

21 August 2018

Chris Schneider
Managing Director
National Ceramic Industries Australia
PO Box 765

Maitland NSW 2320

Dear Chris

Environmental Monitoring for National Ceramic Industries Australia - July 2018

Please find enclosed the documentation for the environmental monitoring carried out for National Ceramic Industries Australia during July 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 (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 (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) *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 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* (ANZECC, 2000). 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 July 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.

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

- 6 July 2018, North West monitoring station ($78.8\mu\text{g}/\text{m}^3$);
- 18 July 2018, North West monitoring station ($77.9\mu\text{g}/\text{m}^3$);
- 18 July 2018, South East monitoring station ($51.6\mu\text{g}/\text{m}^3$); and
- 24 July 2018, North West monitoring station ($92.6\mu\text{g}/\text{m}^3$).

The NCIA facility was predominantly downwind of the North West monitoring station on 6 July with strong north westerly winds recorded at the onsite meteorology station. Elevated PM_{10} readings upwind of the facility and a significantly lower reading at the South East site (downwind of the facility) indicate that the NCIA facility was unlikely to be the primary source of the PM_{10} emissions on this day with a localised upwind offsite source the likely cause of exceedances.

Data sourced from the EPA Beresfield and Singleton ambient monitoring sites indicates regional PM_{10} concentrations were elevated on 18 and 24 July. Meteorology data from the onsite station shows winds on both 18 and 24 July were also strong north westerlies. This again places the NCIA facility downwind of the North West monitoring station for these sampling days.

In addition, although the South East location on 18 July recorded a reading above the criteria, the South East result was significantly lower than the North West result (upwind of the facility) and as such it is likely that elevated regional conditions are the probable cause of this exceedance.

An Environmental Incident Report detailing these exceedances was submitted to Leah Cook (Department of Planning and Environment) on 15 August 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 $30\mu\text{g}/\text{m}^3$. The North West annual average is currently above the criteria following the elevated regional conditions discussed above but is expected to drop back down over time. The North West annual average sits at $31.4\mu\text{g}/\text{m}^3$ following the completion of the July monitoring period while the South East average is $22.6\mu\text{g}/\text{m}^3$.

Fluoride results for July 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 ANZECC 2000 guidelines for pH and conductivity are the default trigger values for slightly disturbed aquatic ecosystems in NSW lowland rivers. All Pond 4 pH readings during July were within the ANZECC 2000 pH guideline. All Pond 4 EC readings taken during the July monitoring period were within the ANZECC 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 July site visits.

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

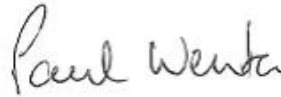
If you require any further information, please contact James McIntyre on 0407 456 232.

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.

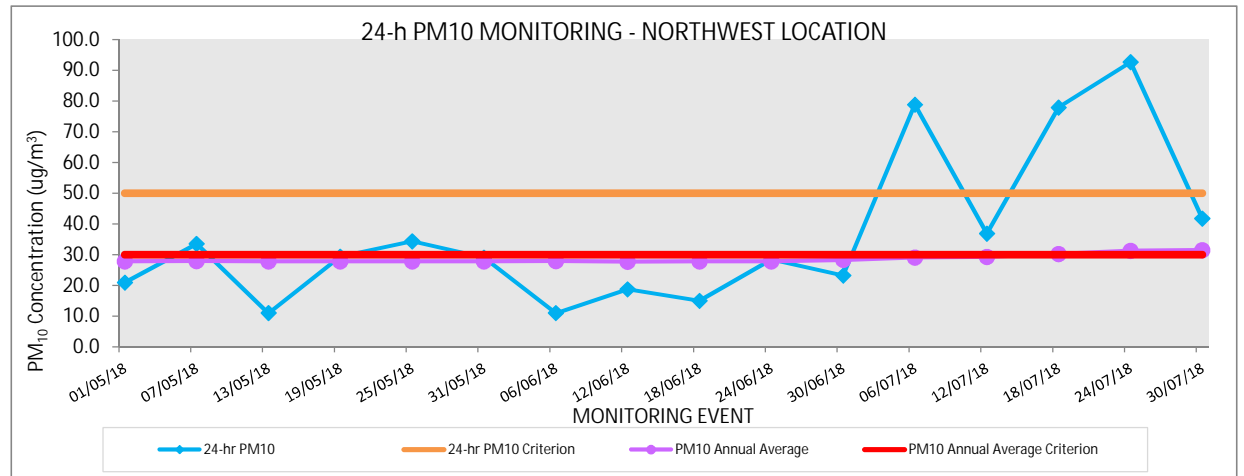
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North West Monitoring Location - 24 hour PM10 Monitoring

North West - 24 hour PM10 Monitoring				
May 2018 to July 2018				
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)	
1-May-18	20.9	50	27.8	30
7-May-18	33.5	50	27.9	30
13-May-18	11.0	50	27.8	30
19-May-18	29.4	50	27.8	30
25-May-18	34.4	50	27.8	30
31-May-18	29.1	50	27.9	30
6-Jun-18	11.0	50	27.9	30
12-Jun-18	18.8	50	27.8	30
18-Jun-18	15.0	50	27.8	30
24-Jun-18	28.4	50	27.8	30
30-Jun-18	23.2	50	28.3	30
6-Jul-18	78.8	50	29.1	30
12-Jul-18	36.9	50	29.2	30
18-Jul-18	77.9	50	30.2	30
24-Jul-18	92.6	50	31.3	30
30-Jul-18	41.8	50	31.4	30

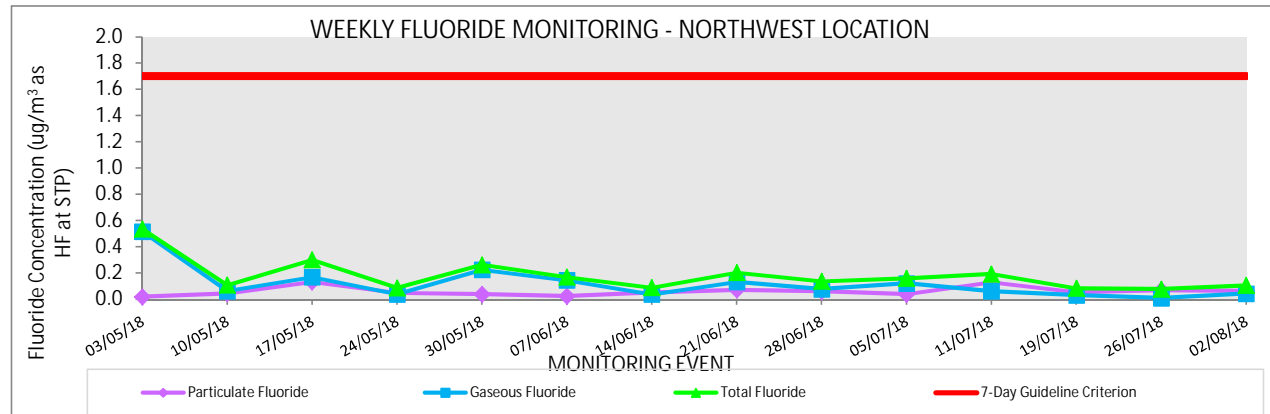
*Bold denotes exceedance



North West Monitoring Location - 7 Day Fluoride Monitoring

North West - 7 Day Fluoride Monitoring
May 2018 to July 2018

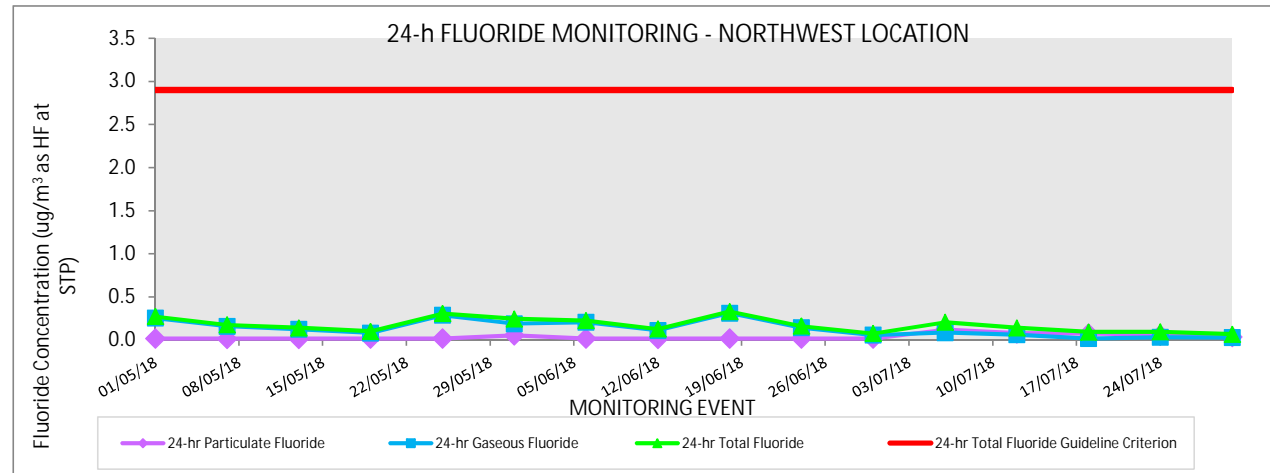
Monitoring Event	Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
3-May-18	0.019	0.517	0.536	1.7
10-May-18	0.045	0.063	0.108	1.7
17-May-18	0.132	0.169	0.301	1.7
24-May-18	0.050	0.038	0.088	1.7
30-May-18	0.038	0.225	0.263	1.7
7-Jun-18	0.024	0.145	0.169	1.7
14-Jun-18	0.052	0.037	0.089	1.7
21-Jun-18	0.071	0.132	0.203	1.7
28-Jun-18	0.060	0.078	0.138	1.7
5-Jul-18	0.038	0.122	0.160	1.7
11-Jul-18	0.130	0.062	0.192	1.7
19-Jul-18	0.053	0.031	0.084	1.7
26-Jul-18	0.069	0.009	0.078	1.7
2-Aug-18	0.063	0.043	0.106	1.7



North West Monitoring Location - 24 hour Fluoride Monitoring

North West - 24 hour Fluoride Monitoring
May 2018 to July 2018

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)	($\mu\text{g}/\text{m}^3$ as HF at STP)
1-May-18	0.018	0.256	0.274	2.9
7-May-18	0.016	0.162	0.178	2.9
13-May-18	0.016	0.127	0.143	2.9
19-May-18	0.018	0.084	0.102	2.9
25-May-18	0.019	0.289	0.308	2.9
31-May-18	0.055	0.192	0.247	2.9
6-Jun-18	0.019	0.208	0.227	2.9
12-Jun-18	0.017	0.113	0.130	2.9
18-Jun-18	0.019	0.314	0.333	2.9
24-Jun-18	0.019	0.144	0.163	2.9
30-Jun-18	0.019	0.059	0.078	2.9
6-Jul-18	0.120	0.088	0.208	2.9
12-Jul-18	0.079	0.063	0.142	2.9
18-Jul-18	0.076	0.018	0.094	2.9
24-Jul-18	0.062	0.034	0.096	2.9
30-Jul-18	0.039	0.030	0.069	2.9

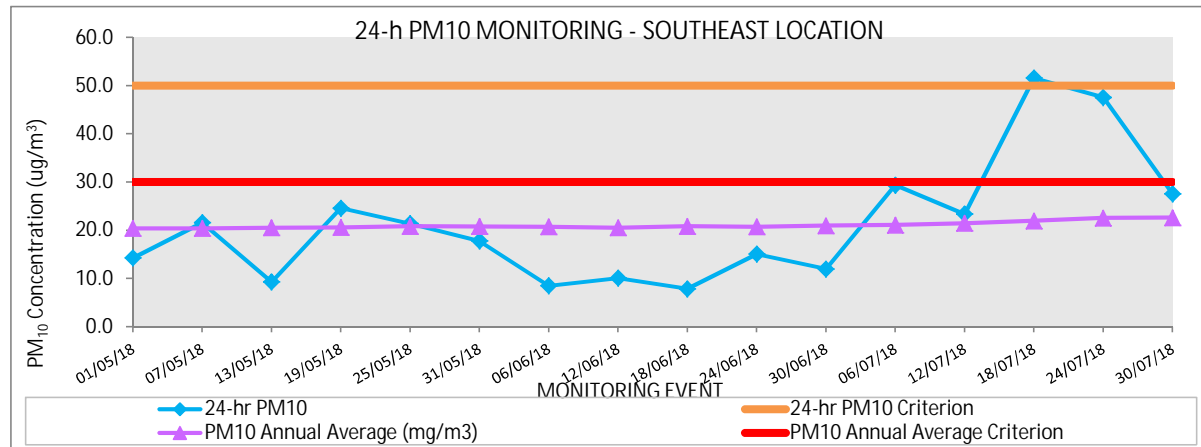


South East Monitoring Location - 24 hour PM10 Monitoring

South East - 24 hour PM10 Monitoring
May 2018 to July 2018

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)	
1-May-18	14.3	50	20.4	30
7-May-18	21.6	50	20.4	30
13-May-18	9.3	50	20.5	30
19-May-18	24.6	50	20.6	30
25-May-18	21.4	50	20.8	30
31-May-18	17.8	50	20.8	30
06/06/18	8.5	50	20.7	30
12/06/18	10.1	50	20.5	30
18/06/18	7.9	50	20.8	30
24/06/18	15.1	50	20.7	30
30/06/18	12.0	50	20.9	30
06/07/18	29.4	50	21.1	30
12/07/18	23.4	50	21.5	30
18/07/18	51.6	50	22.0	30
24/07/18	47.6	50	22.6	30
30/07/18	27.6	50	22.6	30

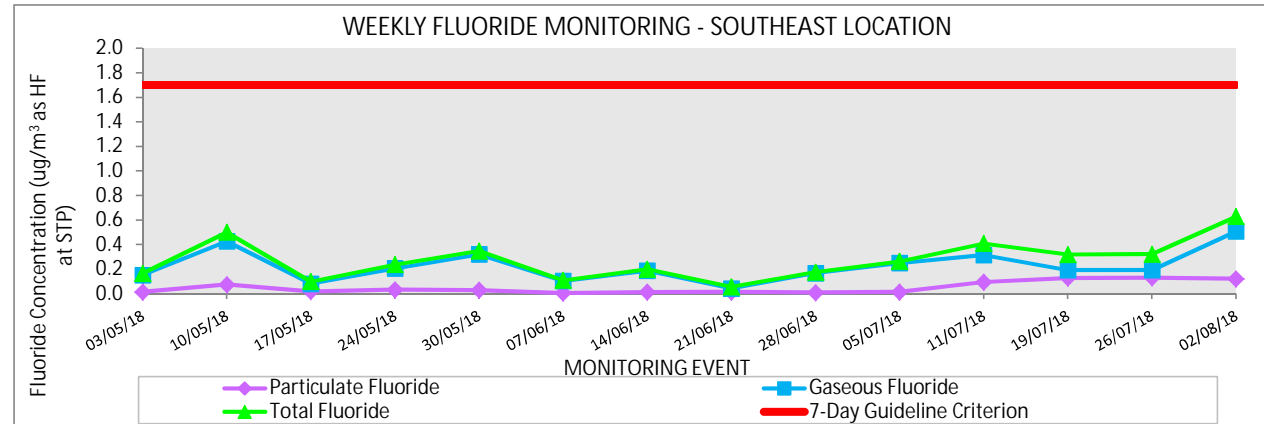
*Bold denotes exceedance



South East Monitoring Location - 7 Day Fluoride Monitoring

South East - 7 Day Fluoride Monitoring
May 2018 to July 2018

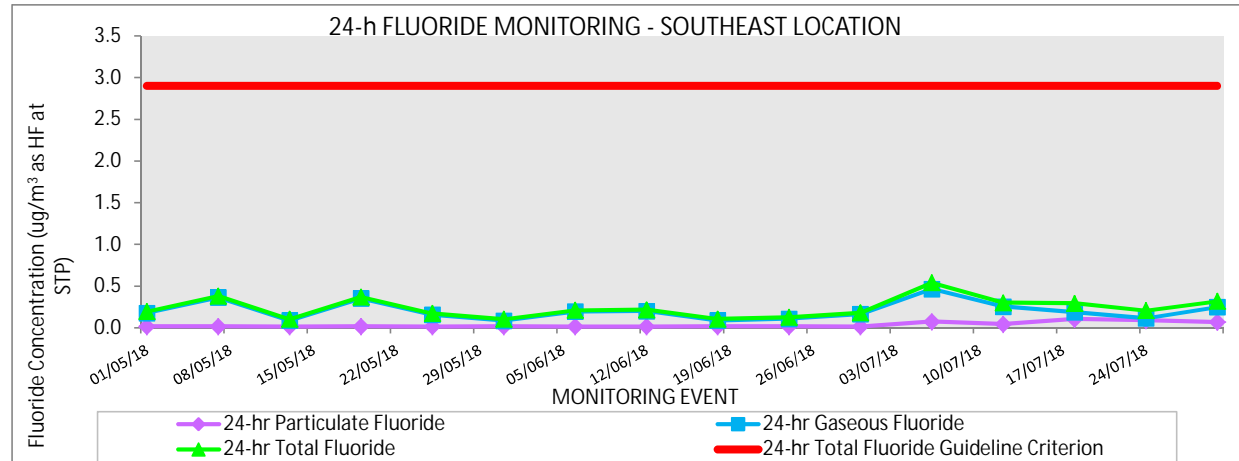
Monitoring Event	Particulate Fluoride	Gaseous Fluoride	Total Fluoride	7-Day Guideline Criterion
	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)	($\mu\text{g}/\text{m}^3$ as HF at STP)
3-May-18	0.013	0.152	0.165	1.7
10-May-18	0.073	0.427	0.500	1.7
17-May-18	0.017	0.081	0.098	1.7
24-May-18	0.032	0.205	0.237	1.7
30-May-18	0.028	0.320	0.348	1.7
7-Jun-18	0.005	0.104	0.109	1.7
14-Jun-18	0.012	0.187	0.199	1.7
21-Jun-18	0.013	0.042	0.055	1.7
28-Jun-18	0.008	0.168	0.176	1.7
5-Jul-18	0.013	0.250	0.263	1.7
11-Jul-18	0.094	0.315	0.409	1.7
19-Jul-18	0.127	0.192	0.319	1.7
26-Jul-18	0.130	0.192	0.322	1.7
2-Aug-18	0.120	0.508	0.628	1.7



South East Monitoring Location - 24 hour Fluoride Monitoring

South East - 24 hour Fluoride Monitoring
May 2018 to July 2018

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)	($\mu\text{g}/\text{m}^3$ as HF at STP)
1-May-18	0.017	0.178	0.195	2.9
7-May-18	0.017	0.365	0.382	2.9
13-May-18	0.015	0.088	0.103	2.9
19-May-18	0.017	0.353	0.370	2.9
25-May-18	0.016	0.157	0.173	2.9
31-May-18	0.017	0.087	0.104	2.9
6-Jun-18	0.016	0.196	0.212	2.9
12-Jun-18	0.015	0.201	0.216	2.9
18-Jun-18	0.017	0.088	0.105	2.9
24-Jun-18	0.017	0.110	0.127	2.9
30-Jun-18	0.016	0.165	0.181	2.9
6-Jul-18	0.074	0.467	0.541	2.9
12-Jul-18	0.045	0.256	0.301	2.9
18-Jul-18	0.105	0.189	0.294	2.9
24-Jul-18	0.091	0.116	0.207	2.9
30-Jul-18	0.069	0.25	0.319	2.9

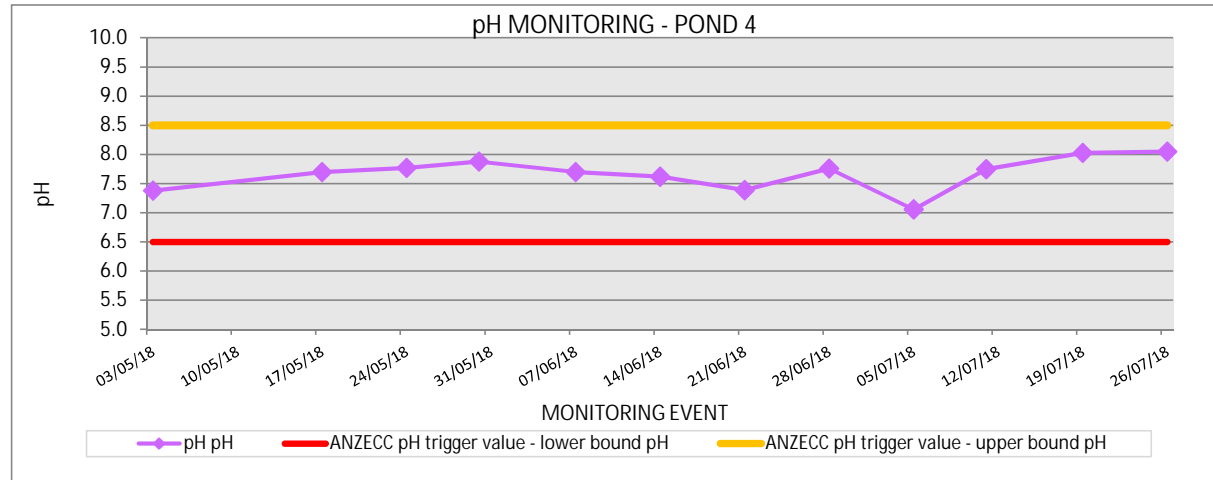


Pond 4 Monitoring Location - Weekly pH Monitoring

Pond 4 - Weekly pH Monitoring
May 2018 to July 2018

Monitoring Event	pH	ANZECC pH trigger value - lower bound	ANZECC pH trigger value - upper bound	Unable to Sample
	pH	pH	pH	
3/05/2018	7.38	6.5	8.5	
17/05/2018	7.70	6.5	8.5	
24/05/2018	7.77	6.5	8.5	
30/05/2018	7.88	6.5	8.5	
7/06/2018	7.70	6.5	8.5	
14/06/2018	7.62	6.5	8.5	
21/06/2018	7.39	6.5	8.5	
28/06/2018	7.76	6.5	8.5	
5/07/2018	7.06	6.5	8.5	
11/07/2018	7.75	6.5	8.5	
19/07/2018	8.03	6.5	8.5	
26/07/2018	8.05	6.5	8.5	

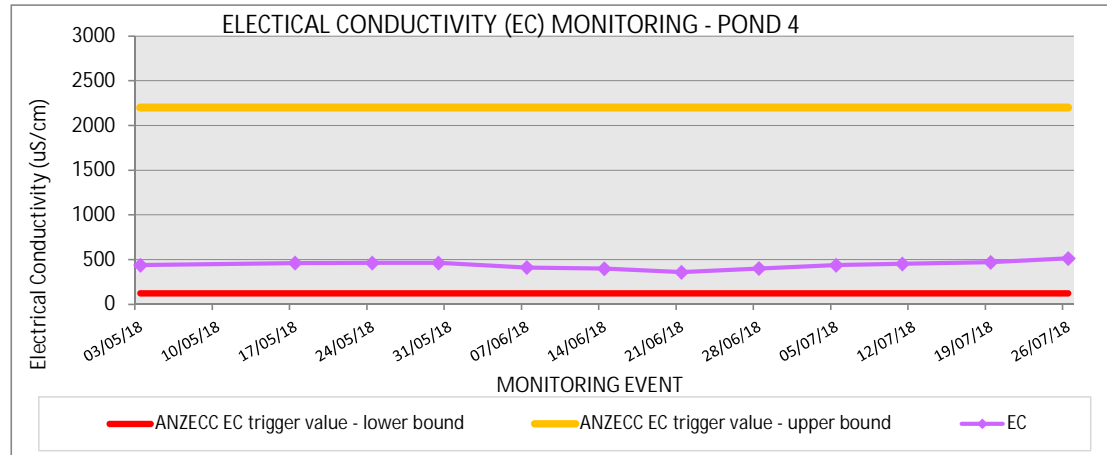
*Bold denotes exceedance



Pond 4 Monitoring Location - Weekly EC Monitoring

Pond 4 - Weekly EC Monitoring
May 2018 to July 2018

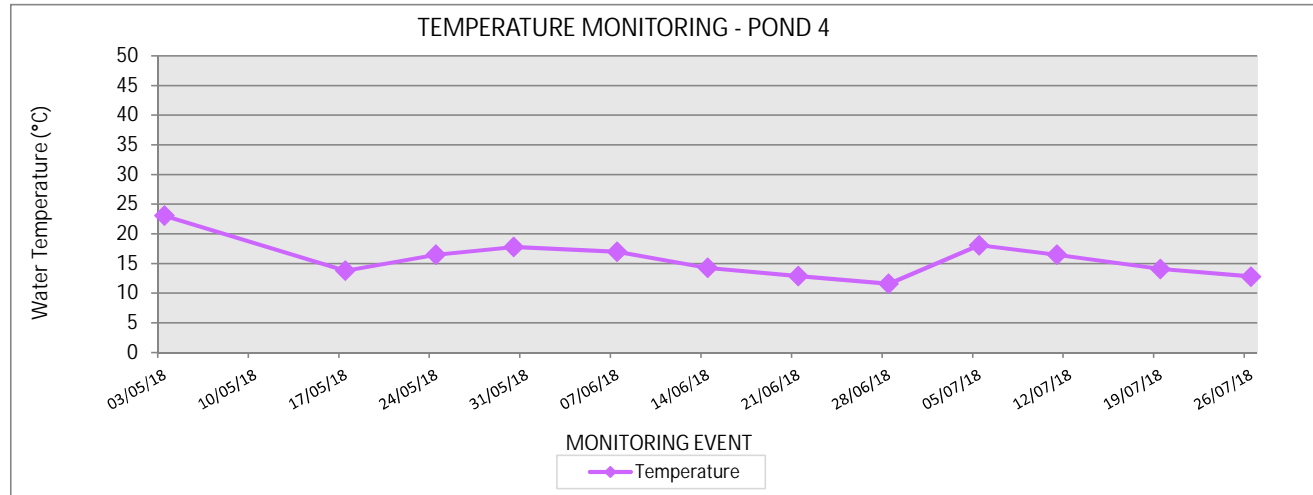
Monitoring Event	EC	ANZECC EC trigger value - lower bound	ANZECC EC trigger value - upper bound	Unable to Sample
	µS/cm	µS/cm	µS/cm	
3/05/2018	438	125	2200	
17/05/2018	461	125	2200	
24/05/2018	463	125	2200	
30/05/2018	464	125	2200	
7/06/2018	412	125	2200	
14/06/2018	399	125	2200	
21/06/2018	359	125	2200	
28/06/2018	401	125	2200	
5/07/2018	439	125	2200	
11/07/2018	453	125	2200	
19/07/2018	470	125	2200	
26/07/2018	514	125	2200	



Pond 4 Monitoring Location - Weekly Temperature Monitoring

Pond 4 - Weekly Temperature Monitoring
May 2018 to July 2018

Monitoring Event	Temperature °C	Unable to Sample
3/05/2018	23.1	
17/05/2018	13.8	
24/05/2018	16.5	
30/05/2018	17.8	
7/06/2018	17	
14/06/2018	14.3	
21/06/2018	12.9	
28/06/2018	11.6	
5/07/2018	18.1	
11/07/2018	16.5	
19/07/2018	14.1	
26/07/2018	12.8	

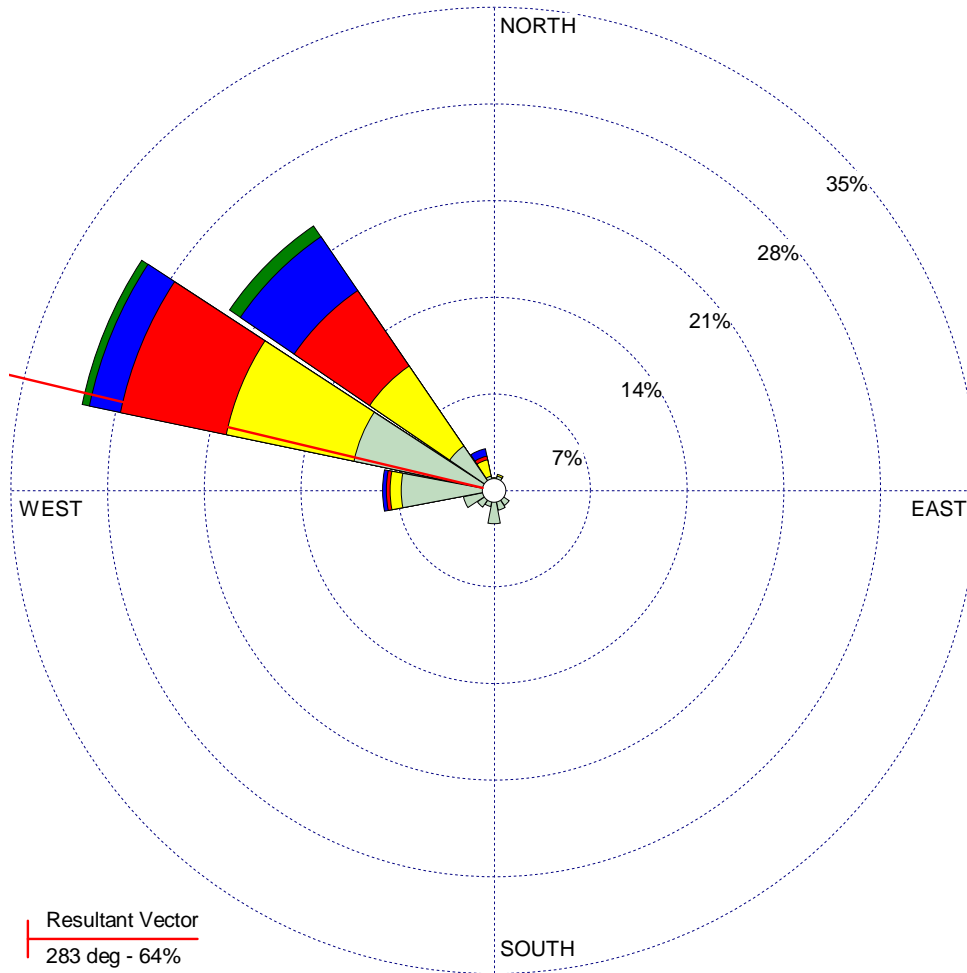


WIND ROSE PLOT:

**NCIA - Meteorological Data
July Sampling Period - July 2018**

DISPLAY:

**Wind Speed
Direction (blowing from)**



Resultant Vector
283 deg - 64%

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: 20.83%

COMMENTS:

DATA PERIOD:

**Start Date: 1/07/2018 - 00:00
End Date: 31/07/2018 - 23:00**

COMPANY NAME:

MODELER:

CALM WINDS:

20.83%

TOTAL COUNT:

743 hrs.

AVG. WIND SPEED:

2.26 m/s

DATE:

14/08/2018

PROJECT NO.:

60551495