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Monthly EM&A Report
February 2020

Client	:	Drainage Services Department
Project	:	Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works
Report No.:	:	0041/17/ED/0533A

Prepared by: Andy K. H. Choi

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Attn: Mr. LAU Ka Kin, Marcus (E/CM16)

11 March 2020

By Post and E-mail

Dear Sir,

RE: CONTRACT NO. CM 13/2016
INDEPENDENT ENVIRONMENTAL CHECKER FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT WORKS (SHWSTW)
MONTHLY ENVIRONMENTAL MONITORING AND AUDIT (EM&A) REPORT (FEBRUARY 2020)

Reference is made to the submission of Monthly Environmental Monitoring and Audit (EM&A) Report for February 2020 (Report No.: 0041/17/ED/0533A) from the Environmental Team (ET), Fugro Technical Services Ltd., received on 11 March 2020 via email.

We would like to inform you that we have no adverse comment on the captioned submission and hereby verify the same in accordance with Condition 4.3 of the Environmental Permit (EP) for the captioned Project (Permit No.: EP-076/2000).

Should you have any queries, please feel free to contact the undersigned, or our Ms. Joanne NG at 2815 7028.

Yours faithfully,

For and on behalf of
Allied Environmental Consultants Ltd.

Grace M. H. KWOK
Independent Environmental Checker

GK/jn/dt

c.c. Fugro Technical Service (ET Leader) Attn: Mr. Colin YUNG (By E-mail)
AECOM Attn: Ms. Joanne TSOI (By E-mail)

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Report No.: 0041/17/ED/0533A

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APPENDICES

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EXECUTIVE SUMMARY

This Monthly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract No. CM 14/2016 – "Environmental Monitoring and Audit for Operation of Siu Ho Wan Sewage Treatment Works" (hereafter referred to as "the Contract") for the Drainage Services Department (DSD) of Hong Kong Special Administrative Region. Fugro Technical Services Limited (hereafter referred to as "FTS") was appointed as the Environmental Team (ET) by DSD, to implement the Environmental Monitoring & Audit (EM&A) programme in accordance with the Operational EM&A Plan of the Contract.

The Contract is part of the "Upgrading of Siu Ho Wan Sewage Treatment Works" (hereinafter referred as "the Project)" which was classified as "Designated Project" under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499) and Environmental Impact Assessment (EIA) Report (Register No. EIAR-124BC) was completed in September 1997. The current Environmental Permit (EP) No. EP-076/2000 was issued in August 2000 to DSD.

In accordance with the EP, an approved operational EM&A Plan was submitted. According to the approved EM&A plan, air quality monitoring (i.e. H_2S concentration monitoring, odour patrol monitoring and olfactometry analysis of H_2S), in addition, water quality monitoring, sediment quality monitoring, benthic survey, Chinese White Dolphin (CWD) monitoring and waste management are the key environmental concern of the Project.

This is the Thirty-first Monthly EM&A Report for the Project which summarizes findings of the EM&A works during the reporting period from 1 February 2020 to 29 February 2020 (the "reporting period").

Breaches of Action and Limit Levels

Odour patrol monitoring was resumed from January 2020 and carried out on 6, 12, 18 and 24 February 2020. No exceedances of Action/Limit levels at Air Sensitive Receivers (ASR) were recorded and no non-compliance of odour monitoring at ASR were recorded in the reporting period.

Water quality monitoring, sediment quality monitoring and benthic survey were carried out on 10 February 2020. No specific Action/Limit level has to be followed since the purpose of the monitoring is to collect data for future purpose.

Complaint Log

There were no complaints received in relation to environmental impact during the reporting period. The incident report for the complaint case received on 28 November 2019 was submitted to EPD on 19 December 2019. Further investigation based on the EPD's comments received on 21 January 2020 was undergoing and the finding shall be submitted to EPD after completed.

Notifications of Summons and Successful Prosecutions

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

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Summary of the Environmental Mitigations Measures

Mitigation measures specified in the EP and EIA Report such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment unit prior to stack exhaust were implemented during the reporting period.

Future Key Issues

The key issues to be considered in the succeeding reporting month include:

Potential environmental impacts arising from the operations of Siu Ho Wan Sewage Treatment Works (SHWSTW) are mainly associated with air quality, water quality, sediment quality, benthic ecology, waste management and distribution and abundance of Chinese White Dolphins (CWDs).

According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m3). H_2S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m3). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring has been carried out to determine reasonable odour-related criteria. Based on IEC's comments given on 8 January 2020, an updated review was submitted on 5 February 2020 for IEC's review. Further comments were received from IEC on 17 February 2020 and the review on air quality monitoring was under progress.

1. INTRODUCTION

1.1 Background

1.1.1 The Project "Upgrading of Siu Ho Wan Sewage Treatment Works" is to upgrade SHWSTW from the preliminary treatment level to Chemically Enhanced Primary Treatment (CEPT) level with Ultraviolet (UV) disinfection facilities. The Project is required to comply with the Environmental Permit (EP) in respect of the construction and operation phases of the Plant.

1.1.2 Under the EIAO, the Project was classified as "Designated Project". The Environmental Impact Assessment (EIA) study was completed in September 1997 with the EIA Report of Register No. EIAR-124BC, Operational Environmental Monitoring and Audit (EM&A) Plan and the EP of No. EP-076/2000 was issued in August 2000 to Drainage Services Department (DSD).

1.1.3 The CEPT part has been completed and was put into operation in March 2005. The UV disinfection works were substantially completed in December 2006. It is considered that the operation of the Project shall be deemed to start when the UV disinfection facilities have been completely installed and tested.

1.2 Project Description

1.2.1 The project proponent was DSD. AECOM was commissioned by DSD as the Engineer for the Project. Allied Environmental Consultants Limited (AEC) was commissioned by DSD as the Independent Environmental Checker (IEC) in the operation phase of the Project. FTS was appointed as the ET by DSD to implement the EM&A programme for the operation phase of the Project including air quality monitoring, water quality monitoring, sediment quality and benthic survey and CWDs monitoring.

1.3 Project Organization

1.3.1 The project organization 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

Organization	Role	Contact Person	Telephone No.	Fax No.
DSD	Project Proponent Representative	Mr. Marcus Lau	2594 7218	3104 6426
AECOM	Engineer Representative (ER)	Ms. Joanne Tsoi	3922 9423	3922 9797
AEC	Independent Environmental Checker (IEC)	Ms. Grace Kwok	2815 7028	2815 5399
FTS	ET Leader (ETL)	Mr. Colin Yung	3565 4114	2450 8032

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1.4 Works Undertaken during the Reporting Period

1.4.1 During this reporting period, the principal work activities included:

- Perform comprehensive operation and maintenance services for the electrical, mechanical and electronic systems/equipment at SHWSTW.
- Alleviate as far as practicable the impact that the facilities and sewage systems imposed on the environment of Hong Kong.

2. AIR QUALITY MONITORING

2.1 Methodology of H_2S Concentration Monitoring

2.1.1 15-min H_2S concentration was measured using a Jerome 631-X analyzer. This analyzer is capable of measuring H_2S concentration in the range of 1 ppb to 50 ppm with a resolution of 1 ppb and operates within a temperature range of 0ºC to 40ºC at an air flow rate of 0.15 L/min. Odour gas samples were drawn by built-in a suction pump of the analyzer and passed through a gold film sensor. The trace level of H_2S of the samples were determined electrochemically on the gold film sensor. Meteorological conditions including temperature, wind speed, wind direction and relative humidity were also measured at the time of the monitoring. Table 2.1 summarizes the equipment used in H_2S monitoring.

Table 2.1 Equipment used for H_2S Concentration Monitoring

Equipment	Manufacturer / Model	Serial Number	Sensor Number
Gold Film Hydrogen Sulphide Analyzer	JEROME X631 0003	2966	14-11-23-R2D

2.2 Methodology of Odour Patrol Monitoring

2.2.1 Odour patrol monitoring was carried out in accordance with the European Standard method: BS EN13725, to ensure the odour sensitivities of all patrol members are within 20-80 ppb/V. Environmental conditions were record as follows:

i. Prevailing Weather Condition;
ii. Wind Direction;
iii. Wind Speed;
iv. Location where Odour is detected;
v. Source of Odour detected;
vi. Perceived intensity of Odour detected;
viii. Duration of Odour detected; and
ix. Characteristics of Odour detected

The perceived intensity is classified into 5 categories as shown in **Table 2.2** below.

Table 2.2 Categories of Odour Intensity

Odour Level	Odour Intensity	Classification Criteria
0	Not detected	No odour perceives or an odour so weak that it cannot be readily characterised or described
1	Slight	Identifiable odour, barely noticeable
2	Noticeable	Identifiable odour, noticeable
3	Strong	Identifiable odour, strong
4	Extreme	Severe odour

2.3 Methodology of Odour Sampling and Olfactometry Analysis

2.3.1 Odour gas samples were collected in a Nalophan sampling bag placed inside a vacuum air-tight sampler using passive sampling technique. Approximately 60 liter of gas sample was collected at each sampling. All samples collected on the sampling day were returned to laboratory for olfactometry analysis within 24 hours and analyzed within 2 hours upon receiving.

2.3.2 ALS Technichem (HK) Pty Ltd. (HOKLAS Reg. No. 066), was the appointed laboratory for olfactometry analysis of the gas sample.

2.3.3 The odour concentration of the samples were determined by Forced-choice Dynamic Olfactometer in accordance with the European Standard Method: BS EN13725. Testing were also performed by a panel of six members who have been trained to comply with the requirement of European Standard Method: BS EN13725. All testing were completed within 24 hours upon sampling.

2.4 Monitoring Location

2.4.1 Odour patrol monitoring was carried out at ASR, Cheung Tung Road near the Bus Depot at the west of the Siu Ho Wan Treatment Plant. The location of ASR is shown in **Figure 1**.

2.5 Monitoring Frequency and Duration

The durations and frequencies of H_2S concentration measurement, odour patrolling and odour sampling are summarized in **Table 2.3** below.

Table 2.3 Durations and Frequencies of Air Quality Monitoring Programme

	Duration	Frequency
H_2S concentration monitoring	15 minutes	[1]Weekly basis for 6 months during the initial operation stage
Odour patrol		[4]Weekly basis
Odour sampling for olfactometry analysis	[3]15 minutes	[2]First week of the odour patrol monitoring

Remark:
1) In case excessive odour nuisance was detected during the odour patrol monitoring or the standard of the 5 odour units cannot be complied with during the odour panel monitoring, the odour patrol monitoring and H_2S concentration monitoring shall be extended for a period of three months to cater for the warm-up period of the functioning of the additional mitigation measures.
2) In case the relationship between H_2S concentration (ppb) with the odour unit (OU/m3) cannot conclude from the correlation study carried out at the first week of the odour patrol monitoring due to invalid data, additional odour sampling for olfactometry analysis shall be carried out for the correlation study.
3) Sufficient air samples (approximate 60L) may be collected in less than 15 minutes during odour sampling.
4) As advice by EPD on the odour complaint received in November 2019, odour patrol monitoring was resumed on weekly basis from 15 January 2020.

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

2.6 Event and Action Plan

2.6.1 Action and limit levels for air quality monitoring are presented in **Table 2.4**.

Table 2.4 Action and Limit Levels for Air Quality Monitoring

Parameter	Action	Limit
Odour	One complaint received for specific odour event	Two or more independent complaints receive for specific odour event

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

2.7 Quality Assurance and Quality Control

2.7.1 A control sample was collected by purging odour-free nitrogen gas from a certified gas cylinder on site at each sampling.

2.7.2 Calibration of the analyzer is conducted every year at the laboratory of the manufacturer.

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

2.8 Monitoring Results and Observations

2.8.1 As advice by EPD on the odour complaint received in November 2019, odour patrol monitoring was resumed on weekly basis from January 2020. The odour patrol monitoring was carried out on 6, 12, 18 and 24 February 2020.

2.8.2 The meteorological data including temperature, wind speed and direction of the reporting period at ASR is summarised in **Table 2.5**.

Table 2.5 Summary of Meteorological Data in Reporting Period

Date	Time	Temperature (°C)	Relative Humidity (%)	Wind Direction	Wind Speed (m/s)
6 February 2020	14:30 – 14:45	19.3	77	E	0.4
12 February 2020	11:45 – 12:00	24.5	89	SE	0.3
18 February 2020	11:46 – 12:01	21.5	57	N	0.8
24 February 2020	11:00 – 11:15	21.8	76	E	0.4

2.8.3 The monitoring results in the reporting period are summarised in **Table 2.6**. Graphical pots of results and details of monitoring data are shown in **Appendix D**.

Table 2.6 Summary of Air Quality Monitoring Result in Reporting Period

Monitoring Location	Monitoring Parameter
	Odour Patrol^ (Odour Level)
	Range
ASR	0 - 0

Remark:
^Odour Level: 0 – Not detected, 1 – Slight, 2 – Moderate, 3 – Strong, 4 – Extreme

2.8.4 According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m^3). H_2S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m^3). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring has been carried out to

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determine reasonable odour-related criteria. Based on IEC's comments given on 8 January 2020, an updated review was submitted on 5 February 2020 for IEC's review. Further comments were received from IEC on 17 February 2020 and the review on air quality monitoring was under progress.

2.8.5 No exceedances of Action/Limit levels at ASR were recorded as no complaint was received during the reporting period.

2.8.6 Odour mitigation measures such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment unit prior to stack exhaust were implemented during the reporting period.

3. WATER QUALITY MONITORING

3.1 Monitoring Station

3.1.1 In accordance with Section 5 of the EM&A Plan, water quality monitoring should be carried out at eight designated monitoring stations (two impact stations and six control stations) during the first five years of the operational phase of the Project. The monitoring stations shall be the same monitoring stations that were used for the baseline monitoring programme and have been approved by EPD. The coordinates of the monitoring stations are shown in **Table 3.1** and their locations are shown in **Figure 2**.

Table 3.1 Location of Water Quality Monitoring

Sampling Location		Easting	Northing
A	The Brothers, Control Station	816 100	822 500
B	The Brothers, Control Station	816 680	822 440
C	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
E	Cheung Sok, Control Station	819 817	821 655
F	Cheung Sok, Control Station	820 158	821 922
G	Tai Ching Chau, Control Station	822 214	822 692
H	Tai Ching Chau, Control Station	822 494	822 939

3.2 Monitoring Parameter

3.2.1 The monitoring parameters for water quality monitoring are summarized in **Table 3.2**.

Table 3.2 Parameters for Water Quality Monitoring

Monitoring Parameters	
In-situ Measurement	**Laboratory Analysis**
Dissolved oxygen (mg/L)	*E. coli* (cfu/100ml)
Temperature (degree Celsius)	5-day BOD (mg/l)
pH value	Suspended Solids (mg/l)
Water depth (m)	Ammonia as N (mg/l)
Salinity (ppt)	Nitrate as N (mg/l)
Turbidity (NTU)	Nitrite as N (mg/l)
Current Speed (m/s)	Total inorganic nitrogen (mg/l)
Current Direction (degree magnetic)	Total phosphorus (soluble and particulate) (mg/l)

3.2.2 Apart from the parameters listed in the **Table 3.2**, other relevant supplementary information such as monitoring location, time, weather conditions and any special phenomena will be also recorded.

3.2.3 The tidal data will be obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by the Hydrographic Office of Marine Department. Location of the tide gauge is shown in **Figure 3**.

3.3 Monitoring Equipment

3.3.1 A multifunctional meter (YSI 6920 V2/ Aqua TROLL 600) will be used to measure dissolved oxygen (DO), concentration, DO saturation, temperature, salinity, pH and turbidity, simultaneously at the same location and water depth. An Acoustic Doppler Current Profiler (ADCP) integrated with echo sounder function will be used to measure water depth, current velocity (speed and direction). The data measured by ADCP will then be downloaded on site to computer on-board. The water depth data measured by the ADCP shall be electronically logged and available for output. All measurement data from the multiparameter monitoring device and ADCP will be integrated with the GPS data from the DGPS logging device, so that data collected at a specific time and location can be shown. The water sampler will be equipped with a multiparameter monitoring device (with water depth probe to determine the exact sampling depth at which a sample is collected). The equipment employed for the monitoring and sampling and their specifications are presented in **Table 3.3**. **Table 3.4** summarizes the equipment used in water quality monitoring. Copy of the calibration certificates for water quality monitoring equipment are presented in **Appendix E**.

Table 3.3 Water Quality Monitoring and Sampling Equipment

Parameter	Equipment	Model	Range	Equipment Accuracy
Temperature, Dissolved Oxygen, salinity, pH, Turbidity, Sampling Depth	Water Quality Monitoring Device	1) YSI 6920V2-2-M Sonde 2) Aqua TROLL 600 Multiparameter Sonde	Temp: -5 to 50°C DO: 0-50mg/L DO%: 0-500% Sal: 0 to 70 ppt pH: 0 to 14 pH units Turb: 0-1000NTU Depth: 0-61 meters	Temp: ±0.15°C DO: ±0.1mg/L or 1% (whichever greater) for 0-20mg/L; ±15% for 20-50mg/L (with correction for salinity and temperature) Sal: ±1% or 0.1ppt (whichever greater) pH: ±0.2 units Turb: ±2% or 0.3NTU (whichever greater) Depth: ±0.12m
Water Depth, Current Speed, Current Direction	Acoustic Doppler Current Profiler	RiverSurveyor M9	Water Depth: 0-80m	Water Depth: 1% Current speed: ±0.25% of measured velocity or ±0.2cm/s Current direction: ±2degree magnetic
Positioning	DGPS	Simrad MX521B Smart Antenna with Simrad MX610 CDU	NA	GPS: ±1m
Water Sampling	Water Sampler	Aquatic Research Transparent PC Vertical Water Sampler 2.2L / 3L / 5L	NA	NA

Table 3.4 Equipment used for Water Quality Monitoring

Equipment	Manufacturer / Model	Serial Number
Water Quality Monitoring Device	Aqua TROLL 600 Multiparameter Sonde	490113
Acoustic Doppler Current Profiler	RiverSurveyor M9	5906

3.3.2 Apart from the equipment mentioned in Section 3.3.1, a Class III commercially licensed vessel will be used as survey vessel. DGPS logging device with accuracy of ±1m at 95% confidence level will be installed on the survey vessel to ascertain that measurement can be made accurately on the specific transects. All GPS data collected during the whole survey will be automatically and electronically logged. Powered winch will be used on-board the Survey Vessel to assist the monitoring. Experienced supervisor will be present all throughout the monitoring activities on-board the survey vessel.

3.3.3 Water samples will be collected by water sampler and stored in high density polythene bottles and sterilized glass bottles (for bacterial analysis), packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory on the same day of collection for analysis. All sampling bottles will be pre-rinsed with the same water samples. The sampling bottles will then be taken to a HOKLAS accredited laboratory for analysis of *E. coli*, BOD_5, Suspended Solids, NH_3-N, NO_3-N, NO_2-N, Total inorganic nitrogen, Total phosphorus (soluble and particulate).

3.4 Laboratory Measurement and Analysis

3.4.1 ALS Technichem (HK) Pty Ltd (HOKLAS Reg. No. 066), is the appointed laboratory for analysis of water samples. The methods adopted by the laboratory and the reporting limits are detailed in **Table 3.5**.

Table 3.5 Laboratory Measurement/Analysis Methods and Reporting Limits

Analysis Description	Method	Reporting limits
E. coli	DoE Section 7.8, 7.9.4.2& 7.9.4.4 plus in situ urease test	1 cfu/100mL
5-day Biochemical Oxygen Demand	APHA 5210B	1 mg/L
Total Suspended Solid	APHA 2540D	0.5 mg/L
Ammonia as N	APHA 4500 NH3: G	0.005 mg/L
Nitrate as N	APHA 4500 NO3: I	0.005 mg/L
Nitrite as N	APHA 4500 NO2 B&H	0.005 mg/L
Total Inorganic Nitrogen	By Calculation	0.01 mg/L
Total phosphorus (soluble and particulate)	APHA 4500 P: J	0.01 mg/L

3.5 Monitoring Frequency and Duration

3.5.1 The water quality monitoring programme will be carried out once per two months for a period of five years of the operational phase of the Project.

3.5.2 Water quality monitoring for two tides at eight designated stations will be carried out for each monitoring event. For each station at each tide, duplicate samples for in-situ parameter and laboratory analysis at three designated water depths (1 m below water surface, mid-depth and 1 m above the seabed) will be taken and analyzed.

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

3.6 Quality Assurance / Quality Control

3.6.1 The equipment is in compliance with the requirements set out in the EM&A Plan. All in-situ monitoring instruments were calibrated by a HOKLAS-accredited laboratory or by standard solutions. Calibration of temperature, DO, salinity, pH and turbidity is conducted in three month interval.

3.6.2 During the measurements of DO concentration, DO saturation, salinity, turbidity, pH and temperature, duplicate readings will be taken. If the difference between the first and second readings of DO or turbidity is more than 25% of the value of the first reading, the reading was discarded and further readings will be taken.

3.6.3 The laboratory incorporates a variety of QA/QC monitoring programme into their testing system. Where applicable or available, the quality of the analysis will be monitored by conducting the following QC analysis:

For each batch of 20 samples:

- A minimal of 1 laboratory method blank will be analyzed;
- A minimal of 1 sample duplicate will be analyzed;
- A minimal of 1 sample matrix spike will be analyzed.

3.7 Event and Action Plan

3.7.1 Since the purpose of the water quality monitoring is to collect data for future propose, no specific event and action has to be followed.

3.8 Monitoring Results and Observations

3.8.1 Water quality monitoring is carried out on 10 February 2020. A summary of the in-situ water quality monitoring results are presented in **Table 3.6** (Mid-ebb) and **Table 3.7** (Mid-flood) respectively. The complete record and graphical presentation of the in-situ water quality monitoring results is given in **Appendix F.**

Table 3.6 Summary of In-situ Monitoring Results (Mid-ebb)

Monitoring Station	Water Depth (m)	Sampling Depth (m)		Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
A	17	S	1	6.95	18.58	8.05	33.83	1.3	0.10	198.5

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Monitoring Station	Water Depth (m)	Sampling Depth (m)		Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
		S	1	6.93	18.59	8.04	33.77	1.0	0.11	187.5
		M	8.5	6.74	18.62	8.01	34.79	3.9	0.22	204.5
		M	8.5	6.75	18.62	8.00	34.78	3.5	0.24	208.5
		B	16	6.57	18.64	7.96	34.77	2.6	0.40	240.0
		B	16	6.52	18.64	7.95	34.77	2.3	0.40	232.7
B	14	S	1	7.01	18.51	8.10	33.90	1.2	0.22	192.6
		S	1	7.00	18.56	8.07	33.98	1.1	0.18	125.8
		M	7	6.67	18.68	7.87	34.66	3.4	0.42	202.4
		M	7	6.67	18.68	7.87	34.65	3.5	0.71	180.3
		B	13	6.65	18.71	7.95	34.95	2.6	0.45	249.3
		B	13	6.66	18.72	7.94	34.98	2.9	0.33	253.0
C	12	S	1	7.09	18.47	8.18	33.78	1.2	0.22	219.5
		S	1	7.05	18.49	8.14	33.83	1.4	0.19	166.1
		M	6	6.81	18.69	7.98	34.83	1.7	0.33	187.8
		M	6	6.77	18.70	7.98	34.85	1.8	0.61	162.9
		B	11	6.64	18.71	7.96	34.97	2.3	0.46	251.7
		B	11	6.66	18.71	7.95	34.97	2.5	0.35	259.4
D	13	S	1	7.29	18.32	8.36	34.66	1.5	0.28	204.9
		S	1	7.18	18.42	8.25	33.53	1.2	0.35	201.3
		M	6.5	6.95	18.66	8.01	34.83	2.2	0.28	208.2
		M	6.5	6.92	18.68	7.99	34.87	2.0	0.13	171.2
		B	12	6.82	18.70	7.97	34.85	3.7	0.40	242.4
		B	12	6.78	18.70	7.97	35.00	4.1	0.31	209.2
E	16	S	1	7.23	18.47	8.52	34.84	2.9	0.15	189.4
		S	1	7.17	18.51	8.33	34.78	2.3	0.19	204.5
		M	8	7.06	18.60	8.04	34.79	2.8	0.25	219.7
		M	8	7.04	18.61	8.02	34.79	3.2	0.21	221.1
		B	15	6.93	18.64	7.97	34.79	2.9	0.24	259.2
		B	15	6.95	18.64	7.96	34.77	2.6	0.21	240.2
F	23	S	1	7.54	18.19	8.15	35.03	2.6	0.13	210.0
		S	1	7.35	18.39	8.97	34.87	2.2	0.18	179.5
		M	11.5	7.17	18.58	8.07	34.79	2.2	0.29	227.5
		M	11.5	7.17	18.59	8.05	34.78	2.0	0.25	143.6
		B	22	7.08	18.63	7.98	34.81	2.8	0.28	221.7
		B	22	7.06	18.63	7.97	34.77	3.4	0.35	208.8
G	22	S	1	7.05	18.54	7.85	34.02	4.6	0.19	211.1
		S	1	7.02	18.56	7.85	34.29	4.2	0.22	208.0
		M	11	6.75	18.59	7.87	34.63	4.9	0.31	230.4
		M	11	6.74	18.58	7.86	34.64	4.6	0.33	239.1
		B	21	6.67	18.59	7.87	34.65	4.9	0.40	248.4
		B	21	6.67	18.59	7.87	34.67	4.8	0.31	253.0
H	19	S	1	7.21	18.43	7.90	28.69	4.3	0.31	202.6
		S	1	7.10	18.51	7.85	34.02	4.2	0.37	198.5
		M	9.5	7.05	18.58	7.87	34.63	4.4	0.26	228.5
		M	9.5	7.03	18.58	7.86	34.62	4.8	0.24	209.8
		B	18	6.80	18.59	7.87	34.64	4.7	0.50	213.0
		B	18	6.80	18.59	7.87	34.68	4.6	0.33	212.8

Table 3.7 Summary of In-situ Monitoring Results (Mid-flood)

Monitoring Station	Water Depth (m)	Sampling Depth (m)		Dissolved oxygen (mg/L)	Temperature (degree Celsius)	pH	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
A	15	S	1	6.95	18.42	8.70	34.59	2.6	0.31	230.4
		S	1	6.92	18.43	8.70	34.55	2.5	0.27	219.8
		M	7.5	6.71	18.71	7.85	34.79	3.3	0.36	206.6
		M	7.5	6.72	18.72	7.84	34.77	3.5	0.32	215.4
		B	14	6.53	18.57	8.72	34.67	5.9	0.34	212.0
		B	14	6.53	18.53	8.72	34.67	6.1	0.37	207.0
B	14	S	1	6.54	18.68	8.71	34.70	3.2	0.39	238.0
		S	1	6.51	18.69	8.73	34.67	3.4	0.34	253.6
		M	7	6.38	18.42	7.85	34.80	4.8	0.15	165.7
		M	7	6.38	18.41	7.83	34.77	4.5	0.34	200.9
		B	13	6.22	18.12	8.72	34.63	5.8	0.20	156.7
		B	13	6.24	18.15	8.72	34.62	6.1	0.31	211.9
C	12	S	1	6.87	18.58	8.72	34.69	6.5	0.30	244.9
		S	1	6.86	18.58	8.72	34.68	6.6	0.18	251.8
		M	6	6.67	18.70	7.85	34.80	2.3	0.47	202.5
		M	6	6.67	18.71	7.86	34.78	2.7	0.29	234.0
		B	11	6.42	18.57	8.72	34.67	3.7	0.35	208.5
		B	11	6.41	18.54	8.72	34.64	3.8	0.18	218.7
D	14	S	1	6.87	18.57	8.72	34.67	6.2	0.23	181.8
		S	1	6.87	18.58	8.72	34.68	6.3	0.19	184.3
		M	7	6.52	18.57	8.72	34.68	3.7	0.81	184.7
		M	7	6.63	18.57	8.72	34.70	3.1	0.96	206.8
		B	13	6.51	18.56	8.72	34.64	3.9	0.28	246.2
		B	13	6.41	18.55	8.72	34.65	3.8	0.26	218.1
E	14	S	1	6.93	18.62	7.90	34.62	2.7	0.16	203.9
		S	1	6.90	18.63	7.89	34.68	2.1	0.11	169.1
		M	7	6.90	18.52	8.71	34.65	3.4	0.13	170.5
		M	7	6.88	18.52	8.71	34.65	3.9	0.15	181.9
		B	13	6.57	18.55	8.72	34.66	3.7	0.13	199.0
		B	13	6.58	18.54	8.72	34.66	3.3	0.17	217.1
F	18	S	1	6.90	18.62	7.88	34.71	2.7	0.31	184.9
		S	1	6.89	18.64	7.87	34.68	3.0	0.32	210.7
		M	9	6.67	18.57	8.72	34.70	3.8	0.13	222.7
		M	9	6.62	18.56	8.72	34.66	3.4	0.18	217.8
		B	17	6.55	18.72	7.85	34.75	2.3	0.41	245.0
		B	17	6.53	18.73	7.85	34.78	2.7	0.32	166.0
G	13	S	1	6.89	18.65	7.87	34.68	1.8	0.15	190.8
		S	1	6.89	18.66	7.86	34.67	2.1	0.16	200.5
		M	6.5	6.72	18.48	8.71	34.64	3.4	0.20	226.6
		M	6.5	6.69	18.50	8.71	34.66	3.0	0.23	217.0
		B	12	6.57	18.72	7.85	34.77	3.1	0.23	235.0
		B	12	6.53	18.72	7.85	34.82	3.3	0.20	226.3
H	19	S	1	6.89	18.66	7.86	34.69	2.1	0.20	233.7
		S	1	6.89	18.67	7.86	34.71	2.3	0.14	137.5
		M	9.5	6.54	18.47	8.71	34.61	3.8	0.18	208.6
		M	9.5	6.52	18.48	8.71	34.66	3.3	0.30	216.1
		B	18	6.45	18.73	7.85	34.77	3.3	0.29	240.3
		B	18	6.46	18.72	7.85	34.76	3.6	0.37	230.7

3.8.2 Results of laboratory analysis of water quality are presented in **Table 3.8** (Mid-ebb) and **Table 3.9** (Mid-flood) respectively. The complete record and graphical presentation of laboratory analysis results are given in **Appendix F**.

Table 3.8 Summary of Laboratory Analysis Results (Mid-ebb)

Monitoring Station	Water Depth (m)	Sampling Depth (m)		TSS (mg/L)	NH_3 as N (mg/L)	NO_2^- as N (mg/L)	NO_3^- as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD_5 (mg/L)
A	17	S	1	6.4	0.061	<0.005	0.071	0.132	100	0.01	<1.0
		S	1	7.4	0.054	0.013	0.068	0.135	140	0.03	<1.0
		M	8.5	5.9	0.057	0.006	0.069	0.132	120	0.02	<1.0
		M	8.5	6.3	0.052	<0.005	0.077	0.129	73	0.02	<1.0
		B	16	5.4	0.057	<0.005	0.076	0.133	160	0.01	<1.0
		B	16	5.9	0.054	0.006	0.075	0.135	130	0.01	<1.0
B	14	S	1	8.0	0.056	0.010	0.076	0.142	78	0.01	<1.0
		S	1	7.1	0.059	<0.005	0.074	0.133	86	0.02	<1.0
		M	7	7.2	0.060	<0.005	0.081	0.141	160	0.01	<1.0
		M	7	6.9	0.052	0.011	0.069	0.132	120	0.01	<1.0
		B	13	5.7	0.051	<0.005	0.073	0.124	100	0.01	<1.0
		B	13	5.2	0.052	<0.005	0.074	0.126	68	0.01	<1.0
C	12	S	1	7.2	0.048	0.007	0.189	0.244	310	0.08	<1.0
		S	1	5.1	0.046	0.009	0.186	0.241	380	0.08	<1.0
		M	6	6.2	0.044	0.009	0.166	0.219	290	0.06	<1.0
		M	6	7.2	0.047	0.017	0.141	0.205	240	0.05	<1.0
		B	11	8.1	0.050	<0.005	0.129	0.178	320	0.04	<1.0
		B	11	8.2	0.053	<0.005	0.118	0.171	260	0.03	<1.0
D	13	S	1	9.6	0.066	<0.005	0.094	0.160	420	0.02	<1.0
		S	1	8.7	0.048	0.009	0.087	0.143	350	0.02	<1.0
		M	6.5	8.8	0.053	<0.005	0.106	0.159	260	0.02	<1.0
		M	6.5	8.8	0.047	<0.005	0.086	0.133	260	0.02	<1.0
		B	12	7.9	0.058	0.006	0.101	0.166	280	0.03	<1.0
		B	12	7.3	0.048	<0.005	0.097	0.145	270	0.02	<1.0
E	16	S	1	7.9	0.046	0.010	0.078	0.134	140	0.02	<1.0
		S	1	8.3	0.048	0.006	0.081	0.136	230	0.02	1.0
		M	8	7.3	0.060	0.008	0.077	0.145	170	0.02	1.0
		M	8	7.5	0.055	<0.005	0.085	0.140	180	0.02	<1.0
		B	15	8.0	0.061	0.008	0.081	0.151	170	0.02	<1.0
		B	15	7.8	0.049	<0.005	0.090	0.139	300	0.02	<1.0
F	23	S	1	5.7	0.055	0.005	0.078	0.138	200	0.02	1.0
		S	1	6.6	0.053	<0.005	0.082	0.135	190	0.02	1.3
		M	11.5	6.4	0.053	<0.005	0.087	0.139	140	0.02	<1.0
		M	11.5	7.2	0.055	<0.005	0.083	0.138	160	0.02	1.1
		B	22	7.8	0.050	<0.005	0.089	0.139	130	0.02	1.1
		B	22	7.1	0.054	0.012	0.079	0.144	230	0.02	1.2
G	22	S	1	4.6	0.074	0.011	0.073	0.157	140	0.02	1.8
		S	1	5.4	0.078	<0.005	0.079	0.157	200	0.02	1.6
		M	11	4.2	0.083	0.007	0.071	0.160	180	0.04	1.3
		M	11	4.7	0.080	0.007	0.078	0.164	130	0.02	1.6
		B	21	3.9	0.077	<0.005	0.082	0.158	120	0.02	2.0
		B	21	3.8	0.079	0.009	0.076	0.164	100	0.02	1.9
H	19	S	1	4.3	0.073	0.008	0.071	0.152	100	0.02	1.3
		S	1	5.2	0.087	<0.005	0.077	0.164	160	0.02	1.5
		M	9.5	4.8	0.079	<0.005	0.082	0.161	160	0.03	1.9

Monitoring Station	Water Depth (m)	Sampling Depth (m)		TSS (mg/L)	NH_3 as N (mg/L)	NO_2^- as N (mg/L)	NO_3^- as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD_5 (mg/L)
		M	9.5	4.1	0.081	<0.005	0.078	0.159	140	0.02	1.5
		B	18	3.6	0.077	<0.005	0.080	0.157	110	0.02	2.0
		B	18	3.9	0.086	<0.005	0.080	0.167	150	0.02	1.2

Table 3.9 Summary of Laboratory Analysis Results (Mid-flood)

Monitoring Station	Water Depth (m)	Sampling Depth (m)		TSS (mg/L)	NH_3 as N (mg/L)	NO_2^- as N (mg/L)	NO_3^- as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD_5 (mg/L)
A	15	S	1	11.6	0.054	0.010	0.077	0.141	280	0.02	1.1
		S	1	11.7	0.055	0.010	0.076	0.140	200	0.02	1.1
		M	7.5	10.8	0.060	<0.005	0.081	0.140	560	0.02	<1.0
		M	7.5	10.7	0.057	0.007	0.081	0.145	260	0.02	1.4
		B	14	11.4	0.057	0.009	0.079	0.145	180	0.02	1.1
		B	14	10.1	0.061	0.012	0.074	0.147	280	0.02	<1.0
B	14	S	1	11.2	0.070	<0.005	0.088	0.158	380	0.02	<1.0
		S	1	11.6	0.060	<0.005	0.085	0.144	490	0.02	1.4
		M	7	11.4	0.067	0.006	0.076	0.150	410	0.02	1.6
		M	7	10.1	0.057	0.006	0.08	0.143	320	0.02	1.4
		B	13	11.8	0.057	0.008	0.074	0.140	340	0.02	1.2
		B	13	10.9	0.062	0.006	0.079	0.146	250	0.02	1.4
C	12	S	1	9.8	0.054	<0.005	0.084	0.138	250	0.02	1.2
		S	1	10.9	0.053	0.005	0.076	0.135	260	0.02	1.4
		M	6	11.9	0.052	<0.005	0.081	0.133	240	0.02	1.6
		M	6	11.3	0.052	<0.005	0.084	0.136	230	0.02	1.7
		B	11	11.0	0.058	<0.005	0.080	0.138	340	0.02	1.4
		B	11	11.5	0.062	<0.005	0.080	0.143	230	0.02	1.7
D	14	S	1	12.1	0.057	0.010	0.076	0.143	140	0.02	<1.0
		S	1	11.0	0.061	<0.005	0.078	0.139	180	0.02	1.2
		M	7	12.2	0.061	<0.005	0.078	0.139	210	0.02	1.1
		M	7	11.1	0.061	<0.005	0.080	0.141	220	0.02	1.4
		B	13	9.6	0.061	<0.005	0.080	0.141	340	0.02	2.1
		B	13	10.6	0.061	0.006	0.078	0.144	190	0.02	1.4
E	14	S	1	8.3	0.048	0.007	0.077	0.132	210	0.02	1.2
		S	1	8.6	0.044	0.007	0.080	0.130	260	0.02	2.4
		M	7	7.6	0.046	0.006	0.078	0.129	210	0.02	1.6
		M	7	7.4	0.046	0.007	0.078	0.131	230	0.02	1.3
		B	13	7.8	0.044	<0.005	0.087	0.130	350	0.02	1.6
		B	13	7.9	0.046	<0.005	0.086	0.132	310	0.02	1.6
F	18	S	1	8.2	0.052	<0.005	0.087	0.139	310	0.02	1.3
		S	1	7.7	0.055	<0.005	0.083	0.138	350	0.02	2.4
		M	9	8.6	0.056	0.005	0.085	0.146	140	0.02	2.2
		M	9	7.9	0.049	<0.005	0.088	0.137	180	0.02	1.4
		B	17	8.6	0.051	<0.005	0.087	0.137	290	0.02	2.0
		B	17	8.4	0.050	<0.005	0.082	0.132	180	0.02	1.9
G	13	S	1	7.0	0.044	<0.005	0.079	0.122	320	0.02	1.5
		S	1	7.7	0.037	<0.005	0.078	0.115	280	0.02	2.2
		M	6.5	6.8	0.043	<0.005	0.081	0.124	370	0.02	2.2
		M	6.5	7.6	0.047	0.006	0.090	0.142	130	0.02	2.8
		B	12	6.8	0.042	0.008	0.080	0.131	200	0.02	2.4
		B	12	6.7	0.045	<0.005	0.087	0.132	94	0.02	1.7

Monitoring Station	Water Depth (m)	Sampling Depth (m)		TSS (mg/L)	NH_3 as N (mg/L)	NO_2^- as N (mg/L)	NO_3^- as N (mg/L)	TIN (mg/L)	E.coli (cfu/100mL)	Total P (mg/L)	BOD_5 (mg/L)
H	19	S	1	9.2	0.041	<0.005	0.081	0.122	86	0.02	1.6
		S	1	8.2	0.043	<0.005	0.083	0.126	130	0.02	3.0
		M	9.5	8.5	0.041	<0.005	0.085	0.125	150	0.02	2.4
		M	9.5	7.6	0.041	<0.005	0.087	0.128	65	0.02	2.2
		B	18	6.2	0.040	<0.005	0.083	0.123	84	0.02	2.2
		B	18	6.8	0.038	<0.005	0.082	0.120	78	0.02	2.0

3.8.3 The tidal data is obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by Hydrographic Office of Marine Department. Tidal data obtained from Ma Wan Marine Traffic Station is present in **Appendix G**.

3.8.4 Heavy marine traffic was observed nearby the Project site and its vicinity and may affect the water quality. The above conditions may affect monitoring results. The weather condition is summarized and presented in **Table 3.10**.

Table 3.10 Weather condition of water quality monitoring

Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
10 February 2020	18.6	16.9	15.5	76	0.0

Source: Hong Kong Observatory

4. SEDIMENT QUALITY MONITORING AND BENTHIC SURVEY

4.1 Monitoring Station

4.1.1 In accordance with Section 6 of the EM&A Plan, sediment quality monitoring and benthic survey should be carried out at eight designated monitoring stations (two impact stations and six control stations) during the first five years of the operational phase of the Project. The proposed monitoring stations shall be the same monitoring stations that were used for the baseline monitoring programme and have been approved by EPD. The coordinates of the monitoring stations are shown in **Table 4.1** and their locations are shown in **Figure 2**.

Table 4.1 Location of Sediment Quality Monitoring and Benthic Survey

Sampling Location		Easting	Northing
A	The Brothers, Control Station	816 100	822 500
B	The Brothers, Control Station	816 680	822 440
C	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
E	Cheung Sok, Control Station	819 817	821 655
F	Cheung Sok, Control Station	820 158	821 922
G	Tai Ching Chau, Control Station	822 214	822 692
H	Tai Ching Chau, Control Station	822 494	822 939

4.2 Monitoring Parameter

4.2.1 The monitoring parameters for sediment quality monitoring and benthic survey are summarized in **Table 4.2**.

Table 4.2 Parameters for Sediment Quality Monitoring and Benthic Survey

Monitoring Parameters	
Sediment Quality Monitoring	**Rinsate Blank for Benthic Survey**
Grain size profile* (i.e. Particle Size Distribution) (%)	Cadmium (µg/L)
Total organic carbon* (%)	Chromium (µg/L)
pH value	Copper (µg/L)
Ammonia as N (mg-N/kg)	Lead (µg/L)
Total nitrogen (mg-N/kg)	Mercury ((µg/L)
Total phosphorus (mg-N/kg)	Nickel (µg/L)
Cadmium (mg/kg)	Zinc (µg/L)
Chromium (mg/kg)	Arsenic (µg/L)
Copper (mg/kg)	Silver (µg/L)
Lead (mg/kg)	
Mercury (mg/kg)	
Nickel (mg/kg)	
Zinc (mg/kg)	
Arsenic (mg/kg)	
Silver (mg/kg)	

*Grain size profile and total organic carbon is determined from the sediment sampled collected for benthic survey.

4.2.2 Apart from the parameters listed in the Table 4.2, other relevant supplementary information such as monitoring location, time, weather conditions and any special phenomena will be also recorded.

4.2.3 The tidal data will be obtained from the tide gauge installed in Ma Wan Marine Traffic Station, managed by the Hydrographic Office of Marine Department. Location of the tide gauge is shown in **Figure 3**.

4.3 Sampling Equipment

4.3.1 Ponar grab sampler (capacity of ~ 1 litre) will be used for collection of samples for sediment analysis. The grab will be capable of collecting sufficient amount of surficial (top 5 cm) sediment for the required analysis in a single deployment at each sampling location. The grab will be constructed with non-contaminating material to prevent sample contamination. Photos of ponar grab sampler are shown in **Appendix J**.

4.3.2 A modified Van Veen grab sampler (capacity of ~ 11.3 litres) will be used for collecting sediment samples for benthic survey. The top of the grab will have openings to allow the easy flow of water through the grab as it descends. The openings will be covered with 0.5 mm mesh to prevent the loss of any benthic fauna once sediment samples are taken. In addition the top openings will be sealable by movable flaps which will close when the grab is hauled to surface. Photos of modified Van Veen grab sampler are shown in **Appendix J**.

4.3.3 Class III commercially licensed vessel will be used as survey vessel. DGPS logging device in the ADCP with accuracy of ±1m at 95% confidence level will be installed on the survey vessel to ascertain that measurement can be made accurately on the specific transects. All GPS data collected during the whole survey will be automatically and electronically logged. Powered winch will be used on-board the survey vessel to assist the monitoring. 4 fixed sieve stations will be equipped on survey vessel. Experienced supervisor will be present all throughout the monitoring activity on-board the survey vessel.

4.4 Sampling Procedure

Benthic Survey, Particle Size Distribution and TOC Analysis

4.4.1 A modified Van Veen grab sampler (capacity of ~ 11.3 litres) will be deployed using a winch at each of the benthic survey stations to collect single grab sample at each station. The grab sampler will be lowered through the water column slowly at a constant rate (approximately 30 cm/s) to prevent the formation of a pressure wave that may disturb surficial deposits. The grab will then be retrieved and evaluated on board of the survey vessel. Any sample showing uneven penetration or only partially filled with sediment shall be rejected. Samples will be placed in a plastic box with an identification card. Sub-samples (approximately 1 kg) will be splitted up for analysis of particle size distribution and TOC. The remaining sediment samples will be washed gently to separate the benthic organisms and the sediment using a watering hose with marine seawater supply, by a sieve stack (comprising 1 mm and 0.5 mm meshes). Benthic organisms remaining on the sieve will be removed into pre-labeled ziplock plastic bags. A 10% solution of buffered formalin containing Rose Bengal in seawater will be added to the bag to ensure tissue preservation. Samples will be sealed in plastic containers for transport to the laboratory for sorting and identification of benthic organisms.

Sediment Quality Monitoring (Except Particle Size Distribution and TOC Analysis)

4.4.2 Ponar grab sampler (capacity of ~ 1 litres) will be deployed at each of the benthic survey stations to collect single grab sample at each station. The grab sampler should be lowered through the water column slowly at a constant rate (approximately 30 cm/s) to prevent the formation of a pressure wave that may disturb surficial deposits. The grab will then be retrieved and evaluated on board of the survey vessel. Any sample showing uneven penetration or only partially filled with sediment will be rejected. Samples will be placed in a plastic box with an identification card. Sediment samples will be then transferred into brand new soil jars with QA/QC monitoring for laboratory analysis. Samples will be preserved and stored in accordance with approved SOP of HOKLAS accredited laboratory and the recommendations stipulated in ETWB TC (W) No. 34/2002.

4.4.3 Sediment samples shall be collected and packed in ice (cooled to 4°C without being frozen), and delivered to the laboratory on the same day of collection for analysis.

4.5 Laboratory Measurement and Analysis

4.5.1 ALS Technichem (HK) Pty Ltd (HOKLAS Reg. No. 066), is the appointed laboratory for analysis of sediment samples. The methods adopted by the laboratory and the reporting limits are detailed in **Table 4.3**.

Table 4.3 Laboratory Measurement/Analysis Methods and Reporting Limits

Analysis Description	Method	Reporting limits
Particle Size Distribution	Geospec 3: 2001 Test method 8.1, 8.5 and 8,7 (Wet Sieve and Hydrometer Method)	1%
Total Organic Carbon	APHA 5310B	0.05%
pH value	APHA 4500H: B	0.1 pH unit
Ammonia as N	APHA 4500 NH3: B&G	0.5 mg/kg
Total Nitrogen	APHA 4500 Norg: D & APHA 4500 NO3: I	10 mg/kg
Total Phosphorus	APHA 4500P: B&H	10 mg/kg
Cadmium	USEPA 6020A Digestion method: 3051A	0.1 mg/kg
Chromium		0.5 mg/kg
Copper		0.2 mg/kg
Lead		0.2 mg/kg
Mercury		0.05 mg/kg
Nickel		0.2 mg/kg
Zinc		0.5 mg/kg
Arsenic		0.5 mg/kg
Silver		0.1 mg/kg

4.6 Taxonomic Identification of Benthic Organism

4.6.1 Taxonomic identification of benthic organisms will be performed using stereo dissecting and high-power compound microscopes where it is necessary. Benthic organisms will be counted and identified to lower taxonomic levels as far as practicable with biomass (wet weight, to 0.01gram) of each individual recorded. If breakage of soft-bodied organism occurs, only anterior portions of fragments will be counted, although all fragments will be retained and

weighted for biomass determinations (wet weight, to 0.01gram). Data of species abundance and biomass will be recorded.

4.6.2 Data collected during surveys will be presented and summarized in tables and graphics. Species/taxon richness and abundance of marine benthic fauna communities will be analyzed by Shannon-Weiner diversity and Pielou's Evenness.

4.7 Monitoring Frequency and Duration

4.7.1 The sediment quality monitoring and benthic survey programmed shall be carried out once per two months for a period of five years of the operational phase of the Project. Since the purpose of the sediment quality monitoring and benthic survey is to collect data for future reference, only a single round of sediment quality monitoring and benthic survey at 8 designated locations will be carried out for each monitoring event. For each location, only a single sample will be taken and analyzed.

4.8 Quality Assurance / Quality Control

4.8.1 A rinsate blank will be collected in each monitoring location before each sediment sampling for benthic survey, so as to monitor the effectiveness of field decontamination procedure.

4.8.2 The laboratory incorporates a variety of QA/QC monitoring programme into their testing system. Where applicable or available, the quality of the analysis will be monitored by conducting the following QC analysis:

For each batch of 20 samples:

- A minimal of 1 laboratory method blank will be analyzed;
- A minimal of 1 sample duplicate will be analyzed;
- A minimal of 1 sample matrix spike will be analyzed.

4.9 Event and Action Plan

4.9.1 Since the purpose of the sediment quality monitoring and benthic survey is to collect data for future purpose, no specific event and action has to be followed.

4.10 Monitoring Results and Observations

4.10.1 Sediment quality monitoring and benthic survey is carried out on 10 February 2020. A summary of laboratory analysis results for the sediment quality monitoring and benthic survey are presented in **Table 4.4** and **Table 4.5** respectively. The complete record and graphical presentation of the sediment quality monitoring results is given in **Appendix H.**

Table 4.4 Summary of laboratory analysis results for sediment monitoring

Monitoring Station	pH value	NH_3 as N (mg/L)	Total N (mg-N/kg)	Total P (mg-P/kg)	Cd (mg/kg)	Cr (mg/kg)	Cu (mg/kg)	Pb (mg/kg)	Hg (mg/kg)	Ni (mg/kg)	Zn (mg/kg)	As (mg/kg)	Ag (mg/kg)
A	8.2	4.4	768	332	<0.10	27.2	21.6	29.0	0.07	15.4	76.1	14.3	0.18
B	8.4	6.1	991	407	<0.10	35.5	32.5	36.0	0.08	21.0	99.6	12.5	0.33
C	8.2	13.0	1260	511	<0.10	42.7	35.2	43.9	0.11	25.4	118	13.7	0.28
D	8.4	7.2	983	446	<0.10	38.3	32.6	40.2	0.08	22.6	107	12.1	0.28
E	8.3	4.3	1330	557	<0.10	41.4	36.0	41.8	0.12	24.7	122	11.0	0.33
F	8.3	21.1	1410	581	<0.10	45.9	40.4	46.4	0.11	27.6	129	12.2	0.36
G	8.4	4.6	920	615	<0.10	47.2	214	40.8	0.09	21.6	142	10.1	0.33
H	8.4	6.6	944	444	<0.10	37.1	37.7	37.7	0.09	22.1	113	11.1	0.33

Table 4.5 Summary of laboratory analysis results for benthic survey

Monitoring Station	Total organic carbon (%)	Grain size profile (%)				Description
		Gravel	Sand	Silt	Clay	
A	1.12	6	43	26	25	Grey, slightly gravelly, sandy SILT/CLAY with shell fragments
B	8.34	2	22	39	37	Grey, slightly sandy SILT/CLAY with shell fragments
C	0.96	0	5	58	37	Grey, slightly sandy SILT/CLAY with shell fragments
D	0.76	3	24	40	33	Grey, slightly sandy SILT/CLAY with shell fragments
E	1.05	5	22	43	30	Grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments
F	1.21	0	3	53	44	Grey, slightly sandy SILT/CLAY with shell fragments
G	2.32	21	35	26	18	Grey, slightly gravelly, sandy SILT/CLAY with shell fragments
H	1.26	1	10	55	34	Grey, slightly sandy SILT/CLAY with shell fragments

4.10.2 Rinsate blank was collected for chemical analysis. The laboratory data results are provided in **Appendix H**.

4.10.3 Construction works from expansion of Hong Kong International Airport was observed nearby the Project site and its vicinity and may affect the sediment quality. The above conditions may affect monitoring results. The weather condition is summarized and presented in **Table 4.6**.

Table 4.6 Weather condition of water quality monitoring

Date	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
10 February 2020	18.6	16.9	15.5	76	0.0

Source: Hong Kong Observatory

4.10.4 The benthic survey data are summarized and presented in **Table 4.7**.

Table 4.7 Summary of benthic survey data on 10 February 2020

Monitoring Station	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	36	15.31	23	2.96	0.95
B	34	1.44	15	2.49	0.92
C	40	3.28	19	2.72	0.92
D	48	17.82	24	3.07	0.96
E	33	3.55	19	2.84	0.96
F	49	7.72	21	2.75	0.91
G	34	4.69	18	2.80	0.90
H	37	4.54	17	2.22	0.91
TOTAL	311	58.33			

4.10.5 The benthic survey results are analyzed and presented as below:

i) Abundance

A total of 311 macrobenthic organisms was recorded from the eight monitoring stations during the February 2020 monitoring period. As of the previous monitoring periods, current results showed relatively lower abundances compared to the both dry (March 2004) and wet (August 2004) seasons baseline data. Compared to the previous monitoring period (December 2019), decrease in total abundance was also observed which can be attributed to the general decline in abundances in the montoring stations. However, seasonal variation in the macrobenthic abundances remained to be statistically insignificant (F-value = 1.31; F-crit = 1.82; P-value = 0.22).

The lowest abundance with 33 individuals (ind.) was recorded at Station E and the highest (49 ind.) was recorded at Station F, both reference stations. Abundances in all reference stations decreased while abundances in impact stations either remained the same as the previous monitoring period (Station C, 40 ind.) or has increased (Station D 45 to 48 ind.) Similar to the previous monitoring periods, differences in the total abundance across the monitoring stations were statistically significant (F-value = 2.88 ; F-crit = 2.10; P-value = 0.01).

ii) Biomass

The total wet biomass recorded in the eight monitoring stations was 58.33 g with the highest biomass at Station D (17.82 g) and lowest at Station B (1.44 g). The relatively higher biomass recorded at Station D was due to the presence of larger organisms such as the molluscan species, *Paphia undulata* in this station. Average biomass at the impact stations were higher compared to that of the reference stations.

iii) Taxonomic Composition

A total of eight phyla comprising of 38 families and 53 genera were identified. Macrobenthic assemblage remained to be dominated by annelida (60.77%), molluscs (19.94%), and arthropods (13.83%). Similar to the baseline study (August 2004), the most dominant family was the polychaete *Capitellidae*. Their dominance might indicate unbalanced and organically enriched habitats (Pearson and Rosenberg 1978; Borja et al. 2000). There is no dominant species (abundance > 10) recorded during

the current monitoring period. Highest number of genera was recorded in Station D (24) and the lowest in Station B (15).

iv) Diversity
Benthic diversity index (*H'*) and eveness index (*J*) ranged 2.72 – 3.07 and 0.92 – 0.96 in impact stations, and 2.22 – 2.96 and 0.90 – 0.96 among the reference stations, which suggest that benthic faunal diversity is relatively richer at some of reference stations than those at impact stations. However, overall diversity in the eight monitoring stations was within the range of typical values in the impact stations and the reference stations, respectively. Compared with the baseline survey result, the diversity index and evenness index increased.

The detailed benthic survey results are provided in **Appendix I**.

5. CHINESE WHITE DOLPHIN MONITORING

5.1 Data Interpretation

5.1.1 In accordance with Section 4.1 of the EM&A Plan, relevant information on the distribution and abundance of CWDs in Hong Kong should be obtained from the Agriculture, Fisheries and Conservation Department (AFCD), and be reviewed on a bimonthly basis during the operational phase of the Project for a period of 5 years.

5.1.2 The latest AFCD's report dated 1 August 2019, "*Monitoring of Marine Mammals in Hong Kong Waters (2018-19)*", in terms of the distribution and abundance of CWDs, was reviewed in the Monthly EM&A report in August 2019. According to the advice from AFCD, the data of distribution and abundance of CWDs would only be available in the annual reports for Monitoring of Marine Mammals In Hong Kong Waters which cover monitoring data from 1 April to 31 March (next year). The updated status of the distribution and abundance of CWDs will be provided once the annual report (2019-20) is uploaded to AFCD's webpage.

6. ADVICE ON IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

6.1 Implementation Status

6.1.1 Although no site inspection is prescribed during the operation of the Plant in accordance with the approved EM&A Plan, SHWSTW is reminded to fully and properly implement the mitigation measures specified in the EP and EIA Report. Mitigation measures such as aeration, chemical dosing system, covering or enclosing the pressing and sludge thickening facilities and ventilating air to a biological treatment prior to stack exhaust was implemented in the reporting period. A summary of mitigation measures implementation schedule is provided in **Appendix L**.

7. ADVICE ON THE SOLID AND LIQUID WASTE MANAGEMENT STATUS

7.1.1 SHWSTW is reminded to fully comply with EP conditions. All measures and recommendations in the EP, EIA Report and approved Waste Management Plan (WMP) shall be fully and properly implemented. During the reporting period, following measures in related to solid and liquid waste management were implemented:

- The influent of waste water shall be treated by CEPT with UV disinfection;
- Trip-ticket system shall be implemented for sludge and sediment;
- The acceptance criteria for Landfill disposal should be followed;
- 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.

7.1.2 A summary of mitigation measures implementation schedule is provided in **Appendix L**.

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8. SUMMARY OF EXCEEDANCE OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMITS

8.1.1 Odour patrol monitoring was resumed and carried out on 6, 12, 18 and 24 February 2020. No exceedances of Action/Limit levels at ASRs were recorded.

8.1.2 Water quality monitoring, sediment quality monitoring and benthic survey were carried out on 10 February 2020. No specific Action/Limit level has to be followed since the purpose of the monitoring is to collect data for future purpose.

9. SUMMARY OF ENVIRONMENTAL COMPLAINTS

9.1.1 No complaint (written or verbal), inspection notice, notification of summons or prosecution was received in relation to environmental impact during the report period. The incident report for the complaint case received on 28 November 2019 was submitted to EPD on 19 December 2019. Further investigation based on the EPD's comments received on 21 January 2020 was undergoing and the finding shall be submitted to EPD after completed. Summaries of complaints, notification of summons and successful prosecutions are presented in **Table 9.1** and **Table 9.2**.

Table 9.1 Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative Project-to-Date
Air	1	0	1
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Others	0	0	0
Total	0	0	0

Table 9.2 Cumulative Statistics on Notification of Summons and Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Notification of Summons and Prosecutions This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
Others	0	0	0
Total	0	0	0

9.1.2 The cumulative complaint log and summaries of complaints are presented in **Appendix K**.

10. FUTURE KEY ISSUES

10.1.1 The key issues to be considered in the coming reporting month include:

i. Potential environmental impacts arising from the operation of SHWSTW are mainly associated with air quality, water quality, sediment quality, benthic ecology, waste management and distribution and abundance of CWDs.

ii. According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m3). H_2S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m3). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring has been carried out to determine reasonable odour-related criteria. Based on IEC's comments given on 8 January 2020, an updated review was submitted on 5 February 2020 for IEC's review. Further comments were received from IEC on 17 February 2020 and the review on air quality monitoring was under progress.

11. CONCLUSION

11.1.1 Odour patrol monitoring was resumed from January 2020 and carried out on 15, 21 and 31 January 2020. No exceedances of Action/Limit levels at Air Sensitive Receivers (ASR) were recorded and no non-compliance of odour monitoring at ASR were recorded in the reporting period.

11.1.2 According to the approved EM&A plan, a correlation study has to be carried out to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m3). H_2S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H_2S concentration (ppb) with the odour unit (OU/m3). Since six months air quality monitoring and additional three months air quality monitoring had been conducted according to Section 2.2 of OEM&A Plan without any complaint or non-compliance recorded, air quality monitoring was temporarily suspension on air quality monitoring was approved by EPD's memo dated 14 May 2018. In order to recommence the monitoring, a review on air quality monitoring has been carried out to determine reasonable odour-related criteria. Based on IEC's comments given on 8 January 2020, an updated review was submitted on 5 February 2020 for IEC's review. Further comments were received from IEC on 17 February 2020 and the review on air quality monitoring was under progress.

11.1.3 Water quality monitoring, sediment quality monitoring and benthic survey were conducted on 10 February 2020 to collect data for future reference in accordance with Section 5.5 and 6.5 of the Operational EM&A Plan. The details of methodology and results collected of the monitoring were presented in Section 3 and Section 4. Heavy marine traffic and construction works from expansion of Hong Kong International Airport were observed nearby the Project site and its vicinity and may affect the water and sediment quality The above conditions may affect monitoring results.

11.1.4 The latest AFCD's report dated 1 August 2019, "*Monitoring of Marine Mammals in Hong Kong Waters (2018-19)*" in terms of the distribution and abundance of CWDs was reviewed in the Monthly EM&A report in August 2019. According to the advice from AFCD, the data of distribution and abundance of CWDs would only be available in the annual reports for Monitoring of Marine Mammals In Hong Kong Waters which cover monitoring data from 1 April to 31 March (next year). The updated status of the distribution and abundance of CWDs will be provided once the annual report (2019-20) is uploaded to AFCD"s webpage.

11.1.5 SHWSTW is reminded to fully *comply with EP conditions. All environmental mitigation measures* and recommendations in the EP, EIA Report and approved waste management plan shall be fully and properly implemented.

11.1.6 No complaint (written or verbal), inspection notice, notification of summons or prosecution was received in relation to environmental impact during the report period. The incident report for the complaint case received on 28 November 2019 was submitted to EPD on 19 December 2019. Further investigation based on the EPD's comments received on 21 January 2020 was undergoing and the finding shall be submitted to EPD after completed.

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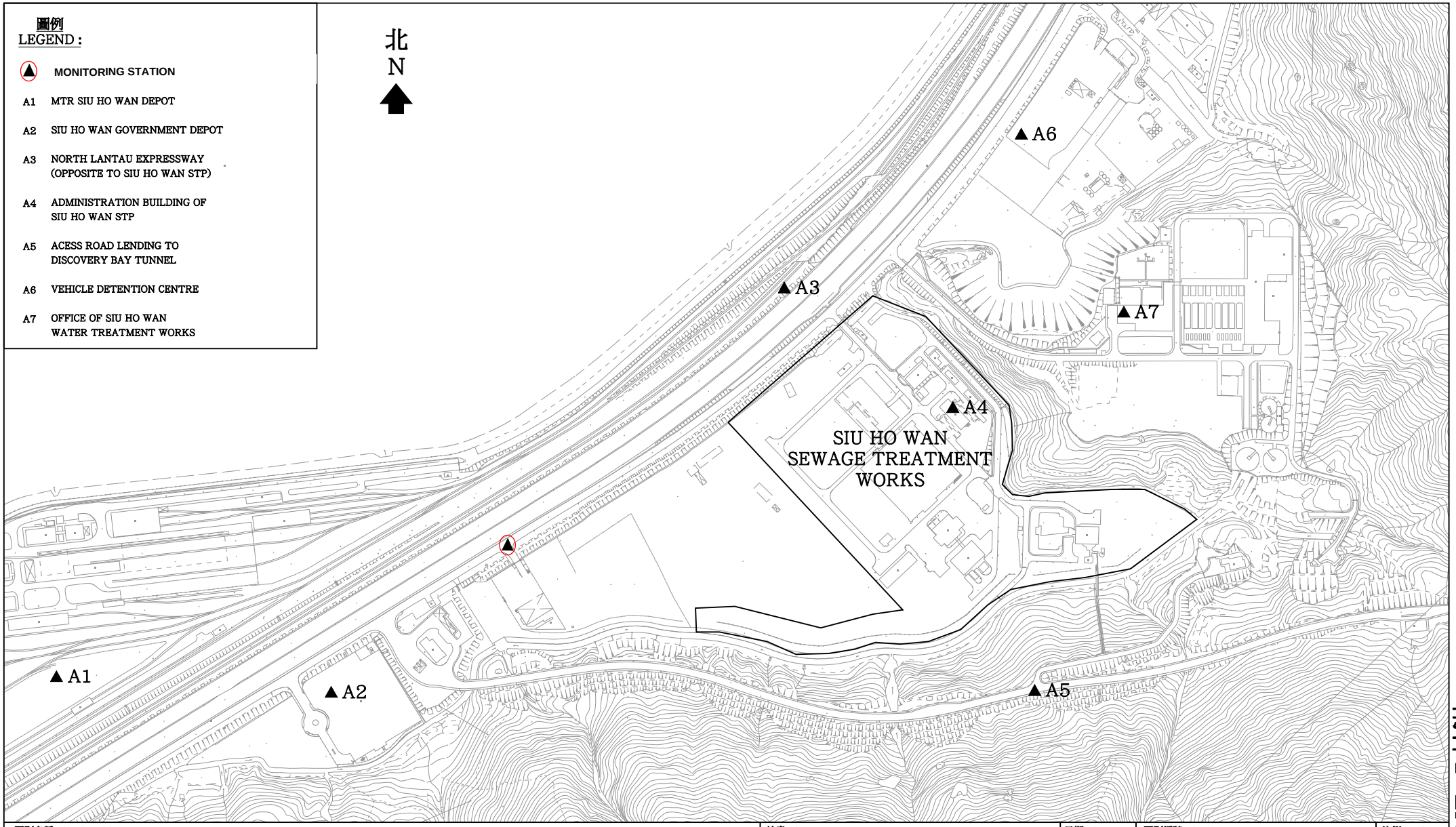
Figure 1

Monitoring Stations of Air Sensitive Receivers



圖則名稱 drawing title

UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT
OPTIONAL ENVIRONMENTAL MONITORING AND AUDIT PLAN
ODOUR PATROL MONITORING STATIONS

繪畫 drawn	C.W. CHAN	日期 date 16-08-2006
核對 checked	C.K. LAM	日期 date 16-08-2006
批核 approved	S.K. WONG	日期 date 16-08-2006
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION	

圖則編號 drawing no. DCM/2006/063

比例 scale N.T.S.

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

附件1 ENCLOSURE 1

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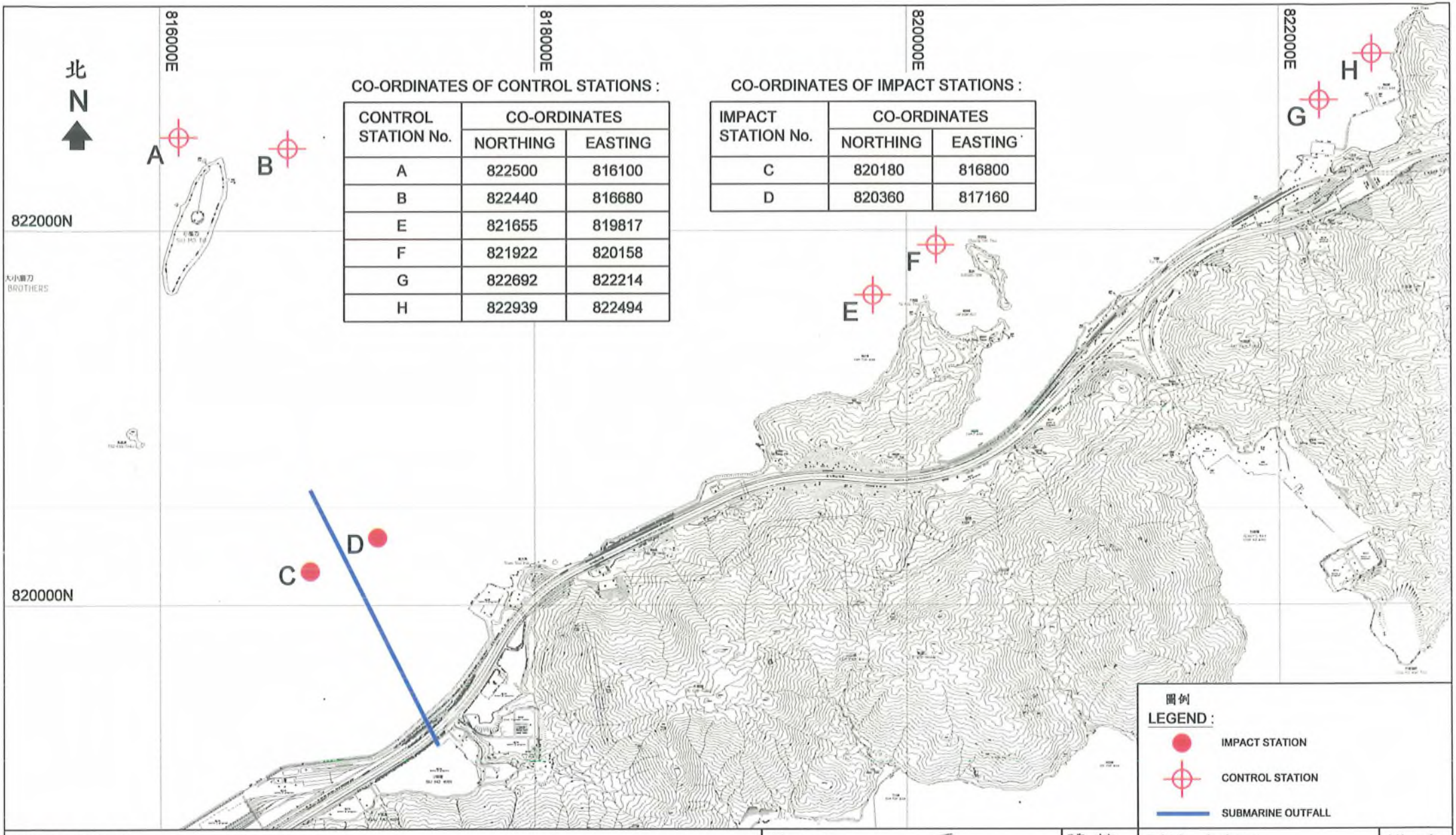
Figure 2

Monitoring Stations of Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey



CO-ORDINATES OF CONTROL STATIONS :

CONTROL STATION No.	CO-ORDINATES	
	NORTHING	EASTING
A	822500	816100
B	822440	816680
E	821655	819817
F	821922	820158
G	822692	822214
H	822939	822494

CO-ORDINATES OF IMPACT STATIONS :

IMPACT STATION No.	CO-ORDINATES	
	NORTHING	EASTING
C	820180	816800
D	820360	817160

圖例
LEGEND :

- IMPACT STATION
- CONTROL STATION
- SUBMARINE OUTFALL

圖則名稱 drawing title

UPGRADING OF SIU HO WAN SEWAGE TREATMENT PLANT
BASELINE MONITORING - LOCATION OF MONITORING STATIONS

繪畫 drawn	H.K. LAI	日期 date	06-02-2004
核對 checked	C.K. LAM	日期 date	04-03-2004
批核 approved	S.K. WONG	日期 date	04-03-2004
部門 office	顧問工程管理部 CONSULTANTS MANAGEMENT DIVISION		

圖則編號 drawing no. DCM/2004/002

比例 scale N.T.S.

香港特別行政區政府渠務署
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE
HONG KONG
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Figure 3

Location of the Tide Gauge

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Location of the Tide Gauge

Source: Google Maps

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Appendix A

Project Organization Chart

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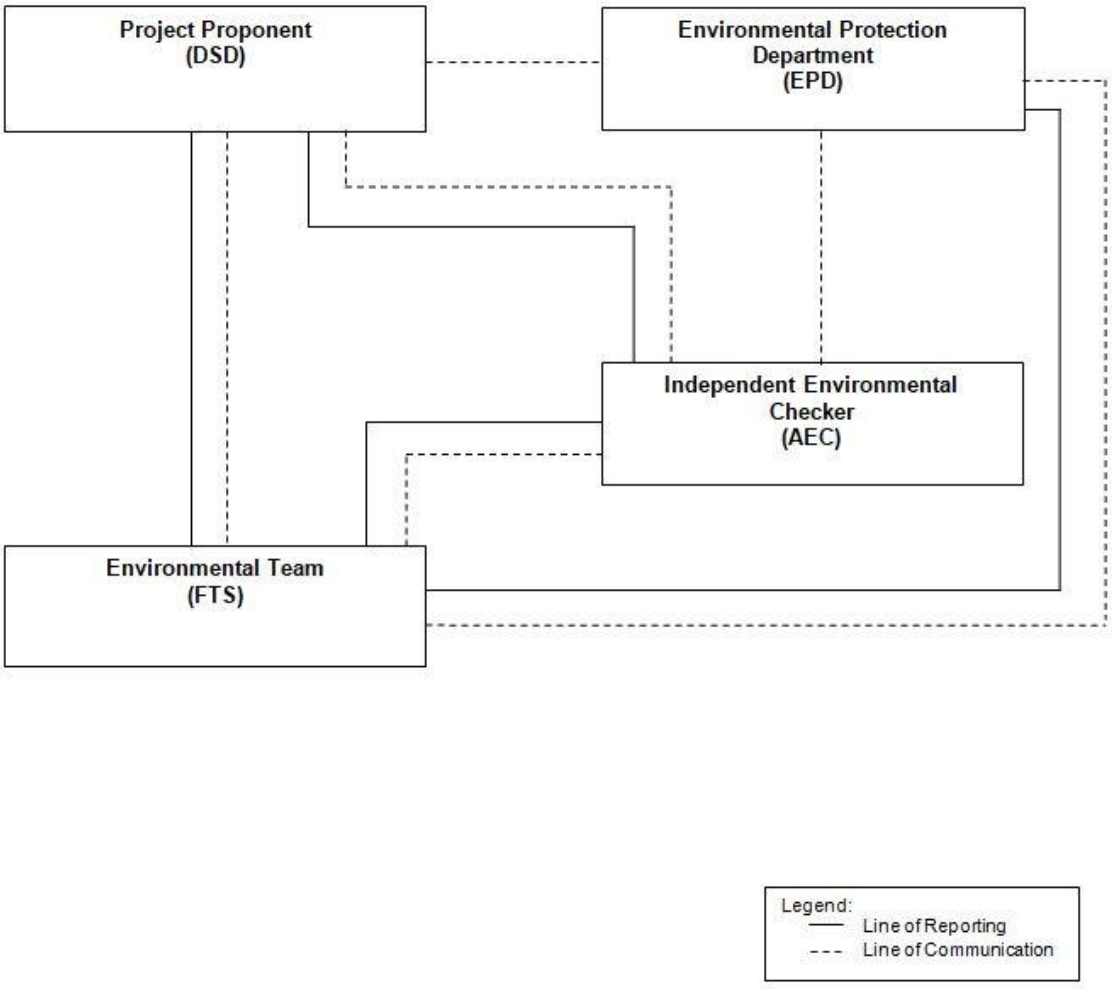

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Appendix B

Monitoring Schedule for Present and Next Reporting Period

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Monitoring Schedule for the Present Reporting Period

Sun	Mon	Tue	Wed	Thur	Fri	Sat
						1 February
2	3	4	5	6 Odour Patrol	7	8
9	10 Water Quality Monitoring and Sediment Quality Monitoring and Benthic Survey Mid-Flood (08:08) Mid-Ebb (13:34)	11	12 Odour Patrol	13	14	15
16	17	18 Odour Patrol	19	20	21	22
23	24 Odour Patrol	25	26	27	28	29

Remarks

1. Actual monitoring will be subjected to change due to any safety concern or adverse weather condition.

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Monitoring Schedule for the Next Reporting Period

Sun	Mon	Tue	Wed	Thur	Fri	Sat
1 March	2	3	4	5	6 Odour Patrol	7
8	9	10	11	12 Odour Patrol	13	14
15	16	17	18 Odour Patrol	19	20	21
22	23	24 Odour Patrol	25	26	27	28
29	30 Odour Patrol	31				

Remarks

1. Actual monitoring will be subjected to change due to any safety concern or adverse weather condition.

FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre,
5 Lok Yi Street, Tai Lam,
Tuen Mun, N.T.,
Hong Kong.

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Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com

Appendix C

Event and Action Plan for Air Quality Monitoring

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EVENT	ACTION		
	ET	IEC	*Operator
Action Level			
One complaint received for specific odour event	1. Check Operator's working methods; 2. Discuss with Operator on required remedial actions	1. Discuss with ET and Operator on the possible remedial actions; 2. Advise the Operator on the effectiveness of the proposed remedial measures; 3 Supervise implementation of remedial measures	1. Identify/ confirm source with ET; 2. Discuss with ET for remedial actions required; 3. Ensure remedial actions properly implemented 4. Rectify any unacceptable practice; 5. Amend operation methods if appropriate
Limit Level			
More than one complaint	1. Investigated the causes of complaint; 2. Check Operator's working methods; 3. Carry out analysis of Operator's working procedures to determine possible mitigation to be implemented; 4. Arrange meeting with ET and EPD to discuss the remedial actions to be taken; 5. Discuss with EPD and the Operator on the required remedial actions; 6. Submit proposals for remedial actions within 3 working days of notification; 7. Assess effectiveness of Operator's remedial actions and keep EPD informed of the results; 8. Amend proposal if appropriate; 9. Resubmit proposal if problem still not under control	1. Discuss amongst ET and the Operator on the potential remedial actions; 2. Review the proposed remedial actions whenever necessary to assure their effectiveness and advise the Operator accordingly; 3. Supervise implementation of remedial measures	1. Indentify/ confirm source with ET; 2. Confirm receipt of notification of failure in writing; 3. Inform ET, IEC and EPD; 4. Discuss with EPD and ET on the required remedial actions; 5. Ensure remedial actions properly implemented; 6. Take immediate action to avoid further exceedance; 7. Implement the agreed proposals

* The operator who is the constructor responsible for the operation during the maintenance period.

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Appendix D

Results and Graphical Presentation of Air Quality Monitoring

FUGRO TECHNICAL SERVICES LIMITED
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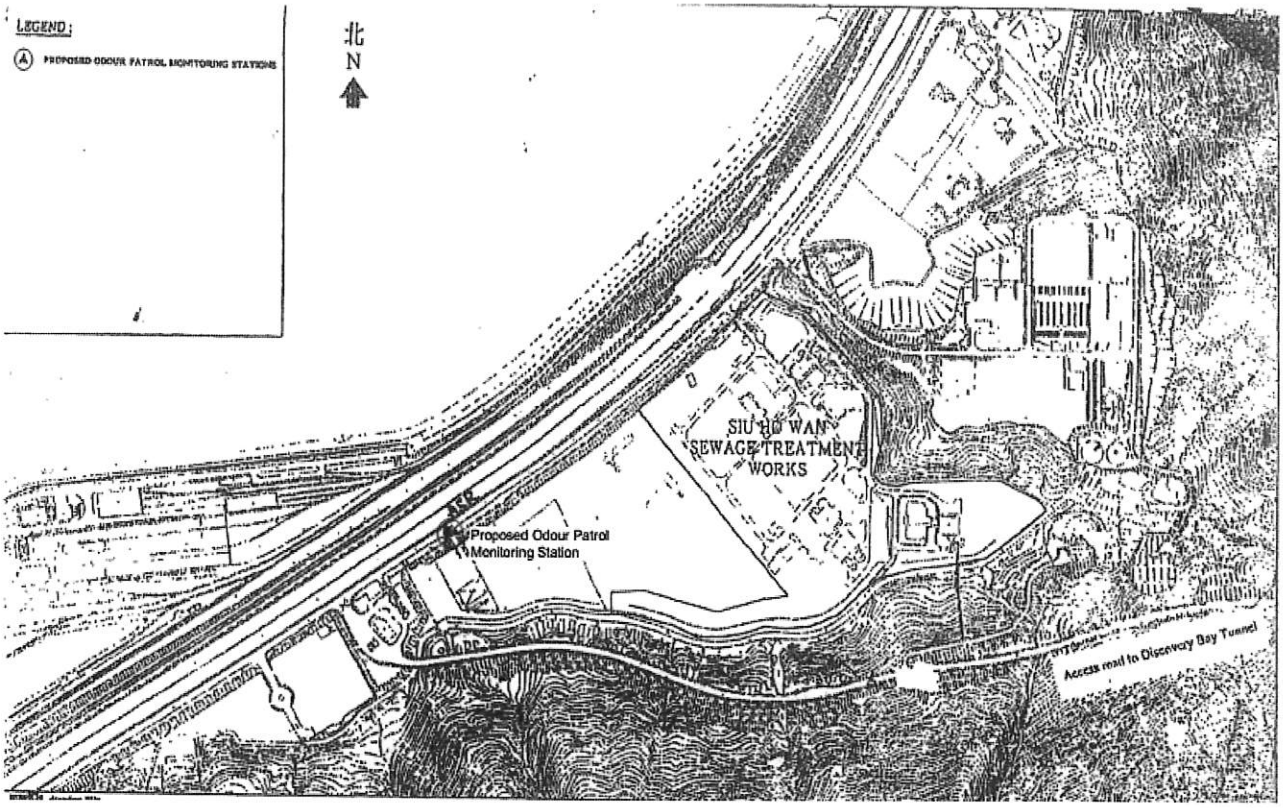
Contract No. CM 14/2016
Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works
Odour Patrol Monitoring Report



Odour Patrol Monitoring Date: 6 February 2020 Weather: Fine

Location:	ASR – Cheung Tung Road near the Bus Depot at the west of treatment plant				
Temperature:	19.3°C	Start Time:	14:30	End Time:	14:45
Wind Speed:	0.4m/s		Wind Direction:	E	
Nature of Odour:	N/A				
*Odour Intensity: (tick as appropriate)	☑ Not detected	☐ Slight	☐ Noticeable	☐ Strong	☐ Extreme

***Classification Criteria:**

Not detected : No odour perceived or an odour so weak that it cannot be readily characterised or described.
Slight : Identifiable odour, barely noticeable
Noticeable : Identifiable odour, noticeable
Strong : Identifiable odour, strong
Extreme : Severe odour

Recorded by: 1. Fong 2. TST
Name: 1. Fong Ka Chun 2. Chan Siu Tung
Date: 6 February 2020

Checked by:
Name: Choi Kam Ho
Date: 6 February 2020

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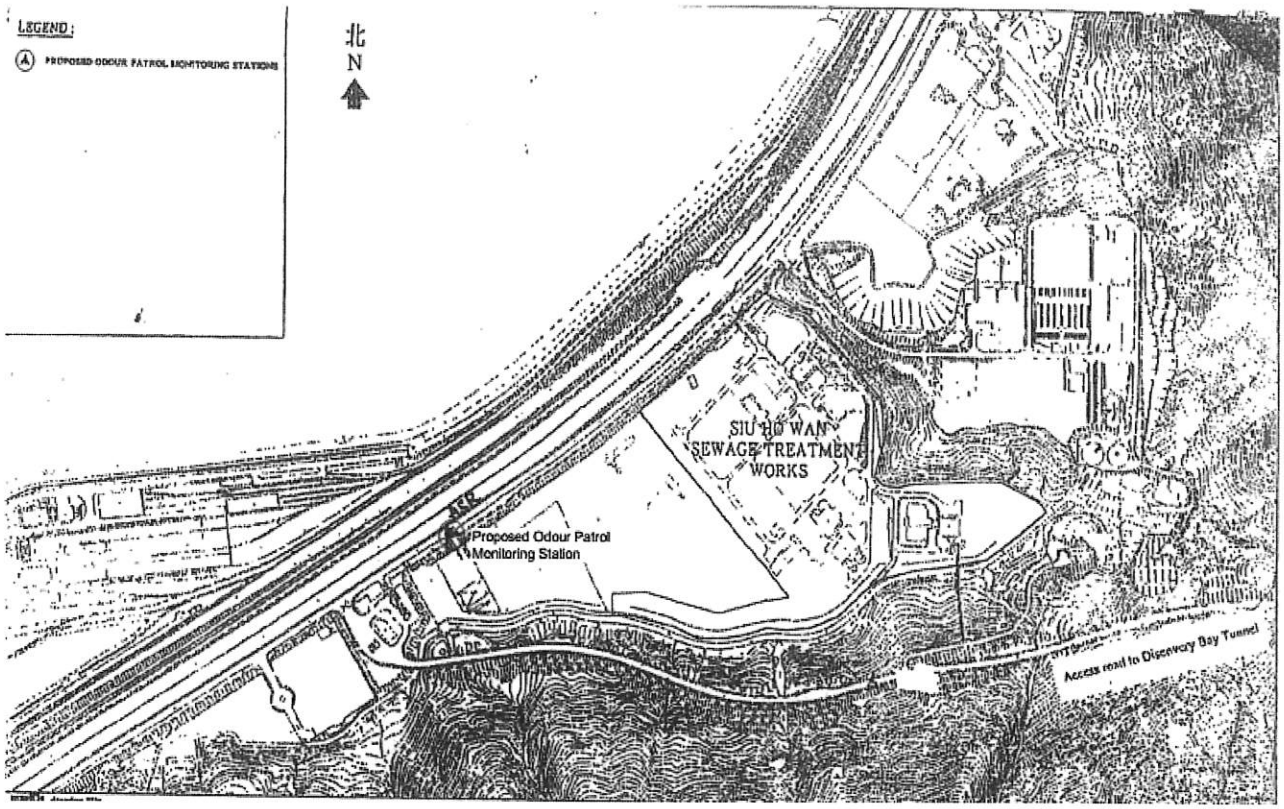

Odour Patrol Monitoring Date: 12 February 2020 Weather: Cloudy

Location:	ASR – Cheung Tung Road near the Bus Depot at the west of treatment plant				
Temperature:	24.5°C	Start Time:	11:45	End Time:	12:00
Wind Speed:	0.3 m/s		Wind Direction:	SE	
Nature of Odour:	N/A				
*Odour Intensity: (tick as appropriate)	☑ Not detected	☐ Slight	☐ Noticeable	☐ Strong	☐ Extreme

***Classification Criteria:**

Not detected : No odour perceived or an odour so weak that it cannot be readily characterised or described.
Slight : Identifiable odour, barely noticeable
Noticeable : Identifiable odour, noticeable
Strong : Identifiable odour, strong
Extreme : Severe odour

Recorded by: 1. TST 2. L
Name: 1. Chan Siu Tung 2. Kan Chun Pan
Date: 12 February 2020

Checked by: AY
Name: CHOI KAM HO
Date: 12 February 2020

FUGRO TECHNICAL SERVICES LIMITED
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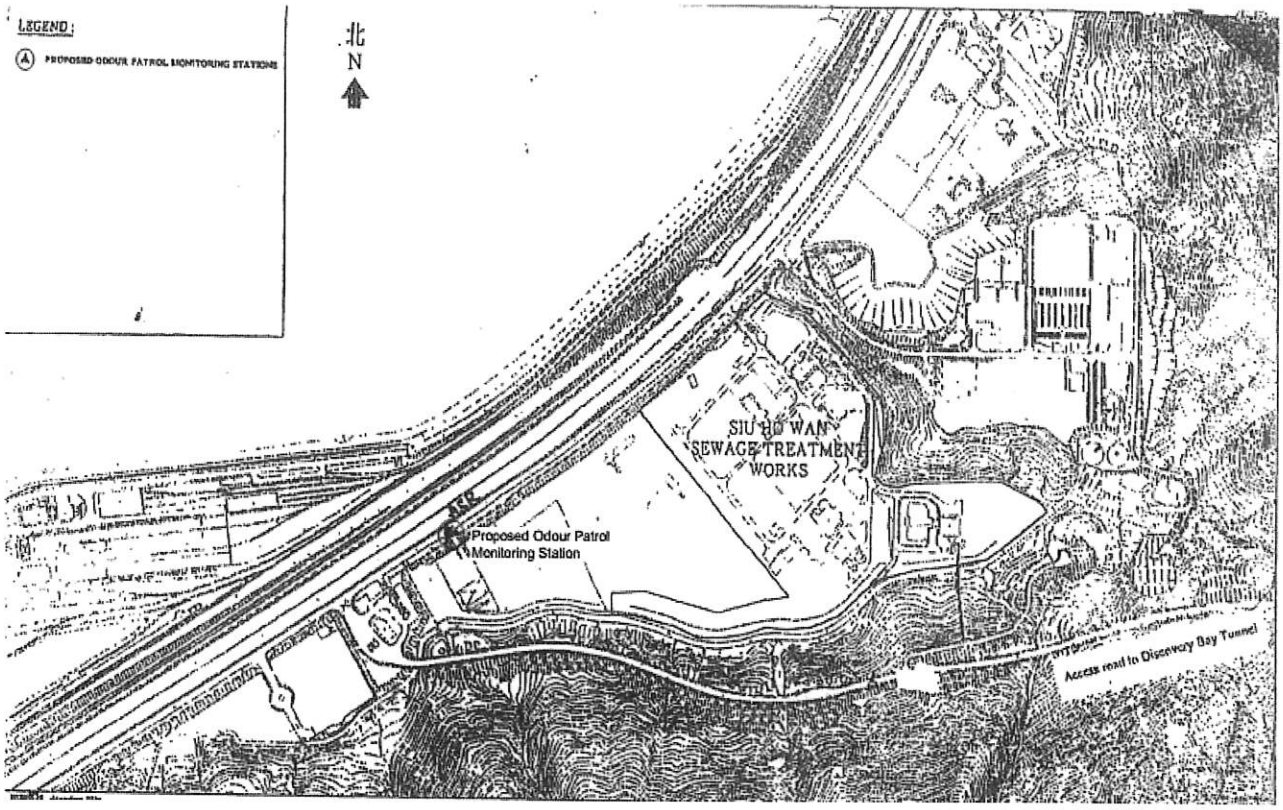

Odour Patrol Monitoring Date: 18 Feb 2020 Weather: Fine

Location:	ASR – Cheung Tung Road near the Bus Depot at the west of treatment plant				
Temperature:	21.5°C	Start Time:	11:46	End Time:	12:01
Wind Speed:	0.8m/s		Wind Direction:	N	
Nature of Odour:	✓				
*Odour Intensity: (tick as appropriate)	☑ Not detected	☐ Slight	☐ Noticeable	☐ Strong	☐ Extreme

***Classification Criteria:**

Not detected : No odour perceived or an odour so weak that it cannot be readily characterised or described.
Slight : Identifiable odour, barely noticeable
Noticeable : Identifiable odour, noticeable
Strong : Identifiable odour, strong
Extreme : Severe odour

Recorded by: 1. [signature] 2. [signature]
Name: 1. Chan Siu Tung 2. Ip Tsz Hin
Date: 18 Feb 2020

Checked by: [signature]
Name: Choi Kam Lo
Date: 12 February 2020

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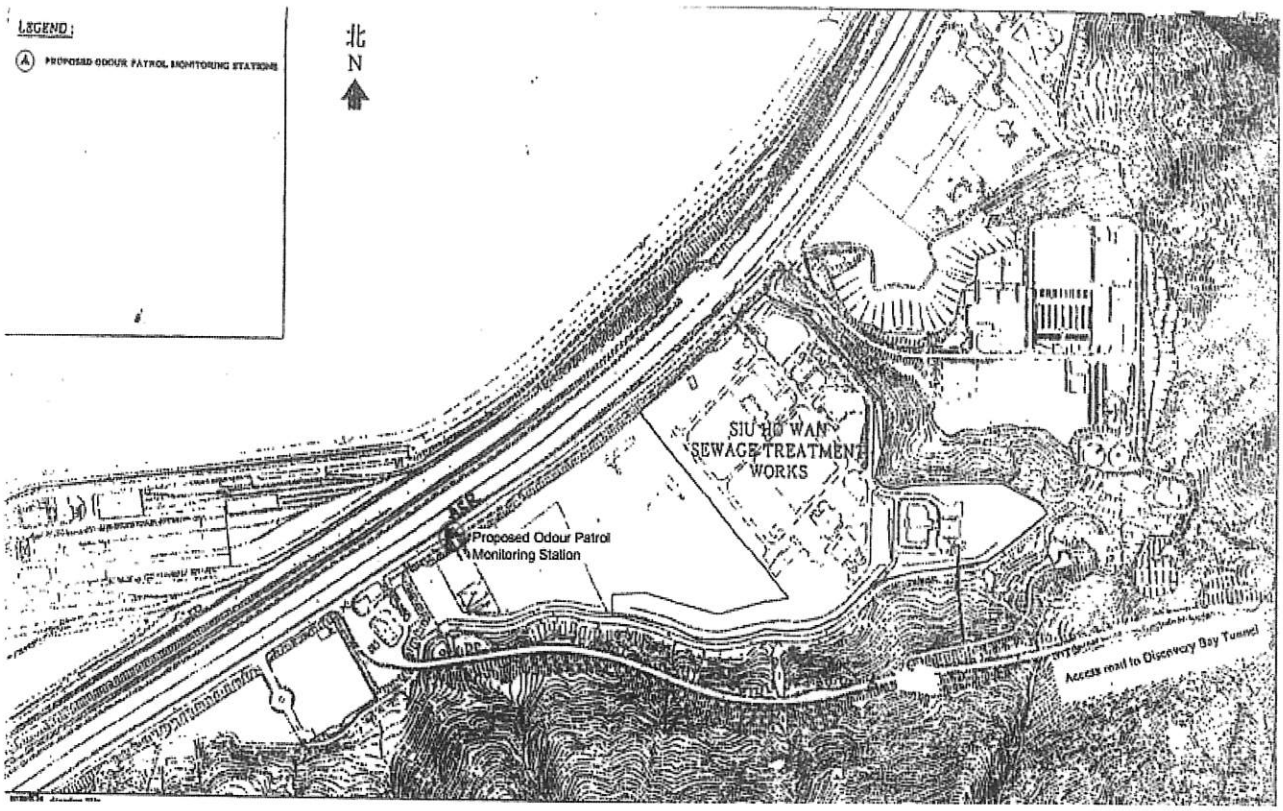
Odour Patrol Monitoring Report



Odour Patrol Monitoring Date: 24 Feb 2020 Weather: Fine

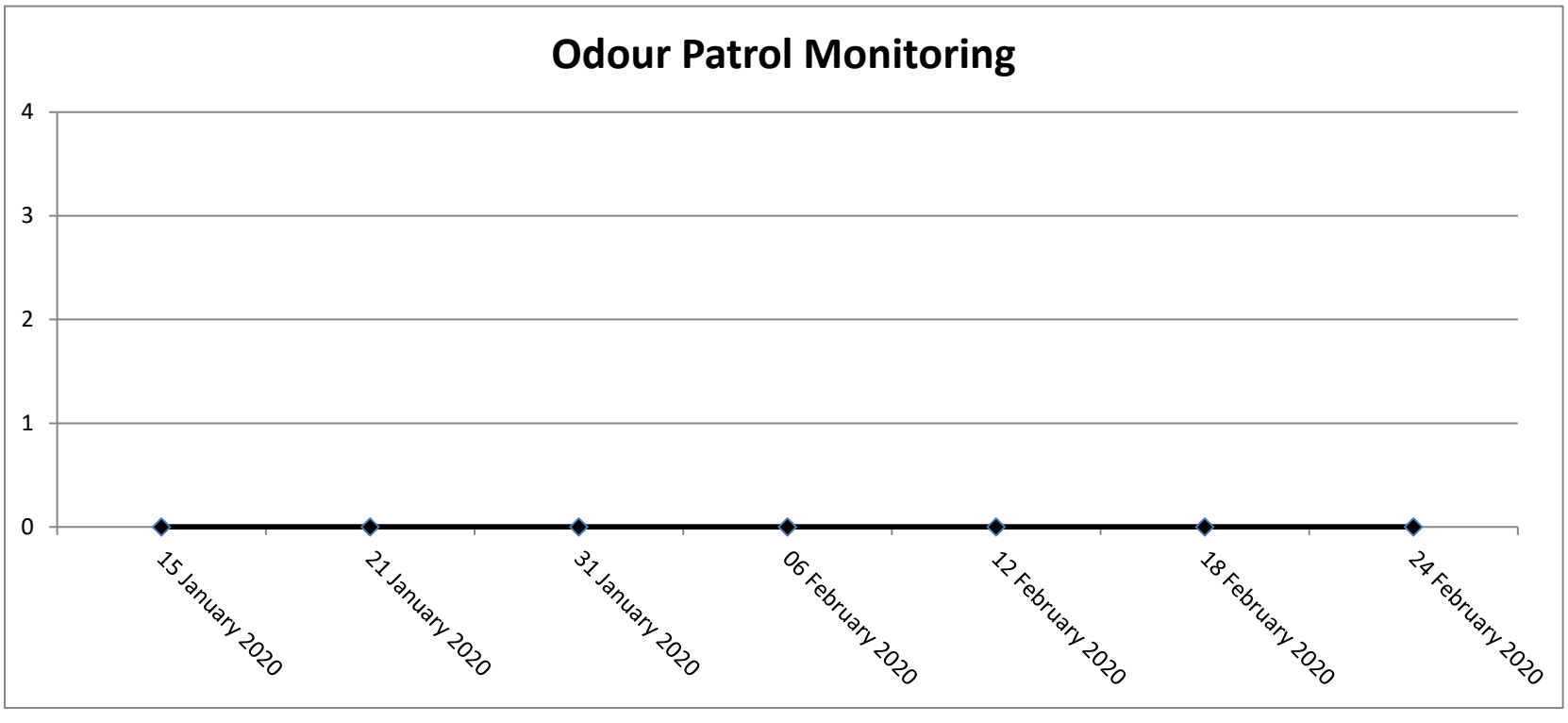
Location:	ASR – Cheung Tung Road near the Bus Depot at the west of treatment plant				
Temperature:	21.8°C	Start Time:	11:00	End Time:	11:15
Wind Speed:	0.4 m/s		Wind Direction:	E	
Nature of Odour:	✓				
*Odour Intensity: (tick as appropriate)	☑ Not detected	☐ Slight	☐ Noticeable	☐ Strong	☐ Extreme

***Classification Criteria:**

Not detected : No odour perceived or an odour so weak that it cannot be readily characterised or described.
Slight : Identifiable odour, barely noticeable
Noticeable : Identifiable odour, noticeable
Strong : Identifiable odour, strong
Extreme : Severe odour

Recorded by: 1. 2.
Name: 1. Chan Ho Cheong 2. Chan Siu Tung
Date: 24 Feb 2020

Checked by:
Name: CHOI KAM FAI
Date: 24 February 2020



Note:
Y-axis refers to the Odour Level: 0 - Not Detected; 1- Slight; 2 - Moderate; 3 - Strong; 4 - Extreme

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Appendix E

Copy of the Calibration Certificates for Water Quality Monitoring Equipment

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA200181

Report on Calibration of Aqua Troll 600 Multi-parameter Water Quality Meter

Information Supplied by Client

Client	:	MateriaLab Consultants Limited
Client's address	:	Rm. 723-726, 7/F, Profit Industrial Building, No. 1-15, Kwai Fung Crescent, Kwai Chung, N.T.
Sample description	:	One Aqua Troll 600 Multi-parameter Water Quality Meter
Client sample ID	:	Serial No. 490113
Test required	:	Calibration of the Aqua Troll 600 Multi-parameter Water Quality Meter

Laboratory Information

Lab. sample ID	:	WA200181/1
Date of calibration	:	27/12/2019
Next calibration date	:	26/03/2020
Test method used	:	In-house comparison method

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA200181

Results :

A. pH calibration

pH reading at 25°C for Q.C. solution(6.86) and at 25°C for Q.C. solution(9.18)		
Theoretical	Measured	Deviation
9.18	9.17	-0.01
6.86	6.86	0.00

B. Salinity calibration

Salinity, ppt			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
10	10.04	+0.04	± 0.5
20	20.05	+0.05	± 1.0
30	29.80	-0.20	± 1.5
40	39.85	-0.15	± 2.0

C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L	
	By calibrated D.O. meter	By D.O. meter
1	7.35	7.35
2	7.36	7.35
3	7.36	7.34
Average	7.36	7.35

Differences of D.O. Content between calibrated D.O. meter and D.O. meter should be less than 0.4mg/L

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 17/2/2020

Note : This report refers only to the sample(s) tested.

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report No. : 142626WA200181

Results :

D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
24.94	25.01

E. Turbidity calibration

Turbidity, N.T.U.			
Theoretical	Measured	Deviation	Maximum acceptable Deviation
0	-	-	± 0.5
4	4.08	+0.08	± 0.6
8	8.09	+0.09	± 0.8
40	39.68	-0.32	± 3.0
80	79.57	-0.43	± 4.0

Certified by : _____
Approved Signatory : HO Kin Man, John
Assistant General Manager – Laboratories

Date : 17/2/2020

** End of Report **

Note : This report refers only to the sample(s) tested.

SonTek
a xylem brand

9940 Summers Ridge Road
San Diego, CA 92121
Tel: (858) 546-8327
support@sontek.com

Certificate of Calibration

TEST REPORT

Serial Number	5906
System Type	M9
System Orientation	Down
Compass Type	Sontek
Compass Offset (degrees)	N/A
Communications Output	RS232
Recorder Size (GB)	14.9
Firmware Version	4.02
Date Tested	05/23/2017

POWER TEST

Command Mode (W):	0.17	Range : 0.00 – 0.30
Sleep Mode (W):	N/A	Range : N/A
Ping Mode - 18V (W):	2.67	Range : 1.50 – 3.50
Power Check		PASS

NOISE TEST

Beam 1 – 3.0 MHz (counts)	95
Beam 2 – 1.0 MHz (counts)	96
Beam 3 – 3.0 MHz (counts)	95
Beam 4 – 1.0 MHz (counts)	101
Beam 5 – 3.0 MHz (counts)	93
Beam 6 – 1.0 MHz (counts)	95
Beam 7 – 3.0 MHz (counts)	91
Beam 8 – 1.0 MHz (counts)	100
Beam Vertical – 500KHz (counts)	88
Noise Test	PASS

VERIFICATION

Velocity Check	PASS
Transmit Output	PASS
Sensitivity	PASS
Temperature Sensor	PASS
Compass Heading Check	PASS
Compass Level Check	PASS
Burn-in (24 hrs)	PASS
Load Default Parameters	DONE

OPTIONS

Bottom Track	Installed
SmartPulse HD ™	Enabled
Stationary	Disabled
GPS Compass Integration	Disabled
RiverSurveyor	Enabled
HydroSurveyor	Disabled

Verified by: **ainthasane**

This report was generated on 5/24/2017.

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Appendix F

Results and Graphical Presentation of Water Quality Monitoring

Monitoring Location	Date	Tide Mode	Weather	Sea Condition	Time	Water Depth (m)	Monitoring Level	Monitoring Level (m)	Replicate	In-situ Measurement								Laboratory Analysis							
										pH	Salinity (ppt)	Temperature (degree C)	DO Saturation (%)	DO (mg/L)	Turbidity (NTU)	Current Speed (m/s)	Current Direction (degree magnetic)	Total Suspended Solids (mg/L)	Ammonia Nitrogen (mg/L-N)	Nitrite Nitrogen (mg/L-N)	Nitrate Nitrogen (mg/L-N)	Total Inorganic Nitrogen (mg/L-N)	E.coli (cfu/100mL)	Total phosphorus (solube and particulate) (mg/L)	BOD_5 (mg/L)
										Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A	10/2/2020	Mid-Ebb	Fine	Moderate	14:52	17	S	1	1	8.05	33.83	18.58	94.2	6.95	1.3	0.10	198.5	6.4	0.061	<0.005	0.071	0.132	100	0.01	<1.0
A	10/2/2020	Mid-Ebb	Fine	Moderate	14:52	17	S	1	2	8.04	33.77	18.59	94.1	6.93	1.0	0.11	187.5	7.4	0.054	0.013	0.068	0.135	140	0.03	<1.0
A	10/2/2020	Mid-Ebb	Fine	Moderate	14:52	17	M	8.5	1	8.01	34.79	18.62	91.1	6.74	3.9	0.22	204.5	5.9	0.057	0.006	0.069	0.132	120	0.02	<1.0
A	10/2/2020	Mid-Ebb	Fine	Moderate	14:52	17	M	8.5	2	8.00	34.78	18.62	91.6	6.75	3.5	0.24	208.5	6.3	0.052	<0.005	0.077	0.129	73	0.02	<1.0
A	10/2/2020	Mid-Ebb	Fine	Moderate	14:52	17	B	16	1	7.96	34.77	18.64	88.3	6.57	2.6	0.40	240.0	5.4	0.057	<0.005	0.076	0.133	160	0.01	<1.0
A	10/2/2020	Mid-Ebb	Fine	Moderate	14:52	17	B	16	2	7.95	34.77	18.64	88.2	6.52	2.3	0.40	232.7	5.9	0.054	0.006	0.075	0.135	130	0.01	<1.0
B	10/2/2020	Mid-Ebb	Fine	Moderate	14:43	14	S	1	1	8.10	33.90	18.51	95.0	7.01	1.2	0.22	192.6	8.0	0.056	0.010	0.076	0.142	78	0.01	<1.0
B	10/2/2020	Mid-Ebb	Fine	Moderate	14:43	14	S	1	2	8.07	33.98	18.56	94.9	7.00	1.1	0.18	125.8	7.1	0.059	<0.005	0.074	0.133	86	0.02	<1.0
B	10/2/2020	Mid-Ebb	Fine	Moderate	14:43	14	M	7	1	7.87	34.66	18.68	92.4	6.67	3.4	0.42	202.4	7.2	0.060	<0.005	0.081	0.141	160	0.01	<1.0
B	10/2/2020	Mid-Ebb	Fine	Moderate	14:43	14	M	7	2	7.87	34.65	18.68	92.5	6.67	3.5	0.71	180.3	6.9	0.052	0.011	0.069	0.132	120	0.01	<1.0
B	10/2/2020	Mid-Ebb	Fine	Moderate	14:43	14	B	13	1	7.95	34.95	18.71	90.9	6.65	2.6	0.45	249.3	5.7	0.051	<0.005	0.073	0.124	100	0.01	<1.0
B	10/2/2020	Mid-Ebb	Fine	Moderate	14:43	14	B	13	2	7.94	34.98	18.72	91.0	6.66	2.9	0.33	253.0	5.2	0.052	<0.005	0.074	0.126	68	0.01	<1.0
C	10/2/2020	Mid-Ebb	Fine	Moderate	14:25	12	S	1	1	8.18	33.78	18.47	96.0	7.09	1.2	0.22	219.5	7.2	0.048	0.007	0.189	0.244	310	0.08	<1.0
C	10/2/2020	Mid-Ebb	Fine	Moderate	14:25	12	S	1	2	8.14	33.83	18.49	95.5	7.05	1.4	0.19	166.1	5.1	0.046	0.009	0.186	0.241	380	0.08	<1.0
C	10/2/2020	Mid-Ebb	Fine	Moderate	14:25	12	M	6	1	7.98	34.83	18.69	92.4	6.81	1.7	0.33	187.8	6.2	0.044	0.009	0.166	0.219	290	0.06	<1.0
C	10/2/2020	Mid-Ebb	Fine	Moderate	14:25	12	M	6	2	7.98	34.85	18.70	92.1	6.77	1.8	0.61	162.9	7.2	0.047	0.017	0.141	0.205	240	0.05	<1.0
C	10/2/2020	Mid-Ebb	Fine	Moderate	14:25	12	B	11	1	7.96	34.97	18.71	90.2	6.64	2.3	0.46	251.7	8.1	0.050	<0.005	0.129	0.178	320	0.04	<1.0
C	10/2/2020	Mid-Ebb	Fine	Moderate	14:25	12	B	11	2	7.95	34.97	18.71	90.3	6.66	2.5	0.35	259.4	8.2	0.053	<0.005	0.118	0.171	260	0.03	<1.0
D	10/2/2020	Mid-Ebb	Fine	Moderate	14:08	13	S	1	1	8.36	34.66	18.32	98.2	7.29	1.5	0.28	204.9	9.6	0.066	<0.005	0.094	0.160	420	0.02	<1.0
D	10/2/2020	Mid-Ebb	Fine	Moderate	14:08	13	S	1	2	8.25	33.53	18.42	98.1	7.18	1.2	0.35	201.3	8.7	0.048	0.009	0.087	0.143	350	0.02	<1.0
D	10/2/2020	Mid-Ebb	Fine	Moderate	14:08	13	M	6.5	1	8.01	34.83	18.66	93.7	6.95	2.2	0.28	208.2	8.8	0.053	<0.005	0.106	0.159	260	0.02	<1.0
D	10/2/2020	Mid-Ebb	Fine	Moderate	14:08	13	M	6.5	2	7.99	34.87	18.68	93.3	6.92	2.0	0.13	171.2	8.8	0.047	<0.005	0.086	0.133	260	0.02	<1.0
D	10/2/2020	Mid-Ebb	Fine	Moderate	14:08	13	B	12	1	7.97	34.85	18.70	91.9	6.82	3.7	0.40	242.4	7.9	0.058	0.006	0.101	0.166	280	0.03	<1.0
D	10/2/2020	Mid-Ebb	Fine	Moderate	14:08	13	B	12	2	7.97	35.00	18.70	91.5	6.78	4.1	0.31	209.2	7.3	0.048	<0.005	0.097	0.145	270	0.02	<1.0
E	10/2/2020	Mid-Ebb	Fine	Moderate	13:54	16	S	1	1	8.52	34.84	18.47	97.8	7.23	2.9	0.15	189.4	7.9	0.046	0.010	0.078	0.134	140	0.02	<1.0
E	10/2/2020	Mid-Ebb	Fine	Moderate	13:54	16	S	1	2	8.33	34.78	18.51	97.1	7.17	2.3	0.19	204.5	8.3	0.048	0.006	0.081	0.136	230	0.02	1.0
E	10/2/2020	Mid-Ebb	Fine	Moderate	13:54	16	M	8	1	8.04	34.79	18.60	95.7	7.06	2.8	0.25	219.7	7.3	0.060	0.008	0.077	0.145	170	0.02	1.0
E	10/2/2020	Mid-Ebb	Fine	Moderate	13:54	16	M	8	2	8.02	34.79	18.61	95.4	7.04	3.2	0.21	221.1	7.5	0.055	<0.005	0.085	0.140	180	0.02	<1.0
E	10/2/2020	Mid-Ebb	Fine	Moderate	13:54	16	B	15	1	7.97	34.79	18.64	94.1	6.93	2.9	0.24	259.2	8.0	0.061	0.008	0.081	0.151	170	0.02	<1.0
E	10/2/2020	Mid-Ebb	Fine	Moderate	13:54	16	B	15	2	7.96	34.77	18.64	94.3	6.95	2.6	0.21	240.2	7.8	0.049	<0.005	0.090	0.139	300	0.02	<1.0
F	10/2/2020	Mid-Ebb	Fine	Moderate	13:41	23	S	1	1	8.15	35.03	18.19	100.7	7.54	2.6	0.13	210.0	5.7	0.055	0.005	0.078	0.138	200	0.02	1.0
F	10/2/2020	Mid-Ebb	Fine	Moderate	13:41	23	S	1	2	8.97	34.87	18.39	99.0	7.35	2.2	0.18	179.5	6.6	0.053	<0.005	0.082	0.135	190	0.02	1.3
F	10/2/2020	Mid-Ebb	Fine	Moderate	13:41	23	M	11.5	1	8.07	34.79	18.58	95.9	7.17	2.2	0.29	227.5	6.4	0.053	<0.005	0.087	0.139	140	0.02	<1.0
F	10/2/2020	Mid-Ebb	Fine	Moderate	13:41	23	M	11.5	2	8.05	34.78	18.59	95.8	7.17	2.0	0.25	143.6	7.2	0.055	<0.005	0.083	0.138	160	0.02	1.1
F	10/2/2020	Mid-Ebb	Fine	Moderate	13:41	23	B	22	1	7.98	34.81	18.63	94.3	7.08	2.8	0.28	221.7	7.8	0.050	<0.005	0.089	0.139	130	0.02	1.1
F	10/2/2020	Mid-Ebb	Fine	Moderate	13:41	23	B	22	2	7.97	34.77	18.63	94.2	7.06	3.4	0.35	208.8	7.1	0.054	0.012	0.079	0.144	230	0.02	1.2
G	10/2/2020	Mid-Ebb	Fine	Moderate	13:10	22	S	1	1	7.85	34.02	18.54	95.6	7.05	4.6	0.19	211.1	4.6	0.074	0.011	0.073	0.157	140	0.02	1.8
G	10/2/2020	Mid-Ebb	Fine	Moderate	13:10	22	S	1	2	7.85	34.29	18.56	95.2	7.02	4.2	0.22	208.0	5.4	0.078	<0.005	0.079	0.157	200	0.02	1.6
G	10/2/2020	Mid-Ebb	Fine	Moderate	13:10	22	M	11	1	7.87	34.63	18.59	91.6	6.75	4.9	0.31	230.4	4.2	0.083	0.007	0.071	0.160	180	0.04	1.3
G	10/2/2020	Mid-Ebb	Fine	Moderate	13:10	22	M	11	2	7.86	34.64	18.58	91.6	6.74	4.6	0.33	239.1	4.7	0.080	0.007	0.078	0.164	130	0.02	1.6
G	10/2/2020	Mid-Ebb	Fine	Moderate	13:10	22	B	21	1	7.87	34.65	18.59	90.4	6.67	4.9	0.40	248.4	3.9	0.077	<0.005	0.082	0.158	120	0.02	2.0
G	10/2/2020	Mid-Ebb	Fine	Moderate	13:10	22	B	21	2	7.87	34.67	18.59	90.3	6.67	4.8	0.31	253.0	3.8	0.079	0.009	0.076	0.164	100	0.02	1.9
H	10/2/2020	Mid-Ebb	Fine	Moderate	13:00	19	S	1	1	7.90	28.69	18.43	97.1	7.21	4.3	0.31	202.6	4.3	0.073	0.008	0.071	0.152	100	0.02	1.3
H	10/2/2020	Mid-Ebb	Fine	Moderate	13:00	19	S	1	2	7.85	34.02	18.51	96.1	7.10	4.2	0.37	198.5	5.2	0.087	<0.005	0.077	0.164	160	0.02	1.5
H	10/2/2020	Mid-Ebb	Fine	Moderate	13:00	19	M	9.5	1	7.87	34.63	18.58	94.6	7.05	4.4	0.26	228.5	4.8	0.079	<0.005	0.082	0.161	160	0.03	1.9
H	10/2/2020	Mid-Ebb	Fine	Moderate	13:00	19	M	9.5	2	7.86	34.62	18.58	94.5	7.03	4.8	0.24	209.8	4.1	0.081	<0.005	0.078	0.159	140	0.02	1.5
H	10/2/2020	Mid-Ebb	Fine	Moderate	13:00	19	B	18	1	7.87	34.64	18.59	91.3	6.80	4.7	0.50	213.0	3.6	0.077	<0.005	0.080	0.157	110	0.02	2.0
H	10/2/2020	Mid-Ebb	Fine	Moderate	13:00	19	B	18	2	7.87	34.68	18.59	91.4	6.80	4.6	0.33	212.8	3.9	0.086	<0.005	0.080	0.167	150	0.02	1.2

Note: 1. ND: Not Detected

Monitoring Location	Date	Tide Mode	Weather	Sea Condition	Time	Water Depth (m)	Monitoring Level	Monitoring Level (m)	Replicate	In-situ Measurement								Laboratory Analysis							
										pH	Salinity (ppt)	Temperature (degree C)	DO Saturation (%)	DO (mg/L)	Turbidity (NTU)	Current Speed (m/s)	Current Direction (degree magnetic)	Total Suspended Solids (mg/L)	Ammonia Nitrogen (mg/L-N)	Nitrite Nitrogen (mg/L-N)	Nitrate Nitrogen (mg/L-N)	Total Inorganic Nitrogen (mg/L-N)	E.coli (cfu/100mL)	Total phosphorus (solube and particulate) (mg/L)	BOD_5 (mg/L)
										Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A	10/2/2020	Mid-Flood	Fine	Moderate	09:10	15	S	1	1	8.70	34.59	18.42	94.0	6.95	2.6	0.31	230.4	11.6	0.054	0.010	0.077	0.141	280	0.02	1.1
A	10/2/2020	Mid-Flood	Fine	Moderate	09:10	15	S	1	2	8.70	34.55	18.43	93.7	6.92	2.5	0.27	219.8	11.7	0.055	0.010	0.076	0.140	200	0.02	1.1
A	10/2/2020	Mid-Flood	Fine	Moderate	09:10	15	M	7.5	1	7.85	34.79	18.71	90.7	6.71	3.3	0.36	206.6	10.8	0.060	<0.005	0.081	0.140	560	0.02	<1.0
A	10/2/2020	Mid-Flood	Fine	Moderate	09:10	15	M	7.5	2	7.84	34.77	18.72	90.8	6.72	3.5	0.32	215.4	10.7	0.057	0.007	0.081	0.145	260	0.02	1.4
A	10/2/2020	Mid-Flood	Fine	Moderate	09:10	15	B	14	1	8.72	34.67	18.57	88.2	6.53	5.9	0.34	212.0	11.4	0.057	0.009	0.079	0.145	180	0.02	1.1
A	10/2/2020	Mid-Flood	Fine	Moderate	09:10	15	B	14	2	8.72	34.67	18.53	88.3	6.53	6.1	0.37	207.0	10.1	0.061	0.012	0.074	0.147	280	0.02	<1.0
B	10/2/2020	Mid-Flood	Fine	Moderate	08:50	14	S	1	1	8.71	34.70	18.68	93.7	6.54	3.2	0.39	238.0	11.2	0.070	<0.005	0.088	0.158	380	0.02	<1.0
B	10/2/2020	Mid-Flood	Fine	Moderate	08:50	14	S	1	2	8.73	34.67	18.69	93.2	6.51	3.4	0.34	253.6	11.6	0.060	<0.005	0.085	0.144	490	0.02	1.4
B	10/2/2020	Mid-Flood	Fine	Moderate	08:50	14	M	7	1	7.85	34.80	18.42	91.3	6.38	4.8	0.15	165.7	11.4	0.067	0.006	0.076	0.150	410	0.02	1.6
B	10/2/2020	Mid-Flood	Fine	Moderate	08:50	14	M	7	2	7.83	34.77	18.41	91.4	6.38	4.5	0.34	200.9	10.1	0.057	0.006	0.08	0.143	320	0.02	1.4
B	10/2/2020	Mid-Flood	Fine	Moderate	08:50	14	B	13	1	8.72	34.63	18.12	89.1	6.22	5.8	0.20	156.7	11.8	0.057	0.008	0.074	0.140	340	0.02	1.2
B	10/2/2020	Mid-Flood	Fine	Moderate	08:50	14	B	13	2	8.72	34.62	18.15	89.4	6.24	6.1	0.31	211.9	10.9	0.062	0.006	0.079	0.146	250	0.02	1.4
C	10/2/2020	Mid-Flood	Fine	Moderate	08:25	12	S	1	1	8.72	34.69	18.58	93.3	6.87	6.5	0.30	244.9	9.8	0.054	<0.005	0.084	0.138	250	0.02	1.2
C	10/2/2020	Mid-Flood	Fine	Moderate	08:25	12	S	1	2	8.72	34.68	18.58	93.2	6.86	6.6	0.18	251.8	10.9	0.053	0.005	0.076	0.135	260	0.02	1.4
C	10/2/2020	Mid-Flood	Fine	Moderate	08:25	12	M	6	1	7.85	34.80	18.70	90.3	6.67	2.3	0.47	202.5	11.9	0.052	<0.005	0.081	0.133	240	0.02	1.6
C	10/2/2020	Mid-Flood	Fine	Moderate	08:25	12	M	6	2	7.86	34.78	18.71	90.2	6.67	2.7	0.29	234.0	11.3	0.052	<0.005	0.084	0.136	230	0.02	1.7
C	10/2/2020	Mid-Flood	Fine	Moderate	08:25	12	B	11	1	8.72	34.67	18.57	87.2	6.42	3.7	0.35	208.5	11.0	0.058	<0.005	0.080	0.138	340	0.02	1.4
C	10/2/2020	Mid-Flood	Fine	Moderate	08:25	12	B	11	2	8.72	34.64	18.54	87.0	6.41	3.8	0.18	218.7	11.5	0.062	<0.005	0.080	0.143	230	0.02	1.7
D	10/2/2020	Mid-Flood	Fine	Moderate	08:16	14	S	1	1	8.72	34.67	18.57	93.3	6.87	6.2	0.23	181.8	12.1	0.057	0.010	0.076	0.143	140	0.02	<1.0
D	10/2/2020	Mid-Flood	Fine	Moderate	08:16	14	S	1	2	8.72	34.68	18.58	93.2	6.87	6.3	0.19	184.3	11.0	0.061	<0.005	0.078	0.139	180	0.02	1.2
D	10/2/2020	Mid-Flood	Fine	Moderate	08:16	14	M	7	1	8.72	34.68	18.57	89.7	6.52	3.7	0.81	184.7	12.2	0.061	<0.005	0.078	0.139	210	0.02	1.1
D	10/2/2020	Mid-Flood	Fine	Moderate	08:16	14	M	7	2	8.72	34.70	18.57	89.8	6.63	3.1	0.96	206.8	11.1	0.061	<0.005	0.080	0.141	220	0.02	1.4
D	10/2/2020	Mid-Flood	Fine	Moderate	08:16	14	B	13	1	8.72	34.64	18.56	88.1	6.51	3.9	0.28	246.2	9.6	0.061	<0.005	0.080	0.141	340	0.02	2.1
D	10/2/2020	Mid-Flood	Fine	Moderate	08:16	14	B	13	2	8.72	34.65	18.55	88.3	6.41	3.8	0.26	218.1	10.6	0.061	0.006	0.078	0.144	190	0.02	1.4
E	10/2/2020	Mid-Flood	Fine	Moderate	07:57	14	S	1	1	7.90	34.62	18.62	94.0	6.93	2.7	0.16	203.9	8.3	0.048	0.007	0.077	0.132	210	0.02	1.2
E	10/2/2020	Mid-Flood	Fine	Moderate	07:57	14	S	1	2	7.89	34.68	18.63	93.8	6.90	2.1	0.11	169.1	8.6	0.044	0.007	0.080	0.130	260	0.02	2.4
E	10/2/2020	Mid-Flood	Fine	Moderate	07:57	14	M	7	1	8.71	34.65	18.52	93.5	6.90	3.4	0.13	170.5	7.6	0.046	0.006	0.078	0.129	210	0.02	1.6
E	10/2/2020	Mid-Flood	Fine	Moderate	07:57	14	M	7	2	8.71	34.65	18.52	93.3	6.88	3.9	0.15	181.9	7.4	0.046	0.007	0.078	0.131	230	0.02	1.3
E	10/2/2020	Mid-Flood	Fine	Moderate	07:57	14	B	13	1	8.72	34.66	18.55	90.1	6.57	3.7	0.13	199.0	7.8	0.044	<0.005	0.087	0.130	350	0.02	1.6
E	10/2/2020	Mid-Flood	Fine	Moderate	07:57	14	B	13	2	8.72	34.66	18.54	90.2	6.58	3.3	0.17	217.1	7.9	0.046	<0.005	0.086	0.132	310	0.02	1.6
F	10/2/2020	Mid-Flood	Fine	Moderate	07:48	18	S	1	1	7.88	34.71	18.62	93.7	6.90	2.7	0.31	184.9	8.2	0.052	<0.005	0.087	0.139	310	0.02	1.3
F	10/2/2020	Mid-Flood	Fine	Moderate	07:48	18	S	1	2	7.87	34.68	18.64	93.6	6.89	3.0	0.32	210.7	7.7	0.055	<0.005	0.083	0.138	350	0.02	2.4
F	10/2/2020	Mid-Flood	Fine	Moderate	07:48	18	M	9	1	8.72	34.70	18.57	91.2	6.67	3.8	0.13	222.7	8.6	0.056	0.005	0.085	0.146	140	0.02	2.2
F	10/2/2020	Mid-Flood	Fine	Moderate	07:48	18	M	9	2	8.72	34.66	18.56	91.0	6.62	3.4	0.18	217.8	7.9	0.049	<0.005	0.088	0.137	180	0.02	1.4
F	10/2/2020	Mid-Flood	Fine	Moderate	07:48	18	B	17	1	7.85	34.75	18.72	89.2	6.55	2.3	0.41	245.0	8.6	0.051	<0.005	0.087	0.137	290	0.02	2.0
F	10/2/2020	Mid-Flood	Fine	Moderate	07:48	18	B	17	2	7.85	34.78	18.73	88.9	6.53	2.7	0.32	166.0	8.4	0.050	<0.005	0.082	0.132	180	0.02	1.9
G	10/2/2020	Mid-Flood	Fine	Moderate	07:17	13	S	1	1	7.87	34.68	18.65	93.7	6.89	1.8	0.15	190.8	7.0	0.044	<0.005	0.079	0.122	320	0.02	1.5
G	10/2/2020	Mid-Flood	Fine	Moderate	07:17	13	S	1	2	7.86	34.67	18.66	93.6	6.89	2.1	0.16	200.5	7.7	0.037	<0.005	0.078	0.115	280	0.02	2.2
G	10/2/2020	Mid-Flood	Fine	Moderate	07:17	13	M	6.5	1	8.71	34.64	18.48	90.7	6.72	3.4	0.20	226.6	6.8	0.043	<0.005	0.081	0.124	370	0.02	2.2
G	10/2/2020	Mid-Flood	Fine	Moderate	07:17	13	M	6.5	2	8.71	34.66	18.50	90.2	6.69	3.0	0.23	217.0	7.6	0.047	0.006	0.090	0.142	130	0.02	2.8
G	10/2/2020	Mid-Flood	Fine	Moderate	07:17	13	B	12	1	7.85	34.77	18.72	87.9	6.57	3.1	0.23	235.0	6.8	0.042	0.008	0.080	0.131	200	0.02	2.4
G	10/2/2020	Mid-Flood	Fine	Moderate	07:17	13	B	12	2	7.85	34.82	18.72	87.4	6.53	3.3	0.20	226.3	6.7	0.045	<0.005	0.087	0.132	94	0.02	1.7
H	10/2/2020	Mid-Flood	Fine	Moderate	07:08	19	S	1	1	7.86	34.69	18.66	93.7	6.89	2.1	0.20	233.7	9.2	0.041	<0.005	0.081	0.122	86	0.02	1.6
H	10/2/2020	Mid-Flood	Fine	Moderate	07:08	19	S	1	2	7.86	34.71	18.67	93.7	6.89	2.3	0.14	137.5	8.2	0.043	<0.005	0.083	0.126	130	0.02	3.0
H	10/2/2020	Mid-Flood	Fine	Moderate	07:08	19	M	9.5	1	8.71	34.61	18.47	89.5	6.54	3.8	0.18	208.6	8.5	0.041	<0.005	0.085	0.125	150	0.02	2.4
H	10/2/2020	Mid-Flood	Fine	Moderate	07:08	19	M	9.5	2	8.71	34.66	18.48	88.9	6.52	3.3	0.30	216.1	7.6	0.041	<0.005	0.087	0.128	65	0.02	2.2
H	10/2/2020	Mid-Flood	Fine	Moderate	07:08	19	B	18	1	7.85	34.77	18.73	88.3	6.45	3.3	0.29	240.3	6.2	0.040	<0.005	0.083	0.123	84	0.02	2.2
H	10/2/2020	Mid-Flood	Fine	Moderate	07:08	19	B	18	2	7.85	34.76	18.72	88.5	6.46	3.6	0.37	230.7	6.8	0.038	<0.005	0.082	0.120	78	0.02	2.0

Note: 1. ND: Not Detected

CERTIFICATE OF ANALYSIS

Client	: FUGRO TECHNICAL SERVICES LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 29
Contact	: MR CYRUS LAI	Contact	: Richard Fung	Work Order	: HK2004284
Address	: ROOM 723 & 725, 7/F, BLOCK B, PROFIT INDUSTRIAL BUILDING, 1-15 KWAI FONG CRESCENT, KWAI FONG, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: c.lai@fugro.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3565 4374	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT - WATER AND SEDIMENT QUALITY MONITORING & BENTHIC SURVEY			Date Samples Received	: 10-Feb-2020
Order number	: 0041/17	Quote number	: HKE/1654/2017_R1	Issue Date	: 24-Feb-2020
C-O-C number	: ----			No. of samples received	: 96
Site	: ----			No. of samples analysed	: 96

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	Managing Director	Inorganics
Ng Sin Kou, May	Laboratory Manager	Microbiology_ENV

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 10-Feb-2020 to 24-Feb-2020.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2004284

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.

Microbiological sample(s) was/ were collected in 125mL sterile plastic bottles containing sodium thiosulfate. Sample(s) arrived at the laboratory at 17:10.

NOT DETECTED denotes result(s) is (are) less than the Limit of Report (LOR).

EK063A - Total Inorganic Nitrogen is the sum of the Total Oxidizable Nitrogen and Ammonical Nitrogen.

EP030 - The accredited LOR of Biochemical Oxygen Demand is 2mg/L. Results reported below 2mg/L and the decimal value of the results were for reference only.

Analytical Results

Sub-Matrix: **WATER**

Compound	CAS Number	LOR	Unit	Client sample ID	A/S/E	A/S/E/Dup	A/M/E	A/M/E/Dup	A/B/E
				Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
					HK2004284-001	HK2004284-002	HK2004284-003	HK2004284-004	HK2004284-005
EA/ED: Physical and Aggregate Properties									
EA025: Suspended Solids (SS)	----	0.5	mg/L		6.4	7.4	5.9	6.3	5.4
ED/EK: Inorganic Nonmetallic Parameters									
EK055A: Ammonia as N	7664-41-7	0.005	mg/L		0.061	0.054	0.057	0.052	0.057
EK057A: Nitrite as N	14797-65-0	0.005	mg/L		<0.005	0.013	0.006	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L		0.071	0.068	0.069	0.077	0.076
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L		0.132	0.135	0.132	0.129	0.133
EK067P: Total Phosphorus as P	----	0.01	mg/L		0.01	0.03	0.02	0.02	0.01
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EP: Aggregate Organics									
EP030: Biochemical Oxygen Demand	----	1.0	mg/L		<1.0	<1.0	<1.0	<1.0	<1.0
EM: Microbiological Testing									
EM002: E. coli	----	1	CFU/100mL		100	140	120	73	160

Sub-Matrix: WATER			Client sample ID	A/B/E/Dup	B/S/E	B/S/E/Dup	B/M/E	B/M/E/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-006	HK2004284-007	HK2004284-008	HK2004284-009	HK2004284-010
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	5.9	8.0	7.1	7.2	6.9
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.054	0.056	0.059	0.060	0.052
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.006	0.010	<0.005	<0.005	0.011
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.075	0.076	0.074	0.081	0.069
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.135	0.142	0.133	0.141	0.132
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.02	0.01	0.01
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	130	78	86	160	120

Sub-Matrix: WATER			Client sample ID	B/B/E	B/B/E/Dup	C/S/E	C/S/E/Dup	C/M/E
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-011	HK2004284-012	HK2004284-013	HK2004284-014	HK2004284-015
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	5.7	5.2	7.2	5.1	6.2
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.051	0.052	0.048	0.046	0.044
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	<0.005	0.007	0.009	0.009
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.073	0.074	0.189	0.186	0.166
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.124	0.126	0.244	0.241	0.219
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.01	0.01	0.08	0.08	0.06
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	0.07	0.07	0.06
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	100	68	310	380	290

Sub-Matrix: WATER			Client sample ID	C/M/E/Dup	C/B/E	C/B/E/Dup	D/S/E	D/S/E/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-016	HK2004284-017	HK2004284-018	HK2004284-019	HK2004284-020
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	7.2	8.1	8.2	9.6	8.7
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.047	0.050	0.053	0.066	0.048
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.017	<0.005	<0.005	<0.005	0.009
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.141	0.129	0.118	0.094	0.087
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.205	0.178	0.171	0.160	0.143
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.05	0.04	0.03	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.05	0.03	0.03	0.02	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	240	320	260	420	350

Sub-Matrix: WATER			Client sample ID	D/M/E	D/M/E/Dup	D/B/E	D/B/E/Dup	E/S/E
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-021	HK2004284-022	HK2004284-023	HK2004284-024	HK2004284-025
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	8.8	8.8	7.9	7.3	7.9
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.053	0.047	0.058	0.048	0.046
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	<0.005	0.006	<0.005	0.010
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.106	0.086	0.101	0.097	0.078
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.159	0.133	0.166	0.145	0.134
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.03	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.02	0.01	0.02	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	<1.0	<1.0	<1.0	<1.0	<1.0
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	260	260	280	270	140

Sub-Matrix: WATER			Client sample ID	E/S/E/Dup	E/M/E	E/M/E/Dup	E/B/E	E/B/E/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-026	HK2004284-027	HK2004284-028	HK2004284-029	HK2004284-030
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	8.3	7.3	7.5	8.0	7.8
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.048	0.060	0.055	0.061	0.049
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.006	0.008	<0.005	0.008	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.081	0.077	0.085	0.081	0.090
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.136	0.145	0.140	0.151	0.139
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	<0.01	<0.01	<0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.0	1.0	<1.0	<1.0	<1.0
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	230	170	180	170	300

Sub-Matrix: WATER			Client sample ID	F/S/E	F/S/E/Dup	F/M/E	F/M/E/Dup	F/B/E
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-031	HK2004284-032	HK2004284-033	HK2004284-034	HK2004284-035
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	5.7	6.6	6.4	7.2	7.8
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.055	0.053	0.053	0.055	0.050
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.005	<0.005	<0.005	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.078	0.082	0.087	0.083	0.089
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.138	0.135	0.139	0.138	0.139
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.0	1.3	<1.0	1.1	1.1
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	200	190	140	160	130

Sub-Matrix: WATER			Client sample ID	F/B/E/Dup	G/S/E	G/S/E/Dup	G/M/E	G/M/E/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-036	HK2004284-037	HK2004284-038	HK2004284-039	HK2004284-040
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	7.1	4.6	5.4	4.2	4.7
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.054	0.074	0.078	0.083	0.080
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.012	0.011	<0.005	0.007	0.007
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.079	0.073	0.079	0.071	0.078
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.144	0.157	0.157	0.160	0.164
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.04	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	<0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.2	1.8	1.6	1.3	1.6
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	230	140	200	180	130

Sub-Matrix: WATER			Client sample ID	G/B/E	G/B/E/Dup	H/S/E	H/S/E/Dup	H/M/E
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-041	HK2004284-042	HK2004284-043	HK2004284-044	HK2004284-045
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	3.9	3.8	4.3	5.2	4.8
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.077	0.079	0.073	0.087	0.079
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.009	0.008	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.082	0.076	0.071	0.077	0.082
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.158	0.164	0.152	0.164	0.161
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.03
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.01	0.01	0.01	<0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.0	1.9	1.3	1.5	1.9
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	120	100	100	160	160

Sub-Matrix: WATER			Client sample ID	H/M/E/Dup	H/B/E	H/B/E/Dup	A/S/F	A/S/F/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-046	HK2004284-047	HK2004284-048	HK2004284-049	HK2004284-050
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	4.1	3.6	3.9	11.6	11.7
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.081	0.077	0.086	0.054	0.055
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	<0.005	<0.005	0.010	0.010
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.078	0.080	0.080	0.077	0.076
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.159	0.157	0.167	0.141	0.140
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.5	2.0	1.2	1.1	1.1
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	140	110	150	280	200

Sub-Matrix: WATER			Client sample ID	A/M/F	A/M/F/Dup	A/B/F	A/B/F/Dup	B/S/F
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-051	HK2004284-052	HK2004284-053	HK2004284-054	HK2004284-055
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	10.8	10.7	11.4	10.1	11.2
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.060	0.057	0.057	0.061	0.070
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.007	0.009	0.012	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.081	0.081	0.079	0.074	0.088
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.140	0.145	0.145	0.147	0.158
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	<1.0	1.4	1.1	<1.0	<1.0
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	560	260	180	280	380

Sub-Matrix: WATER			Client sample ID	B/S/F/Dup	B/M/F	B/M/F/Dup	B/B/F	B/B/F/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-056	HK2004284-057	HK2004284-058	HK2004284-059	HK2004284-060
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	11.6	11.4	10.1	11.8	10.9
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.060	0.067	0.057	0.057	0.062
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.006	0.006	0.008	0.006
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.085	0.076	0.080	0.074	0.079
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.144	0.150	0.143	0.140	0.146
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.4	1.6	1.4	1.2	1.4
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	490	410	320	340	250

Sub-Matrix: WATER			Client sample ID	C/S/F	C/S/F/Dup	C/M/F	C/M/F/Dup	C/B/F
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-061	HK2004284-062	HK2004284-063	HK2004284-064	HK2004284-065
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	9.8	10.9	11.9	11.3	11.0
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.054	0.053	0.052	0.052	0.058
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.005	<0.005	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.084	0.076	0.081	0.084	0.080
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.138	0.135	0.133	0.136	0.138
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.2	1.4	1.6	1.7	1.4
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	250	260	240	230	340

Sub-Matrix: WATER			Client sample ID	C/B/F/Dup	D/S/F	D/S/F/Dup	D/M/F	D/M/F/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-066	HK2004284-067	HK2004284-068	HK2004284-069	HK2004284-070
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	11.5	12.1	11.0	12.2	11.1
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.062	0.057	0.061	0.061	0.061
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.010	<0.005	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.080	0.076	0.078	0.078	0.080
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.143	0.143	0.139	0.139	0.141
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.02	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.7	<1.0	1.2	1.1	1.4
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	230	140	180	210	220

Sub-Matrix: WATER			Client sample ID	D/B/F	D/B/F/Dup	E/S/F	E/S/F/Dup	E/M/F
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-071	HK2004284-072	HK2004284-073	HK2004284-074	HK2004284-075
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	9.6	10.6	8.3	8.6	7.6
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.061	0.061	0.048	0.044	0.046
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.006	0.007	0.007	0.006
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.080	0.078	0.077	0.080	0.078
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.141	0.144	0.132	0.130	0.129
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.02	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.1	1.4	1.2	2.4	1.6
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	340	190	210	260	210

Sub-Matrix: WATER			Client sample ID	E/M/F/Dup	E/B/F	E/B/F/Dup	F/S/F	F/S/F/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-076	HK2004284-077	HK2004284-078	HK2004284-079	HK2004284-080
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	7.4	7.8	7.9	8.2	7.7
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.046	0.044	0.046	0.052	0.055
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.007	<0.005	<0.005	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.078	0.087	0.086	0.087	0.083
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.131	0.130	0.132	0.139	0.138
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.3	1.6	1.6	1.3	2.4
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	230	350	310	310	350

Sub-Matrix: WATER			Client sample ID	F/M/F	F/M/F/Dup	F/B/F	F/B/F/Dup	G/S/F
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-081	HK2004284-082	HK2004284-083	HK2004284-084	HK2004284-085
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	8.6	7.9	8.6	8.4	7.0
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.056	0.049	0.051	0.050	0.044
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	0.005	<0.005	<0.005	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.085	0.088	0.087	0.082	0.079
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.146	0.137	0.137	0.132	0.122
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.2	1.4	2.0	1.9	1.5
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	140	180	290	180	320

Sub-Matrix: WATER			Client sample ID	G/S/F/Dup	G/M/F	G/M/F/Dup	G/B/F	G/B/F/Dup
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-086	HK2004284-087	HK2004284-088	HK2004284-089	HK2004284-090
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	7.7	6.8	7.6	6.8	6.7
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.037	0.043	0.047	0.042	0.045
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	<0.005	0.006	0.008	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.078	0.081	0.090	0.080	0.087
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.115	0.124	0.142	0.131	0.132
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.01	0.01	0.01	0.01	0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.2	2.2	2.8	2.4	1.7
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	280	370	130	200	94

Sub-Matrix: WATER			Client sample ID	H/S/F	H/S/F/Dup	H/M/F	H/M/F/Dup	H/B/F
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004284-091	HK2004284-092	HK2004284-093	HK2004284-094	HK2004284-095
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	9.2	8.2	8.5	7.6	6.2
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.041	0.043	0.041	0.041	0.040
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.081	0.083	0.085	0.087	0.083
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.122	0.126	0.125	0.128	0.123
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.02	0.02	0.02
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	0.02	0.01	0.01	0.01	<0.01
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	1.6	3.0	2.4	2.2	2.2
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	86	130	150	65	84

Sub-Matrix: WATER			Client sample ID	H/B/F/Dup	----	----	----	----
			Client sampling date / time	10-Feb-2020	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2004284-096	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties								
EA025: Suspended Solids (SS)	----	0.5	mg/L	6.8	----	----	----	----
ED/EK: Inorganic Nonmetallic Parameters								
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	0.038	----	----	----	----
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	----	----	----	----
EK058A: Nitrate as N	14797-55-8	0.005	mg/L	0.082	----	----	----	----
EK063A: Inorganic Nitrogen as N	----	0.010	mg/L	0.120	----	----	----	----
EK067P: Total Phosphorus as P	----	0.01	mg/L	0.02	----	----	----	----
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	----	----	----	----
EP: Aggregate Organics								
EP030: Biochemical Oxygen Demand	----	1.0	mg/L	2.0	----	----	----	----
EM: Microbiological Testing								
EM002: E. coli	----	1	CFU/100mL	78	----	----	----	----

Laboratory Duplicate (DUP) Report

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2852573)								
HK2004284-001	A/S/E	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	6.4	6.0	6.50
HK2004284-013	C/S/E	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	7.2	6.4	11.8
EA/ED: Physical and Aggregate Properties (QC Lot: 2852574)								
HK2004284-021	D/M/E	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	8.8	8.2	8.24
HK2004284-031	F/S/E	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	5.7	5.3	7.74
EA/ED: Physical and Aggregate Properties (QC Lot: 2852575)								
HK2004284-041	G/B/E	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	3.9	4.1	4.39
HK2004284-051	A/M/F	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	10.8	11.8	9.52
EA/ED: Physical and Aggregate Properties (QC Lot: 2852576)								
HK2004284-061	C/S/F	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	9.8	10.2	4.50
HK2004284-072	D/B/F/Dup	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	10.6	10.3	2.40
EA/ED: Physical and Aggregate Properties (QC Lot: 2852577)								
HK2004284-081	F/M/F	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	8.6	8.9	4.01
HK2004284-091	H/S/F	**EA025: Suspended Solids (SS)**	----	0.5	mg/L	9.2	8.0	14.2
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853560)								
HK2004284-020	D/S/E/Dup	**EK067P: Total Phosphorus as P**	----	0.01	mg/L	0.02	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853561)								
HK2004284-020	D/S/E/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.01	mg/L	0.01	0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853562)								
HK2004284-040	G/M/E/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.01	mg/L	<0.01	0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853563)								
HK2004284-040	G/M/E/Dup	**EK067P: Total Phosphorus as P**	----	0.01	mg/L	0.02	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853564)								
HK2004284-060	B/B/F/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.01	mg/L	0.01	0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853565)								
HK2004284-060	B/B/F/Dup	**EK067P: Total Phosphorus as P**	----	0.01	mg/L	0.02	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853566)								
HK2004284-080	F/S/F/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.01	mg/L	0.01	0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853567)								
HK2004284-080	F/S/F/Dup	**EK067P: Total Phosphorus as P**	----	0.01	mg/L	0.02	0.02	0.00

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853568)								
HK2004284-096	H/B/F/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.01	mg/L	<0.01	<0.01	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853569)								
HK2004284-096	H/B/F/Dup	**EK067P: Total Phosphorus as P**	----	0.01	mg/L	0.02	0.02	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854933)								
HK2004284-020	D/S/E/Dup	**EK055A: Ammonia as N**	7664-41-7	0.005	mg/L	0.048	0.050	4.77
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854934)								
HK2004284-040	G/M/E/Dup	**EK055A: Ammonia as N**	7664-41-7	0.005	mg/L	0.080	0.080	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854935)								
HK2004284-060	B/B/F/Dup	**EK055A: Ammonia as N**	7664-41-7	0.005	mg/L	0.062	0.069	11.1
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854936)								
HK2004284-080	F/S/F/Dup	**EK055A: Ammonia as N**	7664-41-7	0.005	mg/L	0.055	0.050	8.74
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854937)								
HK2004284-096	H/B/F/Dup	**EK055A: Ammonia as N**	7664-41-7	0.005	mg/L	0.038	0.038	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855355)								
HK2004284-020	D/S/E/Dup	**EK057A: Nitrite as N**	14797-65-0	0.005	mg/L	0.009	0.011	18.4
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855357)								
HK2004284-040	G/M/E/Dup	**EK057A: Nitrite as N**	14797-65-0	0.005	mg/L	0.007	<0.005	29.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855359)								
HK2004284-060	B/B/F/Dup	**EK057A: Nitrite as N**	14797-65-0	0.005	mg/L	0.006	<0.005	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855361)								
HK2004284-080	F/S/F/Dup	**EK057A: Nitrite as N**	14797-65-0	0.005	mg/L	<0.005	<0.005	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855363)								
HK2004284-096	H/B/F/Dup	**EK057A: Nitrite as N**	14797-65-0	0.005	mg/L	<0.005	<0.005	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 2852573)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	104	----	85.0	115	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 2852574)											

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QC Lot: 2852574) - Continued											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	104	----	85.0	115	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 2852575)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	93.0	----	85.0	115	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 2852576)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	102	----	85.0	115	----	----
EA/ED: Physical and Aggregate Properties (QC Lot: 2852577)											
EA025: Suspended Solids (SS)	----	0.5	mg/L	<0.5	20 mg/L	100	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853560)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	98.2	----	94.2	101	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853561)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	96.2	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853562)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	96.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853563)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	97.4	----	94.2	101	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853564)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	96.8	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853565)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	98.2	----	94.2	101	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853566)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	96.7	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853567)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	98.4	----	94.2	101	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853568)											
EK067P: Total Phosphorus - Filtered	----	0.01	mg/L	<0.01	0.5 mg/L	97.1	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853569)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	99.2	----	94.2	101	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854933)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	103	----	85.0	115	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854934)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	105	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854935)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	107	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854936)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	109	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854937)											
EK055A: Ammonia as N	7664-41-7	0.005	mg/L	<0.005	0.05 mg/L	106	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855355)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	109	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855357)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	102	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855359)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	94.0	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855361)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	95.6	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855363)											
EK057A: Nitrite as N	14797-65-0	0.005	mg/L	<0.005	0.05 mg/L	97.4	----	85.0	115	----	----
EP: Aggregate Organics (QC Lot: 2851298)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	96.4	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 2851660)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	94.7	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 2851661)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	101	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 2851662)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	101	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 2851663)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	93.2	----	81.0	115	----	----
EP: Aggregate Organics (QC Lot: 2851664)											
EP030: Biochemical Oxygen Demand	----	----	mg/L	----	198 mg/L	97.7	----	81.0	115	----	----

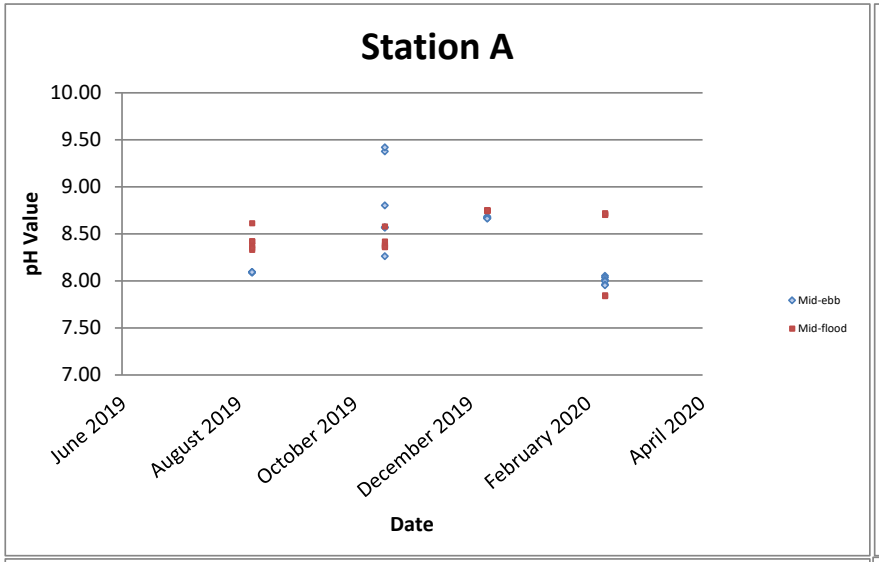
Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

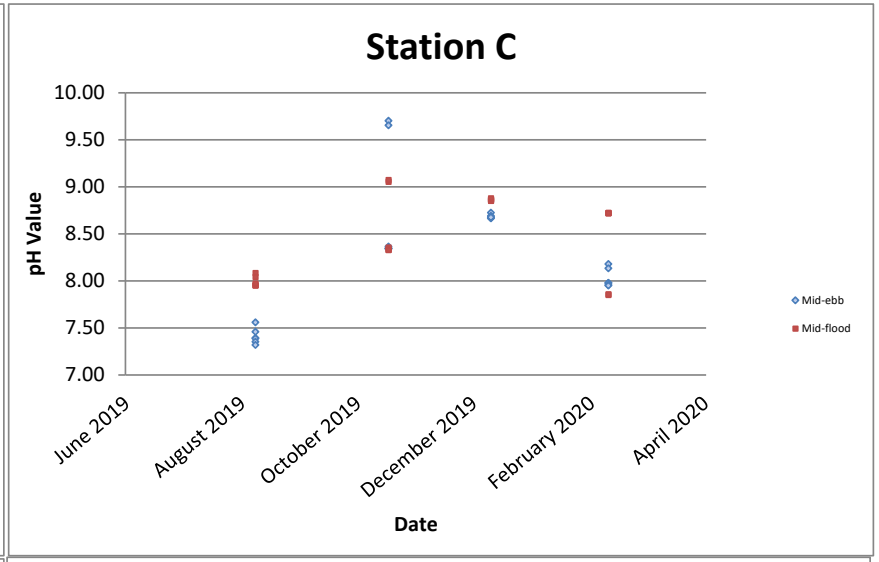
Matrix: **WATER**

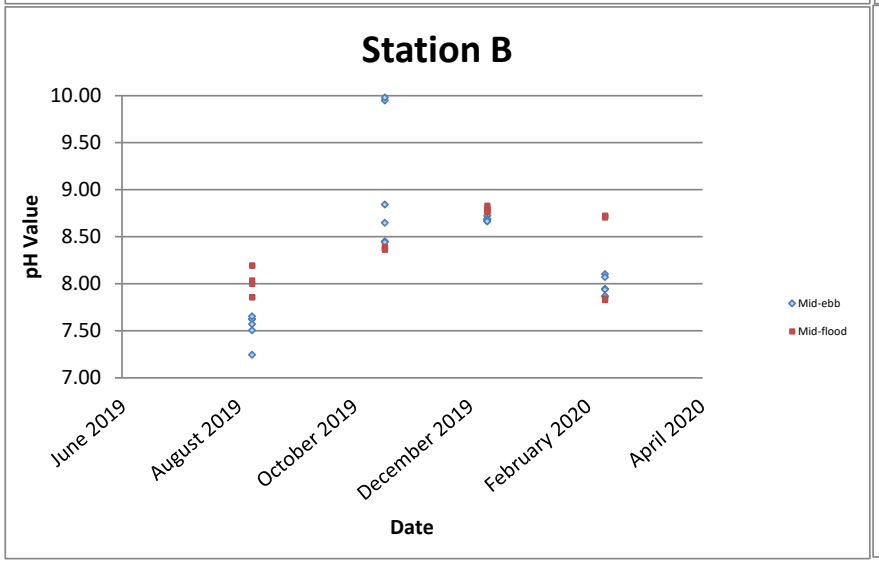
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853560)										
HK2004284-020	D/S/E/Dup	**EK067P: Total Phosphorus as P**	----	0.5 mg/L	103	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853561)										
HK2004284-020	D/S/E/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.5 mg/L	93.3	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853562)										
HK2004284-040	G/M/E/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.5 mg/L	103	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853563)										
HK2004284-040	G/M/E/Dup	**EK067P: Total Phosphorus as P**	----	0.5 mg/L	102	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853564)										
HK2004284-060	B/B/F/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.5 mg/L	96.6	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853565)										
HK2004284-060	B/B/F/Dup	**EK067P: Total Phosphorus as P**	----	0.5 mg/L	101	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853566)										
HK2004284-080	F/S/F/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.5 mg/L	99.2	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853567)										
HK2004284-080	F/S/F/Dup	**EK067P: Total Phosphorus as P**	----	0.5 mg/L	94.3	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853568)										
HK2004284-096	H/B/F/Dup	**EK067P: Total Phosphorus - Filtered**	----	0.5 mg/L	97.1	----	75.0	125	----	25
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2853569)										
HK2004284-096	H/B/F/Dup	**EK067P: Total Phosphorus as P**	----	0.5 mg/L	100	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854933)										
HK2004284-020	D/S/E/Dup	**EK055A: Ammonia as N**	7664-41-7	0.5 mg/L	98.5	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854934)										
HK2004284-040	G/M/E/Dup	**EK055A: Ammonia as N**	7664-41-7	0.5 mg/L	104	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854935)										
HK2004284-060	B/B/F/Dup	**EK055A: Ammonia as N**	7664-41-7	0.5 mg/L	98.2	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854936)										

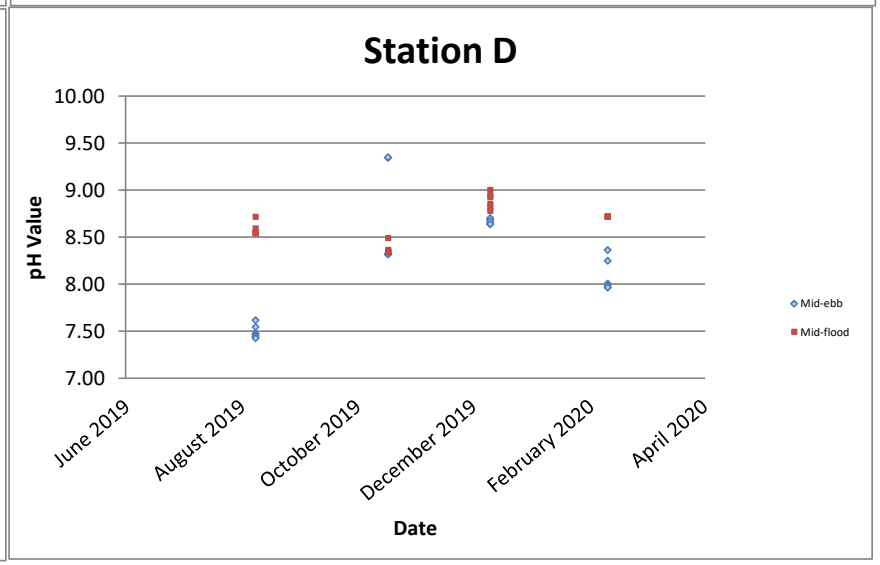
Matrix: **WATER**

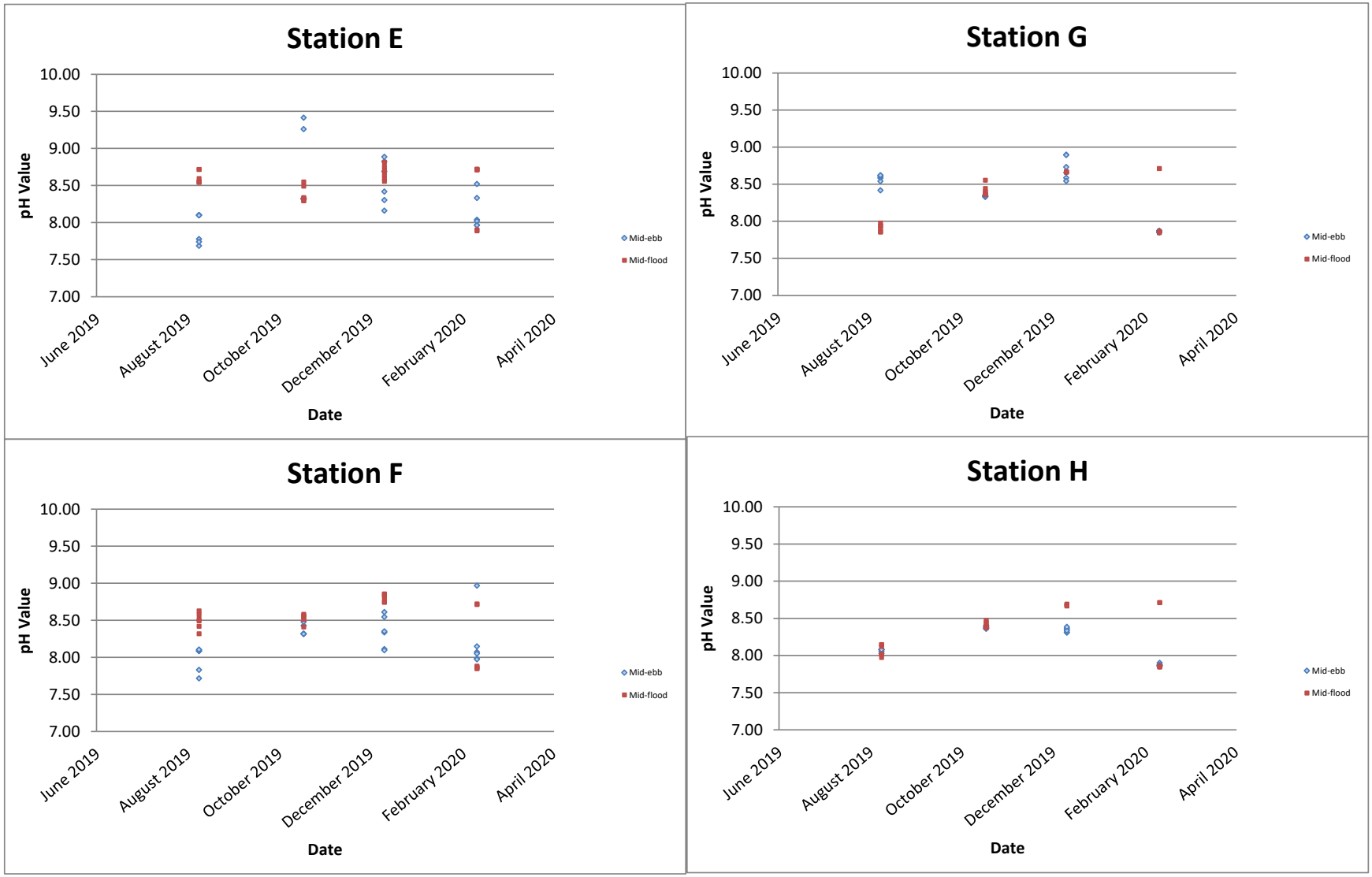
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854936) - Continued										
HK2004284-080	F/S/F/Dup	**EK055A: Ammonia as N**	7664-41-7	0.5 mg/L	102	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2854937)										
HK2004284-096	H/B/F/Dup	**EK055A: Ammonia as N**	7664-41-7	0.5 mg/L	101	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855355)										
HK2004284-020	D/S/E/Dup	**EK057A: Nitrite as N**	14797-65-0	0.25 mg/L	105	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855357)										
HK2004284-040	G/M/E/Dup	**EK057A: Nitrite as N**	14797-65-0	0.25 mg/L	111	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855359)										
HK2004284-060	B/B/F/Dup	**EK057A: Nitrite as N**	14797-65-0	0.25 mg/L	114	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855361)										
HK2004284-080	F/S/F/Dup	**EK057A: Nitrite as N**	14797-65-0	0.25 mg/L	116	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855363)										
HK2004284-096	H/B/F/Dup	**EK057A: Nitrite as N**	14797-65-0	0.25 mg/L	113	----	75.0	125	----	----

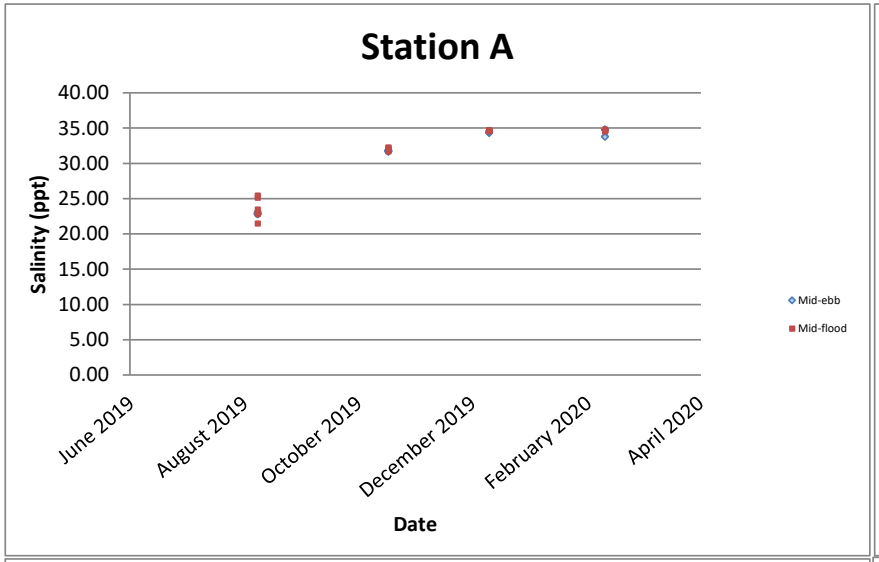

Station A
10.00
9.50
9.00
8.50
8.00
7.50
7.00
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

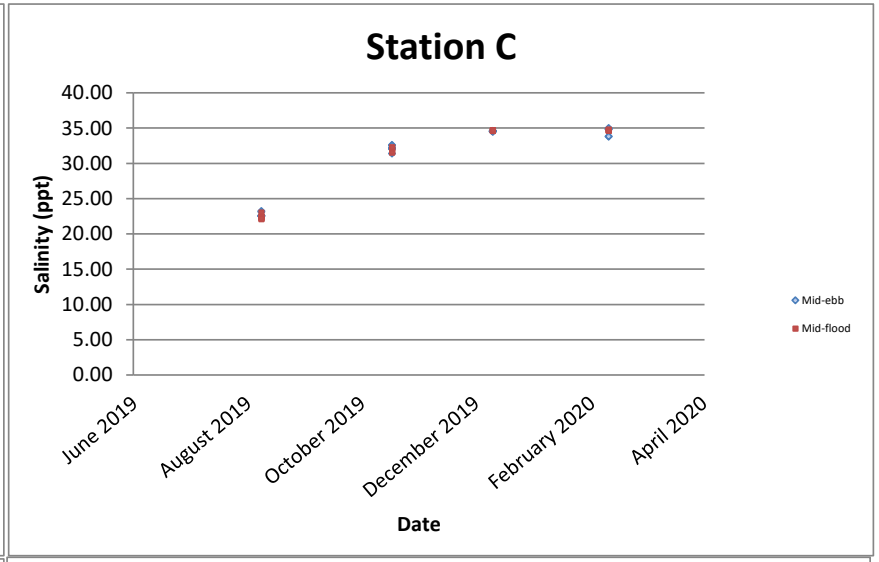

Station C
10.00
9.50
9.00
8.50
8.00
7.50
7.00
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

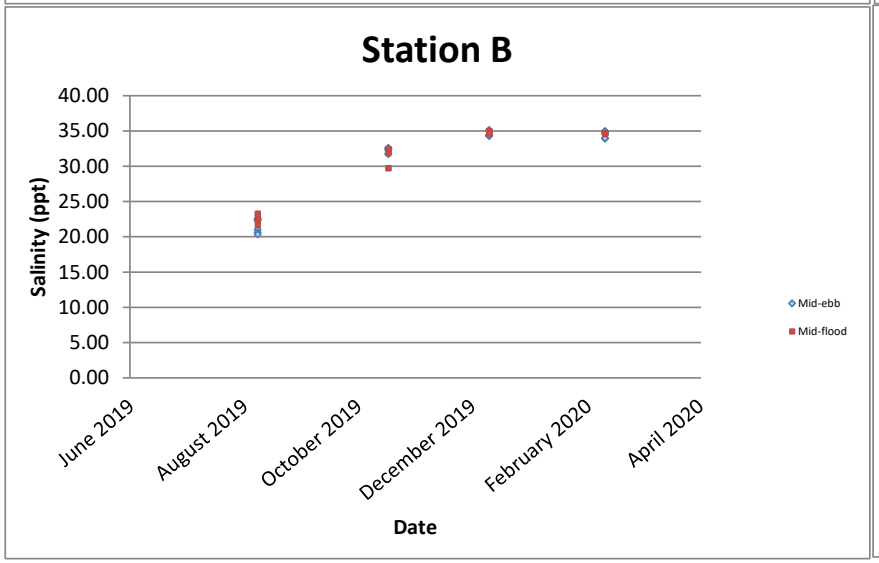

Station B
10.00
9.50
9.00
8.50
8.00
7.50
7.00
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

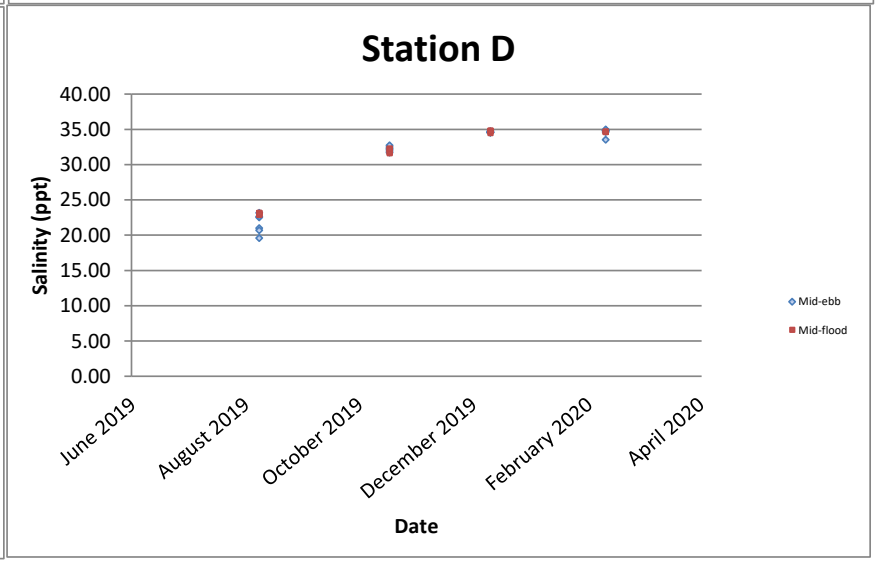

Station D
10.00
9.50
9.00
8.50
8.00
7.50
7.00
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

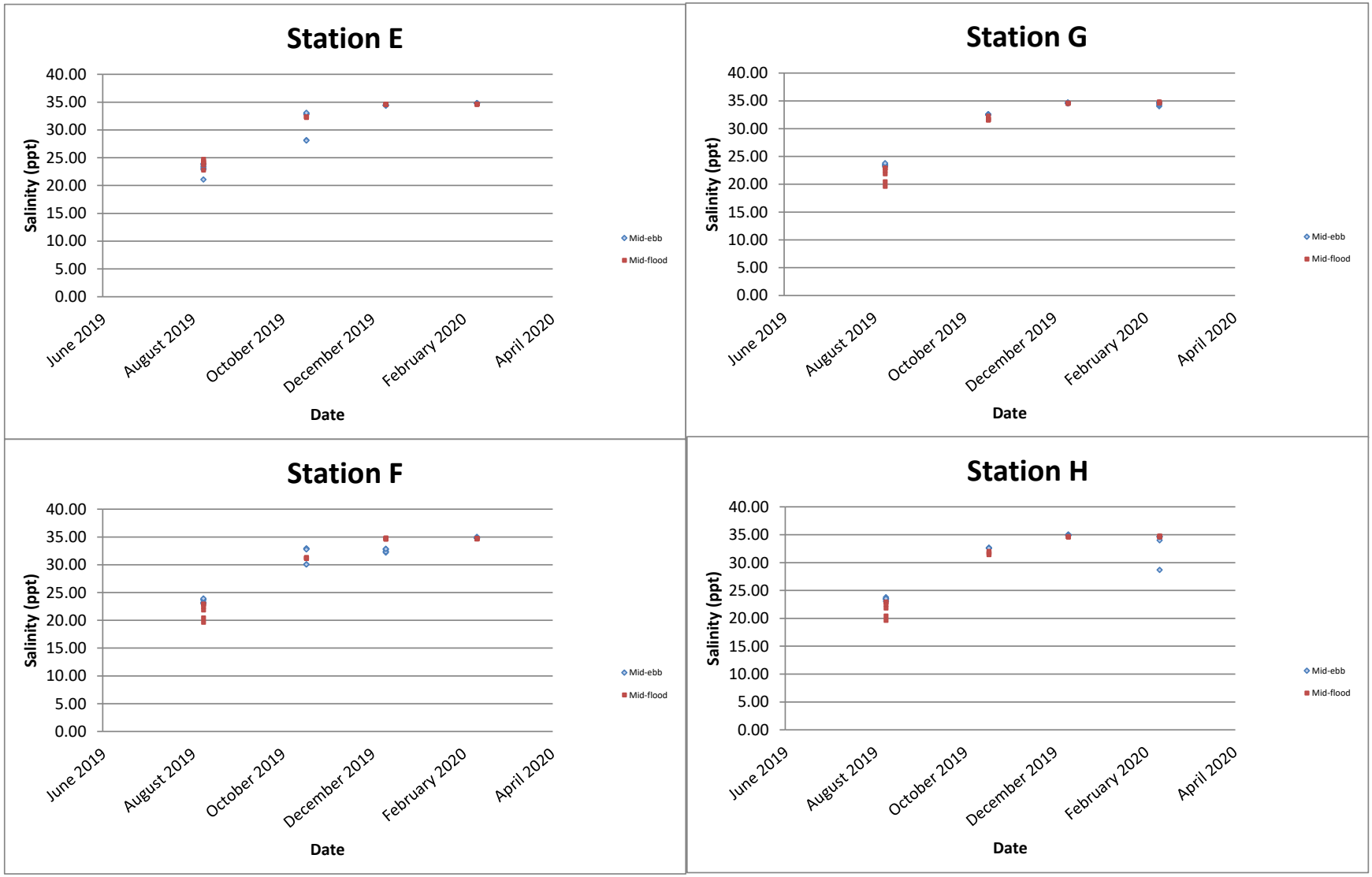

Station E
pH Value
10.00
9.50
9.00
8.50
8.00
7.50
7.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood
Station G
pH Value
Date
Mid-ebb
Mid-flood
Station F
pH Value
Date
Mid-ebb
Mid-flood
Station H
pH Value
Date
Mid-ebb
Mid-flood

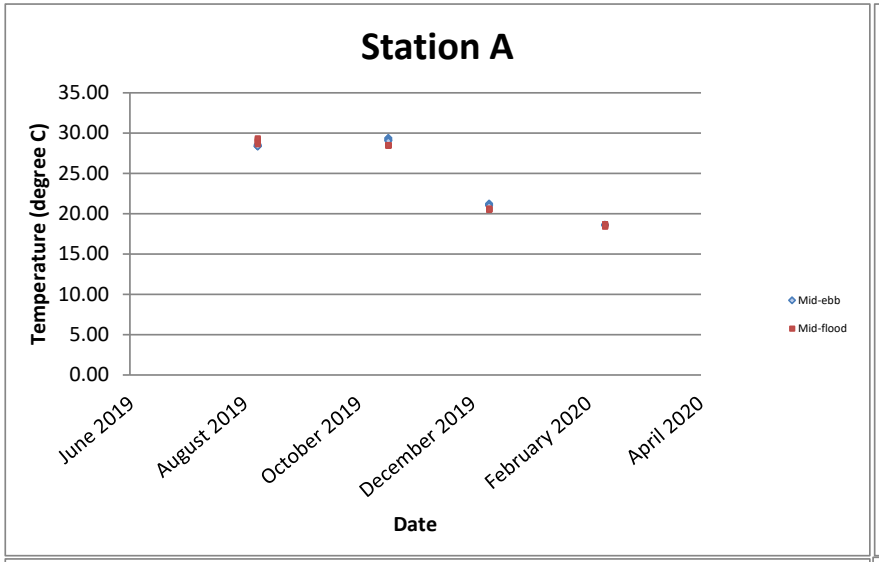

Station A
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Salinity (ppt)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

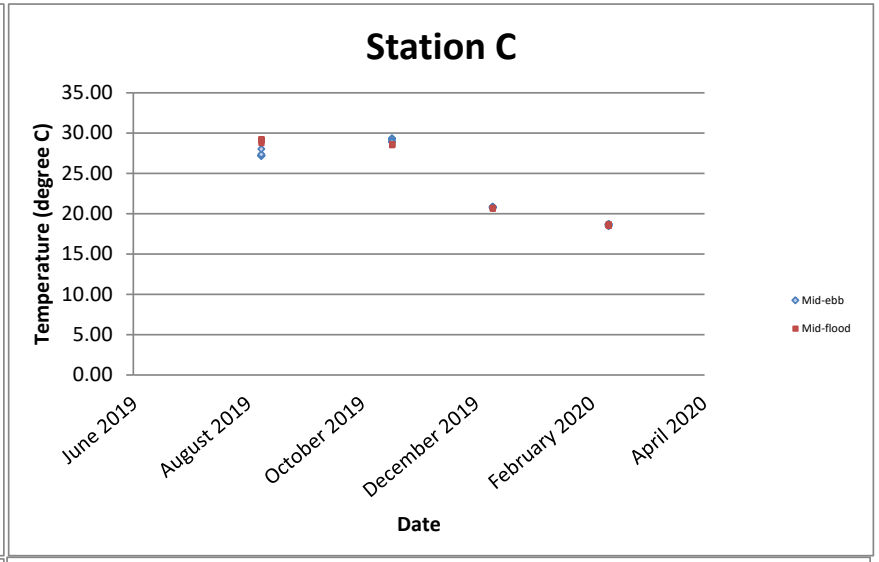

Station C
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Salinity (ppt)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

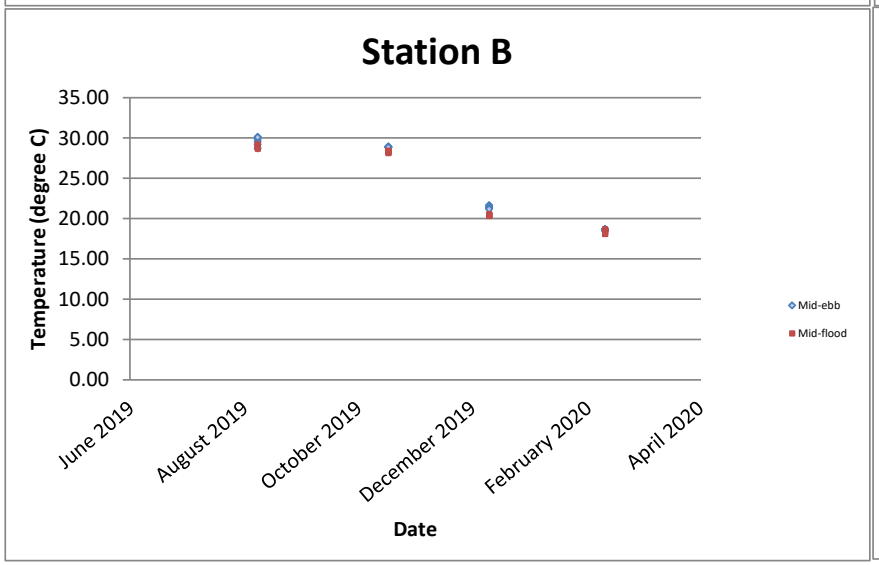

Station B
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Salinity (ppt)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

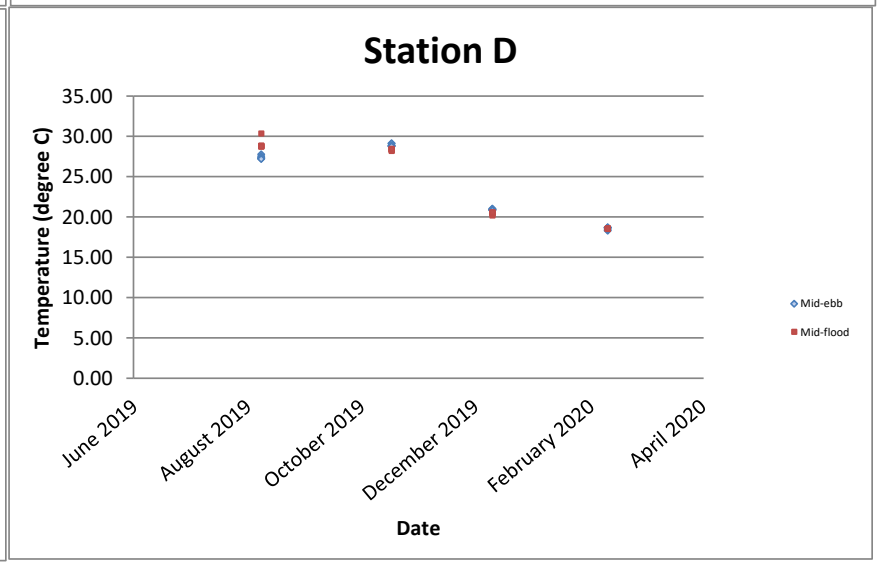

Station D
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
Salinity (ppt)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

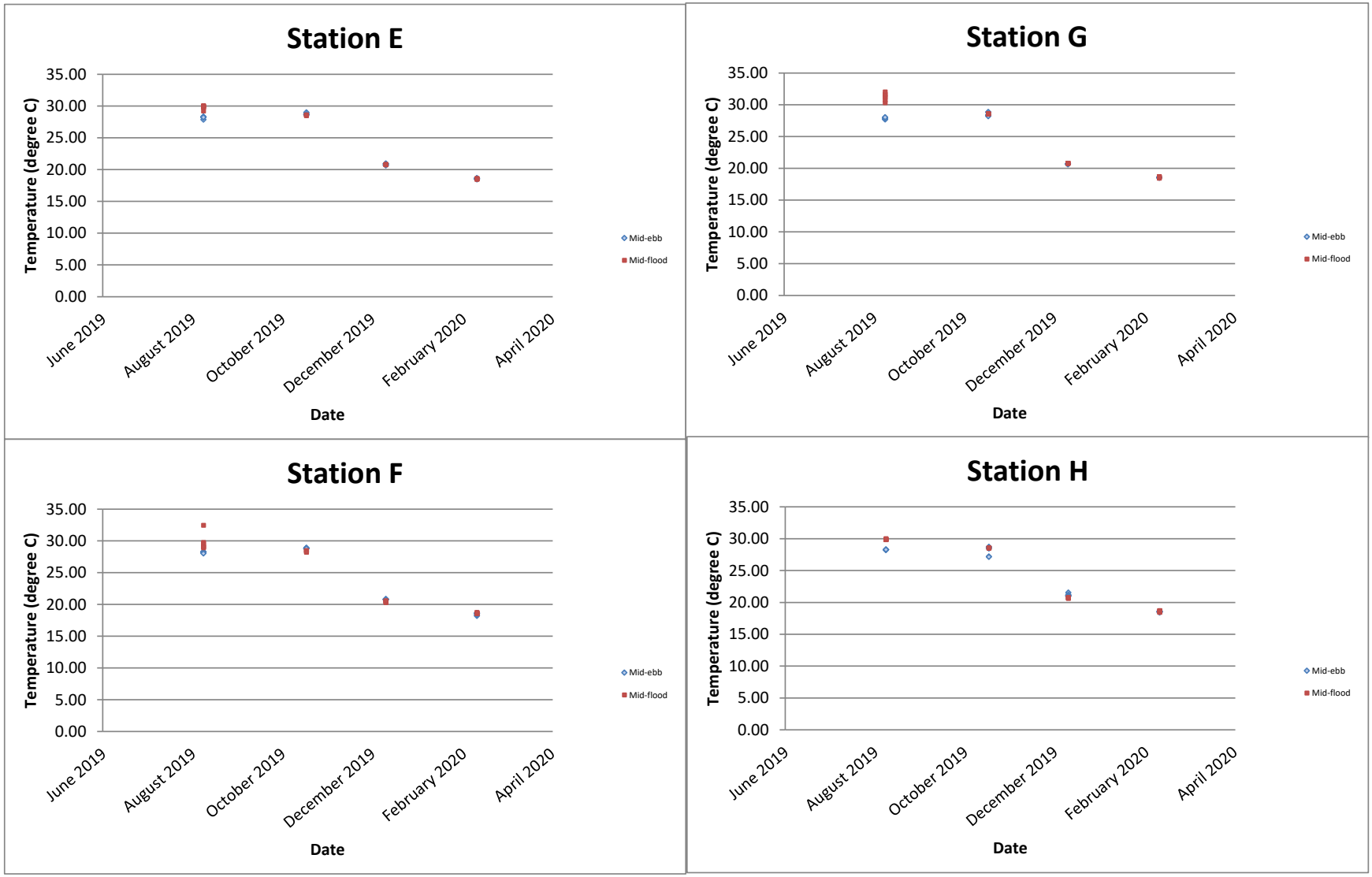

Station E
Salinity (ppt)
40.00
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood
Station G
Salinity (ppt)
Date
Mid-ebb
Mid-flood
Station F
Salinity (ppt)
Date
Mid-ebb
Mid-flood
Station H
Salinity (ppt)
Date
Mid-ebb
Mid-flood

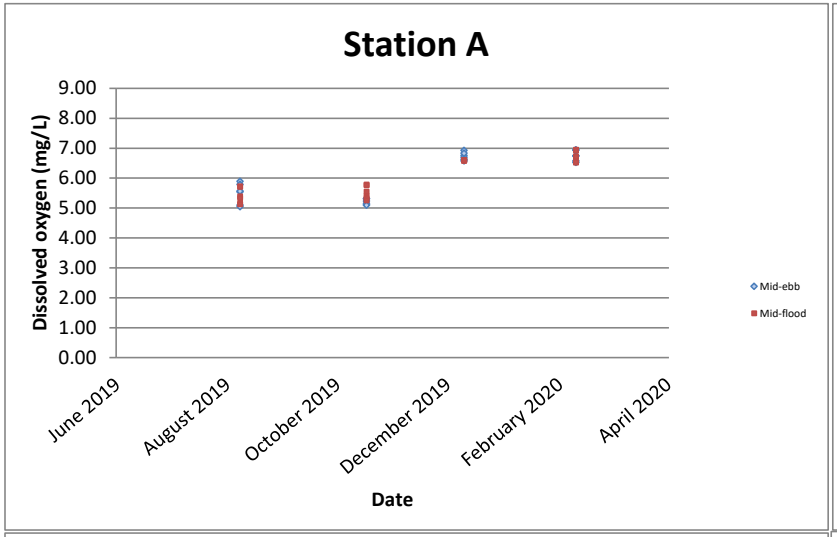

Station A
Temperature (degree C)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

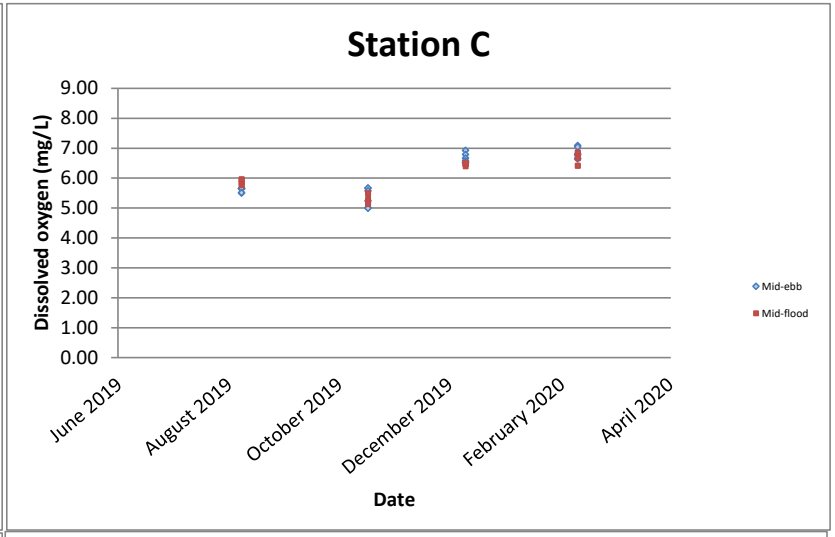

Station C
Temperature (degree C)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

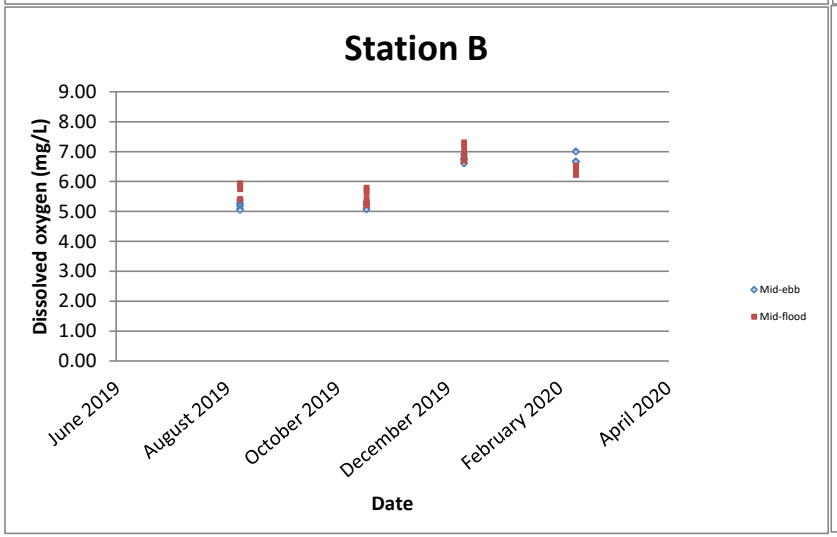

Station B
Temperature (degree C)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

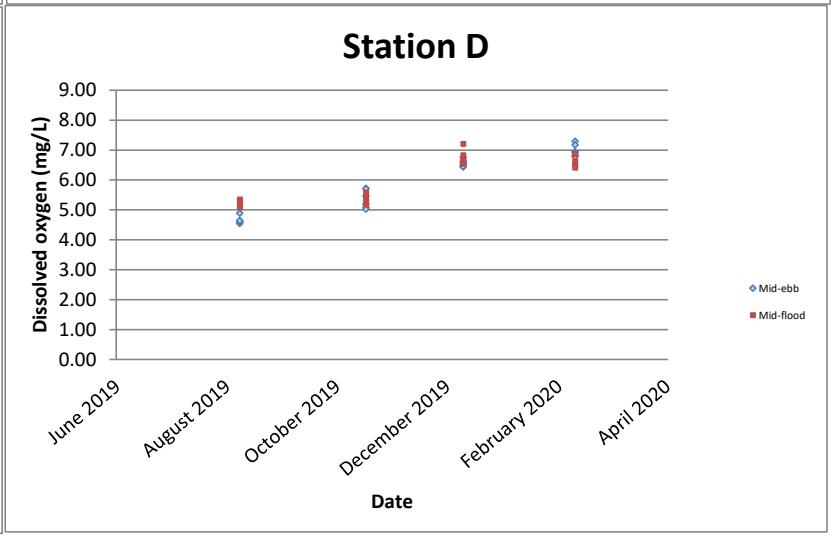

Station D
Temperature (degree C)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

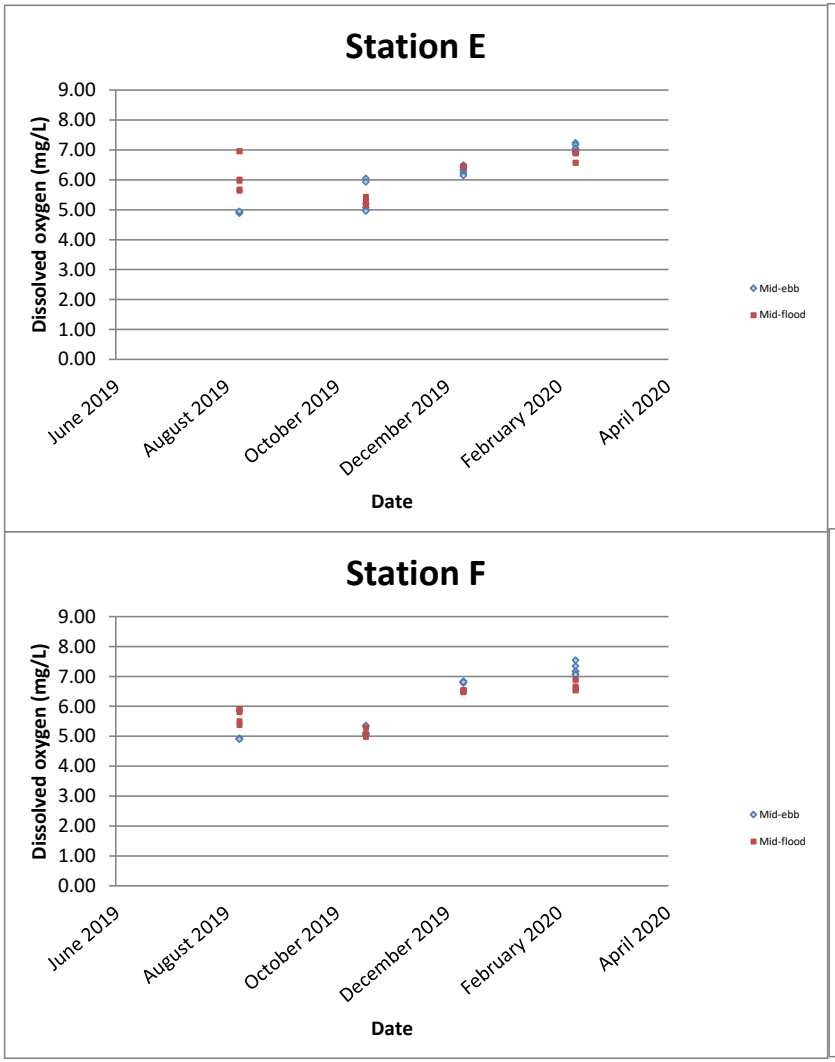

Station E
Temperature (degree C)
35.00
30.00
25.00
20.00
15.00
10.00
5.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood
Station G
Temperature (degree C)
Date
Mid-ebb
Mid-flood
Station F
Temperature (degree C)
Date
Mid-ebb
Mid-flood
Station H
Temperature (degree C)
Date
Mid-ebb
Mid-flood

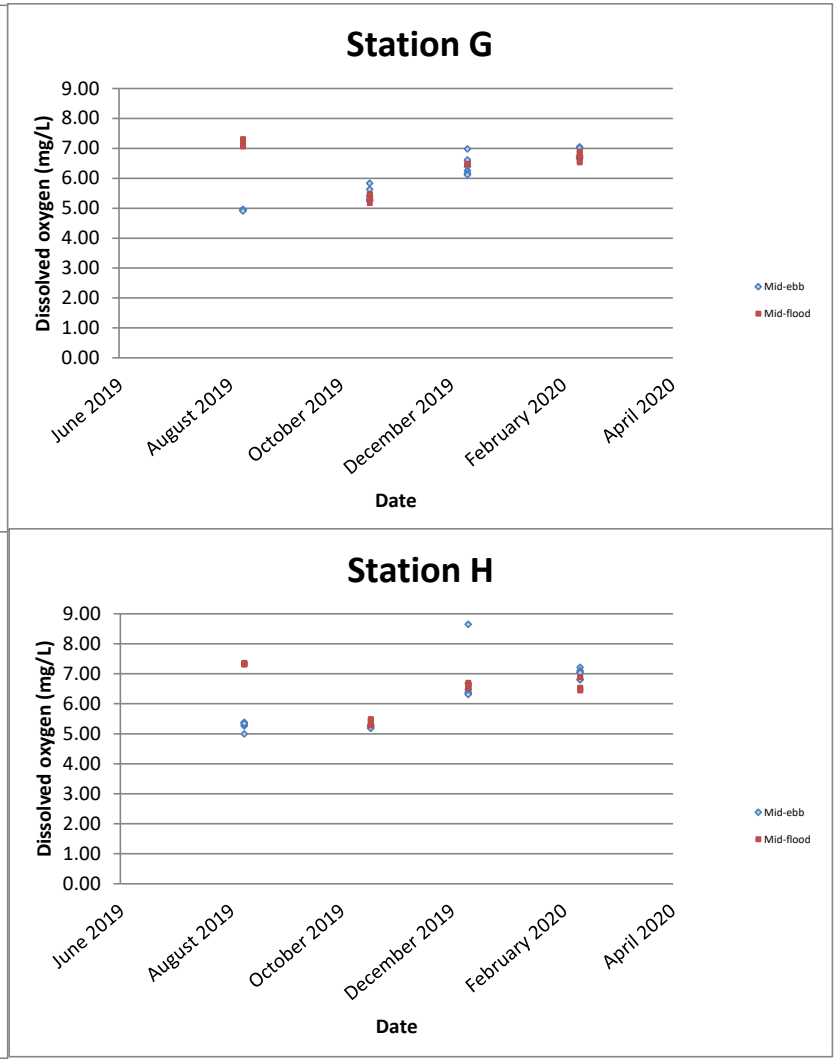

Station A
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood


Station C
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood


Station B
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood


Station D
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

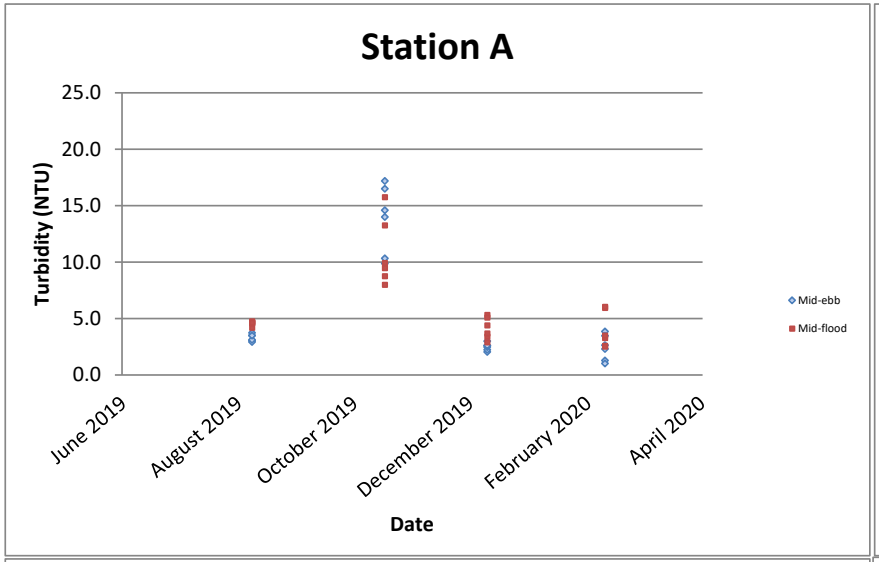

Station E
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

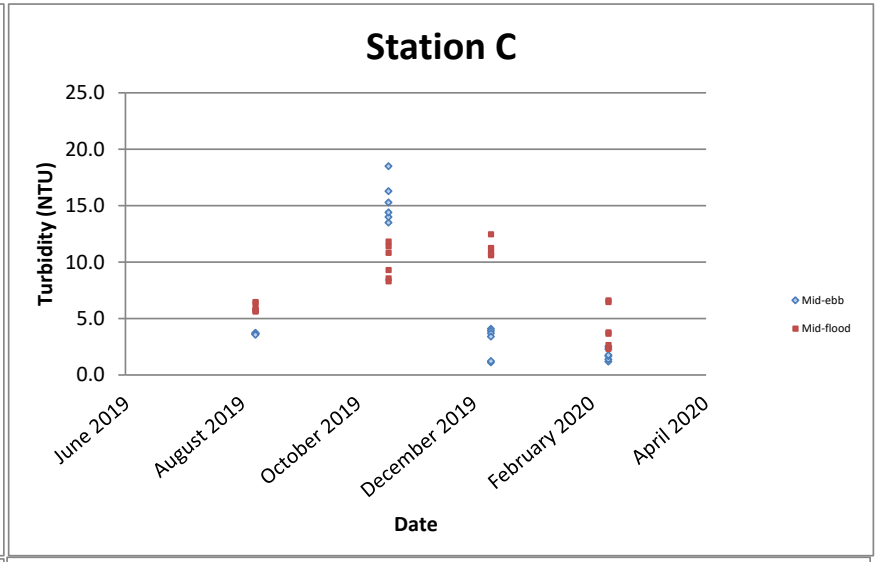

Station G
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

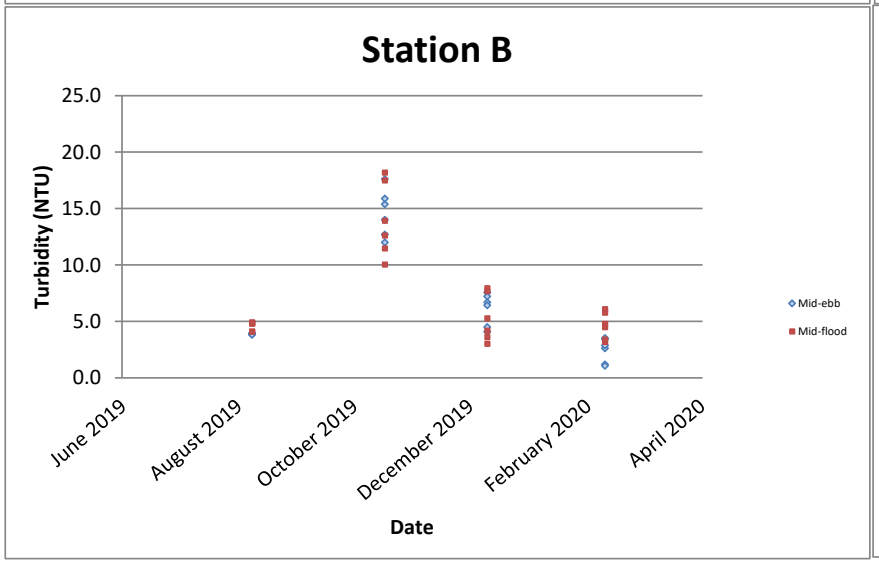
Station F
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

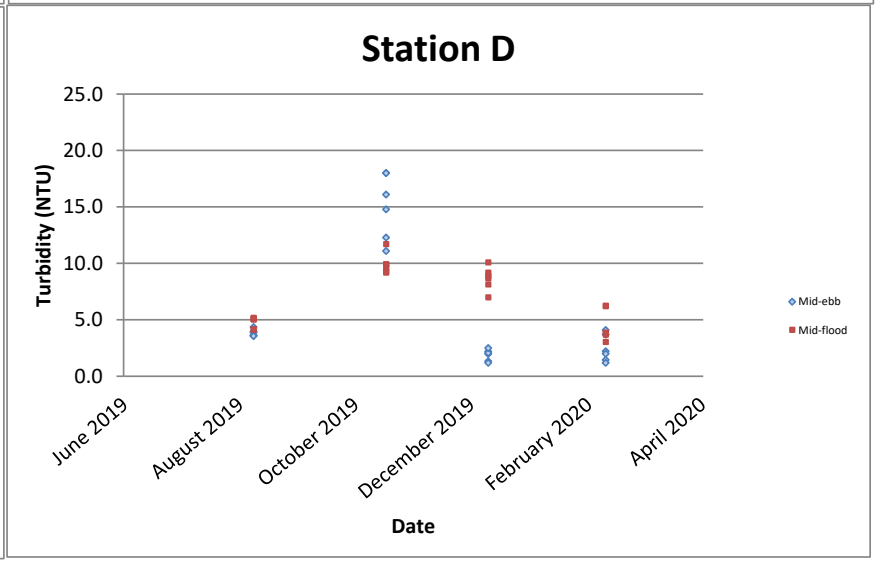
Station H
Dissolved oxygen (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood

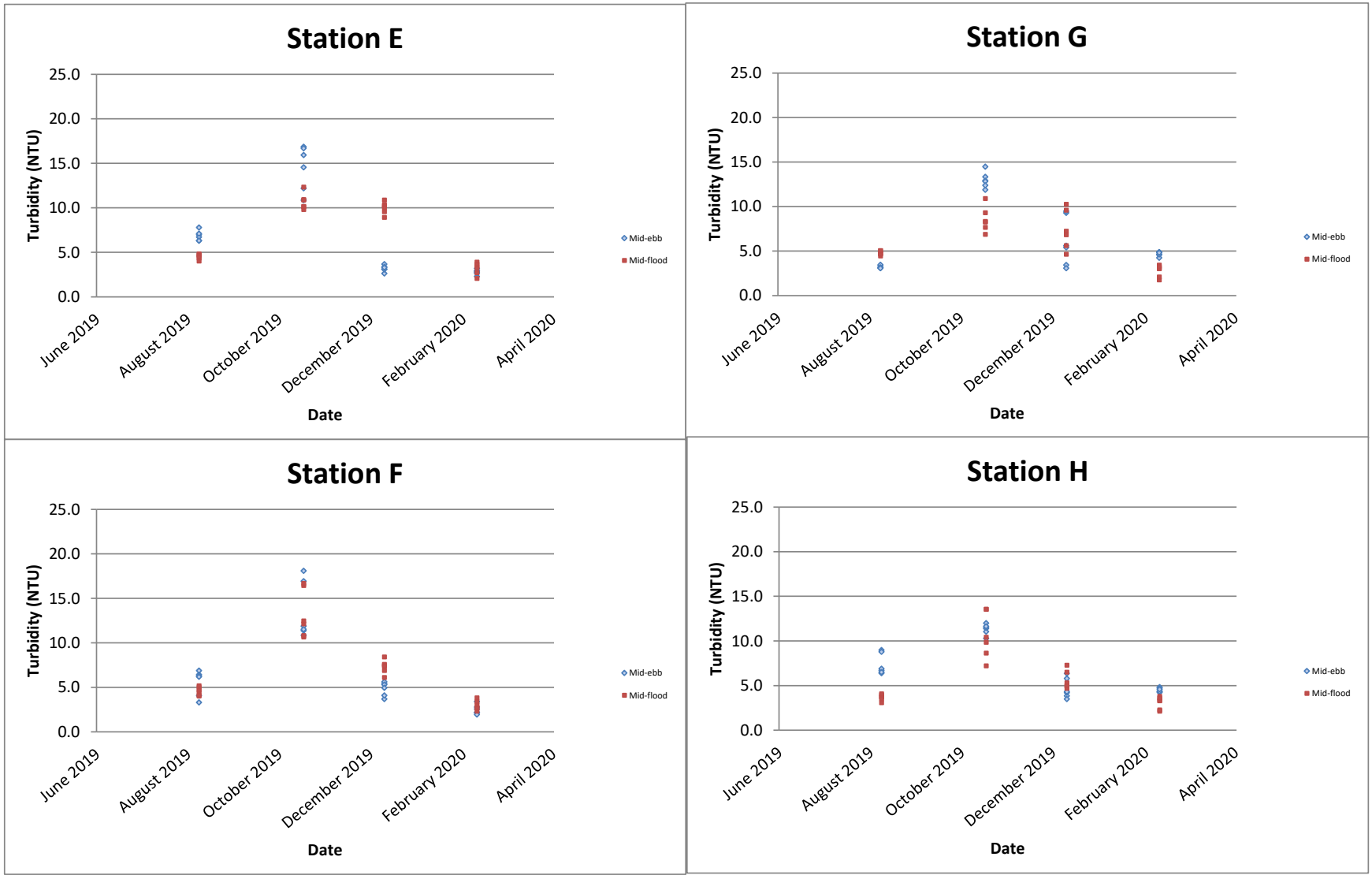
Turbidity (NTU)



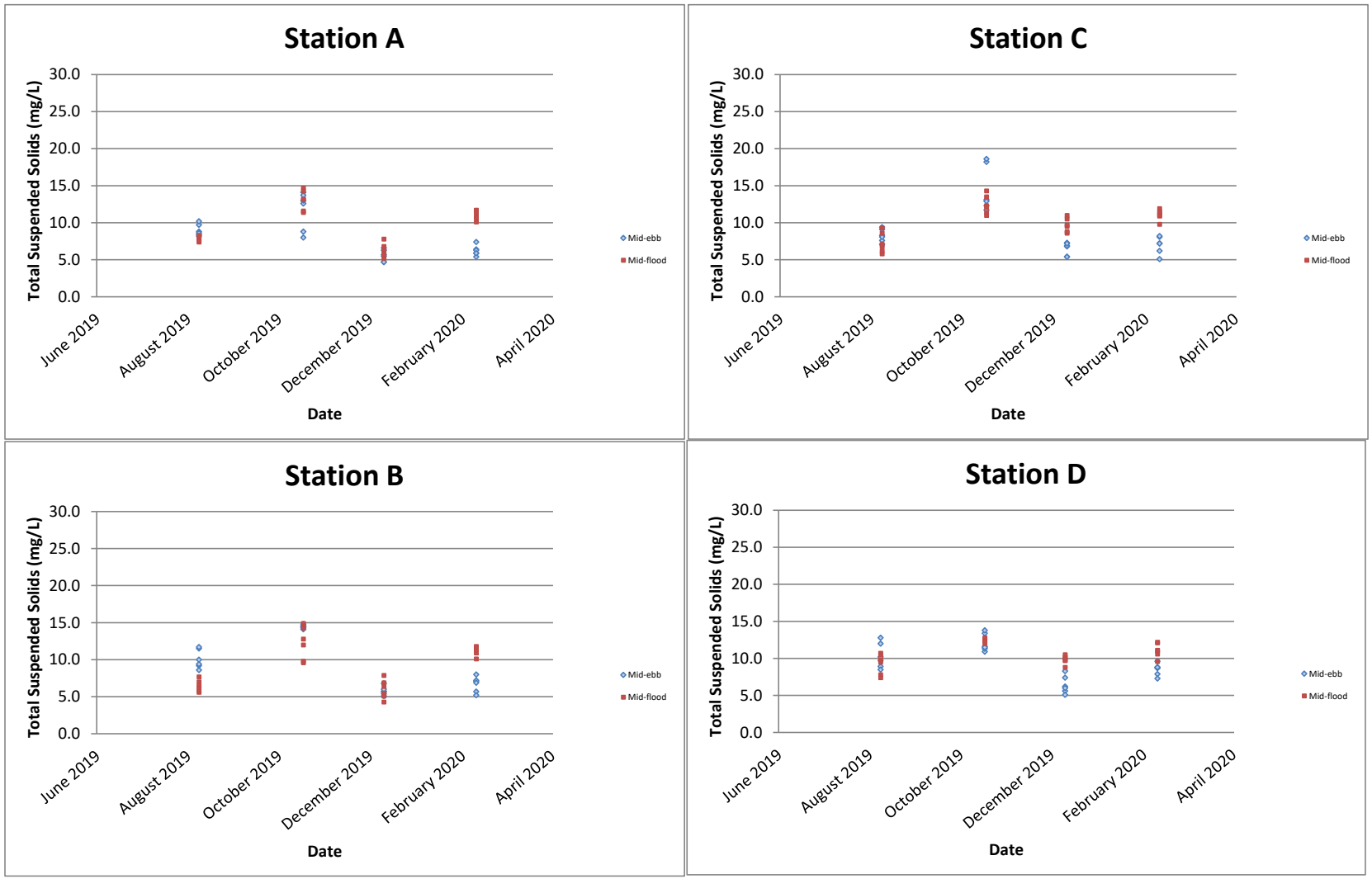




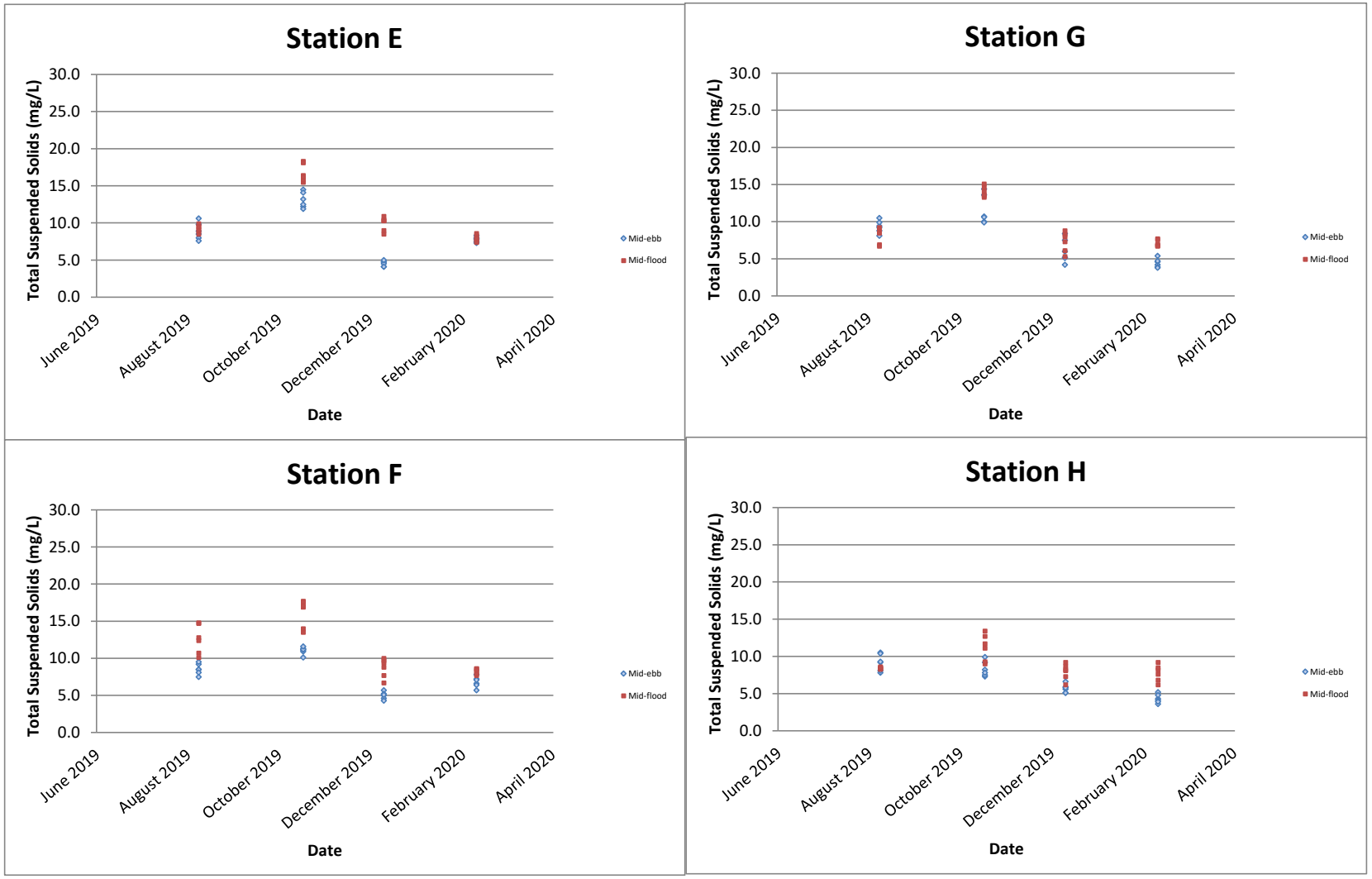



Station E
Turbidity (NTU)
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Mid-ebb
Mid-flood
Station G
Turbidity (NTU)
Date
Mid-ebb
Mid-flood
Station F
Turbidity (NTU)
Date
Mid-ebb
Mid-flood
Station H
Turbidity (NTU)
Date
Mid-ebb
Mid-flood

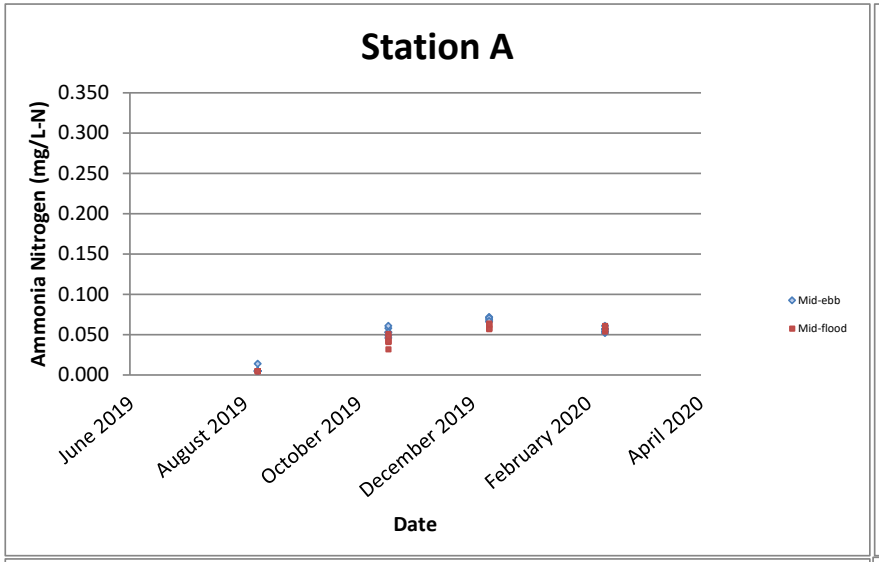
Total Suspended Solids (mg/L)

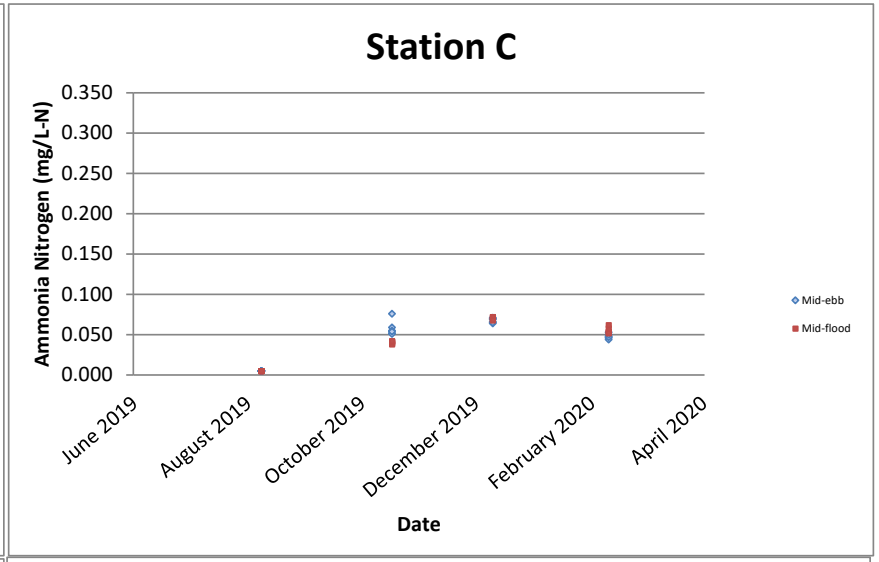


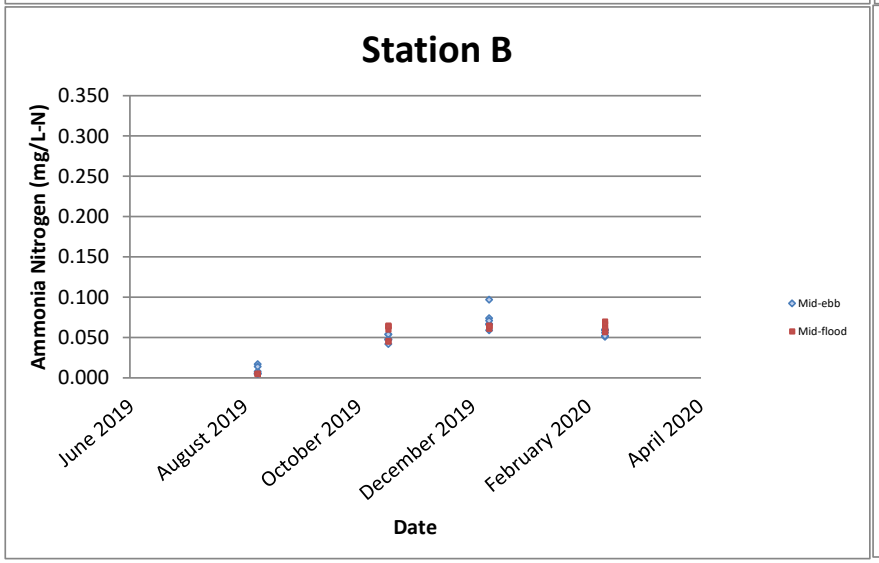
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.

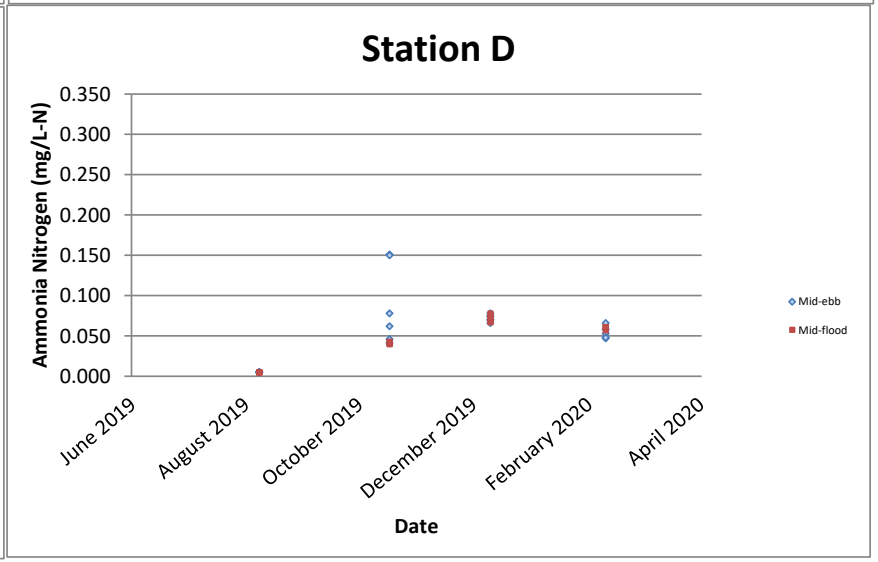


Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.

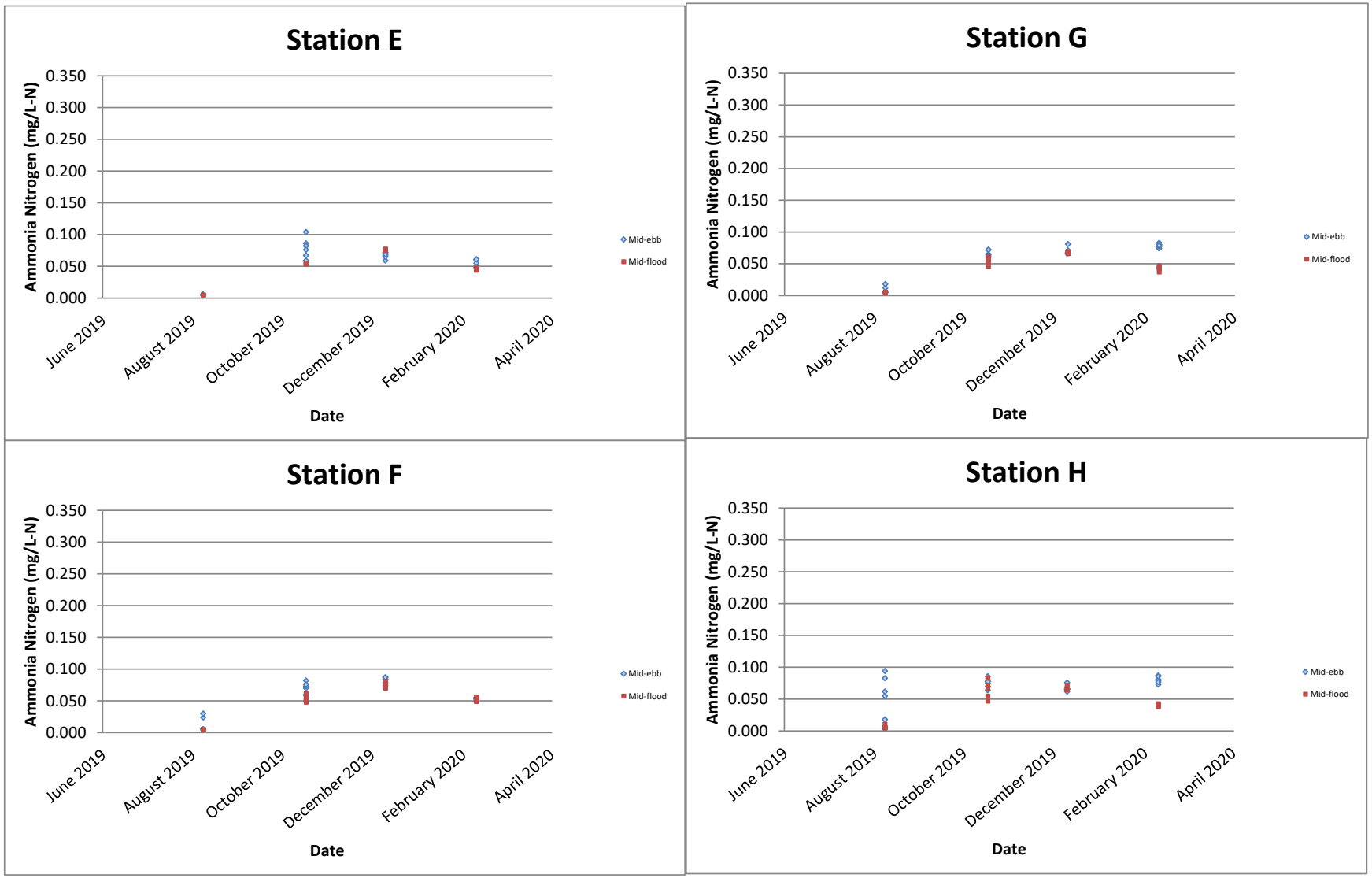




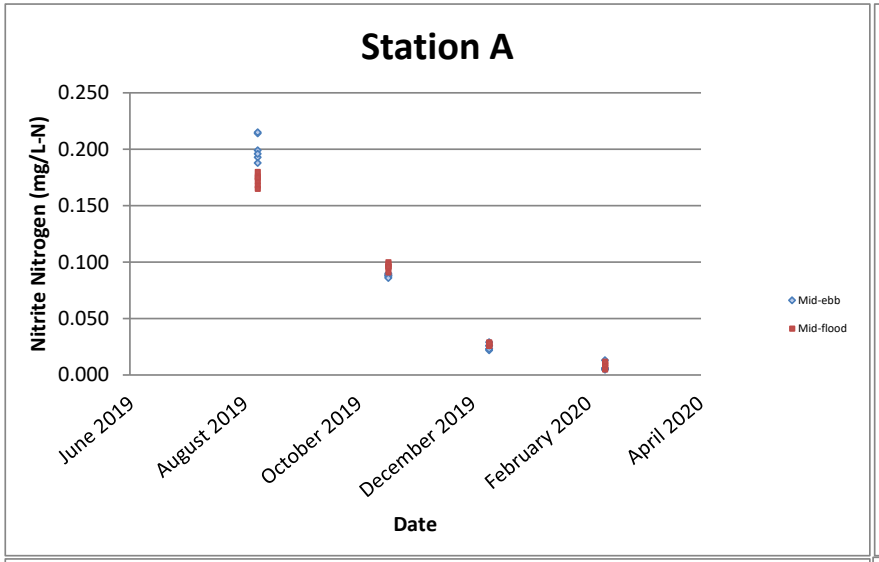


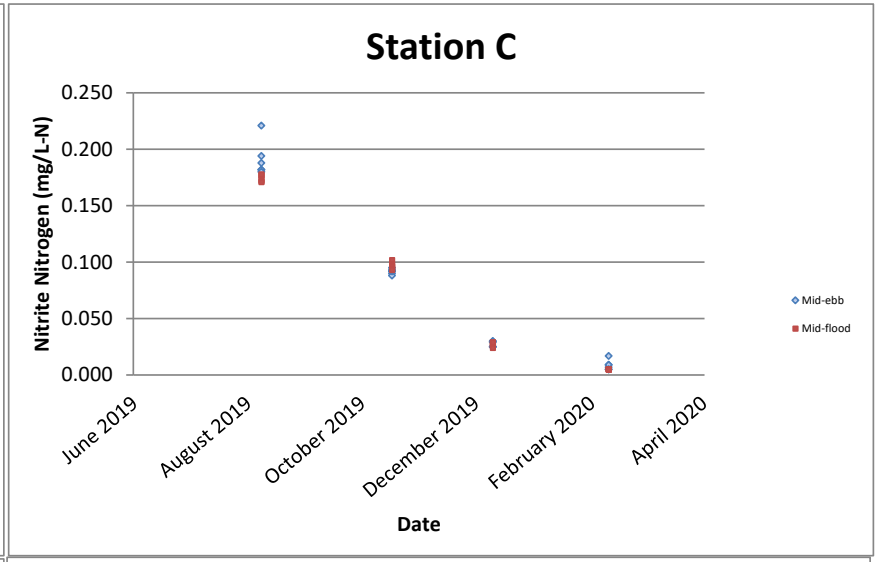


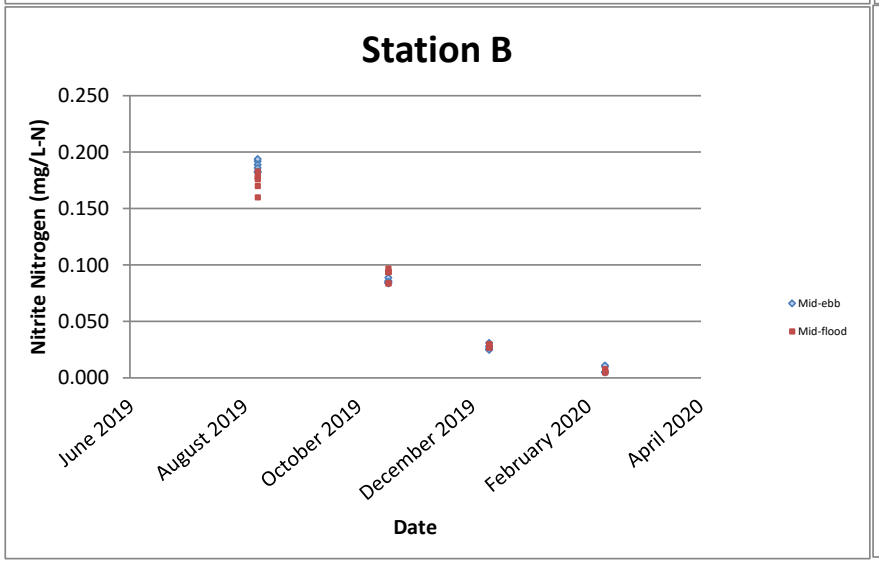
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.

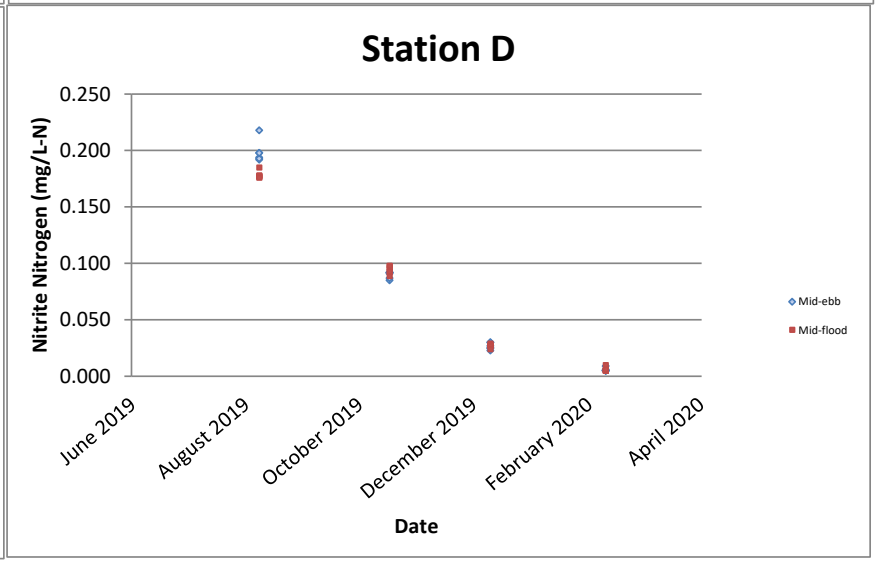


Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.

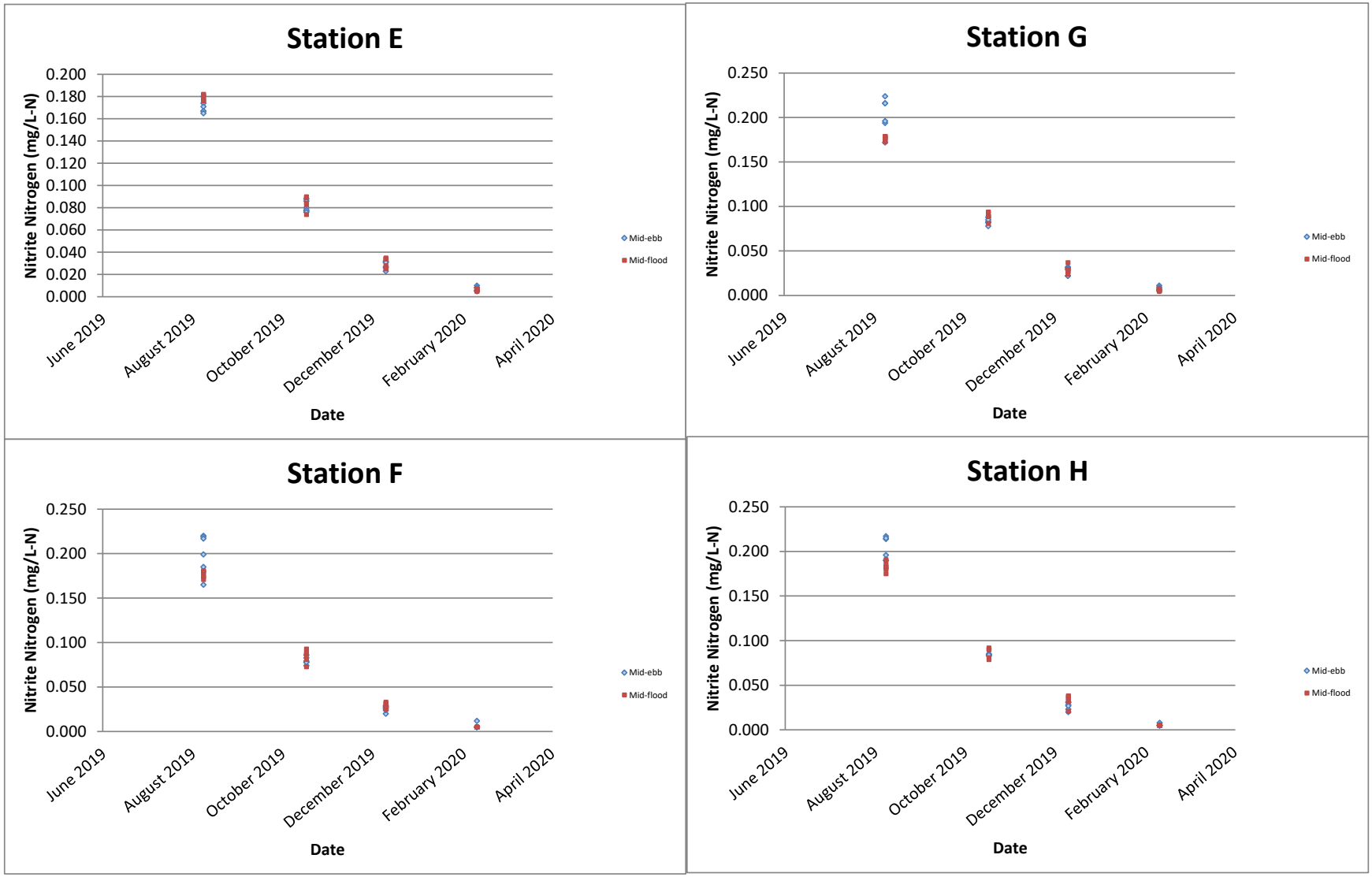






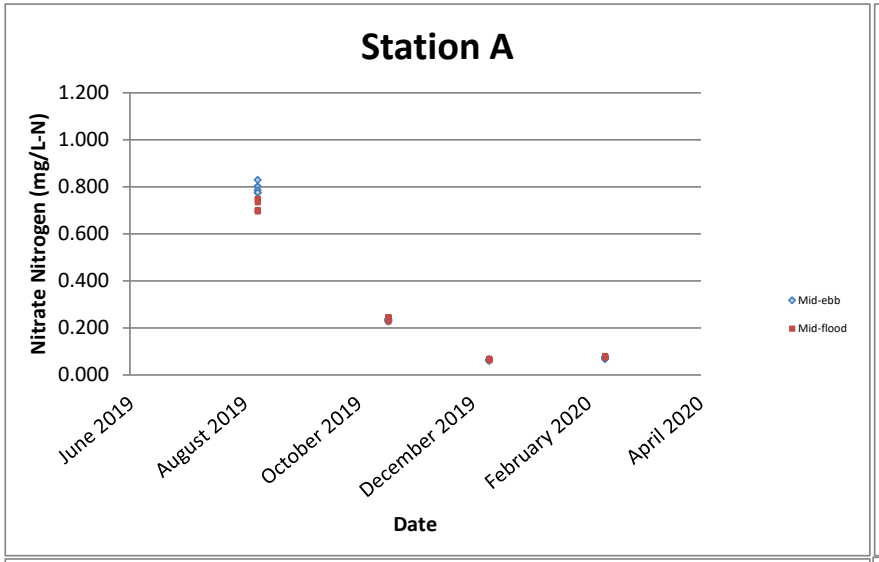


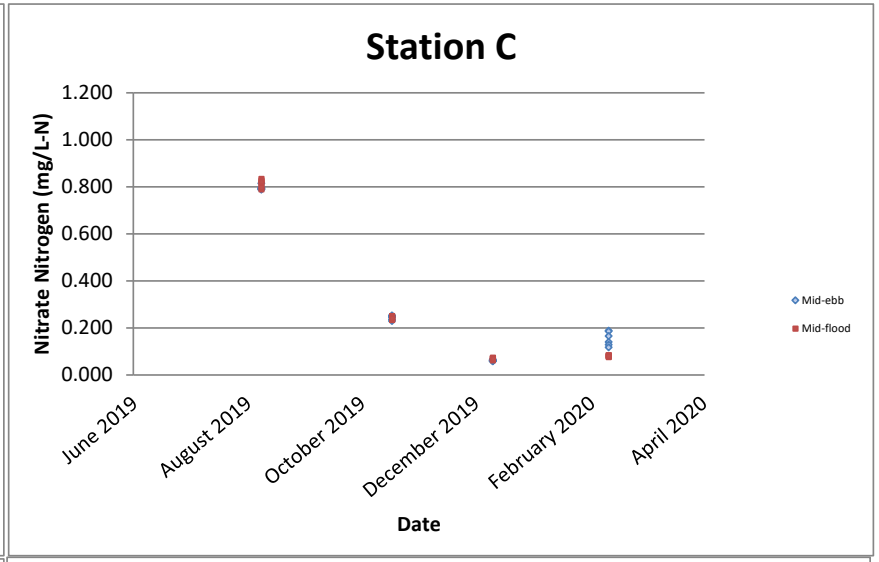
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.

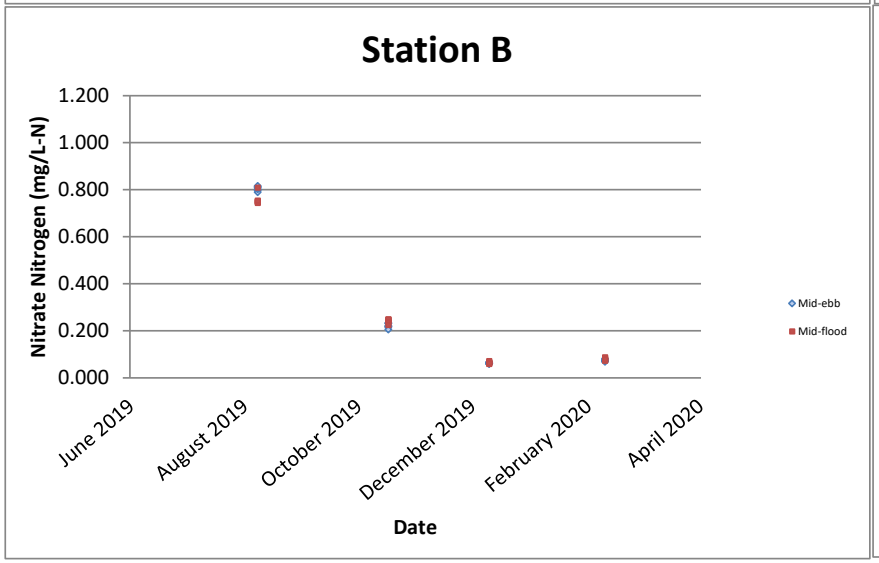


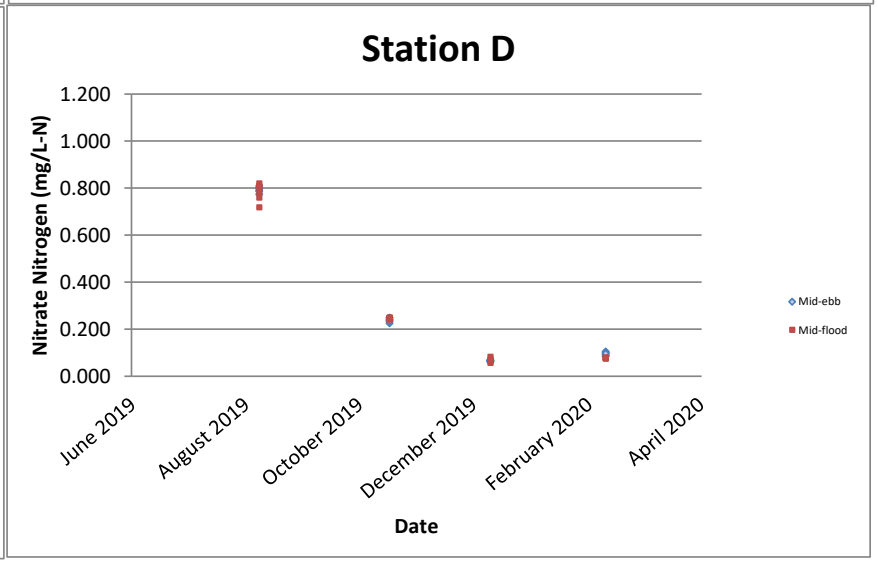
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.

Nitrate Nitrogen (mg/L-N)



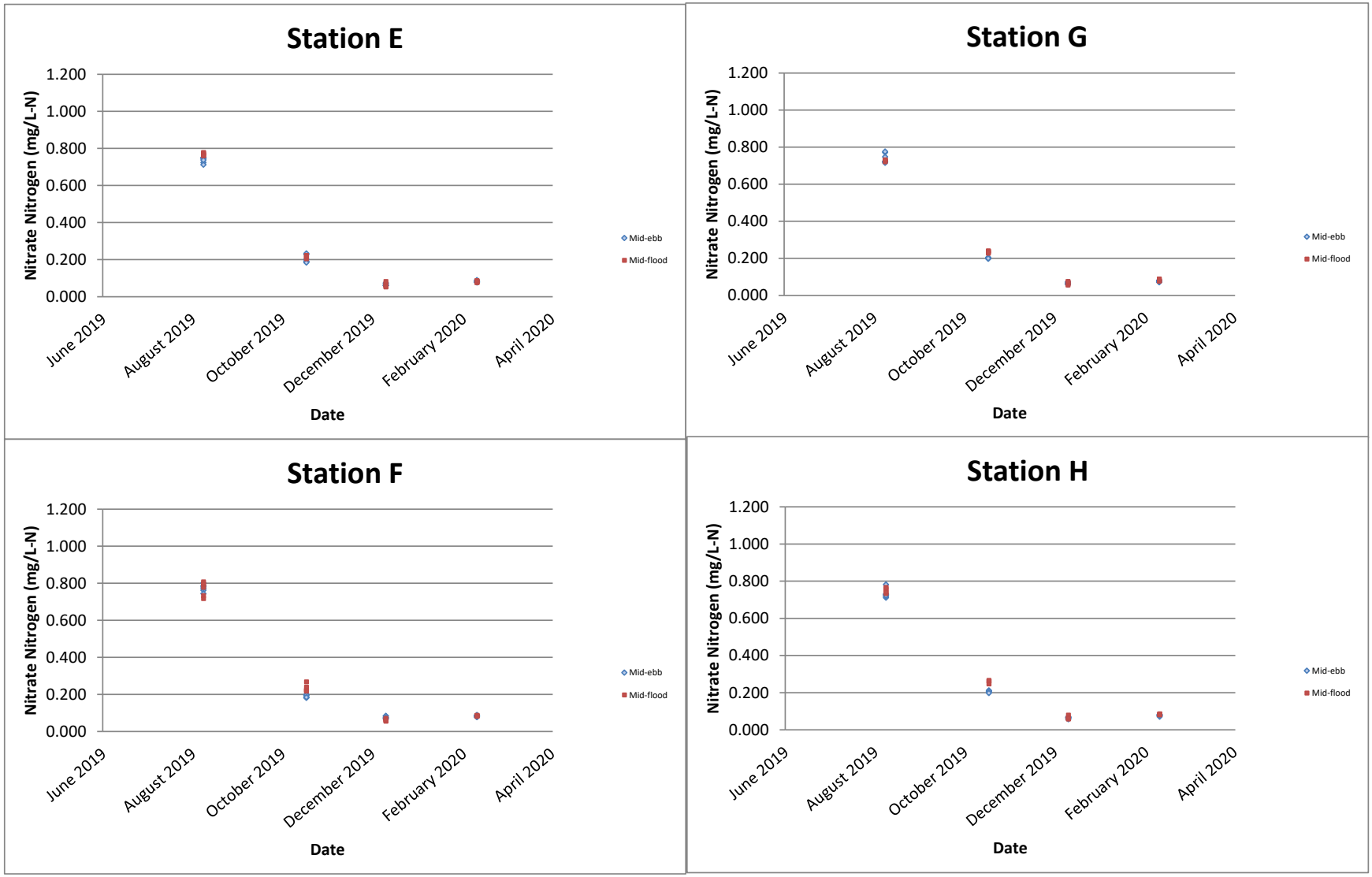




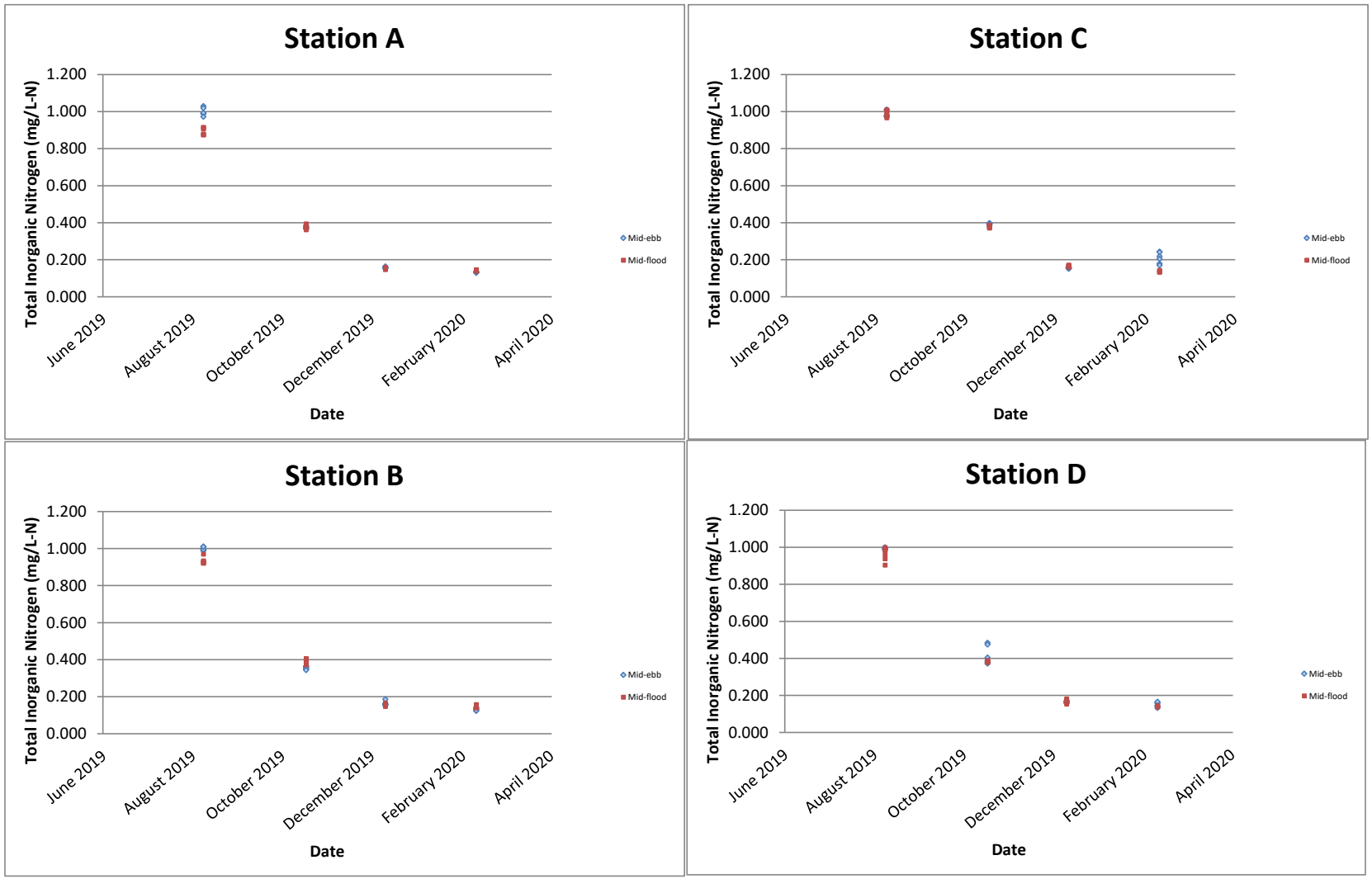


Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.

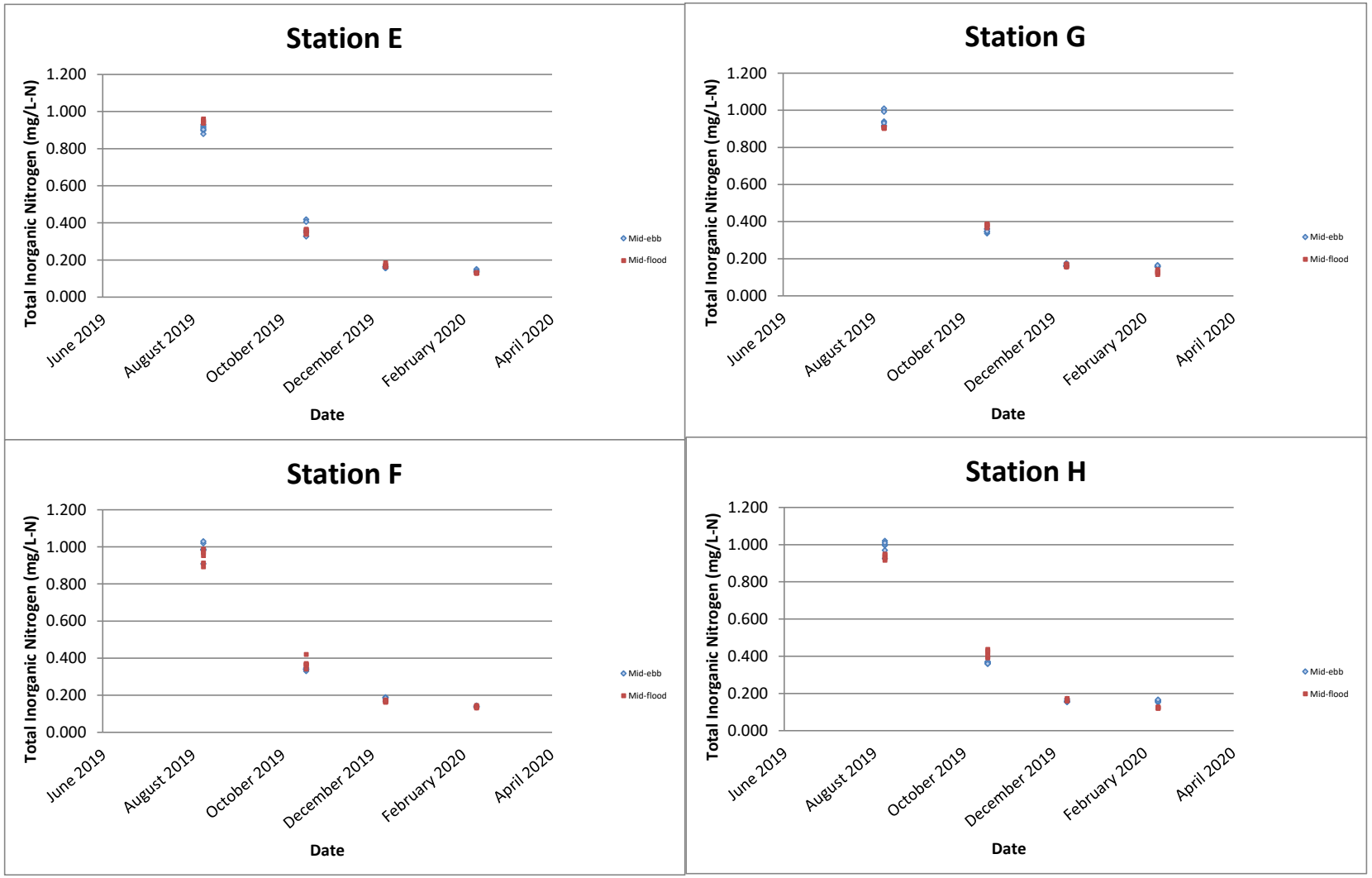
Nitrate Nitrogen (mg/L-N)



Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.

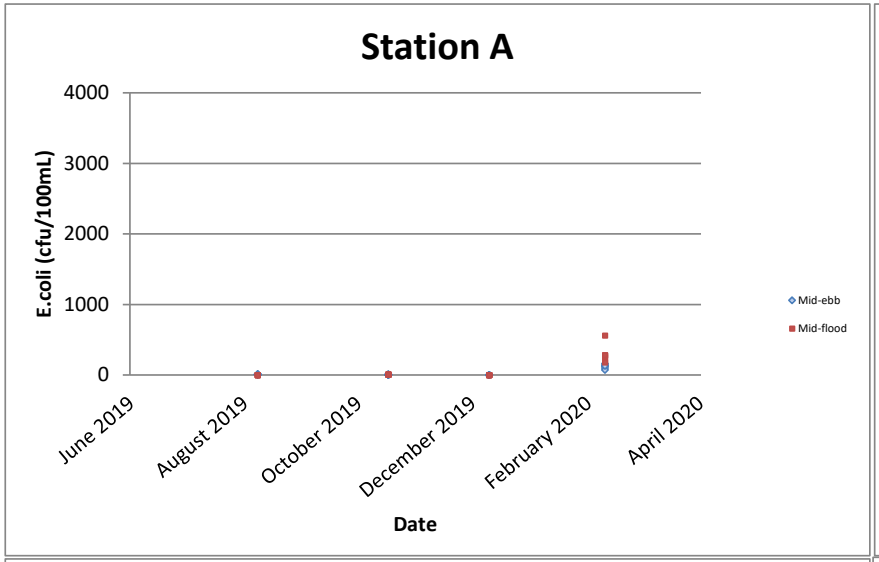


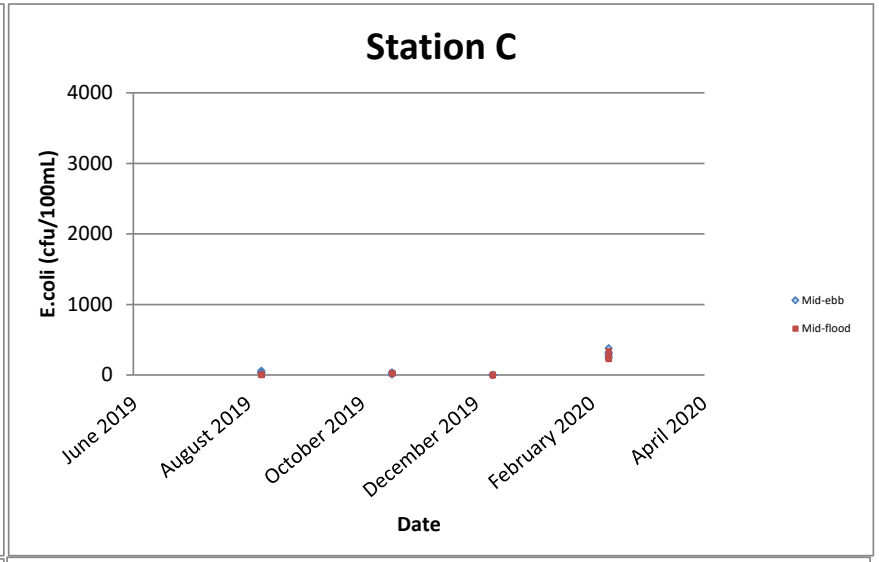
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.

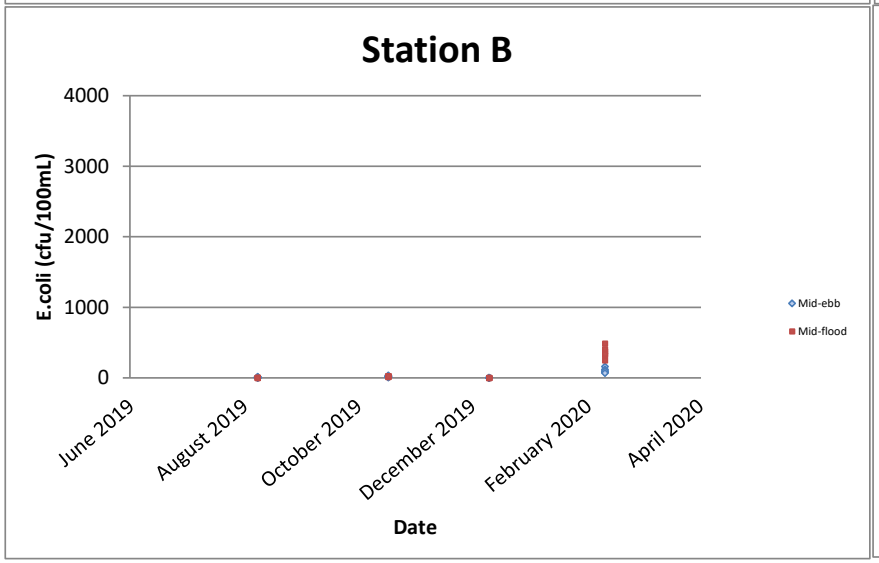


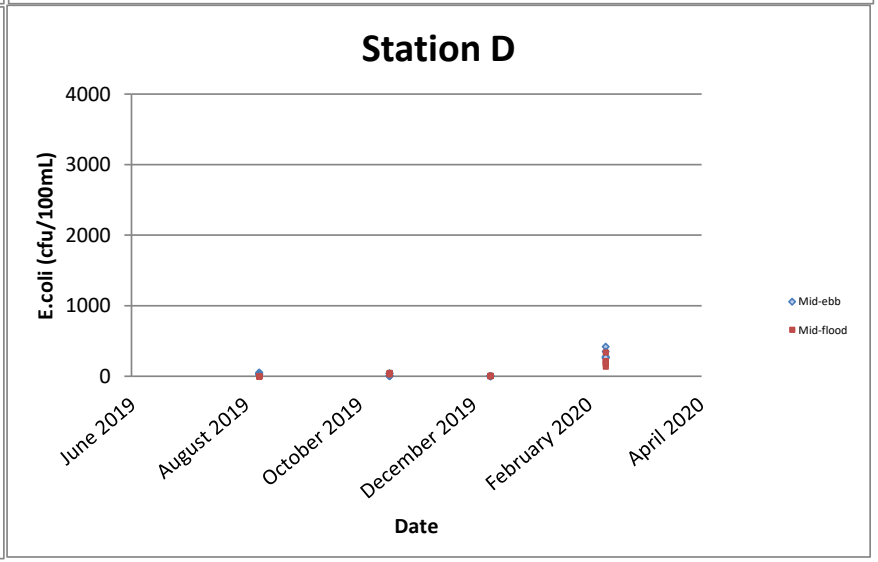
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.

E.coli (cfu/100mL)



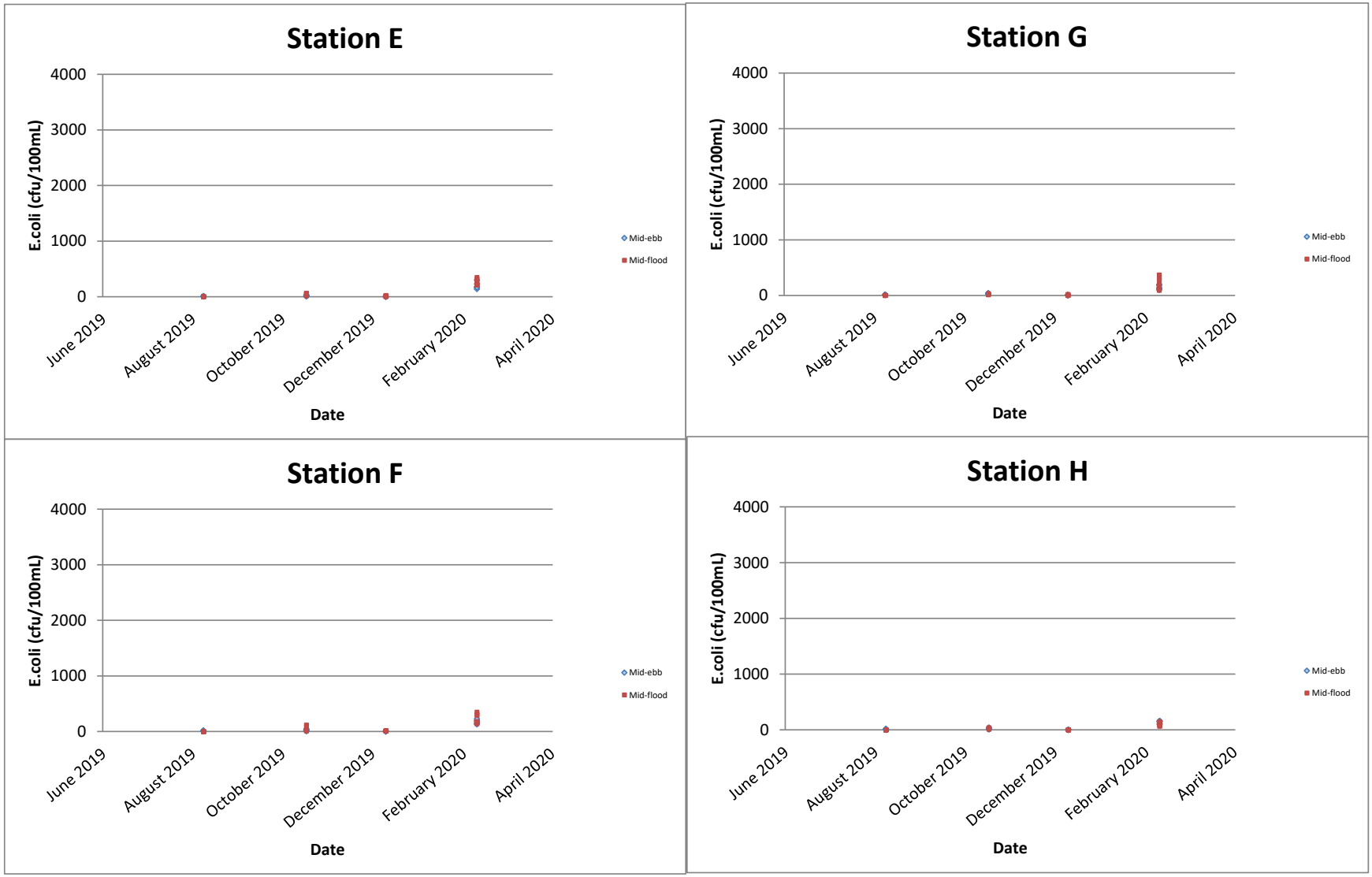






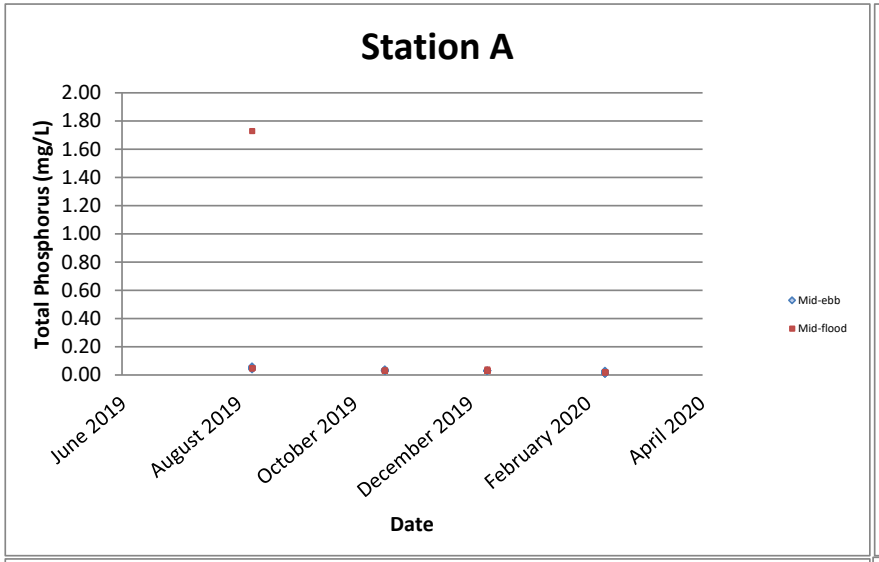
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.

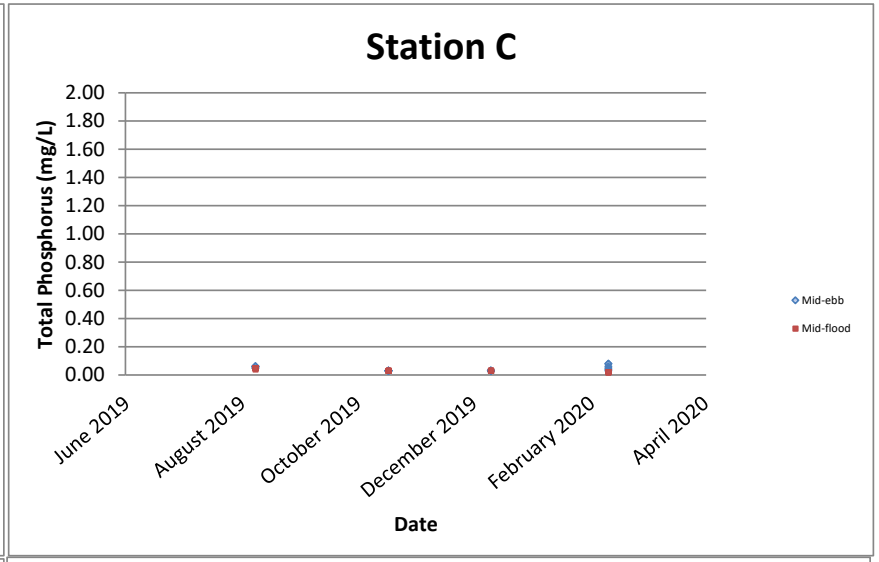
E.coli (cfu/100mL)

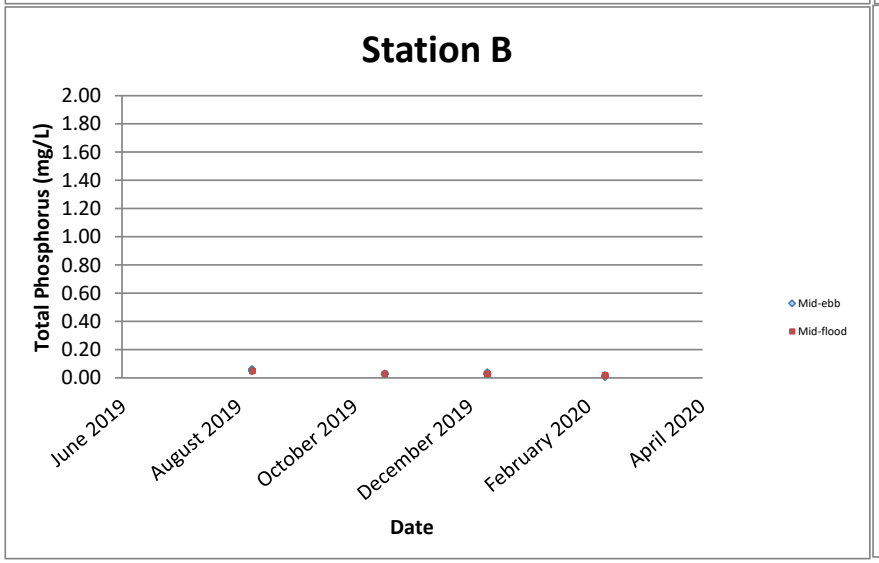


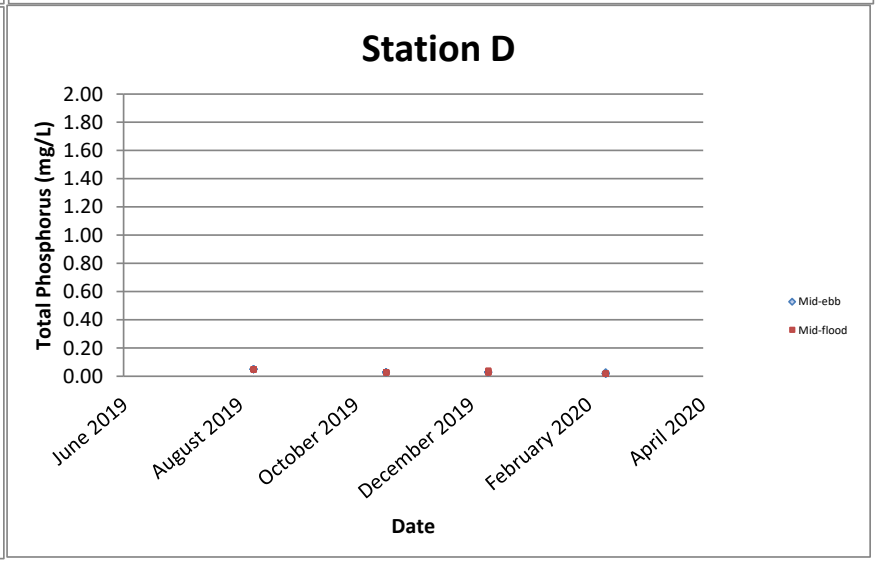
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.

Total Phosphorus (soluble and particulate) (mg/L)



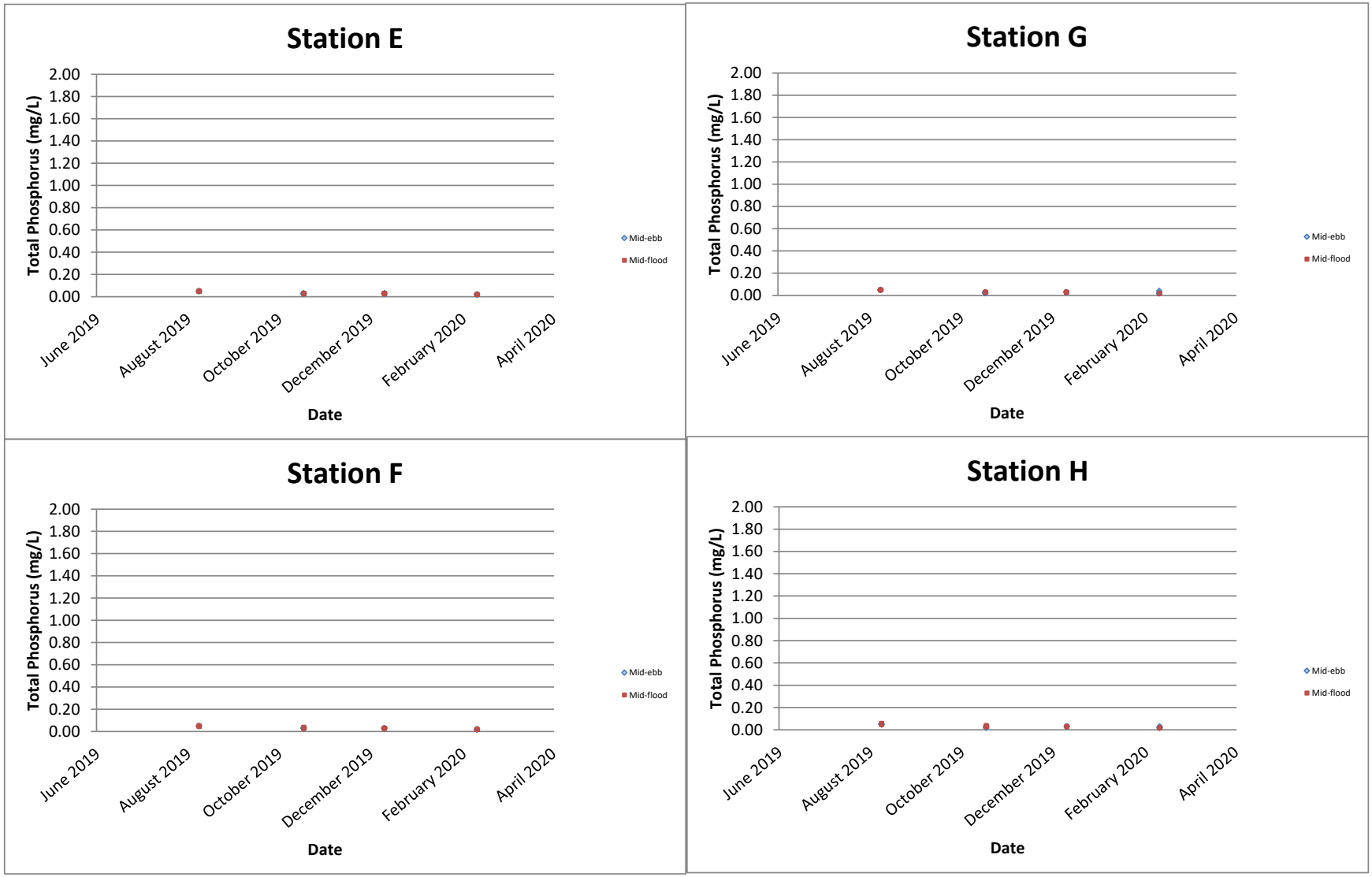






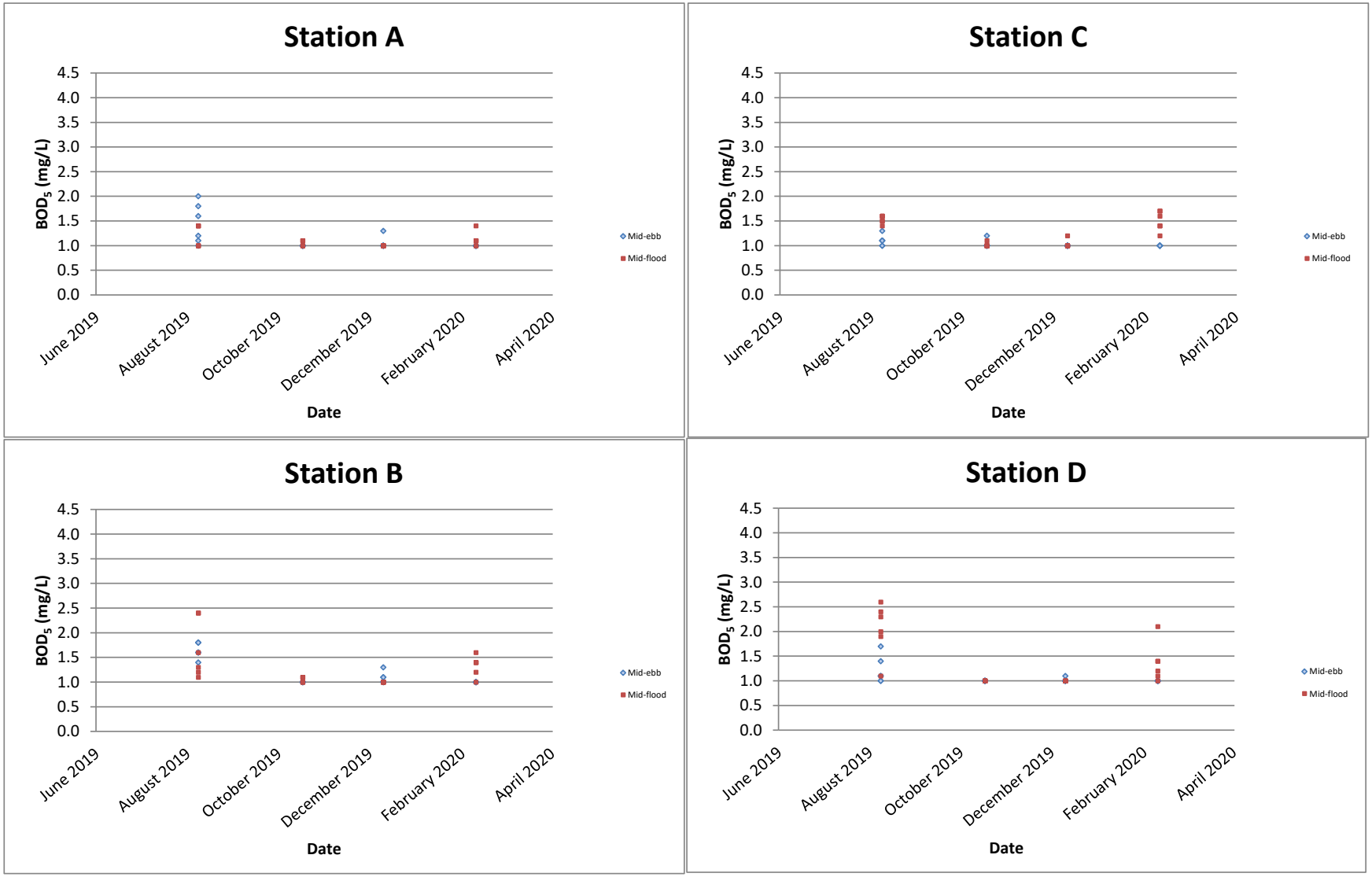
Remark: All below the Limit of Report sample results (<0.01 mg/L) for Total Phosphorus is regarded as 0.01 mg/L in graphical presentation.

Total Phosphorus (soluble and particulate) (mg/L)



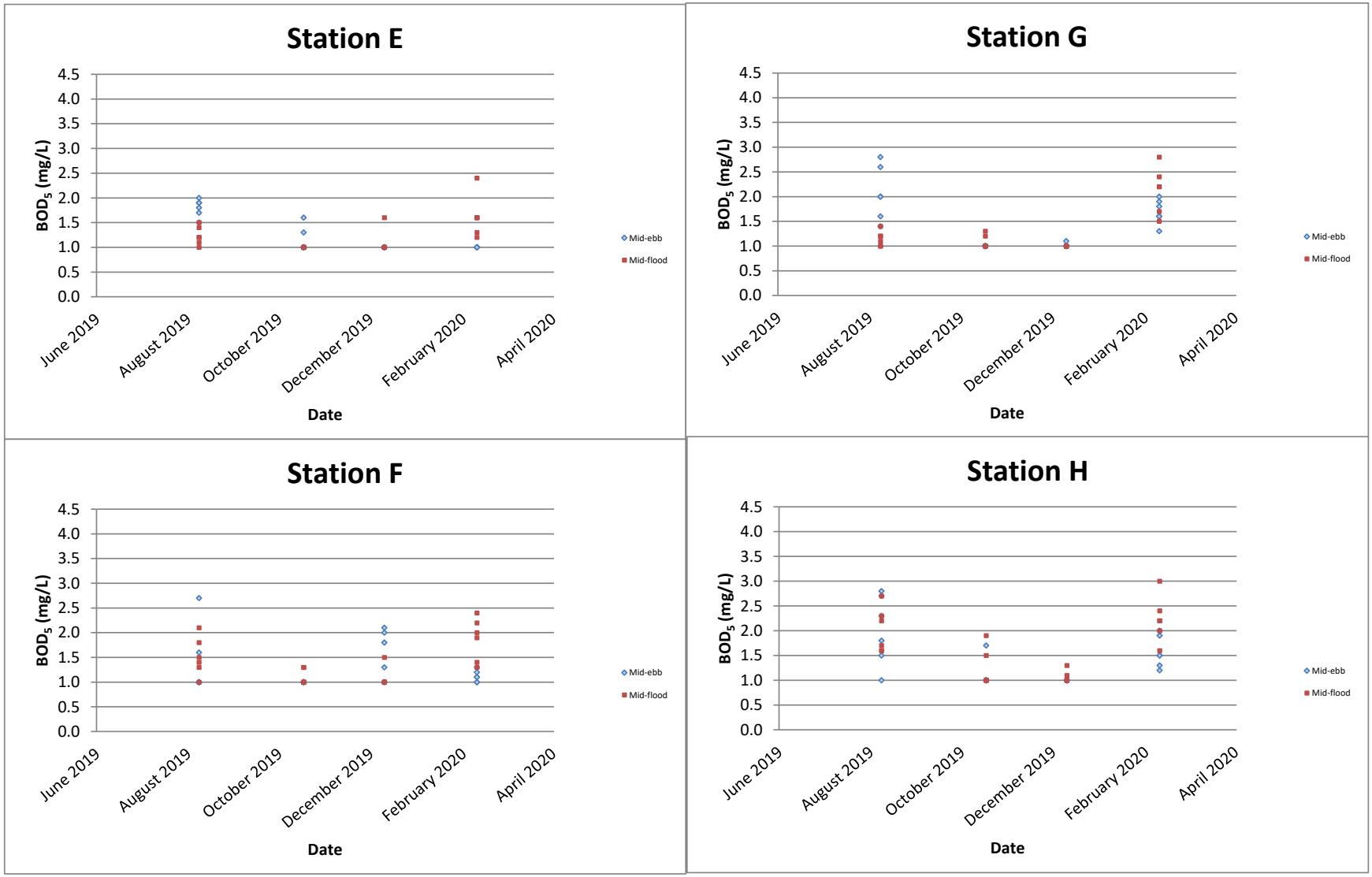
Remark: All below the Limit of Report sample results (<0.01 mg/L) for Total Phosphorus is regarded as 0.01 mg/L in graphical presentation.

BOD_5 (mg/L)



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD_5 is regarded as 1.0 mg/L in graphical presentation.

BOD_5 (mg/L)



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD_5 is regarded as 1.0 mg/L in graphical presentation.

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Appendix G

Tidal Data obtained from Ma Wan Marine Traffic Station

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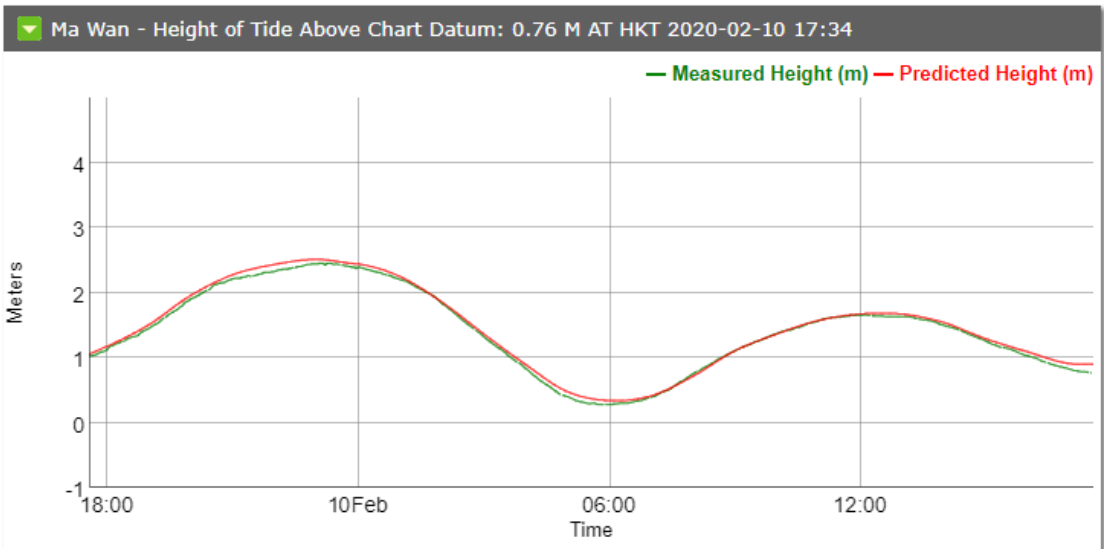
Report No.: 0041/17/ED/0533A



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Appendix H

Results and Graphical Presentation of Laboratory Analysis for Sediment Quality Monitoring and Benthic Survey

Monitoring Location	Date	Weather	Sea Condition	Time	Sediment Monitoring												
					pH	Ammonia as N (mg-N/kg)	Total Nitrogen (mg-N/kg)	Total Phosphorus (mg-P/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Copper (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Nickel (mg/kg)	Zinc (mg/kg)	Arsenic (mg/kg)	Silver (mg/kg)
A	10/2/2020	Fine	Moderate	12:43	8.2	4.4	768	332	<0.10	27.2	21.6	29.0	0.07	15.4	76.1	14.3	0.18
B	10/2/2020	Fine	Moderate	12:25	8.4	6.1	991	407	<0.10	35.5	32.5	36.0	0.08	21.0	99.6	12.5	0.33
C	10/2/2020	Fine	Moderate	12:01	8.2	13.0	1260	511	<0.10	42.7	35.2	43.9	0.11	25.4	118	13.7	0.28
D	10/2/2020	Fine	Moderate	11:50	8.4	7.2	983	446	<0.10	38.3	32.6	40.2	0.08	22.6	107	12.1	0.28
E	10/2/2020	Fine	Moderate	11:25	8.3	4.3	1330	557	<0.10	41.4	36.0	41.8	0.12	24.7	122	11.0	0.33
F	10/2/2020	Fine	Moderate	11:10	8.3	21.1	1410	581	<0.10	45.9	40.4	46.4	0.11	27.6	129	12.2	0.36
G	10/2/2020	Fine	Moderate	10:40	8.4	4.6	920	615	<0.10	47.2	214	40.8	0.09	21.6	142	10.1	0.33
H	10/2/2020	Fine	Moderate	10:25	8.4	6.6	944	444	<0.10	37.1	37.7	37.7	0.09	22.1	113	11.1	0.33

Monitoring Location	Date	Weather	Sea Condition	Time	Benthic Survey				
					Total Organic Carbon (%)	Particle Size Distrbution			
						Gravel (%)	Sand (%)	Silt (%)	Clay (%)
A	10/2/2020	Fine	Moderate	12:43	1.12	6	43	26	25
B	10/2/2020	Fine	Moderate	12:25	8.34	2	22	39	37
C	10/2/2020	Fine	Moderate	12:01	0.96	0	5	58	37
D	10/2/2020	Fine	Moderate	11:50	0.76	3	24	40	33
E	10/2/2020	Fine	Moderate	11:25	1.05	5	22	43	30
F	10/2/2020	Fine	Moderate	11:10	1.21	0	3	53	44
G	10/2/2020	Fine	Moderate	10:40	2.32	21	35	26	18
H	10/2/2020	Fine	Moderate	10:25	1.26	1	10	55	34

CERTIFICATE OF ANALYSIS

Client	: FUGRO TECHNICAL SERVICES LIMITED	Laboratory	: ALS Technichem (HK) Pty Ltd	Page	: 1 of 13
Contact	: MR CYRUS LAI	Contact	: Richard Fung	Work Order	: HK2004449
Address	: ROOM 723 & 725, 7/F, BLOCK B, PROFIT INDUSTRIAL BUILDING, 1-15 KWAI FONG CRESCENT, KWAI FONG, HONG KONG	Address	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
E-mail	: c.lai@fugro.com	E-mail	: richard.fung@alsglobal.com		
Telephone	: +852 3565 4374	Telephone	: +852 2610 1044		
Facsimile	: ----	Facsimile	: +852 2610 2021		
Project	: CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT			Date Samples Received	: 10-Feb-2020
Order number	: ----	Quote number	: HKE/1654/2017_R1	Issue Date	: 24-Feb-2020
C-O-C number	: ----			No. of samples received	: 24
Site	: ----			No. of samples analysed	: 24

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories	*Position*	*Authorised results for*
Fung Lim Chee, Richard	Managing Director	Inorganics
Fung Lim Chee, Richard	Managing Director	Metals_ENV

General Comments

This report supersedes any previous report(s) with this reference. All pages of this report have been checked and approved for release. When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes. Testing period is from 10-Feb-2020 to 24-Feb-2020.

Key: LOR = Limit of reporting; CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.

Specific Comments for Work Order: HK2004449

Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.

Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.

Sediment sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.

Particle Size Distribution was subcontracted to and analysed by Gammon Construction Limited.

Sample digested by In-house method E-3005 prior to the determination of total metals. The In-house method is developed based on USEPA method 3005.

EA002SOIL - pH value is reported as at 25°C.

EK055S - Ammoniacal Nitrogen was determined and reported on a 1:5 soil / 1M KCl solution extract.

EK059A - Nitrate and Nitrite were determined and reported on a 1:5 soil / 1M KCl solution extract.

Sample(s) as received, digested by In-house method E-3051A prior to the determination of metals. The In-house method is developed based on USEPA method 3051A.

EA002SOIL - Soil sample(s) analysed on as air-dry weight basis. pH value determined and reported on a 1:5 soil / water extract.

EA002SOIL - Calibration range of pH value is 4.0 - 10.0. Results exceeding this range is for reference only.

EK062A - Total Nitrogen is the sum of Total Oxidizable (NOx) and Total Kjeldahl Nitrogen.

Analytical Results

Sub-Matrix: **SEDIMENT**

Compound	CAS Number	LOR	Unit	Client sample ID: A/Sediment	B/Sediment	C/Sediment	D/Sediment	E/Sediment
				Client sampling date / time: 10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
				HK2004449-001	HK2004449-002	HK2004449-003	HK2004449-004	HK2004449-005
EA/ED: Physical and Aggregate Properties								
EA002SOIL: pH Value	----	0.1	pH Unit	8.2	8.4	8.2	8.4	8.3
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	40.0	50.3	59.5	54.2	56.0
ED/EK: Inorganic Nonmetallic Parameters								
EK055S: Ammonia as N	7664-41-7	0.5	mg/kg	4.4	6.1	13.0	7.2	4.3
EK062A: Total Nitrogen as N	----	10	mg/kg	768	991	1260	983	1330
EK067A: Total Phosphorus as P	----	10	mg/kg	332	407	511	446	557
EG: Metals and Major Cations								
EG020: Arsenic	7440-38-2	0.5	mg/kg	14.3	12.5	13.7	12.1	11.0
EG020: Cadmium	7440-43-9	0.10	mg/kg	<0.10	<0.10	<0.10	<0.10	<0.10
EG020: Chromium	7440-47-3	0.5	mg/kg	27.2	35.5	42.7	38.3	41.4
EG020: Copper	7440-50-8	0.20	mg/kg	21.6	32.5	35.2	32.6	36.0
EG020: Lead	7439-92-1	0.20	mg/kg	29.0	36.0	43.9	40.2	41.8
EG020: Mercury	7439-97-6	0.05	mg/kg	0.07	0.08	0.11	0.08	0.12
EG020: Nickel	7440-02-0	0.20	mg/kg	15.4	21.0	25.4	22.6	24.7
EG020: Silver	7440-22-4	0.10	mg/kg	0.18	0.33	0.28	0.28	0.33
EG020: Zinc	7440-66-6	0.5	mg/kg	76.1	99.6	118	107	122

Sub-Matrix: SEDIMENT				Client sample ID	F/Sediment	G/Sediment	H/Sediment	A/Benthic Survey	B/Benthic Survey
				Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit		HK2004449-006	HK2004449-007	HK2004449-008	HK2004449-009	HK2004449-010
EA/ED: Physical and Aggregate Properties									
EA002SOIL: pH Value	----	0.1	pH Unit		8.3	8.4	8.4	----	----
EA055: Moisture Content (dried @ 103°C)	----	0.1	%		62.3	51.8	52.4	48.2	54.4
ED/EK: Inorganic Nonmetallic Parameters									
EK055S: Ammonia as N	7664-41-7	0.5	mg/kg		21.1	4.6	6.6	----	----
EK062A: Total Nitrogen as N	----	10	mg/kg		1410	920	944	----	----
EK067A: Total Phosphorus as P	----	10	mg/kg		581	615	444	----	----
EG: Metals and Major Cations									
EG020: Arsenic	7440-38-2	0.5	mg/kg		12.2	10.1	11.1	----	----
EG020: Cadmium	7440-43-9	0.10	mg/kg		<0.10	<0.10	<0.10	----	----
EG020: Chromium	7440-47-3	0.5	mg/kg		45.9	47.2	37.1	----	----
EG020: Copper	7440-50-8	0.20	mg/kg		40.4	214	37.7	----	----
EG020: Lead	7439-92-1	0.20	mg/kg		46.4	40.8	37.7	----	----
EG020: Mercury	7439-97-6	0.05	mg/kg		0.11	0.09	0.09	----	----
EG020: Nickel	7440-02-0	0.20	mg/kg		27.6	21.6	22.1	----	----
EG020: Silver	7440-22-4	0.10	mg/kg		0.36	0.33	0.33	----	----
EG020: Zinc	7440-66-6	0.5	mg/kg		129	142	113	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	0.05	%		----	----	----	1.12	8.34

Sub-Matrix: SEDIMENT			Client sample ID	C/Benthic Survey	D/Benthic Survey	E/Benthic Survey	F/Benthic Survey	G/Benthic Survey
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	CAS Number	LOR	Unit	HK2004449-011	HK2004449-012	HK2004449-013	HK2004449-014	HK2004449-015
EA/ED: Physical and Aggregate Properties								
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	60.5	49.9	49.9	60.1	42.7
EP: Aggregate Organics								
EP005: Total Organic Carbon	----	0.05	%	0.96	0.76	1.05	1.21	2.32

Sub-Matrix: SEDIMENT				Client sample ID	H/Benthic Survey	----	----	----	----
				Client sampling date / time	10-Feb-2020	----	----	----	----
Compound	CAS Number	LOR	Unit	HK2004449-016	-------	-------	-------	-------
EA/ED: Physical and Aggregate Properties									
EA055: Moisture Content (dried @ 103°C)	----	0.1	%	63.0	----	----	----	----
EP: Aggregate Organics									
EP005: Total Organic Carbon	----	0.05	%	1.26	----	----	----	----

Sub-Matrix: WATER			Client sample ID	A/Rinsate Blank	B/Rinsate Blank	C/Rinsate Blank	D/Rinsate Blank	E/Rinsate Blank
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020	10-Feb-2020
Compound	*CAS Number*	*LOR*	*Unit*	HK2004449-017	HK2004449-018	HK2004449-019	HK2004449-020	HK2004449-021
EG: Metals and Major Cations - Total								
EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	<10	<10	<10
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2
EG020: Chromium	7440-47-3	1	µg/L	<1	**3**	**2**	**1**	<1
EG020: Copper	7440-50-8	1	µg/L	**1**	**3**	**2**	**2**	**1**
EG020: Lead	7439-92-1	1	µg/L	<1	**3**	**2**	**3**	<1
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
EG020: Nickel	7440-02-0	1	µg/L	<1	**2**	**2**	**1**	<1
EG020: Silver	7440-22-4	1	µg/L	<1	<1	<1	<1	<1
EG020: Zinc	7440-66-6	10	µg/L	<10	<10	<10	<10	<10

Sub-Matrix: WATER			Client sample ID	F/Rinsate Blank	G/Rinsate Blank	H/Rinsate Blank	----	----
			Client sampling date / time	10-Feb-2020	10-Feb-2020	10-Feb-2020	----	----
Compound	*CAS Number*	*LOR*	*Unit*	HK2004449-022	HK2004449-023	HK2004449-024	-------	-------
EG: Metals and Major Cations - Total								
EG020: Arsenic	7440-38-2	10	µg/L	<10	<10	<10	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	<0.2	<0.2	----	----
EG020: Chromium	7440-47-3	1	µg/L	<1	<1	**2**	----	----
EG020: Copper	7440-50-8	1	µg/L	**1**	**1**	**1**	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	<1	<1	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	<0.5	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	<1	**1**	----	----
EG020: Silver	7440-22-4	1	µg/L	<1	<1	<1	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	<10	<10	----	----

Laboratory Duplicate (DUP) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2855005)								
HK2004449-009	A/Benthic Survey	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	48.2	48.2	0.00
HK2004449-011	C/Benthic Survey	**EA055: Moisture Content (dried @ 103°C)**	----	0.1	%	60.5	60.1	0.727
EA/ED: Physical and Aggregate Properties (QC Lot: 2855014)								
HK2004449-001	A/Sediment	**EA002SOIL: pH Value**	----	0.1	pH Unit	8.2	8.2	0.00
HK2004831-005	Anonymous	**EA002SOIL: pH Value**	----	0.1	pH Unit	6.9	6.9	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855062)								
HK2004449-001	A/Sediment	**EK055S: Ammonia as N**	7664-41-7	1	mg/kg	4.4	4	0.00
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2856157)								
HK2004449-007	G/Sediment	**EK067A: Total Phosphorus as P**	----	10	mg/kg	615	507	19.2
EG: Metals and Major Cations (QC Lot: 2852437)								
HK2004449-002	B/Sediment	**EG020: Cadmium**	7440-43-9	0.01	mg/kg	<0.10	<0.10	0.00
		EG020: Mercury	7439-97-6	0.02	mg/kg	0.08	0.09	0.00
		EG020: Copper	7440-50-8	0.05	mg/kg	32.5	32.7	0.668
		EG020: Lead	7439-92-1	0.05	mg/kg	36.0	35.6	1.11
		EG020: Nickel	7440-02-0	0.05	mg/kg	21.0	20.8	1.04
		EG020: Silver	7440-22-4	0.05	mg/kg	0.33	0.34	3.22
		EG020: Arsenic	7440-38-2	0.5	mg/kg	12.5	12.1	3.43
		EG020: Chromium	7440-47-3	0.5	mg/kg	35.5	35.7	0.532
		EG020: Zinc	7440-66-6	0.5	mg/kg	99.6	98.8	0.755
EP: Aggregate Organics (QC Lot: 2853365)								
HK2004449-011	C/Benthic Survey	**EP005: Total Organic Carbon**	----	0.05	%	0.96	0.98	1.61

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report				
				LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Total (QC Lot: 2852505)								
HK2004449-018	B/Rinsate Blank	**EG020: Cadmium**	7440-43-9	0.2	µg/L	<0.2	<0.2	0.00
		EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	<0.5	0.00
		EG020: Arsenic	7440-38-2	1	µg/L	<10	<10	0.00
		EG020: Chromium	7440-47-3	1	µg/L	3	4	0.00
		EG020: Copper	7440-50-8	1	µg/L	3	3	0.00

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Laboratory Duplicate (DUP) Report: LOR	Unit	Original Result	Duplicate Result	RPD (%)
EG: Metals and Major Cations - Total (QC Lot: 2852505) - Continued								
HK2004449-018	B/Rinsate Blank	**EG020: Lead**	7439-92-1	1	µg/L	3	3	0.00
		EG020: Nickel	7440-02-0	1	µg/L	2	2	0.00
		EG020: Silver	7440-22-4	1	µg/L	<1	<1	0.00
		EG020: Zinc	7440-66-6	10	µg/L	<10	<10	0.00

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: **SOIL**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855062)											
EK055S: Ammonia as N	7664-41-7	1	mg/kg	<1	10 mg/kg	104	----	85.0	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2856157)											
EK067A: Total Phosphorus as P	----	10	mg/kg	<10	695 mg/kg	88.6	----	83.6	95.2	----	----
EG: Metals and Major Cations (QC Lot: 2852437)											
EG020: Arsenic	7440-38-2	0.5	mg/kg	<0.5	5 mg/kg	92.2	----	85.0	110	----	----
EG020: Cadmium	7440-43-9	0.01	mg/kg	<0.01	0.25 mg/kg	90.2	----	85.0	115	----	----
EG020: Chromium	7440-47-3	0.5	mg/kg	<0.5	5 mg/kg	95.8	----	85.0	115	----	----
EG020: Copper	7440-50-8	0.05	mg/kg	<0.05	5 mg/kg	98.3	----	85.0	114	----	----
EG020: Lead	7439-92-1	0.05	mg/kg	<0.05	5 mg/kg	96.5	----	87.0	115	----	----
EG020: Mercury	7439-97-6	0.02	mg/kg	<0.02	0.1 mg/kg	105	----	85.0	115	----	----
EG020: Nickel	7440-02-0	0.05	mg/kg	<0.05	5 mg/kg	95.9	----	85.0	115	----	----
EG020: Silver	7440-22-4	0.05	mg/kg	<0.05	5 mg/kg	93.0	----	85.0	115	----	----
EG020: Zinc	7440-66-6	0.5	mg/kg	<0.5	5 mg/kg	106	----	85.0	115	----	----
EP: Aggregate Organics (QC Lot: 2853365)											
EP005: Total Organic Carbon	----	0.05	%	<0.05	40 %	96.1	----	90.4	106	----	----

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report: LOR	Unit	Result	Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report: Spike Concentration	Spike Recovery (%): LCS	DCS	Recovery Limits(%): Low	High	RPD (%): Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 2852505)											

Matrix: **WATER**

Method: Compound	CAS Number	Method Blank (MB) Report			Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report						
					Spike Concentration	Spike Recovery (%)		Recovery Limits(%)		RPD (%)	
		LOR	Unit	Result		LCS	DCS	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 2852505) - Continued											
EG020: Arsenic	7440-38-2	1	µg/L	<1	50 µg/L	95.2	----	85.0	110	----	----
EG020: Cadmium	7440-43-9	0.2	µg/L	<0.2	5 µg/L	96.2	----	85.0	109	----	----
EG020: Chromium	7440-47-3	1	µg/L	<1	50 µg/L	99.6	----	86.0	111	----	----
EG020: Copper	7440-50-8	1	µg/L	<1	50 µg/L	103	----	90.0	111	----	----
EG020: Lead	7439-92-1	1	µg/L	<1	50 µg/L	101	----	89.0	111	----	----
EG020: Mercury	7439-97-6	0.5	µg/L	<0.5	2 µg/L	97.2	----	85.0	115	----	----
EG020: Nickel	7440-02-0	1	µg/L	<1	50 µg/L	99.2	----	87.0	110	----	----
EG020: Silver	7440-22-4	1	µg/L	<1	50 µg/L	91.1	----	85.0	114	----	----
EG020: Zinc	7440-66-6	10	µg/L	<10	50 µg/L	102	----	86.0	114	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: **SOIL**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2855062)										
HK2004449-002	B/Sediment	**EK055S: Ammonia as N**	7664-41-7	10 mg/kg	89.7	----	75.0	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2856157)										
HK2004449-008	H/Sediment	**EK067A: Total Phosphorus as P**	----	100 mg/kg	83.0	----	75.0	125	----	----
EG: Metals and Major Cations (QC Lot: 2852437)										
HK2004449-001	A/Sediment	**EG020: Arsenic**	7440-38-2	5 mg/kg	88.3	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	0.25 mg/kg	97.6	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	5 mg/kg	84.9	----	75.0	125	----	----
		EG020: Copper	7440-50-8	5 mg/kg	79.9	----	75.0	125	----	----
		EG020: Lead	7439-92-1	5 mg/kg	76.2	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	0.1 mg/kg	77.9	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	5 mg/kg	84.6	----	75.0	125	----	----
		EG020: Silver	7440-22-4	5 mg/kg	92.8	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	5 mg/kg	# Not Determined	----	75.0	125	----	----
EP: Aggregate Organics (QC Lot: 2853365)										
HK2004449-010	B/Benthic Survey	**EP005: Total Organic Carbon**	----	40 %	87.4	----	75.0	125	----	----

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 2852505)										
HK2004449-017	A/Rinsate Blank	**EG020: Arsenic**	7440-38-2	50 µg/L	95.8	----	75.0	125	----	----
		EG020: Cadmium	7440-43-9	5 µg/L	97.9	----	75.0	125	----	----
		EG020: Chromium	7440-47-3	50 µg/L	98.7	----	75.0	125	----	----
		EG020: Copper	7440-50-8	50 µg/L	79.6	----	75.0	125	----	----
		EG020: Lead	7439-92-1	50 µg/L	83.5	----	75.0	125	----	----
		EG020: Mercury	7439-97-6	2 µg/L	84.0	----	75.0	125	----	----
		EG020: Nickel	7440-02-0	50 µg/L	82.5	----	75.0	125	----	----

Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPD (%)	
					MS	MSD	Low	High	Value	Control Limit
EG: Metals and Major Cations - Total (QC Lot: 2852505) - Continued										
HK2004449-017	A/Rinsate Blank	**EG020: Silver**	7440-22-4	50 µg/L	87.9	----	75.0	125	----	----
		EG020: Zinc	7440-66-6	50 µg/L	78.8	----	75.0	125	----	----

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	:	MR CYRUS LAI	WORK ORDER	: **HK2004449**
CLIENT	:	**FUGRO TECHNICAL SERVICES LIMITED**		
ADDRESS	:	ROOM 723 & 725, 7/F, BLOCK B, PROFIT INDUSTRIAL BUILDING, 1-15 KWAI FONG CRESCENT, KWAI FONG, HONG KONG	SUB-BATCH DATE RECEIVED DATE OF ISSUE	: 1 : 10-FEB-2020 : 20-FEB-2020
PROJECT	:	CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT	NO. OF SAMPLES CLIENT ORDER	: 24 :---

General Comments

- **Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in chilled condition. The result(s) related only to the item(s) tested.**
- **Sample information (Project name, Sample ID, Sampling date/time, etc., if any) is provided by client.**
- **Sediment sample(s) analysed on an as received basis. Result(s) reported on dry weight basis.**
- **Particle Size Distribution was subcontracted to and analysed by Gammon Construction Limited.**
- **Sample digested by In-house method E-3005 prior to the determination of total metals. The In-house method is developed based on USEPA method 3005.**
- **EA002SOIL - pH value is reported as at 25°C.**
- **EK055S - Ammoniacal Nitrogen was determined and reported on a 1:5 soil / 1M KCl solution extract.**
- **EK059A - Nitrate and Nitrite were determined and reported on a 1:5 soil / 1M KCl solution extract.**
- **Sample(s) as received, digested by In-house method E-3051A prior to the determination of metals. The In-house method is developed based on USEPA method 3051A.**
- **EA002SOIL - Soil sample(s) analysed on as air-dry weight basis. pH value determined and reported on a 1:5 soil / water extract.**
- **EA002SOIL - Calibration range of pH value is 4.0 - 10.0. Results exceeding this range is for reference only.**
- **EK062A - Total Nitrogen is the sum of Total Oxidizable (NOx) and Total Kjeldahl Nitrogen.**

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	Managing Director

This is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	:	HK2004449
SUB-BATCH	:	1
CLIENT	:	FUGRO TECHNICAL SERVICES LIMITED
PROJECT	:	CONTRACT NO. CM 14/2016 ENVIRONMENTAL TEAM FOR OPERATIONAL ENVIRONMENTAL MONITORING AND AUDIT FOR SIU HO WAN SEWAGE TREATMENT PLANT

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2004449-001	A/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-002	B/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-003	C/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-004	D/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-005	E/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-006	F/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-007	G/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-008	H/Sediment	SEDIMENT	10-Feb-2020	
HK2004449-009	A/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-010	B/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-011	C/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-012	D/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-013	E/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-014	F/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-015	G/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-016	H/Benthic Survey	SEDIMENT	10-Feb-2020	J.2999-272.66
HK2004449-017	A/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-018	B/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-019	C/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-020	D/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-021	E/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-022	F/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-023	G/Rinsate Blank	WATER	10-Feb-2020	
HK2004449-024	H/Rinsate Blank	WATER	10-Feb-2020	

TEST CERTIFICATE
SUMMARY OF SOIL CLASSIFICATION TEST RESULT
GEOSPEC 3 : 2001

Gammon

HOKLAS 055 TEST CAL

Report No : J2999-272.66

Customer : ALS Technichem (HK) Pty Ltd | Job No. : J2999 | Works Order No. : 272

Project : - | Contract No.: | Date : 11/02/2020

Sample ID	Sample			Δ Moisture Content	Test 6.1 Liquid Limit	Test 6.1 Plastic Limit	Test 6.1 Plasticity Index	Test 6.2 Liquidity Index	Passing 425μm Test Sieve	Preparation Method	Particle Size Distribution					Description	Sample Origin
											#	Percentage					
No.	No.	Type	Depth (m)	(%)	(%)	(%)	(%)		(%)		Test Method	Gravel (%)	Sand (%)	Silt (%)	Clay (%)		
HK2004449-009	A/Benthic Survey	D									1,5,7	6	43	26	25	Grey, slightly gravelly, sandy SILT/CLAY with shell fragments	- ‡
HK2004449-010	B/Benthic Survey	D									1,5,7	2	22	39	37	Grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2004449-011	C/Benthic Survey	D									1,5,7	0	5	58	37	Grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2004449-012	D/Benthic Survey	D									1,5,7	3	24	40	33	Grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2004449-013	E/Benthic Survey	D									1,5,7	5	22	43	30	Grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2004449-014	F/Benthic Survey	D									1,5,7	0	3	53	44	Grey, slightly sandy SILT/CLAY with shell fragments	- ‡
HK2004449-015	G/Benthic Survey	D									1,5,7	21	35	26	18	Grey, slightly gravelly, sandy SILT/CLAY with shell fragments	- ‡

Legend : Δ = Test Method in accordance with GEOSPEC 3 : 2001 Test 5.1 Moisture Content at 45°C ± 5°C (A), Test 5.2 Moisture Content at 105°C ± 5°C (B), Test 5.3 Comparative Moisture Content 45/105°C± 5°C (C)

= Test Method in accordance with GEOSPEC3 : 2001 Test 8.1 (1), 8.2 (2), 8.3 (3), 8.4 (4), 8.5 (5), 8.6 (6), 8.7 (7).

Symbols :
U - Undisturbed Sample; LB - Large Disturbed Sample; BLK - Block Sample; SPTL - SPT Split-Barrel Sample;
P - Piston Sample; M - Mazier Sample; D - Small Disturbed Sample; PT - Portable triple tube Sample;
N.P. - Non Plastic; A.R. - As Received; H.P. - Hand Picked; ^ - Moisture Content for A.L. Test.
A.D. - Air Dried; O.D. - Oven Dried; W.S. - Wet Sieved;
Sampling History - Refer the Individual Test Report;
Estimated Uncertainty - Refer the Individual Test Report.
‡ - Information provided by customer.

Notes: IS - Insufficient Sample; Tf - To Follow on supplementary Report.

Checked by : T K Lam

Approved By : Chung Hei Wing, Quality Manager

Date : 19/02/2020

HKAS has accredited this laboratory (Reg. No. HOKLAS 055) under HOKLAS for specific laboratory activities as listed in the HOKLAS directory of accredited laboratories. This report shall not be reproduced unless with prior written approval from this laboratory.

Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel :26991980, Fax : 26917547

TEST CERTIFICATE
SUMMARY OF SOIL CLASSIFICATION TEST RESULT
GEOSPEC 3 : 2001

Gammon

HOKLAS 055 TEST CAL

Report No : J2999-272.66

Customer : ALS Technichem (HK) Pty Ltd

Job No. : J2999

Works Order No. : 272

Project : -

Contract No.:

Date : 11/02/2020

Sample ID	Sample			Δ Moisture Content	Test 6.1 Liquid Limit	Test 6.1 Plastic Limit	Test 6.1 Plasticity Index	Test 6.2 Liquidity Index	Passing 425μm Test Sieve	Preparation Method	Particle Size Distribution					Description	Sample Origin
											#	Percentage					
No.	No.	Type	Depth (m)	(%)	(%)	(%)	(%)		(%)		Test Method	Gravel (%)	Sand (%)	Silt (%)	Clay (%)		
HK2004449-016	H/Benthic Survey	D									1,5,7	1	10	55	34	Grey, slightly sandy SILT/CLAY with shell fragments	- ‡

Legend : Δ = Test Method in accordance with GEOSPEC 3 : 2001 Test 5.1 Moisture Content at 45°C ± 5°C (A), Test 5.2 Moisture Content at 105°C ± 5°C (B), Test 5.3 Comparative Moisture Content 45/105°C± 5°C (C)

= Test Method in accordance with GEOSPEC3 : 2001 Test 8.1 (1), 8.2 (2), 8.3 (3), 8.4 (4), 8.5 (5), 8.6 (6), 8.7 (7).

Symbols :
U - Undisturbed Sample;
LB - Large Disturbed Sample;
BLK - Block Sample;
SPTL - SPT Split-Barrel Sample;
P - Piston Sample;
M - Mazier Sample;
D - Small Disturbed Sample;
PT - Portable triple tube Sample;
N.P. - Non Plastic;
A.R. - As Received;
H.P. - Hand Picked;
^ - Moisture Content for A.L. Test.
A.D. - Air Dried;
O.D. - Oven Dried;
W.S. - Wet Sieved;

Sampling History - Refer the Individual Test Report;
Estimated Uncertainty - Refer the Individual Test Report.
‡ - Information provided by customer.

Notes: IS - Insufficient Sample;
Tf - To Follow on supplementary Report.

Checked by : T K Lam

Approved By : Chung Hei Wing, Quality Manager

Date : 19/02/2020

Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel :26991980, Fax : 26917547

TEST REPORT
DETERMINATION OF PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Works Order No. : 272
Sample ID No. : HK2004449-009
Sample No. : A/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

Description : Grey, slightly gravelly, sandy SILT/CLAY with shell fragments
Sieve Method : Method A

ˆUpon request * Delete as appropriate ‡Information provided by customer

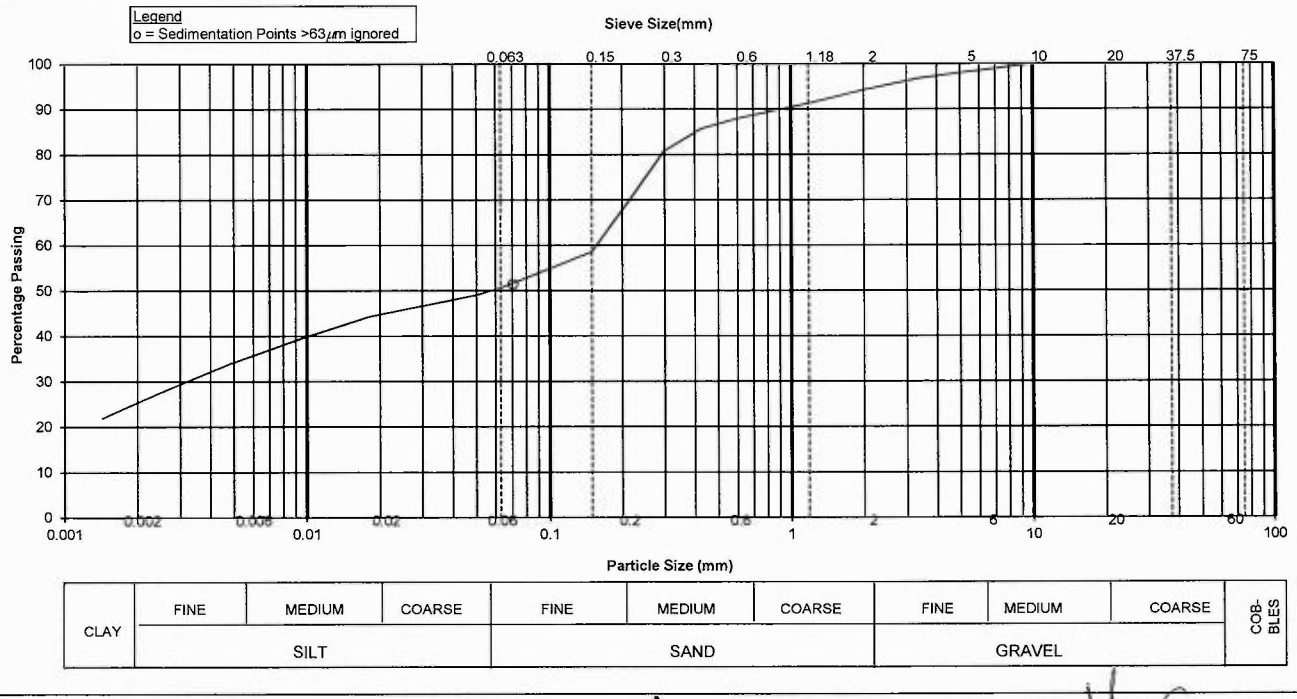
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	ˆExpanded Uncertainty of the Percent Passing (%)	ˆCumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	99	-	-
5.00 mm	98	-	-
3.35 mm	97	-	-
2.00 mm	94	-	-
1.18 mm	91	-	-
600 µm	88	-	-
425 µm	86	-	-
300 µm	81	-	-
212 µm	70	-	-
150 µm	59	-	-
63 µm	51	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	ˆExpanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	ˆExpanded Uncertainty of % finer than D (%)
0.0706	-	51	-
0.0503	-	49	-
0.0358	-	47	-
0.0254	-	46	-
0.0181	-	44	-
0.0095	-	39	-
0.0048	-	34	-
0.0025	-	28	-
0.0014	-	22	-

SUMMARY :

Gravel (%)	:	**6**
Sand (%)	:	**43**
Silt (%)	:	**26**
Clay (%)	:	**25**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 18/02/2020

Approved By :
Signatory : Chung Hoi Wing
Date : 18/02/2020

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Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel :26991980, Fax : 26917547

TEST REPORT
DETERMINATION OF PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Description : Grey, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A

Works Order No. : 272
Sample ID No. : HK2004449-010
Sample No. : B/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

^Upon request * Delete as appropriate ‡Information provided by customer

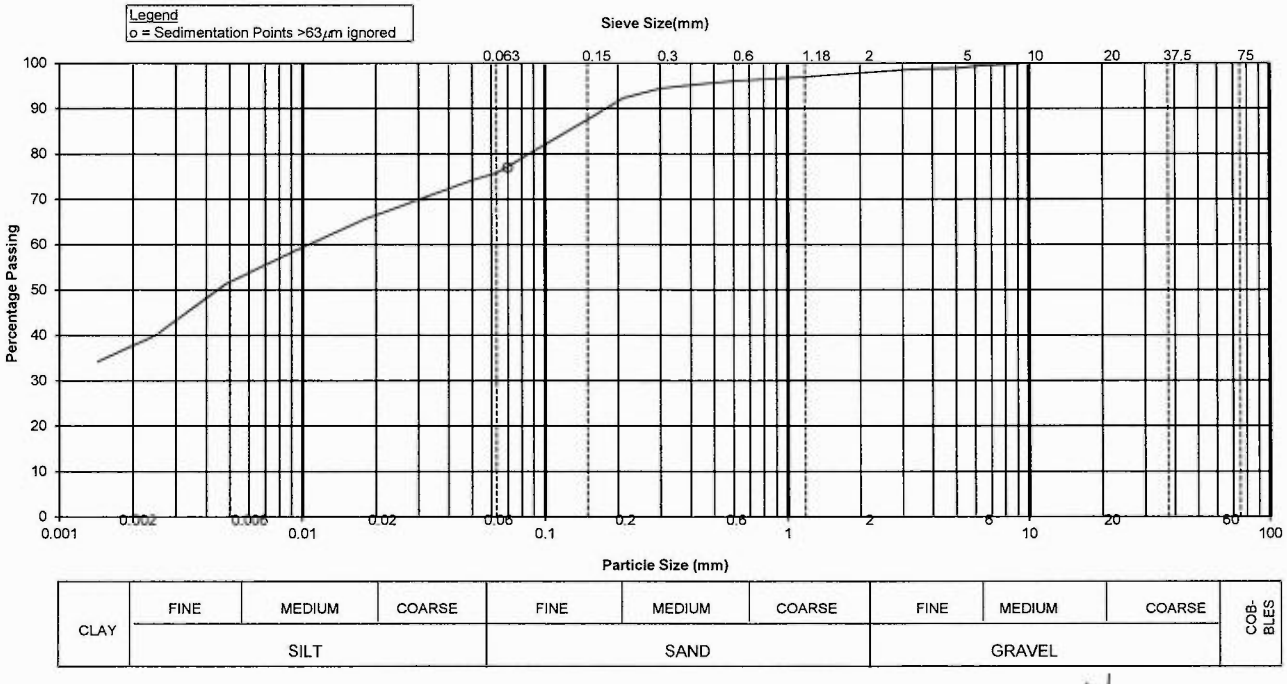
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	^Expanded Uncertainty of the Percent Passing (%)	^Cumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	99	-	-
5.00 mm	99	-	-
3.35 mm	99	-	-
2.00 mm	98	-	-
1.18 mm	97	-	-
600 µm	96	-	-
425 µm	95	-	-
300 µm	94	-	-
212 µm	92	-	-
150 µm	88	-	-
63 µm	76	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	^Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	^Expanded Uncertainty of % finer than D (%)
0.0700	-	77	-
0.0498	-	74	-
0.0355	-	71	-
0.0252	-	68	-
0.0180	-	66	-
0.0094	-	59	-
0.0048	-	51	-
0.0025	-	40	-
0.0014	-	34	-

SUMMARY :

Gravel (%)	:	**2**
Sand (%)	:	**22**
Silt (%)	:	**39**
Clay (%)	:	**37**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 18/02/2020

Approved By :
Signatory : Chung Hei Wing
Date : 18/02/2020

Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel :26991980, Fax : 26917547

Form : GESR003.5 / Sept.14.18 / Issue 1 / Rev 3

TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Description : Grey, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A

Works Order No. : 272
Sample ID No. : HK2004449-011
Sample No. : C/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

ˆUpon request * Delete as appropriate ‡Information provided by customer

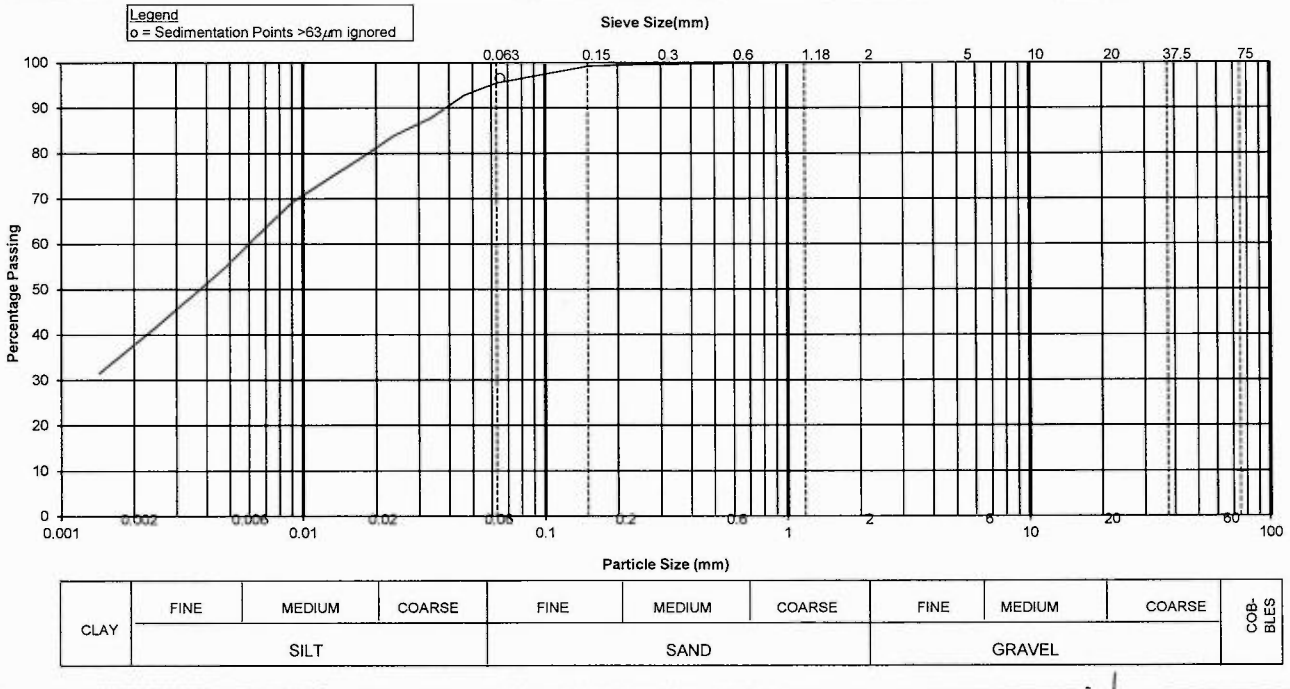
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	ˆExpanded Uncertainty of the Percent Passing (%)	ˆCumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	100	-	-
5.00 mm	100	-	-
3.35 mm	100	-	-
2.00 mm	100	-	-
1.18 mm	100	-	-
600 µm	100	-	-
425 µm	100	-	-
300 µm	100	-	-
212 µm	99	-	-
150 µm	99	-	-
63 µm	95	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	ˆExpanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	ˆExpanded Uncertainty of % finer than D (%)
0.0651	-	97	-
0.0465	-	93	-
0.0334	-	88	-
0.0239	-	84	-
0.0171	-	79	-
0.0091	-	69	-
0.0047	-	55	-
0.0024	-	41	-
0.0014	-	31	-

SUMMARY :

Gravel (%)	:	**0**
Sand (%)	:	**5**
Silt (%)	:	**58**
Clay (%)	:	**37**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 19/02/2020

Approved By :
Signatory : Chung Hoi Wing
Date : 19/02/2020

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TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Works Order No. : 272
Sample ID No. : HK2004449-012
Sample No. : D/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

Description : Grey, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A

ˆUpon request * Delete as appropriate ‡Information provided by customer

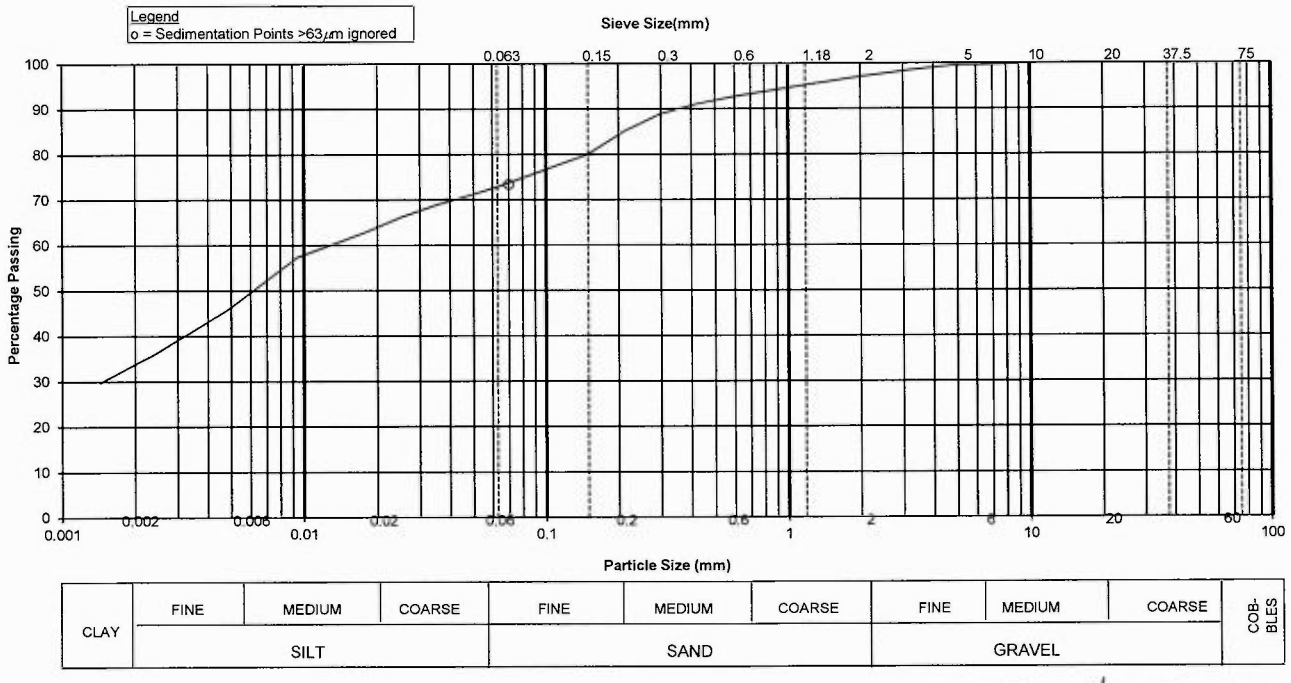
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	ˆExpanded Uncertainty of the Percent Passing (%)	ˆCumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	100	-	-
5.00 mm	100	-	-
3.35 mm	99	-	-
2.00 mm	97	-	-
1.18 mm	95	-	-
600 µm	93	-	-
425 µm	91	-	-
300 µm	89	-	-
212 µm	85	-	-
150 µm	80	-	-
63 µm	73	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	ˆExpanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	ˆExpanded Uncertainty of % finer than D (%)
0.0702	-	73	-
0.0499	-	71	-
0.0355	-	69	-
0.0253	-	66	-
0.0180	-	63	-
0.0094	-	57	-
0.0048	-	46	-
0.0025	-	36	-
0.0014	-	30	-

SUMMARY :

Gravel (%)	:	**3**
Sand (%)	:	**24**
Silt (%)	:	**40**
Clay (%)	:	**33**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 19/02/2020

Approved By :
Signatory : Chung Hei Wing
Date : 19/02/2020

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TEST REPORT
DETERMINATION OF PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Works Order No. : 272
Sample ID No. : HK2004449-013
Sample No. : E/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

Description : Grey, slightly gravelly, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A

ˆUpon request * Delete as appropriate ‡Information provided by customer

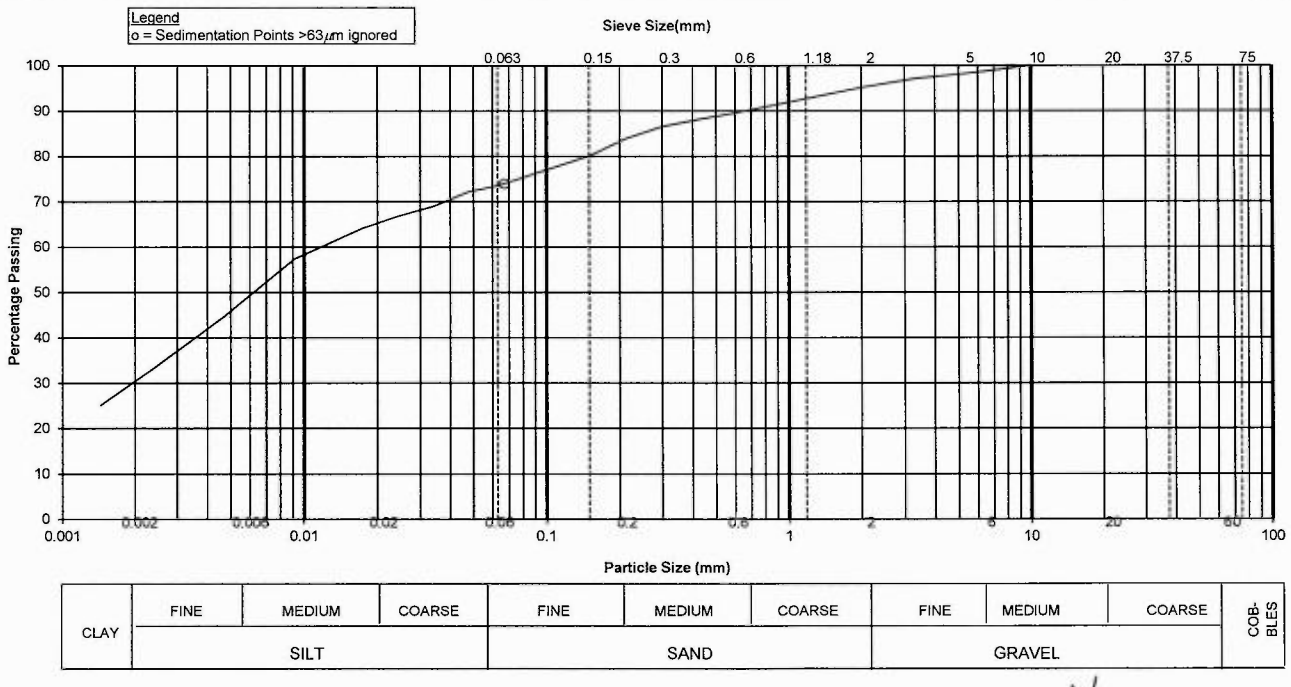
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	ˆExpanded Uncertainty of the Percent Passing (%)	ˆCumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	99	-	-
5.00 mm	98	-	-
3.35 mm	97	-	-
2.00 mm	95	-	-
1.18 mm	93	-	-
600 µm	90	-	-
425 µm	88	-	-
300 µm	87	-	-
212 µm	84	-	-
150 µm	80	-	-
63 µm	73	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	ˆExpanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	ˆExpanded Uncertainty of % finer than D (%)
0.0671	-	74	-
0.0477	-	72	-
0.0341	-	69	-
0.0243	-	67	-
0.0173	-	64	-
0.0091	-	57	-
0.0047	-	45	-
0.0024	-	34	-
0.0014	-	25	-

SUMMARY :

Gravel (%)	:	**5**
Sand (%)	:	**22**
Silt (%)	:	**43**
Clay (%)	:	**30**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 19/02/2020

Approved By :
Signatory : Chung Hei Wing
Date : 19/02/2020

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Form : GESR003.5 / Sept.14.18 / Issue 1 / Rev 3

TEST REPORT
DETERMINATION OF PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Works Order No. : 272
Sample ID No. : HK2004449-014
Sample No. : F/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

Description : Grey, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A

ˆUpon request * Delete as appropriate ‡Information provided by customer

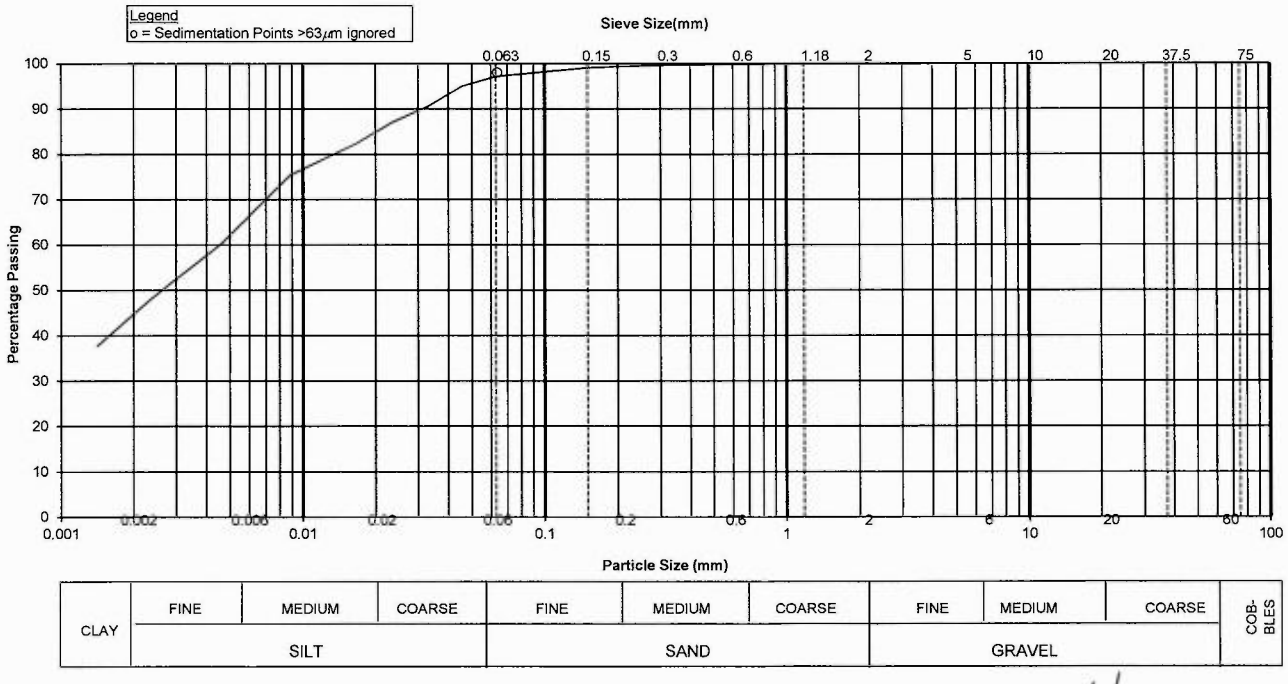
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	ˆExpanded Uncertainty of the Percent Passing (%)	ˆCumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	100	-	-
5.00 mm	100	-	-
3.35 mm	100	-	-
2.00 mm	100	-	-
1.18 mm	100	-	-
600 µm	100	-	-
425 µm	100	-	-
300 µm	100	-	-
212 µm	99	-	-
150 µm	99	-	-
63 µm	97	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	ˆExpanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	ˆExpanded Uncertainty of % finer than D (%)
0.0639	-	98	-
0.0456	-	95	-
0.0327	-	90	-
0.0234	-	87	-
0.0168	-	82	-
0.0088	-	75	-
0.0046	-	60	-
0.0024	-	48	-
0.0014	-	38	-

SUMMARY :

Gravel (%)	:	**0**
Sand (%)	:	**3**
Silt (%)	:	**53**
Clay (%)	:	**44**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 19/02/2020

Approved By :
Signatory : Chung Ha Wing
Date : 19/02/2020

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TEST REPORT
DETERMINATION OF PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Works Order No. : 272
Sample ID No. : HK2004449-015
Sample No. : G/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

Date Received : 11/02/2020
Tested Date : 11/02/2020

Description : Grey, slightly gravelly, sandy SILT/CLAY with shell fragments
Sieve Method : Method A

ˆUpon request * Delete as appropriate ‡Information provided by customer

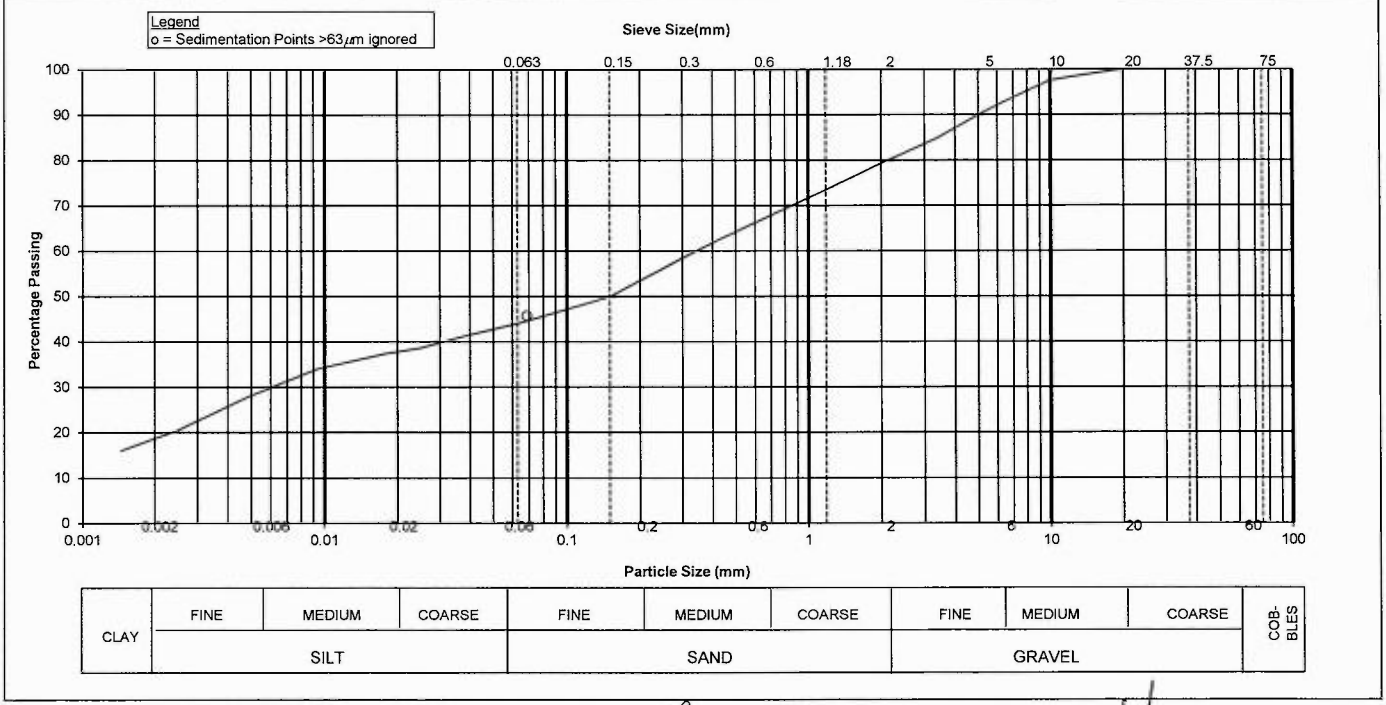
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	ˆExpanded Uncertainty of the Percent Passing (%)	ˆCumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	99	-	-
10.0 mm	98	-	-
6.30 mm	93	-	-
5.00 mm	90	-	-
3.35 mm	85	-	-
2.00 mm	79	-	-
1.18 mm	73	-	-
600 µm	66	-	-
425 µm	62	-	-
300 µm	58	-	-
212 µm	54	-	-
150 µm	50	-	-
63 µm	44	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	ˆExpanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	ˆExpanded Uncertainty of % finer than D (%)
0.0687	-	46	-
0.0493	-	43	-
0.0351	-	41	-
0.0251	-	39	-
0.0178	-	37	-
0.0093	-	34	-
0.0048	-	28	-
0.0025	-	20	-
0.0014	-	16	-

SUMMARY :

Gravel (%)	:	**21**
Sand (%)	:	**35**
Silt (%)	:	**26**
Clay (%)	:	**18**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 19/02/2020

Approved By :
Signatory : Chung Hei Wing
Date : 19/02/2020

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Form : GESR003.5 / Sept.14.18 / Issue 1 / Rev 3

TEST REPORT
DETERMINATION OF
PARTICLE SIZE DISTRIBUTION
GEOSPEC 3 : 2001 Test Method 8.1 / ~~8.2~~*, 8.5 / ~~8.6~~* and 8.7
(Wet Sieve and Hydrometer Method)

Report No. : J2999-272.66

Job No. : J2999 Contract No. :
Customer : ALS Technichem (HK) Pty Ltd
Project : -

Date Received : 11/02/2020
Tested Date : 11/02/2020

Description : Grey, slightly sandy SILT/CLAY with shell fragments
Sieve Method : Method A

Works Order No. : 272
Sample ID No. : HK2004449-016
Sample No. : H/Benthic Survey
Sample Depth (m) :
Specimen Depth (m) :
Sample Type : Small Disturbed
Sample Origin : -‡

^Upon request * Delete as appropriate ‡Information provided by customer

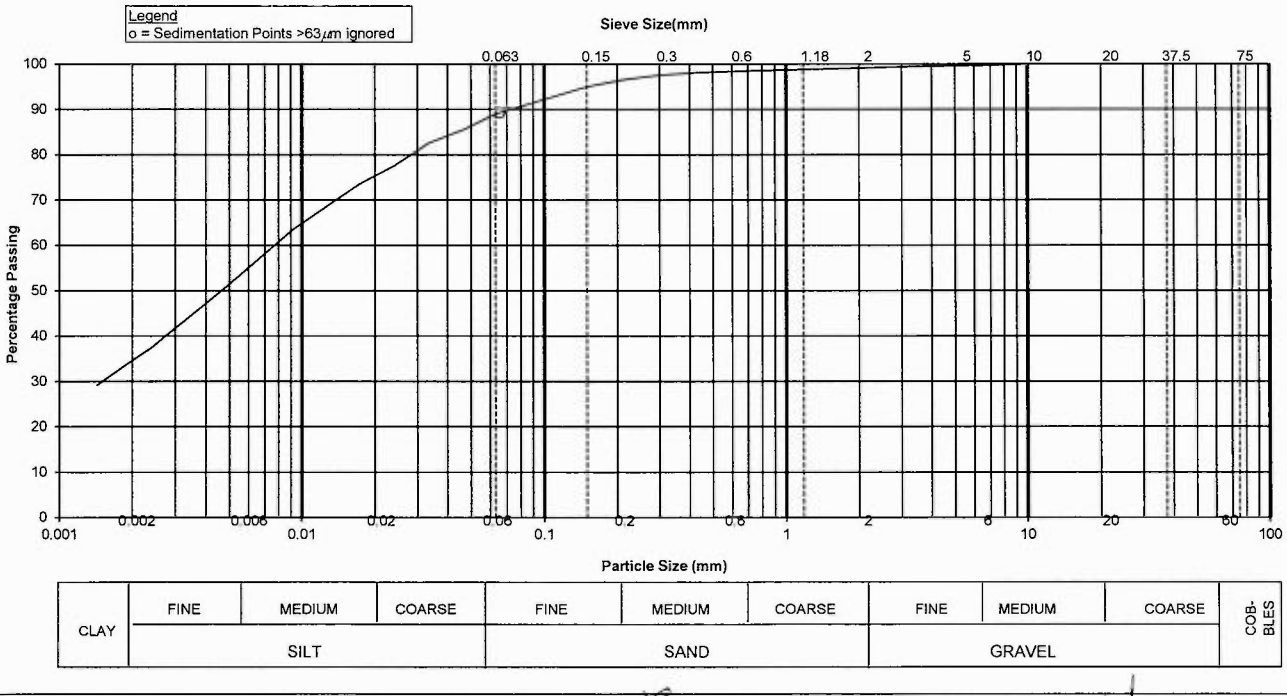
SIEVE ANALYSIS Sieve Size	Percent Passing (%)	^Expanded Uncertainty of the Percent Passing (%)	^Cumulative Percent Passing with Expanded Uncertainty (%)
100.0 mm	100	-	-
75.0 mm	100	-	-
63.0 mm	100	-	-
50.0 mm	100	-	-
37.5 mm	100	-	-
28.0 mm	100	-	-
20.0 mm	100	-	-
14.0 mm	100	-	-
10.0 mm	100	-	-
6.30 mm	100	-	-
5.00 mm	100	-	-
3.35 mm	99	-	-
2.00 mm	99	-	-
1.18 mm	99	-	-
600 µm	98	-	-
425 µm	98	-	-
300 µm	98	-	-
212 µm	97	-	-
150 µm	95	-	-
63 µm	89	-	-
0 µm	0		

SEDIMENTATION ANALYSIS
Specific Gravity (# if assumed) : 2.65 #
Dispersant Details : Sodium hexametaphosphate, Sodium carbonate
Sampling History : As received
The presence of any visible organic matter in the soil : None

Particle Diameter (mm)	^Expanded Uncertainty of the Particle Diameter (mm)	% Finer than D K (%)	^Expanded Uncertainty of % finer than D (%)
0.0658	-	89	-
0.0470	-	86	-
0.0336	-	83	-
0.0241	-	78	-
0.0172	-	74	-
0.0091	-	63	-
0.0047	-	50	-
0.0024	-	38	-
0.0014	-	29	-

SUMMARY :

Gravel (%)	:	**1**
Sand (%)	:	**10**
Silt (%)	:	**55**
Clay (%)	:	**34**



Technician : C M Yip
Date : 11/02/2020

Checked By :
Name : T K Lam
Date : 19/02/2020

Approved By :
Signatory : Chung Hei Wing
Date : 19/02/2020

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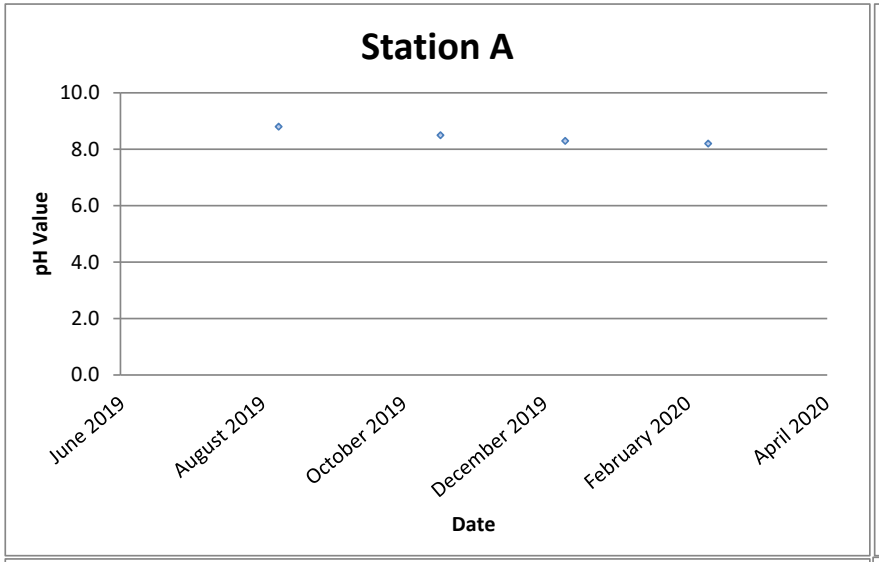
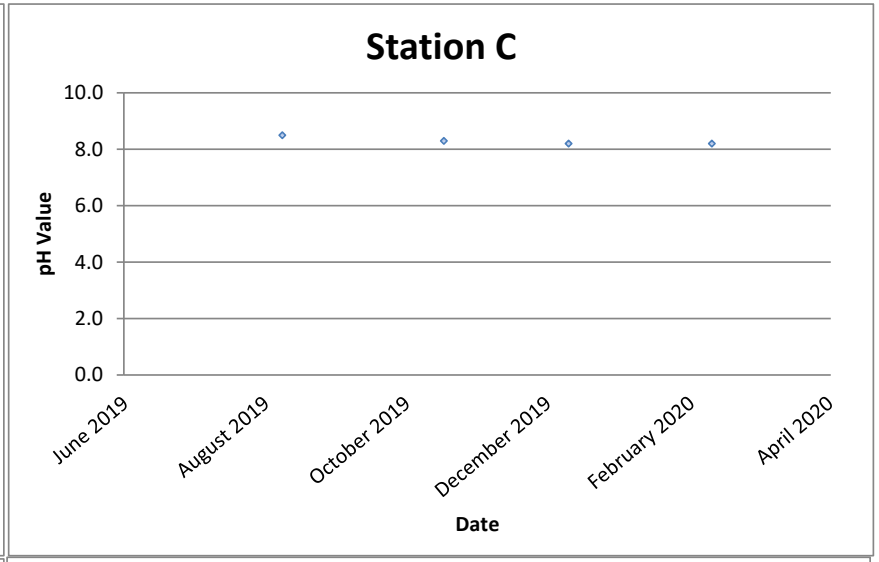
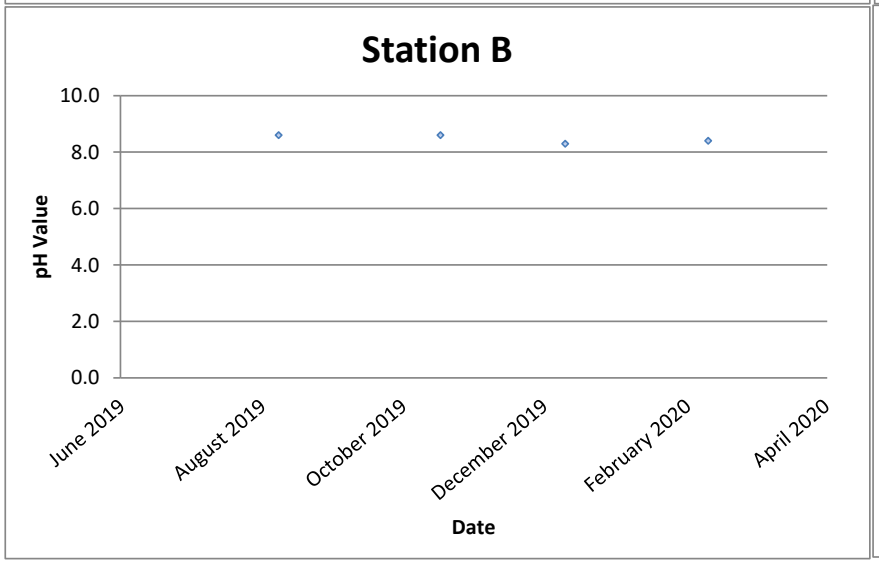
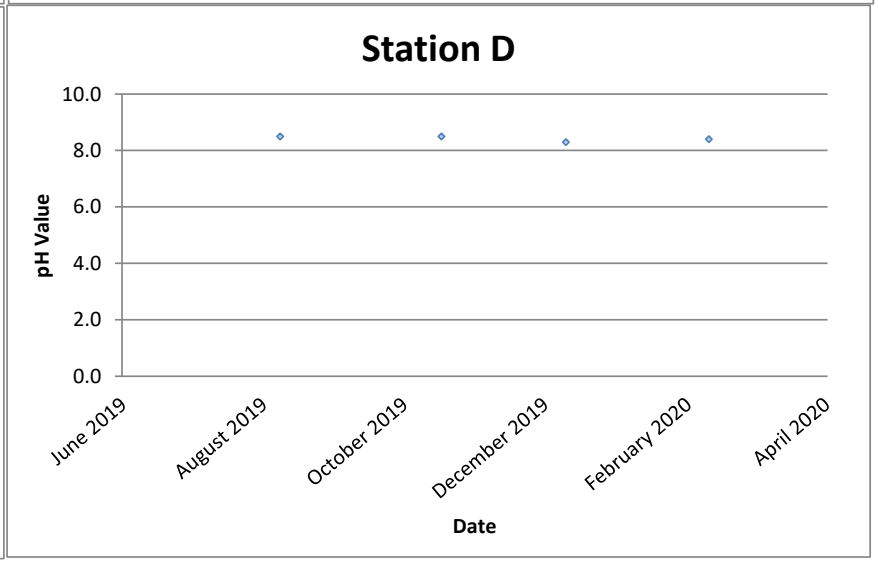
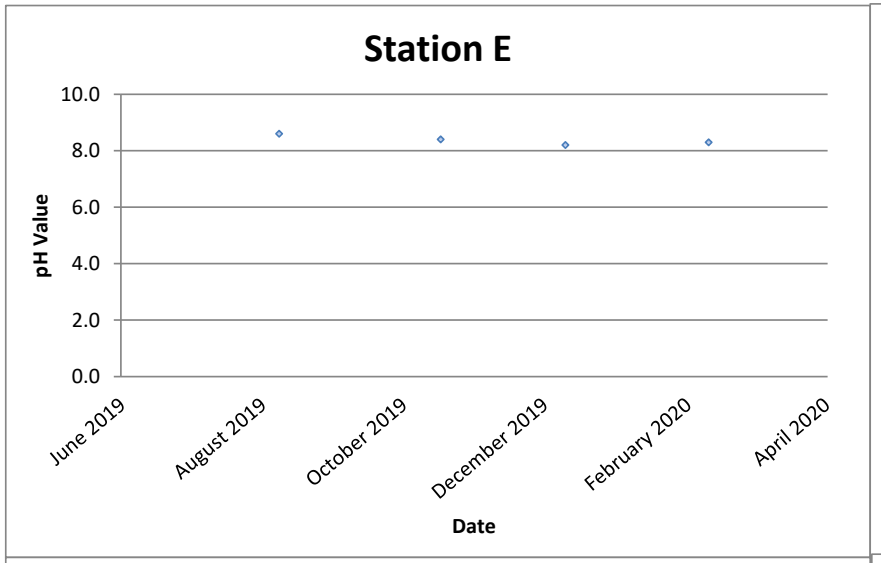
Technology Centre
21 Chun Wang Street, Tseung Kwan O Industrial Estate,
Tseung Kwan O, N.T. Tel :26991980, Fax : 26917547

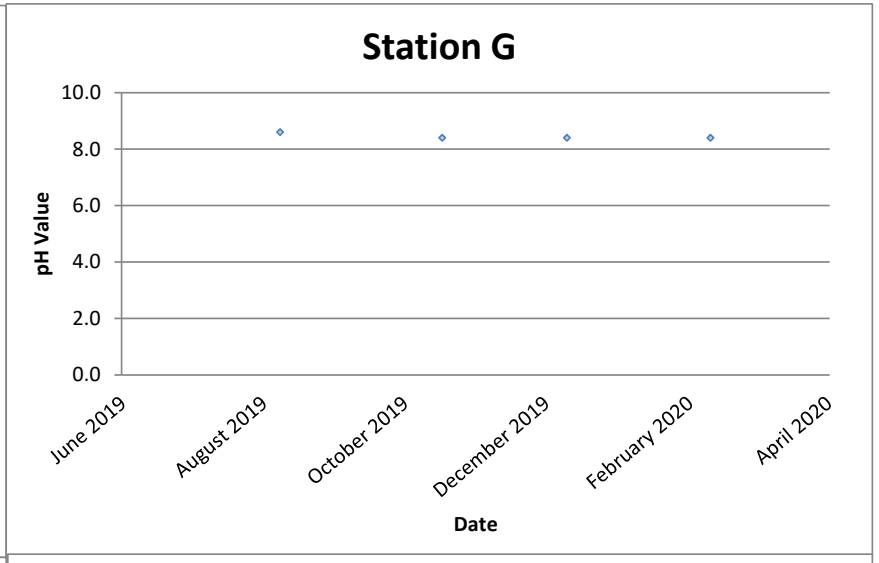

Station A
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

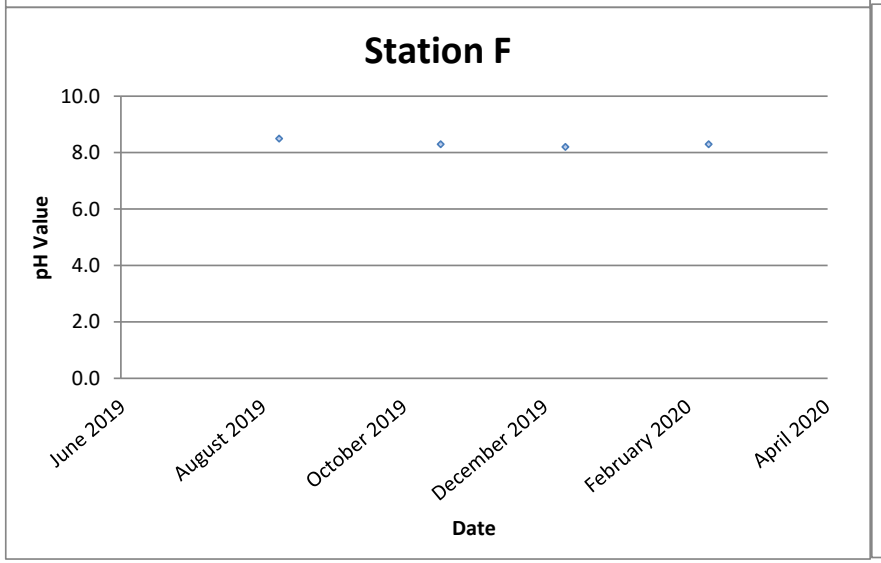

Station C
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

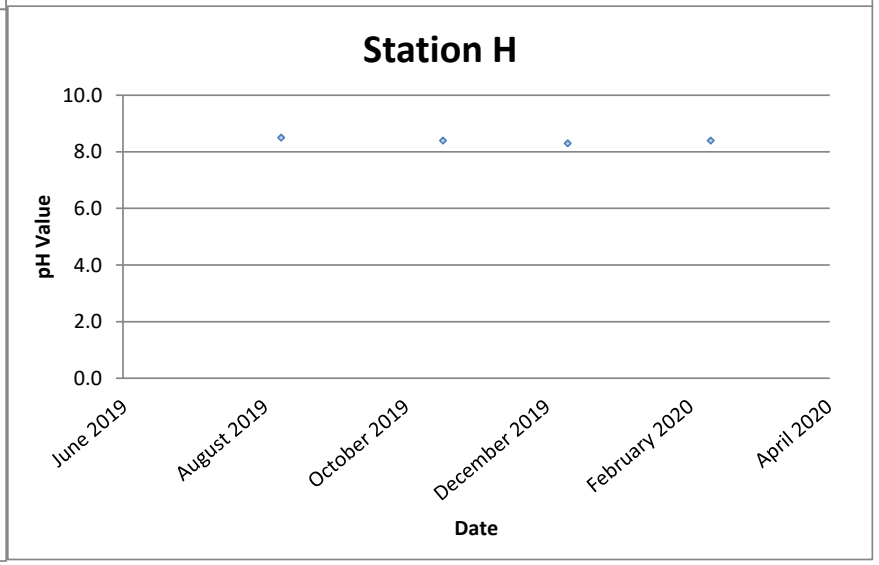

Station B
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

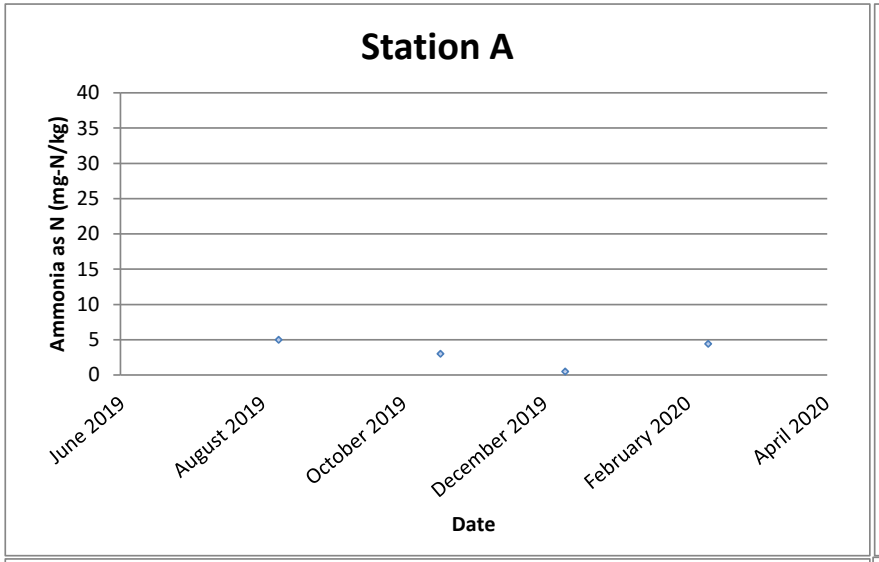

Station D
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

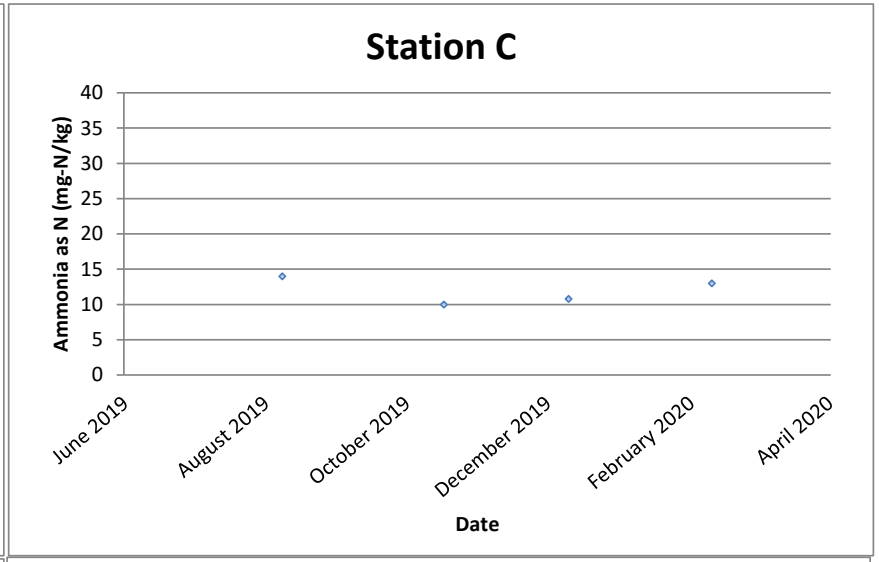

Station E
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

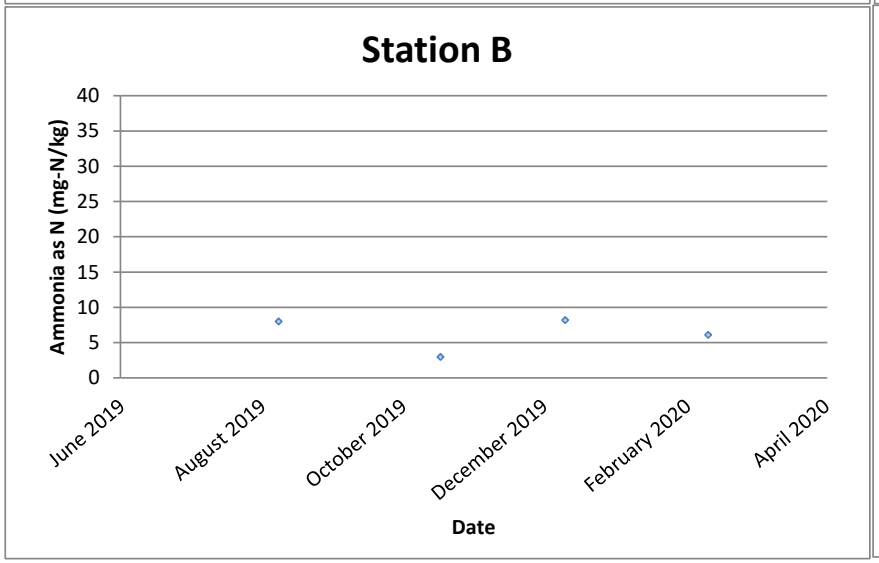

Station G
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

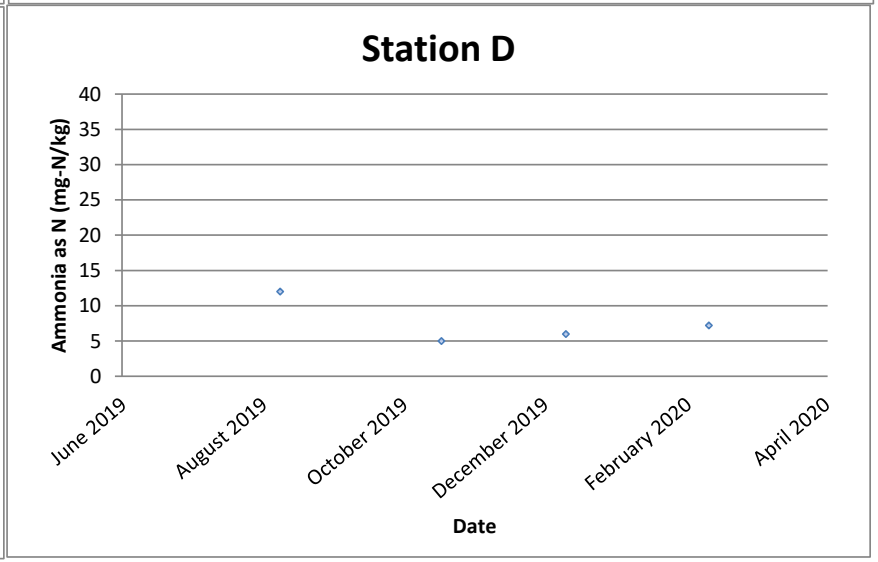

Station F
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

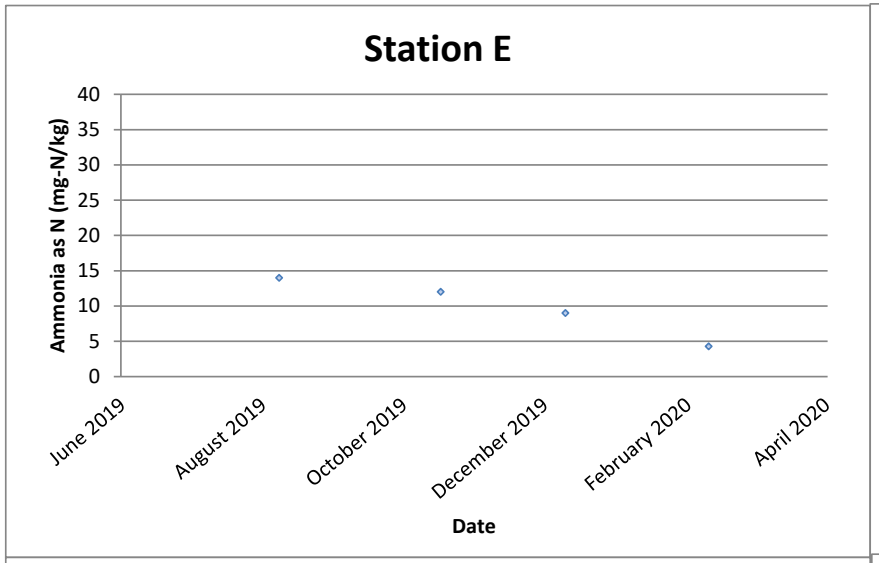

Station H
10.0
8.0
6.0
4.0
2.0
0.0
pH Value
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

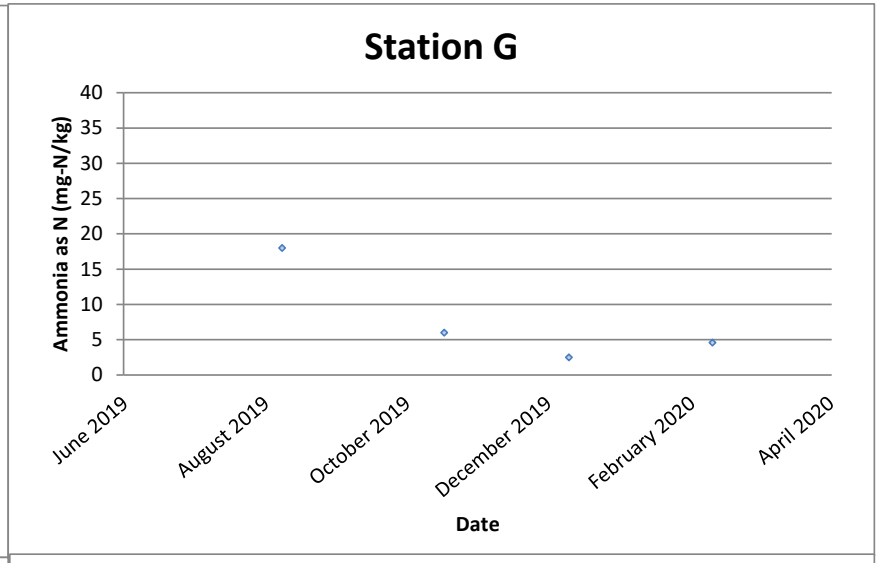

Station A
Ammonia as N (mg-N/kg)
40
35
30
25
20
15
10
5
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

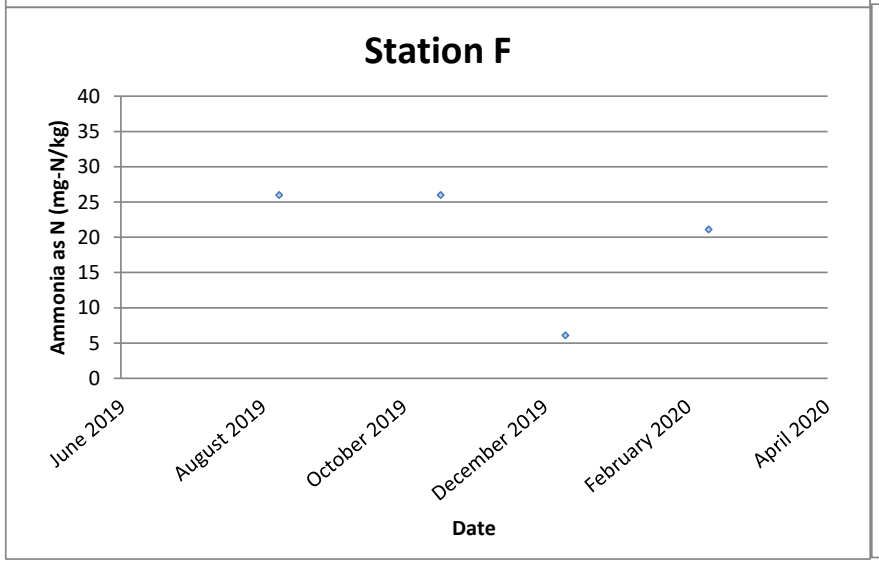

Station C
Ammonia as N (mg-N/kg)
40
35
30
25
20
15
10
5
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

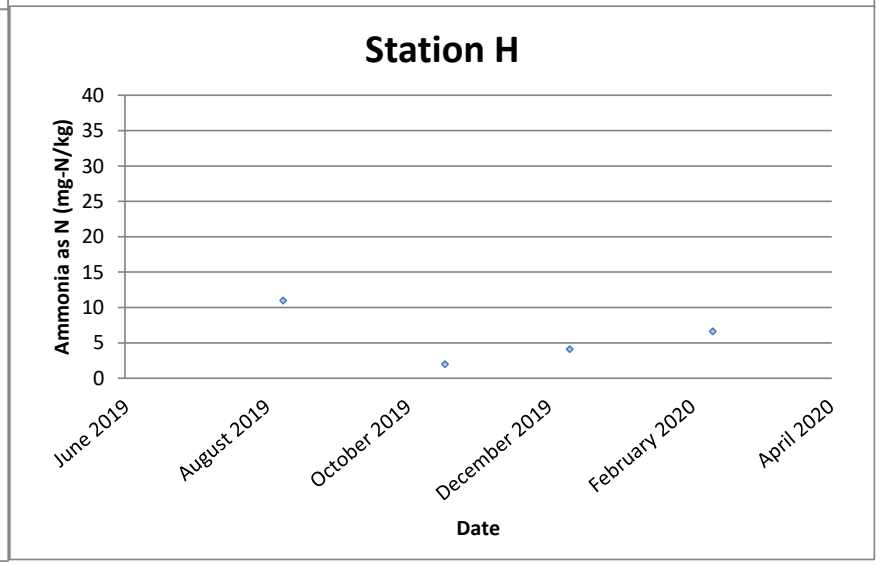

Station B
Ammonia as N (mg-N/kg)
40
35
30
25
20
15
10
5
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station D
Ammonia as N (mg-N/kg)
40
35
30
25
20
15
10
5
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

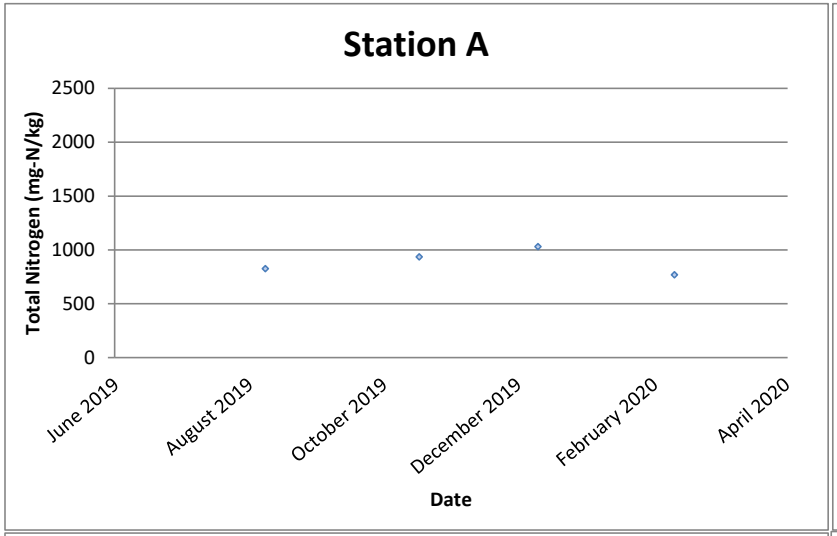

Station E
Ammonia as N (mg-N/kg)
0
5
10
15
20
25
30
35
40
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

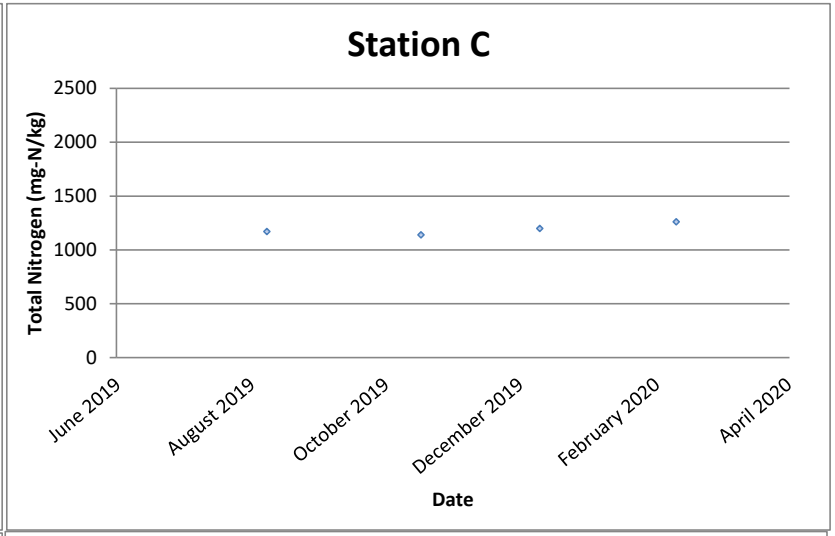

Station G
Ammonia as N (mg-N/kg)
0
5
10
15
20
25
30
35
40
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

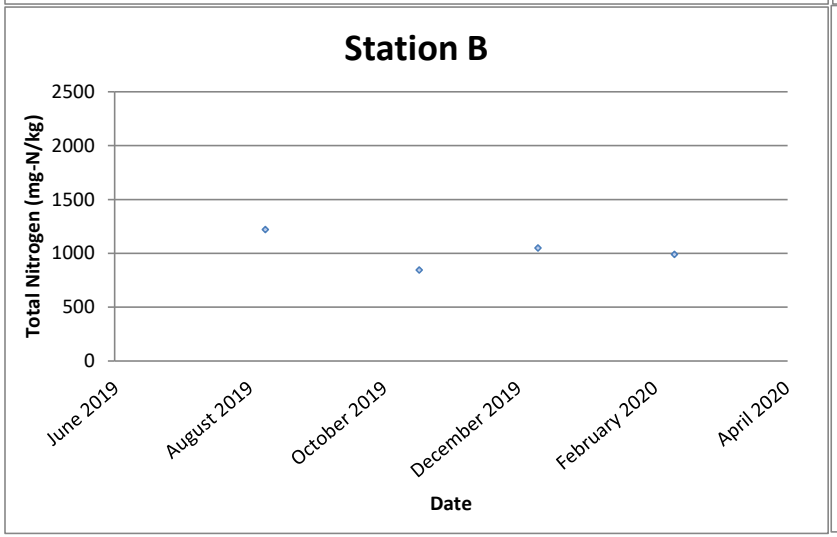

Station F
Ammonia as N (mg-N/kg)
0
5
10
15
20
25
30
35
40
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

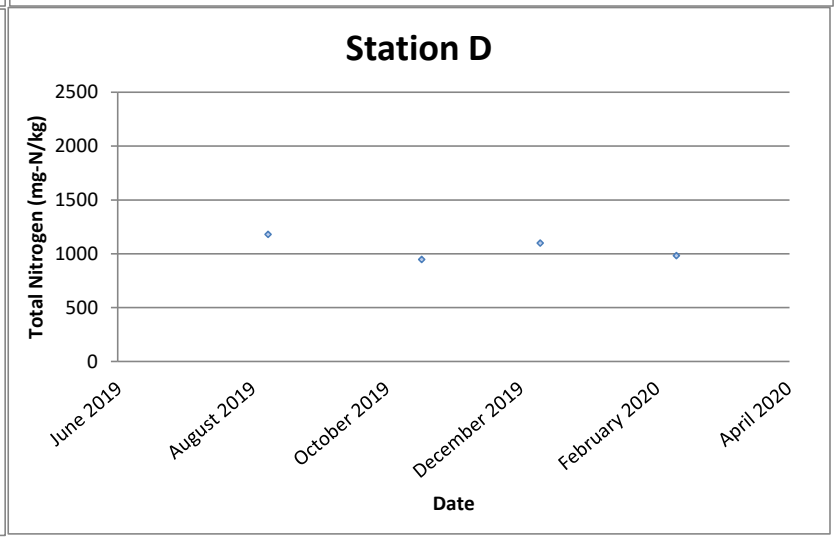

Station H
Ammonia as N (mg-N/kg)
0
5
10
15
20
25
30
35
40
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

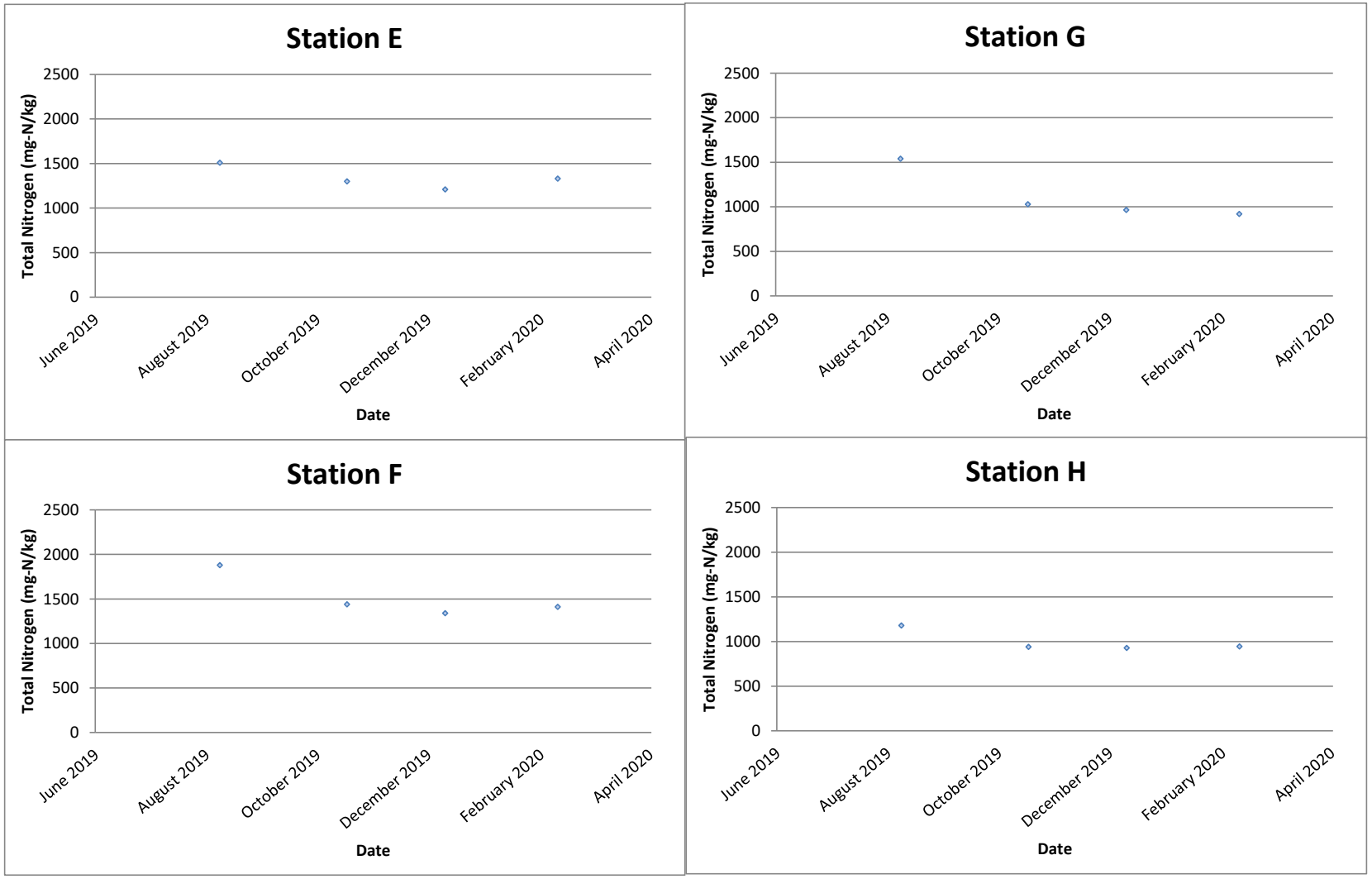
Total Nitrogen (mg-N/kg)



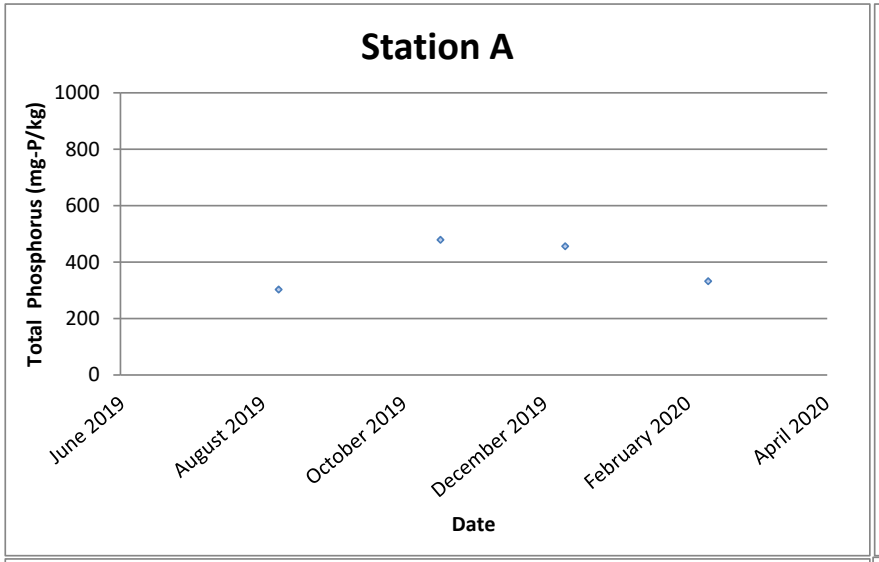


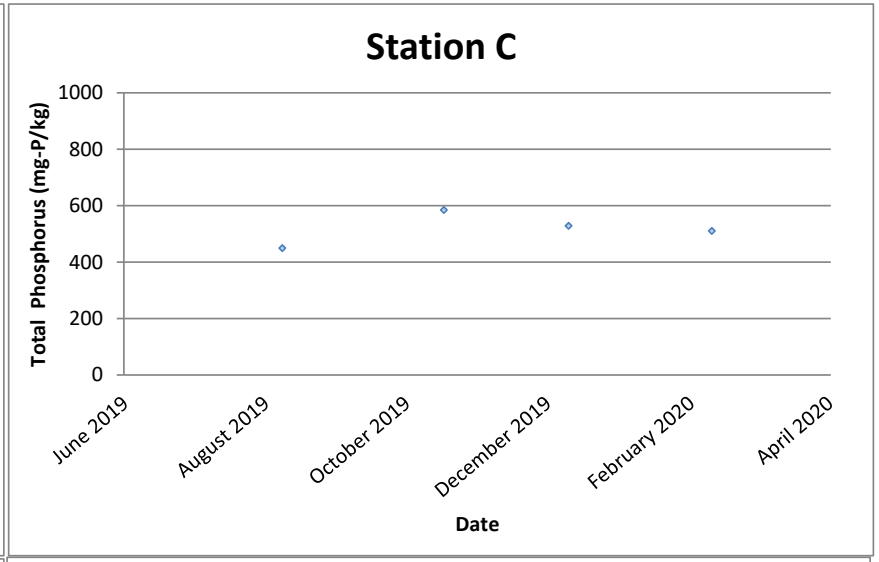


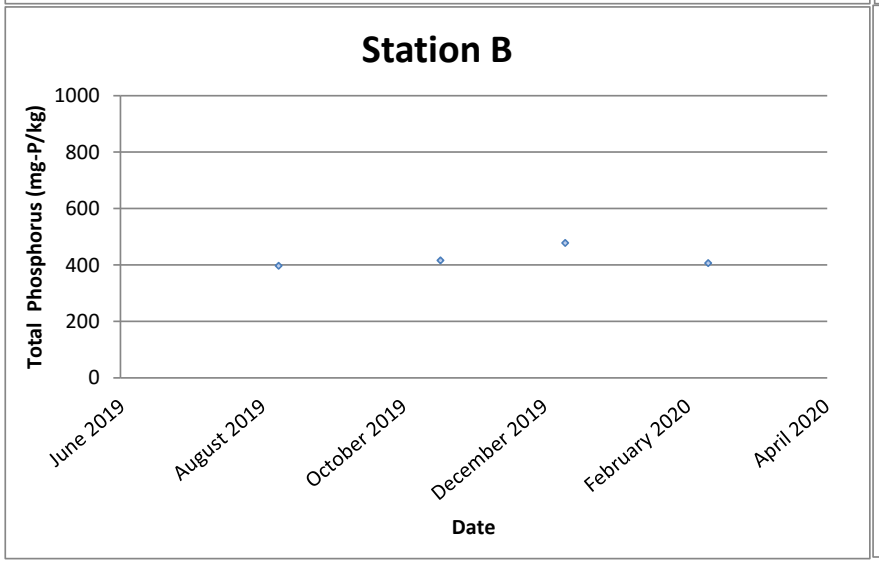


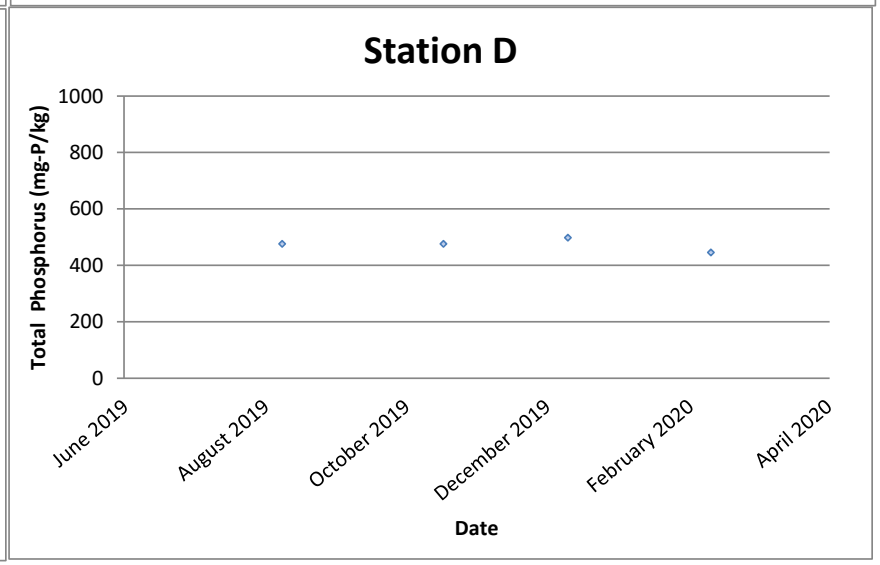

Station E
Total Nitrogen (mg-N/kg)
2500
2000
1500
1000
500
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station G
Total Nitrogen (mg-N/kg)
2500
2000
1500
1000
500
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station F
Total Nitrogen (mg-N/kg)
2500
2000
1500
1000
500
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station H
Total Nitrogen (mg-N/kg)
2500
2000
1500
1000
500
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

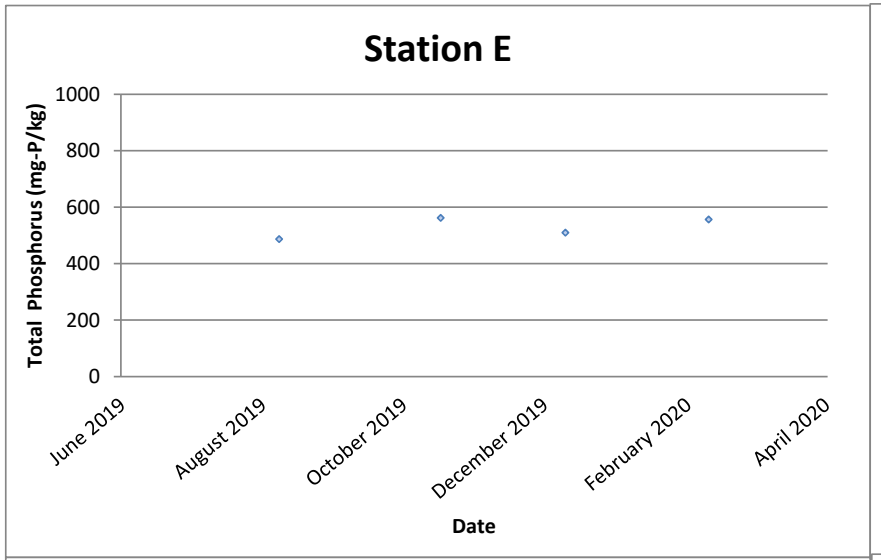
Total Phosphorus (mg-P/kg)

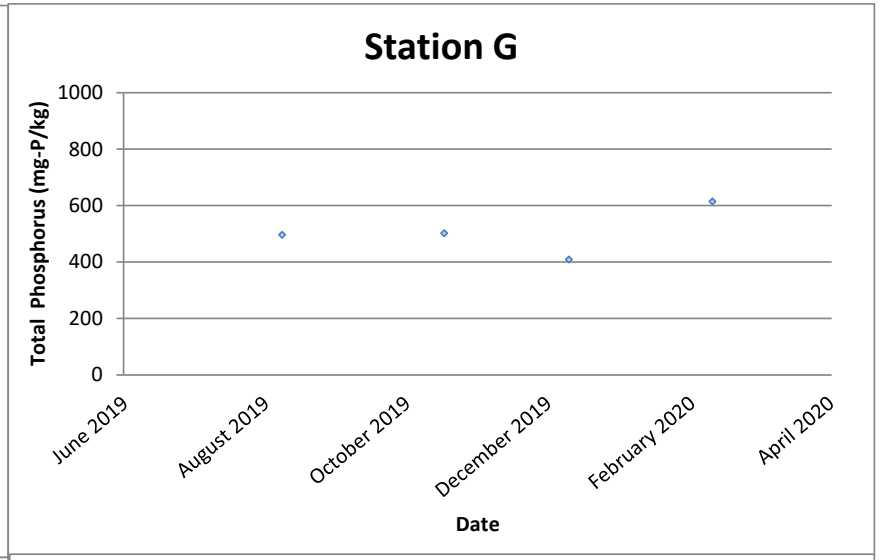


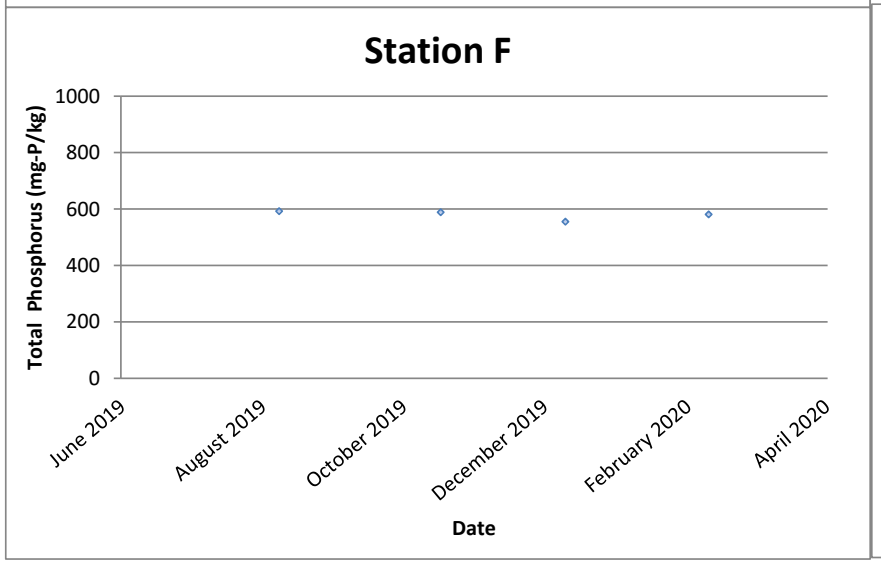


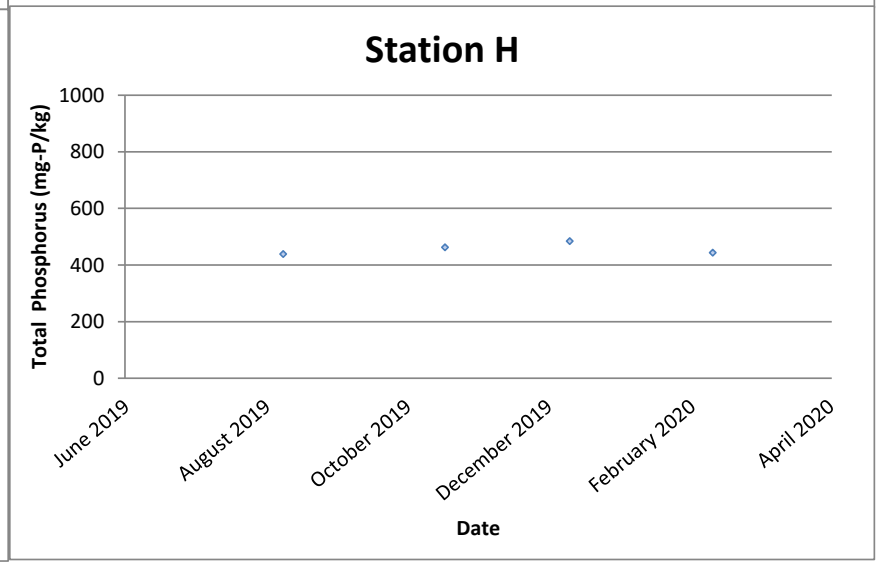




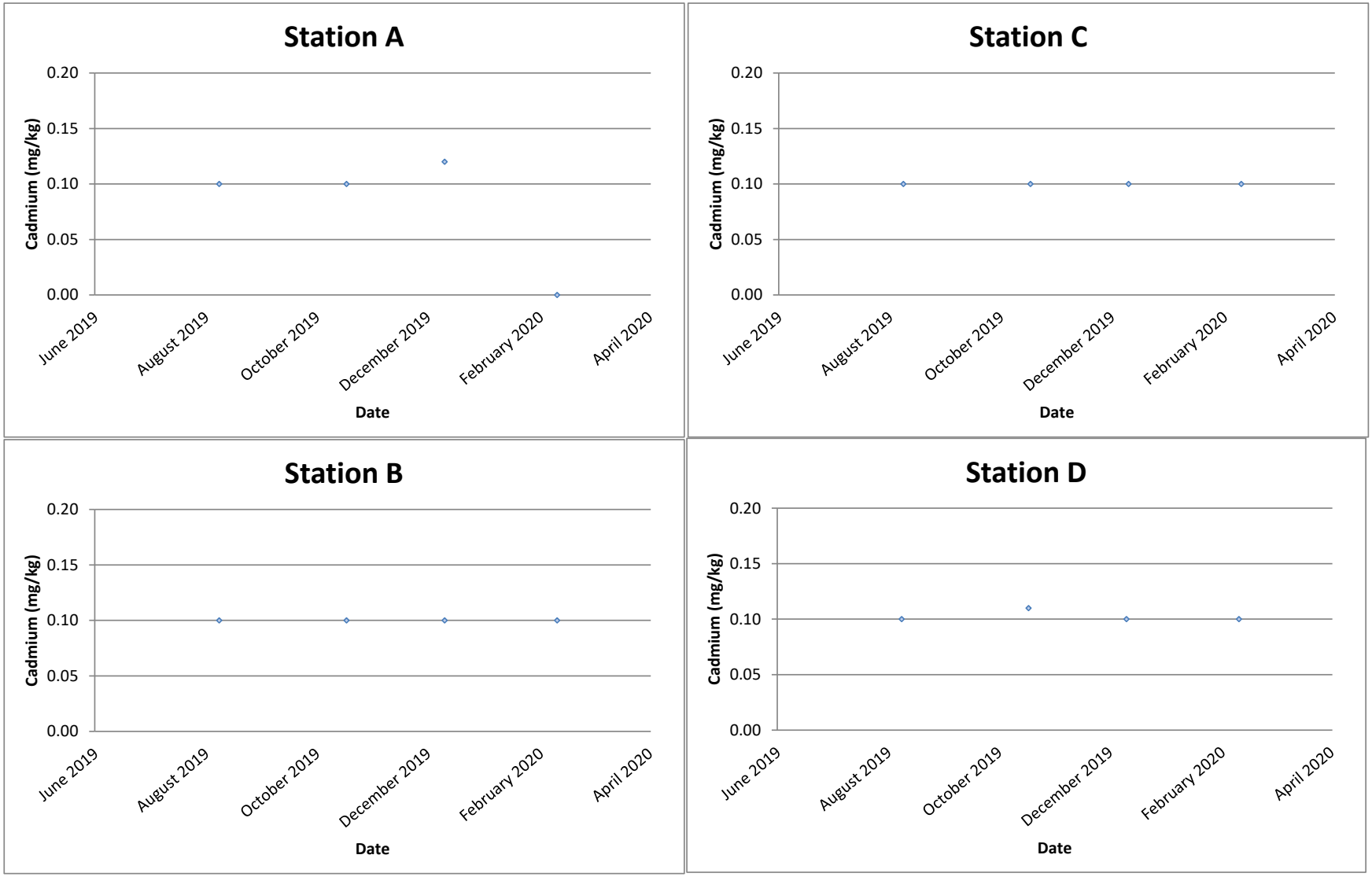

Station E
Total Phosphorus (mg-P/kg)
1000
800
600
400
200
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station G
Total Phosphorus (mg-P/kg)
1000
800
600
400
200
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station F
Total Phosphorus (mg-P/kg)
1000
800
600
400
200
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

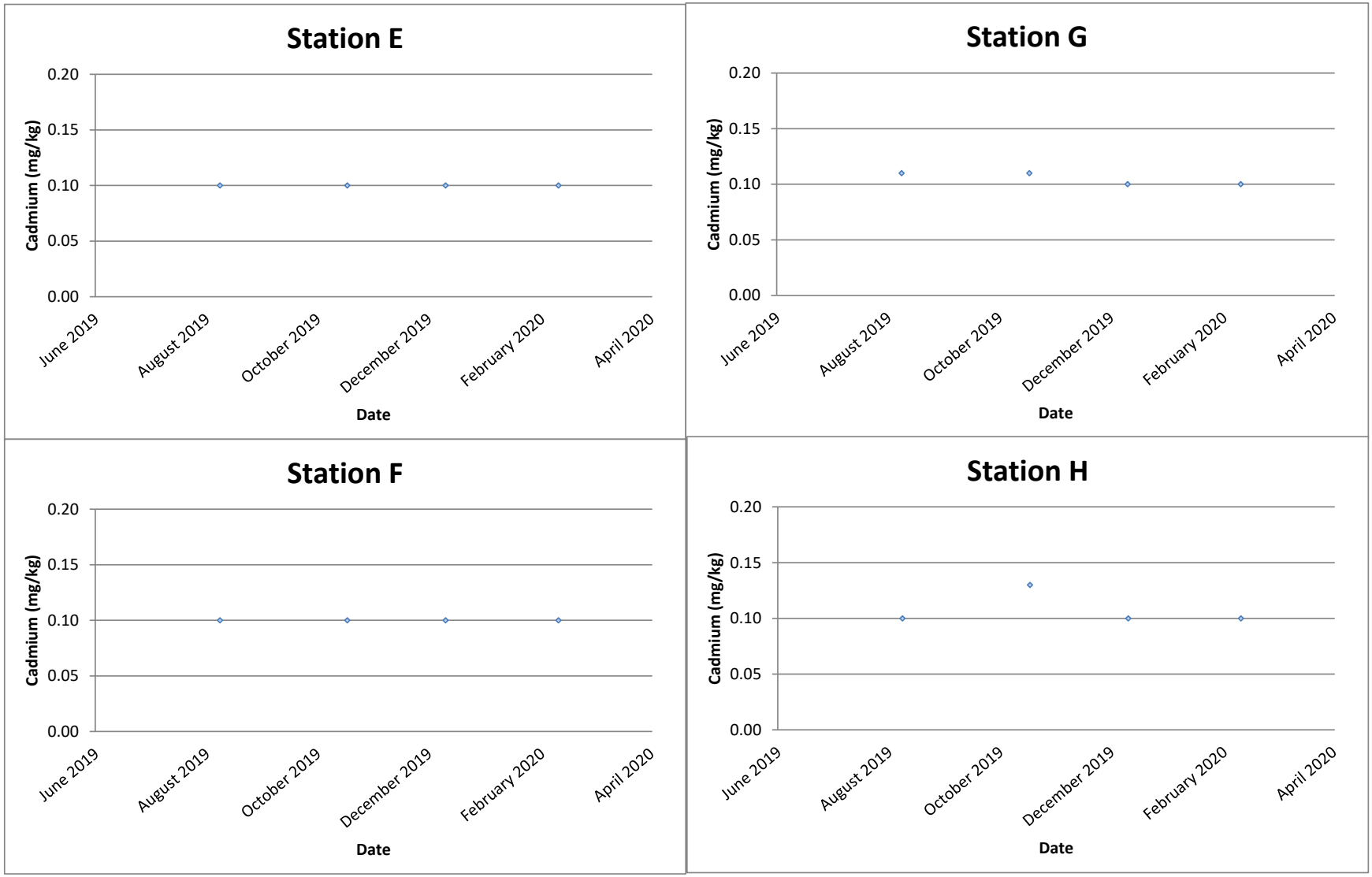

Station H
Total Phosphorus (mg-P/kg)
1000
800
600
400
200
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

Cadmium (mg/kg)

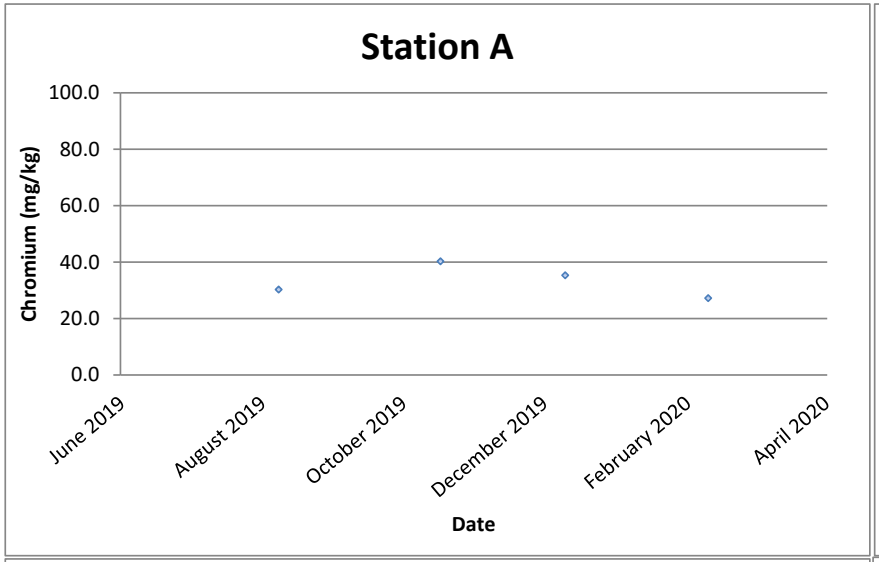


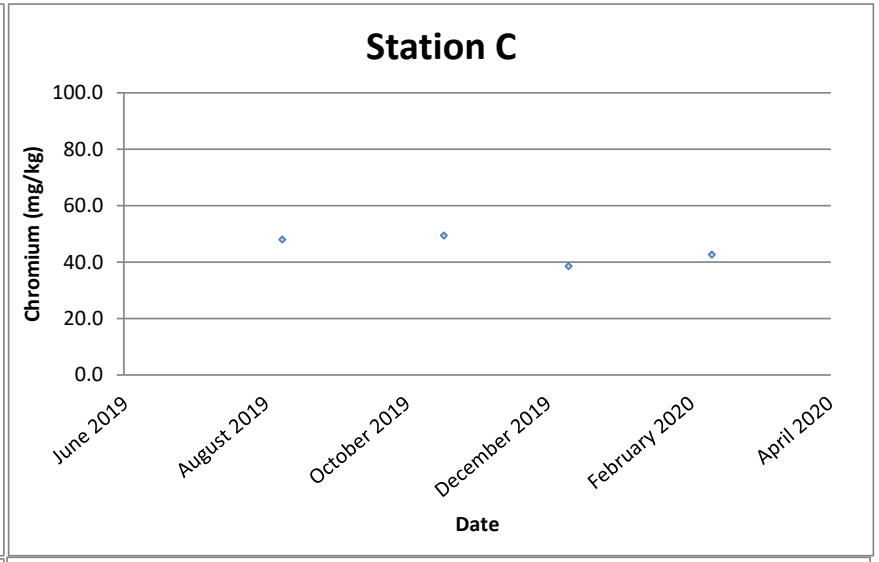
Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

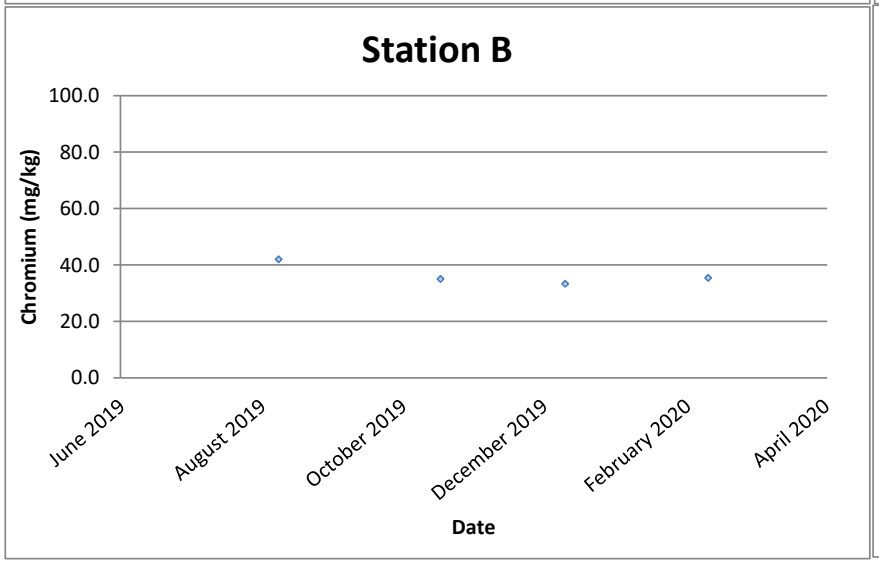
Cadmium (mg/kg)

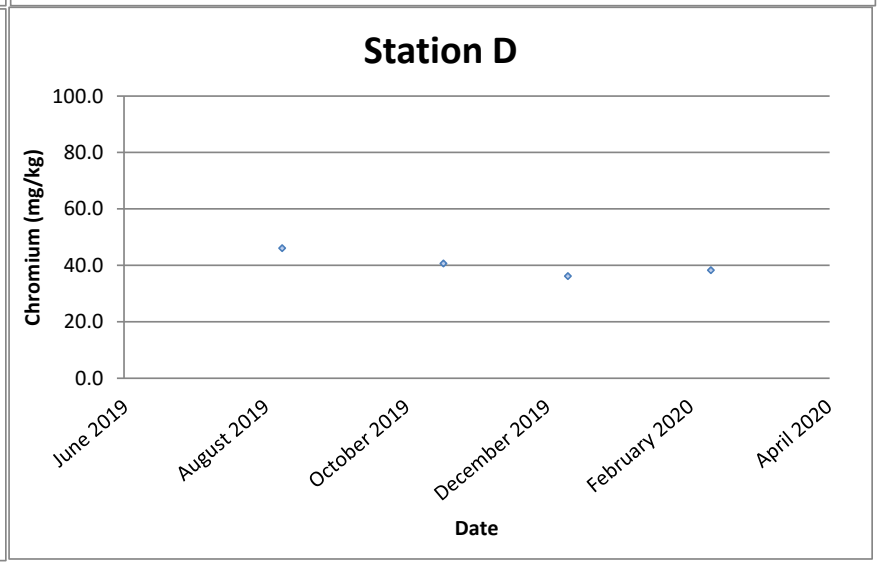


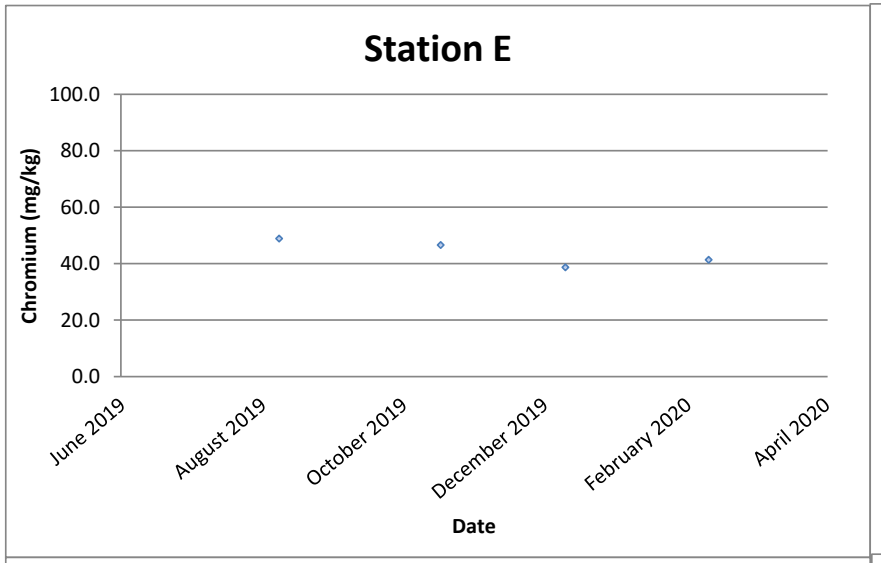
Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

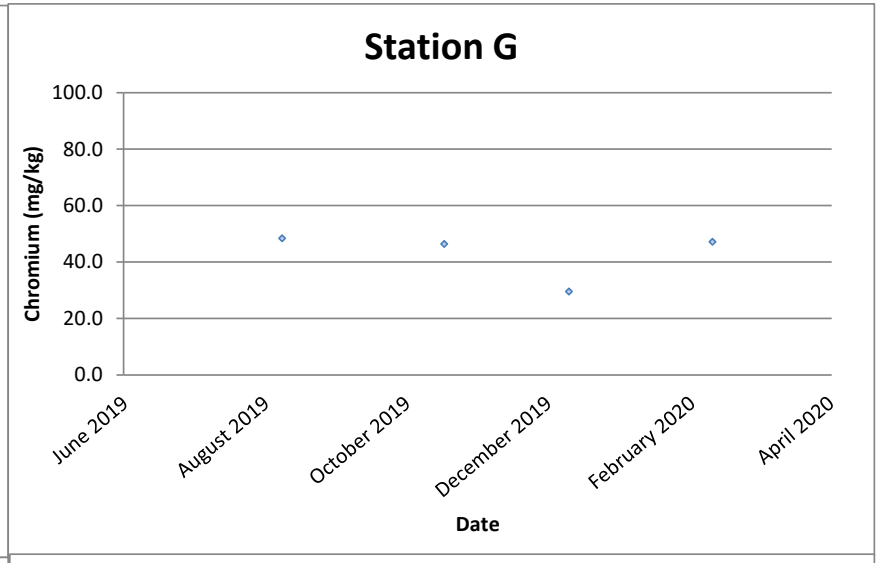

Station A
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

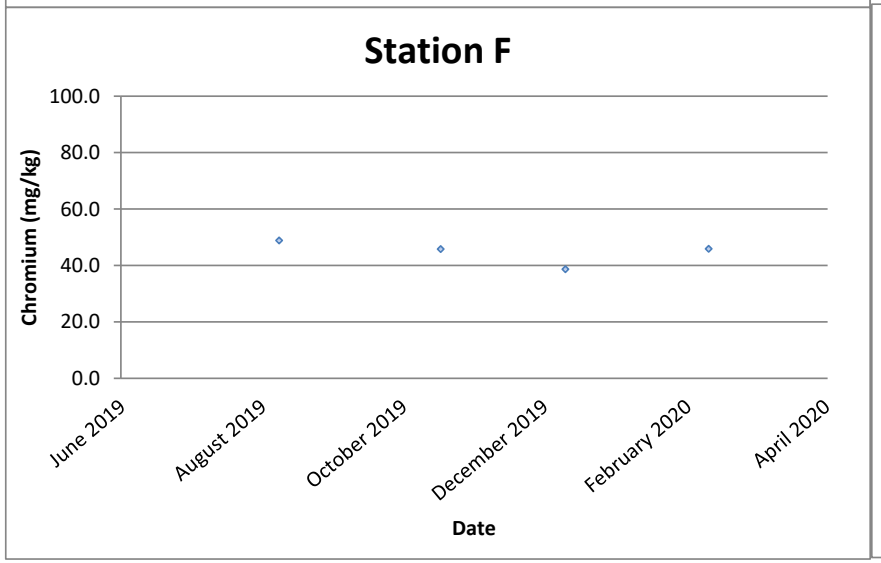

Station C
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

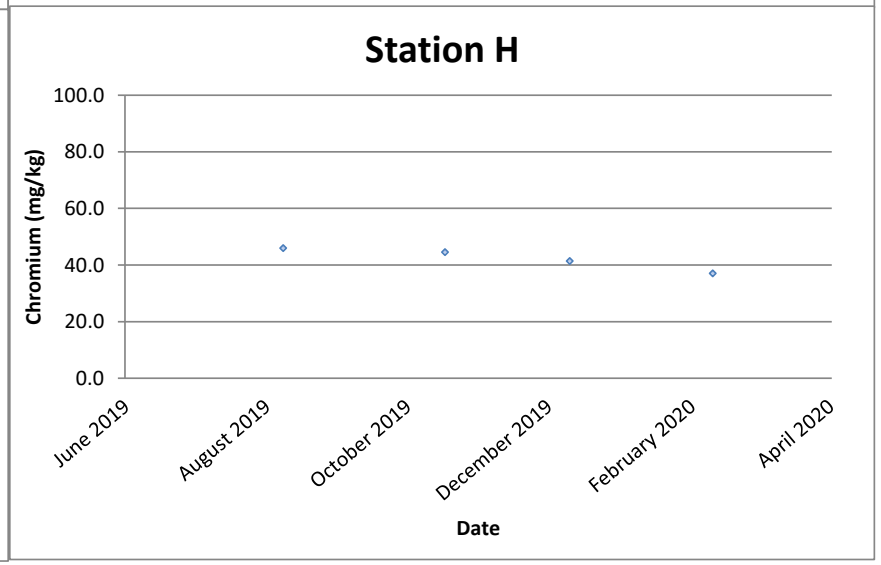

Station B
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

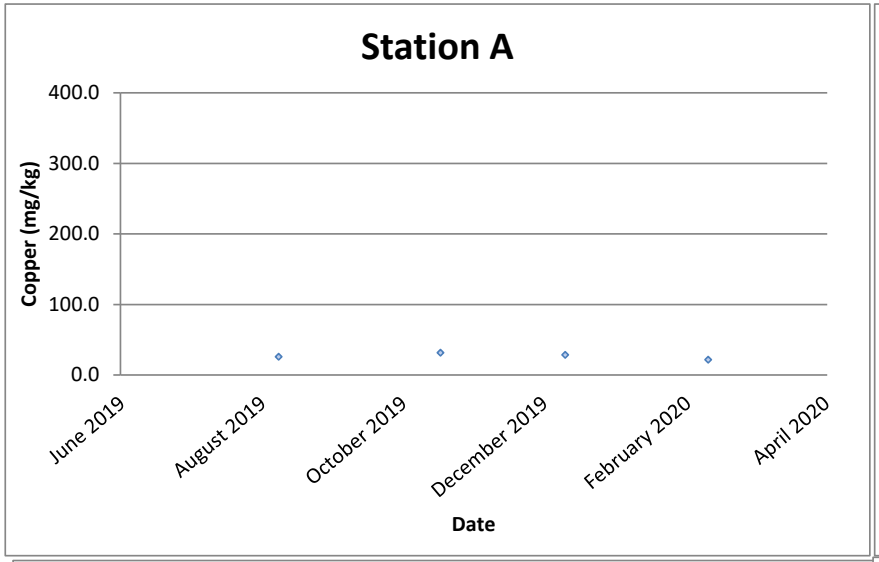

Station D
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

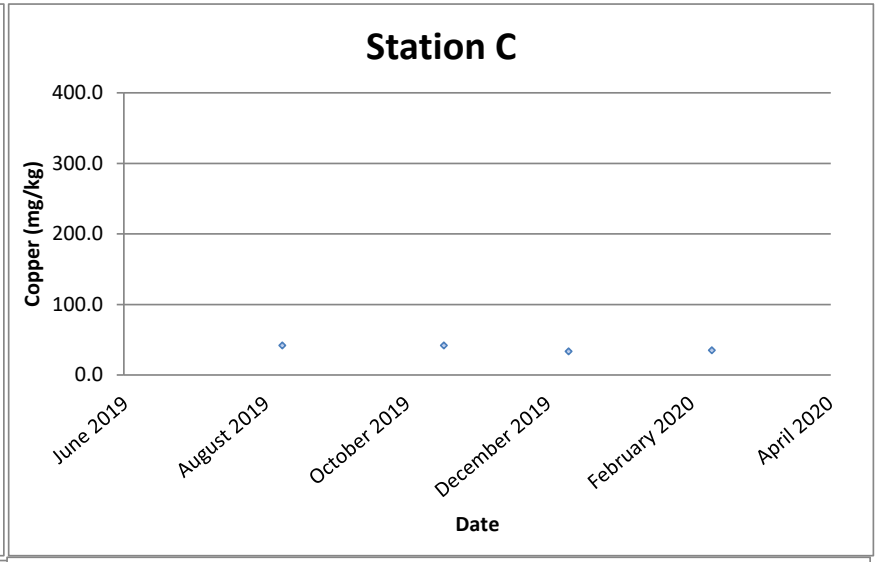

Station E
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

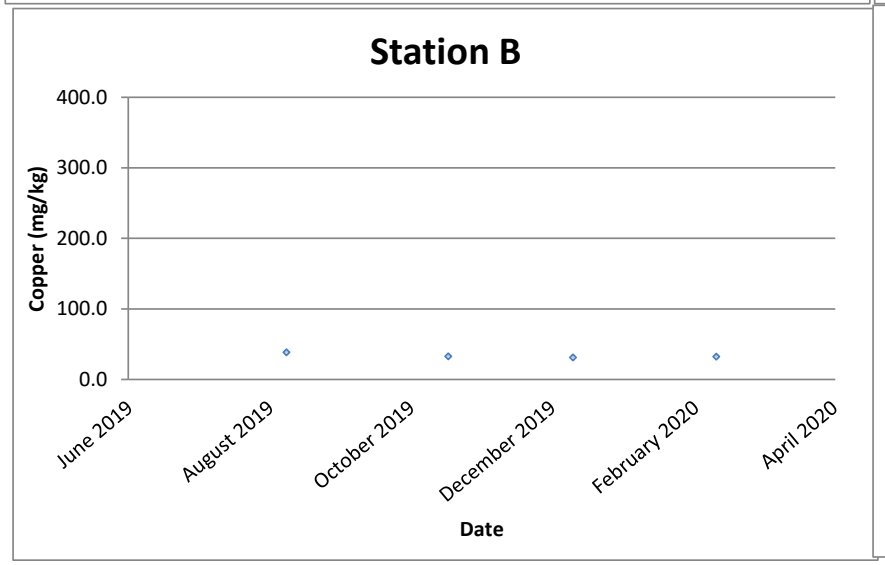

Station G
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

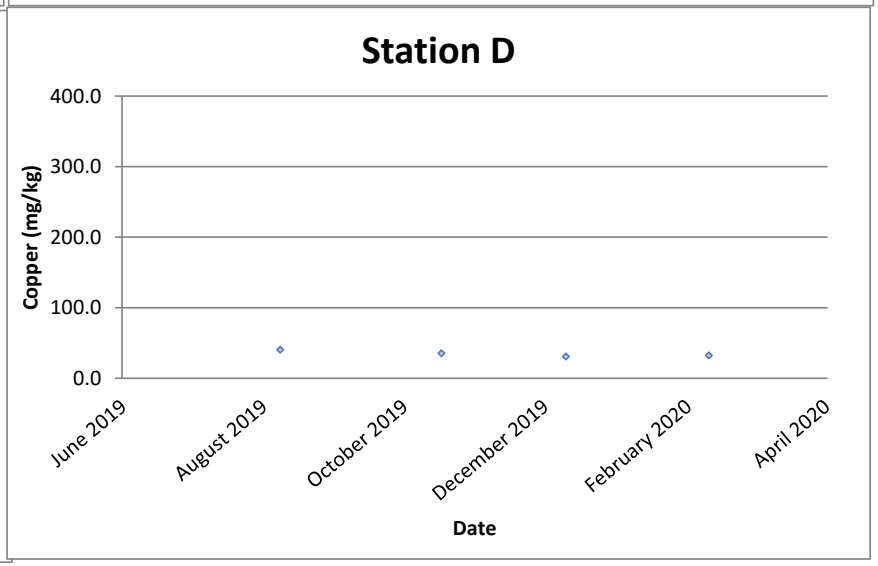

Station F
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

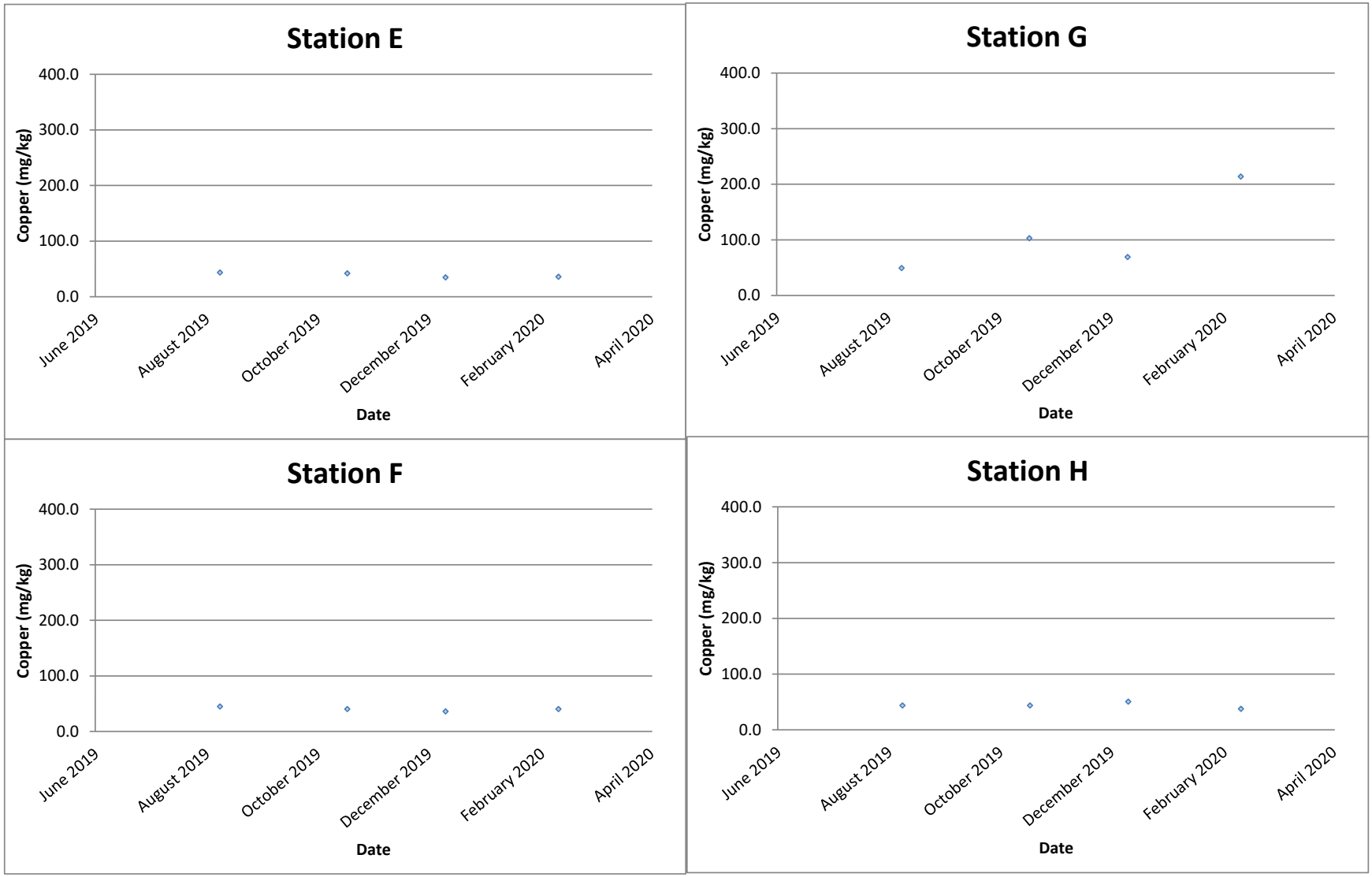

Station H
Chromium (mg/kg)
100.0
80.0
60.0
40.0
20.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station A
400.0
300.0
200.0
100.0
0.0
Copper (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

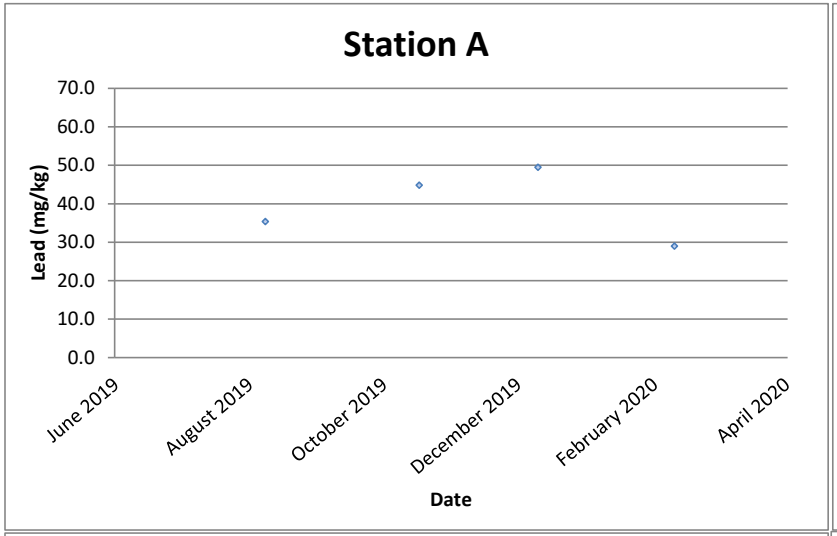

Station C
400.0
300.0
200.0
100.0
0.0
Copper (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

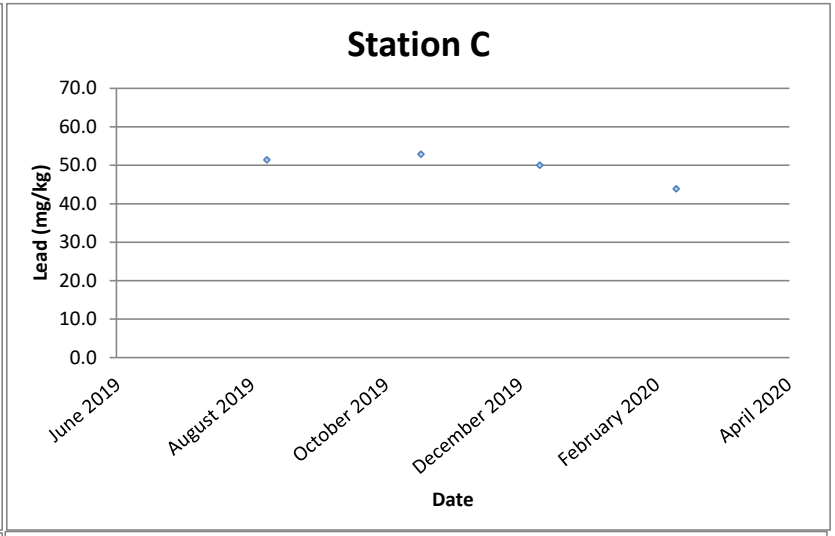

Station B
400.0
300.0
200.0
100.0
0.0
Copper (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

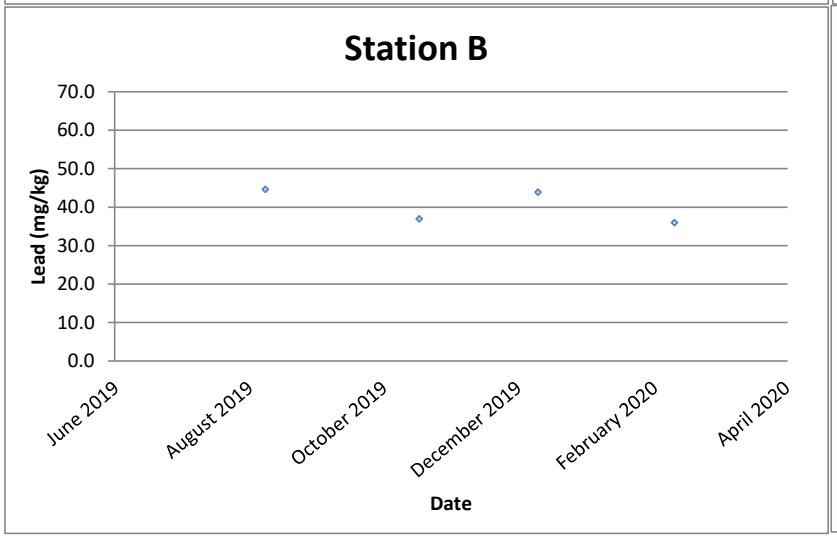

Station D
400.0
300.0
200.0
100.0
0.0
Copper (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

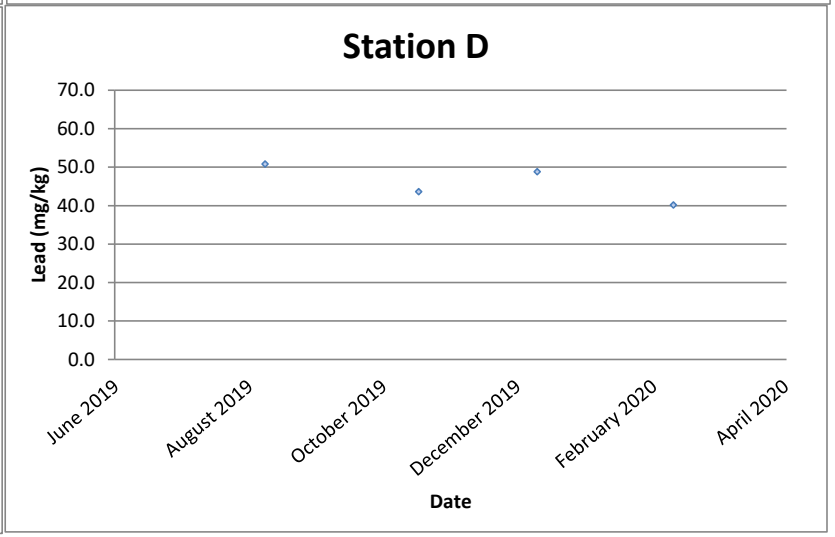

Station E
Copper (mg/kg)
400.0
300.0
200.0
100.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station G
Copper (mg/kg)
400.0
300.0
200.0
100.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station F
Copper (mg/kg)
400.0
300.0
200.0
100.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station H
Copper (mg/kg)
400.0
300.0
200.0
100.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

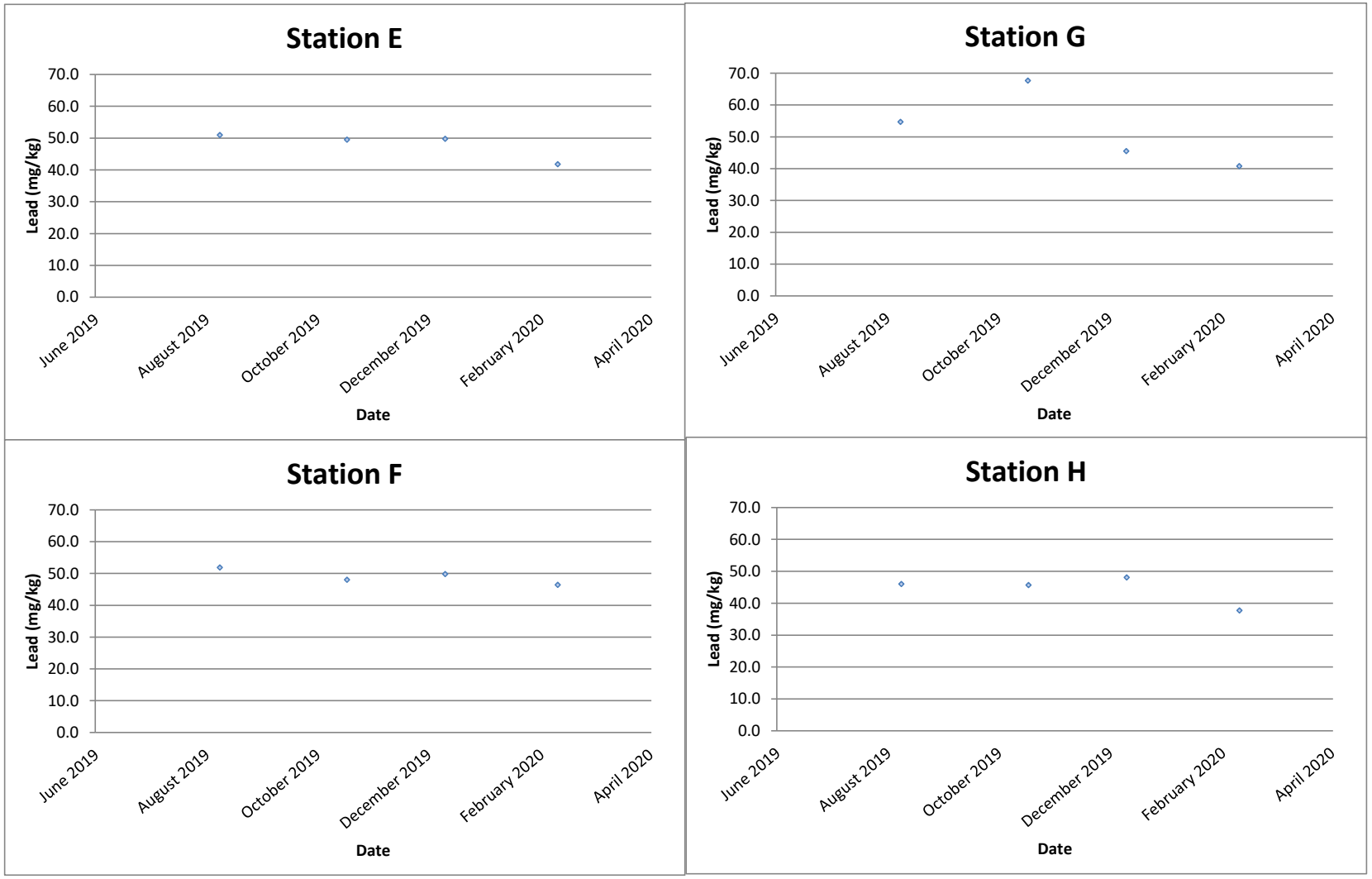
Lead (mg/kg)


Station A
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Lead (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

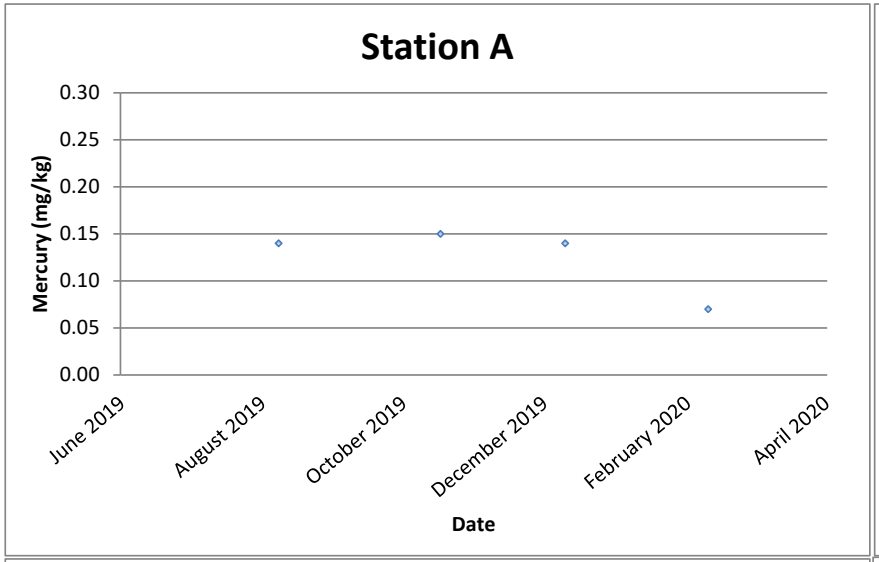

Station C
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Lead (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

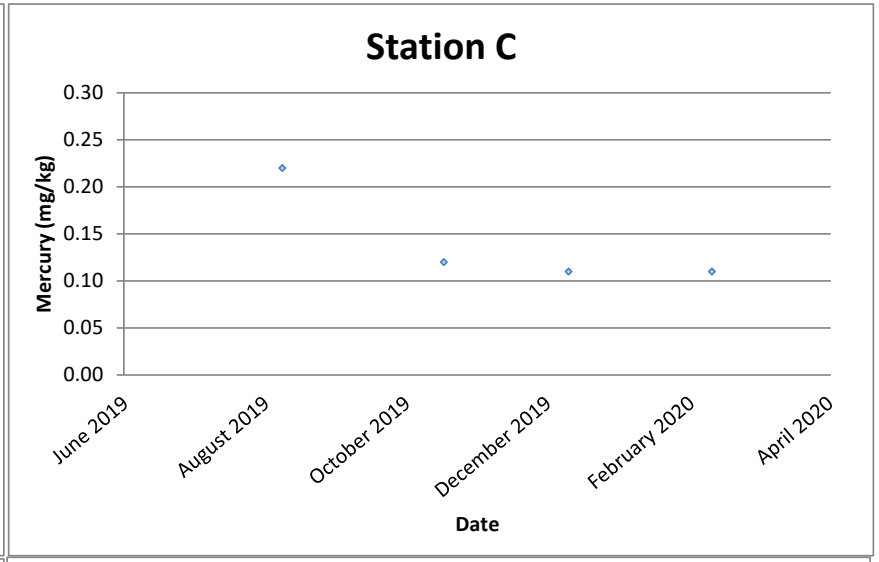

Station B
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Lead (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

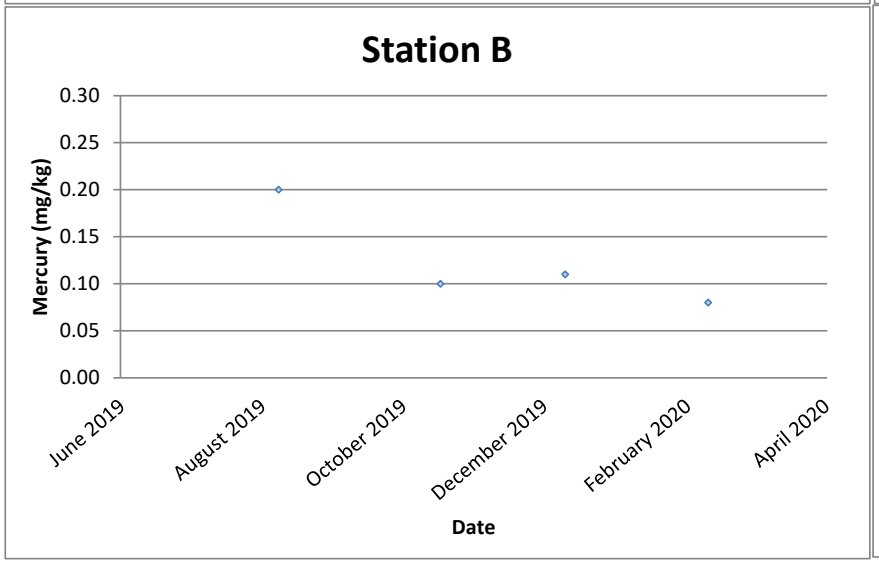

Station D
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Lead (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

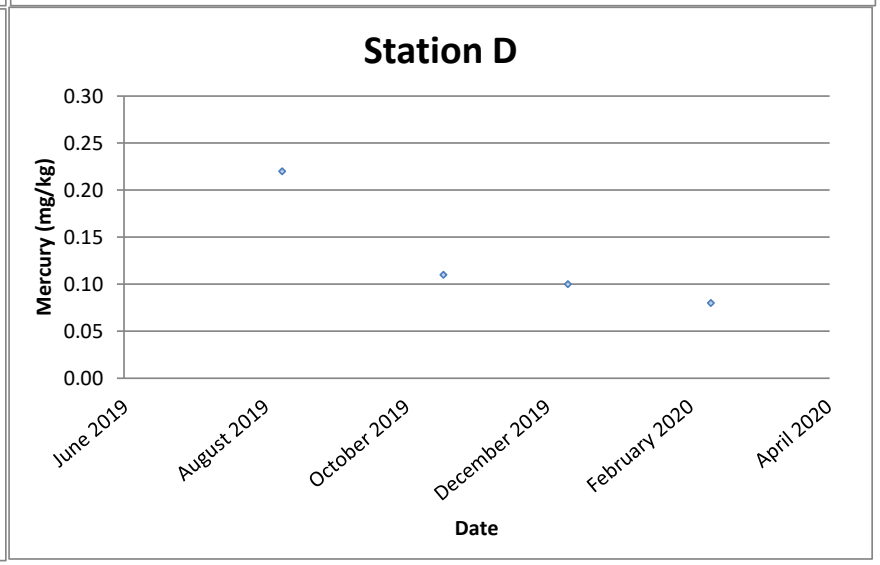

Station E
Lead (mg/kg)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station G
Lead (mg/kg)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station F
Lead (mg/kg)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station H
Lead (mg/kg)
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

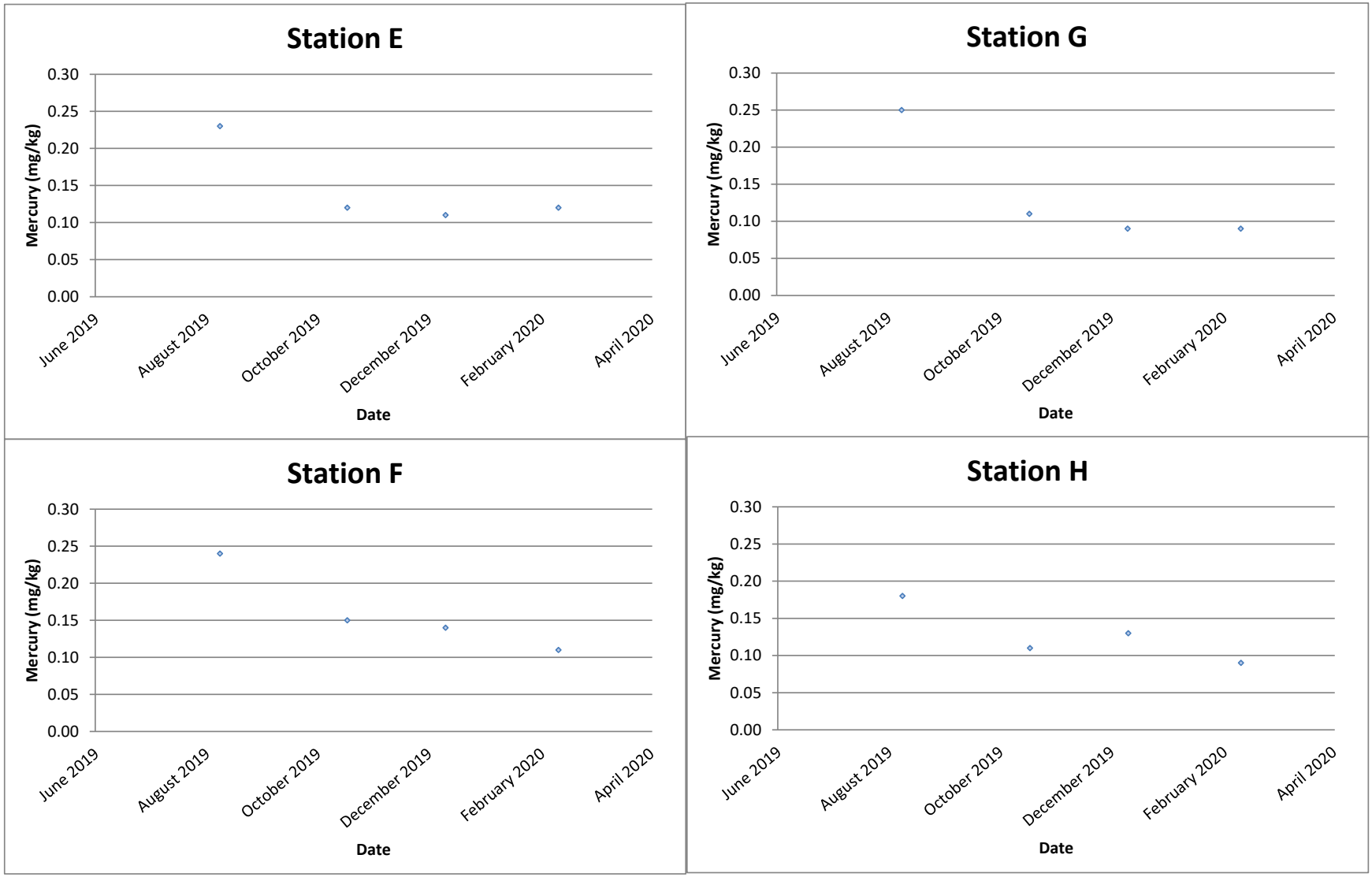
Mercury (mg/kg)

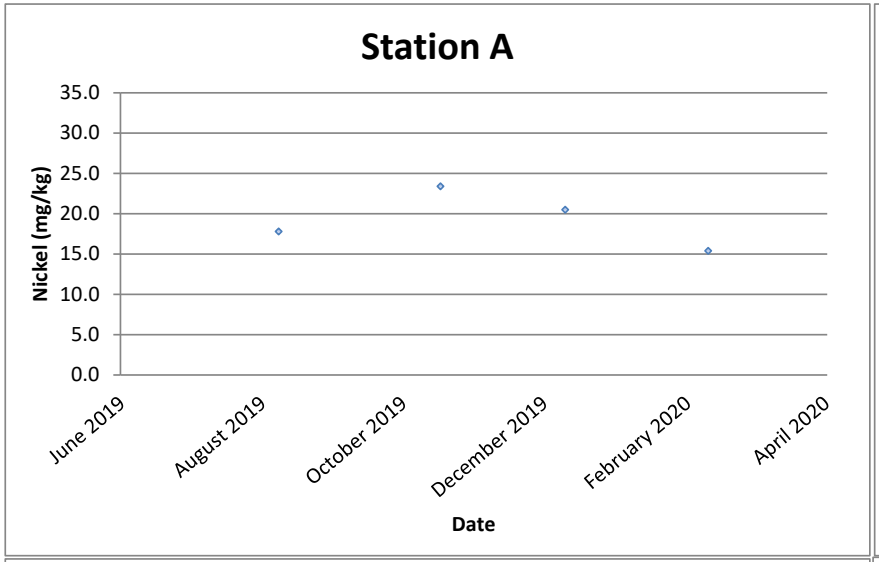


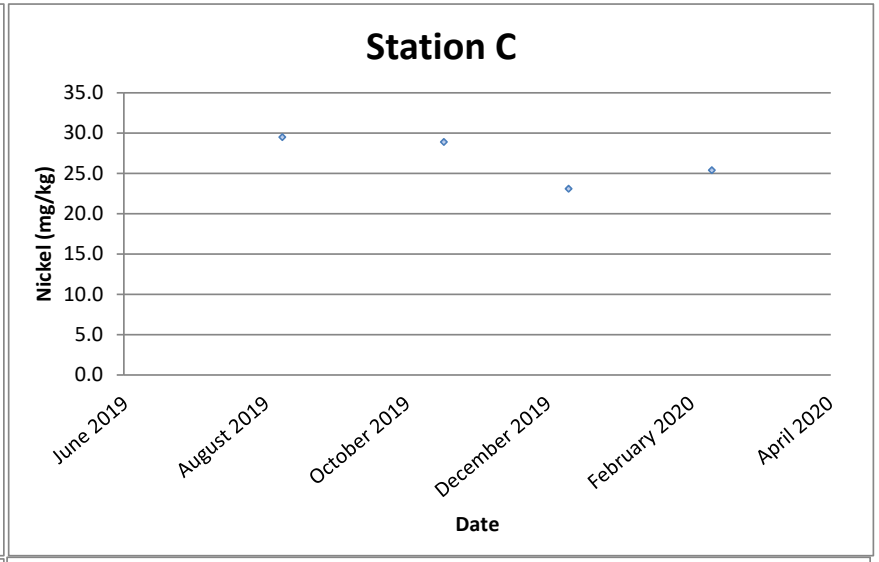


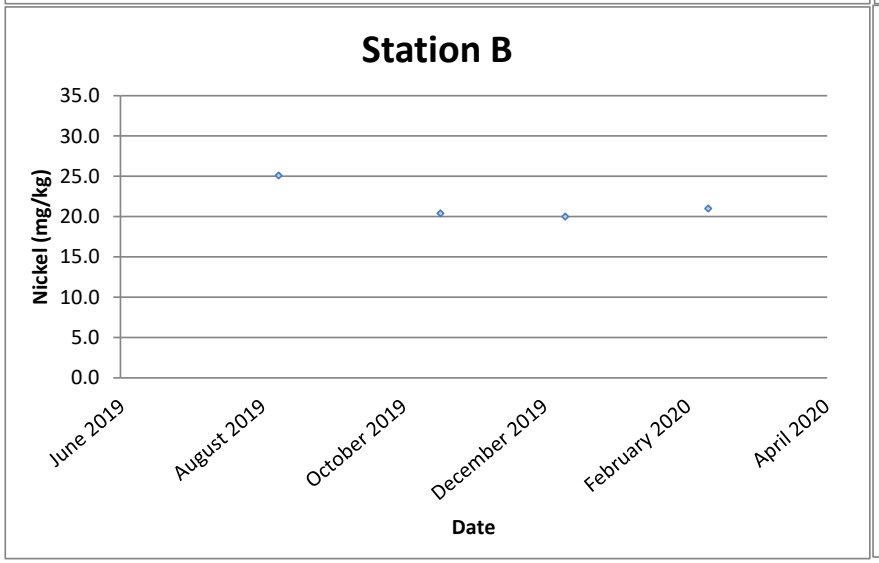


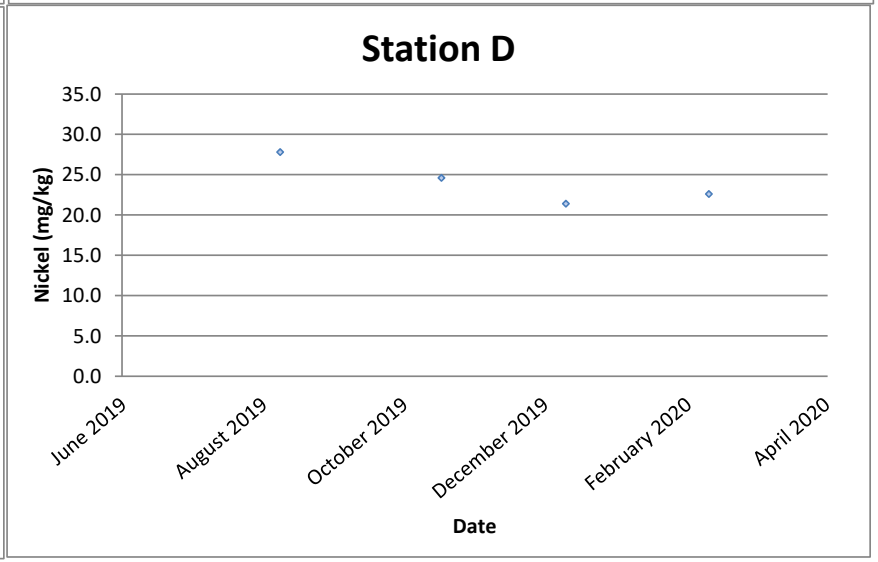


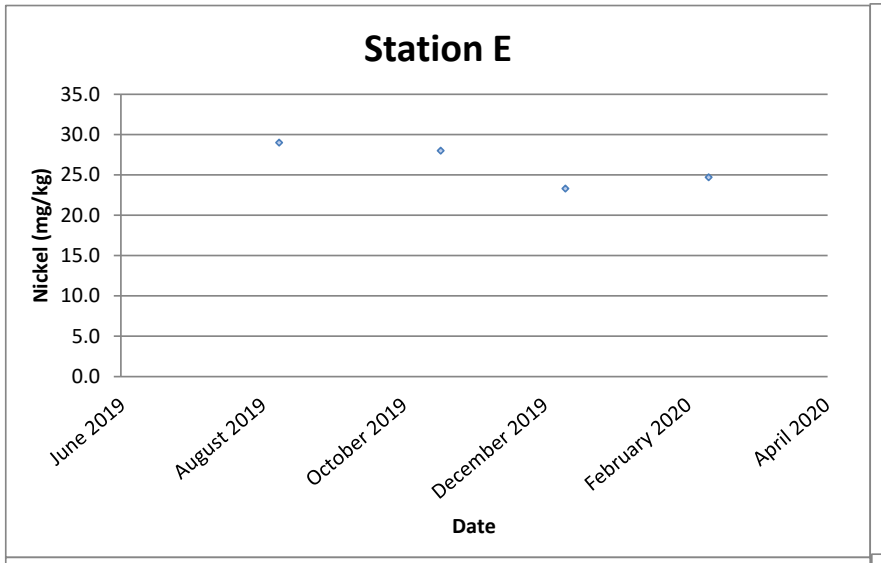

Station E
Mercury (mg/kg)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station G
Mercury (mg/kg)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station F
Mercury (mg/kg)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station H
Mercury (mg/kg)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

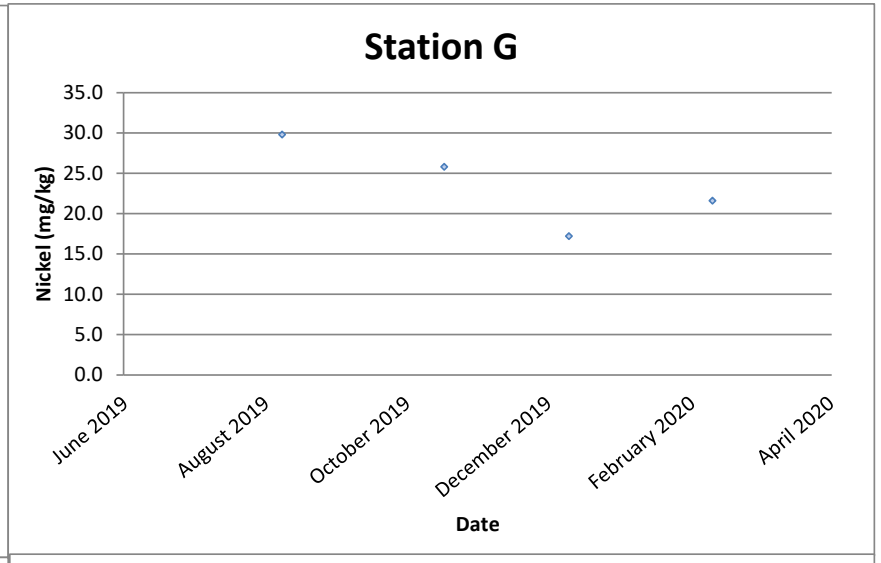

Station A
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Nickel (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

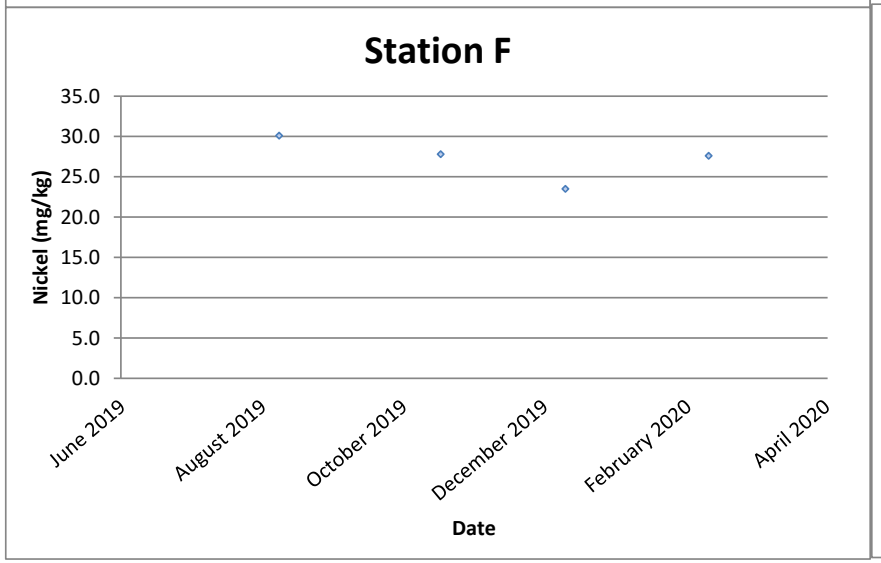

Station C
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Nickel (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

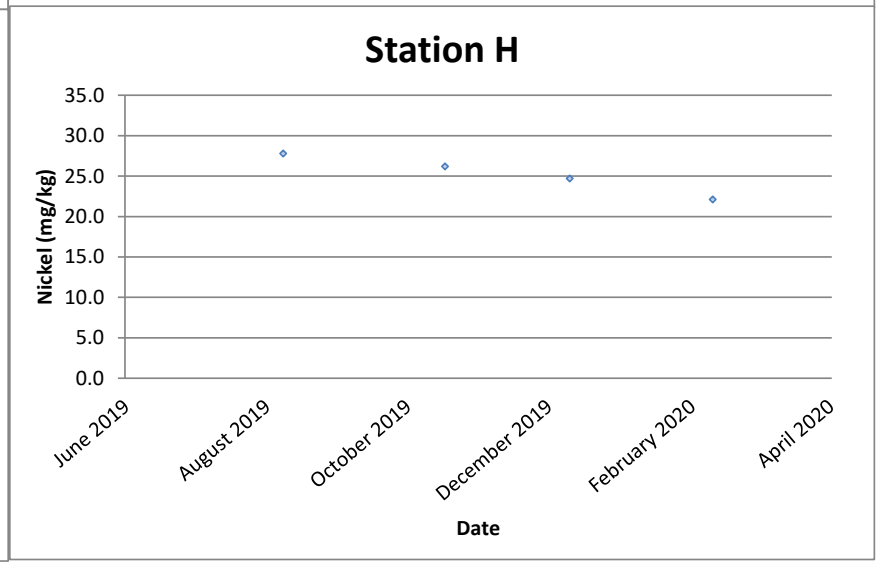

Station B
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Nickel (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

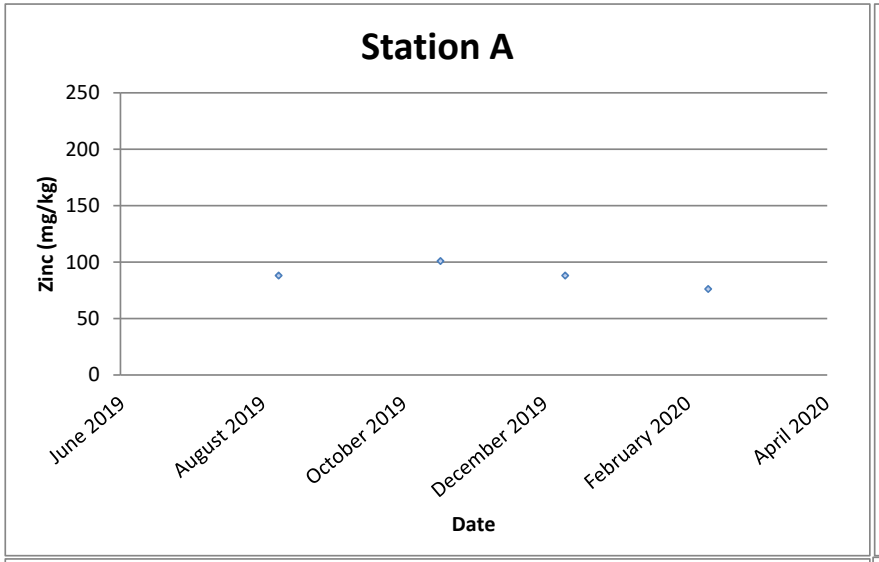

Station D
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Nickel (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

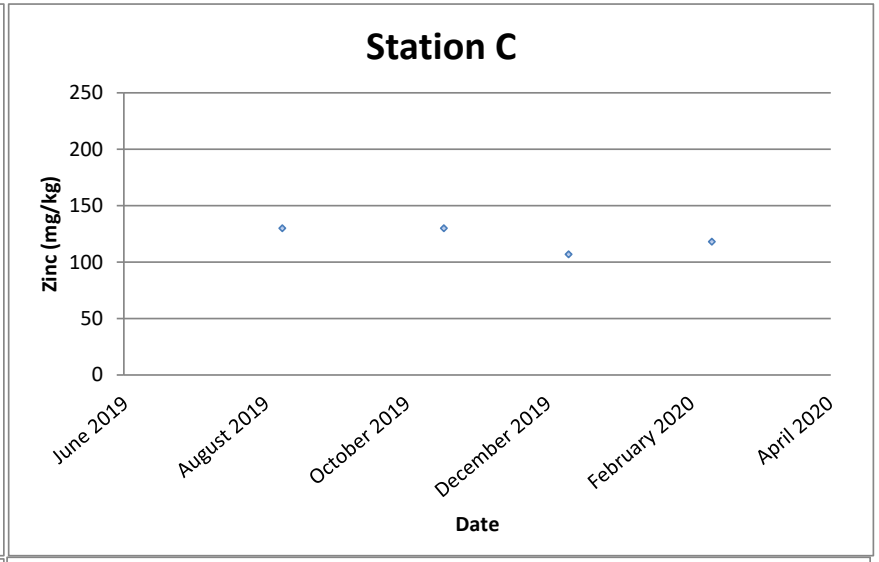

Station E
Nickel (mg/kg)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

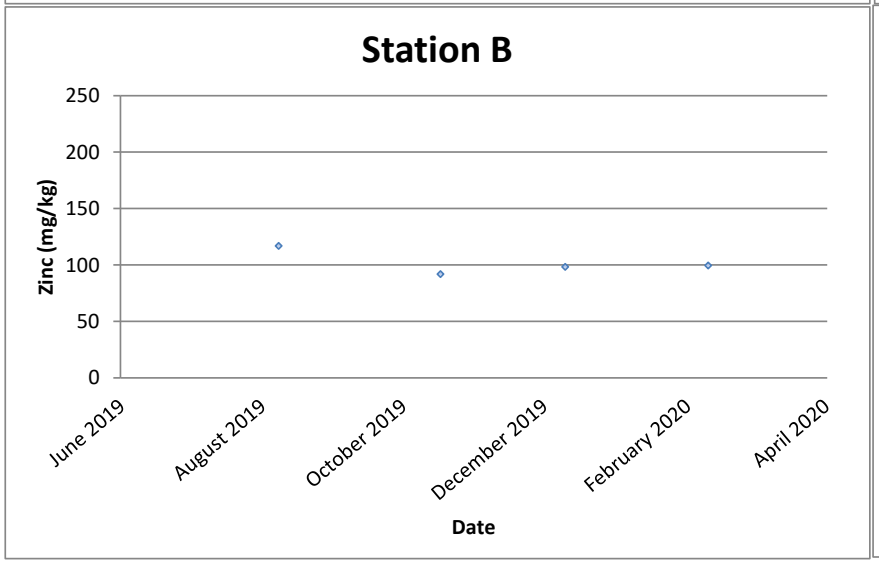

Station G
Nickel (mg/kg)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

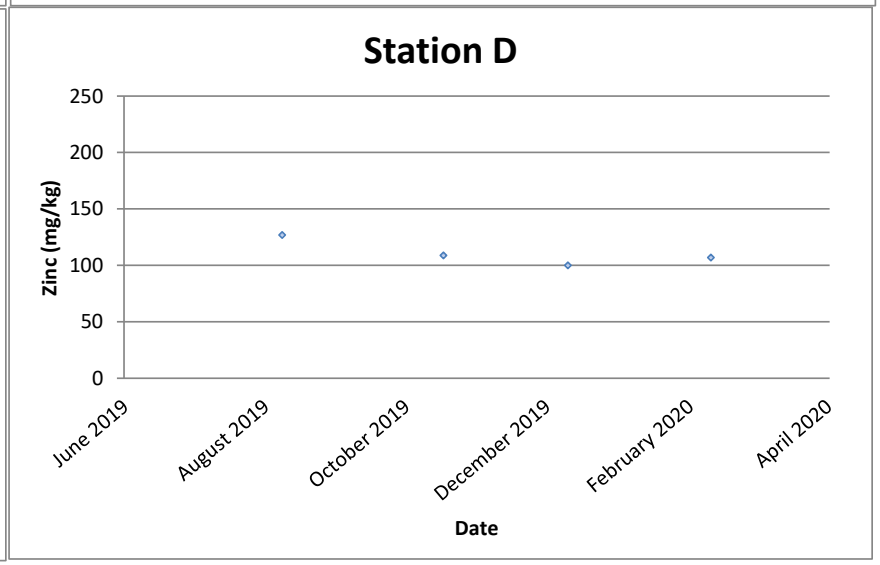

Station F
Nickel (mg/kg)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

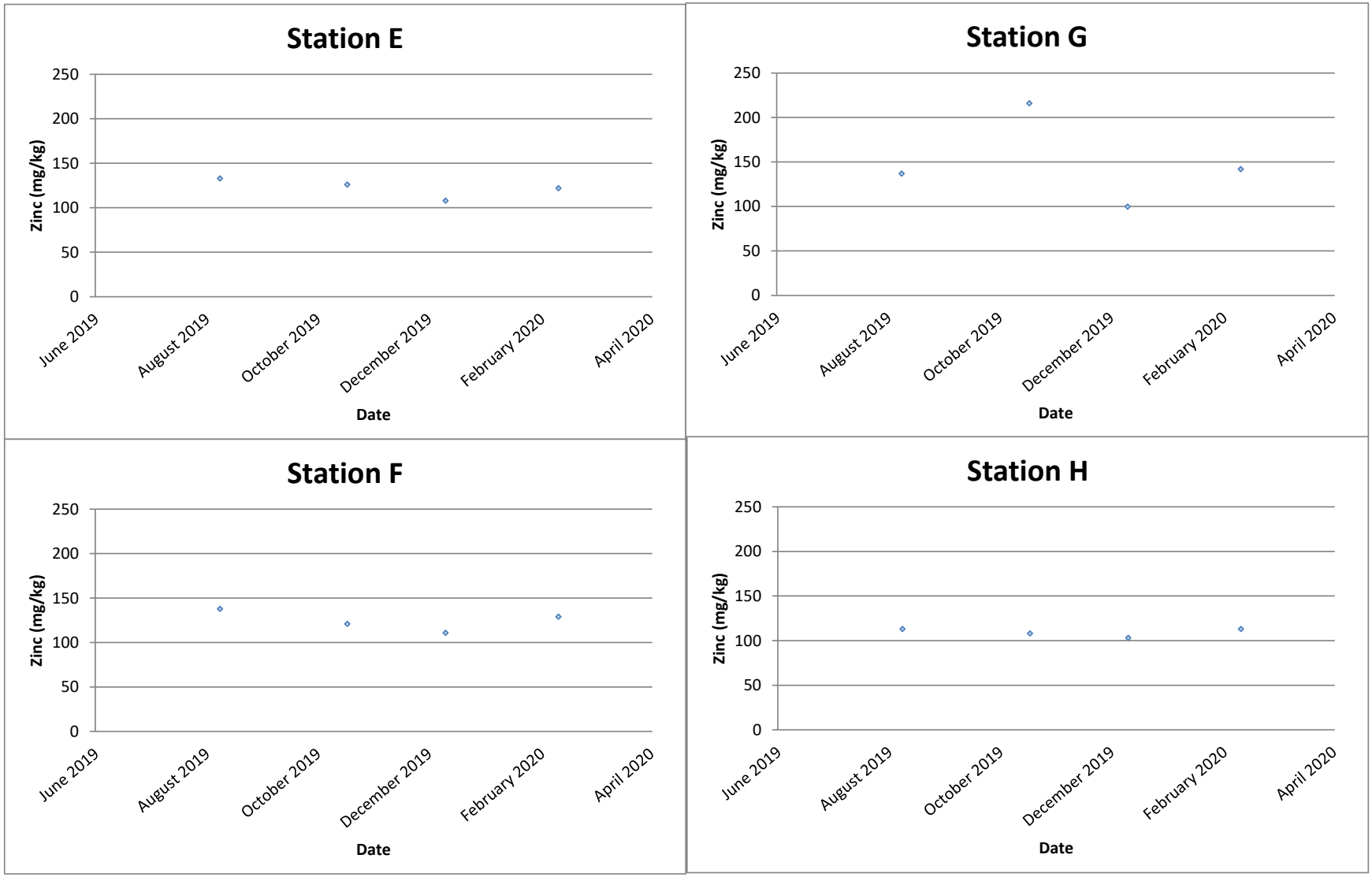

Station H
Nickel (mg/kg)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

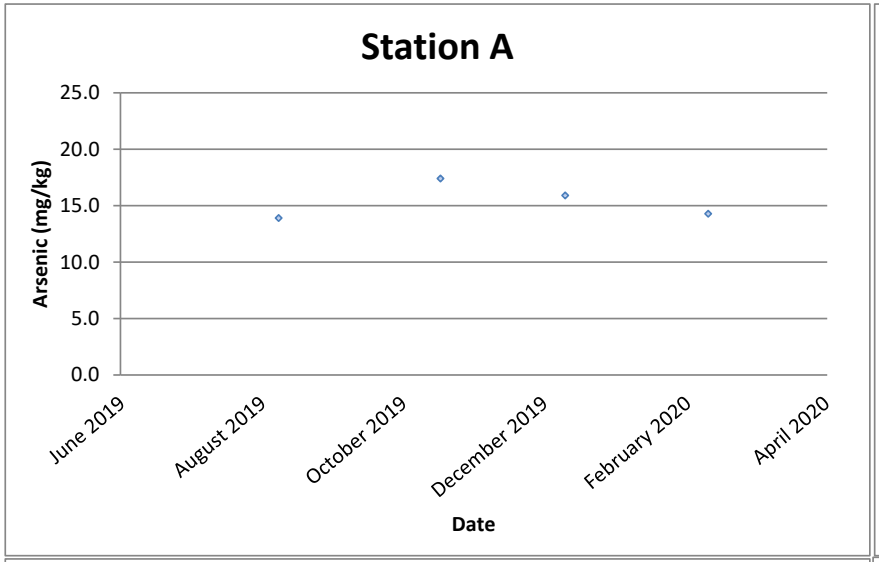

Station A
250
200
150
100
50
0
Zinc (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

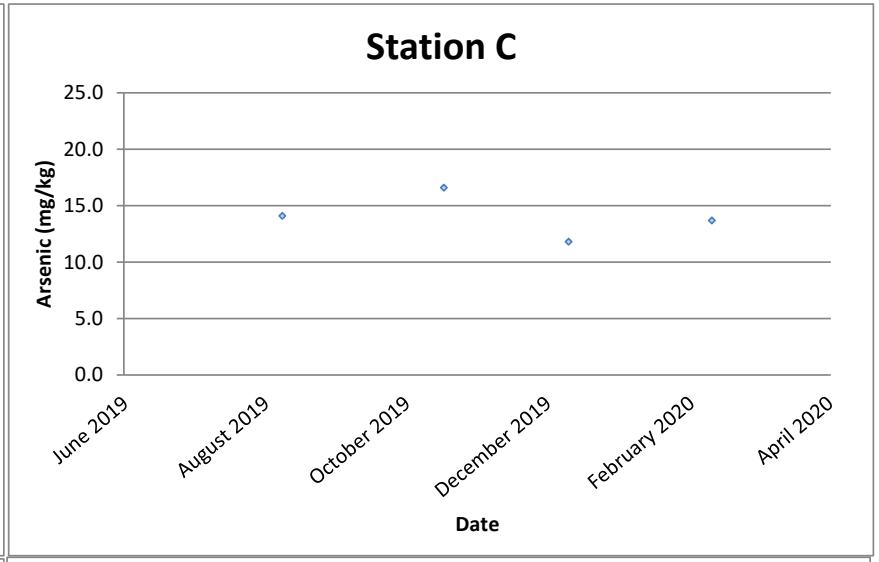

Station C
250
200
150
100
50
0
Zinc (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

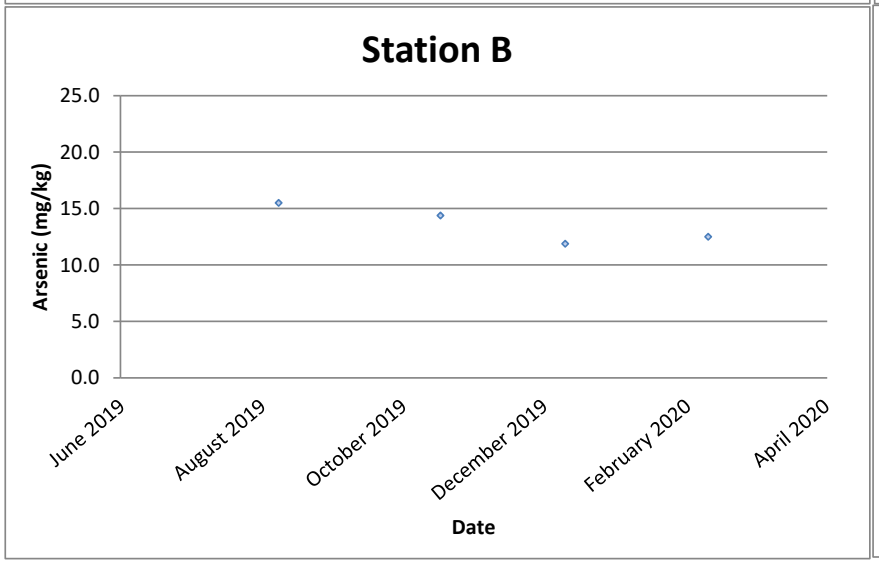

Station B
250
200
150
100
50
0
Zinc (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

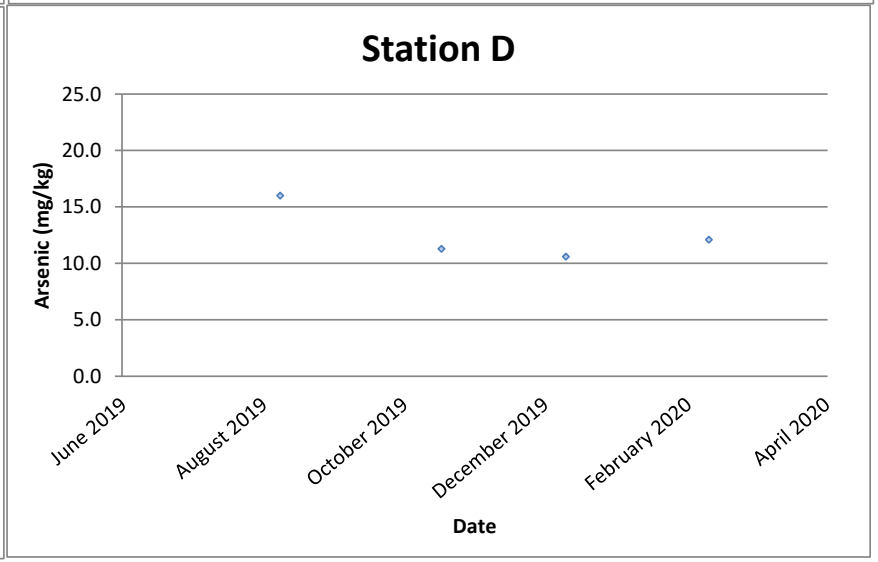

Station D
250
200
150
100
50
0
Zinc (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

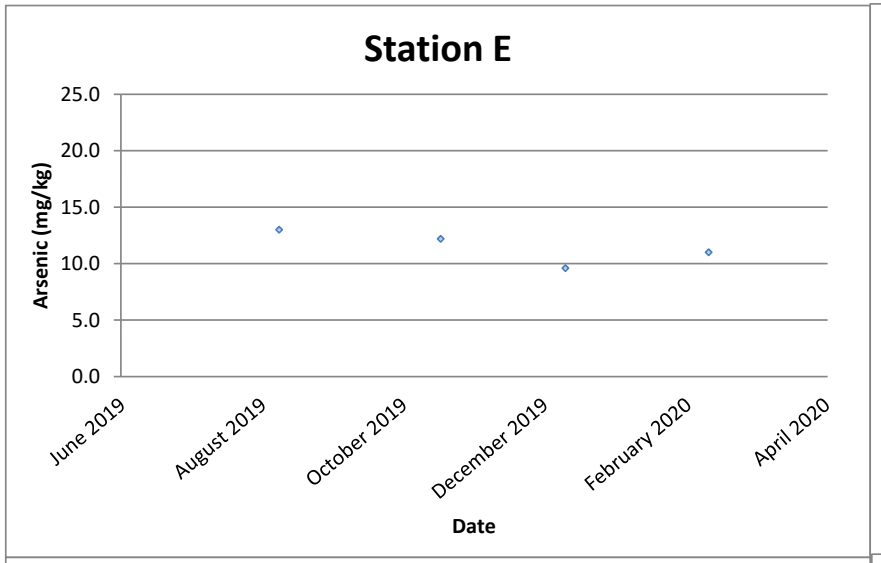

Station E
Zinc (mg/kg)
250
200
150
100
50
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station G
Zinc (mg/kg)
250
200
150
100
50
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station F
Zinc (mg/kg)
250
200
150
100
50
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station H
Zinc (mg/kg)
250
200
150
100
50
0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

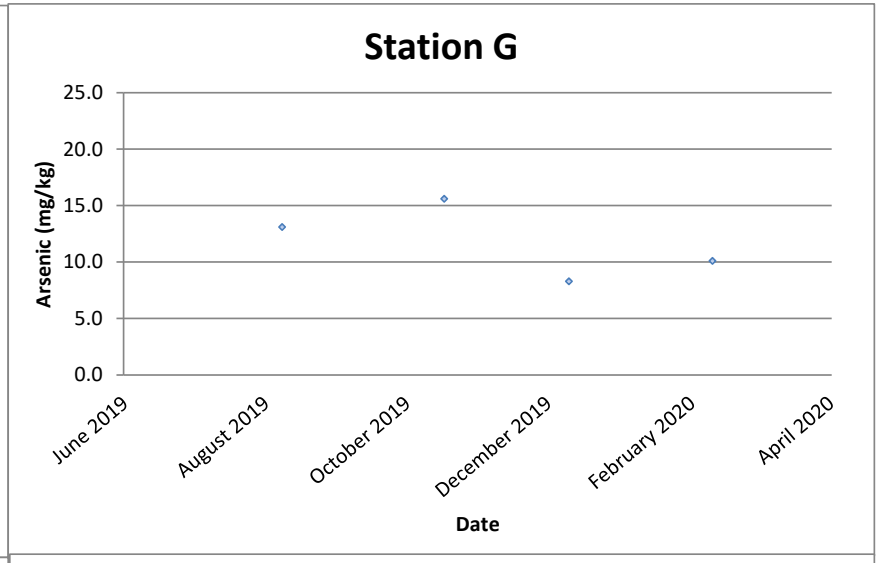

Station A
25.0
20.0
15.0
10.0
5.0
0.0
Arsenic (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

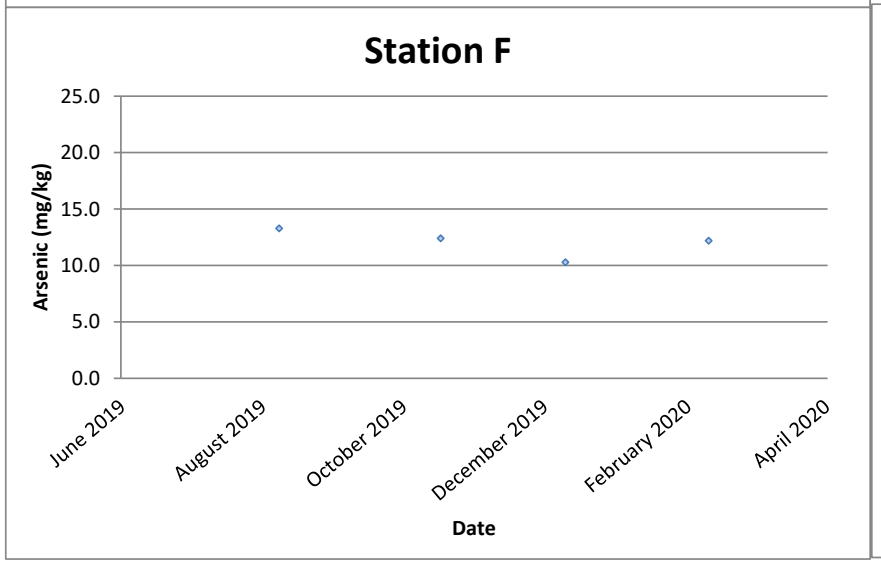

Station C
25.0
20.0
15.0
10.0
5.0
0.0
Arsenic (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

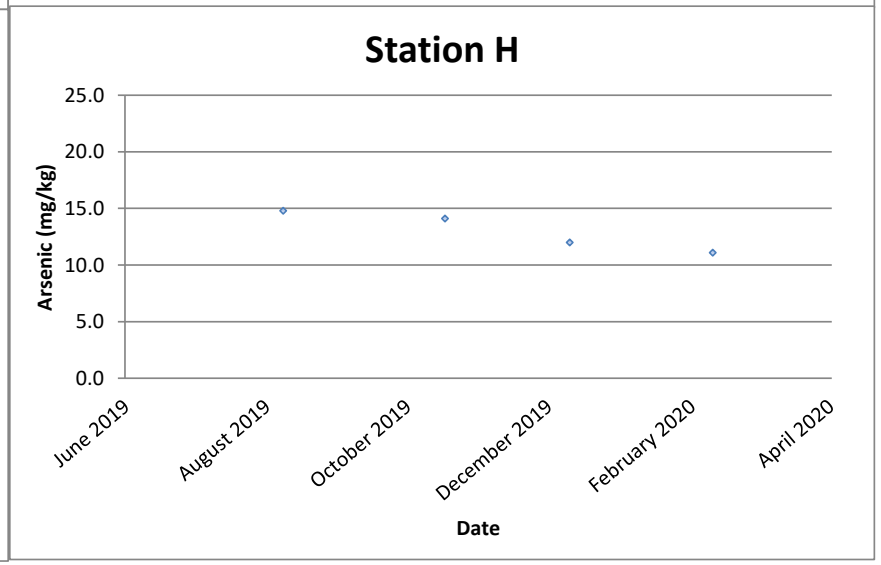

Station B
25.0
20.0
15.0
10.0
5.0
0.0
Arsenic (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

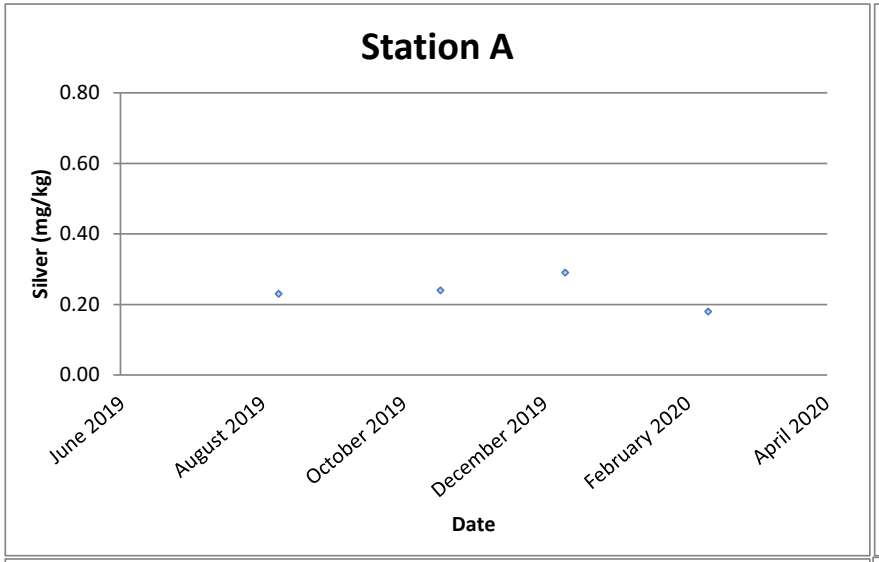

Station D
25.0
20.0
15.0
10.0
5.0
0.0
Arsenic (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

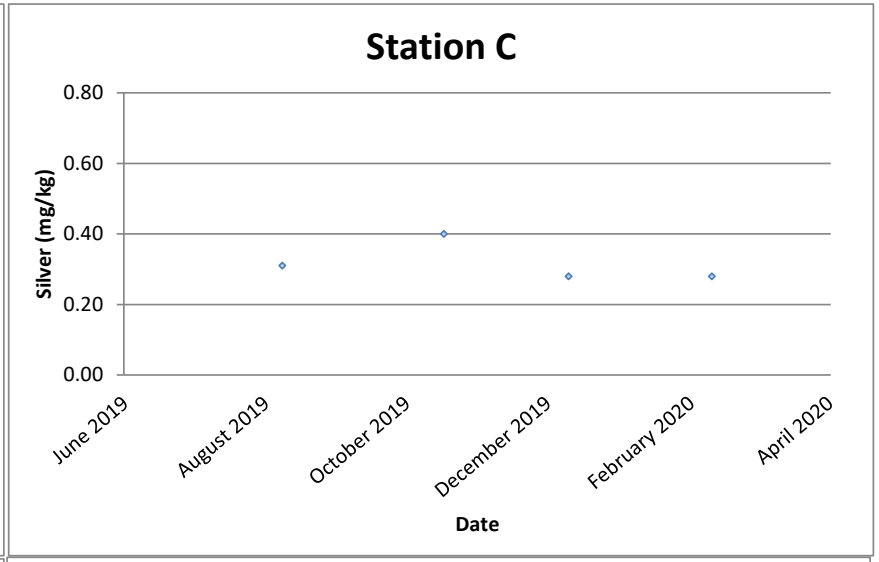

Station E
Arsenic (mg/kg)
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

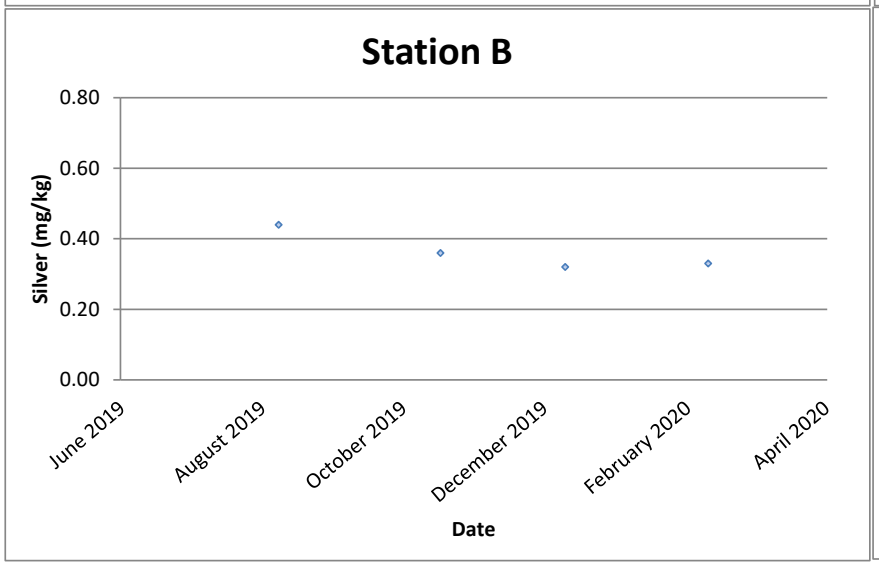

Station G
Arsenic (mg/kg)
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

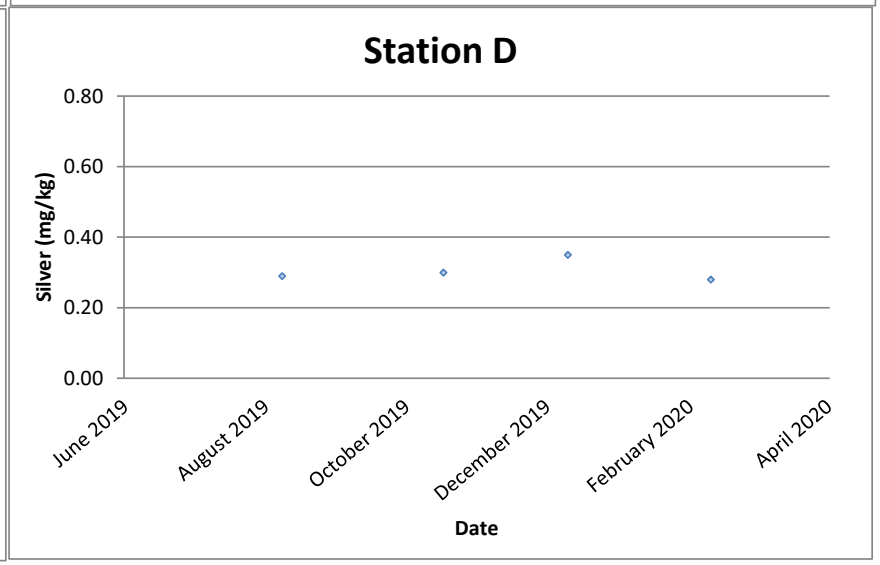

Station F
Arsenic (mg/kg)
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

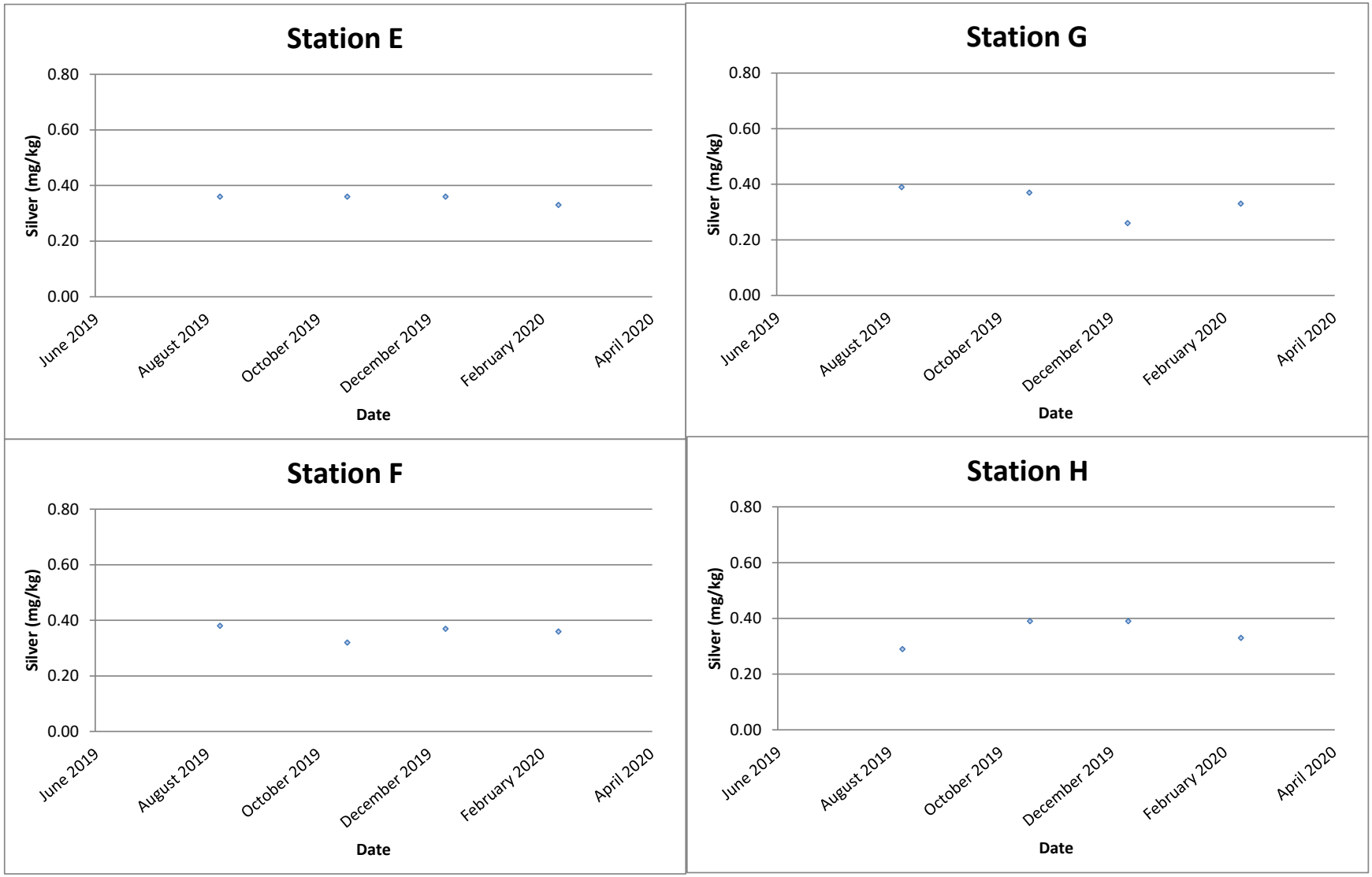

Station H
Arsenic (mg/kg)
25.0
20.0
15.0
10.0
5.0
0.0
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station A
0.80
0.60
0.40
0.20
0.00
Silver (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station C
0.80
0.60
0.40
0.20
0.00
Silver (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station B
0.80
0.60
0.40
0.20
0.00
Silver (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station D
0.80
0.60
0.40
0.20
0.00
Silver (mg/kg)
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date


Station E
Silver (mg/kg)
0.80
0.60
0.40
0.20
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station G
Silver (mg/kg)
0.80
0.60
0.40
0.20
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station F
Silver (mg/kg)
0.80
0.60
0.40
0.20
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date
Station H
Silver (mg/kg)
0.80
0.60
0.40
0.20
0.00
June 2019
August 2019
October 2019
December 2019
February 2020
April 2020
Date

FUGRO TECHNICAL SERVICES LIMITED

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Appendix I

Benthic Survey Report

Benthic Faunal Monitoring

Conducted in February 2020

Summary Report

Abundance

A total of 311 macrobenthic organisms was recorded from the eight monitoring stations during the February 2020 monitoring period. As of the previous monitoring periods, current results showed relatively lower abundances compared to the both dry (March 2004) and wet (August 2004) seasons baseline data (**Figure 1**). Compared to the previous monitoring period (December 2019), decrease in total abundance was also observed which can be attributed to the general decline in abundances in the montoring stations. However, seasonal variation in the macrobenthic abundances remained to be statistically insignificant (F-value = 1.31; F-crit = 1.82; P-value = 0.22).

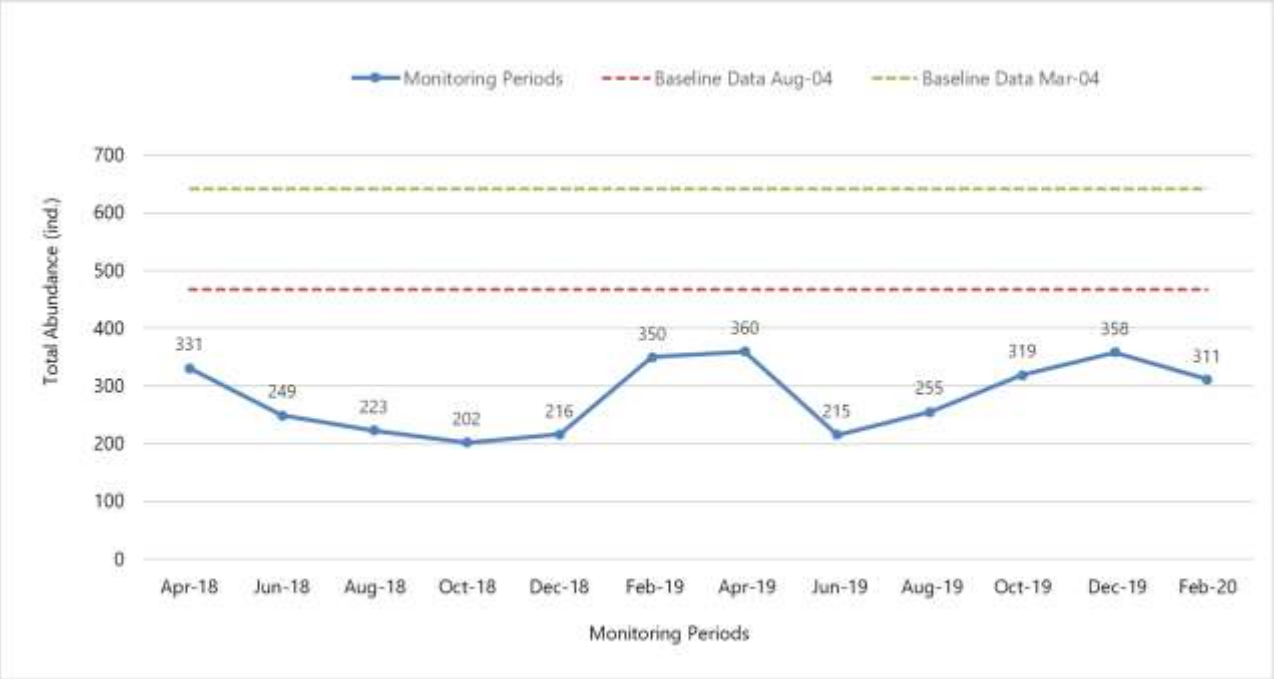

Figure 1. Total abundance (ind.) of benthic organisms across monitoring periods

The lowest abundance with 33 individuals (ind.) was recorded at Station E and the highest (49 ind.) was recorded at Station F (**Figure 2**), both reference stations. Abundances in all reference stations decreased while abundances in impact stations either remained the same as the previous monitoring period (Station C, 40 ind.) or has increased (Station D, 45 to 48 ind.) Similar to the

previous monitoring periods, differences in the total abundance across the monitoring stations were statistically significant (F-value = 2.88 ; F-crit = 2.10; P-value = 0.01).

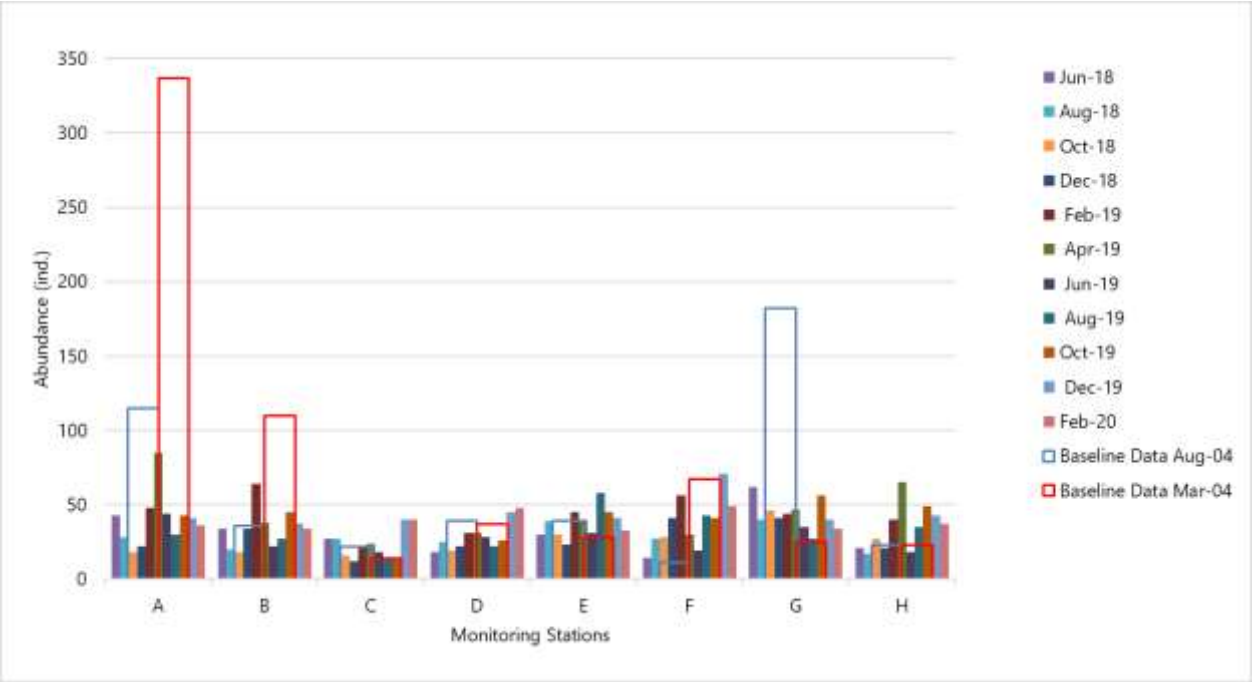

Figure 2. Total abundance (ind.) of benthic organisms across monitoring stations

Biomass

The total wet biomass recorded in the eight monitoring stations was 58.33 g with the highest biomass at Station D (17.82 g) and lowest at Station B (1.44 g). The relatively higher biomass recorded at Station D was due to the presence of larger organisms such as the molluscan species, *Paphia undulata* in this station. Average biomass at the impact stations were higher compared to that of the reference stations. The data of all surveys are shown in **Figure 3**.

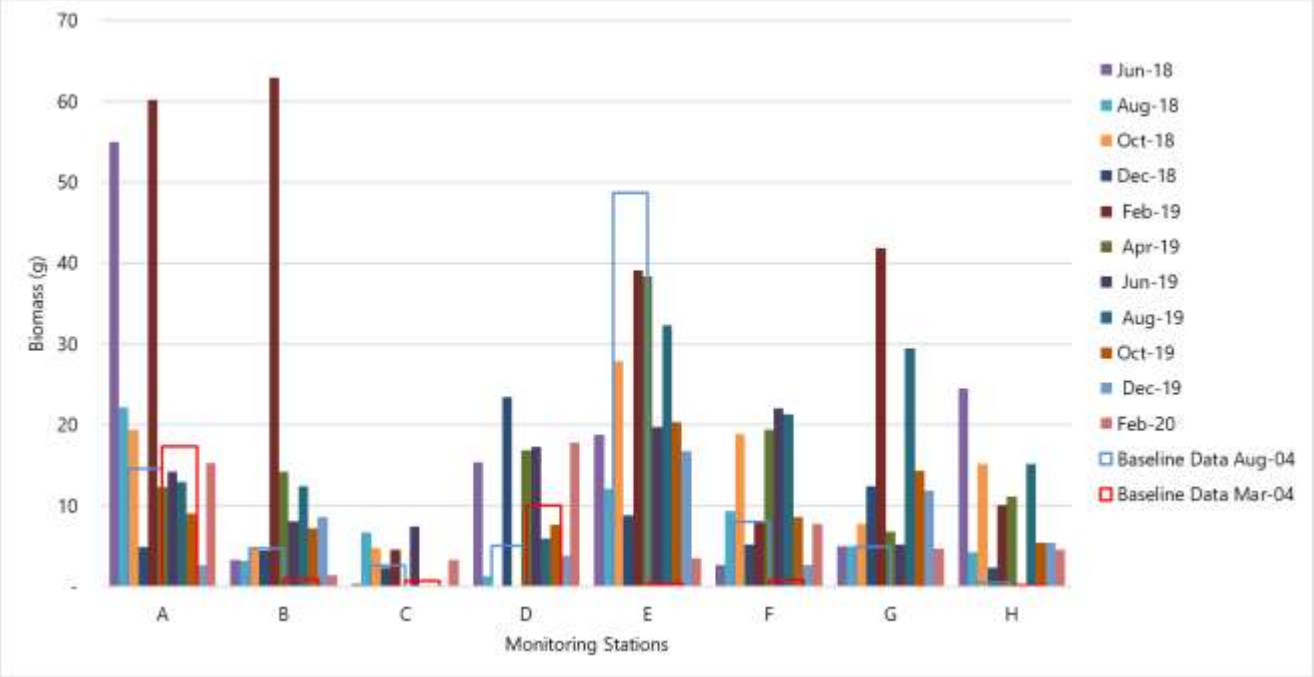

Figure 3. Total biomass (g) of benthic organisms

Taxonomic Composition

A total of eight phyla comprising of 38 families and 53 genera were identified. Macrobenthic assemblage remained to be dominated by annelida (60.77%), molluscs (19.94%), and arthropods (13.83%) (**Figure 4**). Similar to the baseline study (August 2004), the most dominant family was the polychaete *Capitellidae* . Their dominance might indicate unbalanced and organically enriched habitats (Pearson and Rosenberg 1978; Borja et al. 2000). There is no dominant species (abundance > 10) recorded during the current monitoring period. Highest number of genera was recorded in Station D (24) and the lowest in Station B (15).

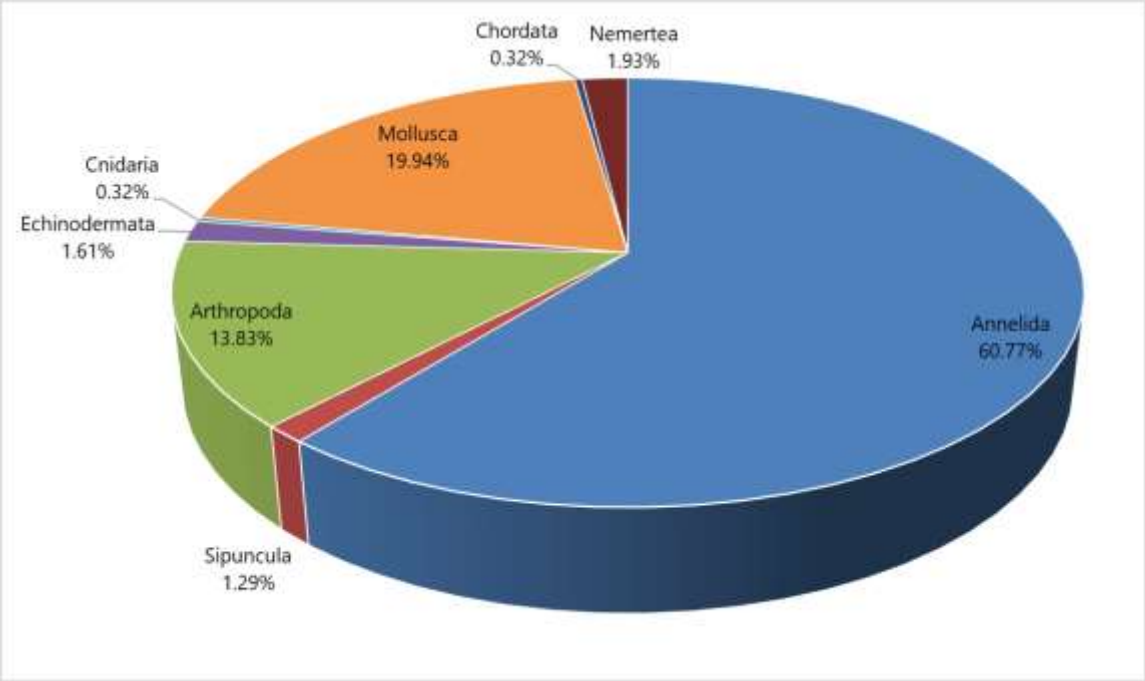

Figure 4. Percent composition of benthic organisms

Diversity

Benthic diversity index (*H'*) and eveness index (*J*) ranged 2.72 – 3.07 and 0.92 – 0.96 in impact stations, and 2.22 – 2.96 and 0.90 – 0.96 among the reference stations, which suggest that benthic faunal diversity is relatively richer at some of reference stations than those at impact stations. However, overall diversity in the eight monitoring stations was within the range of typical values in the impact stations and the reference stations, respectively. Compared with the baseline survey result, the diversity index and evenness index increased.

Abundance and biomass of macrobenthic organisms are shown in Tables 1 and 2, respectively. Data summary for different monitoring periods are presented in Tables 3 to 7. Representative photos of specimen are shown in the last page of this benthic survery report.

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Approved by Supervisor

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Signature of Supervisor : 

Name and Position of Supervisor: Dr. Mark Shea, Senior Ecology Consultant

Date: February 27, 2020

Data Summaries

Table 1. Abundance of macrobenthic communities in theeight monitoring stations, February 2020.

Phylum	Class	Order	Family	Genus	A	B	C	D	E	F	G	H
Annelida	Polychaeta	Aciculata	Aphroditidae	*c.f. Laetmonice*	3	0	0	0	0	0	0	0
Annelida	Polychaeta	Aciculata	Glyceridae	*Glycera*	2	0	0	0	2	2	2	0
Annelida	Polychaeta	Capitellida	Capitellidae	*Capitella(C.capitata)*	0	0	3	2	0	0	0	0
Annelida	Polychaeta	Capitellida	Capitellidae	*Capitella*	2	3	2	2	3	2	0	2
Annelida	Polychaeta	Capitellida	Capitellidae	*Mediomastus*	2	3	1	1	0	1	9	4
Annelida	Polychaeta	Capitellida	Capitellidae	*Notomastus*	1	0	0	0	1	2	0	1
Annelida	Polychaeta	Errantia	Phyllodocidae	*Phyllodoce*	0	0	0	0	0	1	0	0
Annelida	Polychaeta	Eunicida	Eunicidae	*Eunice(E. indica)*	1	4	1	2	2	2	1	3
Annelida	Polychaeta	Phyllodocimorpha	Goniadidae	*Glycinde*	0	0	0	0	2	0	0	0
Annelida	Polychaeta	-	Cossuridae	*Cossurella(C. aciculata)*	0	0	3	0	2	0	0	0
Annelida	Polychaeta	Phyllodocida	Hesionidae	*Hesione(H. intertexta)*	1	0	0	0	0	0	0	0
Annelida	Polychaeta	Nereidida	Nereidae	*Neanthes*	6	7	4	0	2	5	2	0
Annelida	Polychaeta	Phyllodocida	Nereidae	*Nereis1*	0	3	0	0	0	2	0	1
Annelida	Polychaeta	Phyllodocida	Nereidae	*Nereis2*	0	0	0	0	0	0	1	0
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Gattyana*	1	0	0	1	0	0	1	0
Annelida	Polychaeta	-	Maldanidae	*Maldanella*	0	0	1	0	0	0	0	0
Annelida	Polychaeta	Nereidida	Nephtyidae	*Aglaophamus (A. dibranchis)*	1	1	0	0	1	0	0	0

Phylum	Class	Order	Family	Genus	A	B	C	D	E	F	G	H
Annelida	Polychaeta	Nereidida	Nephtyidae	*Aglaophamus (A. lyrochaeta)*	0	0	0	1	0	1	0	0
Annelida	Polychaeta	Nereidida	Nephtyidae	*Nephtys*	1	1	1	3	1	1	0	1
Annelida	Polychaeta	Sabellida	Oweniidae	*Owenia*	1	0	0	2	0	1	0	0
Annelida	Polychaeta	Scolecida	Opheliidae	*Ophelia*	0	0	0	0	3	0	1	0
Annelida	Polychaeta	Spionida	Poecilochaetidae	*Poecilochaetus*	0	0	0	3	0	1	1	0
Annelida	Polychaeta	Spionida	Spionidae	*Paraprionospio*	0	3	2	2	0	3	3	0
Annelida	Polychaeta	Spionida	Spionidae	*Prionospio*	2	0	1	0	0	0	0	1
Annelida	Polychaeta	Sternaspida	Sternaspidae	*Sternaspis(S. scutata)*	0	1	0	1	1	0	3	6
Annelida	Polychaeta	Terebellida	Terebellidae	*Amaeana*	0	0	0	0	0	0	0	1
Annelida	Polychaeta	Terebellida	Terebellidae	*Loimia(L.loimia)*	1	1	0	0	1	0	1	1
Annelida	Polychaeta	Terebellida	Terebellidae	*Terebella sp.1*	0	0	1	0	0	0	0	0
Annelida	Polychaeta	Terebellida	Terebellidae	*Terebella sp.2*	0	0	0	1	1	0	0	0
Annelida	Polychaeta	Terebellida	Trichobranchidae	*Terebellides (T. stroemii)*	0	0	0	0	0	0	1	0
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae	*Lumbriculus sp.1*	0	0	1	2	0	0	0	0
Sipuncula	Sipunculiformes	Sipunculidea	Sipunculidae	*Sipunculus*	0	0	1	3	0	0	0	0
Arthropoda	Crustacea	Cumacea	Diastylidae	*c.f. Diastylis*	0	1	0	0	0	0	0	0
Arthropoda	Crustacea	Decapoda	Macrophthalmidae	*Cleistostoma*	0	0	0	2	1	0	0	0
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile	0	0	2	0	2	1	0	0
Arthropoda	Crustacea	Decapoda	Pilumnidae	*Typhlocarcinus*	1	0	0	1	0	0	1	0
Arthropoda	Crustacea	Decapoda	Porcellanidae	*Petrolisthes*	0	0	0	0	0	1	0	0
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus sp.1*	0	2	4	4	2	9	2	1

Phylum	Class	Order	Family	Genus	A	B	C	D	E	F	G	H
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus sp.2*	0	1	1	0	0	0	1	1
Arthropoda	Maxillopoda	Sessilia	Balanidae	*Balanus*	1	0	0	0	0	0	0	1
Echinodermata	Holothuroidea	Molpadiida	Caudinidae	*Acaudina*	1	0	0	1	0	0	0	0
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	*Amphioplus*	1	0	0	1	0	1	0	0
Cnidaria	Anthozoa	Pennatulacea	-	*Sea pen*	0	0	0	0	1	0	0	0
Mollusca	Bivalvia	Veneroida	Dreissenidae	*Mytilopsis*	0	0	3	2	0	4	0	5
Mollusca	Bivalvia	Veneroida	Solenidae	*Solen*	1	0	0	1	0	0	0	0
Mollusca	Bivalvia	Veneroida	Tellinidae	*c.f. Augulus*	0	2	0	0	0	0	0	0
Mollusca	Bivalvia	Veneroida	Veneridae	*Paphia (P. undulata)*	2	0	0	4	1	6	2	0
Mollusca	Bivalvia	Veneroida	Veneridae	*c.f. Phylloda foliacea*	0	0	7	3	0	0	0	3
Mollusca	Bivalvia	Veneroida	Veneridae	*Ruditapes (R. philippinarum)*	0	0	0	0	0	0	1	0
Mollusca	Bivalvia	Veneroida	Veneridae	Bivalve juvenile	0	0	0	0	0	0	0	1
Mollusca	Scaphopoda	-	Dentaliidae	-	1	0	0	3	4	2	0	4
Chordata	Ascidiacea	Aplousobranchia	-	Sea squirt	1	0	0	0	0	0	0	0
Nemertina	Anopla	Heteronemertea	-	*Cerebratulus sp.1*	2	1	1	0	0	1	1	0

Table 2 . Biomass of macrobenthic communities in the eight monitoring stations, February 2020.

Phylum	Class	Order	Family	Genus	A	B	C	D	E	F	G	H
Annelida	Polychaeta	Aciculata	Aphroditidae	*c.f. Laetmonice*	2.351	0	0	0	0	0	0	0
Annelida	Polychaeta	Aciculata	Glyceridae	*Glycera*	0.007	0	0	0	0.002	0.003	0.027	0
Annelida	Polychaeta	Capitellida	Capitellidae	*Capitella(C.capitata)*	0	0	0.003	0.003	0.000	0	0	0
Annelida	Polychaeta	Capitellida	Capitellidae	*Capitella*	0.004	0.002	0.001	0.003	0.005	0.001	0	0.004
Annelida	Polychaeta	Capitellida	Capitellidae	*Mediomastus*	0.001	0.002	0.002	0.002	0	0.002	0.012	0.007
Annelida	Polychaeta	Capitellida	Capitellidae	*Notomastus*	0.002	0	0	0	0.002	0.004	0	0.006
Annelida	Polychaeta	Errantia	Phyllodocidae	*Phyllodoce*	0	0	0	0	0	0.003	0	0
Annelida	Polychaeta	Eunicida	Eunicidae	*Eunice(E. indica)*	0.003	0.011	0.005	0.003	0.004	0.005	0.002	0.011
Annelida	Polychaeta	Phyllodocimorpha	Goniadidae	*Glycinde*	0	0	0	0	0.004	0	0	0
Annelida	Polychaeta	-	Cossuridae	*Cossurella(C. aciculata)*	0	0	0.004	0	0.003	0	0	0
Annelida	Polychaeta	Phyllodocida	Hesionidae	*Hesione(H. intertexta)*	0.002	0	0	0	0	0	0	0
Annelida	Polychaeta	Nereidida	Nereidae	*Neanthes*	0.016	0.028	0.012	0.000	0.008	0.008	0.004	0
Annelida	Polychaeta	Phyllodocida	Nereidae	*Nereis1*	0	0.002	0	0	0	0.002	0	0.001
Annelida	Polychaeta	Phyllodocida	Nereidae	*Nereis2*	0	0	0	0	0	0	0.002	0
Annelida	Polychaeta	Phyllodocida	Polynoidae	*Gattyana*	0.005	0	0	0.002	0	0	0.014	0
Annelida	Polychaeta	-	Maldanidae	*Maldanella*	0	0	0.003	0	0	0	0	0
Annelida	Polychaeta	Nereidida	Nephtyidae	*Aglaophamus (A. dibranchis)*	0.008	0.002	0	0	0.003	0	0	0
Annelida	Polychaeta	Nereidida	Nephtyidae	*Aglaophamus (A. lyrochaeta)*	0	0	0	0.009	0	0.004	0	0

Phylum	Class	Order	Family	Genus	A	B	C	D	E	F	G	H
Annelida	Polychaeta	Nereidida	Nephtyidae	*Nephtys*	0.006	0.002	0.004	0.008	0.002	0.002	0	0.002
Annelida	Polychaeta	Sabellida	Oweniidae	*Owenia*	0.001	0	0	0.005	0	0.003	0	0
Annelida	Polychaeta	Scolecida	Opheliidae	*Ophelia*	0	0	0	0	0.023	0	0.003	0
Annelida	Polychaeta	Spionida	Poecilochaetidae	*Poecilochaetus*	0	0	0	0.014	0	0.010	0.002	0
Annelida	Polychaeta	Spionida	Spionidae	*Paraprionospio*	0	0.004	0.006	0.003	0	0.003	0.005	0
Annelida	Polychaeta	Spionida	Spionidae	*Prionospio*	0.003	0	0.001	0	0	0	0	0.002
Annelida	Polychaeta	Sternaspida	Sternaspidae	*Sternaspis(S. scutata)*	0	0.004	0	0.004	0.035	0	0.007	0.025
Annelida	Polychaeta	Terebellida	Terebellidae	*Amaeana*	0	0	0	0	0	0	0	0.001
Annelida	Polychaeta	Terebellida	Terebellidae	*Loimia(L.loimia)*	0.015	0.005	0	0	0.004	0	0.002	0.301
Annelida	Polychaeta	Terebellida	Terebellidae	*Terebella sp.1*	0	0	0.002	0	0	0	0	0
Annelida	Polychaeta	Terebellida	Terebellidae	*Terebella sp.2*	0	0	0	0.006	0.005	0	0	0
Annelida	Polychaeta	Terebellida	Trichobranchidae	*Terebellides (T. stroemii)*	0	0	0	0	0	0	0.002	0
Annelida	Oligochaeta	Lumbriculida	Lumbriculidae	*Lumbriculus sp.1*	0	0	0.002	0.005	0	0	0	0
Sipuncula	Sipunculiformes	Sipunculidea	Sipunculidae	*Sipunculus*	0	0	0.001	0.004	0	0	0	0
Arthropoda	Crustacea	Cumacea	Diastylidae	*c.f. Diastylis*	0	1.301	0	0	0	0	0	0
Arthropoda	Crustacea	Decapoda	Macrophthalmidae	*Cleistostoma*	0	0	0	5.145	0.855	0	0	0
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile	0	0	0.005	0	0.207	0.361	0	0
Arthropoda	Crustacea	Decapoda	Pilumnidae	*Typhlocarcinus*	3.261	0	0	0.012	0	0	1.058	0
Arthropoda	Crustacea	Decapoda	Porcellanidae	*Petrolisthes*	0	0	0	0	0	0.295	0	0
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus sp.1*	0	0.001	0.002	0.002	0.001	0.003	0.001	0.001
Arthropoda	Malacostraca	Amphipoda	Gammaridae	*Gammarus sp.2*	0	0.001	0.001	0	0	0	0.001	0.001
Arthropoda	Maxillopoda	Sessilia	Balanidae	*Balanus*	0.200	0	0	0	0	0	0	0.300

Phylum	Class	Order	Family	Genus	A	B	C	D	E	F	G	H
Echinodermata	Holothuroidea	Molpadiida	Caudinidae	*Acaudina*	5.900	0	0	0.298	0	0	0	0
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	*Amphioplus*	0.769	0	0	0.008	0	0.608	0	0
Cnidaria	Anthozoa	Pennatulacea	-	*Sea pen*	0	0	0	0	1.667	0	0	0
Mollusca	Bivalvia	Veneroida	Dreissenidae	*Mytilopsis*	0	0	1.236	2.025	0	1.015	0	2.914
Mollusca	Bivalvia	Veneroida	Solenidae	*Solen*	1.003	0	0	0.021	0	0	0	0
Mollusca	Bivalvia	Veneroida	Tellinidae	*c.f. Augulus*	0	0.069	0	0	0	0	0	0
Mollusca	Bivalvia	Veneroida	Veneridae	*Paphia (P. undulata)*	0.977	0	0	7.300	0.381	5.200	0.945	0
Mollusca	Bivalvia	Veneroida	Veneridae	*c.f. Phylloda foliacea*	0	0	1.987	0.033	0	0	0	0.055
Mollusca	Bivalvia	Veneroida	Veneridae	*Ruditapes (R. philippinarum)*	0	0	0	0	0	0	2.600	0
Mollusca	Bivalvia	Veneroida	Veneridae	Bivalve juvenile	0	0	0	0	0	0	0	0.034
Mollusca	Scaphopoda	-	Dentaliidae	-	0.568	0	0	2.900	0.340	0.180	0	0.870
Chordata	Ascidiacea	Aplousobranchia	-	Sea squirt	0.200	0	0	0	0	0	0	0
Nemertina	Anopla	Heteronemertea	-	*Cerebratulus sp.1*	0.003	0.005	0.002	0	0	0.004	0.002	0

Table 3. Summary of Benthic Survey Data, February 2020

Station	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
A	36	15.31	23	2.96	0.95
B	34	1.44	15	2.49	0.92
C*	40	3.28	19	2.72	0.92
D*	48	17.82	24	3.07	0.96
E	33	3.55	19	2.84	0.96
F	49	7.72	21	2.75	0.91
G	34	4.69	18	2.80	0.90
H	37	4.54	17	2.22	0.91
TOTAL	311	58.33			

*Impact Sites

Table 4. Summary of Benthic Survey Baseline Data, August 2004

Stations	Abundance	Total Biomass	Number of Taxa	Diversity (H')	Evenness (J)
A	115	14.56	24	0.93	0.29
B	36	4.76	14	0.89	0.34
C*	22	2.66	13	0.80	0.31
D*	39	5.07	11	0.62	0.26
E	39	48.69	16	0.89	0.32
F	11	8.07	9	0.68	0.31
G	182	4.91	31	1.10	0.32
H	23	0.49	11	0.81	0.34

*Impact Sites

Table 5. Summary of Benthic Survey Baseline Data, March 2004

Stations	Abundance	Total Biomass	Number of Taxa	Diversity (H')	Evenness (J)
A	337	17.39	38	0.78	0.21
B	110	0.9	21	0.82	0.27
C*	14	0.7	10	0.69	0.30
D*	37	10.07	20	1.01	0.34
E	28	0.44	11	0.76	0.32
F	67	0.78	16	0.85	0.31
G	25	0.09	9	0.64	0.29
H	23	0.15	11	0.44	0.18

*Impact Sites

Table 6. Taxonomic Composition (%) of Benthic Survey

% Composition	Mar-04	Aug-04	Apr-18	Jun-18	Aug-18	Oct-18	Dec-18	Feb-19	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20
Annelida	80.19	73.29	31.12	53.01	65.02	65.35	69.44	54.99	70.28	0.47	64.31	66.14	59.78	60.77
Sipuncula	0.78	0.21	0.30	0.80	0.45	0	0.93	0	0	0.00	1.57	1.25	0.00	1.29
Arthropoda	11.23	18.80	13.60	15.66	12.11	13.86	10.19	20.23	10.83	4.65	9.80	19.75	14.53	13.83
Echinodermata	0.62	3.63	15.11	4.82	5.38	2.97	2.78	3.42	4.72	0.47	5.10	3.13	1.68	1.61
Cnidaria *	1.72	0.43	0.60	0.40	0	0	0.93	0.85	0	1.86	0.39	0.00	0.84	0.32
Mollusca	5.46	3.42	50.45	21.29	15.69	16.83	12.96	19.94	13.33	0.47	17.25	8.15	22.35	19.94
Chordata	0.00	0.21	2.11	0.80	0.45	0.00	0.93	0.28	0.56	0.47	1.18	0.94	0.00	0.32
Nemertea	0.00	0	0.30	3.21	0.90	0.99	1.85	0.28	0.28	98.60	0.39	0.63	0.84	1.93

Table 7. Taxonomic Composition (abundance) of Benthic Survey

Abundance	Mar-04	Aug-04	Apr-18	Jun-18	Aug-18	Oct-18	Dec-18	Feb-19	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20
Annelida	514	343	103	132	145	132	150	193	253	124	164	211	214	189
Sipuncula	5	1	1	2	1	0	2	0	0	0	4	4	0	4
Arthropoda	72	88	45	39	27	28	22	71	39	17	25	63	52	43
Echinodermata	4	17	5	12	12	6	6	12	17	10	13	10	6	5
Cnidaria *	11	2	2	1	0	0	2	3	0	2	1	0	3	1
Mollusca	35	16	167	53	35	34	28	70	48	59	44	26	80	62
Chordata	0	1	7	2	1	0	2	1	2	2	3	3	0	1
Nemertea	0	0	1	8	2	2	4	1	1	1	1	2	3	6

Photos of Representative Taxa Identified

A) The species of Polychaeta, *c.f. Laetmonice sp.*

B) The species of Polychaeta, *Ophelia sp.*

C) The species of Polychaeta, *Sternaspis scutata*

D) The species of Polychaeta, *Neanthes sp.*

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Appendix J

Photos of Grab Samplers

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Report No.: 0041/17/ED/0533A

Photo 1. A ponar grab sampler

Photo 2. Grab dimension 1

Photo3. Grab dimension 2

Photo4. Grab dimension 3

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Photo 1. A modified Van Veen grab sampler

Photo 2. Grab dimension 1

Photo3. Grab dimension 2

Photo4. Grab dimension 3

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Appendix K

Environmental Complaints Log

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Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From and Received By	Nature of Complaint	Investigation
1	28 November 2019	EPD	According to EPD, a member of public complained that SHWSTW cause a malodour and was smelled as far as the Discovery Bay tunnel portal.	As advised by DSD, the operation of Siu Ho Wan Sewage Treatment Works was properly functioned and there was no special activity on 28th November 2019. Due to the possibility of having unpleasant gases or odours emitted from these non-DSD premises cannot be precluded, the complaint is considered as non-project related.

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Appendix L

Environmental Mitigation Implementation Schedule (EMIS)

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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
Air Quality					
NA	4.5	NA	Odour reduction measures like aeration, chemical dosing system shall be implemented to reduce any odour impacts to an acceptable level.	SHWSTW	Implemented
3.4	4.5	NA	Sewage treatment works including sludge thickening tanks, the sludge pump house and sludge press house shall be completely enclosed.	SHWSTW	Implemented
3.4	4.5	NA	Exhaust air shall be ventilated to an odour scrubber prior to discharge. Ventilating air to a biological treatment unit with 95% odour removal efficiency prior to stack exhaust shall be implemented	SHWSTW	Implemented
Water Quality					
3.3	NA	4.01	To avoid impacts on the marine ecology due to effluent discharge, the disinfection facility as in Part B of the EP shall be equipped with an UV disinfection system capable of removing at least 99.9% of E.coli from the sewage	SHWSTW	Implemented
Waste Management					
3.6	NA	NA	Transportation of sludge shall be carried out in fully enclosed containers, or be placed in sludge skips with tarpaulin covers	SHWSTW	Implemented
NA	NA	5.02	Trip-ticket system mentioned shall be implemented. Trip-ticket is required for each truckload delivered to the landfills facilities according to WBTC No. 31/2004.	SHWSTW	Implemented
NA	NA	5.02	The acceptance criteria for Landfill disposal shoula be followed, i.e. solid content of sludge waste should be more than 30%.	SHWSTW	Implemented
NA	NA	5.02	The disposal of grit & debris (if any) generated during primary screening works should follow the requirement set in the WMP Section 4.05.	SHWSTW	Implemented
NA	NA	5.03	The wet sludge should be temporarily stored at the sludge buffer tank. It should then be transported to the centrifuge building for dewatering and discharged to the container for disposal. The whole process should be managed by the automatic electronic electronic system and monitored by the operators during operation.	SHWSTW	Implemented
NA	NA	5.04	The other solid waste material such as sediment and grit, refuse containers or collection bags should be temporarily stored in slips at designated area. Operators should ensure sufficient space is identified and provided for temporary storage of waste materials to facilitate collection. Storage of waste material on site will be kept to a minimum to avoid nuisance to local residents.	SHWSTW	Implemented
NA	NA	5.05	Chemical wastes which likely to be generated by activities arise from the maintenance, shall followed the Waste Disposal (Chemical Waste) (General) Regulation, includes Schedule 1 of the Regulation.	SHWSTW	Implemented
NA	NA	5.06	In case of unlikely occurred chemical spillage, procedures should be followed as according to the WMP Section 5.06.	SHWSTW	Implemented
NA	NA	5.07	Temporary storage aareas should be identify and provided for the temporary storage of general	SHWSTW	Implemented

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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
			refuse to facilitate collection		
NA	NA	5.07	Domestics wastes refuse generated on-site will be stored in enclosed bins or compaction units separately	SHWSTW	Implemented
NA	NA	5.07	Sufficient dustbins should be provided for domestic waste if required.	SHWSTW	Implemented
NA	NA	5.07	Domestics wastes should be cleared daily and will be disposed off to the nearest licensed landfill or refuse transfer station.	SHWSTW	Implemented
NA	NA	5.07	Spearate labeled bins should be provided to segregate the waste generated by workforce. Waste recycle collector should be employed to collect the segregated waste	SHWSTW	Implemented
NA	NA	5.07	Cardboard and paper packaging (for plant, equipment and materials) shouid be recovered on site, properly stockpiled in dry condition and covered to prevent cross contamination by other materials.	SHWSTW	Implemented
NA	NA	5.07	Office waste should be minimized through using papers on both sides. Communication by electronic means should be used as far as possible.	SHWSTW	Implemented
NA	NA	5.07	The burning of refuse on-site is prohibited by law and shall not be undertaken	SHWSTW	Implemented
NA	NA	5.07	Toilet wastewater shall be transported to the STW for treatment	SHWSTW	Implemented
NA	NA	5.07	Arrangement for collection of recyclable materials by recycling contractors should be followed as according to the WMP Section 5.07.	SHWSTW	Implemented
NA	NA	5.08	All recycling materials removed by the recycling contractors should be properly recorded before the removal. The natures and quantities of the recycling materials, the date of removal and the name of the recycling contractor should be recorded.	SHWSTW	Implemented
NA	NA	5.09	To maintain the site in a clean and tidy condition during the operation, general measures specified in the WMP should be implemented on site at all times. Regular site inspections shall be undertaken by the management team to ensure the measures are implemented.	SHWSTW	Implemented
NA	NA	5.10	Daily cleaning should be performed daily after work within the plant and the public areas immediately next to the site.	SHWSTW	Implemented
NA	NA	5.11	The work officer in charge of the corresponding area should perform daily inspection on the items mentioned in the WMP Section 5.10. If observations were discovered, the work officer should record the result of the inspection on an inspection checklist with photos taken and submitted to the inspectors or Chief Technical Officer for review on the following day. Any deficieny should be rectified promptly.	SHWSTW	Implemented
NA	NA	5.12	Weekly tidying should be performed weekly within the site.	SHWSTW	Implemented
NA	NA	5.13	The inspector should perform Weekly Inspection on the items mentioned in the WMP Section 5.12. If observations were discovered, the work officer should record the result on an inspection checklist and submitted to the Chief Technical Officer for review on the following day. Any deficieny should be rectified promptly.	SHWSTW	Implemented

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EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
NA	NA	5.14	All wastes generated through the operational phase will be manages in accordance with the protocols set out in the WMP Section 5.14.	SHWSTW	Implemented