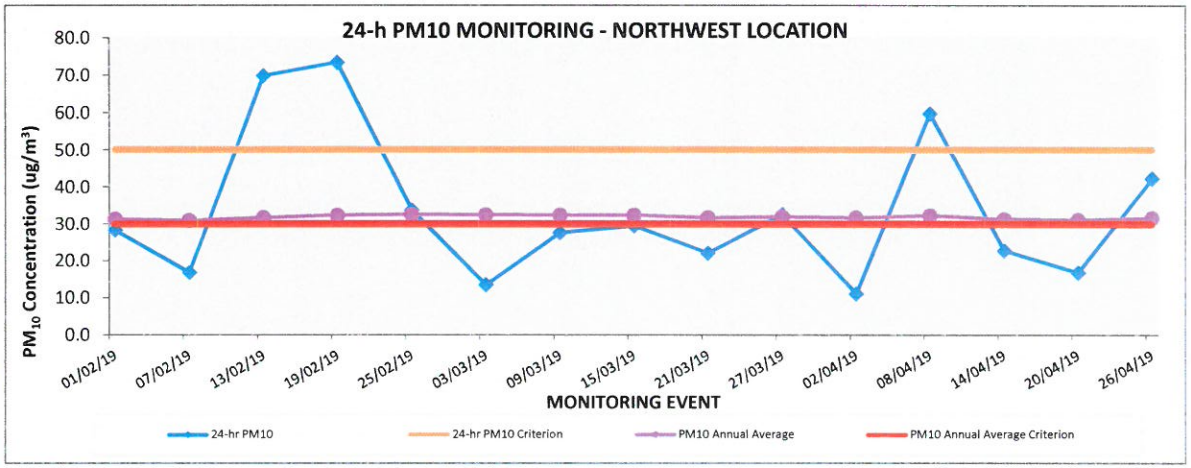
Mobile: +61 457 806 872
Direct Dial: +61 2 4911 4983
Direct Fax: +61 2 4911 4999

encl: Monitoring data tables and charts, wind rose

North West Monitoring Location - 24 hour PM10 Monitoring

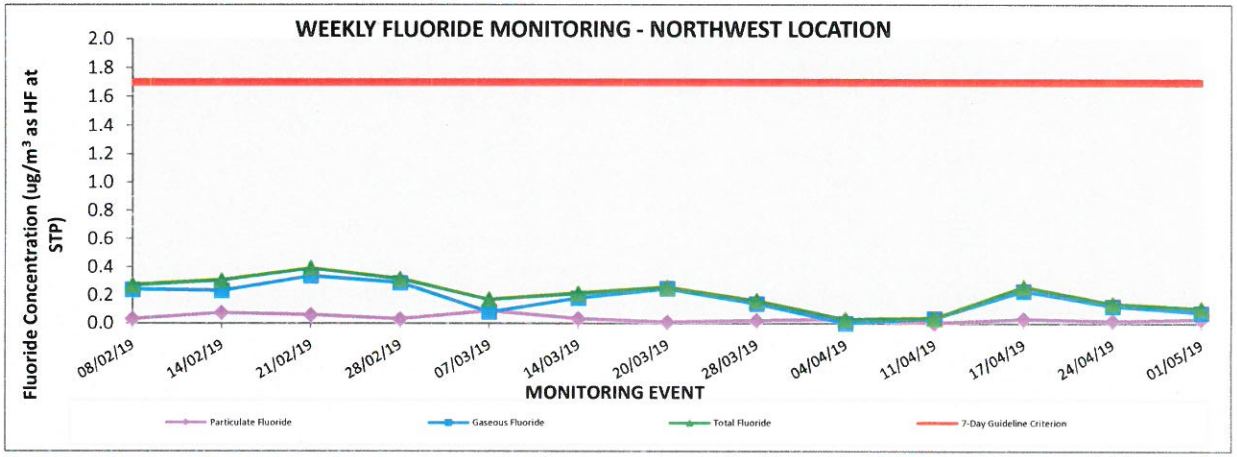
North West - 24 hour PM10 Monitoring February 2019 to April 2019				
Monitoring Event	24-hr PM_{10} (µg/m3)	24-hr PM_{10} Criterion (µg/m^3)	PM_{10} Annual Average (µg/m^3)	PM_{10} Annual Average Criterion
1-Feb-19	28.2	50	**31.2**	30
7-Feb-19	16.7	50	**30.9**	30
13-Feb-19	**69.8**	50	**31.7**	30
19-Feb-19	**73.4**	50	**32.3**	30
25-Feb-19	33.6	50	**32.4**	30
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

*Bold denotes exceedance



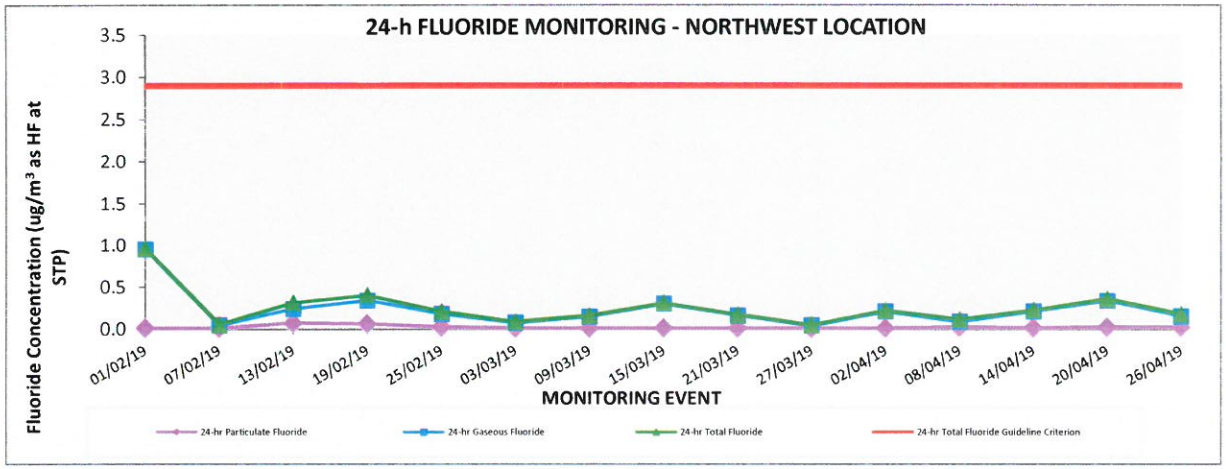
North West Monitoring Location - 7 Day Fluoride Monitoring

North West - 7 Day Fluoride Monitoring					
January 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)
31-Jan-19	8-Feb-19	0.030	0.240	0.270	1.7
8-Feb-19	14-Feb-19	0.073	0.232	0.305	1.7
14-Feb-19	21-Feb-19	0.057	0.335	0.392	1.7
21-Feb-19	28-Feb-19	0.029	0.287	0.316	1.7
28-Feb-19	7-Mar-19	0.088	0.082	0.170	1.7
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



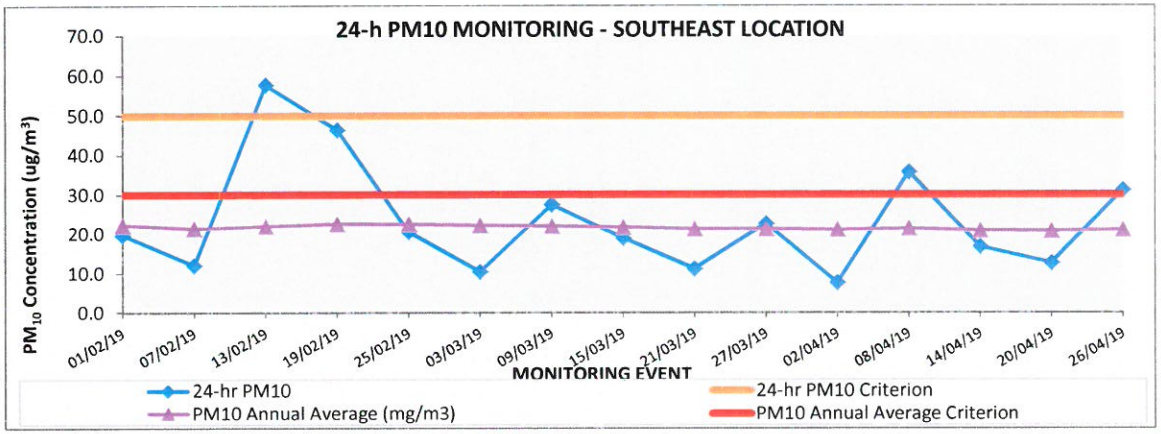
North West Monitoring Location - 24 hour Fluoride Monitoring

North West - 24 hour Fluoride Monitoring February 2019 to April 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)
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
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



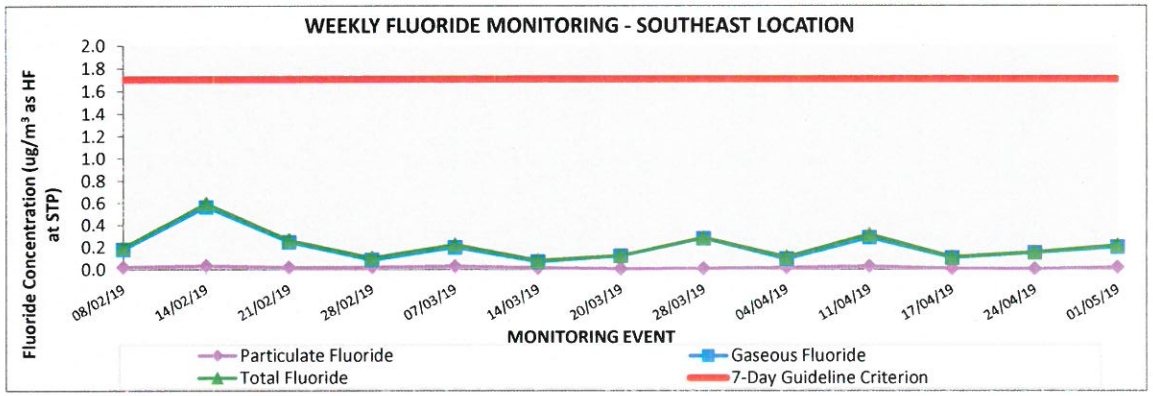
South East Monitoring Location - 24 hour PM10 Monitoring

South East - 24 hour PM10 Monitoring February 2019 to April 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
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
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



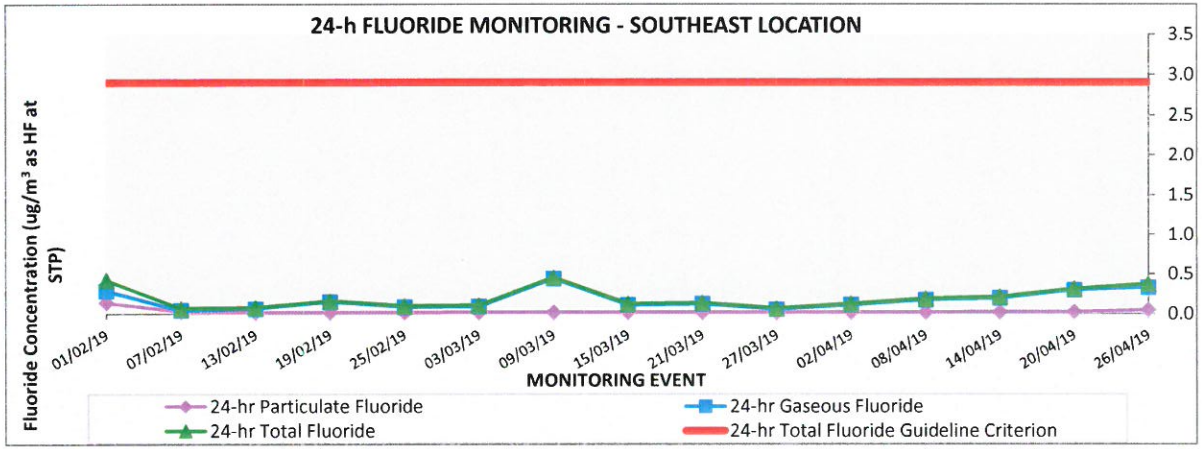
South East Monitoring Location - 7 Day Fluoride Monitoring

South East - 7 Day Fluoride Monitoring					
January 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)**
31-Jan-19	8-Feb-19	0.018	0.179	0.197	1.7
8-Feb-19	14-Feb-19	0.031	0.563	0.594	1.7
14-Feb-19	21-Feb-19	0.017	0.246	0.263	1.7
21-Feb-19	28-Feb-19	0.017	0.085	0.102	1.7
28-Feb-19	7-Mar-19	0.026	0.197	0.223	1.7
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



South East Monitoring Location - 24 hour Fluoride Monitoring

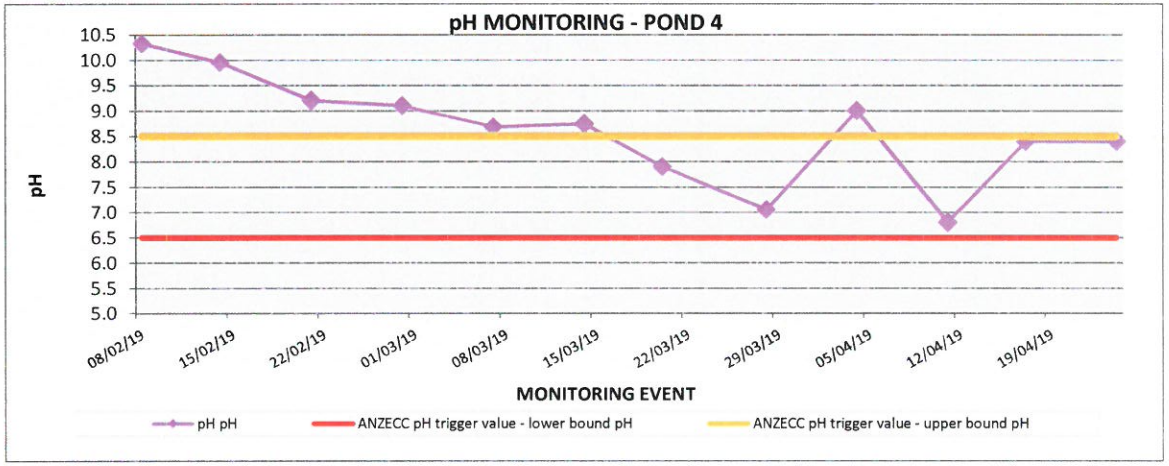
South East - 24 hour Fluoride Monitoring February 2019 to April 2019				
Monitoring Event	24-hr Particulate Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Gaseous Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride ($\mu g/m^3$ as HF at STP)	24-hr Total Fluoride Guideline Criterion ($\mu g/m^3$ as HF at STP)
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
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	0.02	0.297	0.317	2.9
26-Apr-19	0.044	0.328	0.372	2.9



Pond 4 Monitoring Location - Weekly pH Monitoring

Pond 4 - Weekly pH Monitoring
February 2019 to April 2019

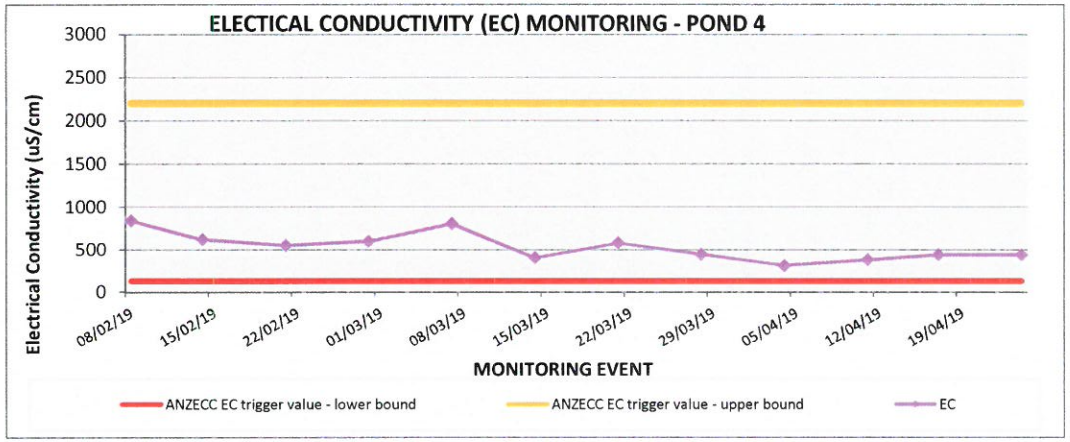
Monitoring Event	pH	ANZECC pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
8/02/2019	10.32	6.5	8.5	
14/02/2019	9.95	6.5	8.5	
21/02/2019	9.20	6.5	8.5	
28/02/2019	9.10	6.5	8.5	
7/03/2019	8.68	6.5	8.5	
14/03/2019	8.74	6.5	8.5	
20/03/2019	7.90	6.5	8.5	
28/03/2019	7.05	6.5	8.5	
4/04/2019	9.00	6.5	8.5	
11/04/2019	6.80	6.5	8.5	
17/04/2019	8.40	6.5	8.5	
24/04/2019	8.40	6.5	8.5	



Pond 4 Monitoring Location - Weekly EC Monitoring

Pond 4 - Weekly EC Monitoring
February 2019 to April 2019

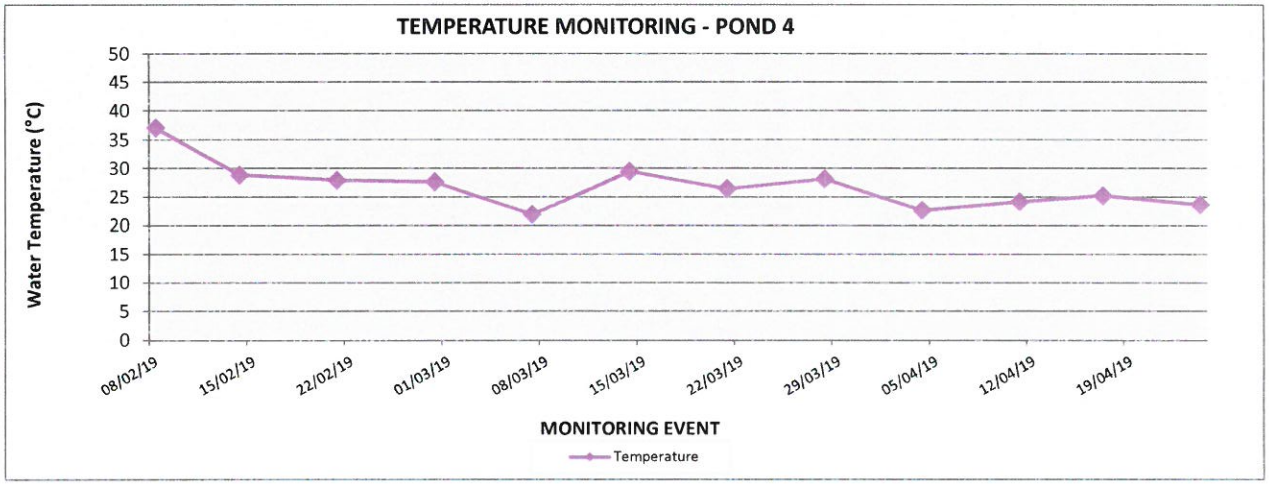
Monitoring Event	EC	ANZECC EC trigger value - lower bound	ANZECC EC trigger value - upper bound	Unable to Sample
	µS/cm	µS/cm	µS/cm	
8/02/2019	836	125	2200	
14/02/2019	618	125	2200	
21/02/2019	547	125	2200	
28/02/2019	598	125	2200	
7/03/2019	802	125	2200	
14/03/2019	399	125	2200	
21/03/2019	578	125	2200	
28/03/2019	440	125	2200	
4/04/2019	309	125	2200	
11/04/2019	375	125	2200	
17/04/2019	435	125	2200	
24/04/2019	433	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
February 2019 to April 2019

Monitoring Event	Temperature °C	Unable to Sample
8/02/2019	37.0	
14/02/2019	28.8	
21/02/2019	27.9	
28/02/2019	27.6	
7/03/2019	21.9	
14/03/2019	29.4	
21/03/2019	26.4	
28/03/2019	28.1	
4/04/2019	22.6	
11/04/2019	24.1	
17/04/2019	25.2	
24/04/2019	23.6	

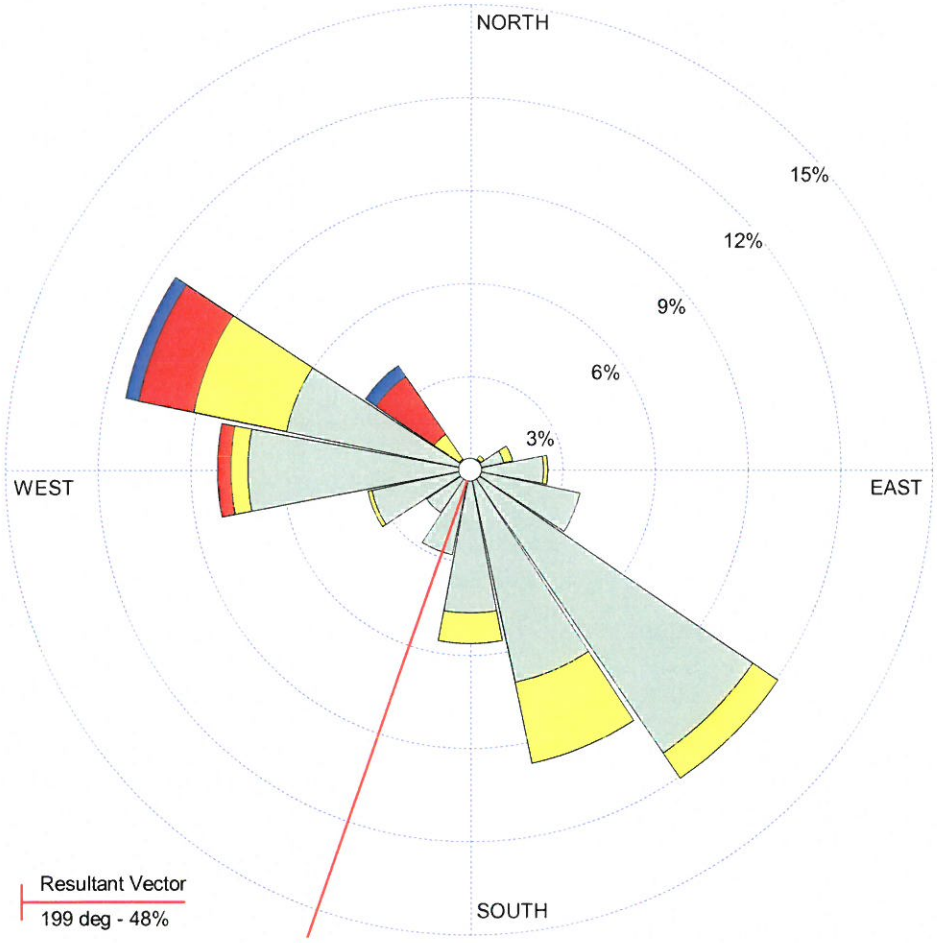


WIND ROSE PLOT:

NCIA - Meteorological Data
April 2019

DISPLAY:

Wind Speed
Direction (blowing from)



WIND SPEED
(m/s)

- >= 11.1
- 8.8 - 11.1
- 5.7 - 8.8
- 3.6 - 5.7
- 2.1 - 3.6
- 0.5 - 2.1

Calms: 32.92%

COMMENTS:	DATA PERIOD: **Start Date: 1/04/2019 - 01:00** **End Date: 30/04/2019 - 23:00**	COMPANY NAME:	
		MODELER:	
	CALM WINDS: **32.92%**	TOTAL COUNT: **715 hrs.**	
	AVG. WIND SPEED: **1.12 m/s**	DATE: **15/05/2019**	PROJECT NO.: **60583731**