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Date : 7 August 2019
Our Ref. : MCL/ED/0379/2019/C

The EIA Ordinance Register Office,
Environmental Protection Department
27/F., Southorn Centre,
130 Hennessy Road,
Wanchai, Hong Kong

**BY HAND**

Attn.: Mr. Matthew Tang

Dear Sir,

**Agreement No. CE 21/2014 (EP)**
**Environmental Monitoring and Audit (EM&A) for Operation of**
**Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation**
**EP Condition 6.6 – Monthly EM&A Report**

Pursuant to Condition 6.6 of the Environmental Permit (EP No. EP-265/2007/A) for the captioned contract, we are pleased to submit the certified Monthly EM&A Report for February 2018 for your retention.

Should you require further information, please do not hesitate to contact our Mr. Vincent Lu at 3565 4158 or the undersigned at 3565 4114.

Assuring you of our best attention at all times.

Yours faithfully,
for and on behalf of
MATERIALAB – WASTE
& ENVIRONMENTAL TECHNOLOGIES JOINT VENTURE

Colin Yung
Environmental Team Leader

CY/vl

c.c. DSD – Ms. Ricky Lau
Mott MacDonald – Ms. Dulcie Chan, Mr. Thomas Chan

MOTT MACDONALD

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**Contract No. SPW 09/2016**
**Independent Environmental Checker for Environmental Monitoring and Audit for Operation of Tai Po Sewage Treatment Works Stage 5 Phase 2B**
EP Condition 6.6 – Monthly EM&A Report

7 August 2019

Dear Sir,

With reference to the ET's letter ref: MCL/ED/0377/2019/C dated 7 August 2019 associated with the Monthly EM&A Report for February 2018 (submitted on 2 August 2019), we have no further comment.

This letter serves as verification of the captioned submission in line with the requirements as set out in the EM&A Manual.

Should you have any queries, please feel free to contact the undersigned at 2828 5970.

Yours faithfully
FOR MOTT MACDONALD HONG KONG LIMITED

Dulcie Chan
Independent Environmental Checker
T 2828 5970
Dulcie.Chan@mottmac.com

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Date : 7 August 2019
Our Ref. : MCL/ED/0377/2019/C

Mott MacDonald Hong Kong Limited
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**BY HAND**

Attn.: Ms. Dulcie Chan, IEC

Dear Madam,

**Agreement No. CE 21/2014 (EP)**
**Environmental Monitoring and Audit (EM&A) for Operation of**
**Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation**
**EP Condition 6.6 – Monthly EM&A Report**

Pursuant to Condition 6.6 of the Environmental Permit (EP No. EP-265/2007/A) for the captioned contract, we are pleased to submit the certified Monthly EM&A Report for February 2019 for your on-ward submission.

Should you require further information, please do not hesitate to contact our Mr. Vincent Lu at 3565 4158 or the undersigned at 3565 4114.

Assuring you of our best attention at all times.

Yours faithfully,
for and on behalf of
MATERIALAB – WASTE
& ENVIRONMENTAL TECHNOLOGIES JOINT VENTURE

Colin Yung
Environmental Team Leader

CY/vl

Encl.

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# MONTHLY ENVIRONMENTAL MONITORING & AUDIT REPORT

**February 2018**

**Client** : Drainage Services Department

**Project** : Agreement No. CE 21/2014(EP) Environmental Monitoring and Audit (EM&A) for Operation of Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation

**Report No.** : 0151/15/ED/1052

Prepared by: Vincent Lu & Kelvin Kwong

Certified by: _____
Colin Yung
Environmental Team Leader

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# CONTENTS



# FIGURES



# APPENDICES

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## EXECUTIVE SUMMARY

This Monthly Environmental Monitoring and Audit (EM&A) Report is prepared for Agreement No. CE 21/2014 (EP) – "Environmental Monitoring and Audit for Operation of Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation" (hereafter referred to as "the Assignment") for the Drainage Services Department (DSD) of Hong Kong Special Administrative Region. M ateriaLab – Waste & Environmental Technologies Joint Venture (hereafter referred to as "MLAB") was appointed as the Environmental Team by DSD.

The Assignment is part of the Tai Po Sewage Treatment Works (TPSTW) Stage V extension (hereinafter referred as "the Project") which is a Designated Project under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and for which an EIA Report (Register No. AEIAR-145/2009) was prepared and approved. The Environmental Permit (EP) for TPSTW Stage V, namely No. EP-265/2007 was issued in March 2007. A Variation Environmental Permit (VEP) EP-265/2007/A was issued on 30 April 2014. These documents are available through the EIA Ordinance Register.

Commencement of the Assignment took place on 9 June 2015 while the operation phase of EM&A programme commenced on 1 March 2016.

This is the twenty-forth Monthly EM&A Report for the Assignment which summaries the progress of the EM&A programme during the reporting period from 1 February 2018 to 28 February 2018 (the "reporting period"). The monthly EM&A programme was undertaken in accordance with the EM&A Manual for TPSTW Stage V. According to the EM&A Manual, air quality and marine water quality are the key environmental concerns from the Project.

### Breaches of Action and Limit Levels

Air quality monitoring was carried out from 9 February 2018 to 10 February 2018. Exceedances of Action/Limit levels at three ASRs (AS1, AS4 and AS12) were recorded.

Due to the annual inspection of the submarine pipeline, there was an event of overflow of treated effluent from TPSTW to Tolo Harbour, thus daily Tolo Harbour water quality impact monitoring was conducted from 2 February 2018 to 9 February 2018. Based on the monitoring results, the overall water quality in Tolo Harbour was considered acceptable during the monitoring period. The results did not reveal any evidence showing that the overflow event from TPSTW has caused any adverse water quality impact to the surrounding water body.

### Complaint Log

There were no complaints received in relation to the environmental impact during the reporting period.

### Notifications of Summons and Successful Prosecutions

There were no notifications of summons or prosecutions received during this reporting period.

### Reporting Changes

There was no reporting change during the reporting period.

### Future key issues

There were no construction activities and no future key issue is reported during this reporting period.

# 1. INTRODUCTION

## 1.1 Background

1.1.1 Tai Po Sewage Treatment Works (TPSTW) is located within the Tai Po Industrial Estate. It currently comprises four Stages: I, II, IVA and IVB works. The TPSTW Stage V aims to upgrade the existing TPSTW to provide additional sewage treatment capacity from the present design flow of 88,000 $m^3$/day to 130,000 $m^3$/day to meet the demands of both existing and future developments and to meet the revised discharge license requirements. The TPSTW Stage V will be implemented in two phases, i.e. Phase 1 and Phase 2. The design capacity of Phase 1 is 100,000 $m^3$/day and Phase 2 is 130,000 $m^3$/day.

1.1.2 The TPSTW Stage V is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 449). A study of Environmental Impact Assessment has been carried out to evaluate the environmental impacts associated with the project. An EIA Report and Environmental Monitoring and Audit (EM&A) Manual were approved by the Environmental Protection Department on 28 October 2004. An Environmental Permit (EP) No.EP-202/2007 and a Variation Environmental Permit (VEP) No. EP-202/2007A were issued on 22 March 2007 and 30 April 2014 for TPSTW Stage V Phase 2B (hereafter referred to as "the Project") to DSD as the Permit Holder. The EP stipulates that an EM&A programme is required to ensure the mitigation measures recommended in the EIA Report and the EM&A Manual, are implemented during the construction and operation of the Project.

## 1.2 Project Description

1.2.1 MateriaLab – Waste and Environmental Technologies Joint Venture (MLAB) was commissioned by DSD to undertake the EM&A services of the Project including Odour Monitoring, Odour Complaint Register and Marine Water Quality Monitoring during the operation phase, under the Agreement No. CE 21/2014 (EP) Environmental Monitoring and Audit for Tai Po Sewage Treatment Works Stage V Phase 2B – Investigation (hereafter referred to as "the Assignment").

## 1.3 Project Organisation

1.3.1 The Project Organisation for Environmental Works is shown in **Appendix A**. The contact person and telephone numbers of key personnel for the captioned project are shown in **Table 1.1**.

Table 1.1 Contact Persons and Telephone Numbers of Key Personnel

| Party | Role | Position | Contact Person | Telephone No. | Fax No. |
|---|---|---|---|---|---|
| DSD | SP Division | Engineer | Ms. Suki Pun | 2594 7472 | 2519 3615 |
| Mott MacDonald | IEC | IEC | Ms. Dulcie Chan | 2828 5970 | 2827 1823 |
| MLAB | Environmental Team | Environmental Team Leader | Mr. Colin Yung | 3565 4114 | 2450 8032 |

## 2. AIR QUAILITY MONITORING

### 2.1 Methodology

2.1.1 The $H_2S$ analyzer, type Jerome 631-X, was used for the air quality monitoring. The analyzer is capable of measuring $H_2S$ concentration in the range of 1 ppb to 50 ppm, with a resolution of 1 ppb. The analyzer operates within a temperature range of 0ºC to 40ºC, at an air flow rate of 0.15 L/min. Grab air sample is drawn by built-in suction pump of the analyzer and passes through a gold film sensor. The electrical resistance of the gold film changes according to the change in mass of hydrogen sulphide in the gas sample. **Table 2.1** summaries the equipment used in air quality ($H_2S$) monitoring.

Table 2.1 Equipment for Air Quality ($H_2S$) Monitoring

| Equipment | Manufacturer / Model | Serial Number | Sensor Number | Calibration Date | Next Calibration Date |
|---|---|---|---|---|---|
| Gold Film Hydrogen Sulphide Analyzer | JEROME X631 0003 | 2966 | 14-11-23-R2D | 2 June 2018 | 1 June 2018 |
| Gold Film Hydrogen Sulphide Analyzer | JEROME X631 0003 | 2967 | 16-4-13-V2DS | 4 August 2018 | 3 August 2018 |

### 2.2 Monitoring Locations

2.2.1 Five monitoring stations were set up inside and outside of TPSTW. **Table 2.2** and **Figure 2.1** show the description and location of the $H_2S$ monitoring stations. The level for odour monitoring agreed with the DSD and EPD is 1.5m from the ground.

Table 2.2 Air Quality ($H_2S$) Monitoring Stations

| ID No. | EM&A Ref. | Monitoring Location | Description |
|---|---|---|---|
| PRI 203[1] | OSM1 | Stage I/II Primary Sedimentation Tank | Source |
| PRI 401[1] | OSM2 | Stage IV Primary Sedimentation Tank | Source |
| AS 12[1,2] | OAM1 | Government Staff Quarter (Inside) | ASR |
| AS 4[1,2] | OAM2 | Interpac Containers Ltd (Outside) | ASR |
| AS 1[1,2] | OAM3 | Watson's Water Centre (Outside) | ASR |

[1]EIA Reference No.
[2]Air Sensitive Receiver

### 2.3 Monitoring Frequency and Duration

2.3.1 The sampling duration and frequency of air quality ($H_2S$) monitoring is summarised in **Table 2.3**.

Table 2.3 Air Quality ($H_2S$) Monitoring Programme

| Sampling Duration | Frequency | |
|---|---|---|
| 24 hour | Year 1 | Once every three months after operation of Stage V Phase 2B works; frequency would increase to monthly interval if exceedances are recorded. |
| | Year 2 and Year 3 | Once every six months after operation of Stage V Phase 2B works; frequency would increase to monthly interval if exceedances are recorded. |

2.3.2 A 15-min integrated gaseous $H_2S$ sample was collected every 3 hours for a period of 24 hours at the monitoring locations. Maximum and minimum $H_2S$ levels for each monitoring station were recorded.

2.3.3 The monitoring schedule for the present and next reporting period is provided in **Appendix B**.

**2.4** Action / Limit Level

2.4.1 **Table 2.4** shows the Action and Limit Levels for air quality ($H_2S$) monitoring at ASRs.

Table 2.4 Action and Limit Levels for Air Quality Monitoring at ASRs

| Monitoring Stations | Action Level | Limit Level* |
|---|---|---|
| AS12: Government Staff Quarter | 2.5 ppb | 2.5 ppb |
| AS4: Interpac Containers Limited | | |
| AS1: Watson's Water Centre | | |

*Limit Level at ASRs only.

2.4.2 The event and action plan for air quality monitoring is provided in **Appendix C**.

**2.5** Quality Assurance / Quality Control

2.5.1 In order to ensure the analyzer is functioning properly, manual sensor regeneration and zero adjustment were performed before each set of odour monitoring.

2.5.2 Calibration of the analyzer is conducted every year at the laboratory of the manufacturer. The calibration certificates for the analyzers are shown in **Appendix D**.

2.5.3 To obtain accurate results from the $H_2S$ monitoring at Stage IV Primary Sedimentation Tanks, sulphide formation at the bottom shall be cleaned and minimised.

2.6 Monitoring Results and Observations

2.6.1 The twenty-first odour impact monitoring was carried out from 09 February 2018 to 10 February 2018 after the commissioning of the Project.

2.6.2 The meteorological data including temperature, wind speed and direction of the monitoring period obtained from the HKO's Tai Po weather station is summarised in **Table 2.5**.

Table 2.5 Summary of meteorological data of the monitoring period#

| Date | Mean Temperature(° C) | Prevailing Wind Direction | Mean Wind speed (km/h) |
|---|---|---|---|
| 09 February | 15.6 | South East | 8.3 |
| 10 February | 15 | East | 5.9 |

# The meteorological data was extracted from the website of HKO.

2.6.3 The monitoring results are summarised in **Table 2.6**. Graphical plots of results and details of monitoring data are shown in **Appendix E** (24-hour average, maximum and minimum $H_2S$ concentration) and **Appendix F** (site record).

Table 2.6 Summary of Monitoring Results

| ID No. | EM&A Ref. | Monitoring Location | 24-hour Average $H_2S$ Concentration (ppb) |
|---|---|---|---|
| PRI203[1] | OSM1 | Stage I Primary Sedimentation Tank | 33.0 |
| PRI401[1] | OSM2 | Stage IV Primary Sedimentation Tank | 224 |
| AS12[1,2] | OAM1 | Government Staff Quarter (Inside) | 8.0 |
| AS4[1,2] | OAM2 | Interpac Containers Ltd (Outside) | 17.9 |
| AS1[1,2] | OAM3 | Watson's Water Centre (Outside) | 3.6 |

[1]EIA Reference No.
[2]Air Sensitive Receiver

2.6.4 Comparison of the average $H_2S$ concentration for ASRs and the corresponding Action/Limit levels established in the odour baseline study is shown in **Table 2.7**.

Table 2.7 Comparison of Average $H_2S$ Concentration with Action/Limit Levels

| Location | $H_2S$ Concentration (ppb) | | | Exceedance | |
|---|---|---|---|---|---|
| | Odour Impact monitoring | Action Level | Limit Level | Action Level | Limit Level |
| AS12 | 8.0 | 2.5 | 2.5 | Y | Y |
| AS4 | 17.9 | 2.5 | 2.5 | Y | Y |
| AS1 | 3.6 | 2.5 | 2.5 | Y | Y |

2.6.5 Exceedances of A/L levels of 2.5 ppb $H_2S$ concentration at three Air Sensitive Receivers (AS1, AS4 and AS12) were recorded.

2.6.6 Odour mitigation measures such as the use of weir launders at Stage I/II and Stage IV Primary Sedimentation Tanks and addition of chemical (calcium nitrate) at Tai Yuen Sewage Pumping Station Package No. 4 were implemented during the odour impact monitoring. However, exceedances of A/L levels of $H_2S$ were resulted.

2.6.7 Even though specific sources of odour that would contribute to the odour nuisance at ASRs was not observed in this monitoring exercise. It is important to consider the location and surrounding environment of the Tai Po Sewage Treatment Works. Located at the Tai Po Industrial Estate, the TPSTW is surrounded by different industrial buildings. Exceedances of A/L levels at ASRs might be attributed to other sources such as nearby Refuse Collection Station and the industrial nature of the surrounding environment. These potential sources may cause odour nuisance to the Air Sensitive Receivers and hence, the high $H_2S$ levels measured at ASRs may be contributed by the emissions from sources other than that of the TPSTW.

2.6.8 In accordance with the Event and Action Plan for Operation Phase Air Quality Monitoring, the following actions have been taken in response to the exceedance of limit level.

2.6.9 The ET had repeated measurement to confirm exceedance. Then they had tried to identify the causes of exceedance and took photos for record. The operation team and DSD/SPD had been notified immediately when exceedance was recorded. After finishing the odour monitoring, the operation team was reminded to have better housekeeping of the TPSTW.

## 3. Marine water quality Monitoring

### 3.1 Monitoring Requirements

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.1.1 In accordance with Section 4.46 of the EM&A Manual, marine water quality monitoring at six designated monitoring stations should be carried out during the operation phase of the Project under the following conditions:

- Leakage of submarine pipeline is confirmed;
- Emergency discharge of untreated sewage;
- Emergency discharge of treated effluent during shutdown of Tai Po Effluent Pumping Station; and
- Maintenance of Tolo Harbour Effluent Export Scheme (THEES).

3.1.2 Due to routine inspection of effluent pipe, the treated effluent overflow from Tai Po Sewage Treatment Works to Tolo Harbour on 2 February 2018 with a total discharge volume of 57,783 cu.m. In accordance with the EM&A Manual, daily marine water quality impact monitoring was conducted from 2 February 2018 to 9 February 2018. EPD and WSD were informed of the overflow event on 2 February 2018. ET has reminded SPD/DSD to inform AFCD of any emergency discharge or THEES maintenance events.

**Water Quality Monitoring at Seawater Intakes**

3.1.3 There was no water quality monitoring conducted during the reporting period and therefore, no water quality monitoring result is reported.

### 3.2 Methodology

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.2.1 The multifunctional meter (Model YSI 6920) was deployed to measure dissolved oxygen (DO) concentration, DO saturation, temperature, salinity, pH and turbidity.

3.2.2 Water samples were collected by water samplers and were stored in polyethylene bottles, where they were taken to a HOKLAS accredited laboratory for analysis of suspended solids (SS), biological oxygen demand (BOD), total inorganic nitrogen (TIN), Ammonia Nitrogen(NH3-N), chlorophyll-a and E. coli. Table 3.1 summaries the equipment used in marine water quality monitoring. Table 3.2 summaries the laboratory test method for each laboratory test parameter and its associated limit of reporting.

Table 3.1 Equipment for Marine Water Quality Monitoring

| Equipment | Manufacturer / Model | Serial Number | Calibration Date | Next Calibration Date |
|---|---|---|---|---|
| Water Sampler | Van Dorn | N/A | N/A | N/A |
| Multifunctional Meter | YSI 6920V2 | 00019CB2 | 07 December 2017 | 07 March 2018 |

Table 3.2 Laboratory Test Method for Each Laboratory Test Parameter and Its Associated Limit of Reporting

| Parameter | Test Method[1] | Reporting Limit |
|---|---|---|
| SS | APHA 2540 D | 0.5 mg/L |
| BOD | APHA 5210B | 1 mg/L |
| $NH_3$-N | APHA 4500$NH_3$ : H | 0.005 mg/L |
| TIN | APHA 4500$NH_3$: G, APHA 4500$NO_3$: I | 0.005 mg/L |
| Chlorophyll-a | APHA 10200 H2&H3 | 0.001 mg/L |
| E. coli | DoE Section 7.8 & 7.9 plus in-situ urease test | 1 cfu/100ml |

Note:
[1] Test method refers to Standard Methods for the Examination of Water and Wastewater the American Public Health Association (APHA).

3.2.3 During each monitoring event, water quality monitoring was conducted at mid-flood and mid-ebb tides and the interval between two monitoring events was less than 36 hours. All in-situ measurements and samplings were conducted at three water depths, namely 1 m below water surface, mid-depth and 1 m above seabed, except where the water depth was less than 6 m, in which case the mid-depth station was omitted. Only mid-depth station was monitored if the water depth was less than 3 m.

3.2.4 At each sampling depth, duplicate readings of DO concentration, DO saturation, salinity, turbidity, pH and temperature were taken. The probes were retrieved out of the water after the first measurement and re-deployed for the second measurement.

3.2.5 Water samples were collected by water samplers and were stored in polyethylene bottles. Sampling bottles were pre-rinsed with the same water samples. The sample bottles were then packed into a cool-box (kept at 4°C) and delivered immediately to a HOKLAS accredited laboratory ALS Technichem (HK) Pty Limited (ALS) for the analysis of SS, BOD, TIN, NH3-N, chlorophyll-a and E. coli.

### 3.3 Monitoring Locations

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.3.1 In accordance with the EM&A Manual, the measurements were taken at all designated impact and control stations as summarized in Table 3.3. The locations of the monitoring stations are shown in Figure 3.1.

Table 3.3 Tolo Harbour Water Quality Monitoring Stations

| Station | Description | Easting | Northing |
|---|---|---|---|
| W1 | WSD Seawater Intake at Tai Po | 837688.18 | 834676.19 |
| W2 | WSD Seawater Intake at Sha Tin | 840222.64 | 830058.70 |
| FC2 | Yim Tin Tsai Marine Fish Culture Zone | 839321.74 | 834828.84 |
| G1 | Gradient Station | 838474.91 | 834702.06 |
| C1 | Pak Sha Tau Corals | 843778.51 | 834659.42 |
| C12 | Gruff Head Corals (Control Station) | 851027.82 | 837940.83 |

### 3.4 Monitoring Parameter, Frequency and Duration

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.4.1 The monitoring parameters, frequency and duration of Tolo Harbour Water Quality Impact Monitoring are summarised in Table 3.4.

Table 3.4 Tolo Harbour Water Quality Monitoring Parameters, Frequency and Duration

| Monitoring Stations | Parameter, unit | Frequency | No. of Depths |
|---|---|---|---|
| Impact Stations: W1, W2, FC2, C1<br><br>Gradient Stations: G1<br><br>Control Stations: C12 | • Depth, m<br>• pH<br>• Temperature, °C<br>• Salinity, ppt<br>• DO, mg/L<br>• DO Saturation, %<br>• Turbidity, NTU<br>• SS, mg/L<br>• E.coli, cfu/100ml<br>• Ammonia-Nitrogen, mg/L<br>• Total Inorganic Nitrogen, mg/L<br>• BOD5, mg-O2/L<br>• Chlorophyll-a, mg/L | For emergency discharge of treated effluent: Daily monitoring at least 1 week after the normal plant operation is restored. | • 3 water depths: 1m below water surface, mid-depth and 1m above sea bed<br>• If water depth is less than 3m, mid-depth sampling only<br>• If water depth is between 3-6m, omit mid-depth sampling |

### 3.5 Event and action plan

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.5.1 The event and action plan for emergency discharge / accidental spillage at Tolo Harbour is provided in Appendix C.

### 3.6 Quality Assurance / Quality Control

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.6.1 The Multifunctional Meter (YSI 6920) used in marine water quality monitoring was checked, calibrated and certified by a laboratory accredited under HOKLAS before use and subsequently re-calibrated at 3-monthly intervals throughout all stages of the water quality monitoring. The copy of the calibration certificate for the Multifunctional Meter (YSI 6920) is attached in **Appendix D**.

3.6.2 Before each round of monitoring, the dissolved oxygen probe of YSI 6920 was calibrated with wet bulb method.

3.6.3 During the measurement of DO concentration, DO saturation, salinity, turbidity, pH and temperature, if the difference between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.

3.6.4 During water sampling by water samplers, for QA/QC purpose, one duplicate sample from each batch of 20 samples was analysed as required by the HOKLAS. QA/QC results are shown in **Appendix G**.

### 3.7 Monitoring Results

**Tolo Harbour Marine Water Quality Impact Monitoring**

3.7.1 Due to routine inspection of effluent pipe, the treated effluent overflow from Tai Po Sewage Treatment Works to Tolo Harbour on 2 February 2018 with a total discharge volume of 57,783 cu.m.

3.7.2 The marine water quality impact monitoring was conducted from 2 February 2018 to 9 February 2018 on a daily basis. A summary of the monitoring results is presented in Table 3.5. Details of the marine water quality monitoring results are presented in **Appendix H**. Graphical presentations of the results are presented in **Appendix I**.

3.7.3 The levels of salinity, turbidity and dissolved oxygen were within baseline range. BOD and chlorophyll-a levels are shown below the minimum baseline level. However, it would not result in adverse impact to seawater.

3.7.4 The depth-averaged pH levels (in the range of 7.9 – 8.3, average 8.1 during mid-ebb tide and in the range of 7.2 - 8.2, average 8.1 during mid-flood tide) measured were slightly higher than the baseline range (in the range of 7.1 – 8.0, average 7.7) at all monitoring stations, including the control station C12. The graphs in Appendix F show no appreciable difference between impact and control stations, hence the higher pH compared to baseline is likely due to natural fluctuation. Low pH result for FC2 recorded on 5 Feb 2018 while results for G1; W1 and W2 were recorded normal on the same day. The decrease in reading for FC2 was likely due to source from external activities around FC2 instead of TPSTW. A mariculture raft is operating around the FC2 station, the decrease in reading for FC2 may due to mariculture runoff from the raft.

3.7.5 Referring to the graph in Appendix I, the suspended solid level marginally exceeded the maximum baseline level on 2/2/2018, 5/2/2018 and 6/2/2018. The exceeded readings were not sustained and were restored to within baseline levels within the monitoring period. Thus it was most likely a result of natural fluctuation and is considered as not related to any adverse impact of the overflow of treated effluent from TPSTW.

3.7.6 The depth-averaged temperature level was exceeded than the minimum baseline level, including control station C12. Referring to the graphs in Appendix I, there was no appreciable difference between impact and control stations, hence the lower temperature is likely due to natural fluctuation.

3.7.7 Referring to the graph in Appendix I, the E. coli levels exceeded the maximum baseline level on 2/2/2018, 3/2/2018, 4/2/2018 and 5/2/2018 at the station W1. The increase in the readings was most likely a result of the treated effluent overflow from TPSTW. However, it would not result in adverse impact to seawater as the readings were recorded within baseline level at the after.

3.7.8 Referring to the graph in Appendix I, the ammonia nitrogen levels exceeded the maximum baseline level on 2/2/2018, 3/2/2018 and 4/2/2018 at the station W1. The increase in the readings was most likely a result of the treated effluent overflow from TPSTW. However, it would not result in adverse impact to seawater as the readings were recorded within baseline level at the after. Reading of ammonia nitrogen level is exceeded the maximum baseline level

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at station W1 on 9/2/2018 while readings of chlorophyll-a and dissolved oxygen at W1 did not have notable elevation, thus it was no adverse impact from treated effluent discharge from TPSTW. The increasing reading of ammonia nitrogen level at W1 most likely due to natural fluctuation.

3.7.9 Referring to the graph in Appendix I, the TIN levels exceeded the maximum baseline level on 2/2/2018, 3/2/2018 and 4/2/2018 at the station W1. The increase in the readings was most likely a result of the treated effluent overflow from TPSTW. However, it would not result in adverse impact to seawater as the readings were recorded within baseline level at the after. Reading of TIN level is exceeded the maximum baseline level at station W1 on 9/2/2018 while readings of chlorophyll-a and dissolved oxygen at W1 did not have notable elevation, thus it was no adverse impact from treated effluent discharge from TPSTW. The increasing reading of TIN level at W1 most likely due to natural fluctuation.

3.7.10 By confirmation with ALS Technichem (HK) Pty Ltd, the fluctuating readings of the water quality monitoring results as shown in Appendix G are in acceptable range.

Table 3.5 Summary of the Water Quality Monitoring Results (From 2 February to 9 February 2018)

| Location | | Temperature (°C) | pH | Salinity (ppt) | DO (Surface & Middle) (mg/L) | DO (Bottom) (mg/L) | Turbidity (NTU) | E-Coli (cfu/100 ml) | NH3-N ( mg/L) | TIN ( mg/L) | SS ( mg/L) | BOD ( mg/L) | Chlorophyll-a (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mid-Ebb Tide | | | | | | | | | | | | | |
| C1 | Max | 16.0 | 8.2 | 32.1 | 9.1 | 8.9 | 5.2 | 76.0 | 0.049 | 0.094 | 6.7 | 3.3 | 0.009 |
| | Min | 13.9 | 8.0 | 31.2 | 7.5 | 7.3 | 1.0 | 0.0 | 0.023 | 0.047 | 3.1 | 0.4 | 0.002 |
| | Mean | 14.6 | 8.1 | 31.7 | 8.1 | 7.9 | 2.9 | 22.0 | 0.035 | 0.070 | 4.7 | 1.7 | 0.005 |
| C12 (control Station) | Max | 16.0 | 8.3 | 32.6 | 9.0 | 8.9 | 5.0 | 74.7 | 0.061 | 0.094 | 5.7 | 3.3 | 0.010 |
| | Min | 14.0 | 8.1 | 31.5 | 7.7 | 7.3 | 1.2 | 0.0 | 0.020 | 0.054 | 3.4 | 0.5 | 0.002 |
| | Mean | 14.6 | 8.2 | 32.1 | 8.2 | 8.0 | 2.8 | 13.3 | 0.033 | 0.067 | 4.9 | 1.8 | 0.005 |
| G1 | Max | 15.6 | 8.2 | 32.0 | 8.5 | 8.7 | 5.0 | 830.0 | 0.116 | 0.165 | 8.1 | 3.6 | 0.012 |
| | Min | 14.0 | 8.0 | 31.3 | 7.7 | 7.3 | 1.8 | 6.0 | 0.027 | 0.054 | 1.7 | 0.7 | 0.003 |
| | Mean | 14.6 | 8.1 | 31.6 | 8.0 | 8.0 | 3.4 | 146.0 | 0.051 | 0.101 | 5.4 | 1.8 | 0.006 |
| FC2 | Max | 15.6 | 8.2 | 32.1 | 9.0 | 8.7 | 5.0 | 2030.0 | 0.086 | 0.179 | 5.4 | 3.5 | 0.007 |
| | Min | 13.9 | 7.9 | 31.3 | 7.1 | 7.2 | 1.3 | 9.7 | 0.027 | 0.067 | 3.3 | 0.0 | 0.002 |
| | Mean | 14.5 | 8.1 | 31.7 | 7.8 | 7.6 | 3.0 | 335.3 | 0.057 | 0.104 | 4.1 | 2.1 | 0.005 |
| W1 | Max | 15.8 | 8.0 | 32.0 | 8.2 | - | 7.0 | 8200.0 | 7.260 | 7.580 | 6.2 | 4.3 | 0.007 |
| | Min | 14.1 | 7.9 | 29.3 | 6.5 | - | 2.0 | 0.0 | 0.044 | 0.103 | 1.5 | 1.2 | 0.001 |
| | Mean | 14.8 | 8.0 | 31.0 | 7.4 | - | 3.3 | 2245.8 | 1.645 | 2.077 | 4.0 | 2.1 | 0.003 |
| W2 | Max | 14.8 | 8.1 | 31.4 | 9.1 | 8.8 | 4.0 | 137.5 | 0.131 | 0.398 | 3.6 | 4.3 | 0.009 |
| | Min | 12.3 | 8.0 | 28.0 | 8.0 | 7.9 | 1.3 | 9.0 | 0.024 | 0.093 | 1.6 | 1.7 | 0.003 |
| | Mean | 13.5 | 8.1 | 30.4 | 8.6 | 8.3 | 2.3 | 34.8 | 0.054 | 0.200 | 2.8 | 2.3 | 0.006 |
| Mid-Flood Tide | | | | | | | | | | | | | |
| C1 | Max | 16.0 | 8.2 | 32.1 | 9.0 | 8.7 | 4.8 | 353.3 | 0.048 | 0.117 | 6.7 | 3.3 | 0.008 |
| | Min | 14.0 | 8.1 | 31.4 | 7.3 | 7.2 | 1.3 | 0.3 | 0.019 | 0.055 | 2.4 | 0.4 | 0.002 |
| | Mean | 14.7 | 8.1 | 31.8 | 8.1 | 8.0 | 2.9 | 48.1 | 0.038 | 0.074 | 4.2 | 1.9 | 0.005 |
| C12 (control Station) | Max | 15.6 | 8.2 | 32.1 | 8.7 | 8.6 | 7.3 | 26.7 | 0.045 | 0.085 | 6.5 | 2.8 | 0.007 |
| | Min | 14.2 | 8.1 | 31.6 | 7.1 | 7.1 | 1.7 | 0.7 | 0.018 | 0.053 | 2.6 | 0.4 | 0.001 |
| | Mean | 14.7 | 8.1 | 31.9 | 8.0 | 7.9 | 3.5 | 6.4 | 0.031 | 0.064 | 4.6 | 1.8 | 0.004 |
| G1 | Max | 15.6 | 8.2 | 32.0 | 8.7 | 8.8 | 5.8 | 2550.0 | 0.119 | 0.167 | 7.0 | 4.4 | 0.011 |
| | Min | 14.0 | 8.1 | 30.8 | 7.3 | 7.3 | 1.8 | 6.5 | 0.017 | 0.054 | 2.9 | 0.0 | 0.003 |
| | Mean | 14.6 | 8.1 | 31.6 | 8.1 | 7.9 | 3.3 | 368.3 | 0.053 | 0.103 | 4.9 | 2.0 | 0.006 |
| FC2 | Max | 15.6 | 8.1 | 32.4 | 9.1 | 8.9 | 7.3 | 1400.0 | 0.086 | 0.178 | 5.9 | 3.4 | 0.008 |
| | Min | 13.9 | 7.2 | 31.2 | 7.4 | 7.0 | 1.3 | 11.7 | 0.024 | 0.066 | 2.4 | 0.7 | 0.003 |
| | Mean | 14.5 | 8.0 | 31.7 | 7.8 | 7.6 | 3.2 | 321.3 | 0.056 | 0.103 | 4.0 | 2.0 | 0.005 |
| W1 | Max | 15.6 | 8.1 | 31.9 | 8.0 | - | 6.0 | 7600.0 | 7.480 | 8.370 | 5.7 | 2.0 | 0.007 |
| | Min | 14.3 | 7.9 | 30.2 | 6.7 | - | 2.0 | 0.0 | 0.050 | 0.112 | 2.7 | 0.0 | 0.001 |
| | Mean | 14.9 | 8.0 | 31.4 | 7.4 | - | 3.3 | 2331.1 | 1.685 | 1.964 | 4.4 | 1.4 | 0.004 |
| W2 | Max | 14.9 | 8.2 | 31.3 | 9.0 | 9.0 | 4.0 | 109.0 | 0.076 | 0.413 | 5.3 | 4.6 | 0.014 |
| | Min | 12.5 | 8.0 | 28.1 | 7.5 | 7.2 | 1.5 | 0.0 | 0.023 | 0.088 | 1.4 | 0.6 | 0.004 |
| | Mean | 13.7 | 8.1 | 30.2 | 8.4 | 8.1 | 2.5 | 26.4 | 0.041 | 0.176 | 3.3 | 2.0 | 0.006 |
| Defined baseline level | Max | 29.1 | 8.0 | 33.1 | 8.4 | 9.2 | 15.3 | 595 | 0.2 | 0.24 | 7.0 | 6.0 | 0.015 |
| | Min | 17.2 | 7.1 | 27.0 | 1.2 | 0.8 | 1.0 | 0.0 | 0.01 | 0.01 | 1.0 | 1.0 | 0.001 |
| | Mean | 22.8 | 7.7 | 31.7 | 5.7 | 5.0 | 2.4 | 6.0 | 0.05 | 0.07 | 3.0 | 2.0 | 0.003 |

Note:

- The max, min and mean results and baseline levels are depth-averaged values
- Mean results of E.coli are geometric mean
- There may be discrepancies in the mean values with those derived from Appendix H, due to rounding errors

3.7.11 It was confirmed that the overflow event stopped when inspection was finished and mitigation measures required as per EM&A Manual to minimize the risk of overflow or emergency discharge had been implemented. Based on the findings of the water quality monitoring, it was confirmed that the overflow event had not resulted in adverse water quality impacts and the baseline was confirmed to be restored.

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## 4. ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS

4.1.1 TPSTW had registered as a chemical waste producer for this Project. The license number of Chemical Waste Producer Registration is 0014-727-D2226-15 which is presented in **Appendix K**.

4.1.2 TPSTW is reminded that chemical waste should be properly handled and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. TPSTW should also engage a licensed waste collector to collect the chemical waste for proper disposal.

4.1.3 Sludge cake of TPSTW was temporarily stored within the dewatering house. Normally, all the sludge cake was disposed to Sludge Treatment Facility (STF). If STF breaks down, the sludge cake will be disposed to WENT landfill.

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## 5. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

5.1.1 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) for operation phase is presented in Appendix J. Most of the necessary mitigation measures at this stage of works were implemented properly.

5.1.2 Implementation status of operational landfill gas monitoring was confirmed with operation team of TPSTW. There is no accumulation of landfill gas at area for normal occupation inside TPSTW. When confined space works were being conducted, gas monitoring was performed before entry in accordance with Code of Practice on Safety and Health at Work in Confined Spaces.

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## 6. SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

6.1.1 There was no complaint received in relation to the environmental impact or notifications of summons or prosecutions received during this reporting period.

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## 7. CONCLUSION AND RECOMMENDATIONS

7.1.1 The twenty-first odour impact monitoring was carried out from 09 February 2018 to 10 February 2018 during this reporting period in accordance with the EM&A requirements.

7.1.2 Air quality monitoring of hydrogen sulphide (H2S) was conducted at five monitoring stations including three Air Sensitive Receivers around TPSTW. Exceedances of A/L levels of 2.5 ppb at three ASRs (AS1, AS4 and AS12) were recorded.

7.1.3 There was an event of treated effluent overflowing from TPSTW due to routine inspection of effluent pipe, the treated effluent overflow from Tai Po Sewage Treatment Works to Tolo Harbour on 2 February 2018 with a total discharge volume of 57,783 cu.m. Daily marine water quality data was collected in accordance with the EM&A Manual from 2 February 2018 to 9 February 2018.

7.1.4 Based on the monitoring results, level of several parameters had exceeded the range of baseline level during the monitoring period. However, the exceeded readings were not sustained and were restored to within baseline levels within the monitoring period. The results revealed that the overflow event from TPSTW has not caused any long-term adverse marine water quality impact to the surrounding water body.

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**Figure 2.1**

**Air Quality (H2S) Monitoring Stations**

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Report No.: 0151/15/ED/1052

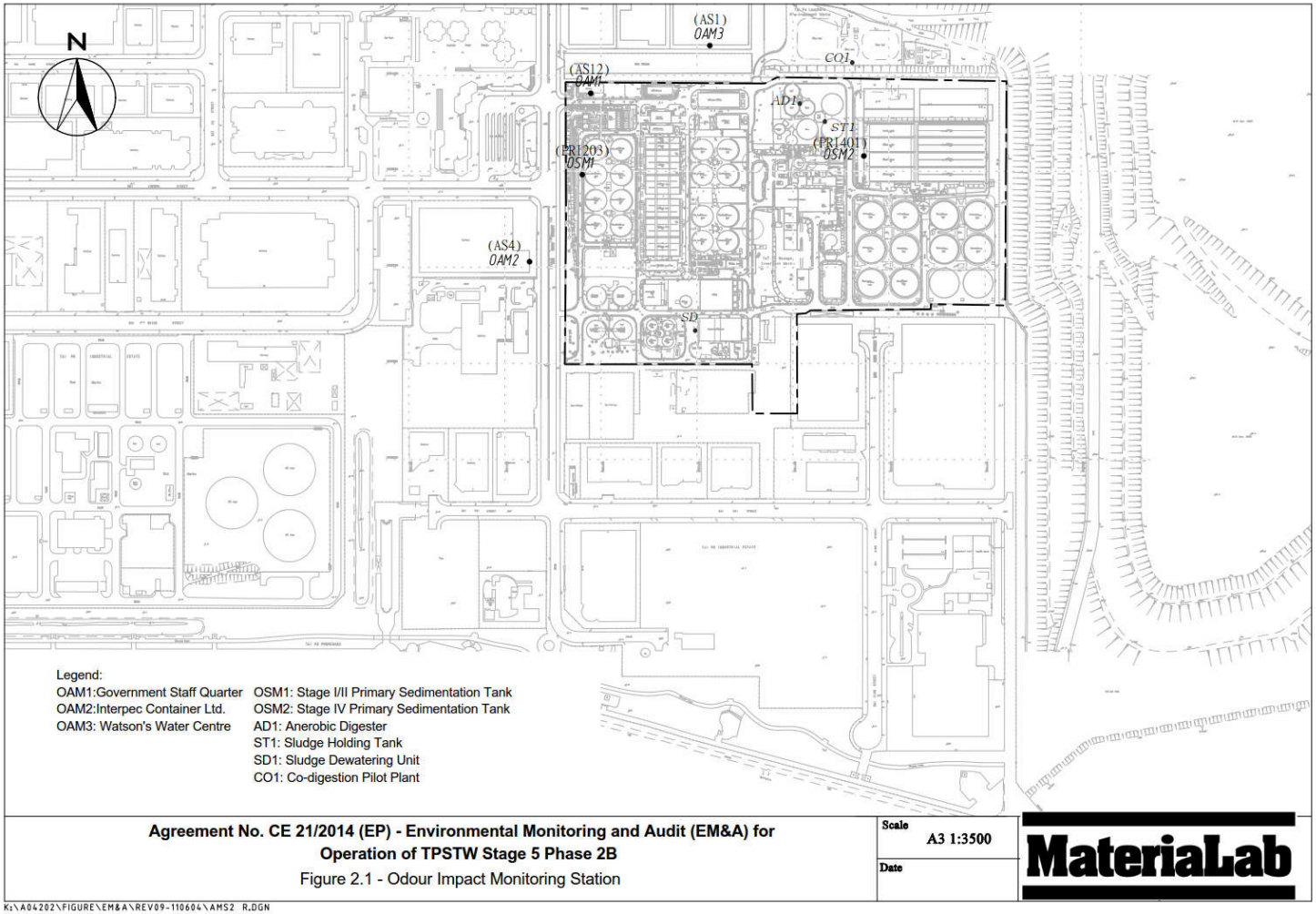

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**Figure 3.1**

**Tolo Harbour Water Quality Monitoring Stations**

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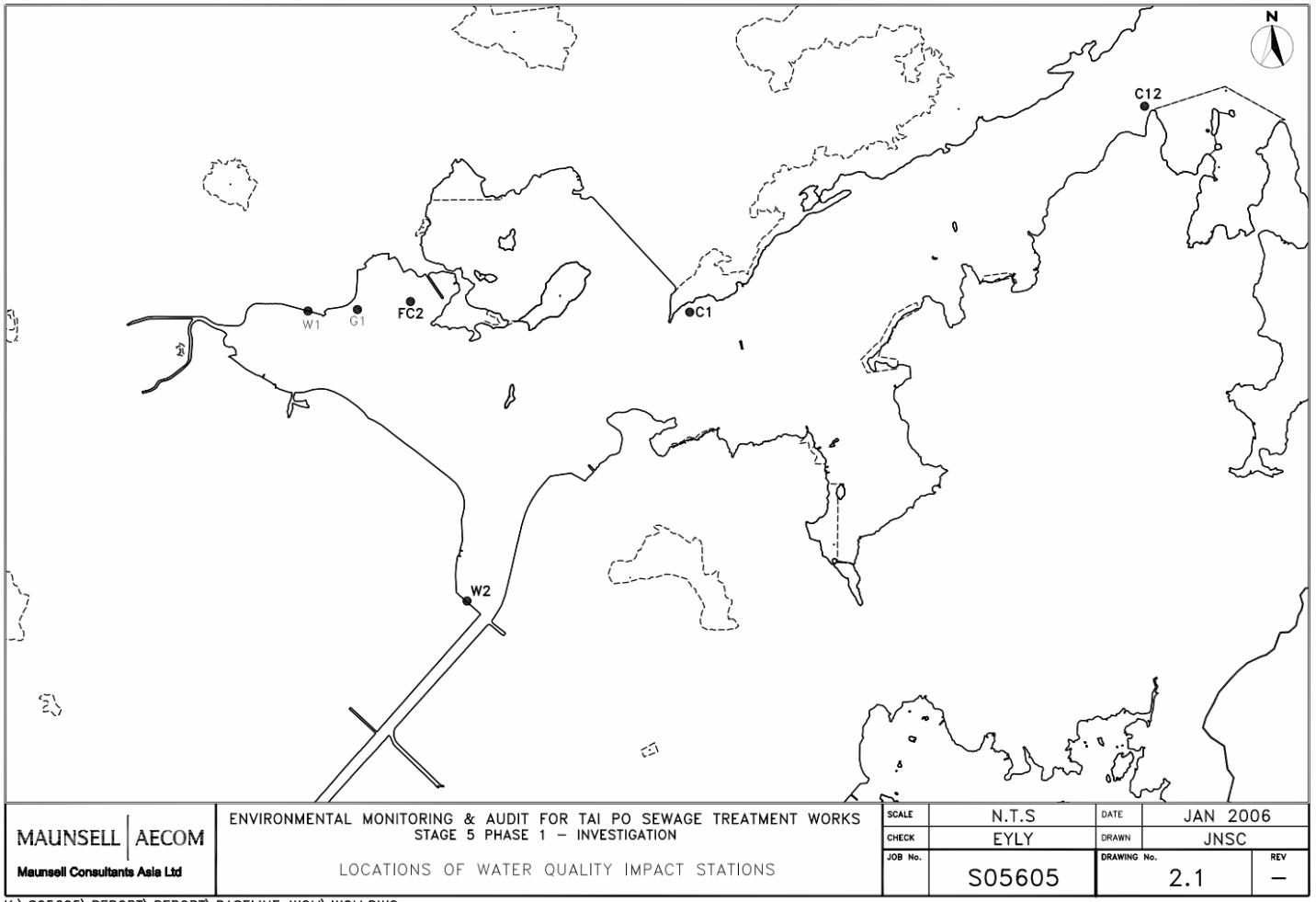
MaterialLab

Report No.: 0151/15/ED/1052



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## Appendix A

## Project Organisation Chart

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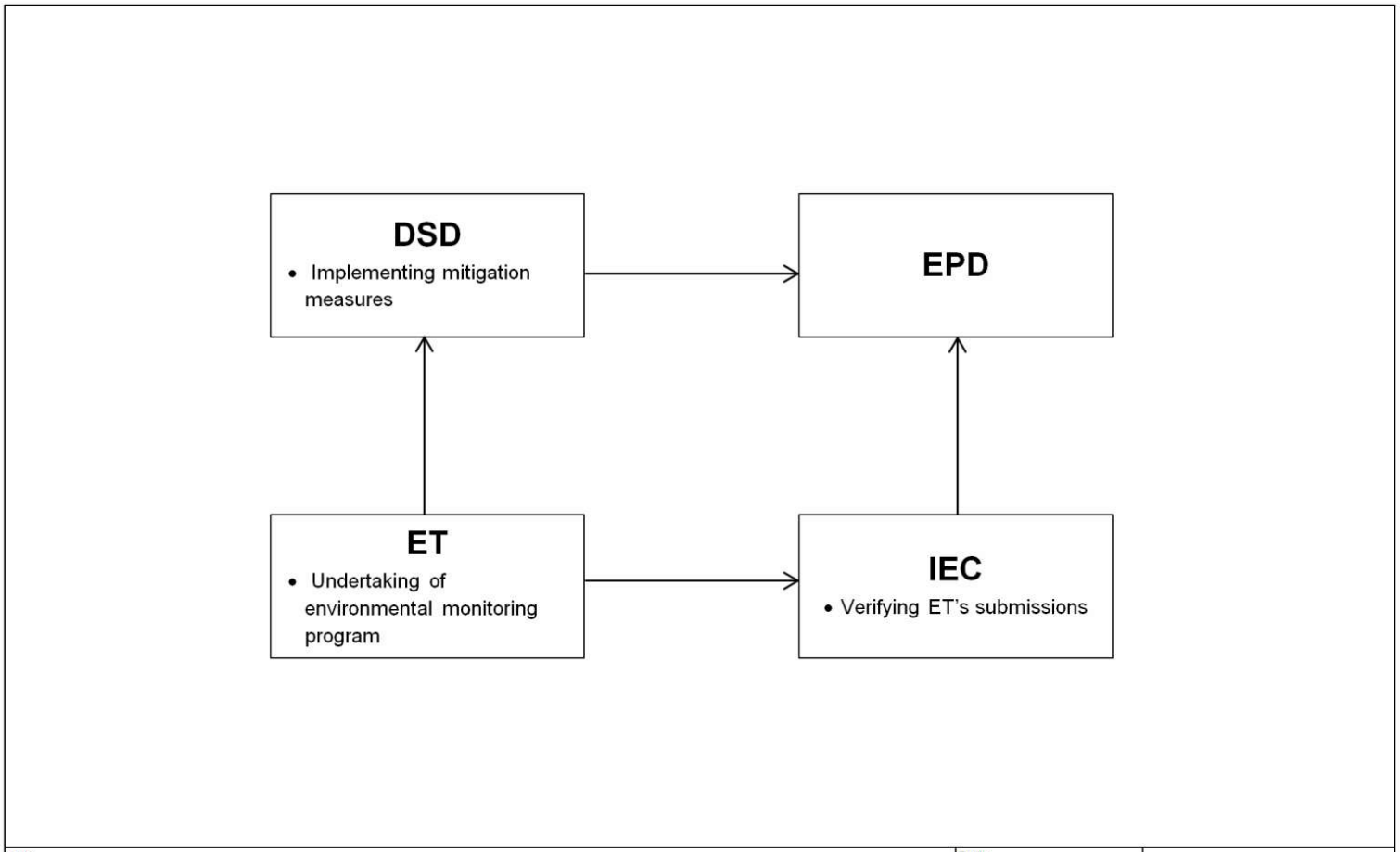


| Title | Scale | Date |
|---|---|---|
| Agreement No. CE 21/2014 (EP) – EM&A for Operation of Tai Po Sewage Works Stage V Phase 2B – Investigation Project Organization During Operation Phase | N.T.S | January 2016 |

P:\MCL\E M&A\2015\0151-15\O-Chart

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## Appendix B

## Monitoring Schedule

**MATERIALAB – Waste & Environmental Technologies Joint Venture**
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Report No.: 0151/15/ED/1052

Tentative Air Quality Monitoring Schedule for February 2018

| Feb-2018 | | | | | | |
|---|---|---|---|---|---|---|
| **Sun** | **Mon** | **Tue** | **Wed** | **Thu** | **Fri** | **Sat** |
| | | | | 1 | 2 **Tolo Harbour water quality Monitoring** | 3 **Tolo Harbour water quality Monitoring** |
| 4 **Tolo Harbour water quality Monitoring** | 5 **Tolo Harbour water quality Monitoring** | 6 **Tolo Harbour water quality Monitoring** | 7 **Tolo Harbour water quality Monitoring** | 8 **Tolo Harbour water quality Monitoring** | 9 **Tolo Harbour water quality Monitoring/ Air Quality ($H_2S$) Monitoring** | 10 **Air Quality ($H_2S$) Monitoring** |
| 11 | 12 | 13 | 14 | 15 | 16 | 17 |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | | | |

Air Quality Monitoring Schedule for March 2018

| Mar-2018 | | | | | | |
|---|---|---|---|---|---|---|
| **Sun** | **Mon** | **Tue** | **Wed** | **Thu** | **Fri** | **Sat** |
| | | | | 1 | 2 | 3 |
| 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 11 | 12 | 13 | 14 | 15 | 16 **Air Quality ($H_2S$) Monitoring** | 17 **Air Quality ($H_2S$) Monitoring** |
| 18 | 19 | 20 | 21 | 22 | 23 | 24 |
| 25 | 26 | 27 | 28 | 29 | 30 | 31 |

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## Appendix C

## Event / Action Plan for Air Quality Monitoring (Operation Phase)

| Event | Action | | |
|---|---|---|---|
| | **TPSTW Engineer –in-charge of Odour Monitoring** | **DSD ST1** | **DSD/SP / E &MP (*)** |
| Exceedance of action level or receipt of any odour complaints | 1. Identify source/ reason of exceedance or odour complaints; and<br>2. Repeat measurement confirm finding. | 1. carry out investigation to identify the source / reason of exceedance or complaints. Investigation shall be completed within 1 week;<br>2. rectify any unacceptable practice;<br>3. amended working methods if required;<br>4. inform DSD SP/E&MP if cause of complaints or exceedance is considered to be caused by civil or E &M design problems;<br>5. Correspond to the complaints within 10 days to inform the cause of nuisance and action taken; and cause of nuisance; and<br>6. Implement amended working methods. | 1. Assist ST1 to find the root cause of the complaint or exceedance; and<br>2. modify or improve design as appropriate. |
| Exceedance of Limit level or receipt of two or more complaints in 3 months | 1. Identify source / reason of exceedance or odour complaints;<br>2. Repeat measurements to confirm findings;<br>3. Increase monitoring frequency to monthly; and<br>4. If exceedance stops, cease additional monitoring. | 1. Carry out investigation to identify the source / reason of exceedance or complaints. Investigation shall be completed within 1 week;<br>2. rectify any unacceptable practice;<br>3. amended working methods if required;<br>4. notify DSD SP / E&MP;<br>5. formulate remedial actions;<br>6. ensure amended working methods and remedial actions properly implemented;<br>7. if exceedance continues, consider what portion of the work is responsible and stop that protion of work until the exceedance is abated; and<br>8. Correspond to the complaints within 10 days to inform the cause of the nuisance and action taken. | 1. Assist ST1 to find the root cause of the complaint or exceedance;<br>2. modify or improve design as appropriate; and<br>3. formulate remedial actions in association with ST1 |

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| Event | Action Plan |
|---|---|
| Pipe leakage as detected by dye test | 1. Carry out investigation to determine the reason of such detection and identify the location of any leakage.<br>2. If pipe leakage is confirmed, inform EPD and WSD.<br>3. Determine possible remedial measures such as pipe repairing work.<br>4. Ensure remedial actions are properly implemented.<br>5. Assess effectiveness of the remedial actions and keep EPD, AFCD and WSD informed of the results.<br>6. If leakage continues, consider what portion of the work is responsible and reassess the remedial actions.<br>7. Arrange meeting with EPD, AFCD and WSD to discuss the required remedial actions if necessary and ensure all necessary remedial actions are properly implemented.<br>8. Conduct daily effluent and marine water monitoring (as discussed in Sections 4.6 to 4.11 and 4.45 to 4.51) until the baseline water quality levels are restored or at least 1 week after the leakage is abated.<br>9. The monitoring data collected in Item 8 above shall be compared with the baseline data collected under normal operation of the Project to identify the degree of impact caused by the pipe leakage. |
| Failure of power supply, treatment units or equipment | 1. Investigate the reason of failure.<br>2. Determine possible remedial measures and identify the need of emergency discharge.<br>3. If emergency discharge is required,inform EPD and WSD.<br>4. Ensure remedial measures are implemented.<br>5. Assess the effectiveness of the implemented remedial measures and identify alternative measures if necessary.<br>6. Discuss with EPD, AFCD and WSD for the required remedial actions if necessary and ensure all necessary remedial actions are properly implemented.<br>7. Conduct daily effluent and marine water monitoring (as discussed in Sections 4.6 to 4.11 and 4.45 to 4.51) until the baseline water quality levels are restored or at least 1 week after normal plant operation is resumed (whichever is longer).<br>8. The monitoring data collected in Item 7 above shall be compared with the baseline data collected under normal operation of the Project to identify the degree of impact caused by the emergency discharge (if any). |
| THEES Maintenance period | 1. Inform EPD, WSD and AFCD of the maintenance event before any discharge.<br>2. Conduct daily effluent and marine water monitoring (as discussed in Sections 4.6 to 4.11 and 4.45 to 4.51) until the baseline water quality levels are restored or at least 4 weeks after termination of the maintenance period (whichever is longer).<br>3. Install silt curtains at Tai Po and Shatin seawater intakes during the whole discharge period until the baseline water quality levels are restored.<br>4. The monitoring data collected in Item 2 above shall be compared with the baseline data collected under normal operation of the Project to identify the degree of impact caused by the THEES maintenance discharge. |

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**Appendix D**

**Calibration Certificate**

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QUALITY PRO TEST-CONSULT LIMITED
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Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION

Report No. : AG120028
Date of Issue : 11 December 2017


## PART A – CUSTOMER INFORMATION

Enovative Environmental Service Ltd.
Rm 811, Hin Pui House,
Hin Keng Estate, Tai Wai
New Territories, Hong Kong
Attn: Mr. Thomas WONG

## PART B – DESCRIPTION

| | | |
|---|---|---|
| Name of Equipment | : | YSI 6920V2 (Multi-Parameters) |
| Manufacturer | : | YSI (a xylem brand) |
| Serial Number | : | 00019CB2 |
| Date of Received | : | Dec 07, 2017 |
| Date of Calibration | : | Dec 07, 2017 to Dec 07, 2017 |
| Date of Next Calibration[a] | : | Mar 07, 2018 |

## PART C – REFERENCE METHODS/ DOCUMENTS FOR THE CALIBRATION

| Parameter | Reference Method |
|---|---|
| pH at 25°C | APHA 21e 4500-$H^+$ B |
| Dissolved Oxygen | APHA 21e 4500-O G |
| Conductivity at 25°C | APHA 21e 2510 B |
| Salinity | APHA 21e 2520 B |
| Turbidity | APHA 21e 2130 B |
| Temperature | Section 6 of international Accreditation New Zealand Technical Guide no. 3 Second edition March 2008: Working Thermometer Calibration Procedure. |

## PART D – CALIBRATION RESULTS[b,c]

### (1) pH at 25°C

| Target (pH unit) | Displayed Reading[d] (pH Unit) | Tolerance[e](pH Unit) | Results |
|---|---|---|---|
| 4 | 4.02 | +0.02 | Satisfactory |
| 6.86 | 6.86 | +0.00 | Satisfactory |
| 7.42 | 7.38 | -0.04 | Satisfactory |
| 10.01 | 10.03 | +0.02 | Satisfactory |

Tolerance of pH should be less than ±0.10 (pH unit)

### (2) Temperature

| Reading of Ref. thermometer (°C) | Displayed Reading (°C) | Tolerance (°C) | Results |
|---|---|---|---|
| 15 | 15.70 | +0.70 | Satisfactory |
| 20 | 20.12 | +0.12 | Satisfactory |
| 37 | 35.80 | -1.20 | Satisfactory |

Tolerance limit of temperature should be less than ±2.0 (°C)

~ CONTINUED ON NEXT PAGE ~

*Remark(s): -*

*[a] The "Date of Next Calibration" is recommended according to best practice principals as practiced by QPT or quoted form relevant international standards.*
*[b] The results relate only to the calibrated equipment as received*
*[c] The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.*
*[d] "Displayed Reading" denotes the figure shown on item under calibration/ checking regardless of equipment precision or significant figures.*
*[e] The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by QPT or quoted form relevant international standards.*

APPROVED SIGNATORY : _____
FUNG Yuen-ching Aries
Laboratory Manager

專業化驗有限公司
QUALITY PRO TEST-CONSULT LIMITED
Unit 10, 14/F, Wah Wai Centre, 38-40 Au Pui Wan St., Fotan, Hong Kong
Email: info@qualityprotest.com; Website: www.qualityprotest.com
Tel: (852) 3956 8717; Fax: (852) 3956 3928

# REPORT OF EQUIPMENT PERFORMANCE CHECK/ CALIBRATION



## PART D – CALIBRATION RESULTS (Cont'd)

### (3) Dissolved Oxygen

| Expected Reading (mg/L) | Displayed Reading (mg/L) | Tolerance (mg/L) | Results |
|---|---|---|---|
| 0 | 0.02 | +0.02 | Satisfactory |
| 3.54 | 3.40 | -0.14 | Satisfactory |
| 8.7 | 8.73 | +0.03 | Satisfactory |

Tolerance limit of dissolved oxygen should be less than ±0.20 (mg/L)

### (4) Conductivity at 25°C

| Conc. of KCl (M) | Expected Reading (µS/cm) | Displayed Reading (µS/cm) | Tolerance (%) | Results |
|---|---|---|---|---|
| 0.001 | 146.9 | 152.3 | +3.7 | Satisfactory |
| 0.01 | 1412 | 1515 | +7.3 | Satisfactory |
| 0.1 | 12890 | 13408 | +4.0 | Satisfactory |
| 0.5 | 58670 | 56872 | -3.1 | Satisfactory |
| 1.0 | 111900 | 111144 | -0.7 | Satisfactory |

Tolerance limit of conductivity should be less than ±10.0 (%)

### (5) Salinity

| Expected Reading (g/L) | Displayed Reading (g/L) | Tolerance (%) | Results |
|---|---|---|---|
| 10 | 9.68 | -3.2 | Satisfactory |
| 20 | 18.98 | -5.1 | Satisfactory |
| 30 | 28.88 | -3.7 | Satisfactory |

Tolerance limit of salinity should be less than ±10.0 (%)

### (6) Turbidity

| Expected Reading (NTU) | Displayed Reading[f] (NTU) | Tolerance[g] (%) | Results |
|---|---|---|---|
| 0 | 0.4 | -- | -- |
| 4 | 3.8 | -5.0 | Satisfactory |
| 20 | 19.8 | -1.0 | Satisfactory |
| 100 | 102.4 | +2.4 | Satisfactory |
| 800 | 828.4 | +3.6 | Satisfactory |

Tolerance limit of turbidity should be less than ±10.0 (%)

~ END OF REPORT ~

*Remark(s): -*

*(f) "Displayed Reading" presents the figures shown on item under calibration/ checking regardless of equipment precision or significant figures.*

*(g) The "Tolerance Limit" mentioned is the acceptance criteria applicable for similar equipment used by Quality Pro Test-Consult Ltd. or quoted form relevant international standards.*

**ARIZONA INSTRUMENT LLC**
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# *Certification of Instrument Calibration*

Guyline (Asia) Ltd
Rm 1611, Eastern Harbour Centre
Quarry Bay,

RMA # 2459849

This is to certify that the Jerome **X631 0003** Gold Film Hydrogen Sulfide Analyzer, Serial Number **2966**, with Sensor Number **14-11-23-R2D**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **Out of Calibration**

| | | Actual | | Calibration Gas | | Allowable Range |
|---|---|---|---|---|---|---|
| **Incoming:** | Range 1 | 0.346 | ppm H2S | 0.500 | ppm H2S | +/- 6% |
| | RSD % | 10.17 | | | | <5% |
| **Outgoing:** | Range 1 | 0.476 | ppm H2S | 0.500 | ppm H2S | +/- 6% |
| | RSD % | 2.18 | | | | <5% |

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 2.8%

Calibration Date: 02-Jun-2017 Recalibration Date: 01-Jun-2018

Temperature °F: % Relative Humidity:

Approved By: Cheryl Hradek Date Approved: 05-Jun-2017
Title: Cheryl Hradek - Quality Control

Equipment Used:

**H2S Calibration Standard:** CC-57152 **NIST#:** 1385481
**Calibration Date:** 17-Aug-2016 **Calibration Date Due:** 18-Aug-2019

**Mass Flow Controller B:** 124604 **NIST#:** 152971
**Calibration Date:** 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

**Mass Flow Controller D:** 124602 **NIST#:** 151792
**Calibration Date:** 08-Nov-2016 **Calibration Date Due:** 08-Nov-2017

**Digital Multimeter:** 66961028 **NIST#:** 7000660
**Calibration Date:** 28-Mar-2017 **Calibration Date Due:** 28-Mar-2018

**Flowmeter:** US10H44183 **NIST#:** 1813; 1817; 1796
**Calibration Date:** 08-Nov-2016 **Calibration Date Due:** 09-Nov-2017

Calibration Procedure Used: 730-0032

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.
Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. Because any of the above acts could affect the calibration and readings of the instrument, their certification will no longer be valid and, further, Arizona Instrument LLC WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications.
As long as a functional test is within range, according to the procedure outlined in the Operator's Manual, the instrument is performing correctly.

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# *Certification of Instrument Calibration*

Guyline (Asia) Ltd
Rm 1611, Eastern Harbour Centre
Quarry Bay,

RMA # 2473663

This is to certify that the Jerome **X631 0003** Gold Film Hydrogen Sulfide Analyzer, Serial Number **2967**, with Sensor Number **16-4-13-V2DS**, was calibrated with standard units traceable to NIST.

Calibration Status as Received: **In Calibration**

| | | Actual | Calibration Gas | Allowable Range |
|---|---|---|---|---|
| **Incoming:** | Range 1 | 0.512 ppm H2S | 0.500 ppm H2S | +/- 6% |
| | RSD % | 1.64 | | <5% |
| **Outgoing:** | Range 1 | 0.518 ppm H2S | 0.500 ppm H2S | +/- 6% |
| | RSD % | 1.38 | | <5% |

Calibration Status as Left: **In Calibration**

Estimated Uncertainty of Calibration System: 2.8%

Calibration Date: 04-Aug-2017 Recalibration Date: 03-Aug-2018

Temperature °F: 74.40 % Relative Humidity: 62.00

Approved By: Cheryl Hradek
Title: Cheryl Hradek - Quality Control

Date Approved: 04-Aug-2017

Equipment Used:

**H2S Calibration Standard:** CC-57152 **NIST#:** 1385481
**Calibration Date:** 17-Aug-2016 **Calibration Date Due:** 18-Aug-2019

**Mass Flow Controller B:** 124604 **NIST#:** 152971
**Calibration Date:** 28-Nov-2016 **Calibration Date Due:** 28-Nov-2017

**Mass Flow Controller D:** 124602 **NIST#:** 151792
**Calibration Date:** 08-Nov-2016 **Calibration Date Due:** 08-Nov-2017

**Digital Multimeter:** 66961028 **NIST#:** 7000660
**Calibration Date:** 28-Mar-2017 **Calibration Date Due:** 28-Mar-2018

**Flowmeter:** US10H44183 **NIST#:** 1813; 1817; 1796
**Calibration Date:** 08-Nov-2016 **Calibration Date Due:** 09-Nov-2017

Calibration Procedure Used: 730-0032

Arizona Instrument certifies that the above listed instrument meets or exceeds all published specifications and has been calibrated using standards whose accuracy are traceable to the NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY within the limitations of the Institute's calibration services, or have been derived from accepted values of natural physical constants, or have been derived by the ratio type of self-calibration techniques.

Disclaimer: Any unauthorized adjustments, removal or breaking of QC seals, or other customer modifications on your Jerome Analyzer WILL VOID this factory calibration. Because any of the above acts could affect the calibration and readings of the instrument, their certification will no longer be valid and, further, Arizona Instrument LLC WILL NOT be responsible for any liabilities created as a result of using the instrument after such adjustments, seal removal, or modifications.

As long as a functional test is within range, according to the procedure outlined in the Operator's Manual, the instrument is performing correctly.

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## Appendix E

## Air Quality ($H_2S$) Monitoring Data and Graphical Plots

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Tel : (852)-24508238
Fax : (852)-24508032
Email : mcl@fugro.com

Report No.: 0151/15/ED/1052

| Location | Time Interval | $H_2S$ concentration (ppb)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 21th Odour Impact Monitoring (09-10 February 2018) | | | | | | | |
| | | 15-minute integrated average | 24-hour average | Maximum | Minimum | Action Level | Exceedance | Limit Level | Exceedance |
| AS12[1,2] | 0700-1000 | 2.7 | 8.0 | 25.7 | 2.3 | 2.5 | Yes | 2.5 | Yes |
| | 1000-1300 | 2.3 | | | | | | | |
| | 1300-1600 | 5.3 | | | | | | | |
| | 1600-1900 | 25.7 | | | | | | | |
| | 1900-2200 | 2.7 | | | | | | | |
| | 2200-0100 | 5.3 | | | | | | | |
| | 0100-0400 | 16.0 | | | | | | | |
| | 0400-0700 | 4.3 | | | | | | | |
| AS4[1,2] | 0700-1000 | 8.7 | 17.9 | 55.3 | 2.3 | 2.5 | Yes | 2.5 | Yes |
| | 1000-1300 | 7.7 | | | | | | | |
| | 1300-1600 | 2.3 | | | | | | | |
| | 1600-1900 | 3.7 | | | | | | | |
| | 1900-2200 | 2.3 | | | | | | | |
| | 2200-0100 | 35.0 | | | | | | | |
| | 0100-0400 | 28.3 | | | | | | | |
| | 0400-0700 | 55.3 | | | | | | | |
| AS1[1,2] | 0700-1000 | 2.7 | 3.6 | 5.3 | 2.0 | 2.5 | Yes | 2.5 | Yes |
| | 1000-1300 | 3.7 | | | | | | | |
| | 1300-1600 | 3.0 | | | | | | | |
| | 1600-1900 | 3.7 | | | | | | | |
| | 1900-2200 | 2.0 | | | | | | | |
| | 2200-0100 | 5.3 | | | | | | | |
| | 0100-0400 | 3.7 | | | | | | | |
| | 0400-0700 | 5.0 | | | | | | | |
| PRI401 | 0700-1000 | 68.3 | 224.0 | 670.0 | 36.0 | NA | NA | NA | NA |
| | 1000-1300 | 163.0 | | | | | | | |
| | 1300-1600 | 670.0 | | | | | | | |
| | 1600-1900 | 605.3 | | | | | | | |
| | 1900-2200 | 149.0 | | | | | | | |
| | 2200-0100 | 64.3 | | | | | | | |
| | 0100-0400 | 36.3 | | | | | | | |
| | 0400-0700 | 36.0 | | | | | | | |
| PRI203 | 0700-1000 | 62.7 | 33.0 | 62.7 | 3.3 | NA | NA | NA | NA |
| | 1000-1300 | 5.3 | | | | | | | |
| | 1300-1600 | 3.3 | | | | | | | |
| | 1600-1900 | 36.3 | | | | | | | |
| | 1900-2200 | 48.3 | | | | | | | |
| | 2200-0100 | 51.3 | | | | | | | |
| | 0100-0400 | 21.7 | | | | | | | |
| | 0400-0700 | 35.3 | | | | | | | |

*Accuracy is not guaranteed by the manufacturer for readings that are lower than 0.003 ppm (3 ppb).

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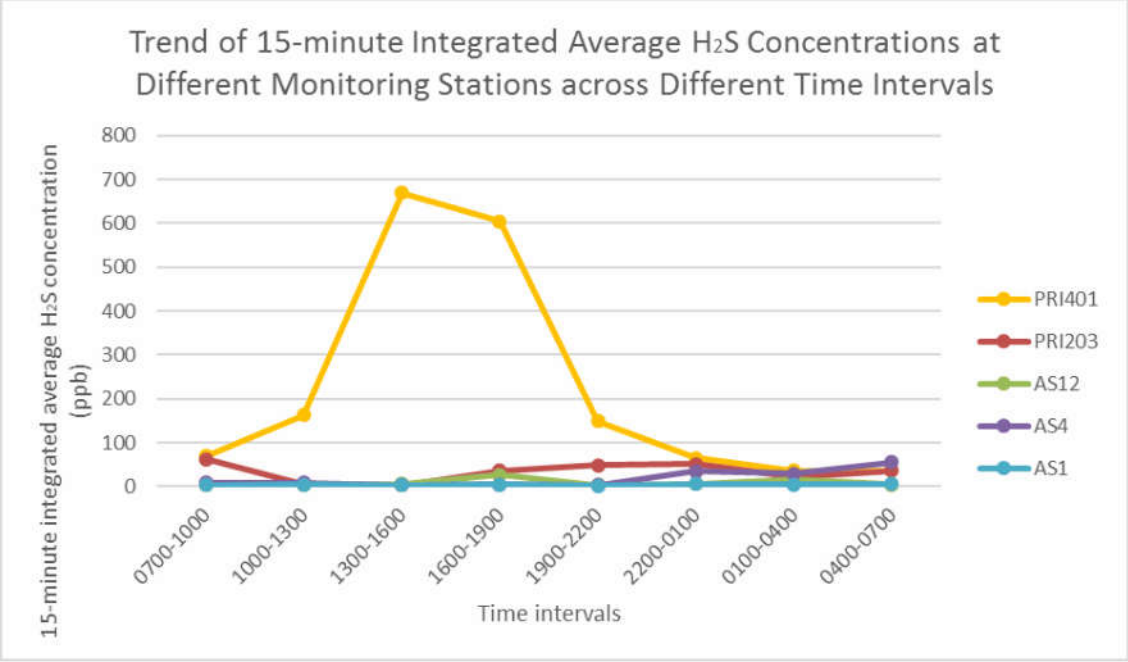
Report No.: 0151/15/ED/1052

| | 0700-1000 | 1000-1300 | 1300-1600 | 1600-1900 | 1900-2200 | 2200-0100 | 0100-0400 | 0400-0700 |
|---|---|---|---|---|---|---|---|---|
| PRI401 | 68.3 | 163.0 | 670.0 | 605.3 | 149.0 | 64.3 | 36.3 | 36.0 |
| PRI203 | 62.7 | 5.3 | 3.3 | 36.3 | 48.3 | 51.3 | 21.7 | 35.3 |
| AS12 | 2.7 | 2.3 | 5.3 | 25.7 | 2.7 | 5.3 | 16.0 | 4.3 |
| AS4 | 8.7 | 7.7 | 2.3 | 3.7 | 2.3 | 35.0 | 28.3 | 55.3 |
| AS1 | 2.7 | 3.7 | 3.0 | 3.7 | 2.0 | 5.3 | 3.7 | 5.0 |



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**Appendix F**

**Site Record**

MateriaLab

**Form 3.1** **Air Quality ($H_2S$) Monitoring Data Record Sheet**

| General Information | |
|---|---|
| Monitoring Station | PR1401 |
| Date | 9/2/2019 |
| Weather | ~~Cloudy~~ Cloudy |

**Monitoring Results**

| *Sample No.* | Time | *Wind Speed* | *Wind Direction* | *Level(ppm)* |
|---|---|---|---|---|
| Sample 1 | Start: 0730 | 0 | / | 0.1 0.04 0.065 |
| | Stop: 0740 | 0 | / | |
| Sample 2 | Start: 1000 | 0 | / | 0.029 0.18 0.28 |
| | Stop: 1010 | 0 | / | |
| Sample 3 | Start: 1300 | 0 | / | 1.42 0.3 0.29 |
| | Stop: 1310 | 0 | / | |
| Sample 4 | Start: 16:00 | 0 m/s | / | 0.073 0.043 1.7 |
| | Stop: 16:10 | 0 m/s | / | |
| Sample 5 | Start: 19:069 | 0 m/s | / | 0.076 027 0101 |
| | Stop: 19:169 | 0 m/s | / | |
| Sample 6 | Start: 2205 ~~19:21~~ ~~2205~~ | 0 m/s | / | 0.052, 0.073, 0.668 |
| | Stop: 2215 | 0 m/s | / | |
| Sample 7 | Start: 0100 | 0 m/s | / | 0.019, 0.080, 0.01 |
| | Stop: 0110 | 0 m/s | / | |
| Sample 8 | Start: 0400 | 0 m/s | / | 0.012, 0.036 0.060 |
| | Stop: 0410 | 0 m/s | / | |
| Other Observations | | | | |

| | Name & Designation | Signature | Date |
|---|---|---|---|
| **Recorded by:** | | | |
| **Checked by:** | | | |

MaterialLab

**Form 3.1** **Air Quality ($H_2S$) Monitoring Data Record Sheet**

| General Information | |
|---|---|
| Monitoring Station | PRI 203 |
| Date | 9/7/18 |
| Weather | Cloudy |

**Monitoring Results**

| *Sample No.* | Time | *Wind Speed* | *Wind Direction* | *Level (ppm)* |
|---|---|---|---|---|
| Sample 1 | Start: 0838 | 0 | / | 0.015 |
| | Stop: 0848 | 0 | / | 0.013<br>0.16 |
| Sample 2 | Start: 1110 | 0 | / | 0.007 |
| | Stop: 1120 | 0 | / | 0.002<br>0.007 |
| Sample 3 | Start: 1411 | 0.5 | E | 0.005 |
| | Stop: 1421 | 0.4 | E | 0.002<br>0.003 |
| Sample 4 | Start: 17:09 | 0 | / | 0.034 0.023 0.032 |
| | Stop: 17:19 | 0 | / | |
| Sample 5 | Start: 20:18 | 0 | / | 0.046 0.080 |
| | Stop: 20:28 | 0 | / | 0.079 |
| Sample 6 | Start: 2314 | 0 | / | 0.089, 0.053, |
| | Stop: 2324 | 0 | / | 0.012 |
| Sample 7 | Start: 0213 | 0 | / | 0.029, 0.016, |
| | Stop: 0223 | 0 | / | 0.020 |
| Sample 8 | Start: 0514 | 0 | / | 0.011, 0.015, |
| | Stop: 0524 | 0 | / | 0.080. |
| Other Observations | | | | |

| | Name & Designation | Signature | Date |
|---|---|---|---|
| **Recorded by:** | | | |
| **Checked by:** | | | |

MaterialLab

**Form 3.1** **Air Quality ($H_2S$) Monitoring Data Record Sheet**

| General Information | |
|---|---|
| Monitoring Station | AS12 |
| Date | 9/2/18 |
| Weather | Cloudy |

**Monitoring Results**

| *Sample No.* | Time | *Wind Speed* | *Wind Direction* | *Level (ppm)* |
|---|---|---|---|---|
| Sample 1 | Start: 0852 | 0 | / | 0.003 |
| | Stop: 0902 | 0 | / | 0.003 0.002 |
| Sample 2 | Start: 1122 | 0 | / | 0.002 |
| | Stop: 1132 | 0 | / | 0.003 ~~0.003~~ 0.002 |
| Sample 3 | Start: 1425 | 0 | / | 0.004 |
| | Stop: 1435 | 0 | / | 0.007 0.005 |
| Sample 4 | Start: 1721 | 0 | / | 0.020 0.026 0.031 |
| | Stop: 1731 | 0 | / | |
| Sample 5 | Start: 20:37 | 0 | / | 0.003 0.002 |
| | Stop: 20:42 | 0 | / | 0.003 |
| Sample 6 | Start: 2329 | 0 | / | 0.007, 0.008; |
| | Stop: 2339 | 0 | / | 0.001 |
| Sample 7 | Start: 0227 | 0 | / | 0.009, 0.021 |
| | Stop: 0237 | 0 | / | 0.018. |
| Sample 8 | Start: 0529 | 0 | / | 0.002, 0.009 |
| | Stop: 0539 | 0 | / | 0.007 |
| Other Observations | | | | |

| | **Name & Designation** | **Signature** | **Date** |
|---|---|---|---|
| **Recorded by:** | | | |
| **Checked by:** | | | |

MaterialLab

**Form 3.1** **Air Quality ($H_2S$) Monitoring Data Record Sheet**

| General Information | |
|---|---|
| Monitoring Station | AS4 |
| Date | 9/2/18 |
| Weather | Cloudy |

**Monitoring Results**

| *Sample No.* | Time | *Wind Speed* | *Wind Direction* | *Level(ppm)* |
|---|---|---|---|---|
| Sample 1 | Start: 0922 | 0 | / | 0.012 |
| | Stop: 0932 | 0 | / | 0.007 0.007 |
| Sample 2 | Start: 1151 | 0.2 | E | 0.005 0.007 0.011 |
| | Stop: 1201 | 0.4 | E | |
| Sample 3 | Start: 1456 | 0.6 | E | 0.003 0.002 0.002 |
| | Stop: 1506 | 0.8 | E | |
| Sample 4 | Start: 17:52 | 0.5 | E | 0.003 0.003 0.005 |
| | Stop: 18:02 | 0.6 | E | |
| Sample 5 | Start: 21:03 | 0.2 | E | 0.003 0.002 0.002 |
| | Stop: 21:13 | 0.2 | E | |
| Sample 6 | Start: 0001 | 0.2 | E | 0.036, 0.046, 0.023. |
| | Stop: 0011 | 0.3 | E | |
| Sample 7 | Start: 0303 | 0. | — | 0.032, 0.023, 0.030 |
| | Stop: 0313 | 0 | / | |
| Sample 8 | Start: 0603 | 0 | / | 0.032, 0.044 0.090 |
| | Stop: 0613 | 0 | / | |
| Other Observations | | | | |

| | Name & Designation | Signature | Date |
|---|---|---|---|
| **Recorded by:** | | | |
| **Checked by:** | | | |

MaterialLab

**Form 3.1** **Air Quality ($H_2S$) Monitoring Data Record Sheet**

| General Information | |
|---|---|
| Monitoring Station | AS1 |
| Date | 9/2/18 |
| Weather | Cloudy |

**Monitoring Results**

| *Sample No.* | Time | | *Wind Speed* | *Wind Direction* | *Level(ppm)* |
|---|---|---|---|---|---|
| Sample 1 | Start: | 0907 | 0 | / | 0.003 0.003 0.002 |
| | Stop: | 0917 | 0 | / | |
| Sample 2 | Start: | 1136 | 0.3 | E | 0.003 0.004 0.004 |
| | Stop: | 1146 | 0.6 | E | |
| Sample 3 | Start: | 1440 | 0.6 | E | 0.003 0.003 0.003 |
| | Stop: | 1450 | 0.8 | E | |
| Sample 4 | Start: | 17:37 | 0.5 | E | 0.006 0.003 0.002 |
| | Stop: | 17:47 | 0.3 | E | |
| Sample 5 | Start: | 20:47 | 0 | / | 0.002 0.001 0.003 |
| | Stop: | 20:57 | 0 | / | |
| Sample 6 | Start: | 2344 | 0 | ✓ | 0.006, 0.005, 0.005 |
| | Stop: | 2354 | 0 | / | |
| Sample 7 | Start: | 0245 | 0 | / | 0.001, 0.003 0.007. |
| | Stop: | 0255 | 0 | / | |
| Sample 8 | Start: | 0546 | 0 | ✓ | 0.006, 0.006 0.003 |
| | Stop: | 0556 | 0 | ✓ | |
| Other Observations | | | | | |

| | **Name & Designation** | **Signature** | **Date** |
|---|---|---|---|
| **Recorded by:** | | | |
| **Checked by:** | | | |

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**Hourly Temperature of the Monitoring Period:**

| Date | Time | Temperature (° C) |
|---|---|---|
| 09-Feb-18 | 7:00 | 14 |
| | 8:00 | 14 |
| | 9:00 | 14 |
| | 10:00 | 15 |
| | 11:00 | 16 |
| | 12:00 | 16 |
| | 13:00 | 16 |
| | 14:00 | 17 |
| | 15:00 | 16 |
| | 16:00 | 16 |
| | 17:00 | 16 |
| | 18:00 | 16 |
| | 19:00 | 16 |
| | 20:00 | 16 |
| | 21:00 | 16 |
| | 22:00 | 16 |
| | 23:00 | 15 |
| 10-Feb-18 | 0:00 | 15 |
| | 1:00 | 15 |
| | 2:00 | 15 |
| | 3:00 | 15 |
| | 4:00 | 15 |
| | 5:00 | 15 |
| | 6:00 | 15 |
| | 7:00 | 15 |

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**Appendix G**

**QA/QC Result**

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QA/QC Procedures and Results

Manual or automatic sampling will be done by experienced staff or staff who has the required training. Choice of container depends on the nature of sample analyses required. Sterile bacteriological sampling tools/bottles must be used for sampling for bacteriological examination. Labels will be used to prevent sample misidentification. Samples must be put into ice-box to prevent denature during transportation. All in-situ tests should be conducted in duplicate and deviation should be less than 10%.

QC result

| Test | Day | Batch | Duplicate (relative deviation %) |
|---|---|---|---|
| SS | Day 1 | 1 | 27.2 |
| | | 2 | 0 |
| | | 3 | 13.2 |
| | | 4 | 17.6 |
| | Day 2 | 1 | 0 |
| | | 2 | 11.5 |
| | | 3 | 0 |
| | | 4 | 12.3 |
| | Day 3 | 1 | 2 |
| | | 2 | 0 |
| | | 3 | 0 |
| | | 4 | 0 |
| | Day 4 | 1 | 0 |
| | | 2 | 0 |
| | | 3 | 0 |
| | | 4 | 0 |
| | Day 5 | 1 | 4.2 |
| | | 2 | 0 |
| | | 3 | 0 |
| | | 4 | 9.2 |
| | Day 6 | 1 | 0 |
| | | 2 | 7.1 |
| | | 3 | 4.2 |
| | | 4 | 5.4 |
| | Day 7 | 1 | 7.1 |
| | | 2 | 0 |
| | | 3 | 4.7 |
| | | 4 | 5.5 |
| | Day 8 | 1 | 5.1 |
| | | 2 | 0 |
| | | 3 | 0 |
| | | 4 | 0 |

| Test | Day | Batch | Duplicate (relative deviation %) |
|---|---|---|---|
| TIN | Day 1 | 1 | 0 |
| | | 2 | 0 |
| | Day 2 | 1 | 0 |
| | | 2 | 0 |
| | Day 3 | 1 | 0 |
| | | 2 | 0 |
| | Day 4 | 1 | 0 |
| | | 2 | 0 |
| | Day 5 | 1 | 0 |
| | | 2 | 0 |
| | Day 6 | 1 | 0 |
| | | 2 | 0 |
| | Day 7 | 1 | 0 |
| | | 2 | 0 |
| | Day 8 | 1 | 0 |
| | | 2 | 0 |

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Report No.: 0151/15/ED/1052

| Test | Day | Batch | Duplicate (relative deviation %) |
|---|---|---|---|
| NH3-N | Day 1 | 1 | 0 |
| | | 2 | 0 |
| | Day 2 | 1 | 0 |
| | | 2 | 0 |
| | Day 3 | 1 | 0 |
| | | 2 | 0 |
| | Day 4 | 1 | 0 |
| | | 2 | 0 |
| | Day 5 | 1 | 0 |
| | | 2 | 0 |
| | Day 6 | 1 | 0 |
| | | 2 | 0 |
| | Day 7 | 1 | 0 |
| | | 2 | 0 |
| | Day 8 | 1 | 8.9 |
| | | 2 | 19.9 |

| Test | Day | Batch | Duplicate (relative deviation %) |
|---|---|---|---|
| Chlorophyll-a | Day 1 | 1 | 0 |
| | | 2 | 0 |
| | Day 2 | 1 | 0 |
| | | 2 | 0 |
| | Day 3 | 1 | 0 |
| | | 2 | 0 |
| | Day 4 | 1 | 0 |
| | | 2 | 5.1 |
| | Day 5 | 1 | 5.1 |
| | | 2 | 0 |
| | Day 6 | 1 | 0 |
| | | 2 | 0 |
| | Day 7 | 1 | 0 |
| | | 2 | 0 |
| | Day 8 | 1 | 0 |
| | | 2 | 0 |

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**Appendix H**
**Tolo Harbour Water Quality Monitoring Results**

**MATERIALAB – Waste & Environmental Technologies Joint Venture**

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at C1 - Mid-Ebb Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 12:50 | Surface | 1.0 | 15.9 | 15.9 | 16.0 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 102.0 | 102.0 | 8.3 | 8.3 | 8.0 | 5.0 | 5.0 | 5.2 |
| | | | | | | 15.9 | | | 8.2 | | | 32.1 | | | 102.0 | | 8.3 | | | 5.0 | | |
| | | | | Middle | 3.0 | 16.0 | 16.0 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 95.0 | 95.0 | 7.7 | 7.7 | | 5.0 | 5.0 | |
| | | | | | | 16.0 | | | 8.2 | | | 32.1 | | | 95.0 | | 7.7 | | | 5.0 | | |
| | | | | Bottom | 5.0 | 16.0 | 16.0 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 90.0 | 90.0 | 7.3 | 7.3 | 7.3 | 6.0 | 5.5 | |
| | | | | | | 16.0 | | | 8.2 | | | 32.1 | | | 90.0 | | 7.3 | | | 5.0 | | |
| 3-Feb-18 | Cloudy | Rough | 13:32 | Surface | 1.0 | 15.4 | 15.4 | 15.5 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 105.0 | 105.0 | 8.6 | 8.6 | 8.4 | 4.0 | 4.0 | 5.0 |
| | | | | | | 15.4 | | | 8.2 | | | 32.1 | | | 105.0 | | 8.6 | | | 4.0 | | |
| | | | | Middle | 3.0 | 15.5 | 15.5 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 100.0 | 100.0 | 8.2 | 8.2 | | 5.0 | 5.0 | |
| | | | | | | 15.5 | | | 8.2 | | | 32.1 | | | 100.0 | | 8.2 | | | 5.0 | | |
| | | | | Bottom | 5.0 | 15.5 | 15.5 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 92.0 | 92.0 | 7.6 | 7.6 | 7.6 | 6.0 | 6.0 | |
| | | | | | | 15.5 | | | 8.2 | | | 32.1 | | | 92.0 | | 7.6 | | | 6.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 14:27 | Surface | 1.0 | 15.1 | 15.1 | 15.1 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 93.0 | 91.5 | 7.7 | 7.6 | 7.5 | 5.0 | 5.0 | 4.3 |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 90.0 | | 7.4 | | | 5.0 | | |
| | | | | Middle | 3.0 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 92.0 | 91.0 | 7.6 | 7.5 | | 4.0 | 4.0 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 90.0 | | 7.4 | | | 4.0 | | |
| | | | | Bottom | 5.0 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 90.0 | 89.5 | 7.4 | 7.4 | 7.4 | 4.0 | 4.0 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 89.0 | | 7.4 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 15:15 | Surface | 1.0 | 14.0 | 14.0 | 14.0 | 8.1 | 8.1 | 8.1 | 31.7 | 31.7 | 31.7 | 93.0 | 93.0 | 7.9 | 7.9 | 7.7 | 3.0 | 3.0 | 2.3 |
| | | | | | | 13.9 | | | 8.1 | | | 31.7 | | | 93.0 | | 7.9 | | | 3.0 | | |
| | | | | Middle | 3.1 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.7 | 31.7 | | 90.0 | 89.5 | 7.6 | 7.6 | | 2.0 | 2.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 31.7 | | | 89.0 | | 7.5 | | | 2.0 | | |
| | | | | Bottom | 5.1 | 13.9 | 13.9 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 90.0 | 89.0 | 7.6 | 7.6 | 7.6 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.6 | | | 88.0 | | 7.5 | | | 2.0 | | |
| 6-Feb-18 | Cloudy | Rough | 4:46 | Surface | 1.0 | 14.0 | 14.0 | 13.9 | 8.1 | 8.1 | 8.1 | 31.5 | 31.6 | 31.6 | 97.0 | 96.5 | 8.2 | 8.2 | 8.0 | 2.0 | 2.0 | 2.0 |
| | | | | | | 13.9 | | | 8.1 | | | 31.6 | | | 96.0 | | 8.2 | | | 2.0 | | |
| | | | | Middle | 3.2 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 92.0 | 91.5 | 7.8 | 7.8 | | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.6 | | | 91.0 | | 7.7 | | | 2.0 | | |
| | | | | Bottom | 5.4 | 13.9 | 13.9 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 92.0 | 92.0 | 7.8 | 7.8 | 7.8 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.6 | | | 92.0 | | 7.8 | | | 2.0 | | |
| 7-Feb-16 | Fine | Calm | 4:47 | Surface | 1.0 | 13.9 | 13.9 | 13.9 | 8.0 | 8.0 | 8.0 | 31.5 | 31.5 | 31.5 | 97.0 | 96.5 | 8.3 | 8.3 | 8.2 | 2.0 | 1.5 | 1.8 |
| | | | | | | 13.9 | | | 8.0 | | | 31.5 | | | 96.0 | | 8.2 | | | 1.0 | | |
| | | | | Middle | 3.0 | 13.9 | 13.9 | | 8.0 | 8.0 | | 31.5 | 31.5 | | 97.0 | 97.0 | 8.2 | 8.2 | | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.0 | | | 31.5 | | | 97.0 | | 8.2 | | | 2.0 | | |
| | | | | Surface | 5.0 | 14.0 | 14.0 | | 8.0 | 8.0 | | 31.5 | 31.6 | | 96.0 | 96.0 | 8.2 | 8.2 | 8.2 | 2.0 | 2.0 | |
| | | | | | | 14.0 | | | 8.0 | | | 31.6 | | | 96.0 | | 8.1 | | | 2.0 | | |
| 8-Feb-14 | Fine | Calm | 5:42 | Surface | 1.0 | 14.2 | 14.2 | 14.3 | 8.1 | 8.1 | 8.1 | 31.4 | 31.4 | 31.5 | 98.0 | 98.0 | 8.3 | 8.3 | 8.3 | 2.0 | 1.5 | 1.8 |
| | | | | | | 14.2 | | | 8.1 | | | 31.4 | | | 98.0 | | 8.2 | | | 1.0 | | |
| | | | | Middle | 3.1 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 98.0 | 98.0 | 8.3 | 8.3 | | 2.0 | 2.0 | |
| | | | | | | 14.2 | | | 8.1 | | | 31.4 | | | 98.0 | | 8.3 | | | 2.0 | | |
| | | | | Bottom | 5.1 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.7 | 31.7 | | 98.0 | 98.0 | 8.2 | 8.2 | 8.2 | 2.0 | 2.0 | |
| | | | | | | 14.4 | | | 8.1 | | | 31.7 | | | 98.0 | | 8.2 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 6:56 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.2 | 31.2 | 31.2 | 107.0 | 107.0 | 9.0 | 9.0 | 9.1 | 1.0 | 1.0 | 1.0 |
| | | | | | | 14.3 | | | 8.1 | | | 31.2 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Middle | 3.1 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.2 | 31.2 | | 107.0 | 107.0 | 9.1 | 9.1 | | 1.0 | 1.0 | |
| | | | | | | 14.2 | | | 8.1 | | | 31.2 | | | 107.0 | | 9.1 | | | 1.0 | | |
| | | | | Bottom | 5.1 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.3 | 31.3 | | 106.0 | 106.0 | 8.9 | 8.9 | 8.9 | 1.0 | 1.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.3 | | | 106.0 | | 8.9 | | | 1.0 | | |

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## Water Quality Monitoring Results at C1 - Mid-Ebb Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 12:50 | Surface | 1.0 | 4 | 3 | 0.036 | 0.037 | 0.036 | 0.047 | 4.3 | 5.1 | 1.3 | 1.1 | 0.0024 | 0.0021 |
| | | | | Middle | 3.0 | 2 | | 0.037 | | 0.049 | | 6.2 | | 1.0 | | 0.0019 | |
| | | | | Bottom | 5.0 | 3 | | 0.038 | | 0.056 | | 4.9 | | 1.1 | | 0.0021 | |
| 3-Feb-18 | Cloudy | Rough | 13:32 | Surface | 1.0 | NOT DETECTED | 0 | 0.038 | 0.036 | 0.062 | 0.060 | 6.7 | 6.7 | 1.0 | 0.7 | 0.0017 | 0.0017 |
| | | | | Middle | 3.0 | NOT DETECTED | | 0.035 | | 0.057 | | 7.0 | | 1.2 | | 0.0015 | |
| | | | | Bottom | 5.0 | NOT DETECTED | | 0.035 | | 0.062 | | 6.4 | | <1.0 | | 0.0020 | |
| 4-Feb-18 | Cloudy | Moderate | 14:27 | Surface | 1.0 | NOT DETECTED | 6 | 0.036 | 0.039 | 0.055 | 0.057 | 5.0 | 5.0 | 1.2 | 0.4 | 0.0016 | 0.0029 |
| | | | | Middle | 3.0 | NOT DETECTED | | 0.042 | | 0.062 | | 5.6 | | <1.0 | | 0.0036 | |
| | | | | Bottom | 5.0 | 17 | | 0.039 | | 0.053 | | 4.4 | | <1.0 | | 0.0036 | |
| 5-Feb-18 | Cloudy | Moderate | 15:15 | Surface | 1.0 | 7 | 10 | 0.048 | 0.049 | 0.078 | 0.082 | 5.1 | 5.1 | 2.0 | 2.4 | 0.0041 | 0.0042 |
| | | | | Middle | 3.1 | 10 | | 0.048 | | 0.080 | | 5.7 | | 1.5 | | 0.0042 | |
| | | | | Bottom | 5.1 | 14 | | 0.050 | | 0.088 | | 4.5 | | 3.6 | | 0.0042 | |
| 6-Feb-18 | Cloudy | Rough | 4:46 | Surface | 1.0 | 66 | 62 | 0.035 | 0.035 | 0.075 | 0.073 | 4.2 | 5.2 | 1.6 | 1.4 | 0.0051 | 0.0048 |
| | | | | Middle | 3.2 | 57 | | 0.036 | | 0.071 | | 6.0 | | 1.2 | | 0.0049 | |
| | | | | Bottom | 5.4 | 62 | | 0.035 | | 0.072 | | 5.5 | | 1.5 | | 0.0044 | |
| 7-Feb-18 | Fine | Calm | 4:47 | Surface | 1.0 | 16 | 15 | 0.033 | 0.032 | 0.074 | 0.076 | 2.6 | 3.6 | 4.7 | 3.3 | 0.0080 | 0.0082 |
| | | | | Middle | 3.0 | 10 | | 0.025 | | 0.068 | | 3.2 | | 2.7 | | 0.0083 | |
| | | | | Bottom | 5.0 | 18 | | 0.038 | | 0.087 | | 4.9 | | 2.5 | | 0.0084 | |
| 8-Feb-18 | Fine | Calm | 5:42 | Surface | 1.0 | 85 | 76 | 0.024 | 0.028 | 0.091 | 0.094 | 4.0 | 3.6 | 2.0 | 2.0 | 0.0060 | 0.0085 |
| | | | | Middle | 3.1 | 92 | | 0.025 | | 0.085 | | 3.2 | | 2.5 | | 0.0083 | |
| | | | | Bottom | 5.1 | 51 | | 0.036 | | 0.107 | | 3.6 | | 1.5 | | 0.0112 | |
| 9-Feb-18 | Cloudy | Moderate | 6:56 | Surface | 1.0 | 10 | 4 | 0.019 | 0.023 | 0.064 | 0.072 | 3.4 | 3.1 | 1.6 | 2.4 | 0.0072 | 0.0066 |
| | | | | Middle | 3.1 | 1 | | 0.023 | | 0.072 | | 2.3 | | 3.1 | | 0.0064 | |
| | | | | Bottom | 5.1 | 2 | | 0.028 | | 0.080 | | 3.7 | | 2.4 | | 0.0061 | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at C1 - Mid-flood Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 7:35 | Surface | 1.0 | 16.0 | 16.0 | 16.0 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 93.0 | 91.0 | 7.6 | 7.4 | 7.3 | 4.0 | 4.0 | 4.2 |
| | | | | | | 16.0 | | | 8.2 | | | 32.1 | | | 89.0 | | 7.2 | | | 4.0 | | |
| | | | | Middle | 3.0 | 16.0 | 16.0 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 89.0 | 88.5 | 7.2 | 7.2 | | 4.0 | 4.0 | |
| | | | | | | 16.0 | | | 8.2 | | | 32.1 | | | 88.0 | | 7.2 | | | 4.0 | | |
| | | | | Bottom | 5.0 | 16.0 | 16.0 | | 8.2 | 8.2 | | 32.2 | 32.2 | | 89.0 | 88.5 | 7.2 | 7.2 | 7.2 | 4.0 | 4.5 | |
| | | | | | | 16.0 | | | 8.2 | | | 32.2 | | | 88.0 | | 7.2 | | | 5.0 | | |
| 3-Feb-18 | Cloudy | Rough | 8:10 | Surface | 1.0 | 15.5 | 15.5 | 15.5 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 106.0 | 106.0 | 8.7 | 8.7 | 8.6 | 4.0 | 4.0 | 4.3 |
| | | | | | | 15.5 | | | 8.2 | | | 32.1 | | | 106.0 | | 8.7 | | | 4.0 | | |
| | | | | Middle | 3.1 | 15.5 | 15.5 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 102.0 | 102.0 | 8.4 | 8.4 | | 4.0 | 4.0 | |
| | | | | | | 15.5 | | | 8.2 | | | 32.1 | | | 102.0 | | 8.4 | | | 4.0 | | |
| | | | | Bottom | 5.1 | 15.5 | 15.5 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 97.0 | 97.0 | 8.0 | 8.0 | 8.0 | 5.0 | 5.0 | |
| | | | | | | 15.5 | | | 8.2 | | | 32.1 | | | 97.0 | | 8.0 | | | 5.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 8:55 | Surface | 1.0 | 15.1 | 15.1 | 15.1 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 92.0 | 90.5 | 7.6 | 7.5 | 7.5 | 5.0 | 5.0 | 4.8 |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 89.0 | | 7.4 | | | 5.0 | | |
| | | | | Middle | 3.1 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 91.0 | 90.0 | 7.5 | 7.5 | | 5.0 | 5.0 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 89.0 | | 7.4 | | | 5.0 | | |
| | | | | Bottom | 5.1 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 90.0 | 89.5 | 7.4 | 7.4 | 7.4 | 5.0 | 4.5 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 89.0 | | 7.3 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 10:04 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 91.0 | 90.5 | 7.7 | 7.6 | 7.5 | 3.0 | 2.5 | 3.0 |
| | | | | | | 14.3 | | | 8.1 | | | 31.6 | | | 90.0 | | 7.5 | | | 2.0 | | |
| | | | | Middle | 3.1 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 90.0 | 89.0 | 7.5 | 7.5 | | 3.0 | 3.5 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.6 | | | 88.0 | | 7.4 | | | 4.0 | | |
| | | | | Bottom | 5.1 | 14.3 | 14.2 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 89.0 | 89.0 | 7.5 | 7.6 | 7.6 | 3.0 | 3.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.6 | | | 89.0 | | 7.6 | | | 3.0 | | |
| 6-Feb-18 | Cloudy | Rough | 10:05 | Surface | 1.0 | 14.1 | 14.1 | 14.0 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 97.0 | 96.0 | 8.2 | 8.2 | 8.1 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.0 | | | 8.1 | | | 31.6 | | | 95.0 | | 8.1 | | | 2.0 | | |
| | | | | Middle | 3.0 | 14.1 | 14.1 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 95.0 | 95.0 | 8.0 | 8.0 | | 2.0 | 2.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 31.6 | | | 95.0 | | 8.0 | | | 2.0 | | |
| | | | | Bottom | 5.0 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 95.0 | 95.0 | 8.1 | 8.1 | 8.1 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.6 | | | 95.0 | | 8.1 | | | 2.0 | | |
| 7-Feb-16 | Fine | Calm | 10:53 | Surface | 1.0 | 14.0 | 14.0 | 14.0 | 8.1 | 8.1 | 8.1 | 31.5 | 31.5 | 31.5 | 100.0 | 99.5 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | 1.8 |
| | | | | | | 14.0 | | | 8.1 | | | 31.5 | | | 99.0 | | 8.4 | | | 2.0 | | |
| | | | | Middle | 3.1 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 99.0 | 99.0 | 8.4 | 8.4 | | 2.0 | 1.5 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.5 | | | 99.0 | | 8.4 | | | 1.0 | | |
| | | | | Surface | 5.1 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 99.0 | 99.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.6 | | | 99.0 | | 8.4 | | | 2.0 | | |
| 8-Feb-14 | Fine | Calm | 11:40 | Surface | 1.0 | 14.7 | 14.7 | 14.5 | 8.1 | 8.1 | 8.1 | 31.3 | 31.4 | 31.4 | 101.0 | 101.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.6 | | | 8.1 | | | 31.4 | | | 101.0 | | 8.4 | | | 2.0 | | |
| | | | | Middle | 3.1 | 14.6 | 14.6 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 100.0 | 100.0 | 8.4 | 8.4 | | 2.0 | 2.0 | |
| | | | | | | 14.5 | | | 8.1 | | | 31.4 | | | 100.0 | | 8.4 | | | 2.0 | | |
| | | | | Bottom | 5.1 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 101.0 | 101.0 | 8.6 | 8.6 | 8.6 | 2.0 | 2.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.5 | | | 101.0 | | 8.6 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 12:32 | Surface | 1.0 | 14.4 | 14.4 | 14.4 | 8.1 | 8.1 | 8.1 | 31.5 | 31.5 | 31.5 | 107.0 | 107.0 | 9.0 | 9.0 | 9.0 | 1.0 | 1.0 | 1.3 |
| | | | | | | 14.3 | | | 8.1 | | | 31.5 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Middle | 3.0 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 107.0 | 107.0 | 9.0 | 9.0 | | 1.0 | 1.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.5 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Bottom | 5.0 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 103.0 | 103.0 | 8.7 | 8.7 | 8.7 | 2.0 | 2.0 | |
| | | | | | | 14.4 | | | 8.1 | | | 31.6 | | | 103.0 | | 8.7 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at C1 - Mid-flood Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 7:35 | Surface | 1.0 | 1 | 1.7 | 0.050 | 0.042 | 0.062 | 0.056 | 2.7 | 3.5 | 1.5 | 1.4 | 0.0022 | 0.0019 |
| | | | | Middle | 3.0 | NOT DETECTED | | 0.036 | | 0.051 | | 4.4 | | 1.5 | | 0.0018 | |
| | | | | Bottom | 5.0 | 4 | | 0.040 | | 0.054 | | 3.3 | | 1.3 | | 0.0017 | |
| 3-Feb-18 | Cloudy | Rough | 8:10 | Surface | 1.0 | 1 | 0.3 | 0.051 | 0.047 | 0.068 | 0.065 | 5.2 | 5.4 | 1.2 | 0.4 | 0.0014 | 0.0018 |
| | | | | Middle | 3.1 | NOT DETECTED | | 0.035 | | 0.054 | | 6.0 | | <1.0 | | 0.0019 | |
| | | | | Bottom | 5.1 | NOT DETECTED | | 0.056 | | 0.072 | | 5.0 | | <1.0 | | 0.0021 | |
| 4-Feb-18 | Cloudy | Moderate | 8:55 | Surface | 1.0 | NOT DETECTED | 3.7 | 0.038 | 0.037 | 0.055 | 0.055 | 5.0 | 5.3 | 1.4 | 1.4 | 0.0037 | 0.0022 |
| | | | | Middle | 3.1 | NOT DETECTED | | 0.037 | | 0.056 | | 6.0 | | 1.4 | | 0.0014 | |
| | | | | Bottom | 5.1 | 11 | | 0.036 | | 0.053 | | 4.8 | | 1.4 | | 0.0016 | |
| 5-Feb-18 | Cloudy | Moderate | 10:04 | Surface | 1.0 | 8 | 12.0 | 0.048 | 0.048 | 0.083 | 0.082 | 6.6 | 6.7 | <1.0 | 1.1 | 0.0038 | 0.0038 |
| | | | | Middle | 3.1 | 12 | | 0.048 | | 0.082 | | 5.4 | | 2.1 | | 0.0035 | |
| | | | | Bottom | 5.1 | 16 | | 0.048 | | 0.08 | | 8.2 | | 1.3 | | 0.0040 | |
| 6-Feb-18 | Cloudy | Rough | 10:05 | Surface | 1.0 | 6 | 3.0 | 0.036 | 0.038 | 0.072 | 0.075 | 4.5 | 3.8 | 2.3 | 1.7 | 0.0065 | 0.0067 |
| | | | | Middle | 3.0 | 1 | | 0.040 | | 0.078 | | 3.7 | | 1.4 | | 0.0063 | |
| | | | | Bottom | 5.0 | 2 | | 0.038 | | 0.074 | | 3.2 | | 1.4 | | 0.0072 | |
| 7-Feb-18 | Fine | Calm | 10:53 | Surface | 1.0 | 5 | 9.0 | 0.029 | 0.027 | 0.075 | 0.072 | 2.1 | 2.9 | 3.5 | 3.3 | 0.0076 | 0.0080 |
| | | | | Middle | 3.1 | 10 | | 0.015 | | 0.057 | | 4.4 | | 1.9 | | 0.0083 | |
| | | | | Bottom | 5.1 | 12 | | 0.037 | | 0.085 | | 2.2 | | 4.6 | | 0.0081 | |
| 8-Feb-18 | Fine | Calm | 11:40 | Surface | 1.0 | 540 | 353.0 | 0.021 | 0.045 | 0.084 | 0.117 | 3.1 | 3.7 | 3.4 | 3.3 | 0.0035 | 0.0064 |
| | | | | Middle | 3.1 | 210 | | 0.019 | | 0.084 | | 2.9 | | 3.2 | | 0.0065 | |
| | | | | Bottom | 5.1 | 310 | | 0.094 | | 0.183 | | 5.1 | | 3.2 | | 0.0091 | |
| 9-Feb-18 | Cloudy | Moderate | 12:32 | Surface | 1.0 | 6 | 2.0 | 0.013 | 0.019 | 0.065 | 0.074 | 2.2 | 2.4 | 1.5 | 2.2 | 0.0068 | 0.0078 |
| | | | | Middle | 3.0 | NOT DETECTED | | 0.019 | | 0.077 | | 2.6 | | 2.2 | | 0.0070 | |
| | | | | Bottom | 5.0 | NOT DETECTED | | 0.026 | | 0.081 | | 2.3 | | 2.9 | | 0.0096 | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at C12 - Mid-Ebb Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 12:36 | Surface | 1.0 | 15.9 | 15.9 | 16.0 | 8.3 | 8.3 | 8.3 | 32.3 | 32.3 | 32.3 | 103.0 | 103.0 | 8.4 | 8.4 | 8.1 | 4.0 | 4.5 | 4.0 |
| | | | | | | 15.9 | | | 8.3 | | | 32.3 | | | 103.0 | | 8.4 | | | 5.0 | | |
| | | | | Middle | 5.0 | 16.0 | 16.0 | | 8.3 | 8.3 | | 32.3 | 32.3 | | 95.0 | 95.0 | 7.7 | 7.7 | | 4.0 | 4.0 | |
| | | | | | | 16.0 | | | 8.3 | | | 32.3 | | | 95.0 | | 7.7 | | | 4.0 | | |
| | | | | Bottom | 9.0 | 16.0 | 16.0 | | 8.3 | 8.3 | | 32.3 | 32.3 | | 93.0 | 93.0 | 7.6 | 7.6 | 7.6 | 4.0 | 3.5 | |
| | | | | | | 16.0 | | | 8.3 | | | 32.3 | | | 93.0 | | 7.6 | | | 3.0 | | |
| 3-Feb-18 | Cloudy | Rough | 13:15 | Surface | 1.0 | 15.4 | 15.4 | 15.3 | 8.2 | 8.2 | 8.2 | 32.6 | 32.6 | 32.6 | 105.0 | 105.0 | 8.6 | 8.6 | 8.4 | 4.0 | 4.0 | 5.0 |
| | | | | | | 15.4 | | | 8.2 | | | 32.6 | | | 105.0 | | 8.6 | | | 4.0 | | |
| | | | | Middle | 5.0 | 15.3 | 15.3 | | 8.2 | 8.2 | | 32.6 | 32.6 | | 98.0 | 98.0 | 8.1 | 8.1 | | 6.0 | 6.0 | |
| | | | | | | 15.3 | | | 8.2 | | | 32.6 | | | 98.0 | | 8.1 | | | 6.0 | | |
| | | | | Bottom | 8.9 | 15.2 | 15.2 | | 8.3 | 8.3 | | 32.6 | 32.6 | | 88.0 | 88.0 | 7.3 | 7.3 | 7.3 | 5.0 | 5.0 | |
| | | | | | | 15.2 | | | 8.3 | | | 32.6 | | | 88.0 | | 7.3 | | | 5.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 14:00 | Surface | 1.0 | 15.1 | 15.1 | 15.1 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 99.0 | 97.5 | 8.2 | 8.1 | 8.0 | 4.0 | 4.0 | 4.2 |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 96.0 | | 8.0 | | | 4.0 | | |
| | | | | Middle | 5.1 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 96.0 | 95.0 | 7.9 | 7.9 | | 4.0 | 4.0 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 94.0 | | 7.8 | | | 4.0 | | |
| | | | | Bottom | 9.1 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 93.0 | 91.5 | 7.7 | 7.6 | 7.6 | 5.0 | 4.5 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 90.0 | | 7.5 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 14:47 | Surface | 1.0 | 14.2 | 14.2 | 14.2 | 8.1 | 8.1 | 8.1 | 32.1 | 32.1 | 32.1 | 93.0 | 92.0 | 7.9 | 7.8 | 7.7 | 2.0 | 2.0 | 2.2 |
| | | | | | | 14.1 | | | 8.1 | | | 32.1 | | | 91.0 | | 7.7 | | | 2.0 | | |
| | | | | Middle | 5.2 | 14.2 | 14.2 | | 8.1 | 8.1 | | 32.1 | 32.1 | | 92.0 | 91.0 | 7.7 | 7.7 | | 2.0 | 2.5 | |
| | | | | | | 14.2 | | | 8.1 | | | 32.1 | | | 90.0 | | 7.6 | | | 3.0 | | |
| | | | | Bottom | 9.3 | 14.2 | 14.2 | | 8.1 | 8.1 | | 32.1 | 32.1 | | 91.0 | 91.0 | 7.7 | 7.7 | 7.7 | 2.0 | 2.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 32.1 | | | 91.0 | | 7.7 | | | 2.0 | | |
| 6-Feb-18 | Cloudy | Rough | 4:19 | Surface | 1.0 | 14.0 | 14.0 | 14.0 | 8.1 | 8.1 | 8.1 | 31.8 | 31.8 | 31.8 | 97.0 | 95.5 | 8.2 | 8.1 | 8.1 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.0 | | | 8.1 | | | 31.8 | | | 94.0 | | 8.0 | | | 2.0 | | |
| | | | | Middle | 5.3 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.8 | 31.8 | | 94.0 | 94.0 | 8.0 | 8.0 | | 2.0 | 2.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 31.8 | | | 94.0 | | 8.0 | | | 2.0 | | |
| | | | | Bottom | 9.5 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.8 | 31.8 | | 94.0 | 94.0 | 8.0 | 8.0 | 8.0 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.8 | | | 94.0 | | 8.0 | | | 2.0 | | |
| 7-Feb-16 | Fine | Calm | 5:13 | Surface | 1.0 | 14.0 | 14.0 | 14.0 | 8.1 | 8.1 | 8.1 | 32.1 | 32.1 | 32.1 | 99.0 | 99.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | 1.8 |
| | | | | | | 14.0 | | | 8.1 | | | 32.1 | | | 99.0 | | 8.3 | | | 2.0 | | |
| | | | | Middle | 5.2 | 14.0 | 14.0 | | 8.1 | 8.1 | | 32.1 | 32.1 | | 99.0 | 99.0 | 8.4 | 8.4 | | 1.0 | 1.5 | |
| | | | | | | 14.0 | | | 8.1 | | | 32.1 | | | 99.0 | | 8.4 | | | 2.0 | | |
| | | | | Surface | 9.3 | 14.1 | 14.1 | | 8.1 | 8.1 | | 32.2 | 32.2 | | 97.0 | 97.0 | 8.2 | 8.2 | 8.2 | 2.0 | 2.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 32.2 | | | 97.0 | | 8.2 | | | 2.0 | | |
| 8-Feb-14 | Fine | Calm | 6:09 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 32.0 | 32.0 | 32.1 | 100.0 | 100.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.2 | | | 8.1 | | | 32.0 | | | 100.0 | | 8.4 | | | 2.0 | | |
| | | | | Middle | 5.1 | 14.2 | 14.2 | | 8.1 | 8.1 | | 32.0 | 32.0 | | 100.0 | 100.0 | 8.4 | 8.4 | | 2.0 | 2.0 | |
| | | | | | | 14.2 | | | 8.1 | | | 32.0 | | | 100.0 | | 8.4 | | | 2.0 | | |
| | | | | Bottom | 9.2 | 14.3 | 14.3 | | 8.1 | 8.1 | | 32.3 | 32.3 | | 101.0 | 101.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 32.3 | | | 101.0 | | 8.4 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 7:23 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.4 | 31.5 | 31.5 | 106.0 | 106.5 | 9.0 | 9.0 | 9.0 | 1.0 | 1.0 | 1.2 |
| | | | | | | 14.3 | | | 8.1 | | | 31.5 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Middle | 5.1 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 107.0 | 107.0 | 9.0 | 9.0 | | 1.0 | 1.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.5 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Bottom | 9.2 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 106.0 | 106.0 | 8.9 | 8.9 | 8.9 | 2.0 | 1.5 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.5 | | | 106.0 | | 8.9 | | | 1.0 | | |

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## Water Quality Monitoring Results at C12 - Mid-Ebb Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 12:36 | Surface | 1.0 | NOT DETECTED | 0.0 | 0.034 | 0.037 | 0.054 | 0.058 | 4.8 | 5.5 | 1.2 | 1.7 | 0.0025 | 0.0022 |
| | | | | Middle | 5.0 | NOT DETECTED | | 0.043 | | 0.060 | | 6.6 | | 2.8 | | 0.0021 | |
| | | | | Bottom | 9.0 | NOT DETECTED | | 0.035 | | 0.059 | | 5.1 | | 1.1 | | 0.0021 | |
| 3-Feb-18 | Cloudy | Rough | 13:15 | Surface | 1.0 | 1 | 0.7 | 0.035 | 0.036 | 0.053 | 0.054 | 6.4 | 5.6 | 1.0 | 0.7 | 0.0021 | 0.0021 |
| | | | | Middle | 5.0 | 1 | | 0.034 | | 0.053 | | 5.3 | | 1.0 | | 0.0021 | |
| | | | | Bottom | 8.9 | NOT DETECTED | | 0.039 | | 0.056 | | 5.1 | | <1.0 | | 0.0022 | |
| 4-Feb-18 | Cloudy | Moderate | 14:00 | Surface | 1.0 | NOT DETECTED | 0.7 | 0.036 | 0.037 | 0.057 | 0.055 | 5.5 | 5.3 | 1.4 | 0.5 | 0.0018 | 0.0016 |
| | | | | Middle | 5.1 | 1 | | 0.039 | | 0.054 | | 6.0 | | <1.0 | | 0.0014 | |
| | | | | Bottom | 9.1 | 1 | | 0.035 | | 0.053 | | 4.5 | | <1.0 | | 0.0017 | |
| 5-Feb-18 | Cloudy | Moderate | 14:47 | Surface | 1.0 | 23 | 18.0 | 0.047 | 0.061 | 0.076 | 0.094 | 4.7 | 5.2 | <1.0 | 0.9 | 0.0042 | 0.0041 |
| | | | | Middle | 5.2 | 13 | | 0.049 | | 0.080 | | 6.0 | | 1.1 | | 0.0042 | |
| | | | | Bottom | 9.3 | 18 | | 0.086 | | 0.126 | | 5.0 | | 1.7 | | 0.0040 | |
| 6-Feb-18 | Cloudy | Rough | 4:19 | Surface | 1.0 | 11 | 6.0 | 0.026 | 0.026 | 0.058 | 0.062 | 4.6 | 5.7 | 1.8 | 1.8 | 0.0063 | 0.0059 |
| | | | | Middle | 5.3 | 3 | | 0.024 | | 0.057 | | 5.4 | | 1.9 | | 0.0059 | |
| | | | | Bottom | 9.5 | 4 | | 0.029 | | 0.071 | | 7.1 | | 1.8 | | 0.0055 | |
| 7-Feb-18 | Fine | Calm | 5:13 | Surface | 1.0 | 5 | 4.0 | 0.020 | 0.021 | 0.055 | 0.061 | 3.6 | 3.5 | 2.8 | 2.5 | 0.0068 | 0.0070 |
| | | | | Middle | 5.2 | 4 | | 0.022 | | 0.061 | | 3.9 | | 2.8 | | 0.0073 | |
| | | | | Bottom | 9.3 | 4 | | 0.020 | | 0.067 | | 3.0 | | 2.0 | | 0.0069 | |
| 8-Feb-18 | Fine | Calm | 6:09 | Surface | 1.0 | 92 | 75.0 | 0.034 | 0.027 | 0.098 | 0.092 | 5.6 | 5.1 | 3.3 | 3.3 | 0.0053 | 0.0100 |
| | | | | Middle | 5.1 | 87 | | 0.020 | | 0.084 | | 5.5 | | 4.4 | | 0.0102 | |
| | | | | Bottom | 9.2 | 45 | | 0.028 | | 0.094 | | 4.2 | | 2.2 | | 0.0145 | |
| 9-Feb-18 | Cloudy | Moderate | 7:23 | Surface | 1.0 | 3 | 2.0 | 0.018 | 0.020 | 0.062 | 0.058 | 3.6 | 3.4 | 2.5 | 2.7 | 0.0062 | 0.0066 |
| | | | | Middle | 5.1 | 3 | | 0.025 | | 0.057 | | 3.6 | | 2.3 | | 0.0065 | |
| | | | | Bottom | 9.2 | NOT DETECTED | | 0.016 | | 0.056 | | 3.1 | | 3.3 | | 0.0070 | |

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MaterialLab

Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at C12 - Mid-flood Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 8:03 | Surface | 1.0 | 15.6 | 15.6 | 15.6 | 8.2 | 8.2 | 8.2 | 32.0 | 32.0 | 32.1 | 88.0 | 87.0 | 7.2 | 7.2 | 7.1 | 7.0 | 7.5 | 7.3 |
| | | | | | | 15.6 | | | 8.2 | | | 32.0 | | | 86.0 | | 7.1 | | | 8.0 | | |
| | | | | Middle | 5.1 | 15.6 | 15.6 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 87.0 | 86.5 | 7.1 | 7.1 | | 7.0 | 7.0 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.1 | | | 86.0 | | 7.1 | | | 7.0 | | |
| | | | | Bottom | 9.2 | 15.6 | 15.6 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 87.0 | 86.5 | 7.1 | 7.1 | 7.1 | 7.0 | 7.5 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.1 | | | 86.0 | | 7.0 | | | 8.0 | | |
| 3-Feb-18 | Cloudy | Rough | 8:37 | Surface | 1.0 | 15.3 | 15.3 | 15.3 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 107.0 | 107.0 | 8.8 | 8.8 | 8.7 | 3.0 | 3.0 | 3.7 |
| | | | | | | 15.3 | | | 8.2 | | | 32.1 | | | 107.0 | | 8.8 | | | 3.0 | | |
| | | | | Middle | 5.2 | 15.3 | 15.3 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 103.0 | 103.0 | 8.5 | 8.5 | | 4.0 | 4.0 | |
| | | | | | | 15.3 | | | 8.2 | | | 32.1 | | | 103.0 | | 8.5 | | | 4.0 | | |
| | | | | Bottom | 9.3 | 15.3 | 15.3 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 97.0 | 97.0 | 8.0 | 8.0 | 8.0 | 4.0 | 4.0 | |
| | | | | | | 15.3 | | | 8.2 | | | 32.1 | | | 97.0 | | 8.0 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 9:23 | Surface | 1.0 | 15.1 | 15.1 | 15.1 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.1 | 94.0 | 92.0 | 7.8 | 7.6 | 7.6 | 4.0 | 5.0 | 4.5 |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 90.0 | | 7.4 | | | 6.0 | | |
| | | | | Middle | 5.1 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 92.0 | 91.0 | 7.6 | 7.5 | | 4.0 | 4.5 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 90.0 | | 7.4 | | | 5.0 | | |
| | | | | Bottom | 9.2 | 15.1 | 15.1 | | 8.2 | 8.2 | | 32.1 | 32.1 | | 90.0 | 89.5 | 7.5 | 7.5 | 7.5 | 4.0 | 4.0 | |
| | | | | | | 15.1 | | | 8.2 | | | 32.1 | | | 89.0 | | 7.4 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 9:37 | Surface | 1.0 | 14.2 | 14.2 | 14.2 | 8.1 | 8.1 | 8.1 | 31.8 | 31.8 | 31.8 | 91.0 | 90.0 | 7.6 | 7.6 | 7.6 | 3.0 | 2.5 | 2.7 |
| | | | | | | 14.2 | | | 8.1 | | | 31.8 | | | 89.0 | | 7.5 | | | 2.0 | | |
| | | | | Middle | 5.3 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.8 | 31.9 | | 90.0 | 89.5 | 7.6 | 7.6 | | 3.0 | 2.5 | |
| | | | | | | 14.2 | | | 8.1 | | | 31.9 | | | 89.0 | | 7.6 | | | 2.0 | | |
| | | | | Bottom | 9.5 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.8 | 31.8 | | 90.0 | 89.5 | 7.6 | 7.6 | 7.6 | 3.0 | 3.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.8 | | | 89.0 | | 7.5 | | | 3.0 | | |
| 6-Feb-18 | Cloudy | Rough | 9:38 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.9 | 31.9 | 32.0 | 95.0 | 94.5 | 8.0 | 8.0 | 7.9 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.3 | | | 8.1 | | | 31.9 | | | 94.0 | | 7.9 | | | 2.0 | | |
| | | | | Middle | 5.0 | 14.4 | 14.4 | | 8.1 | 8.1 | | 32.0 | 32.0 | | 94.0 | 94.0 | 7.9 | 7.9 | | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 32.0 | | | 94.0 | | 7.9 | | | 2.0 | | |
| | | | | Bottom | 8.9 | 14.3 | 14.3 | | 8.1 | 8.1 | | 32.0 | 32.0 | | 94.0 | 94.0 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | |
| | | | | | | 14.2 | | | 8.1 | | | 32.0 | | | 94.0 | | 7.9 | | | 2.0 | | |
| 7-Feb-16 | Fine | Calm | 10:26 | Surface | 1.0 | 14.2 | 14.2 | 14.2 | 8.1 | 8.1 | 8.1 | 31.8 | 31.8 | 31.8 | 100.0 | 100.0 | 8.5 | 8.4 | 8.4 | 2.0 | 1.5 | 1.8 |
| | | | | | | 14.1 | | | 8.1 | | | 31.8 | | | 100.0 | | 8.3 | | | 1.0 | | |
| | | | | Middle | 5.0 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.8 | 31.8 | | 100.0 | 100.0 | 8.4 | 8.4 | | 2.0 | 2.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.8 | | | 100.0 | | 8.4 | | | 2.0 | | |
| | | | | Surface | 9.0 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.9 | 31.9 | | 100.0 | 99.5 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.9 | | | 99.0 | | 8.4 | | | 2.0 | | |
| 8-Feb-14 | Fine | Calm | 11:13 | Surface | 1.0 | 14.6 | 14.6 | 14.4 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 101.0 | 101.0 | 8.4 | 8.5 | 8.4 | 2.0 | 2.0 | 1.7 |
| | | | | | | 14.5 | | | 8.1 | | | 31.6 | | | 101.0 | | 8.5 | | | 2.0 | | |
| | | | | Middle | 5.1 | 14.5 | 14.5 | | 8.0 | 8.0 | | 31.6 | 31.6 | | 100.0 | 100.0 | 8.4 | 8.4 | | 1.0 | 1.0 | |
| | | | | | | 14.4 | | | 8.0 | | | 31.6 | | | 100.0 | | 8.4 | | | 1.0 | | |
| | | | | Bottom | 9.2 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.7 | 31.7 | | 102.0 | 102.0 | 8.6 | 8.6 | 8.6 | 2.0 | 2.0 | |
| | | | | | | 14.2 | | | 8.1 | | | 31.7 | | | 102.0 | | 8.6 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 12:05 | Surface | 1.0 | 14.4 | 14.4 | 14.3 | 8.1 | 8.1 | 8.1 | 31.8 | 31.8 | 31.8 | 101.0 | 101.0 | 8.5 | 8.5 | 8.6 | 4.0 | 4.0 | 4.0 |
| | | | | | | 14.3 | | | 8.1 | | | 31.8 | | | 101.0 | | 8.5 | | | 4.0 | | |
| | | | | Middle | 5.1 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.7 | 31.7 | | 103.0 | 103.0 | 8.7 | 8.7 | | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.7 | | | 103.0 | | 8.7 | | | 2.0 | | |
| | | | | Bottom | 9.1 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.8 | 31.8 | | 101.0 | 101.0 | 8.4 | 8.5 | 8.5 | 6.0 | 6.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.8 | | | 101.0 | | 8.5 | | | 6.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at C12 - Mid-flood Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 8:03 | Surface | 1.0 | 1 | 0.7 | 0.035 | 0.036 | 0.052 | 0.055 | 7.3 | 6.5 | 1.2 | 1.1 | 0.0022 | 0.0023 |
| | | | | Middle | 5.1 | 1 | | 0.037 | | 0.054 | | 6.2 | | 1.0 | | 0.0022 | |
| | | | | Bottom | 9.2 | NOT DETECTED | | 0.037 | | 0.060 | | 6.0 | | 1.1 | | 0.0026 | |
| 3-Feb-18 | Cloudy | Rough | 8:37 | Surface | 1.0 | 1 | 2.0 | 0.034 | 0.036 | 0.055 | 0.054 | 5.0 | 4.9 | <1.0 | 0.4 | 0.0020 | 0.0019 |
| | | | | Middle | 5.2 | 1 | | 0.037 | | 0.049 | | 5.2 | | <1.0 | | 0.0019 | |
| | | | | Bottom | 9.3 | 3 | | 0.036 | | 0.058 | | 4.5 | | 1.2 | | 0.0017 | |
| 4-Feb-18 | Cloudy | Moderate | 9:23 | Surface | 1.0 | 1 | 1.3 | 0.036 | 0.036 | 0.055 | 0.053 | 5.3 | 4.4 | 1.2 | 0.4 | 0.0016 | 0.0015 |
| | | | | Middle | 5.1 | 3 | | 0.038 | | 0.056 | | 3.7 | | <1.0 | | 0.0015 | |
| | | | | Bottom | 9.2 | NOT DETECTED | | 0.035 | | 0.047 | | 4.2 | | <1.0 | | 0.0013 | |
| 5-Feb-18 | Cloudy | Moderate | 9:37 | Surface | 1.0 | 8 | 16.0 | 0.050 | 0.045 | 0.081 | 0.075 | 5.8 | 6.2 | 3.9 | 2.8 | 0.0044 | 0.0047 |
| | | | | Middle | 5.3 | 19 | | 0.041 | | 0.069 | | 5.7 | | 3.2 | | 0.0054 | |
| | | | | Bottom | 9.5 | 20 | | 0.044 | | 0.075 | | 7.1 | | 1.2 | | 0.0044 | |
| 6-Feb-18 | Cloudy | Rough | 9:38 | Surface | 1.0 | NOT DETECTED | 0.7 | 0.026 | 0.026 | 0.061 | 0.060 | 4.5 | 5.0 | 2.0 | 2.0 | 0.0060 | 0.0052 |
| | | | | Middle | 5.0 | 2 | | 0.024 | | 0.056 | | 5.0 | | 2.6 | | 0.0051 | |
| | | | | Bottom | 8.9 | NOT DETECTED | | 0.028 | | 0.064 | | 5.6 | | 1.3 | | 0.0045 | |
| 7-Feb-18 | Fine | Calm | 10:26 | Surface | 1.0 | NOT DETECTED | 0.7 | 0.015 | 0.018 | 0.053 | 0.056 | 4.9 | 4.1 | 2.5 | 2.4 | 0.0084 | 0.0072 |
| | | | | Middle | 5.0 | NOT DETECTED | | 0.021 | | 0.058 | | 3.6 | | 2.3 | | 0.0069 | |
| | | | | Bottom | 9.0 | 2 | | 0.018 | | 0.056 | | 3.8 | | 2.5 | | 0.0064 | |
| 8-Feb-18 | Fine | Calm | 11:13 | Surface | 1.0 | 38 | 27.0 | 0.019 | 0.021 | 0.083 | 0.085 | 2.1 | 2.6 | 1.9 | 2.4 | 0.0042 | 0.0062 |
| | | | | Middle | 5.1 | 32 | | 0.022 | | 0.086 | | 2.0 | | 2.8 | | 0.0059 | |
| | | | | Bottom | 9.2 | 10 | | 0.021 | | 0.085 | | 3.6 | | 2.5 | | 0.0084 | |
| 9-Feb-18 | Cloudy | Moderate | 12:05 | Surface | 1.0 | 5 | 4.0 | 0.028 | 0.027 | 0.073 | 0.074 | 1.9 | 2.9 | 2.1 | 2.7 | 0.0054 | 0.0055 |
| | | | | Middle | 5.1 | 3 | | 0.039 | | 0.077 | | 3.6 | | 2.6 | | 0.0056 | |
| | | | | Bottom | 9.1 | 4 | | 0.015 | | 0.073 | | 3.2 | | 3.5 | | 0.0054 | |

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MaterialLab

Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at FC2 - Mid-Ebb Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 14:28 | Surface | 1.0 | 15.5 | 15.5 | 15.6 | 8.1 | 8.2 | 8.2 | 31.9 | 31.9 | 31.9 | 100.0 | 100.0 | 8.2 | 8.2 | 8.0 | 5.0 | 5.5 | 5.0 |
| | | | | | | 15.5 | | | 8.2 | | | 31.9 | | | 100.0 | | 8.2 | | | 6.0 | | |
| | | | | Middle | 3.2 | 15.6 | 15.6 | | 8.2 | 8.2 | | 31.9 | 31.9 | | 94.0 | 94.0 | 7.7 | 7.7 | | 4.0 | 4.5 | |
| | | | | | | 15.6 | | | 8.2 | | | 31.9 | | | 94.0 | | 7.7 | | | 5.0 | | |
| | | | | Bottom | 5.3 | 15.6 | 15.6 | | 8.2 | 8.2 | | 32.0 | 32.0 | | 88.0 | 88.0 | 7.2 | 7.2 | 7.2 | 5.0 | 5.0 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.0 | | | 88.0 | | 7.2 | | | 5.0 | | |
| 3-Feb-18 | Cloudy | Rough | 14:17 | Surface | 1.0 | 15.0 | 15.0 | 15.2 | 8.1 | 8.1 | 8.1 | 32.0 | 32.0 | 32.1 | 85.0 | 85.0 | 7.0 | 7.0 | 7.1 | 4.0 | 4.0 | 4.0 |
| | | | | | | 15.0 | | | 8.1 | | | 32.0 | | | 85.0 | | 7.0 | | | 4.0 | | |
| | | | | Middle | 3.2 | 15.0 | 15.0 | | 8.1 | 8.1 | | 32.0 | 32.0 | | 86.0 | 86.0 | 7.1 | 7.1 | | 4.0 | 4.0 | |
| | | | | | | 15.0 | | | 8.1 | | | 32.0 | | | 86.0 | | 7.1 | | | 4.0 | | |
| | | | | Bottom | 5.3 | 15.6 | 15.6 | | 8.2 | 8.2 | | 32.4 | 32.4 | | 88.0 | 87.0 | 7.2 | 7.2 | 7.2 | 4.0 | 4.0 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.4 | | | 86.0 | | 7.1 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 15:13 | Surface | 1.0 | 14.6 | 14.6 | 14.7 | 8.1 | 8.1 | 8.2 | 31.8 | 31.8 | 31.9 | 95.0 | 95.5 | 8.0 | 8.0 | 7.7 | 5.0 | 5.0 | 5.0 |
| | | | | | | 14.6 | | | 8.1 | | | 31.7 | | | 96.0 | | 8.0 | | | 5.0 | | |
| | | | | Middle | 3.2 | 14.7 | 14.7 | | 8.2 | 8.2 | | 31.9 | 31.9 | | 91.0 | 88.5 | 7.6 | 7.4 | | 5.0 | 5.0 | |
| | | | | | | 14.7 | | | 8.2 | | | 31.9 | | | 86.0 | | 7.2 | | | 5.0 | | |
| | | | | Bottom | 5.3 | 14.7 | 14.7 | | 8.2 | 8.2 | | 31.9 | 31.9 | | 88.0 | 86.5 | 7.3 | 7.2 | 7.2 | 5.0 | 5.0 | |
| | | | | | | 14.7 | | | 8.2 | | | 31.9 | | | 85.0 | | 7.1 | | | 5.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 15:59 | Surface | 1.0 | 14.2 | 14.2 | 14.2 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 89.0 | 88.5 | 7.5 | 7.5 | 7.4 | 3.0 | 2.5 | 2.5 |
| | | | | | | 14.1 | | | 8.1 | | | 31.6 | | | 88.0 | | 7.4 | | | 2.0 | | |
| | | | | Middle | 3.2 | 14.4 | 14.3 | | 8.1 | 8.1 | | 31.6 | 31.7 | | 87.0 | 87.0 | 7.3 | 7.3 | | 3.0 | 2.5 | |
| | | | | | | 14.2 | | | 8.1 | | | 31.7 | | | 87.0 | | 7.3 | | | 2.0 | | |
| | | | | Bottom | 5.3 | 14.3 | 14.2 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 87.0 | 87.0 | 7.4 | 7.4 | 7.4 | 2.0 | 2.5 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.6 | | | 87.0 | | 7.4 | | | 3.0 | | |
| 6-Feb-18 | Cloudy | Rough | 3:31 | Surface | 1.0 | 13.8 | 13.8 | 13.9 | 8.1 | 8.1 | 8.0 | 31.5 | 31.5 | 31.5 | 92.0 | 92.0 | 7.8 | 7.8 | 7.8 | 2.0 | 2.0 | 2.0 |
| | | | | | | 13.8 | | | 8.0 | | | 31.5 | | | 92.0 | | 7.8 | | | 2.0 | | |
| | | | | Middle | 3.3 | 13.9 | 13.9 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 90.0 | 90.0 | 7.7 | 7.7 | | 2.0 | 2.0 | |
| | | | | | | 13.8 | | | 8.0 | | | 31.5 | | | 90.0 | | 7.7 | | | 2.0 | | |
| | | | | Bottom | 5.6 | 14.0 | 14.0 | | 8.0 | 8.0 | | 31.5 | 31.6 | | 86.0 | 86.0 | 7.3 | 7.3 | 7.3 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.0 | | | 31.6 | | | 86.0 | | 7.3 | | | 2.0 | | |
| 7-Feb-16 | Fine | Calm | 4:00 | Surface | 1.0 | 14.4 | 14.4 | 14.4 | 7.9 | 7.9 | 7.9 | 31.6 | 31.6 | 31.6 | 94.0 | 94.0 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.3 | | | 7.9 | | | 31.6 | | | 94.0 | | 7.9 | | | 2.0 | | |
| | | | | Middle | 3.3 | 14.4 | 14.4 | | 7.9 | 7.9 | | 31.6 | 31.6 | | 94.0 | 94.0 | 7.9 | 7.9 | | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 7.9 | | | 31.6 | | | 94.0 | | 7.9 | | | 2.0 | | |
| | | | | Surface | 5.5 | 14.4 | 14.4 | | 7.9 | 7.9 | | 31.6 | 31.6 | | 94.0 | 94.0 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 7.9 | | | 31.6 | | | 94.0 | | 7.9 | | | 2.0 | | |
| 8-Feb-14 | Fine | Calm | 4:55 | Surface | 1.0 | 13.9 | 14.0 | 14.1 | 8.0 | 8.0 | 8.0 | 31.2 | 31.2 | 31.3 | 92.0 | 92.0 | 7.8 | 7.8 | 7.8 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.0 | | | 8.0 | | | 31.2 | | | 92.0 | | 7.8 | | | 2.0 | | |
| | | | | Middle | 3.2 | 14.0 | 14.0 | | 8.0 | 8.0 | | 31.1 | 31.1 | | 92.0 | 92.0 | 7.8 | 7.8 | | 2.0 | 2.0 | |
| | | | | | | 14.0 | | | 8.0 | | | 31.1 | | | 92.0 | | 7.8 | | | 2.0 | | |
| | | | | Bottom | 5.4 | 14.3 | 14.3 | | 8.0 | 8.0 | | 31.5 | 31.5 | | 92.0 | 92.0 | 7.8 | 7.8 | 7.8 | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 8.0 | | | 31.5 | | | 92.0 | | 7.8 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 6:10 | Surface | 1.0 | 14.4 | 14.4 | 14.4 | 8.1 | 8.1 | 8.1 | 31.3 | 31.3 | 31.4 | 107.0 | 107.0 | 9.0 | 9.0 | 9.0 | 1.0 | 1.0 | 1.3 |
| | | | | | | 14.4 | | | 8.1 | | | 31.3 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Middle | 3.2 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.3 | 31.3 | | 107.0 | 107.0 | 9.0 | 9.0 | | 1.0 | 1.0 | |
| | | | | | | 14.4 | | | 8.1 | | | 31.3 | | | 107.0 | | 9.0 | | | 1.0 | | |
| | | | | Bottom | 5.4 | 14.5 | 14.5 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 104.0 | 103.5 | 8.7 | 8.7 | 8.7 | 2.0 | 2.0 | |
| | | | | | | 14.5 | | | 8.1 | | | 31.5 | | | 103.0 | | 8.7 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at FC2 - Mid-Ebb Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 14:28 | Surface | 1.0 | 180 | 114 | 0.049 | 0.052 | 0.066 | 0.072 | 2.9 | 4.3 | 2.0 | 1.6 | 0.0021 | 0.0021 |
| | | | | Middle | 3.2 | 89 | | 0.055 | | 0.077 | | 5.4 | | 1.6 | | 0.0024 | |
| | | | | Bottom | 5.3 | 72 | | 0.052 | | 0.074 | | 4.6 | | 1.3 | | 0.0019 | |
| 3-Feb-18 | Cloudy | Rough | 14:17 | Surface | 1.0 | 11 | 10 | 0.034 | 0.039 | 0.064 | 0.067 | 4.6 | 4.1 | 1.7 | 1.5 | 0.0031 | 0.0030 |
| | | | | Middle | 3.2 | 13 | | 0.044 | | 0.066 | | 4.0 | | 1.5 | | 0.0031 | |
| | | | | Bottom | 5.3 | 5 | | 0.038 | | 0.071 | | 3.6 | | 1.3 | | 0.0028 | |
| 4-Feb-18 | Cloudy | Moderate | 15:13 | Surface | 1.0 | 2900 | 2030 | 0.081 | 0.079 | 0.123 | 0.125 | 4.8 | 4.6 | 1.1 | 1.4 | 0.0044 | 0.0036 |
| | | | | Middle | 3.2 | 2500 | | 0.081 | | 0.132 | | 4.8 | | 1.4 | | 0.0033 | |
| | | | | Bottom | 5.3 | 690 | | 0.076 | | 0.120 | | 4.2 | | 1.6 | | 0.0030 | |
| 5-Feb-18 | Cloudy | Moderate | 15:59 | Surface | 1.0 | 37 | 27 | 0.055 | 0.056 | 0.093 | 0.095 | 5.3 | 5.4 | <1.0 | 0.0 | 0.0036 | 0.0034 |
| | | | | Middle | 3.2 | 20 | | 0.056 | | 0.095 | | 5.5 | | <1.0 | | 0.0032 | |
| | | | | Bottom | 5.3 | 24 | | 0.058 | | 0.098 | | 5.5 | | <1.0 | | 0.0034 | |
| 6-Feb-18 | Cloudy | Rough | 3:31 | Surface | 1.0 | 84 | 77 | 0.078 | 0.077 | 0.131 | 0.129 | 4.0 | 4.6 | 1.9 | 2.3 | 0.0042 | 0.0035 |
| | | | | Middle | 3.7 | 89 | | 0.075 | | 0.126 | | 6.1 | | 2.8 | | 0.0037 | |
| | | | | Bottom | 6.3 | 57 | | 0.079 | | 0.129 | | 3.8 | | 2.3 | | 0.0025 | |
| 7-Feb-18 | Fine | Calm | 4:00 | Surface | 1.0 | 15 | 16 | 0.026 | 0.027 | 0.070 | 0.071 | 3.9 | 3.4 | 2.6 | 2.9 | 0.0071 | 0.0074 |
| | | | | Middle | 3.9 | 17 | | 0.027 | | 0.073 | | 4.3 | | 3.3 | | 0.0079 | |
| | | | | Bottom | 6.7 | 16 | | 0.027 | | 0.069 | | 2.0 | | 2.8 | | 0.0071 | |
| 8-Feb-18 | Fine | Calm | 4:55 | Surface | 1.0 | 86 | 167 | 0.083 | 0.086 | 0.176 | 0.179 | 4.1 | 3.4 | 4.1 | 3.5 | 0.0068 | 0.0068 |
| | | | | Middle | 3.8 | 340 | | 0.088 | | 0.182 | | 3.0 | | 3.4 | | 0.0068 | |
| | | | | Bottom | 6.6 | 74 | | 0.086 | | 0.179 | | 3.1 | | 3.1 | | 0.0069 | |
| 9-Feb-18 | Cloudy | Moderate | 6:10 | Surface | 1.0 | 720 | 243 | 0.026 | 0.040 | 0.072 | 0.090 | 3.5 | 3.3 | 2.8 | 3.3 | 0.0061 | 0.0064 |
| | | | | Middle | 3.8 | 3 | | 0.047 | | 0.098 | | 3.6 | | 3.2 | | 0.0062 | |
| | | | | Bottom | 6.5 | 6 | | 0.046 | | 0.100 | | 2.7 | | 4.0 | | 0.0070 | |

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MaterialLab

Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at FC2 - Mid-flood Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 6:44 | Surface | 1.0 | 15.6 | 15.6 | 15.6 | 8.1 | 8.1 | 8.1 | 32.3 | 32.4 | 32.4 | 104.0 | 103.5 | 8.5 | 8.5 | 8.2 | 7.0 | 7.5 | 7.3 |
| | | | | | | 15.6 | | | 8.1 | | | 32.4 | | | 103.0 | | 8.4 | | | 8.0 | | |
| | | | | Middle | 3.8 | 15.6 | 15.6 | | 8.1 | 8.1 | | 32.4 | 32.4 | | 97.0 | 96.0 | 7.9 | 7.9 | | 7.0 | 7.0 | |
| | | | | | | 15.6 | | | 8.1 | | | 32.4 | | | 95.0 | | 7.9 | | | 7.0 | | |
| | | | | Bottom | 6.5 | 15.6 | 15.6 | | 8.2 | 8.2 | | 32.4 | 32.4 | | 95.0 | 94.5 | 7.7 | 7.7 | 7.7 | 7.0 | 7.5 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.4 | | | 94.0 | | 7.7 | | | 8.0 | | |
| 3-Feb-18 | Cloudy | Rough | 7:25 | Surface | 1.0 | 15.0 | 15.0 | 15.0 | 8.1 | 8.1 | 8.1 | 32.0 | 32.0 | 32.0 | 91.0 | 91.0 | 7.5 | 7.5 | 7.5 | 4.0 | 4.0 | 4.0 |
| | | | | | | 15.0 | | | 8.1 | | | 32.0 | | | 91.0 | | 7.5 | | | 4.0 | | |
| | | | | Middle | 3.8 | 15.0 | 15.0 | | 8.1 | 8.1 | | 32.0 | 32.0 | | 90.0 | 90.0 | 7.5 | 7.5 | | 4.0 | 4.0 | |
| | | | | | | 15.0 | | | 8.1 | | | 32.0 | | | 90.0 | | 7.5 | | | 4.0 | | |
| | | | | Bottom | 6.5 | 15.1 | 15.1 | | 8.1 | 8.1 | | 32.1 | 32.1 | | 87.0 | 86.5 | 7.2 | 7.2 | 7.2 | 4.0 | 4.0 | |
| | | | | | | 15.1 | | | 8.1 | | | 32.1 | | | 86.0 | | 7.1 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 8:10 | Surface | 1.0 | 14.5 | 14.6 | 14.6 | 8.1 | 8.1 | 8.1 | 31.8 | 31.8 | 31.9 | 94.0 | 94.0 | 7.8 | 7.8 | 7.5 | 5.0 | 5.5 | 4.8 |
| | | | | | | 14.6 | | | 8.1 | | | 31.8 | | | 94.0 | | 7.8 | | | 6.0 | | |
| | | | | Middle | 3.8 | 14.6 | 14.6 | | 8.1 | 8.1 | | 31.9 | 31.9 | | 88.0 | 86.0 | 7.3 | 7.2 | | 4.0 | 4.5 | |
| | | | | | | 14.6 | | | 8.1 | | | 31.9 | | | 84.0 | | 7.0 | | | 5.0 | | |
| | | | | Bottom | 6.5 | 14.7 | 14.7 | | 8.2 | 8.2 | | 32.0 | 32.0 | | 84.0 | 83.5 | 7.0 | 7.0 | 7.0 | 5.0 | 4.5 | |
| | | | | | | 14.7 | | | 8.2 | | | 31.9 | | | 83.0 | | 6.9 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 8:50 | Surface | 1.0 | 14.1 | 14.1 | 14.1 | 7.2 | 7.2 | 7.2 | 31.6 | 31.6 | 31.7 | 89.0 | 88.0 | 7.5 | 7.5 | 7.4 | 2.0 | 2.0 | 2.3 |
| | | | | | | 14.0 | | | 7.2 | | | 31.6 | | | 87.0 | | 7.4 | | | 2.0 | | |
| | | | | Middle | 3.8 | 14.3 | 14.3 | | 7.2 | 7.2 | | 31.7 | 31.7 | | 87.0 | 86.5 | 7.3 | 7.3 | | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 7.2 | | | 31.6 | | | 86.0 | | 7.2 | | | 2.0 | | |
| | | | | Bottom | 6.6 | 14.1 | 14.1 | | 7.2 | 7.2 | | 31.7 | 31.7 | | 88.0 | 87.5 | 7.4 | 7.4 | 7.4 | 3.0 | 3.0 | |
| | | | | | | 14.0 | | | 7.2 | | | 31.7 | | | 87.0 | | 7.3 | | | 3.0 | | |
| 6-Feb-18 | Cloudy | Rough | 10:51 | Surface | 1.0 | 13.9 | 13.9 | 13.9 | 8.0 | 8.0 | 8.0 | 31.5 | 31.5 | 31.5 | 88.0 | 88.0 | 7.5 | 7.5 | 7.4 | 2.0 | 2.0 | 2.0 |
| | | | | | | 13.9 | | | 8.0 | | | 31.5 | | | 88.0 | | 7.5 | | | 2.0 | | |
| | | | | Middle | 3.7 | 14.0 | 14.0 | | 8.0 | 8.0 | | 31.5 | 31.5 | | 87.0 | 86.5 | 7.4 | 7.4 | | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.0 | | | 31.5 | | | 86.0 | | 7.3 | | | 2.0 | | |
| | | | | Bottom | 6.3 | 13.9 | 13.9 | | 8.0 | 8.0 | | 31.6 | 31.6 | | 85.0 | 84.5 | 7.2 | 7.2 | 7.2 | 2.0 | 2.0 | |
| | | | | | | 13.8 | | | 8.0 | | | 31.6 | | | 84.0 | | 7.2 | | | 2.0 | | |
| 7-Feb-16 | Fine | Calm | 11:40 | Surface | 1.0 | 14.3 | 14.3 | 14.2 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 95.0 | 95.0 | 8.0 | 8.0 | 8.0 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.2 | | | 8.1 | | | 31.6 | | | 95.0 | | 8.0 | | | 2.0 | | |
| | | | | Middle | 3.9 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 94.0 | 94.0 | 7.9 | 7.9 | | 2.0 | 2.0 | |
| | | | | | | 14.2 | | | 8.1 | | | 31.6 | | | 94.0 | | 7.9 | | | 2.0 | | |
| | | | | Surface | 6.7 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 95.0 | 95.0 | 8.0 | 8.0 | 8.0 | 2.0 | 2.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.6 | | | 95.0 | | 8.0 | | | 2.0 | | |
| 8-Feb-14 | Fine | Calm | 12:25 | Surface | 1.0 | 14.0 | 14.0 | 14.0 | 8.0 | 8.0 | 8.0 | 31.1 | 31.1 | 31.2 | 91.0 | 91.0 | 7.7 | 7.7 | 7.7 | 2.0 | 1.5 | 1.7 |
| | | | | | | 14.0 | | | 8.0 | | | 31.1 | | | 91.0 | | 7.7 | | | 1.0 | | |
| | | | | Middle | 3.8 | 14.0 | 14.0 | | 8.0 | 8.0 | | 31.0 | 31.0 | | 90.0 | 90.0 | 7.7 | 7.7 | | 1.0 | 1.5 | |
| | | | | | | 13.9 | | | 8.0 | | | 31.0 | | | 90.0 | | 7.7 | | | 2.0 | | |
| | | | | Bottom | 6.6 | 14.2 | 14.2 | | 8.0 | 8.0 | | 31.4 | 31.4 | | 93.0 | 93.0 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | |
| | | | | | | 14.1 | | | 8.0 | | | 31.4 | | | 93.0 | | 7.9 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 13:19 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.3 | 31.3 | 31.3 | 109.0 | 108.5 | 9.2 | 9.2 | 9.1 | 1.0 | 1.0 | 1.3 |
| | | | | | | 14.3 | | | 8.1 | | | 31.3 | | | 108.0 | | 9.1 | | | 1.0 | | |
| | | | | Middle | 3.8 | 14.3 | 14.3 | | 8.1 | 8.1 | | 31.3 | 31.3 | | 108.0 | 108.0 | 9.1 | 9.1 | | 1.0 | 1.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.3 | | | 108.0 | | 9.1 | | | 1.0 | | |
| | | | | Bottom | 6.5 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 106.0 | 106.0 | 8.9 | 8.9 | 8.9 | 2.0 | 2.0 | |
| | | | | | | 14.4 | | | 8.1 | | | 31.4 | | | 106.0 | | 8.9 | | | 2.0 | | |

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## Water Quality Monitoring Results at FC2 – Mid-flood Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 6:44 | Surface | 1.0 | 12000 | 4237 | 0.072 | 0.055 | 0.098 | 0.081 | 4.5 | 4.9 | 1.8 | 1.7 | 0.0026 | 0.0027 |
| | | | | Middle | 3.8 | 440 | | 0.043 | | 0.061 | | 4.0 | | 1.0 | | 0.0027 | |
| | | | | Bottom | 6.5 | 270 | | 0.051 | | 0.084 | | 6.3 | | 2.2 | | 0.0027 | |
| 3-Feb-18 | Cloudy | Rough | 7:25 | Surface | 1.0 | 8 | 15 | 0.041 | 0.044 | 0.075 | 0.075 | 4.3 | 4.0 | 1.8 | 1.7 | 0.0031 | 0.0032 |
| | | | | Middle | 3.8 | 24 | | 0.050 | | 0.079 | | 3.6 | | 1.7 | | 0.0030 | |
| | | | | Bottom | 6.5 | 14 | | 0.040 | | 0.072 | | 4.1 | | 1.6 | | 0.0036 | |
| 4-Feb-18 | Cloudy | Moderate | 8:10 | Surface | 1.0 | 1500 | 1400 | 0.076 | 0.077 | 0.119 | 0.122 | 6.5 | 5.9 | 1.2 | 0.8 | 0.0034 | 0.0032 |
| | | | | Middle | 3.8 | 1200 | | 0.077 | | 0.124 | | 5.3 | | 1.0 | | 0.0027 | |
| | | | | Bottom | 6.5 | 1500 | | 0.078 | | 0.123 | | 6.0 | | <1.0 | | 0.0034 | |
| 5-Feb-18 | Cloudy | Moderate | 8:50 | Surface | 1.0 | 26 | 32 | 0.057 | 0.058 | 0.095 | 0.097 | 4.6 | 5.1 | <1.0 | 0.7 | 0.0038 | 0.0039 |
| | | | | Middle | 3.8 | 40 | | 0.058 | | 0.096 | | 6.0 | | <1.0 | | 0.0034 | |
| | | | | Bottom | 6.6 | 31 | | 0.058 | | 0.099 | | 4.8 | | 2.0 | | 0.0045 | |
| 6-Feb-18 | Cloudy | Rough | 10:51 | Surface | 1.0 | 47 | 61 | 0.074 | 0.074 | 0.126 | 0.126 | 5.7 | 4.7 | 1.6 | 1.7 | 0.0036 | 0.0032 |
| | | | | Middle | 3.7 | 74 | | 0.073 | | 0.125 | | 4.4 | | 1.7 | | 0.0034 | |
| | | | | Bottom | 6.3 | 63 | | 0.076 | | 0.128 | | 3.9 | | 1.7 | | 0.0027 | |
| 7-Feb-18 | Fine | Calm | 11:40 | Surface | 1.0 | 6 | 12 | 0.024 | 0.024 | 0.064 | 0.066 | 3.5 | 2.5 | 2.0 | 2.7 | 0.0098 | 0.0081 |
| | | | | Middle | 3.9 | 17 | | 0.022 | | 0.067 | | 2.0 | | 3.0 | | 0.0083 | |
| | | | | Bottom | 6.7 | 12 | | 0.026 | | 0.068 | | 2.0 | | 3.1 | | 0.0063 | |
| 8-Feb-18 | Fine | Calm | 12:25 | Surface | 1.0 | 16 | 102 | 0.090 | 0.086 | 0.184 | 0.178 | 1.5 | 2.6 | 3.8 | 3.4 | 0.0057 | 0.0058 |
| | | | | Middle | 3.8 | 120 | | 0.085 | | 0.175 | | 3.6 | | 3.3 | | 0.0054 | |
| | | | | Bottom | 6.6 | 170 | | 0.082 | | 0.174 | | 2.6 | | 3.1 | | 0.0062 | |
| 9-Feb-18 | Cloudy | Moderate | 13:19 | Surface | 1.0 | NOT DETECTED | 263 | 0.022 | 0.030 | 0.074 | 0.080 | 2.2 | 2.4 | 2.3 | 3.2 | 0.0069 | 0.0070 |
| | | | | Middle | 3.8 | NOT DETECTED | | 0.039 | | 0.084 | | 3.0 | | 2.5 | | 0.0070 | |
| | | | | Bottom | 6.5 | 790 | | 0.030 | | 0.082 | | 2.1 | | 4.7 | | 0.0070 | |

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## Water Quality Monitoring Results at G1 - Mid-Ebb Tide (In-situ Data)

| Location | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature (°C) | | | pH | | | Salinity (ppt) | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity (NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 14:15 | Surface | 1.0 | 15.6 | 15.6 | 15.6 | 8.2 | 8.2 | 8.2 | 31.9 | 32.0 | 32.0 | 103.0 | 103.0 | 8.5 | 8.5 | 8.5 | 5.0 | 5.0 | 5.0 |
| | | | | | | 15.6 | | | 8.2 | | | 32.0 | | | 103.0 | | 8.4 | | | 5.0 | | |
| | | | | Bottom | 4.9 | 15.6 | 15.6 | | 8.2 | 8.2 | | 31.9 | 32.0 | | 102.0 | 102.0 | 8.3 | 8.3 | 8.3 | 5.0 | 5.0 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.0 | | | 102.0 | | 8.3 | | | 5.0 | | |
| 3-Feb-18 | Cloudy | Rough | 14:06 | Surface | 1.0 | 15.0 | 15.0 | 15.0 | 8.2 | 8.2 | 8.2 | 31.9 | 31.9 | 31.9 | 93.0 | 93.0 | 7.7 | 7.7 | 7.7 | 4.0 | 4.0 | 4.0 |
| | | | | | | 15.0 | | | 8.2 | | | 31.9 | | | 93.0 | | 7.7 | | | 4.0 | | |
| | | | | Bottom | 4.9 | 15.0 | 15.0 | | 8.2 | 8.2 | | 31.9 | 31.9 | | 92.0 | 92.0 | 7.6 | 7.6 | 7.6 | 4.0 | 4.0 | |
| | | | | | | 15.0 | | | 8.2 | | | 31.9 | | | 92.0 | | 7.6 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 15:02 | Surface | 1.0 | 14.7 | 14.8 | 14.7 | 8.2 | 8.2 | 8.2 | 31.8 | 31.8 | 31.9 | 96.0 | 91.5 | 8.0 | 7.7 | 7.7 | 5.0 | 5.0 | 5.0 |
| | | | | | | 14.8 | | | 8.2 | | | 31.8 | | | 87.0 | | 7.3 | | | 5.0 | | |
| | | | | Bottom | 4.8 | 14.7 | 14.7 | | 8.2 | 8.2 | | 31.9 | 31.9 | | 89.0 | 87.5 | 7.4 | 7.3 | 7.3 | 5.0 | 5.0 | |
| | | | | | | 14.7 | | | 8.2 | | | 31.9 | | | 86.0 | | 7.2 | | | 5.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 15:48 | Surface | 1.0 | 14.0 | 14.0 | 14.0 | 8.1 | 8.1 | 8.0 | 31.5 | 31.6 | 31.6 | 93.0 | 93.0 | 7.9 | 7.9 | 7.9 | 3.0 | 3.0 | 3.5 |
| | | | | | | 14.0 | | | 8.0 | | | 31.6 | | | 93.0 | | 7.9 | | | 3.0 | | |
| | | | | Bottom | 4.5 | 14.0 | 14.0 | | 8.0 | 8.0 | | 31.6 | 31.6 | | 90.0 | 89.0 | 7.6 | 7.6 | 7.6 | 4.0 | 4.0 | |
| | | | | | | 14.0 | | | 8.0 | | | 31.6 | | | 88.0 | | 7.5 | | | 4.0 | | |
| 6-Feb-18 | Cloudy | Rough | 3:43 | Surface | 1.0 | 14.2 | 14.2 | 14.1 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 96.0 | 94.5 | 8.1 | 8.0 | 8.0 | 3.0 | 3.0 | 3.5 |
| | | | | | | 14.2 | | | 8.1 | | | 31.6 | | | 93.0 | | 7.8 | | | 3.0 | | |
| | | | | Bottom | 4.6 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.6 | 31.6 | | 93.0 | 92.5 | 7.9 | 7.9 | 7.9 | 4.0 | 4.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 31.6 | | | 92.0 | | 7.8 | | | 4.0 | | |
| 7-Feb-16 | Fine | Calm | 4:11 | Surface | 1.0 | 14.2 | 14.2 | 14.2 | 8.1 | 8.1 | 8.1 | 31.5 | 31.5 | 31.5 | 101.0 | 101.0 | 8.5 | 8.5 | 8.5 | 2.0 | 2.0 | 2.5 |
| | | | | | | 14.1 | | | 8.1 | | | 31.5 | | | 101.0 | | 8.5 | | | 2.0 | | |
| | | | | Bottom | 4.6 | 14.2 | 14.2 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 101.0 | 101.0 | 8.5 | 8.5 | 8.5 | 3.0 | 3.0 | |
| | | | | | | 14.1 | | | 8.1 | | | 31.5 | | | 101.0 | | 8.5 | | | 3.0 | | |
| 8-Feb-14 | Fine | Calm | 5:07 | Surface | 1.0 | 14.6 | 14.6 | 14.4 | 8.0 | 8.1 | 8.0 | 31.1 | 31.1 | 31.3 | 93.0 | 93.0 | 7.8 | 7.8 | 7.8 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.5 | | | 8.1 | | | 31.1 | | | 93.0 | | 7.8 | | | 2.0 | | |
| | | | | Bottom | 4.7 | 14.2 | 14.3 | | 7.9 | 8.0 | | 31.5 | 31.5 | | 98.0 | 97.0 | 8.3 | 8.2 | 8.2 | 2.0 | 2.0 | |
| | | | | | | 14.4 | | | 8.1 | | | 31.4 | | | 96.0 | | 8.1 | | | 2.0 | | |
| 9-Feb-12 | Cloudy | Moderate | 6:21 | Surface | 1.0 | 14.7 | 14.7 | 14.7 | 8.1 | 8.1 | 8.1 | 31.2 | 31.2 | 31.3 | 99.0 | 99.0 | 8.3 | 8.3 | 8.3 | 1.0 | 1.5 | 1.8 |
| | | | | | | 14.6 | | | 8.1 | | | 31.2 | | | 99.0 | | 8.3 | | | 2.0 | | |
| | | | | Bottom | 4.7 | 14.7 | 14.7 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 103.0 | 103.0 | 8.6 | 8.7 | 8.7 | 2.0 | 2.0 | |
| | | | | | | 14.6 | | | 8.1 | | | 31.4 | | | 103.0 | | 8.7 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at G1 - Mid-Ebb Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 14:15 | Surface | 1.0 | 59 | 65 | 0.036 | 0.038 | 0.050 | 0.054 | 6.4 | 7.4 | 1.4 | 1.5 | 0.0033 | 0.0031 |
| | | | | Bottom | 4.9 | 70 | | 0.040 | | 0.058 | | 8.3 | | 1.6 | | 0.0028 | |
| 3-Feb-18 | Cloudy | Rough | 14:06 | Surface | 1.0 | 8 | 9 | 0.039 | 0.037 | 0.067 | 0.066 | 3.9 | 3.8 | 1.4 | 1.3 | 0.0029 | 0.0035 |
| | | | | Bottom | 4.9 | 10 | | 0.035 | | 0.064 | | 3.6 | | 1.2 | | 0.0040 | |
| 4-Feb-18 | Cloudy | Moderate | 15:02 | Surface | 1.0 | 1400 | 830 | 0.118 | 0.116 | 0.172 | 0.165 | 6.2 | 5.5 | 1.4 | 1.4 | 0.0037 | 0.0036 |
| | | | | Bottom | 4.8 | 260 | | 0.113 | | 0.158 | | 4.7 | | 1.4 | | 0.0035 | |
| 5-Feb-18 | Cloudy | Moderate | 15:48 | Surface | 1.0 | 36 | 57 | 0.056 | 0.056 | 0.090 | 0.089 | 8.2 | 8.1 | <1.0 | 0.7 | 0.0038 | 0.0038 |
| | | | | Bottom | 4.5 | 78 | | 0.055 | | 0.087 | | 8.0 | | 1.4 | | 0.0037 | |
| 6-Feb-18 | Cloudy | Rough | 3:43 | Surface | 1.0 | 35 | 42 | 0.051 | 0.051 | 0.090 | 0.091 | 6.4 | 7.6 | 1.4 | 1.9 | 0.0058 | 0.0061 |
| | | | | Bottom | 4.6 | 49 | | 0.051 | | 0.091 | | 8.7 | | 2.3 | | 0.0063 | |
| 7-Feb-18 | Fine | Calm | 4:11 | Surface | 1.0 | 16 | 17 | 0.045 | 0.031 | 0.082 | 0.068 | 5.3 | 5.2 | 3.5 | 3.6 | 0.0100 | 0.0117 |
| | | | | Bottom | 4.6 | 18 | | 0.017 | | 0.054 | | 5.0 | | 3.7 | | 0.0133 | |
| 8-Feb-18 | Fine | Calm | 5:07 | Surface | 1.0 | 74 | 142 | 0.051 | 0.054 | 0.164 | 0.161 | 2.9 | 4.0 | 1.8 | 2.0 | 0.0064 | 0.0101 |
| | | | | Bottom | 4.7 | 210 | | 0.056 | | 0.158 | | 5.1 | | 2.2 | | 0.0137 | |
| 9-Feb-18 | Cloudy | Moderate | 6:21 | Surface | 1.0 | 5 | 6 | 0.028 | 0.027 | 0.113 | 0.112 | 1.0 | 1.7 | 2.2 | 1.7 | 0.0054 | 0.0080 |
| | | | | Bottom | 4.7 | 7 | | 0.025 | | 0.111 | | 2.3 | | 1.2 | | 0.0106 | |

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## Water Quality Monitoring Results at G1 - Mid-flood Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 6:56 | Surface | 1.0 | 15.5 | 15.6 | 15.6 | 8.2 | 8.2 | 8.2 | 32.1 | 32.1 | 32.0 | 94.0 | 93.5 | 7.7 | 7.7 | 7.7 | 5.0 | 5.0 | 5.8 |
| | | | | | | 15.6 | | | 8.2 | | | 32.0 | | | 93.0 | | 7.6 | | | 5.0 | | |
| | | | | Bottom | 4.7 | 15.6 | 15.6 | | 8.2 | 8.2 | | 32.0 | 32.0 | | 90.0 | 89.5 | 7.4 | 7.3 | 7.3 | 6.0 | 6.5 | |
| | | | | | | 15.6 | | | 8.2 | | | 32.0 | | | 89.0 | | 7.2 | | | 7.0 | | |
| 3-Feb-18 | Cloudy | Rough | 7:36 | Surface | 1.0 | 15.0 | 15.0 | 15.0 | 8.2 | 8.2 | 8.2 | 31.8 | 31.8 | 31.9 | 102.0 | 101.5 | 8.5 | 8.5 | 8.5 | 4.0 | 4.0 | 4.0 |
| | | | | | | 15.0 | | | 8.2 | | | 31.8 | | | 101.0 | | 8.4 | | | 4.0 | | |
| | | | | Bottom | 4.8 | 15.0 | 15.0 | | 8.1 | 8.1 | | 31.9 | 31.9 | | 99.0 | 99.0 | 8.2 | 8.2 | 8.2 | 4.0 | 4.0 | |
| | | | | | | 15.0 | | | 8.1 | | | 31.9 | | | 99.0 | | 8.2 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 8:21 | Surface | 1.0 | 14.8 | 14.8 | 14.8 | 8.2 | 8.2 | 8.2 | 31.8 | 31.8 | 31.9 | 101.0 | 100.5 | 8.4 | 8.3 | 8.3 | 5.0 | 5.0 | 5.0 |
| | | | | | | 14.8 | | | 8.2 | | | 31.8 | | | 100.0 | | 8.2 | | | 5.0 | | |
| | | | | Bottom | 4.6 | 14.8 | 14.8 | | 8.2 | 8.2 | | 31.9 | 31.9 | | 91.0 | 88.5 | 7.6 | 7.4 | 7.4 | 5.0 | 5.0 | |
| | | | | | | 14.8 | | | 8.2 | | | 31.9 | | | 86.0 | | 7.1 | | | 5.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 9:02 | Surface | 1.0 | 14.1 | 14.1 | 14.1 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.7 | 85.0 | 86.0 | 7.2 | 7.3 | 7.3 | 3.0 | 3.0 | 3.0 |
| | | | | | | 14.0 | | | 8.1 | | | 31.6 | | | 87.0 | | 7.3 | | | 3.0 | | |
| | | | | Bottom | 4.8 | 14.1 | 14.1 | | 8.1 | 8.1 | | 31.7 | 31.7 | | 87.0 | 86.5 | 7.3 | 7.3 | 7.3 | 3.0 | 3.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 31.7 | | | 86.0 | | 7.3 | | | 3.0 | | |
| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 6-Feb-18 | Cloudy | Rough | 10:40 | Surface | 1.0 | 14.2 | 14.1 | 14.0 | 8.1 | 8.1 | 8.1 | 31.5 | 31.5 | 31.5 | 93.0 | 92.5 | 7.8 | 7.8 | 7.8 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.0 | | | 8.1 | | | 31.5 | | | 92.0 | | 7.8 | | | 2.0 | | |
| | | | | Bottom | 4.4 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 94.0 | 93.5 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | |
| | | | | | | 13.9 | | | 8.1 | | | 31.5 | | | 93.0 | | 7.9 | | | 2.0 | | |
| 7-Feb-18 | Fine | Calm | 11:29 | Surface | 1.0 | 14.1 | 14.1 | 14.0 | 8.1 | 8.1 | 8.1 | 31.5 | 31.5 | 31.5 | 101.0 | 100.5 | 8.6 | 8.6 | 8.6 | 3.0 | 3.0 | 3.0 |
| | | | | | | 14.0 | | | 8.1 | | | 31.5 | | | 100.0 | | 8.5 | | | 3.0 | | |
| | | | | Bottom | 4.6 | 14.0 | 14.0 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 98.0 | 98.5 | 8.3 | 8.4 | 8.4 | 3.0 | 3.0 | |
| | | | | | | 14.0 | | | 8.1 | | | 31.5 | | | 99.0 | | 8.4 | | | 3.0 | | |
| 8-Feb-18 | Fine | Calm | 12:14 | Surface | 1.0 | 15.2 | 15.2 | 14.9 | 8.0 | 8.0 | 8.1 | 30.2 | 30.2 | 30.8 | 94.0 | 94.0 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | 2.0 |
| | | | | | | 15.2 | | | 8.0 | | | 30.2 | | | 94.0 | | 7.8 | | | 2.0 | | |
| | | | | Bottom | 4.8 | 14.6 | 14.6 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 96.0 | 96.0 | 8.0 | 8.1 | 8.1 | 2.0 | 2.0 | |
| | | | | | | 14.6 | | | 8.1 | | | 31.3 | | | 96.0 | | 8.1 | | | 2.0 | | |
| 9-Feb-18 | Cloudy | Moderate | 13:07 | Surface | 1.0 | 14.8 | 14.8 | 14.8 | 8.1 | 8.1 | 8.1 | 31.4 | 31.4 | 31.4 | 103.0 | 103.5 | 8.6 | 8.7 | 8.7 | 2.0 | 1.5 | 1.8 |
| | | | | | | 14.8 | | | 8.1 | | | 31.4 | | | 104.0 | | 8.7 | | | 1.0 | | |
| | | | | Bottom | 4.6 | 14.7 | 14.7 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 105.0 | 105.0 | 8.8 | 8.8 | 8.8 | 2.0 | 2.0 | |
| | | | | | | 14.7 | | | 8.1 | | | 31.4 | | | 105.0 | | 8.8 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at G1 - Mid-flood Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 6:56 | Surface | 1.0 | 230 | 195 | 0.043 | 0.044 | 0.060 | 0.059 | 6.2 | 6.3 | 1.4 | 1.5 | 0.0032 | 0.0031 |
| | | | | Bottom | 4.7 | 160 | | 0.045 | | 0.057 | | 6.4 | | 1.5 | | 0.0029 | |
| 3-Feb-18 | Cloudy | Rough | 7:36 | Surface | 1.0 | 4 | 7 | 0.050 | 0.047 | 0.081 | 0.075 | 4.6 | 4.4 | 1.4 | 1.4 | 0.0026 | 0.0027 |
| | | | | Bottom | 4.8 | 10 | | 0.043 | | 0.069 | | 4.2 | | 1.4 | | 0.0028 | |
| 4-Feb-18 | Cloudy | Moderate | 8:21 | Surface | 1.0 | 2000 | 2550 | 0.127 | 0.119 | 0.171 | 0.167 | 4.3 | 4.7 | 1.5 | 1.4 | 0.0033 | 0.0030 |
| | | | | Bottom | 4.6 | 3100 | | 0.110 | | 0.162 | | 5.1 | | 1.3 | | 0.0026 | |
| 5-Feb-18 | Cloudy | Moderate | 9:02 | Surface | 1.0 | 38 | 46 | 0.072 | 0.062 | 0.102 | 0.093 | 6.3 | 6.1 | <1.0 | 0.0 | 0.0052 | 0.0046 |
| | | | | Bottom | 4.8 | 53 | | 0.052 | | 0.084 | | 5.9 | | <1.0 | | 0.0039 | |
| 6-Feb-18 | Cloudy | Rough | 10:40 | Surface | 1.0 | 58 | 61 | 0.055 | 0.053 | 0.101 | 0.096 | 6.4 | 7.0 | 1.3 | 1.4 | 0.0057 | 0.0070 |
| | | | | Bottom | 4.4 | 64 | | 0.051 | | 0.090 | | 7.5 | | 1.4 | | 0.0082 | |
| 7-Feb-18 | Fine | Calm | 11:29 | Surface | 1.0 | 21 | 26 | 0.015 | 0.017 | 0.053 | 0.054 | 3.7 | 3.8 | 3.2 | 4.4 | 0.0121 | 0.0110 |
| | | | | Bottom | 4.6 | 30 | | 0.018 | | 0.055 | | 3.8 | | 5.5 | | 0.0099 | |
| 8-Feb-18 | Fine | Calm | 12:14 | Surface | 1.0 | 61 | 56 | 0.063 | 0.059 | 0.173 | 0.165 | 4.6 | 3.9 | 3.4 | 3.6 | 0.0057 | 0.0083 |
| | | | | Bottom | 4.8 | 51 | | 0.055 | | 0.157 | | 3.1 | | 3.7 | | 0.0109 | |
| 9-Feb-18 | Cloudy | Moderate | 13:07 | Surface | 1.0 | 11 | 7 | 0.025 | 0.026 | 0.121 | 0.114 | 3.6 | 2.9 | 1.6 | 2.3 | 0.0070 | 0.0077 |
| | | | | Bottom | 4.6 | 2 | | 0.026 | | 0.106 | | 2.1 | | 2.9 | | 0.0084 | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at W1 - Mid-Ebb Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(°C) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 14:05 | Mid | 0.6 | 15.7 | 15.8 | 15.8 | 8.0 | 8.0 | 8.0 | 31.8 | 31.2 | 31.2 | 97.0 | 97.0 | 7.9 | 7.9 | 7.9 | 7.0 | 7.0 | 7.0 |
| | | | | | | 15.8 | | | 8.0 | | | 30.5 | | | 97.0 | | 7.9 | | | 7.0 | | |
| 3-Feb-18 | Cloudy | Rough | 14:00 | Mid | 0.7 | 15.2 | 15.2 | 15.2 | 8.0 | 8.0 | 8.0 | 32.0 | 32.0 | 32.0 | 99.0 | 99.0 | 8.2 | 8.2 | 8.2 | 4.0 | 4.0 | 4.0 |
| | | | | | | 15.2 | | | 8.0 | | | 32.0 | | | 99.0 | | 8.2 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 14:56 | Mid | 0.7 | 14.4 | 14.4 | 14.4 | 8.0 | 8.0 | 8.0 | 31.4 | 31.4 | 31.4 | 98.0 | 98.0 | 8.2 | 8.2 | 8.2 | 5.0 | 5.0 | 5.0 |
| | | | | | | 14.4 | | | 8.0 | | | 31.4 | | | 98.0 | | 8.2 | | | 5.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 15:42 | Mid | 0.7 | 14.4 | 14.4 | 14.4 | 8.0 | 8.0 | 8.0 | 29.2 | 29.3 | 29.3 | 78.0 | 78.0 | 6.6 | 6.6 | 6.6 | 3.0 | 2.5 | 2.5 |
| | | | | | | 14.4 | | | 7.9 | | | 29.3 | | | 78.0 | | 6.6 | | | 2.0 | | |
| 6-Feb-18 | Cloudy | Rough | 3:50 | Mid | 0.7 | 14.0 | 14.1 | 14.1 | 8.0 | 8.0 | 8.0 | 31.4 | 31.4 | 31.4 | 77.0 | 77.0 | 6.5 | 6.5 | 6.5 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.1 | | | 7.9 | | | 31.4 | | | 77.0 | | 6.5 | | | 2.0 | | |
| 7-Feb-18 | Fine | Calm | 4:18 | Mid | 0.8 | 14.6 | 14.6 | 14.6 | 8.0 | 8.0 | 8.0 | 31.5 | 31.5 | 31.5 | 83.0 | 83.0 | 7.0 | 7.0 | 7.0 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.6 | | | 8.0 | | | 31.5 | | | 83.0 | | 6.9 | | | 2.0 | | |
| 8-Feb-18 | Fine | Calm | 5:14 | Mid | 0.7 | 14.5 | 14.5 | 14.5 | 8.0 | 8.0 | 8.0 | 31.2 | 31.3 | 31.3 | 86.0 | 85.5 | 7.2 | 7.2 | 7.2 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.5 | | | 8.0 | | | 31.4 | | | 85.0 | | 7.2 | | | 2.0 | | |
| 9-Feb-18 | Cloudy | Moderate | 6:28 | Mid | 0.8 | 15.2 | 15.2 | 15.2 | 7.9 | 7.9 | 7.9 | 30.5 | 30.3 | 30.3 | 88.0 | 88.0 | 7.3 | 7.3 | 7.3 | 2.0 | 2.0 | 2.0 |
| | | | | | | 15.2 | | | 7.9 | | | 30.1 | | | 88.0 | | 7.3 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at W1 - Mid-Ebb Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 14:05 | Mid | 0.6 | 5400 | 5400 | 1.010 | 1.010 | 2.930 | 2.930 | 6.2 | 6.2 | 1.8 | 1.8 | 0.0019 | 0.0019 |
| 3-Feb-18 | Cloudy | Rough | 14:00 | Mid | 0.7 | 3700 | 3700 | 3.320 | 3.320 | 4.000 | 4.000 | 3.4 | 3.4 | 2.3 | 2.3 | 0.0010 | 0.0010 |
| 4-Feb-18 | Cloudy | Moderate | 14:56 | Mid | 0.7 | 8200 | 8200 | 7.260 | 7.260 | 7.580 | 7.580 | 4.1 | 4.1 | 1.2 | 1.2 | 0.0018 | 0.0018 |
| 5-Feb-18 | Cloudy | Moderate | 15:42 | Mid | 0.7 | 9 | 9 | 0.044 | 0.044 | 0.113 | 0.113 | 3.3 | 3.3 | 1.7 | 1.7 | 0.0045 | 0.0045 |
| 6-Feb-18 | Cloudy | Rough | 3:50 | Mid | 0.7 | 480 | 480 | 0.095 | 0.095 | 0.157 | 0.157 | 4.9 | 4.9 | 2.0 | 2.0 | 0.0023 | 0.0023 |
| 7-Feb-18 | Fine | Calm | 4:18 | Mid | 0.8 | 47 | 47 | 0.045 | 0.045 | 0.103 | 0.103 | 5.9 | 5.9 | 2.0 | 2.0 | 0.0038 | 0.0038 |
| 8-Feb-18 | Fine | Calm | 5:14 | Mid | 0.7 | 130 | 130 | 0.434 | 0.434 | 0.592 | 0.592 | 1.5 | 1.5 | 1.6 | 1.6 | 0.0070 | 0.0070 |
| 9-Feb-18 | Cloudy | Moderate | 6:28 | Mid | 0.8 | Not Detected | 0 | 0.952 | 0.952 | 1.140 | 1.140 | 2.6 | 2.6 | 4.3 | 4.3 | 0.0042 | 0.0042 |

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## Water Quality Monitoring Results at W1 - Mid-flood Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 7:04 | Mid | 0.9 | 15.6 | 15.6 | 15.6 | 8.1 | 8.1 | 8.1 | 31.9 | 31.9 | 31.9 | 87 | 84.0 | 7.1 | 6.9 | 6.9 | 7.0 | 6.0 | 6.0 |
| | | | | | | 15.6 | | | 8.1 | | | 31.9 | | | 81 | | 6.7 | | | 5.0 | | |
| 3-Feb-18 | Cloudy | Rough | 7:42 | Mid | 0.9 | 15.3 | 15.3 | 15.3 | 8.0 | 8.0 | 8.0 | 31.9 | 31.9 | 31.9 | 97 | 97.0 | 8.0 | 8.0 | 8.0 | 5.0 | 5.0 | 5.0 |
| | | | | | | 15.3 | | | 8.0 | | | 31.9 | | | 97 | | 8.0 | | | 5.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 8:27 | Mid | 0.9 | 14.9 | 14.9 | 14.9 | 8.0 | 8.0 | 8.0 | 31.8 | 31.8 | 31.8 | 94 | 94.0 | 7.8 | 7.8 | 7.8 | 5.0 | 5.0 | 5.0 |
| | | | | | | 14.9 | | | 8.0 | | | 31.7 | | | 94 | | 7.8 | | | 5.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 9:08 | Mid | 1.0 | 14.2 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.6 | 31.6 | 31.6 | 88 | 88.0 | 7.4 | 7.4 | 7.4 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.3 | | | 8.1 | | | 31.6 | | | 88 | | 7.4 | | | 2.0 | | |
| 6-Feb-18 | Cloudy | Rough | 10:34 | Mid | 0.7 | 14.4 | 14.4 | 14.4 | 8.0 | 8.0 | 8.0 | 31.1 | 31.2 | 31.2 | 88 | 88.0 | 7.4 | 7.4 | 7.4 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.4 | | | 8.0 | | | 31.2 | | | 87 | | 7.4 | | | 2.0 | | |
| 7-Feb-18 | Fine | Calm | 11:23 | Mid | 0.8 | 14.6 | 14.7 | 14.7 | 8.0 | 8.0 | 8.0 | 31.5 | 31.4 | 31.4 | 87 | 87.0 | 7.3 | 7.3 | 7.3 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.7 | | | 8.0 | | | 31.2 | | | 87 | | 7.2 | | | 2.0 | | |
| 8-Feb-18 | Fine | Calm | 12:08 | Mid | 0.9 | 15.1 | 15.1 | 15.1 | 7.9 | 7.9 | 7.9 | 29.9 | 30.2 | 30.2 | 84 | 83.5 | 7.0 | 7.0 | 7.0 | 2.0 | 2.0 | 2.0 |
| | | | | | | 15.1 | | | 7.9 | | | 30.5 | | | 83 | | 6.9 | | | 2.0 | | |
| 9-Feb-18 | Cloudy | Moderate | 13:01 | Mid | 0.7 | 15.1 | 15.1 | 15.1 | 8.0 | 8.0 | 8.0 | 31.4 | 31.4 | 31.4 | 92 | 92.0 | 7.7 | 7.7 | 7.7 | 2.0 | 2.0 | 2.0 |
| | | | | | | 15.1 | | | 8.0 | | | 31.4 | | | 92 | | 7.7 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at W1 - Mid-flood Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 7:04 | Mid | 0.9 | 2300 | 2300 | 0.106 | 0.106 | 0.140 | 0.140 | 5.7 | 5.7 | 1.4 | 1.4 | 0.0016 | 0.0016 |
| 3-Feb-18 | Cloudy | Rough | 7:42 | Mid | 0.9 | 7600 | 7600 | 4.140 | 4.140 | 4.910 | 4.910 | 4.6 | 4.6 | 2.0 | 2.0 | 0.0029 | 0.0029 |
| 4-Feb-18 | Cloudy | Moderate | 8:27 | Mid | 0.9 | 5100 | 5100 | 7.480 | 7.480 | 8.370 | 8.370 | 3.3 | 3.3 | 1.2 | 1.2 | 0.0012 | 0.0012 |
| 5-Feb-18 | Cloudy | Moderate | 9:06 | Mid | 1.0 | 3200 | 3200 | 0.113 | 0.113 | 0.154 | 0.154 | 5.3 | 5.3 | <1.0 | 0.0 | 0.0024 | 0.0024 |
| 6-Feb-18 | Cloudy | Rough | 10:34 | Mid | 0.7 | 190 | 190 | 0.101 | 0.101 | 0.164 | 0.164 | 3.8 | 3.8 | 1.4 | 1.4 | 0.0041 | 0.0041 |
| 7-Feb-18 | Fine | Calm | 11:23 | Mid | 0.8 | 49 | 49 | 0.050 | 0.050 | 0.112 | 0.112 | 4.6 | 4.6 | 2.0 | 2.0 | 0.0064 | 0.0064 |
| 8-Feb-18 | Fine | Calm | 12:08 | Mid | 0.9 | 210 | 210 | 0.453 | 0.453 | 0.618 | 0.618 | 5.2 | 5.2 | 1.6 | 1.6 | 0.0065 | 0.0065 |
| 9-Feb-18 | Cloudy | Moderate | 13:01 | Mid | 0.7 | Not Detected | 0 | 1.040 | 1.040 | 1.240 | 1.240 | 2.7 | 2.7 | 2.0 | 2.0 | 0.0045 | 0.0045 |

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## Water Quality Monitoring Results at W2 - Mid-Ebb Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 13:47 | Surface | 1.0 | 14.4 | 14.4 | 14.8 | 8.0 | 8.1 | 8.1 | 30.4 | 30.4 | 30.9 | 103.0 | 103.5 | 8.8 | 8.8 | 8.8 | 3.0 | 3.0 | 3.3 |
| | | | | | | 14.4 | | | 8.1 | | | 30.4 | | | 104.0 | | 8.8 | | | 3.0 | | |
| | | | | Bottom | 4.8 | 15.1 | 15.1 | | 8.1 | 8.1 | | 31.4 | 31.4 | | 95.0 | 95.0 | 7.9 | 7.9 | 7.9 | 4.0 | 3.5 | |
| | | | | | | 15.1 | | | 8.1 | | | 31.4 | | | 95.0 | | 7.9 | | | 3.0 | | |
| 3-Feb-18 | Cloudy | Rough | 13:47 | Surface | 1.0 | 14.2 | 14.2 | 14.3 | 8.0 | 8.0 | 8.0 | 31.3 | 31.3 | 31.4 | 108.0 | 108.0 | 9.1 | 9.1 | 9.1 | 1.0 | 1.0 | 2.0 |
| | | | | | | 14.2 | | | 8.0 | | | 31.3 | | | 108.0 | | 9.1 | | | 1.0 | | |
| | | | | Bottom | 4.7 | 14.3 | 14.4 | | 8.0 | 8.0 | | 31.4 | 31.4 | | 103.0 | 103.0 | 8.7 | 8.7 | 8.7 | 3.0 | 3.0 | |
| | | | | | | 14.4 | | | 8.0 | | | 31.4 | | | 103.0 | | 8.7 | | | 3.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 14:42 | Surface | 1.0 | 13.8 | 13.8 | 13.8 | 8.0 | 8.0 | 8.1 | 31.2 | 31.3 | 31.3 | 99.0 | 97.5 | 8.5 | 8.4 | 8.4 | 4.0 | 4.0 | 4.0 |
| | | | | | | 13.8 | | | 8.0 | | | 31.3 | | | 96.0 | | 8.3 | | | 4.0 | | |
| | | | | Bottom | 4.8 | 13.8 | 13.8 | | 8.1 | 8.1 | | 31.3 | 31.3 | | 94.0 | 92.5 | 8.0 | 7.9 | 7.9 | 4.0 | 4.0 | |
| | | | | | | 13.8 | | | 8.1 | | | 31.3 | | | 91.0 | | 7.8 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 15:30 | Surface | 1.0 | 12.9 | 12.9 | 12.9 | 8.0 | 8.1 | 8.1 | 30.7 | 30.7 | 30.8 | 92.0 | 91.0 | 8.0 | 8.0 | 8.0 | 2.0 | 2.0 | 2.0 |
| | | | | | | 12.9 | | | 8.1 | | | 30.7 | | | 90.0 | | 7.9 | | | 2.0 | | |
| | | | | Bottom | 4.7 | 13.0 | 13.0 | | 8.1 | 8.1 | | 30.9 | 31.0 | | 91.0 | 91.0 | 7.9 | 7.9 | 7.9 | 2.0 | 2.0 | |
| | | | | | | 12.9 | | | 8.1 | | | 31.0 | | | 91.0 | | 7.9 | | | 2.0 | | |
| 6-Feb-18 | Cloudy | Rough | 4:03 | Surface | 1.0 | 12.2 | 12.3 | 12.3 | 8.0 | 8.0 | 8.0 | 29.7 | 29.7 | 30.0 | 96.0 | 95.5 | 8.5 | 8.5 | 8.5 | 1.0 | 1.0 | 1.3 |
| | | | | | | 12.3 | | | 8.0 | | | 29.7 | | | 95.0 | | 8.4 | | | 1.0 | | |
| | | | | Bottom | 4.8 | 12.4 | 12.4 | | 8.0 | 8.0 | | 30.4 | 30.4 | | 96.0 | 96.0 | 8.5 | 8.5 | 8.5 | 1.0 | 1.5 | |
| | | | | | | 12.4 | | | 8.0 | | | 30.3 | | | 96.0 | | 8.4 | | | 2.0 | | |
| 7-Feb-18 | Fine | Calm | 4:31 | Surface | 1.0 | 13.1 | 13.1 | 13.2 | 8.0 | 8.0 | 8.0 | 29.1 | 29.1 | 29.4 | 96.0 | 96.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | 2.0 |
| | | | | | | 13.1 | | | 8.0 | | | 29.1 | | | 96.0 | | 8.4 | | | 2.0 | | |
| | | | | Bottom | 4.9 | 13.3 | 13.3 | | 8.0 | 8.0 | | 29.6 | 29.6 | | 96.0 | 96.0 | 8.4 | 8.4 | 8.4 | 2.0 | 2.0 | |
| | | | | | | 13.2 | | | 8.0 | | | 29.6 | | | 96.0 | | 8.4 | | | 2.0 | | |
| 8-Feb-18 | Fine | Calm | 5:27 | Surface | 1.0 | 12.2 | 12.2 | 12.8 | 8.1 | 8.1 | 8.1 | 26.2 | 26.2 | 28.0 | 97.0 | 97.5 | 8.8 | 8.9 | 8.9 | 2.0 | 2.0 | 2.3 |
| | | | | | | 12.2 | | | 8.1 | | | 26.2 | | | 98.0 | | 8.9 | | | 2.0 | | |
| | | | | Bottom | 4.7 | 13.4 | 13.4 | | 8.1 | 8.1 | | 29.7 | 29.7 | | 100.0 | 100.5 | 8.7 | 8.8 | 8.8 | 2.0 | 2.5 | |
| | | | | | | 13.3 | | | 8.1 | | | 29.7 | | | 101.0 | | 8.8 | | | 3.0 | | |
| 9-Feb-18 | Cloudy | Moderate | 6:41 | Surface | 1.0 | 14.3 | 14.3 | 14.3 | 8.1 | 8.1 | 8.1 | 31.1 | 31.1 | 31.3 | 101.0 | 101.0 | 8.5 | 8.5 | 8.5 | 1.0 | 1.5 | 1.8 |
| | | | | | | 14.3 | | | 8.1 | | | 31.1 | | | 101.0 | | 8.5 | | | 2.0 | | |
| | | | | Bottom | 4.9 | 14.4 | 14.4 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 101.0 | 101.0 | 8.5 | 8.5 | 8.5 | 2.0 | 2.0 | |
| | | | | | | 14.3 | | | 8.1 | | | 31.5 | | | 101.0 | | 8.5 | | | 2.0 | | |

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Report No.: 0151/15/ED/1052

## Water Quality Monitoring Results at W2 - Mid-Ebb Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 13:47 | Surface | 1.0 | 210 | 138 | 0.041 | 0.131 | 0.154 | 0.250 | 3.4 | 2.8 | 1.6 | 1.7 | 0.0050 | 0.0050 |
| | | | | Bottom | 4.8 | 65 | | 0.220 | | 0.345 | | 2.2 | | 1.8 | | 0.0050 | |
| 3-Feb-18 | Cloudy | Rough | 13:47 | Surface | 1.0 | 34 | 48 | 0.053 | 0.050 | 0.195 | 0.178 | 3.7 | 3.2 | 1.9 | 2.0 | 0.0028 | 0.0030 |
| | | | | Bottom | 4.7 | 62 | | 0.047 | | 0.161 | | 2.7 | | 2.0 | | 0.0031 | |
| 4-Feb-18 | Cloudy | Moderate | 14:42 | Surface | 1.0 | 34 | 27 | 0.057 | 0.056 | 0.204 | 0.206 | 3.8 | 3.2 | 1.4 | 1.8 | 0.0033 | 0.0029 |
| | | | | Bottom | 4.8 | 19 | | 0.054 | | 0.208 | | 2.6 | | 2.2 | | 0.0024 | |
| 5-Feb-18 | Cloudy | Moderate | 15:30 | Surface | 1.0 | 19 | 11 | 0.041 | 0.047 | 0.119 | 0.131 | 3.8 | 3.6 | 2.0 | 2.1 | 0.0046 | 0.0048 |
| | | | | Bottom | 4.7 | 3 | | 0.053 | | 0.142 | | 3.4 | | 2.2 | | 0.0049 | |
| 6-Feb-18 | Cloudy | Rough | 4:03 | Surface | 1.0 | 7 | 9 | 0.031 | 0.031 | 0.163 | 0.158 | 2.9 | 3.1 | 2.0 | 1.8 | 0.0038 | 0.0044 |
| | | | | Bottom | 4.8 | 11 | | 0.030 | | 0.153 | | 3.3 | | 1.6 | | 0.0050 | |
| 7-Feb-18 | Fine | Calm | 4:31 | Surface | 1.0 | 19 | 11 | 0.023 | 0.024 | 0.188 | 0.188 | 1.8 | 1.6 | 3.2 | 2.5 | 0.0050 | 0.0058 |
| | | | | Bottom | 4.9 | 2 | | 0.024 | | 0.188 | | 1.3 | | 1.8 | | 0.0066 | |
| 8-Feb-18 | Fine | Calm | 5:27 | Surface | 1.0 | 23 | 27 | 0.074 | 0.073 | 0.391 | 0.398 | 2.5 | 2.4 | 2.3 | 2.5 | 0.0097 | 0.0093 |
| | | | | Bottom | 4.7 | 30 | | 0.072 | | 0.405 | | 2.2 | | 2.7 | | 0.0088 | |
| 9-Feb-18 | Cloudy | Moderate | 6:41 | Surface | 1.0 | 19 | 10 | 0.024 | 0.025 | 0.101 | 0.093 | 3.2 | 2.7 | 3.2 | 4.3 | 0.0061 | 0.0093 |
| | | | | Bottom | 4.9 | Not Detected | | 0.025 | | 0.084 | | 2.2 | | 5.3 | | 0.0125 | |

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## Water Quality Monitoring Results at W2 - Mid-flood Tide (In-situ Data)

| Date | Weather Condition | Sea Condition | Sampling Time | Depth (m) | | Temperature(oC) | | | pH | | | Salinity ppt | | | DO Saturation (%) | | Dissolved Oxygen (mg/L) | | | Turbidity(NTU) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | Average | DA* | Value | Average | DA* | Value | Average | DA* | Value | Average | Value | Average | DA* | Value | Average | DA* |
| 2-Feb-18 | Cloudy | Rough | 7:18 | Surface | 1.0 | 14.4 | 14.4 | 14.9 | 8.1 | 8.1 | 8.1 | 30.6 | 30.5 | 31.1 | 90.0 | 88.5 | 7.6 | 7.5 | 7.5 | 3.0 | 4.0 | 4.0 |
| | | | | | | 14.4 | | | 8.1 | | | 30.4 | | | 87.0 | | 7.3 | | | 5.0 | | |
| | | | | Bottom | 4.8 | 15.3 | 15.4 | | 8.1 | 8.2 | | 31.7 | 31.7 | | 88.0 | 87.0 | 7.3 | 7.2 | 7.2 | 4.0 | 4.0 | |
| | | | | | | 15.4 | | | 8.2 | | | 31.7 | | | 86.0 | | 7.1 | | | 4.0 | | |
| 3-Feb-18 | Cloudy | Rough | 7:55 | Surface | 1.0 | 13.9 | 13.9 | 14.3 | 8.1 | 8.1 | 8.1 | 30.5 | 30.6 | 31.0 | 105.0 | 105.0 | 9.0 | 9.0 | 9.0 | 3.0 | 3.0 | 3.5 |
| | | | | | | 13.9 | | | 8.1 | | | 30.6 | | | 105.0 | | 9.0 | | | 3.0 | | |
| | | | | Bottom | 4.9 | 14.7 | 14.7 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 95.0 | 95.0 | 7.9 | 7.9 | 7.9 | 4.0 | 4.0 | |
| | | | | | | 14.7 | | | 8.1 | | | 31.5 | | | 95.0 | | 7.9 | | | 4.0 | | |
| 4-Feb-18 | Cloudy | Moderate | 8:40 | Surface | 1.0 | 13.0 | 13.1 | 13.6 | 8.1 | 8.1 | 8.2 | 29.9 | 29.9 | 30.7 | 96.0 | 97.5 | 8.4 | 8.5 | 8.5 | 3.0 | 3.5 | 3.5 |
| | | | | | | 13.1 | | | 8.1 | | | 29.9 | | | 99.0 | | 8.6 | | | 4.0 | | |
| | | | | Bottom | 4.8 | 14.1 | 14.2 | | 8.2 | 8.2 | | 31.6 | 31.6 | | 94.0 | 91.5 | 8.0 | 7.8 | 7.8 | 3.0 | 3.5 | |
| | | | | | | 14.3 | | | 8.2 | | | 31.5 | | | 89.0 | | 7.5 | | | 4.0 | | |
| 5-Feb-18 | Cloudy | Moderate | 9:22 | Surface | 1.0 | 13.1 | 13.2 | 13.3 | 8.1 | 8.1 | 8.1 | 30.2 | 30.2 | 30.6 | 91.0 | 91.0 | 8.0 | 8.0 | 8.0 | 2.0 | 1.5 | 1.5 |
| | | | | | | 13.3 | | | 8.1 | | | 30.1 | | | 91.0 | | 7.9 | | | 1.0 | | |
| | | | | Bottom | 4.9 | 13.4 | 13.4 | | 8.1 | 8.1 | | 31.0 | 31.0 | | 92.0 | 91.5 | 7.9 | 7.9 | 7.9 | 2.0 | 1.5 | |
| | | | | | | 13.4 | | | 8.1 | | | 30.9 | | | 91.0 | | 7.9 | | | 1.0 | | |
| 6-Feb-18 | Cloudy | Rough | 10:20 | Surface | 1.0 | 12.5 | 12.6 | 12.5 | 8.0 | 8.0 | 8.0 | 29.5 | 29.5 | 29.8 | 96.0 | 95.5 | 8.5 | 8.5 | 8.5 | 1.0 | 1.0 | 1.5 |
| | | | | | | 12.6 | | | 8.0 | | | 29.5 | | | 95.0 | | 8.4 | | | 1.0 | | |
| | | | | Bottom | 4.6 | 12.5 | 12.5 | | 8.0 | 8.0 | | 30.1 | 30.1 | | 96.0 | 95.5 | 8.5 | 8.5 | 8.5 | 2.0 | 2.0 | |
| | | | | | | 12.5 | | | 8.0 | | | 30.0 | | | 95.0 | | 8.4 | | | 2.0 | | |
| 7-Feb-18 | Fine | Calm | 11:09 | Surface | 1.0 | 13.3 | 13.3 | 13.3 | 8.0 | 8.0 | 8.1 | 28.9 | 28.9 | 29.4 | 94.0 | 94.0 | 8.2 | 8.3 | 8.3 | 2.0 | 2.0 | 2.0 |
| | | | | | | 13.2 | | | 8.0 | | | 28.9 | | | 94.0 | | 8.3 | | | 2.0 | | |
| | | | | Bottom | 4.7 | 13.4 | 13.4 | | 8.1 | 8.1 | | 29.9 | 29.9 | | 97.0 | 97.0 | 8.5 | 8.5 | 8.5 | 2.0 | 2.0 | |
| | | | | | | 13.3 | | | 8.1 | | | 29.9 | | | 97.0 | | 8.5 | | | 2.0 | | |
| 8-Feb-18 | Fine | Calm | 11:55 | Surface | 1.0 | 12.4 | 12.4 | 12.9 | 8.1 | 8.1 | 8.1 | 26.3 | 26.3 | 28.1 | 98.0 | 98.0 | 8.9 | 8.9 | 8.9 | 2.0 | 2.0 | 2.0 |
| | | | | | | 12.4 | | | 8.0 | | | 26.3 | | | 98.0 | | 8.9 | | | 2.0 | | |
| | | | | Bottom | 4.9 | 13.5 | 13.5 | | 8.1 | 8.1 | | 30.0 | 30.0 | | 104.0 | 103.5 | 9.0 | 9.0 | 9.0 | 2.0 | 2.0 | |
| | | | | | | 13.4 | | | 8.1 | | | 29.9 | | | 103.0 | | 9.0 | | | 2.0 | | |
| 9-Feb-18 | Cloudy | Moderate | 12:47 | Surface | 1.0 | 14.6 | 14.6 | 14.6 | 8.1 | 8.1 | 8.1 | 31.1 | 31.1 | 31.3 | 101.0 | 100.5 | 8.5 | 8.5 | 8.5 | 2.0 | 2.0 | 2.0 |
| | | | | | | 14.6 | | | 8.1 | | | 31.1 | | | 100.0 | | 8.4 | | | 2.0 | | |
| | | | | Bottom | 4.8 | 14.6 | 14.6 | | 8.1 | 8.1 | | 31.5 | 31.5 | | 99.0 | 98.5 | 8.3 | 8.3 | 8.3 | 2.0 | 2.0 | |
| | | | | | | 14.6 | | | 8.1 | | | 31.4 | | | 98.0 | | 8.3 | | | 2.0 | | |

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## Water Quality Monitoring Results at W2 - Mid-flood Tide (Laboratory Data)

| Date | Weather | Sea Condition | Sampling Time | Depth (m) | | E-coli (cfu/100ml) | | Ammonia-Nitrogen (mg-N/L) | | Total Inorganic Nitrogen | | Suspended Solids (mg/L) | | Biochemical Oxygen Demand | | Chlorophyll-a (mg/L) | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA | Value | DA |
| 2-Feb-18 | Cloudy | Rough | 7:18 | Surface | 1.0 | 36 | 42 | 0.048 | 0.046 | 0.139 | 0.133 | 4.2 | 3.8 | 2.0 | 1.8 | 0.0062 | 0.0062 |
| | | | | Bottom | 4.8 | 47 | | 0.043 | | 0.127 | | 3.3 | | 1.6 | | 0.0062 | |
| 3-Feb-18 | Cloudy | Rough | 7:55 | Surface | 1.0 | 160 | 109 | 0.044 | 0.045 | 0.134 | 0.137 | 3.8 | 3.6 | 2.5 | 2.3 | 0.0038 | 0.0041 |
| | | | | Bottom | 4.9 | 58 | | 0.045 | | 0.140 | | 3.3 | | 2.0 | | 0.0043 | |
| 4-Feb-18 | Cloudy | Moderate | 8:40 | Surface | 1.0 | 37 | 24 | 0.061 | 0.057 | 0.183 | 0.180 | 3.2 | 2.8 | 1.6 | 1.5 | 0.0032 | 0.0035 |
| | | | | Bottom | 4.8 | 11 | | 0.052 | | 0.177 | | 2.3 | | 1.4 | | 0.0038 | |
| 5-Feb-18 | Cloudy | Moderate | 9:22 | Surface | 1.0 | 7 | 7 | 0.031 | 0.033 | 0.110 | 0.113 | 3.3 | 2.8 | 1.1 | 1.4 | 0.0048 | 0.0047 |
| | | | | Bottom | 4.9 | 7 | | 0.034 | | 0.116 | | 2.3 | | 1.7 | | 0.0046 | |
| 6-Feb-18 | Cloudy | Rough | 10:20 | Surface | 1.0 | 2 | 5 | 0.035 | 0.031 | 0.164 | 0.152 | 4.2 | 5.3 | 2.3 | 2.4 | 0.0033 | 0.0038 |
| | | | | Bottom | 4.6 | 7 | | 0.027 | | 0.139 | | 6.3 | | 2.4 | | 0.0042 | |
| 7-Feb-18 | Fine | Calm | 11:09 | Surface | 1.0 | 4 | 4 | 0.024 | 0.023 | 0.190 | 0.189 | 1.6 | 1.4 | 1.1 | 0.6 | 0.0046 | 0.0043 |
| | | | | Bottom | 4.7 | 3 | | 0.022 | | 0.188 | | 1.1 | | <1 | | 0.0040 | |
| 8-Feb-18 | Fine | Calm | 11:55 | Surface | 1.0 | 19 | 22 | 0.072 | 0.076 | 0.414 | 0.413 | 2.2 | 2.4 | 1.7 | 1.9 | 0.0067 | 0.0074 |
| | | | | Bottom | 4.9 | 24 | | 0.079 | | 0.411 | | 2.5 | | 2.0 | | 0.0080 | |
| 9-Feb-18 | Cloudy | Moderate | 12:47 | Surface | 1.0 | Not Detected | 0 | 0.025 | 0.023 | 0.094 | 0.088 | 3.7 | 4.4 | 5.4 | 4.6 | 0.0083 | 0.0136 |
| | | | | Bottom | 4.8 | Not Detected | | 0.020 | | 0.082 | | 5.1 | | 3.7 | | 0.0188 | |

**Remarks: * DA: Depth-Averaged**
**** Calm: Small or no wave; Moderate: Between calm and rough; Rough: White capped or rougher**

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# Appendix I
# Graphical Presentation of Water Quality Monitoring Results

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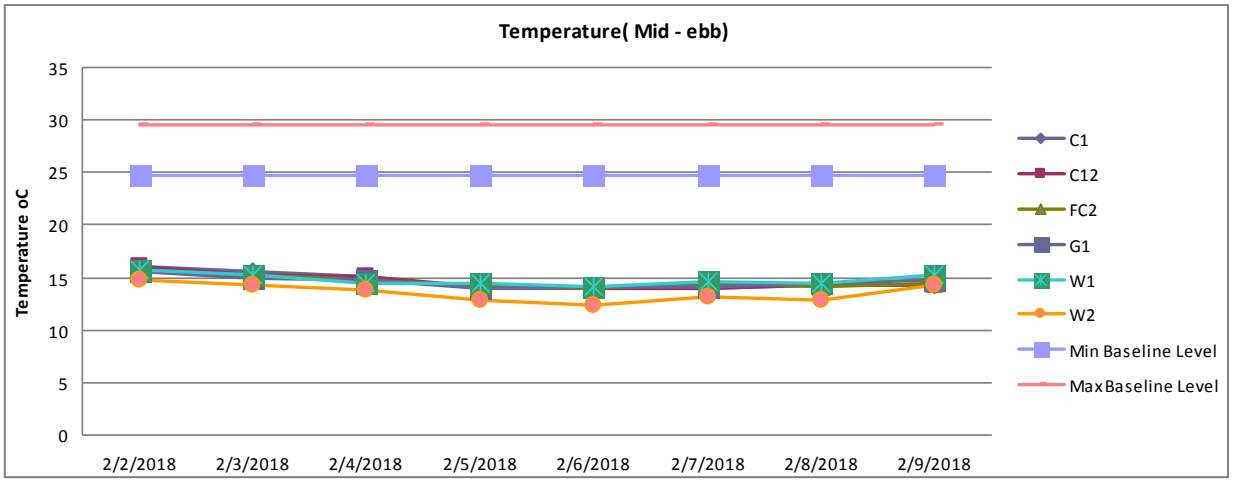


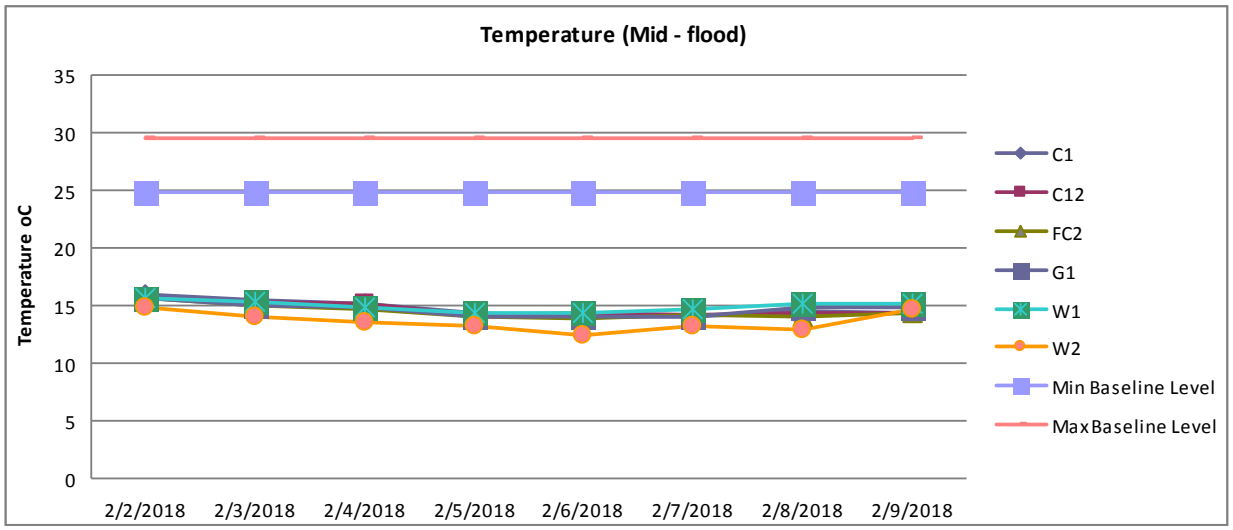

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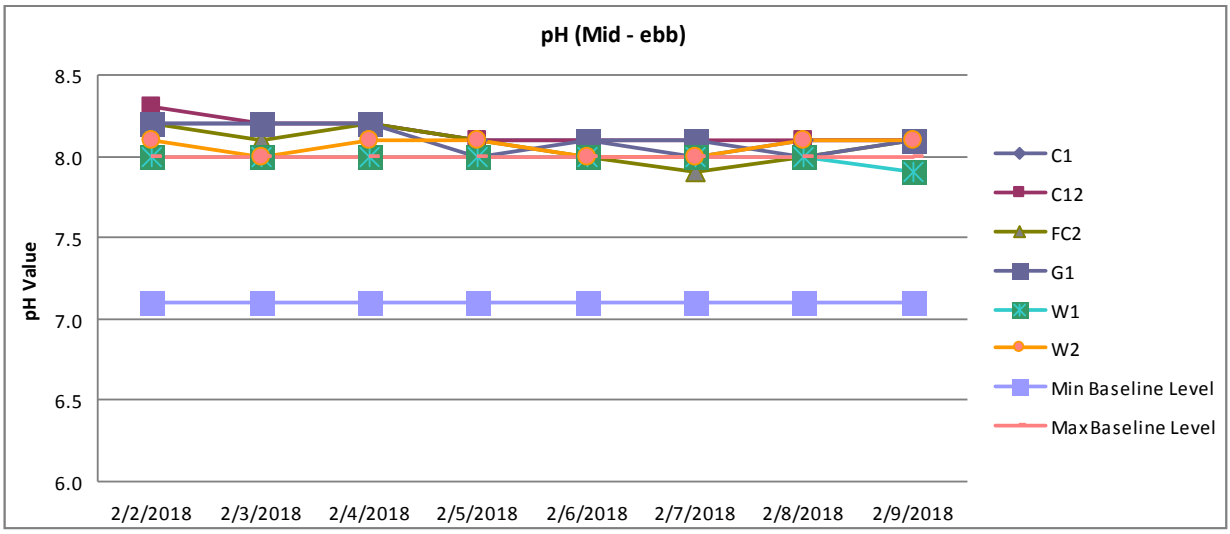


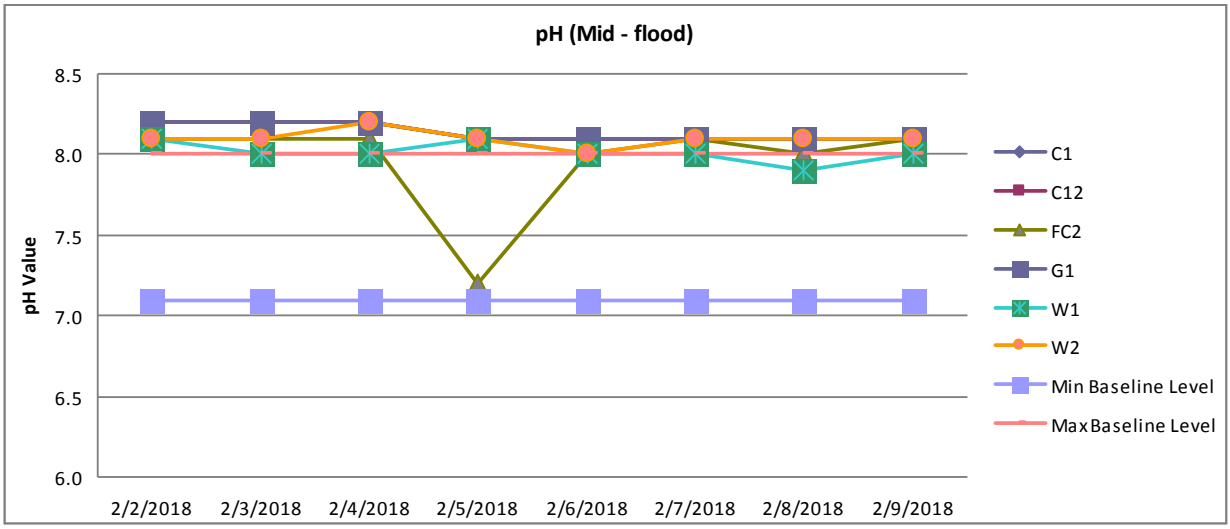

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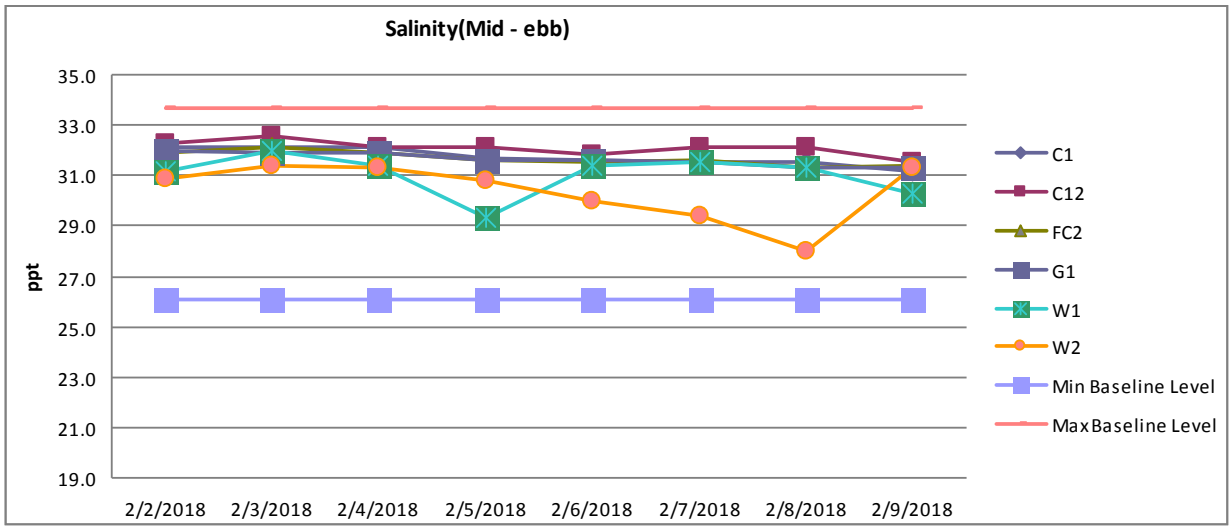


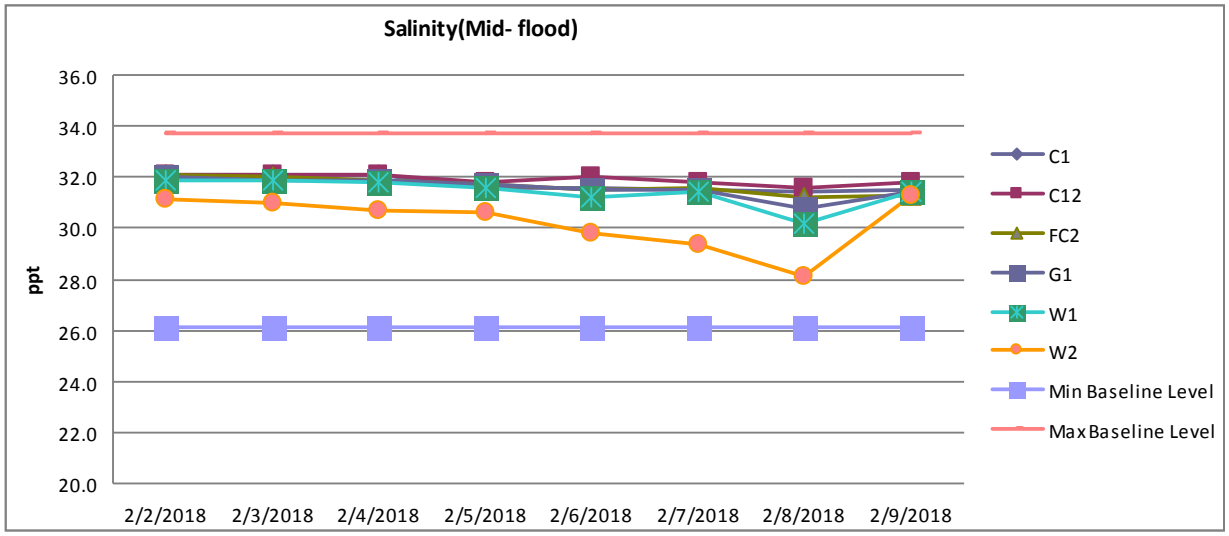

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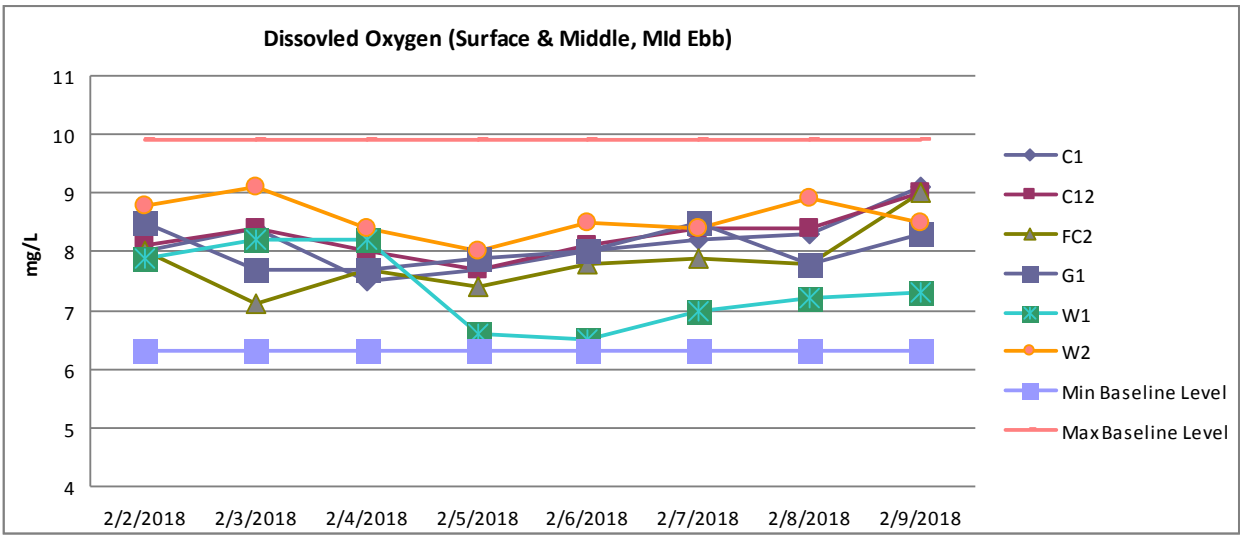


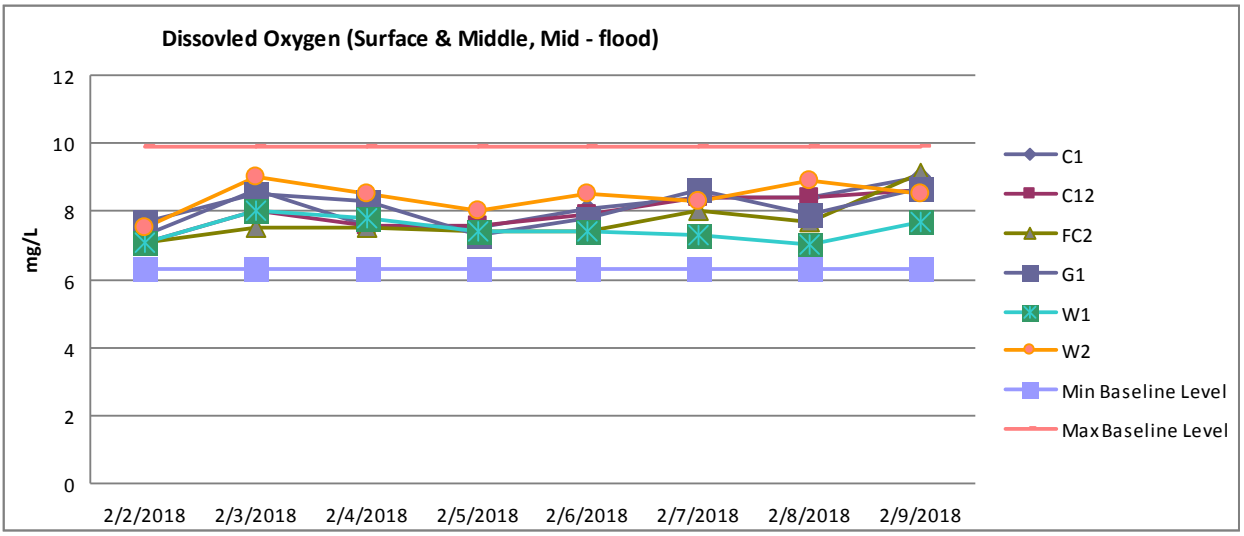

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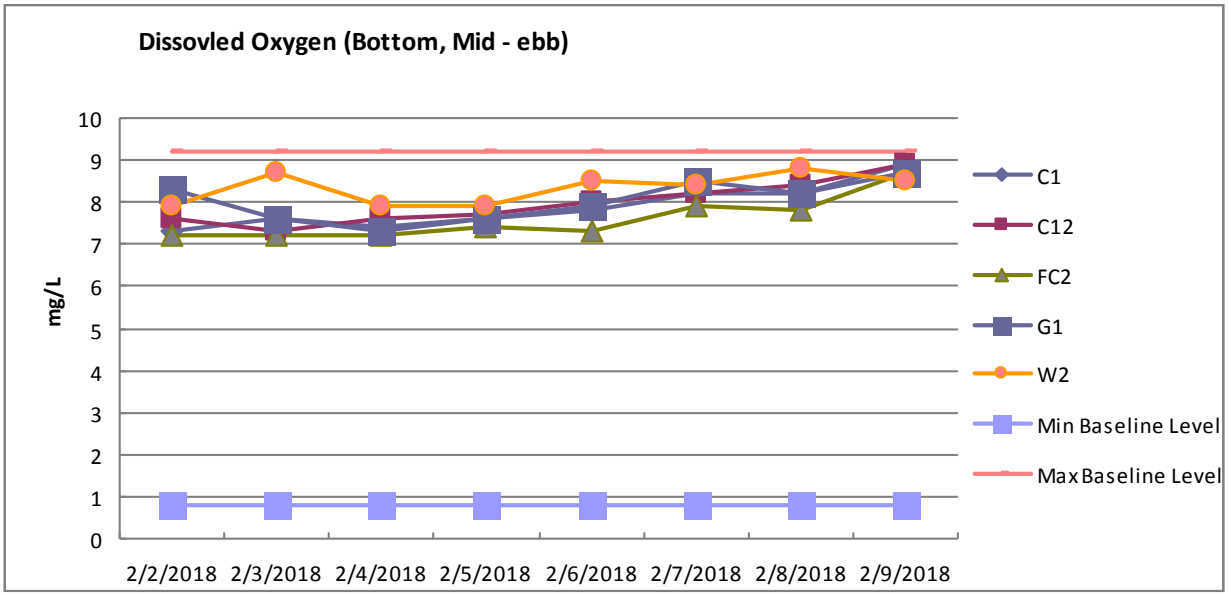


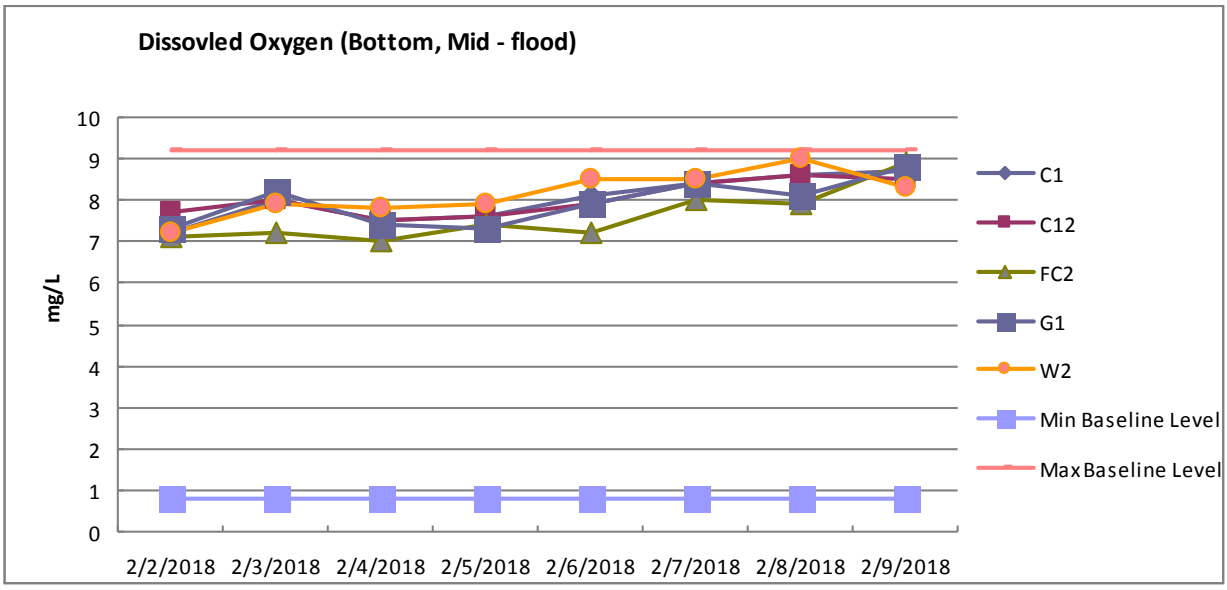

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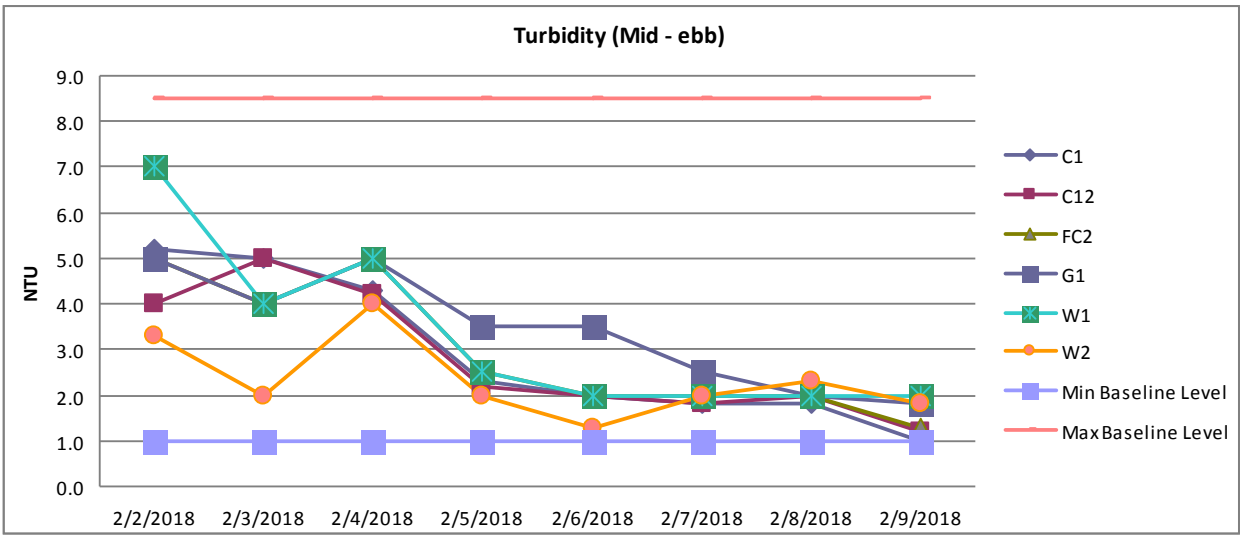


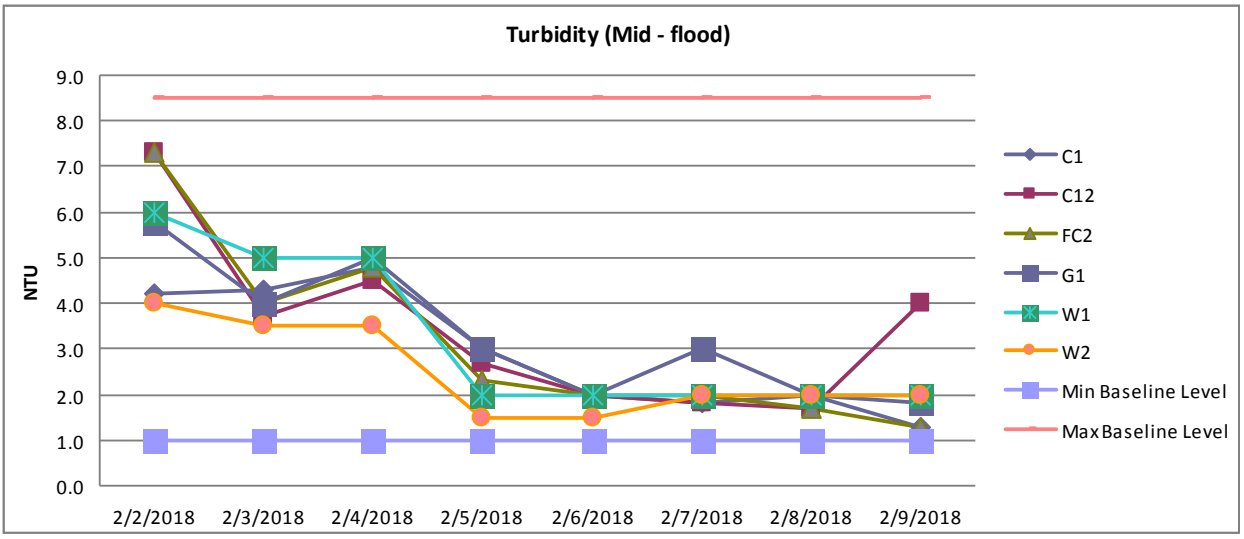

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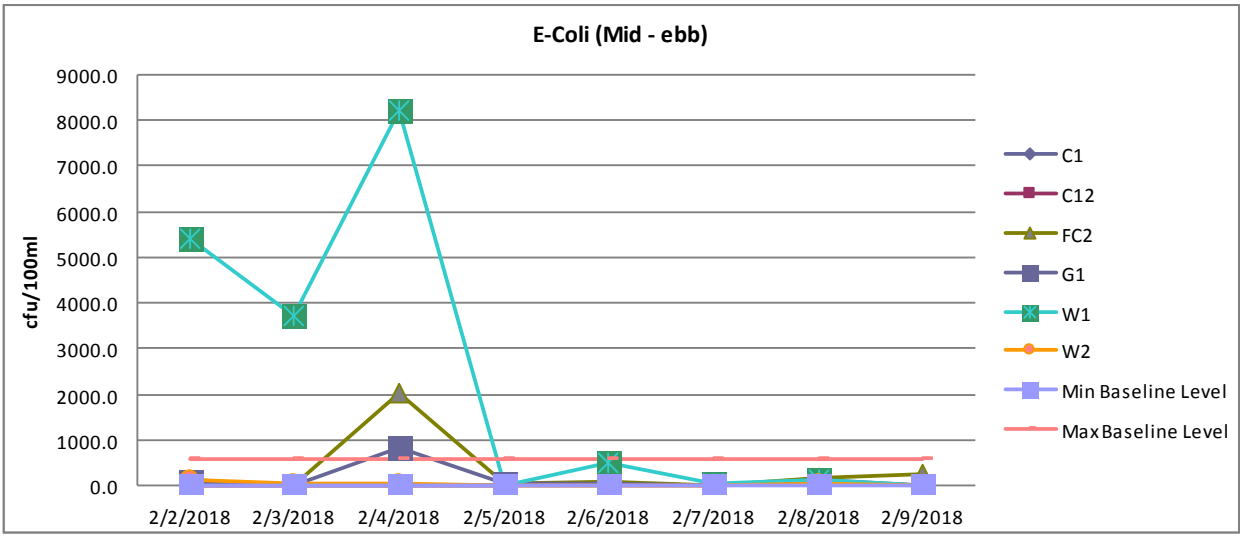


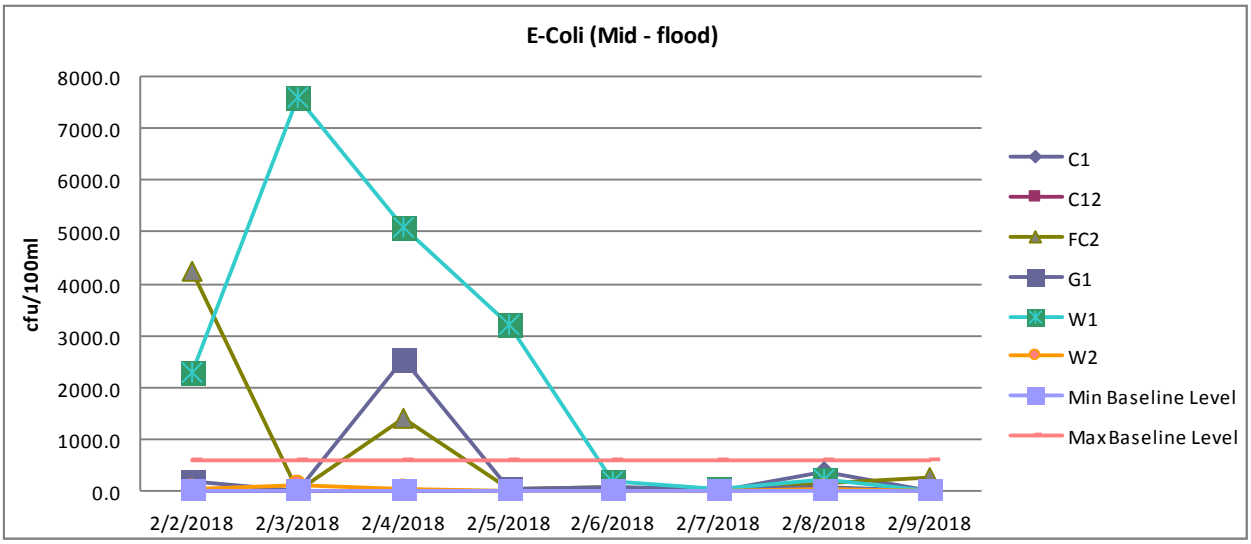

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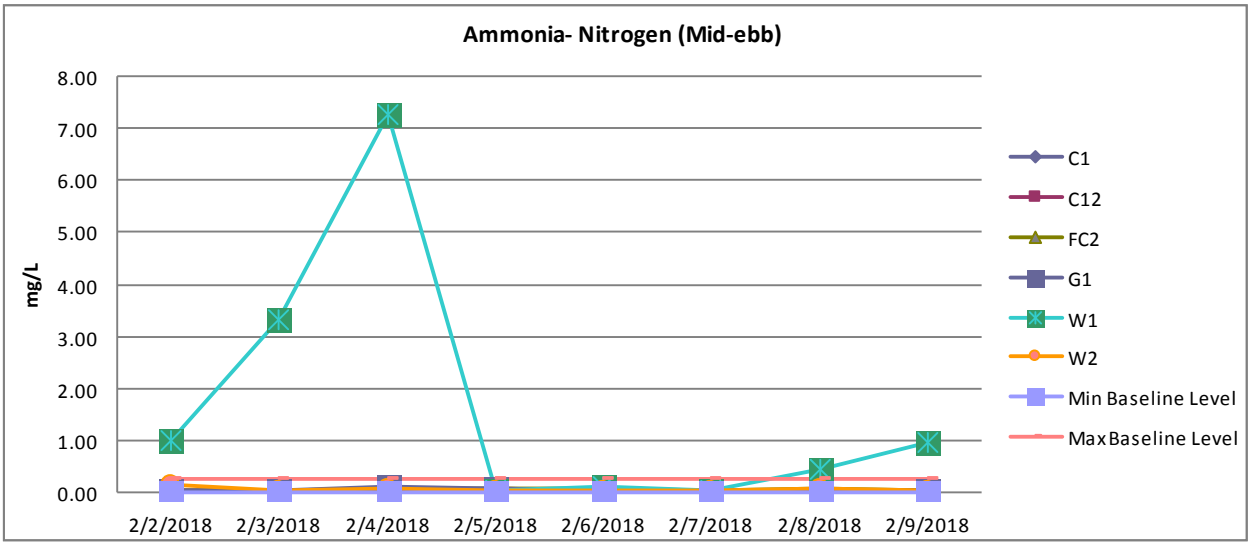


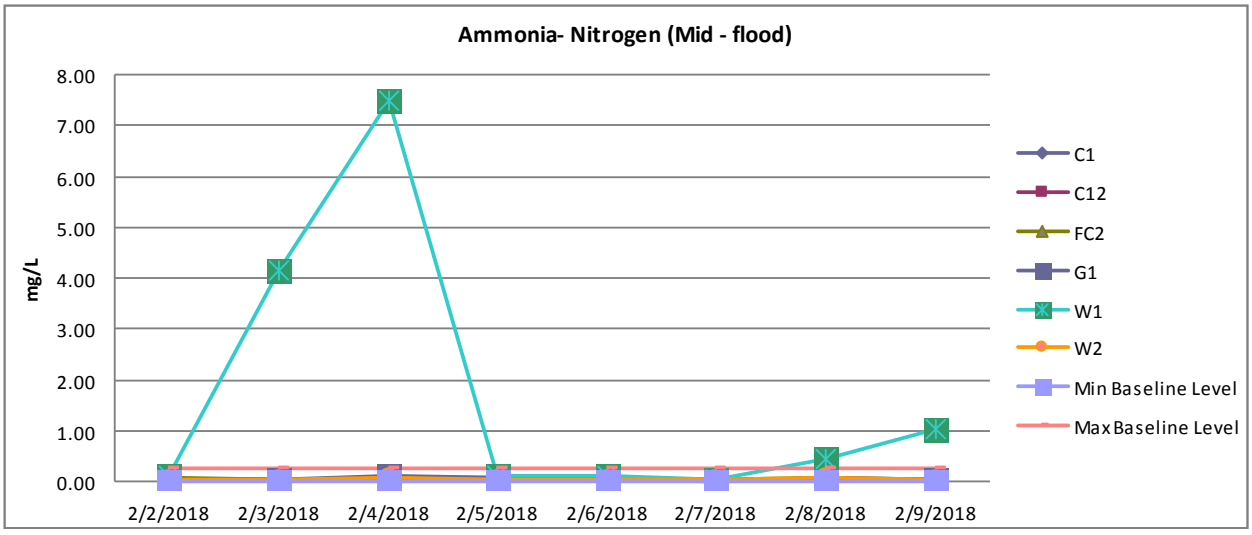

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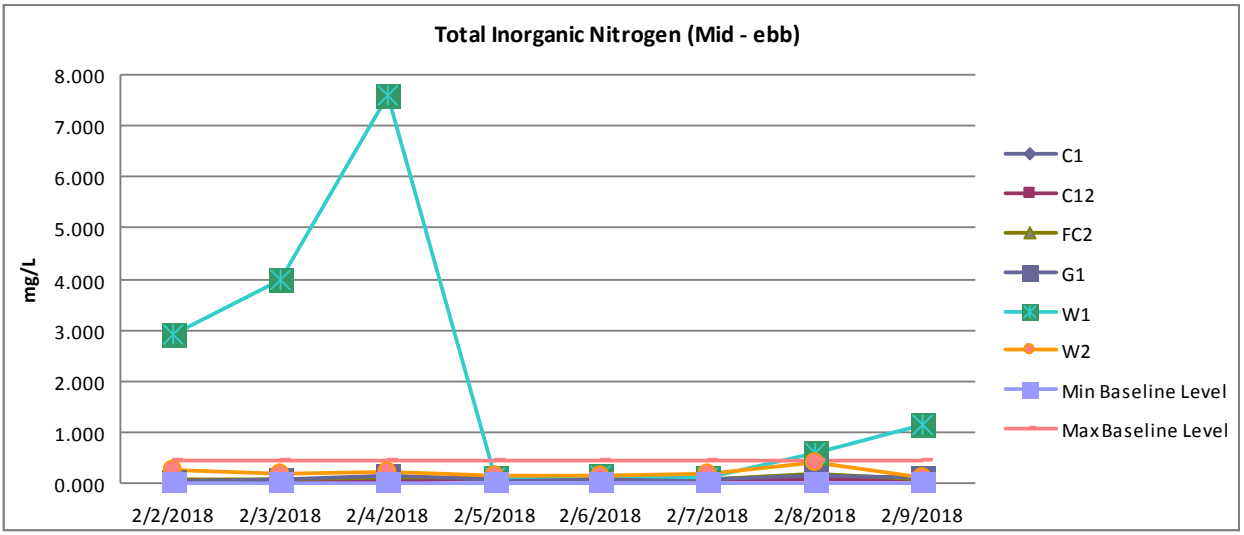


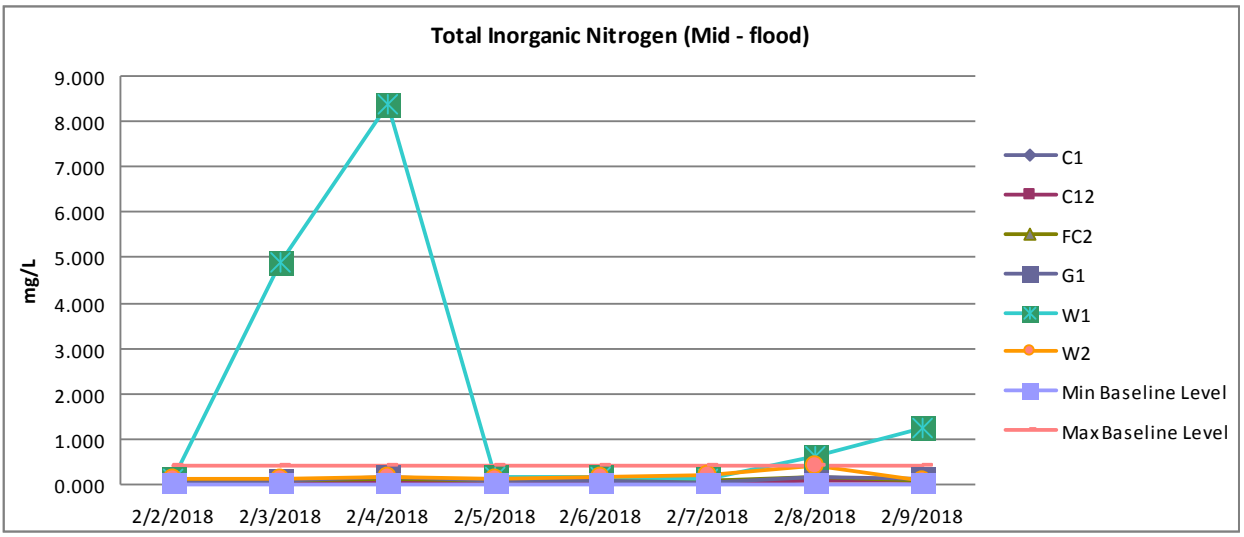

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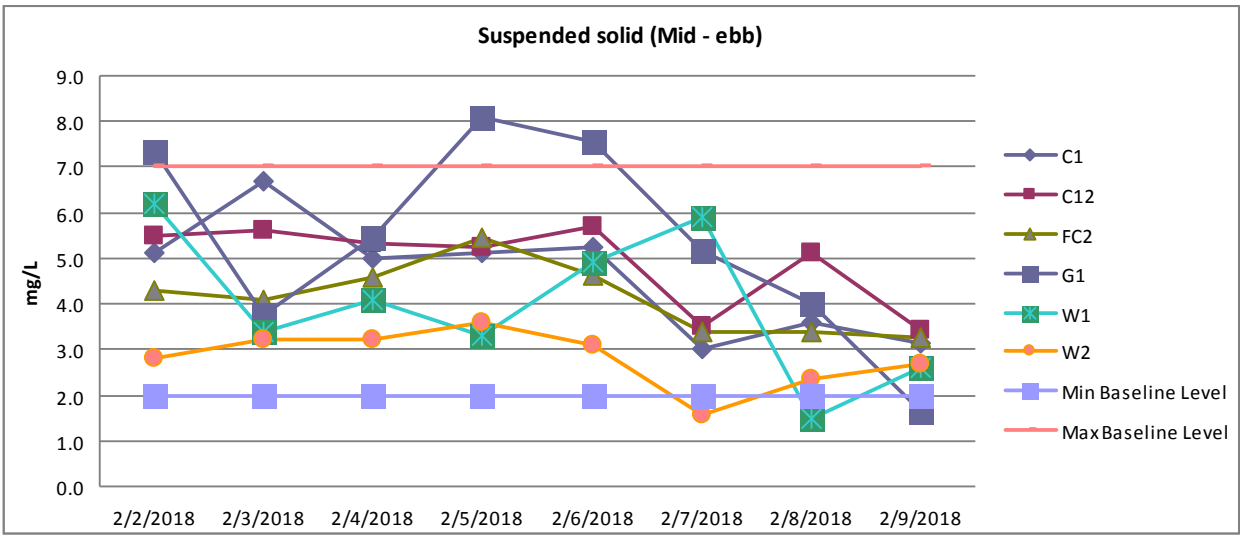


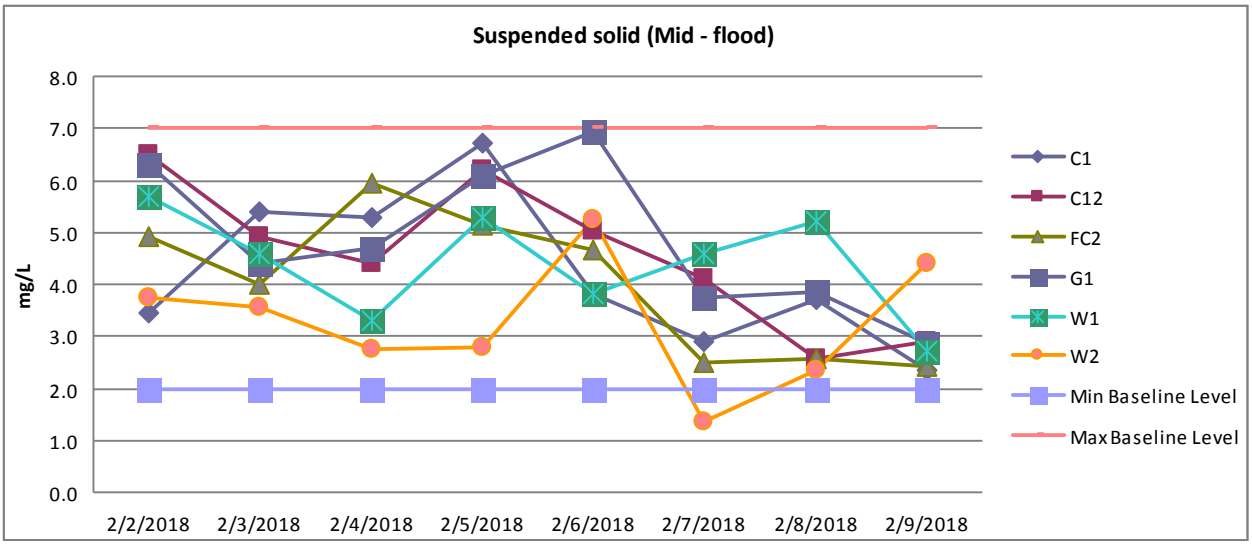

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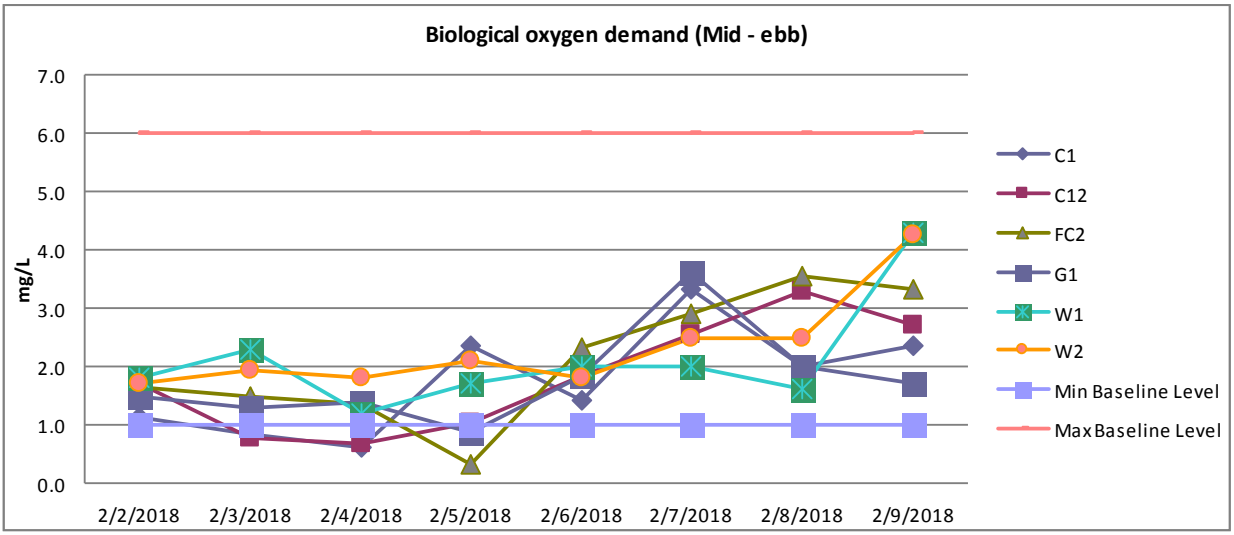


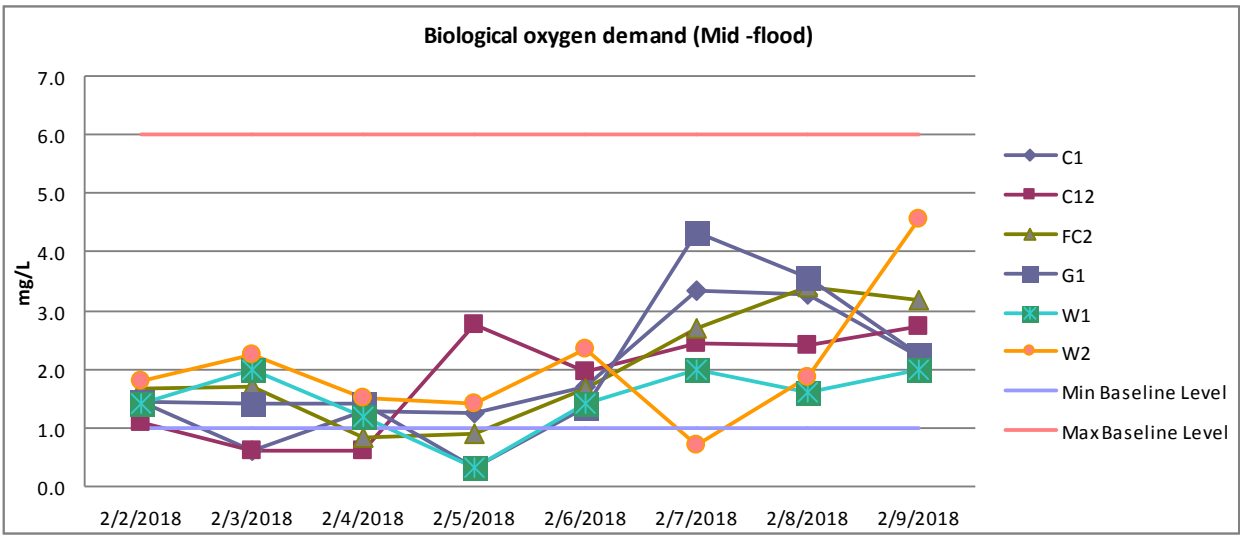

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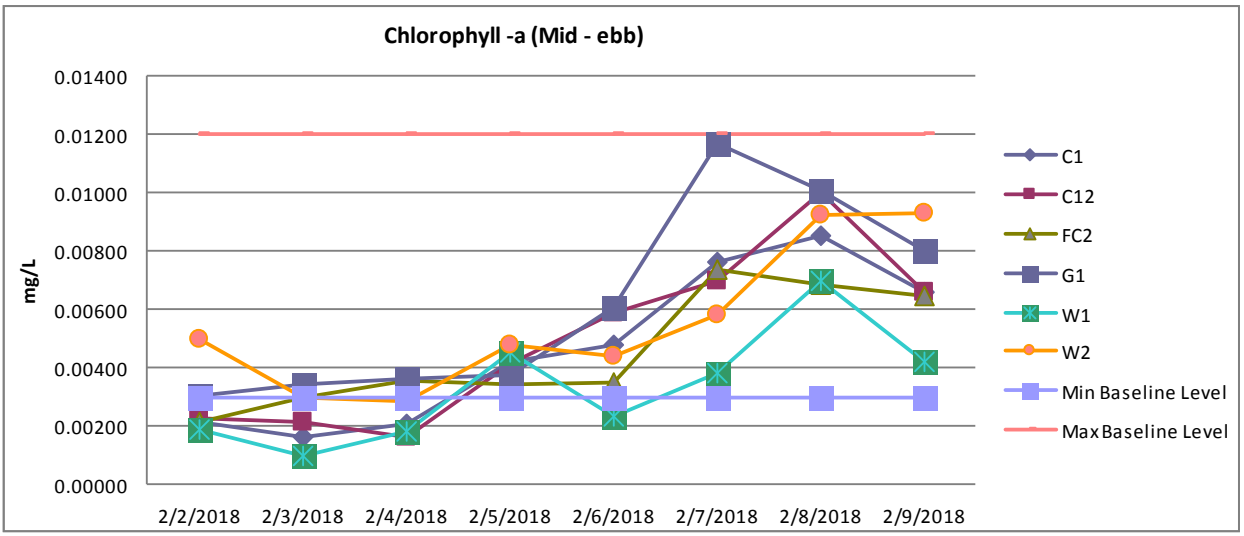


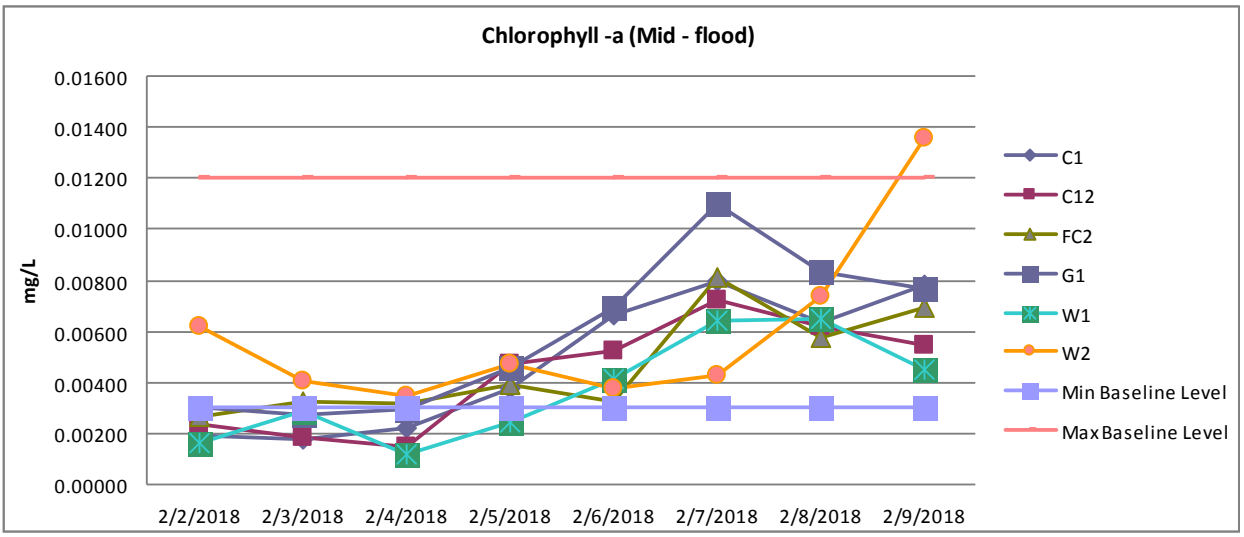

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**Appendix J**

**Implementation Schedule of Environmental Mitigation Measures (EMIS) for Operation Phase**

| EIA Ref. | Environmental Protection Measures | Location of the measures | Implementation Status |
|---|---|---|---|
| **Air Quality** | | | |
| S3.7.5 & 3.7.8 | Exposed area at Stage I/II & IV of inlet pumping stations, sludge digestion tank outlet chambers should be covered, with the foul air drawn through deodorization units and discharged after treatment. The grit removal & flume channel at Stage I/II inlet works and the grit removal at Stage IV inlet works should be covered. | TPSTW | Completed |
| S3.7.6 | Weir launders of the Stage I/II and Stage IV primary sedimentation tanks should be covered to control odour emission. Chemical should also be added to the sewage at Tai Yuen Sewage Pumping Station No.4 for the control of odour at Stage IV inlet pumping station, screen house and primary sedimentation tanks. | TPSTW | Completed |
| S3.7.7 | The sludge gravity thickeners, sludge consolidation tanks, screening unit (next to dewatering house), exposed area of wet well of Stage I/II returned activated sludge pumping station and wet well of Stage I/II sludge pumping station should be enclosed to ensure no leakage of odorous gas whereas foul air from the sludge gravity thickeners and sludge consolidation tanks would be discharged via deodorizers. | TPSTW | Completed |
| **Water Quality** | | | |
| S4.8.10 | Silt curtains should be installed at the Shatin and Tai Po Seawater Intakes. Relevant government departments including EPD and WSD should be informed of then maintenance. | TPSTW | Not applicable in this reporting month. |
| S4.8.11 | Dual power supply or ring main supply from CLP should be provided for the Project to avoid any loss of electrical supply. In addition, standby facilities for the main treatment units, standby parts/accessories to the equipment should also be provided in order to minimize the chance of emergency discharge. | TPSTW | Completed |
| S4.8.10 S4.8.12 | Shutdown of the THEES, if unavoidable, should be shortened as far as possible. The relevant procedures established in the contingency plan as attached in Appendix 4.5 of the EIA report should be properly followed. | TPSTW | Not applicable in this reporting month. |
| S4.8.13 | Dye test is recommended for detection of pipe leakage. | Submarine pipeline at Tolo Harbour | Not applicable in this reporting month. |
| S4.10.1 | Effluent monitoring is recommended to ensure the effectiveness of the proposed treatment process. Details of the monitoring requirements are specified in the EM&A. | Exit of disinfection facilities | Completed |
| S4.10.2 | A post project monitoring (PPM) programme for Victoria Harbour should be implemented to confirm the predictions of the water quality made in the EIA report. The PPM would consist of one- year baseline monitoring before commissioning and one-year impact monitoring after commissioning of the Project. The extent of PPM programme is subject to the prevailing environmental conditions at the time before commissioning of the Project. A more detailed description of the PPM requirements is given in the standalone EM&A Manual | Victoria Harbour | Not applicable in this reporting month. |
| S4.10.3 | A PPM programme will be also implemented in the Tolo Harbour during the operational phase. The PPM would involve water quality monitoring at the Tai Po and Sha Tin seawater intake during the first wet season (June to August) after full commissioning of the Project. Marine water quality parameters including SS and NH3-N should be monitored. The water quality monitoring frequency shall be twice per month and should cover the effects of different tidal status (at least one for high tide and one for low tide) for each seawater intake. | Tolo Harbour | Not applicable in this reporting month. |

| | | | |
|---|---|---|---|
| S4.8.10 &S4.10.4 | Marine water quality monitoring should be carried out under emergency condition or during maintenance of the THEES tunnel to verify the findings of the water quality modelling. It is recommended that the maintenance of the THEES tunnel, if unavoidable, should be conducted during winter season or low flow periods and to avoid the ”blooming” season of algae (normally from April to June)if practicable. Details of the monitoring requirements are specified in the EM&A Manual. | Tolo Harbour | Completed. |
| **Waste Management** | | | |
| S5.5.9 | Chemical Waste<br>For the disposal of spent UV lamps, the STW operator would be required to register with the EPD as a Chemical Waste Producer and to follow the requirements stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. A chemical waste producer must engage a licensed waste collector to transport and dispose of the chemical wastes in accordance with the Waste Disposal (Chemical Waste) (General) Regulation. | TPSTW | Completed |
| **Landfill Gas Hazard** | | | |
| S6.6.9 | When service voids, manholes or inspection chambers within the proposed site are entered for maintenance, monitoring and a checklist system of safety requirements should be performed before entry in accordance with Code of Practice on Safety and Health at Work in Confined Spaces. | Area of TPSTW within 250m consultation zone | Completed |
| S6.6.10 | For newly built permanent structures, gas- resistant polymeric membranes shall be incorporated into floor or wall construction to act as a continuous sealed layer for the structure. In addition, forced ventilation shall be installed in such rooms or buildings. Gas detection systems should also be proposed where there is an organization involved in the long-term or frequently use of the development in order to monitor internal spaces inside buildings. | Area of TPSTW within 250m consultation zone | Completed |
| S6.6.11 | Forced ventilation should be used if methane of more than 0.5% (by volume) in the internal atmosphere (e.g. In service voids, manholes, inspection chambers or rooms as mentioned above) is detected. | Area of TPSTW within 250m consultation zone | Completed |
| S6.6.12 | No person should enter or remain in any confined spaces or trenches where the carbon dioxide concentration exceeds 1.5% (by volume). | Area of TPSTW within 250m consultation zone | Completed |
| S6.6.13 | Oxygen concentration should be monitored and no person shall enter or remain in any confined spaces or trenches where the oxygen content of air has fallen below 18 % by volume. | Area of TPSTW within 250m consultation zone | Completed |
| S6.6.14 | All the access to these confined spaces should be restricted only to authorized personnel who should be aware of the LFG hazard. No member of general public should be permitted or allowed to access these confined spaces, manholes or inspection chambers. | Area of TPSTW within 250m consultation zone | Completed |

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**Appendix K**
**Chemical Waste Producer Registration License**

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(30)

# MEMO

From : Director of Environmental Protection
Ref. : ( ) in EP CW/D2226/727/15
Tel. : 2634 3884 Fax 2685 1155
Date : 19 APRIL , 2000

To : Director of Drainage Services
(Attn. Mr. Ho Wai Hung) 2/5
/ Tai Po STW
Your Ref. : _____ in TP/A57
dated : Fax no 26660207

Waste Disposal Ordinance (Cap.354)
Waste Disposal (Chemical Waste) (General) Regulation
Registration as a Chemical Waste Producer
Tai Po Sewage Treatment Works

I refer to your memo under reference.

2. Our records show that there are duplicate registration as a chemical waste producer (CWP) for the Tai Po Sewage Treatment Works. As per your request, we have removed one of the CWP registration (WPN of 0014-727-D2158-02 dated 26.10.1992) from the register with effect from the date of this memo. As a result, the registration form (Form EPD 130) with WPN of 0014-727-D2158-02 dated 26.10.1992 for the above premises is no longer valid.

3. On the other hand, I am pleased to inform you that your revised registration (WPN of 0014-727-D2226-15) with this Department as a CWP has been completed. Your assiged Waste Producer Number (WPN) and the particulars of your establishment are printed in the enclosed form (EPD 130). Please check these entries in the form and notify this Department immediately in any irregularities are detected. Please note that this registration is not transferable and will be valid only in respect of the applicant and the premises registered. In case of any change in the registration particulars, you should inform this Department as soon as possible so that our record so that our record can be amended accordingly.

4. Should you have any queries, please contact our Mr. YIU on 26851156 or the undersigned.

( W.C. SUN )
Local Control Office (Territory North)
for Director of Environmental Protection

Encl.

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Report No.: 0151/15/ED/1052

## Environmental Protection Department
## 環境保護署

**Waste Disposal Ordinance (Chapter 354)**
**香港法例第354章廢物處理條例**
**Waste Disposal (Chemical Waste) (General) Regulation**
**廢物處理(化學廢物)(一般)規例**
**Registration of Waste Producer**
**廢物產生者登記證**

To: 致

**Waste Producer 廢物產生者**

Full Name (English) DIRECTOR OF (Chinese) 渠務署署長
全 名：(英 文) DRAINAGE SERVICES (中 文)
I.D. Card No. (if any) - - -
身份證號碼：(如有者)
Business Reg. Cert. No. (if any)
商業登記證號碼：(如有者) - - -
Address for Correspondence
通訊地址：DSD, TAI PO SEWAGE TREATMENT WORKS,
7 DAI KWAI STREET, TAI PO INDUSTRIAL ESTATE, TAI PO, N.T.
Tel. No. 電話：26640011
Fax No. 圖文傳真：26660207

With reference to your application dated 09 / 03 / 2000 for registration as a Waste Producer under the Waste Disposal (Chemical Waste) (General) Regulation, the Waste Producer Number, WPN [5][1][1][4]-[7][2][7]-[D][2][2][2][6]-[1][5] is assigned to you in respect of the location or premises listed below:—

前於二000年三月九日根據廢物處理(化學廢物)(一般)規例而來信，申請登記為廢物產生者，茲特配予廢物產生者編號第 [5][1][1][4]-[7][2][7]-[D][2][2][2][6]-[1][5] 號，予下開地點或樓宇：—

**Location or Premises where the waste is produced 產生廢物的地點或樓宇**

Name of Establishment
機構名稱：DSD, TAI PO SEWAGE TREATMENT WORKS
Business Reg. Cert. No. (if any)
商業登記證號碼：(如有者) - - -
Nature of Business
業務性質：SEWAGE TREATMENT
Major chemical waste types
主要化學廢物種類：SPENT LUBRICATING OIL & SPENT SOLVENT
Address
地址：DSD, TAI PO SEWAGE TREATMENT WORKS, 7 DAI KWAI STREET,
TAI PO INDUSTRIAL ESTATE, TAI PO, N.T.
Tel. No. 電話：26640011
Fax No. 圖文傳真：26660207
Contact Person (Full Name) 聯絡人：(全名) HO WAI HUNG
(Capacity) (職位) WORKS MANAGER

HONG KONG — ENVIRONMENTAL PROTECTION DEPARTMENT — 香港環境保護署

( W.C. SUN )
for *Director of Environmental Protection*
環境保護署署長 ( 辛偉才 代行)

Date
日期 19 / 04 / 2000

**WARNING:** Any registered waste producer who fails to inform the Director of Environmental Protection of any change in his registration particulars commits an offence and is liable on conviction to a fine of $10,000.
**警 告：** 任何已登記的廢物產生者，若其登記資料有任何改變而不知會環境保護署署長，即屬違法，被定罪者最高罰款港幣10,000元。