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Report No.: 0041/17/ED/0670

# Monthly EM&A Report April 2022

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/0670

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Appendix C	Event and Action Plan for Air Quality Monitoring
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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 Fifty-seventh Monthly EM&A Report for the Project which summarizes findings of the EM&A works during the reporting period from 1 April 2022 to 30 April 2022 (the "reporting period").

#### **Breaches of Action and Limit Levels**

Odour patrol monitoring was resumed from January 2020 and carried out on 4, 14, 20 and 26 April 2022. The modified odour patrol monitoring plan including updated Event and Action Plan was approved on March 2020, and modified odour patrol monitoring was commenced from 20 March 2020. No exceedances of Action/Limit levels at Air Sensitive Receivers (ASR) and odour patrol points 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 27 April 2022. 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.

## **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<sub>2</sub>S concentration (ppb) with the odour unit (OU/m³). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S 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 had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD.

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## 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.

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## 2. AIR QUALITY MONITORING

## 2.1 Methodology of H<sub>2</sub>S Concentration Monitoring

2.1.1 15-min H<sub>2</sub>S concentration was measured using a Jerome 631-X analyzer. This analyzer is capable of measuring H<sub>2</sub>S concentration in the range of 1 ppb to 50 ppm with a resolution of 1 ppb and operates within a temperature range of 0°C to 40°C 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<sub>2</sub>S 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<sub>2</sub>S monitoring.

Table 2.1 Equipment used for H₂S Concentration Monitoring

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

# 2.2 Methodology of Modified Odour Patrol Monitoring

- 2.2.1 Due to the complaint case received on 28 November 2019, a modified version of odour patrol monitoring is proposed and approved on 13 March 2020. According to the approved proposal for odour patrol monitoring plan (0041/17/ED/0524G), a modified version of odour patrol monitoring was commenced on 20 March 2020 to ensure the mitigation measures are effectively implemented. The modified odour patrol conducted once per week by two independent trained personnel/competent persons (the "patrollists") patrolling and sniffing along the SHWSTW boundary and the air sensitive receivers (ASRs).
- 2.2.2 The odour monitoring should not be undertaken on rainy days. Subject to the prevailing weather forecast condition, odour patrol shall be conducted by two patrollists at the downwind locations. During the patrol, the sequence should start from less odourous locations to stronger odourous locations.

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- 2.2.3 The two patrollists shall be satisfied the below requirements during odour patrol:
  - Have their individual odour threshold of n-butanol in nitrogen gas in the range of 20 to 80 ppb/V required by the European Standard menthod: BS EN13725.
  - Be free from any respiratory illnesses.
  - Not be allowed to smoke, eat, drink (except water) or use chewing gum or sweets 30min before and during odour patrol.
  - Take great care not to cause any interference with their own perception or that of others by lack of personal hygiene or the use of perfumes, deodorants, body lotions or cosmetics.
  - Not communicate with each other about the results of their choices.
- 2.2.4 During the odour patrol monitoring, the meteorological and surrounding information are recorded 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
- 2.2.5 The perceived intensity is to be divided into 5 levels which are ranked in a descending order as follows:

Table 2.2 Categories of Odour Intensity for Modified Odour Patrol Monitoring

Odour Level	Odour Intensity	Classification Criteria
0	Not detected	No odour perceived or an odour so weak that it cannot be easily characterised or described.
1	Slight	Slight identifiable odour, and slight chance to have odour nuisance.
2	Moderate	Moderate identifiable odour, and moderate chance to have odour nuisance.
3	Strong	Strong identifiable, likely to have odour nuisance.
4	Extreme	Extreme severe odour, and unacceptable odour level.

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# 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 airtight 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 H<sub>2</sub>S concentration monitoring and odour sampling at ASR, Cheung Tung Road near the Bus Depot at the west of the Siu Ho Wan Treatment Plant, were temporarily suspended from 14 May 2018. The location of ASR is shown in **Figure 1**.
- 2.4.2 9 odour patrol points is chosen to conduct the modified odour patrol for collecting more representative data and identify the particular source of odour in the site. The nine odour patrol points is as below:

Table 2.3 Odour Patrol Point

Odour Patrol Point	Description	
	Factors Cita Davisdani	
OD1	Eastern Site Boundary	
OD2	Southern Site Boundary	
OD3	Western Site Boundary	
OD4	Northern Site Boundary	
OD5	Spur Road near Discovery Bay Tunnel Outlet	
OD6	Cheung Tung Road near the Bus Depot	
OD7	Cheung Tung Road near O-PARK1	
OD8	Sham Shui Kok Dr near MTR Depot	
OD9	Discovery Bay Tunnel Toll Plaza	

2.4.3 The odour patrol points of modified odour patrol is shown in **Figure 2**.

## 2.5 Monitoring Frequency and Duration

2.5.1 The durations and frequencies of H<sub>2</sub>S concentration measurement, odour patrolling and odour sampling are summarized in **Table 2.4** below.

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Table 2.4 Durations and Frequencies of Air Quality Monitoring Programme

	Duration	Frequency		
H <sub>2</sub> S concentration		<sup>1</sup> Weekly basis for 6 months during the initial operation		
monitoring	15 minutes	stage		
Odour patrol		<sup>4,5</sup> Weekly basis		
Odour sampling for				
olfactometry	<sup>3</sup> 15 minutes	<sup>2</sup> First week of the odour patrol monitoring		
analysis				

#### 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<sub>2</sub>S concentration (ppb) with the odour unit (OU/m<sup>3</sup>) 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.
- 4) As instruction from the company of Discovery Bay Tunnel, odour patrol monitoring at OD5 (Spur Road near Discovery Bay Tunnel Outlet) was conducted on monthly basis.
- 2.5.2 The monitoring schedule for the present and next reporting period is provided in **Appendix B**.

#### 2.6 Event and Action Plan

2.6.1 According to the approved proposal for odour patrol monitoring plan (0041/17/ED/0524G), updated Action and limit levels for air quality monitoring are presented in **Table 2.5**.

Table 2.5 Action and Limit Levels for Air Quality Monitoring

Parameter	Action	Limit
Odour Nuisance	One complaint received for specific	•
	odour event / Odour intensity of 2	complaints received for specific
	or above is measured from odour	odour event in 3 months / Odour
	patrol	intensity of 3 or above is measured
		from odour patrol

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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. The odour patrol monitoring was carried out on 10, 16, 22 and 28 December 2021. As instruction from the company of Discovery Bay Tunnel, odour patrol monitoring at OD5 (Spur Road near Discovery Bay Tunnel Outlet) was conducted on monthly basis.
- 2.8.2 The meteorological data including temperature, wind speed and direction of the reporting period at ASR is summarised in **Table 2.6**.

Table 2.6 Summary of Meteorological Data in Reporting Period

Date	Location	Temperature (°C)	Relative Humidity (%)	Wind Direction	Wind Speed
		( 0)	riaillancy (70)	Direction	(m/s)
4 April 2022	OD1	24.0	32	SW	1.3
	OD2			-	0.0
	OD3			SW	1.4
	OD4			SW	0.9
	OD6			-	0.0
	OD7			NE	1.1
	OD8			NE	0.7
	OD9			NE	0.3
14 April 2022	OD1	24.7	64	NW	1.4
	OD2			NW	0.4
	OD3			NW	0.3
	OD4			NW	0.6
	OD6			N	0.5
	OD7			NW	0.3
	OD8			NW	1.2
	OD9			NW	0.6
20 April 2022	OD1	22.2	72	N	0.5
	OD2			N	0.4
	OD3			NE	0.4
	OD4			NE	0.6
	OD6			NE	0.3
	OD7			NE	0.4
	OD8			NE	0.4

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	OD9			NE	0.7
26 April 2022	OD1	29.0	69	S	1.7
	OD2			S	0.5
	OD3			S	0.4
	OD4			S	1.4
	OD5			NE	0.7
	OD6			S	2.1
	OD7			SW	0.9
	OD8			N	1.2
	OD9			SW	0.8

2.8.3 The monitoring results in the reporting period are summarised in **Table 2.7**. Graphical pots of results and details of monitoring data are shown in **Appendix D**.

Table 2.7 Summary of Air Quality Monitoring Result in Reporting Period

	Monitoring Parameter
Monitoring Location	Odour Patrol <sup>^</sup> (Odour Level)
	Range
OD1	0 - 0
OD2	0 - 1
OD3	0 - 0
OD4	0 - 0
OD5	0
OD6	0 - 0
OD7	0 - 0
OD8	0 - 0
OD9	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<sub>2</sub>S concentration (ppb) with the odour unit (OU/m³). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S 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 had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD.
- 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.

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## 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 3**.

Table 3.1 Location of Water Quality Monitoring

	Sampling Location	Easting	Northing
Α	The Brothers, Control Station	816 100	822 500
В	The Brothers, Control Station	816 680	822 440
С	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
Е	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
Н	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)							

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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 4**.

# 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	Pri. 0 to 14 pri units	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

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Table 3.4 Equipment used for Water Quality Monitoring

Equipment	Manufacturer / Model	Serial Number
Water Quality Monitoring Device	Aqua TROLL 600 Multiparameter Sonde	525120
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<sub>5</sub>, Suspended Solids, NH<sub>3</sub>-N, NO<sub>3</sub>-N, NO<sub>2</sub>-N, Total inorganic nitrogen, Total phosphorus (soluble and particulate).

## 3.4 Laboratory Measurement and Analysis

3.4.1 With reference to EPD's letter (Ref: Ax(7) to EP 2/No/F/50 Pt.7) dated 8 February 2022, Change of Laboratory on Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey (0041\_17\_ED\_0632A) is approved. Fugro Technical Services Limited (HOKLAS Reg. No. 015), 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

		, p o : g =
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 23rd edition 5210B	1 mg/L
Total Suspended Solid	APHA 23rd edition 2540D	0.5 mg/L
Ammonia as N	APHA 23rd edition 4500 - NH <sub>3</sub> H	0.005 mg/L
Nitrate as N	APHA 23rd edition 4500 - NO <sub>3</sub> - I	0.005 mg/L
Nitrite as N	APHA 23rd edition 4500 - NO <sub>2</sub> - A & NO <sub>3</sub> - I	0.005 mg/L
Total Inorganic Nitrogen	By Calculation	0.01 mg/L

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Analysis Description	Method	Reporting limits
Total phosphorus (soluble and particulate)	APHA 17th edition 4500-PB5 (digestion) and In-house method E- T-056 (determination)	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.

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## 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 was 27 April 2022. 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)

Station Depth g Depth oxygen (degree (m) (m) (mg/L) Celsius) (ppt) (NTU) speed (m/s) (m/s)	Current velocity (degree magnetic) 74.1 72.5 100.3 101.4 89.2
A       (m)       (mg/L)       Celsius)       (m/s)       (	(degree magnetic) 74.1 72.5 100.3 101.4
A 17	magnetic) 74.1 72.5 100.3 101.4
A 17	74.1 72.5 100.3 101.4
A 17	72.5 100.3 101.4
A 17	100.3 101.4
A       17       M       8.5       6.20       24.73       8.29       26.34       6.1       0.14         B       16       6.14       24.52       8.31       26.71       7.2       0.12         B       16       6.15       24.51       8.34       26.73       7.3       0.13         S       1       6.58       24.71       8.24       26.11       4.1       0.24         S       1       6.57       24.72       8.24       26.14       4.3       0.22         M       7       6.43       24.53       8.30       26.39       6.1       0.13         M       7       6.42       24.54       8.31       26.34       6.3       0.18         B       13       6.21       24.11       8.32       26.58       7.1       0.17         B       13       6.23       24.14       8.32       26.59       7.3       0.19         S       1       6.42       24.74       8.29       26.10       9.1       0.06         S       1       6.43       24.79       8.27       26.04       9.3       0.06         M       6       6.26       23.92<	101.4
B 16 6.14 24.52 8.31 26.71 7.2 0.12 B 16 6.15 24.51 8.34 26.73 7.3 0.13  S 1 6.58 24.71 8.24 26.11 4.1 0.24 S 1 6.57 24.72 8.24 26.14 4.3 0.22 M 7 6.43 24.53 8.30 26.39 6.1 0.13 M 7 6.42 24.54 8.31 26.34 6.3 0.18 B 13 6.21 24.11 8.32 26.58 7.1 0.17 B 13 6.23 24.14 8.32 26.59 7.3 0.19  S 1 6.42 24.74 8.29 26.10 9.1 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 M 6 6.27 23.92 8.26 26.41 12.7 0.04 M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	
B 16 6.15 24.51 8.34 26.73 7.3 0.13  S 1 6.58 24.71 8.24 26.11 4.1 0.24  S 1 6.57 24.72 8.24 26.14 4.3 0.22  M 7 6.43 24.53 8.30 26.39 6.1 0.13  M 7 6.42 24.54 8.31 26.34 6.3 0.18  B 13 6.21 24.11 8.32 26.58 7.1 0.17  B 13 6.23 24.14 8.32 26.59 7.3 0.19  S 1 6.42 24.74 8.29 26.10 9.1 0.06  S 1 6.43 24.79 8.27 26.04 9.3 0.06  M 6 6.27 23.92 8.26 26.41 12.7 0.04  M 6 6.26 23.92 8.24 26.42 12.6 0.07  B 11 6.15 23.81 8.24 26.81 13.4 0.10	
B 14 6.58 24.71 8.24 26.11 4.1 0.24   S 1 6.57 24.72 8.24 26.14 4.3 0.22   M 7 6.43 24.53 8.30 26.39 6.1 0.13   M 7 6.42 24.54 8.31 26.34 6.3 0.18   B 13 6.21 24.11 8.32 26.58 7.1 0.17   B 13 6.23 24.14 8.32 26.59 7.3 0.19   S 1 6.42 24.74 8.29 26.10 9.1 0.06   S 1 6.43 24.79 8.27 26.04 9.3 0.06   S 1 6.43 24.79 8.27 26.04 9.3 0.06   M 6 6.27 23.92 8.26 26.41 12.7 0.04   M 6 6.26 23.92 8.24 26.42 12.6 0.07   B 11 6.15 23.81 8.24 26.81 13.4 0.10	88.6
B 14 6.57 24.72 8.24 26.14 4.3 0.22 M 7 6.43 24.53 8.30 26.39 6.1 0.13 M 7 6.42 24.54 8.31 26.34 6.3 0.18 B 13 6.21 24.11 8.32 26.58 7.1 0.17 B 13 6.23 24.14 8.32 26.59 7.3 0.19 S 1 6.42 24.74 8.29 26.10 9.1 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 M 6 6.27 23.92 8.26 26.41 12.7 0.04 M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	144.5
B 14 M 7 6.43 24.53 8.30 26.39 6.1 0.13 M 7 6.42 24.54 8.31 26.34 6.3 0.18 B 13 6.21 24.11 8.32 26.58 7.1 0.17 B 13 6.23 24.14 8.32 26.59 7.3 0.19 S 1 6.42 24.74 8.29 26.10 9.1 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 M 6 6.26 23.92 8.26 26.41 12.7 0.04 M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	141.7
B       14       M       7       6.42       24.54       8.31       26.34       6.3       0.18         B       13       6.21       24.11       8.32       26.58       7.1       0.17         B       13       6.23       24.14       8.32       26.59       7.3       0.19         S       1       6.42       24.74       8.29       26.10       9.1       0.06         S       1       6.43       24.79       8.27       26.04       9.3       0.06         S       1       6.43       24.79       8.27       26.04       9.3       0.06         M       6       6.27       23.92       8.26       26.41       12.7       0.04         M       6       6.26       23.92       8.24       26.42       12.6       0.07         B       11       6.15       23.81       8.24       26.81       13.4       0.10	182.6
C 12 B 13 6.21 24.11 8.32 26.58 7.1 0.17 B 13 6.23 24.14 8.32 26.59 7.3 0.19 S 1 6.42 24.74 8.29 26.10 9.1 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 M 6 6.27 23.92 8.26 26.41 12.7 0.04 M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	173.5
C 12 B 13 6.23 24.14 8.32 26.59 7.3 0.19 S 1 6.42 24.74 8.29 26.10 9.1 0.06 S 1 6.43 24.79 8.27 26.04 9.3 0.06 M 6 6.27 23.92 8.26 26.41 12.7 0.04 M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	162.4
C   S   1   6.42   24.74   8.29   26.10   9.1   0.06	166.1
C   S   1   6.43   24.79   8.27   26.04   9.3   0.06   M   6   6.27   23.92   8.26   26.41   12.7   0.04   M   6   6.26   23.92   8.24   26.42   12.6   0.07   B   11   6.15   23.81   8.24   26.81   13.4   0.10	31.6
C 12 M 6 6.27 23.92 8.26 26.41 12.7 0.04 M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	31.4
M 6 6.26 23.92 8.24 26.42 12.6 0.07 B 11 6.15 23.81 8.24 26.81 13.4 0.10	52.4
B 11 6.15 23.81 8.24 26.81 13.4 0.10	51.8
	49.2
D         0.14   23.02   0.23   20.03   13.8   0.11	49.3
S 1 6.20 26.14 8.32 26.40 4.8 0.17	213.4
S 1 6.18 26.19 8.31 26.41 4.9 0.13	206.1
M 65 603 2644 934 2690 51 0.11	246.1
D 13 M 6.5 6.05 26.48 8.34 26.88 5.3 0.12	241.3
B 12 5.87 26.71 8.33 27.11 5.8 0.14	261.2
B 12 5.86 26.72 8.33 27.13 5.9 0.17	253.1
S 1 6.02 24.16 8.26 28.17 4.9 0.06	312.4
S 1 6.04 24.15 8.25 28.11 4.4 0.05	311.6
T 46 M 8 5.74 24.01 8.24 28.31 5.9 0.09	271.4
E 16 M 8 5.76 24.01 8.24 28.32 5.7 0.09	277.6
B 15 5.64 23.86 8.29 28.59 7.1 0.13	301.2
B 15 5.61 23.84 8.26 28.56 7.2 0.14	303.4
S 1 5.72 28.81 8.41 28.21 5.7 0.26	204.5
S 1 5.73 23.82 8.42 28.34 5.6 0.24	201.1
F 23 M 11.5 5.61 23.61 8.26 28.61 7.2 0.11	184.6
F 23 M 11.5 5.62 23.62 8.27 28.67 7.3 0.13	10 1.0
B 22 5.41 23.44 8.29 28.91 8.8 0.20	183.1
B 22 5.42 23.41 8.29 28.92 8.9 0.21	

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Monitoring Station	Water Depth (m)	Samplin g Depth (m)		Dissolved oxygen (mg/L)	Temperature (degree Celsius)	рН	Salinity (ppt)	Turbidity (NTU)	Current speed (m/s)	Current velocity (degree magnetic)
		S	1	6.01	24.61	8.24	27.31	4.1	0.10	71.4
		S	1	6.03	24.64	8.22	27.32	4.2	0.12	70.8
G	22	М	11	6.02	24.51	8.26	27.11	4.2	0.15	92.1
G		М	11	6.01	24.52	8.22	27.12	4.2	0.17	92.4
		В	21	6.03	24.44	8.24	27.14	3.4	0.13	101.4
		В	21	6.02	24.41	8.27	27.15	3.2	0.14	102.6
		S	1	5.84	24.59	8.22	27.03	3.1	0.21	144.1
		S	1	5.81	24.58	8.23	27.04	3.4	0.23	142.5
	19	М	9.5	5.77	24.51	8.26	27.24	4.2	0.12	164.1
Н	19	М	9.5	5.74	24.52	8.24	27.22	4.3	0.14	166.2
		В	18	5.63	24.23	8.17	27.34	5.2	0.20	121.4
		В	18	5.64	24.22	8.17	27.38	5.1	0.21	122.4

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

Monitoring	Water		pling	Dissolved	Temperature	рН	Salinity	Turbidity	Current	Current
Station	Depth	Dep		oxygen	(degree	ľ	(ppt)	(NTU)	speed	velocity
	(m)	(m)		(mg/L)	Celsius)		(PP3)	()	(m/s)	(degree
	()	(***)		(1119/ =)	Coloido				(111/0)	magnetic)
		S	1	6.12	25.77	8.26	25.11	4.1	0.21	324.5
		S	1	6.13	25.64	8.24	25.13	4.2	0.28	322.7
		M	7.5	6.07	25.91	8.31	25.38	8.7	0.13	341.9
Α	15	M	7.5	6.05	25.93	8.32	25.39	8.6	0.19	338.2
		В	14	5.89	26.14	8.36	25.82	9.4	0.18	350.6
		В	14	5.90	26.12	8.39	25.80	9.5	0.17	352.1
		S	1	6.45	25.31	8.24	25.74	5.1	0.13	52.8
		S	1	6.41	25.34	8.23	25.79	5.3	0.15	51.4
		M	7	6.31	25.14	8.26	25.91	6.2	0.09	26.9
В	14	М	7	6.33	25.11	8.26	25.93	6.4	0.08	26.4
		В	13	6.24	25.02	8.21	26.14	7.3	0.13	37.2
		В	13	6.22	25.04	8.23	26.12	7.4	0.16	37.8
		S	1	5.86	27.14	8.26	27.41	1.3	0.24	61.4
		S	1	5.87	27.16	8.24	27.42	1.4	0.21	60.3
0	12	М	6	5.52	27.82	8.22	27.81	5.6	0.26	81.2
С		М	6	5.53	27.88	8.26	27.88	5.2	0.24	81.9
		В	11	5.41	28.26	8.29	28.02	7.7	0.20	64.7
		В	11	5.44	28.22	8.27	28.03	7.8	0.24	64.6
		S	1	6.03	24.30	8.11	27.19	4.2	0.14	204.2
		S	1	6.01	24.31	8.12	27.18	4.4	0.11	206.1
D	14	М	7	5.87	24.01	8.14	27.34	6.2	0.09	184.5
D	14	М	7	5.86	24.02	8.15	27.33	6.3	0.09	182.7
		В	13	5.64	23.79	8.16	27.59	8.9	0.08	171.2
		В	13	5.63	23.78	8.16	27.58	9.1	007	173.4
		S	1	6.44	24.59	8.31	28.12	2.5	0.14	91.2
		S	1	6.48	24.58	8.34	28.14	2.7	0.13	90.4
Е	14	М	7	6.37	24.13	8.31	28.36	4.1	0.19	131.4
<b>—</b>	14	М	7	6.39	24.11	8.32	28.39	4.2	0.21	133.7
		В	13	6.12	23.17	8.32	28.61	5.3	0.15	104.1
		В	13	6.10	23.16	8.31	28.67	5.8	0.15	104.2
F	18	S	1	6.41	24.81	8.29	27.40	6.4	0.13	34.5

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Monitoring	Water	Sam	pling	Dissolved	Temperature	рН	Salinity	Turbidity	Current	Current
Station	Depth	Dep		oxygen	(degree	•	(ppt)	(NTU)	speed	velocity
	(m)	(m)		(mg/L)	Čelsius)		(1 )	,	(m/s)	(degree
	,			, ,	,				, ,	magnetic)
		S	1	6.43	24.83	8.24	27.41	7.0	0.11	31.2
		М	9	6.18	24.51	8.26	27.58	7.1	0.15	52.6
		М	9	6.19	24.55	8.26	27.59	7.3	0.13	52.7
		В	17	6.11	24.11	8.31	27.81	8.0	0.09	41.8
		В	17	6.09	24.12	8.32	27.85	8.1	0.09	40.6
	13	S	1	6.41	24.91	8.28	28.11	2.4	0.19	291.4
		S	1	6.39	24.92	8.29	28.14	2.5	0.21	283.7
G		М	6.5	6.23	24.61	8.29	28.28	2.3	0.07	266.5
l G	13	М	6.5	6.24	24.62	8.31	28.34	2.4	0.07	266.1
		В	12	6.08	24.27	8.24	28.57	2.8	0.12	304.2
		В	12	6.09	24.22	8.26	28.56	2.9	0.14	303.8
		S	1	6.24	24.40	8.28	27.72	3.4	0.08	161.5
		S	1	6.22	24.51	8.29	27.70	3.9	0.08	162.3
Н	19	М	9.5	6.03	24.11	8.26	27.56	5.8	0.06	164.8
"	19	М	9.5	6.04	24.12	8.27	27.55	5.9	0.05	166.1
		В	18	5.92	24.01	8.26	27.84	7.1	0.13	183.1
		В	18	5.91	24.02	8.27	27.81	7.2	0.14	181.4

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	Water		pling	TSS	NH <sub>3</sub>	NO <sub>2</sub>	NO <sub>3</sub> -	TIN	E.coli	Total P	BOD <sub>5</sub>
Station	Depth	Dep		(mg/L)	as N	as N	as N	(mg/L)	(cfu/100mL)	(mg/L)	(mg/L)
	(m)	(m)			(mg/L)	(mg/L)	(mg/L)		,	, ,	, ,
		S	1	5	0.040	0.020	0.55	0.61	ND	0.01	1.4
		S	1	5	0.040	0.020	0.52	0.59	2	0.01	1.2
Α	17	М	8.5	7	0.050	0.020	0.52	0.58	1	0.02	<1
A	17	М	8.5	6	0.04	0.02	0.53	0.59	3	0.02	1.4
		В	16	3	0.03	0.02	0.62	0.67	1	0.01	1.6
		В	16	3	0.04	0.02	0.70	0.75	2	0.01	1.8
		S	1	6	0.05	0.02	0.51	0.58	2	0.01	1.3
		S	1	6	0.05	0.02	0.56	0.63	ND	0.02	1.0
В	14	М	7	6	0.05	0.02	0.49	0.56	2	0.02	1.8
Ь		M	7	6	0.04	0.02	0.46	0.52	4	0.02	1.2
		В	13	7	0.04	0.02	0.55	0.61	2	0.01	1.2
		В	13	7	0.04	0.02	0.44	0.50	4	0.02	1.2
		S	1	4	0.04	0.02	0.56	0.62	1	0.02	1.3
		S	1	4	0.04	0.02	0.57	0.63	2	0.02	2.9
С	12	М	6	5	0.04	0.02	0.54	0.59	2	0.01	2.5
	12	М	6	5	0.04	0.02	0.52	0.58	4	0.01	<1
		В	11	5	0.03	0.02	0.55	0.60	3	0.01	1.5
		В	11	5	0.03	0.02	0.58	0.64	1	<0.01	2.7
		S	1	5	0.07	0.02	0.48	0.57	1	<0.01	1.4
		S	1	5	0.07	0.02	0.52	0.60	1	0.01	1.5
D	13	М	6.5	3	0.04	0.02	0.48	0.54	1	0.01	1.2
		М	6.5	3	0.04	0.02	0.46	0.53	2	0.01	1.1
		В	12	3	0.05	0.02	0.49	0.56	2	0.02	1.4

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B. 8				T00	I	110	110			T	505
Monitoring	Water		pling	TSS	NH <sub>3</sub>	NO <sub>2</sub>	NO <sub>3</sub>	TIN	E.coli	Total P	BOD <sub>5</sub>
Station	Depth	Dep	th	(mg/L)	as N	as N	as N	(mg/L)	(cfu/100mL)	(mg/L)	(mg/L)
	(m)	(m)			(mg/L)	(mg/L)	(mg/L)				
		В	12	4	0.05	0.02	0.53	0.60	4	0.02	1.1
		S	1	4	0.07	0.02	0.52	0.61	26	0.02	1.2
		S	1	4	0.07	0.02	0.49	0.58	32	0.01	2.7
E 16	16	М	8	4	0.07	0.02	0.50	0.59	25	<0.01	1.4
	10	М	8	4	0.07	0.02	0.43	0.52	12	<0.01	1.8
		В	15	4	0.07	0.02	0.43	0.52	30	0.02	2.0
		В	15	4	0.06	0.02	0.45	0.54	35	0.01	1.3
		S	1	3	0.06	0.02	0.46	0.55	22	0.01	1.3
		S	1	3	0.05	0.02	0.44	0.51	2	0.01	<1
F	23	М	11.5	3	0.10	0.02	0.55	0.67	20	0.01	<1
Г		М	11.5	3	0.10	0.02	0.57	0.37	26	0.01	1.5
		В	22	3	0.07	0.02	0.50	0.59	20	0.01	1.3
		В	22	3	0.07	0.02	0.56	0.65	16	0.01	1.3
		S	1	5	0.07	0.01	0.33	0.41	30	0.02	1.5
		S	1	5	0.07	0.02	0.32	0.41	41	0.01	1.4
G	22	М	11	5	0.08	0.01	0.33	0.43	21	0.01	1.5
G	22	М	11	5	0.08	0.01	0.35	0.45	14	0.01	1.3
		В	21	4	0.08	0.01	0.32	0.41	12	<0.01	1.8
		В	21	4	0.08	0.01	0.27	0.37	13	0.01	1.8
		S	1	4	0.08	0.01	0.31	0.40	150	0.02	2.0
		S	1	4	0.08	0.01	0.31	0.41	140	0.02	2.3
ш	10	М	9.5	4	0.08	0.02	0.39	0.49	410	0.01	2.0
Н	19	М	9.5	4	0.09	0.01	0.43	0.53	210	0.01	2.3
		В	18	4	0.06	0.01	0.32	0.39	26	0.03	1.9
		В	18	4	0.06	0.01	0.34	0.42	15	0.04	1.8

Table 3.9 Summary of Laboratory Analysis Results (Mid-flood)											
Monitoring	Water	Sam	npling	TSS	NH <sub>3</sub>	$NO_2^-$	$NO_3^-$	TIN	E.coli	Total P	BOD <sub>5</sub>
Station	Depth	Dep	th	(mg/L)	as N	as N	as N	(mg/L)	(cfu/100mL)	(mg/L)	(mg/L)
	(m)	(m)			(mg/L)	(mg/L)	(mg/L)				
		S	1	3	0.04	0.02	0.48	0.54	3	0.02	1.0
		S	1	3	0.04	0.02	0.51	0.57	ND	0.02	1.1
Α	15	М	7.5	3	0.07	0.02	0.43	0.52	1	0.01	1.1
_ ^	15	М	7.5	3	0.07	0.02	0.44	0.53	ND	0.01	1.3
		В	14	3	0.04	0.02	0.45	0.51	ND	0.02	1.0
		В	14	3	0.04	0.02	0.51	0.56	1	0.02	1.1
		S	1	4	0.05	0.02	0.50	0.57	ND	0.03	1.2
		S	1	4	0.05	0.02	0.47	0.54	1	0.03	<1
В	14	М	7	4	0.09	0.02	0.59	0.70	1	0.03	<1
Ь	14	М	7	4	0.09	0.02	0.55	0.66	1	0.02	1.1
		В	13	3	0.04	0.02	0.46	0.52	ND	0.03	1.0
		В	13	3	0.04	0.02	0.48	0.54	1	0.02	1.1
		S	1	3	0.04	0.02	0.63	0.69	1	<0.01	1.3
		S	1	3	0.04	0.02	0.37	0.73	ND	<0.01	1.0
С	12	М	6	3	0.05	0.02	0.45	0.51	ND	0.01	1.3
0   12	12	М	6	3	0.04	0.02	0.48	0.55	1	0.01	1.1
		В	11	3	0.04	0.02	0.54	0.60	ND	0.01	1.1
		В	11	3	0.04	0.02	0.52	0.58	1	0.01	1.1
D	14	S	1	4	0.05	0.02	0.66	0.74	1	<0.01	<1
U	14	S	1	4	0.05	0.02	0.62	0.69	ND	<0.01	<1

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Monitoring	Water	San	npling	TSS	NH <sub>3</sub>	NO <sub>2</sub> -	NO <sub>3</sub> -	TIN	E.coli	Total P	BOD <sub>5</sub>
Station	Depth	Dep	th	(mg/L)	as N	as N	as N	(mg/L)	(cfu/100mL)	(mg/L)	(mg/L)
	(m)	(m)			(mg/L)	(mg/L)	(mg/L)				
		М	7	3	0.05	0.02	0.75	0.82	3	<0.01	1.2
		М	7	3	0.05	0.02	0.71	0.78	1	<0.01	1.2
		В	13	4	0.05	0.02	0.72	0.79	2	<0.01	1.2
		В	13	4	0.05	0.02	0.66	0.73	1	<0.01	1.2
		S	1	5	0.02	0.02	0.39	0.43	13	0.01	2.1
		S	1	5	0.03	0.02	0.46	0.50	20	0.01	1.8
Е	14	М	7	5	0.04	0.02	0.60	0.66	22	<0.01	1.6
_	14	М	7	5	0.04	0.02	0.67	0.73	30	<0.01	1.5
		В	13	5	0.04	0.02	0.61	0.67	15	0.01	1.4
		В	13	5	0.04	0.02	0.65	0.71	16	0.01	1.1
		S	1	4	0.04	0.02	0.62	0.68	22	0.02	1.2
		S	1	4	0.04	0.02	0.64	0.69	14	0.02	1.3
F	18	М	9	5	0.06	0.02	0.52	0.59	35	<0.01	1.1
'	10	М	9	5	0.05	0.02	0.57	0.64	21	<0.01	1.0
		В	17	6	0.02	0.02	0.44	0.48	16	<0.01	1.3
		В	17	6	0.02	0.02	0.43	0.47	21	<0.01	1.5
		S	1	6	0.04	0.02	0.38	0.44	390	0.01	1.5
		S	1	6	0.03	0.01	0.36	0.41	120	0.01	1.7
G	13	М	6.5	6	0.05	0.01	0.42	0.48	160	0.02	1.5
	13	М	6.5	6	0.06	0.01	0.60	0.53	230	0.02	1.6
		В	12	6	0.03	0.02	0.55	0.59	10	<0.01	1.3
		В	12	6	0.03	0.02	0.53	0.57	7	0.01	1.4
		S	1	6	0.03	0.01	0.38	0.42	24	0.01	1.9
		S	1	6	0.05	0.01	0.39	0.45	10	0.01	2.1
Н	19	М	9.5	6	0.04	0.01	0.38	0.43	8	0.02	1.8
''	19	М	9.5	6	0.03	0.01	0.41	0.46	35	0.02	2.4
		В	18	6	0.04	0.02	0.37	0.42	200	0.01	2.2
		В	18	6	0.03	0.02	0.40	0.44	200	0.01	2.2

- 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	Ai	r Temperat	ure	Mean	Total
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)	Relative Humidity (%)	Rainfall (mm)
27 April 2022	31.6	28.4	26.1	78	0.0

Source: Hong Kong Observatory

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## 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 3**.

Table 4.1 Location of Sediment Quality Monitoring and Benthic Survey

	Sampling Location	Easting	Northing
Α	The Brothers, Control Station	816 100	822 500
В	The Brothers, Control Station	816 680	822 440
С	Siu Ho Wan Outfall, Impact Station	816 800	820 180
D	Siu Ho Wan Outfall, Impact Station	817 160	820 360
Е	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
Н	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 Paramet	ters
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)	

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\*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 4**.

# 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.

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## 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 With reference to EPD's letter (Ref: Ax(7) to EP 2/No/F/50 Pt.7) dated 8 February 2022, Change of Laboratory on Water Quality Monitoring, Sediment Quality Monitoring and Benthic Survey (0041\_17\_ED\_0632A) is approved. Fugro Technical Services Limited (HOKLAS Reg. No. 015), 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 8.1, 8.5 and 8.7	1%
Total Organic Carbon	APHA 23rd edition 5310B	0.05%
pH value	APHA 23rd edition 4500-H+B	0.1 pH unit
Ammonia as N	APHA 23rd edition 4500 NH3: B & C / In house method E-T-039	0.5 mg/kg
Total Nitrogen	APHA 23rd edition 4500 $N_{org}$ : D (digestion), In-house method E-T-036, E-T-037 & APHA 23rd edition 4500 - $NO_3$ - I	10 mg/kg
Total Phosphorus	APHA 17th edition 4500 – PB.5 (digestion) & In house method E-T-056 (determination)	10 mg/kg
Cadmium	USEPA method 3050B (digestion) and	0.1 mg/kg
Chromium	6020A (determination)	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

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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 27 April 2022. 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.** 

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Table 4.4 Summary of laboratory analysis results for sediment monitoring

Monitoring Station	pH value	NH <sub>3</sub> 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/k g)	Ni (mg /kg)	Zn (mg /kg)	As (mg /kg)	Ag (mg/k g)
Α	8.2	7.3	1200	490	<0.1	23	21	31	0.10	13	73	12	0.2
В	8.1	9.3	1100	450	<0.1	27	29	36	0.11	16	90	10	0.5
С	8.0	12	1100	480	<0.1	28	29	36	0.10	17	87	10	0.3
D	8.0	12	950	440	<0.1	28	29	36	0.14	16	89	10	0.3
Е	8.0	15	930	460	<0.1	28	30	36	0.10	17	91	9.2	0.3
F	8.0	20	940	470	<0.1	22	37	33	0.21	13	87	9.4	0.3
G	8.8	6.0	920	740	<0.1	17	19	23	0.07	10	56	6.1	0.2
Н	8.2	8.0	910	380	<0.1	26	36	32	0.07	15	79	10	0.3

Table 4.5 Summary of laboratory analysis results for benthic survey

Monitoring Station	Total organic	Grain size profile (%)				Description	
Station	carbon (%)	Gravel	Gravel Sand Silt Clay		Clay		
А	0.33	8	33	26	33	Moist, brownish grey, slightly gravelly, slightly sandy SILT/CLAY	
В	0.68	0	13	43	44	Moist, grey, slightly sandy SILT/CLAY	
С	0.79	0	3	47	50	Moist, grey, slightly sandy SILT/CLAY	
D	0.70	0	7	47	46	Moist, grey, slightly sandy SILT/CLAY	
E	0.75	0	3	48	49	Moist, grey, slightly sandy SILT/CLAY	
F	0.86	0	2	51	47	Moist, grey, slightly sandy SILT/CLAY	
G	0.57	43	25	17	15	Moist, brown, very clayey, very silty, very sandy GRAVEL with shell fragments	
Н	0.49	1	9	44	46	Moist, grey, slightly gravelly, slightly sandy SILT/CLAY	

- 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	Ai	r Temperat	Mean	Total	
	Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)	Relative Humidity (%)	Rainfall (mm)
27 April 2022	31.6	28.4	26.1	78	0.0

Source: Hong Kong Observatory

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

Table 4.7 Summary of benthic survey data on 27 April 2022

rable 1.7 Carimary or bortane curvey data on 27 7 pm 2022								
Monitoring Station	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)			
Α	32	3.70	14	2.46	0.93			
В	46	2.78	13	2.25	0.88			
С	41	0.73	12	2.03	0.82			
D	37	1.75	8	1.71	0.82			
Е	85	11.26	14	2.17	0.82			
F	55	2.48	8	1.77	0.85			
G	28	0.49	9	1.74	0.79			
Н	49	2.87	12	1.93	0.78			

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

## i) Abundance

A total of 373 benthic organisms was recorded from the eight monitoring stations during April 2022 monitoring period. Current monitoring results showed lower total monthly abundance compared to both dry (March 2004) and wet (August 2004) seasons baseline data results. Similar with previous monitoring periods, total monthly abundance of benthic organisms exhibits significant seasonal variation (F-value = 4.54; F-crit = 1.55; p-value = 3.72E-10;  $\alpha = 0.05$ ).

In terms of spatial distribution, the lowest abundance of 28 ind. was recorded in the reference station, Station G, while the highest (85 ind.) was also noted in other reference station, Station E. Total macrobenthic abundances, similar with the previous monitoring periods, showed statistically significant spatial distribution (F-value = 3.43; F-crit = 2.05; P-value = 0.002;  $\alpha = 0.05$ ).

## ii) Biomass

The total wet biomass recorded in the eight monitoring stations was 26.05 g with the highest biomass recorded in the reference station, Station E (11.26 g) while the lowest biomass was observed in another reference station, Station G (0.49 g). Relative to the February 2022 period, a general decrease in biomass was observed during the current monitoring period. Most of the current decrease was attributed to the absence of *Trypauchen (T. vagina)* in the benthic community.

#### iii) Taxonomic Composition

A total of six phyla comprising of 24 families and about 28 genera were identified. During the current monitoring period, the molluscs (37.27%) dominated the macrobenthic assemblage, followed by the annelids (33.78%), and arthropods (26.54%). Relative to February 2022 community assemblage, current results showed a shift to molluscs-dominated community.

Currently, a shift in the community assemblage was noted as shift in season starts (from dry season to wet season).

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# iv) Diversity

Benthic diversity index (H') in the impact stations ranged from 1.71 to 2.03. In the reference stations, H' values ranged from 1.74 to 2.46. Currently, reference station, Station A had the highest diversity value among the different monitoring stations, while the lowest was the impact station, Station D. In terms of evenness index (J) values, impact Stations C and D were noted with relatively high values as compared to reference stations G, and H. Moreover, current monitoring results indicated an overall increase in both diversity and evenness values from the baseline survey condition.

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

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## 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 27 August 2021, "Monitoring of Marine Mammals in Hong Kong Waters (2020-21)", in terms of the distribution and abundance of CWDs, was reviewed in the Monthly EM&A report in August 2021. 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 (2021-22) is uploaded to AFCD's webpage.

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# 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**.

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## 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 4, 14, 20 and 26 April 2022. 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 27 April 2022. No specific Action/Limit level has to be followed since the purpose of the monitoring is to collect data for future purpose.

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## 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. 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	0	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**.

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## 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<sub>2</sub>S concentration (ppb) with the odour unit (OU/m³). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S 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 had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD.

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## 11. CONCLUSION

- 11.1.1 Odour patrol monitoring was resumed from January 2020 and carried out on 4, 14, 20 and 26 April 2022. The modified odour patrol monitoring plan including updated Event and Action Plan was approved on March 2020, and odour patrol monitoring was commenced from 20 March 2020. No exceedances of Action/Limit levels at Air Sensitive Receivers (ASR) and odour patrol points were recorded and no non-compliance of odour monitoring at odour patrol points 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<sub>2</sub>S concentration (ppb) with the odour unit (OU/m³). H<sub>2</sub>S measurement and olfactometry analysis conducted between August 2017 and May 2018 was considered as unlikely way to establish the relationship of H<sub>2</sub>S 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 had been carried out to determine reasonable odour-related criteria and was submitted to EPD for approval on 24 March 2020. Comments from EPD was received on 1 April 2020 and the review is currently under revision for further submission to the EPD.
- 11.1.3 Water quality monitoring, sediment quality monitoring and benthic survey were conducted on 27 April 2022 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 27 August 2021, "Monitoring of Marine Mammals in Hong Kong Waters (2020-21)" in terms of the distribution and abundance of CWDs was reviewed in the Monthly EM&A report in August 2021. 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 (2021-22) 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.

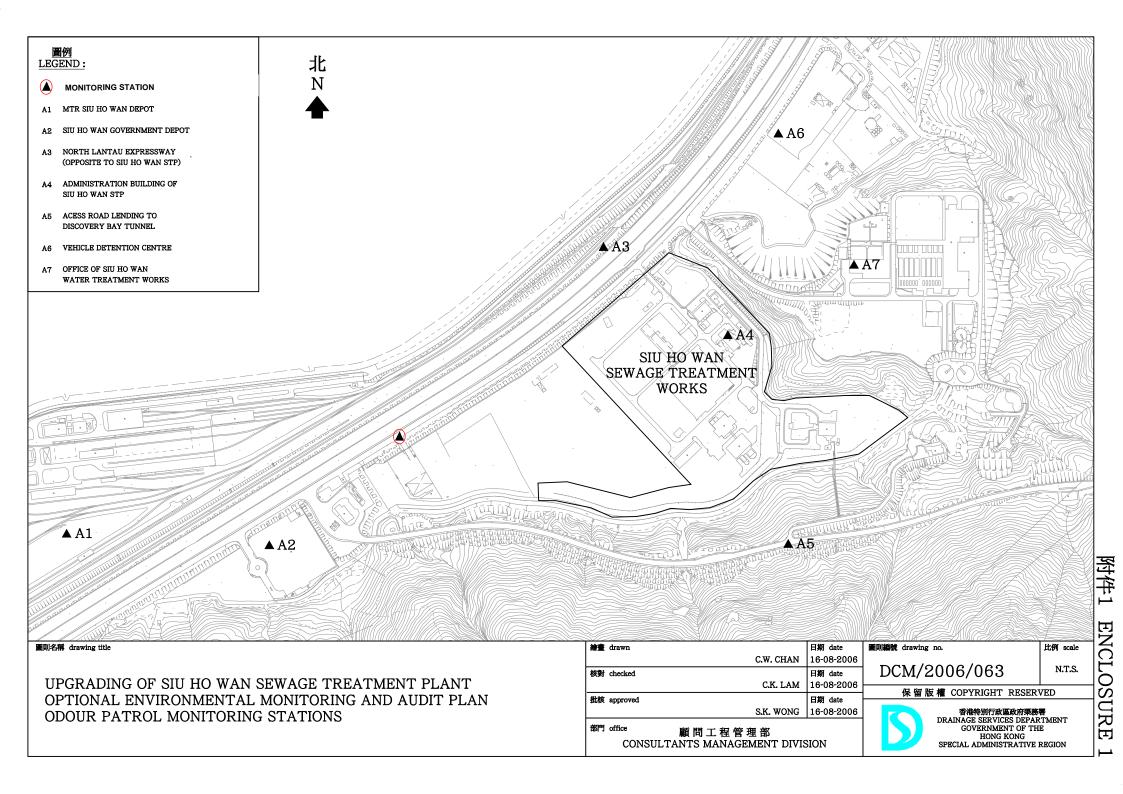
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# Figure 1

Monitoring Stations of Air Sensitive Receivers



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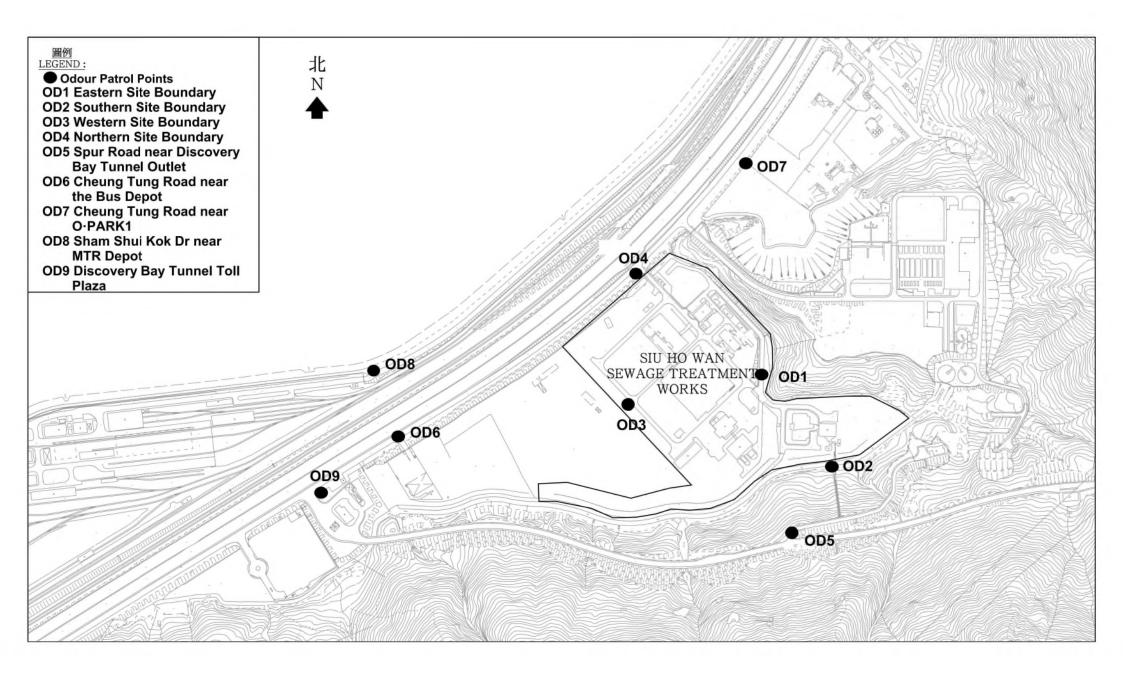
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# Figure 2

Odour Patrol Points of Modified Odour Patrol



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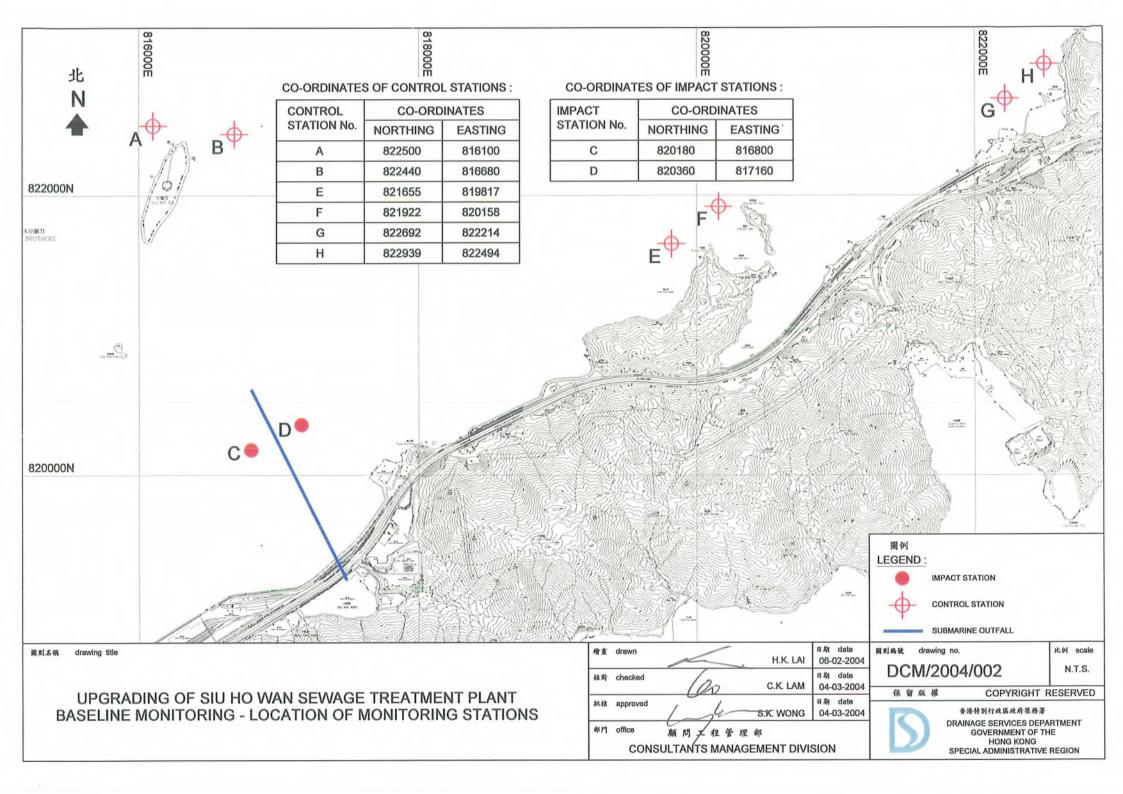
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# Figure 3

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



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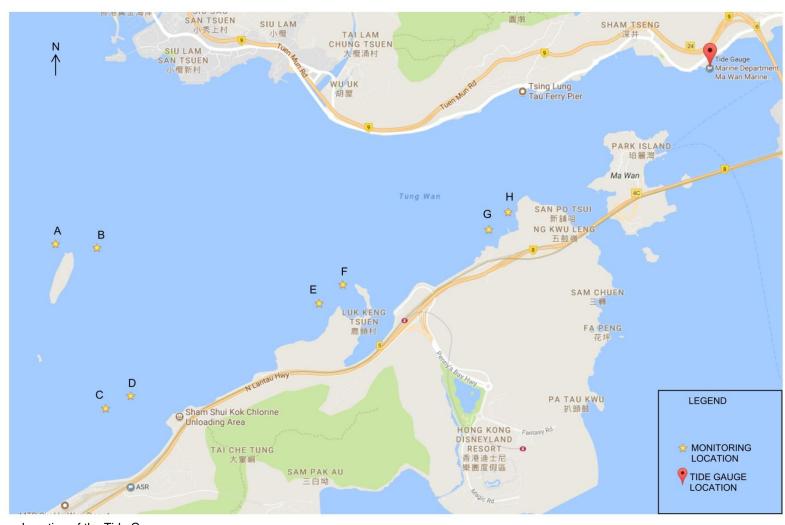
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Figure 4

Location of the Tide Gauge

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Location of the Tide Gauge

Source: Google Maps

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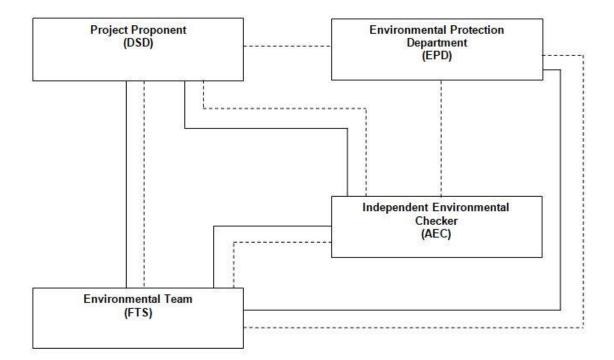
Appendix A

**Project Organization Chart** 

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## 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 April	2
3	4 Odour Patrol	5	6	7	8	9
10	11	12	13	14 Odour Patrol	15	16
17	18	19	20 Odour Patrol	21	22	23
24	25	26 Odour Patrol	27 Water Quality Monitoring and Sediment Quality Monitoring and Benthic Survey Mid-Ebb (10:52) Mid-Flood (16:17)	28	29	30

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Monitoring Schedule for the Next Reporting Period

Sun	Mon	Tue	Wed	Thur	Fri	Sat
1 May	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.

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# Appendix C

Event and Action Plan for Air Quality Monitoring

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=>/=>		ACTION	
EVENT	ET	IEC	*Operator
Action Level			
One complaint received for specific odour event / Odour intensity of 2 or above is measured from odour patrol	1. Identify source/reason of exceedance or odour complaints; 2. Notify the IEC and Operator of exceedance; 3. Repeat odour patrol to confirm finding; 4. If exceedance continues, notify the IEC and Operator; 5. Carry out investigation to identify the source/reason of exceedance or complaints; 6. Check Operator's working methods; and 7. Discuss with Operator on required remedial actions.	1. Check odour patrol results submitted by ET; 2. Discuss with ET and Operator on the possible remedial actions; 3. Advise the Operator on the effectiveness of the proposed remedial measures; 4. Supervise implementation of remedial measures.	1. Notify the ET and IEC when receipt of odour complaint; 2. Confirm receipt of notification of exceedance in writing; 3. Identify/ confirm source with ET; 4. Discuss with ET for remedial actions required; 5. Ensure remedial actions required implemented 6. Rectify any unacceptable practice; and 7. Amend operation methods if appropriate.
Limit Level			
More than one complaint in 3 months / Odour intensity of 3 or above is measured from odour patrol	1. Identify source/reason of exceedance or odour complaints; 2. Notify the IEC and Operator of exceedance; 3. Repeat odour patrol to confirm finding; 4. If exceedance continues, notify the IEC and Operator; 5. Carry out investigation to identify the source/reason of exceedance or complaints; 6. Check Operator's working methods; 7. Carry out analysis of Operator's working procedures to determine possible mitigation to be implemented; 8. Arrange meeting with ET and EPD to discuss the remedial actions to be taken; 9. Discuss with EPD and the	1. Check odour patrol results submitted by ET; 2. Discuss amongst ET and the Operator on the potential remedial actions; 3. Review the proposed remedial actions whenever necessary to assure their effectiveness and advise the Operator accordingly; 4. Supervise implementation of remedial measures.	1. Notify the ET and IEC when receipt of odour complaint; 2. Confirm receipt of notification of exceedance in writing; 3. Indentify/ confirm source with ET; 4. Inform ET, IEC and EPD; 5. Discuss with EPD and ET on the required remedial actions; 6. Ensure remedial actions properly implemented; 7. Take immediate action to avoid further exceedance; 8. Implement the agreed proposals.

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Operator on the required	
remedial actions;	
10. Submit proposals for	
remedial actions within 3	
working days of notification;	
11. Assess effectiveness of	
Operator's remedial actions	
and keep EPD informed of	
the results;	
12. Amend proposal if	
appropriate; and	
13. Resubmit proposal if	
problem still not under	
control.	
* The operator who is the constructor responsible for the c	and the state of t

<sup>\*</sup> 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

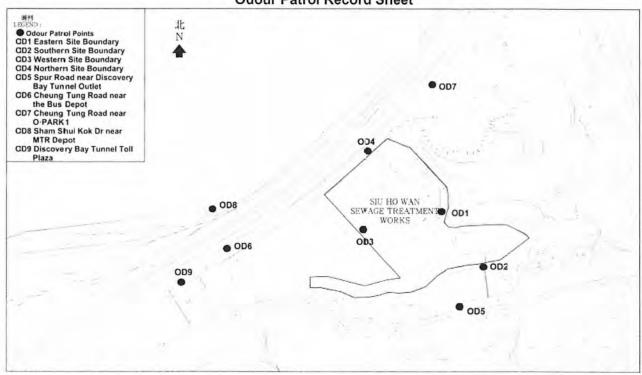
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#### Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works **Odour Patrol Record Sheet**



Date		4-4-2022 Weather	Fi	12	Temperatu	re 7	14°C	Hur	midity	32%
ID	Locat	ion		Time	Wind Direction	Wind Speed (m/s)		lour ensity	Odour C	haracteristics
OD1	Easte	ern Site Boundary		12:48	SW	1.3		0	/	
OD2	South	nern Site Boundary		12:50	/	0		0		
OD3	West	ern Site Boundary		12:46	SW	1.4		0	1	
OD4	North	ern Site Boundary		12:44	SW	0.	9	0		-
OD5	Spur	Road near Discovery Bay Tunnel (	Outlet	/	/	/		/	1	/
OD6	Cheu	ng Tung Road near the Bus Depot		12:36	/	0		0	/	
OD7	Cheu	ng Tung Road near O·PARK1		12:34	NE	1.1	CTI	0	/	/
OD8	Sham	Shui Kok Dr near MTR Depot		2119	NE	0-7		0	/	/
OD9	Disco	very Bay Tunnel Toll Plaza		12:29	NE	6.	5	0		/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight Slight identifiable odour, and slight chance to have odour nuisance

Moderate Moderate identifiable odour, and moderate chance to have odour nuisance

Strong Strong identifiable, likely to have odour nuisance Extreme : Extreme severe odour, and unacceptable odour level

Recorded by:

Name:

Checked by:

Name: CH6]

Date:

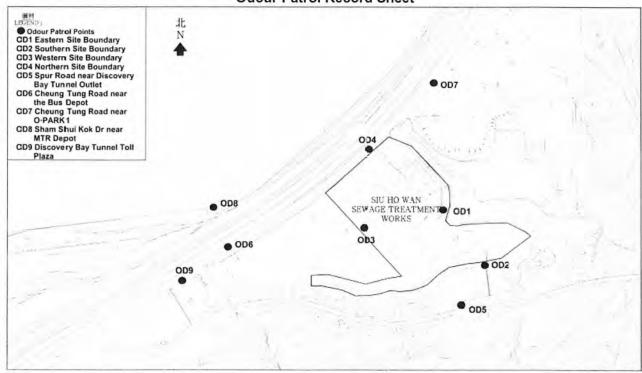
10 2022

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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 Record Sheet



OD1 Ea OD2 So OD3 Wo OD4 No	4 APR LOZZ Weather F70	ne	Temperatur	re 20	fol Hur	midity 32%
OD2 So OD3 Wo OD4 No	ocation	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics
OD3 W	astern Site Boundary	12:48	SW	1-3	0	
OD4 No	outhern Site Boundary	12:50	-	0	0	/
140	estern Site Boundary	12:46	SW	1.4	D.	
	orthern Site Boundary	12:44	SW	0.9	0	/
OD5 Sp	pur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/
OD6 Ch	heung Tung Road near the Bus Depot	12:36	/	0	0	/
OD7 Ch	heung Tung Road near O·PARK1	12:34	NE	1.1	0	1
OD8 Sh	ham Shui Kok Dr near MTR Depot	12:29	NE	0-7	0	
OD9 Dis	scovery Bay Tunnel Toll Plaza	12:29	ME	0.3	D	/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight : Slight identifiable odour, and slight chance to have odour nuisance

Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance

Strong : Strong identifiable, likely to have odour nuisance Extreme : Extreme severe odour, and unacceptable odour level

Recorded by:

Name:

Date:

4 APR 2022

Checked by:

Name:

Date:

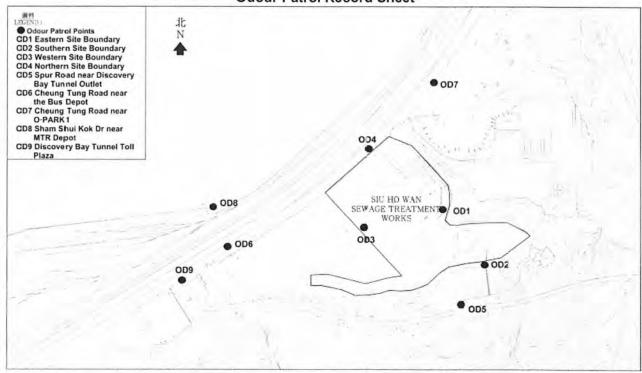
4 April 2022

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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 Record Sheet**



Date		14-4-22	Weather	Fine		Temperatu	re 24.7	00	Humidity	64%
ID	Locat	ion			ime	Wind Direction	Wind Speed (m/s)	Odour	y Odour C	Characteristics
OD1	Easte	rn Site Boundary		10	9150	MU	1.4	0	/	
OD2	South	ern Site Boundar	ry		10.22	NW	0.4	U	Ef	fluent
OD3	Weste	ern Site Boundary	у	1	047	NW	0.3	0	,	/
OD4	North	ern Site Boundar	у		1044	NN	0.6	0		/
OD5	Spur I	Road near Disco	very Bay Tunne	l Outlet	/	/	/	/	-	/
OD6	Cheui	ng Tung Road ne	ear the Bus Dep	ot (	0:02	7	0.5	0		/
OD7	Cheui	ng Tung Road ne	ear O-PARK1		0.06	NW	03	0		/
OD8	Sham	Shui Kok Dr nea	ar MTR Depot	-	1250	NW	1,2	0	/	
OD9	Disco	very Bay Tunnel	Toll Plaza		1:59	NW	0.6	0		/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight : Slight identifiable odour, and slight chance to have odour nuisance

: Moderate identifiable odour, and moderate chance to have odour nuisance Moderate

Strong : Strong identifiable, likely to have odour nuisance Extreme : Extreme severe odour, and unacceptable odour level

Recorded by:

Name: Cheung

Date:

China 14-4

Checked by:

Date:

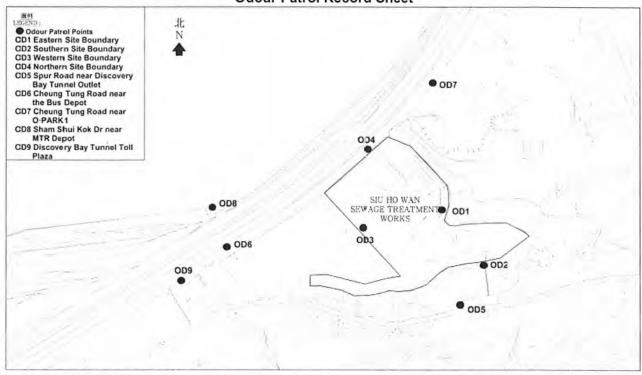
Name: (US)

Room 723 - 726, 7/F, Block B, Profit Industrial Building,

(852)-24508238 1-15 Kwai Fung Crescent, Kwai Fong, Fax (852)-24508032 Hong Kong. Email : mcl@fugro.com.hk



#### Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works **Odour Patrol Record Sheet**



Date	14/4/2022 Weather Fine	2	Temperatur	e 24,	7°C	Humidity	64%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odou	()dour	Characteristics
OD1	Eastern Site Boundary	1019	NW	1.4	0		
OD2	Southern Site Boundary	1022	NW	014	0		
OD3	Western Site Boundary	1017	NW	013	0		/
OD4	Northern Site Boundary	1014	NW	0.6	0		/
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/		/
OD6	Cheung Tung Road near the Bus Depot	1002	N	0.5	0		/
OD7	Cheung Tung Road near O·PARK1	1006	NW	0,3	0		/
OD8	Sham Shui Kok Dr near MTR Depot	0950	NW	1.2	0		/
OD9	Discovery Bay Tunnel Toll Plaza	0959	NW	0.6	0		/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight Slight identifiable odour, and slight chance to have odour nuisance

Moderate identifiable odour, and moderate chance to have odour nuisance Moderate

Strong Strong identifiable, likely to have odour nuisance Extreme Extreme severe odour, and unacceptable odour level

Recorded by:

hon Ka Ho 14/4/2022 Name: \_\_ Date:

Checked by:

Name: ClfoZ Date:

KAM HO April

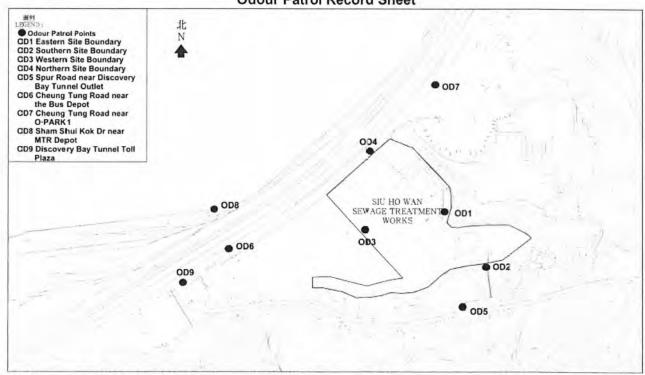
Room 723 - 726, 7/F, Block B,

Profit Industrial Building, T.
1-15 Kwai Fung Crescent, Kwai Fong, F.
Hong Kong. E

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



# Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works Odour Patrol Record Sheet



Date	20/4/2022 Weather Cloud	N	Temperatur	e 22,2	SC Hu	midity 72 %
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics
OD1	Eastern Site Boundary	1112	N	0.5	0	
OD2	Southern Site Boundary	1116	N	0.4	0	/
OD3	Western Site Boundary	1109	NE	0.4	0	
OD4	Northern Site Boundary	1105	NE	0.6	0	/
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	/
OD6	Cheung Tung Road near the Bus Depot	1055	NE	0.3	0	/
OD7	Cheung Tung Road near O-PARK1	1059	NE	0.4	0	/
OD8	Sham Shui Kok Dr near MTR Depot	1044	NE	0.4	0	/
OD9	Discovery Bay Tunnel Toll Plaza	1051	NE	0.7	0	/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight : Slight identifiable odour, and slight chance to have odour nuisance

Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance

Strong : Strong identifiable, likely to have odour nuisance
Extreme : Extreme severe odour, and unacceptable odour level

Recorded by: \_\_\_\_\_\_\_

Name: 100 10 110
Date: 20/4/1022

Checked by:

Name:

Date:

Name:

20 April 2022

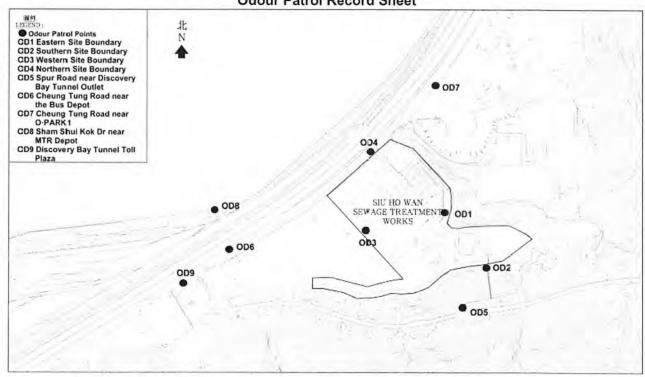
Room 723 - 726, 7/F, Block B, Profit Industrial Building,

1-15 Kwai Fung Crescent, Kwai Fong, Hong Kong.

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



#### Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works **Odour Patrol Record Sheet**



Date	70 Apr 2022 Weather Clo	ncly	Temperatu	re 22.	2°C Hu	midity 72%
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics
OD1	Eastern Site Boundary	11:12	N	0.5	0	
OD2	Southern Site Boundary	11:19	N	0.4	0	/
OD3	Western Site Boundary	11:00	NE	0.4	0	
OD4	Northern Site Boundary	11:05	NE	0,6	0	/
OD5	Spur Road near Discovery Bay Tunnel Outlet	/	/	/	/	1
OD6	Cheung Tung Road near the Bus Depot	10:55	NE	0.3	0	/
OD7	Cheung Tung Road near O·PARK1	10:59	NE	0.4	0	/
OD8	Sham Shui Kok Dr near MTR Depot	10:44	NE	0.4	0	/
OD9	Discovery Bay Tunnel Toll Plaza	[0:5]	NE	0-7	0	/
	Faction Cultural			1		/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight Slight identifiable odour, and slight chance to have odour nuisance Moderate Moderate identifiable odour, and moderate chance to have odour nuisance

Strong : Strong identifiable, likely to have odour nuisance

Extreme : Extreme severe odour, and unacceptable odour level

Recorded by:

Name: Date:

Checked by:

Name: (Ho] Date:

20 2022

Room 723 - 726, 7/F, Block B, Profit Industrial Building,

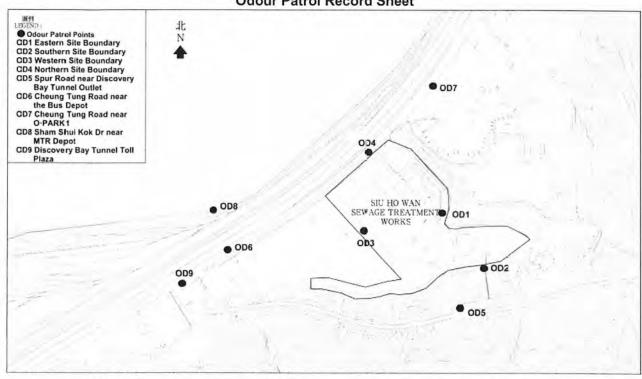
1-15 Kwai Fung Crescent, Kwai Fong,

Hong Kong.

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



### Contract No. CM 14/2016 **Environmental Team for Operational Environmental Monitoring and Audit for** Siu Ho Wan Sewage Treatment Works **Odour Patrol Record Sheet**



Date	26/10/2012 Weather F-	me	Temperatu	re 29	"C Hu	imidity	69 %
ID	Location	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour C	naracteristics
OD1	Eastern Site Boundary	14:44	5	(.7	0	/	
OD2	Southern Site Boundary	14:46	S	0.5	0	1	
OD3	Western Site Boundary	14:42	5	0.4	0	1	
OD4	Northern Site Boundary	14:39	5	1.4	0	,	
OD5	Spur Road near Discovery Bay Tunnel Outlet	15.06	WE	0.7	0		
OD6	Cheung Tung Road near the Bus Depot	14:25	-	2.1	б		/
OD7	Cheung Tung Road near O·PARK1	14:30	Sw	0.4	0		/
OD8	Sham Shui Kok Dr near MTR Depot	14:12	N	1.2	0		/
OD9	Discovery Bay Tunnel Toll Plaza	14:22	SW	8.0	0		/

#### \*Classification Criteria:

Not detected

: No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight Moderate Slight identifiable odour, and slight chance to have odour nuisance

: Moderate identifiable odour, and moderate chance to have odour nuisance

Strong

Strong identifiable, likely to have odour nuisance

Extreme

: Extreme severe odour, and unacceptable odour level

Recorded by:

Name:

Date:

Checked by:

Name: Date:

2022

Room 723 - 726, 7/F, Block B,

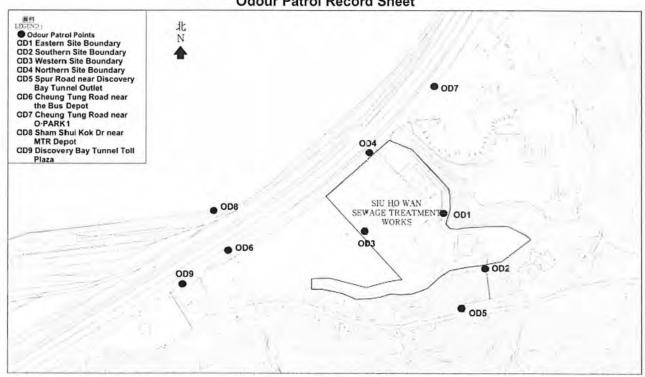
Fax

Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Fong, Hong Kong.

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



#### Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for Siu Ho Wan Sewage Treatment Works **Odour Patrol Record Sheet**



Date		26 APR Zozz Weather	Fine	Temperatur	re 29	°C HI	umidity 69 %
ID	Locati	on	Time	Wind Direction	Wind Speed (m/s)	Odour intensity	Odour Characteristics
OD1	Easter	rn Site Boundary	14:44	S	1.7	0	/
OD2	South	ern Site Boundary	1446	5	0.5	0	/
OD3	Weste	rn Site Boundary	1442	S	0.4	0	
OD4	Northe	ern Site Boundary	1439	5	1.4	0	
OD5	Spur F	Road near Discovery Bay Tunnel Ou	utlet 1501	NE	0-7	0	
OD6	Cheur	ng Tung Road near the Bus Depot	1425	S	2-1	D	/
OD7	Cheur	ng Tung Road near O·PARK1	1430	SW	0.9	D	/
OD8	Sham	Shui Kok Dr near MTR Depot	1412	N	1.2	0	/
OD9	Discov	very Bay Tunnel Toll Plaza	1422	SW	6.0	b	/

#### \*Classification Criteria:

Not detected : No odour perceived or an odour so weak that it cannot be easily characterised or described

Slight Slight identifiable odour, and slight chance to have odour nuisance Moderate : Moderate identifiable odour, and moderate chance to have odour nuisance

Strong Strong identifiable, likely to have odour nuisance : Extreme severe odour, and unacceptable odour level Extreme

Recorded by:

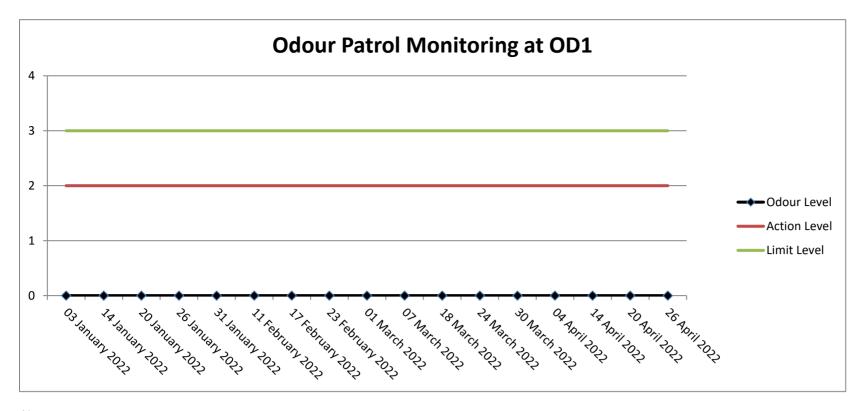
Name: Date:

2022

Checked by:

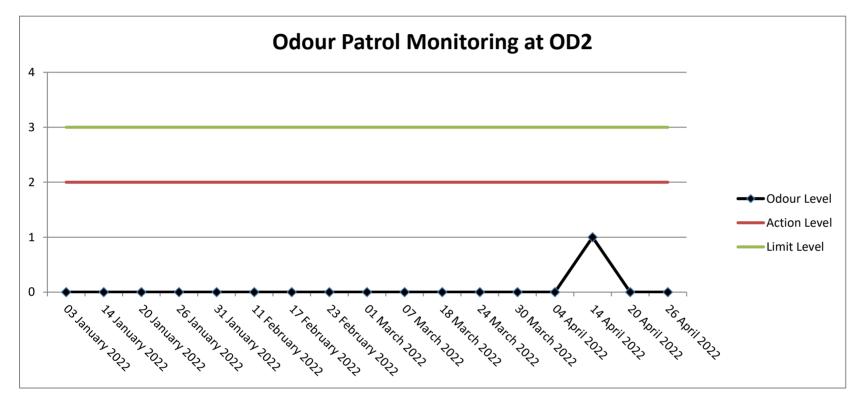
Name: Date:

KAN 1-10 UHOI 2022



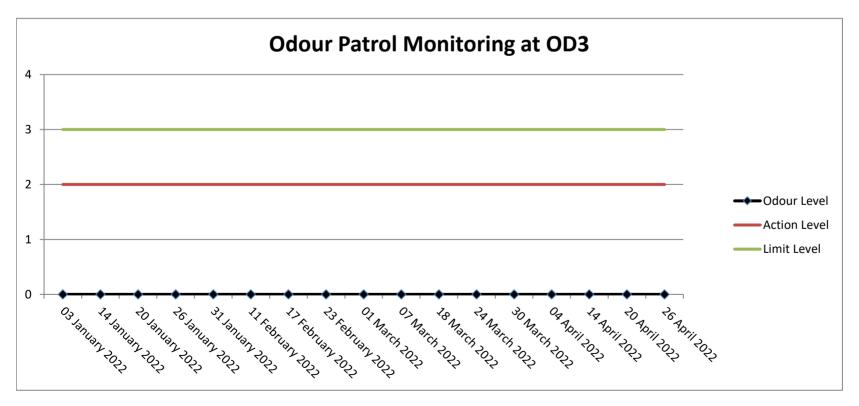
Note:

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



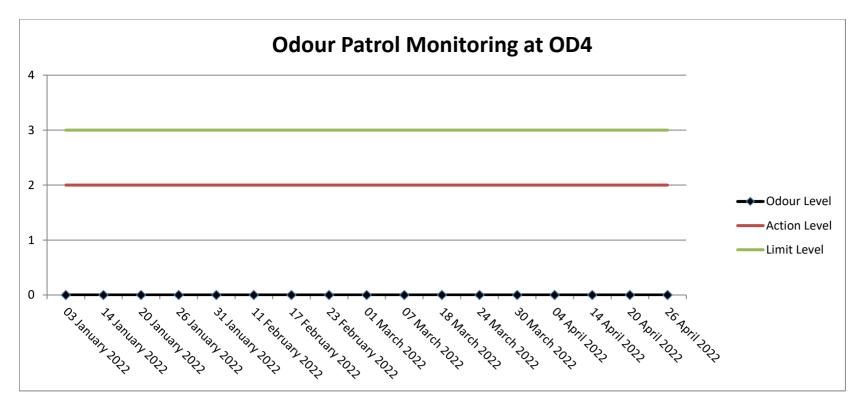
## Note:

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



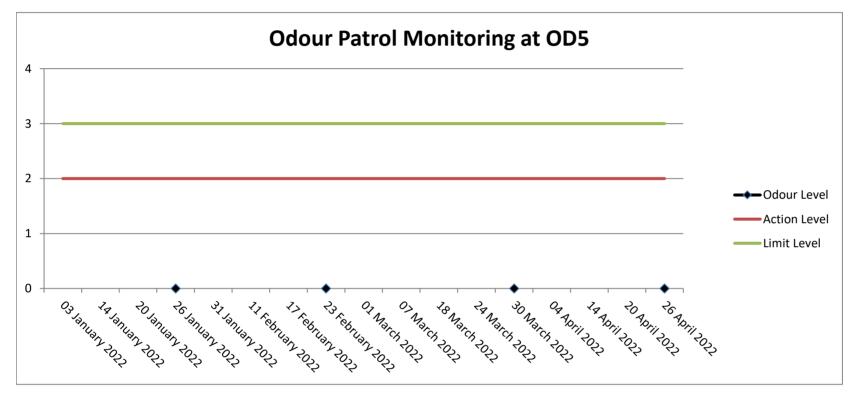
## Note:

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



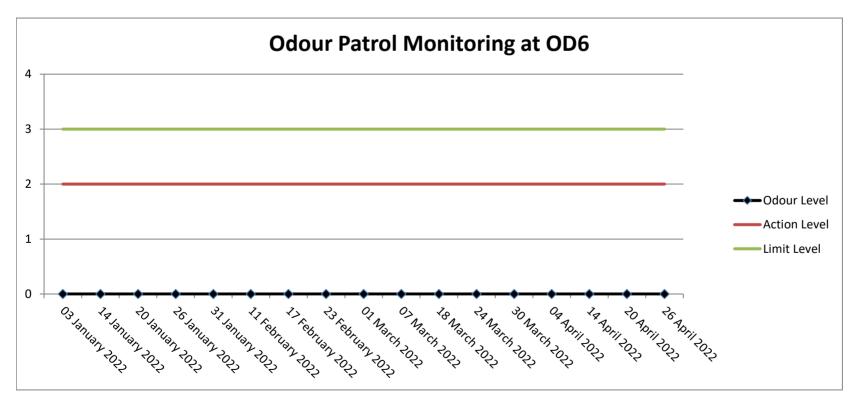
Note:

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



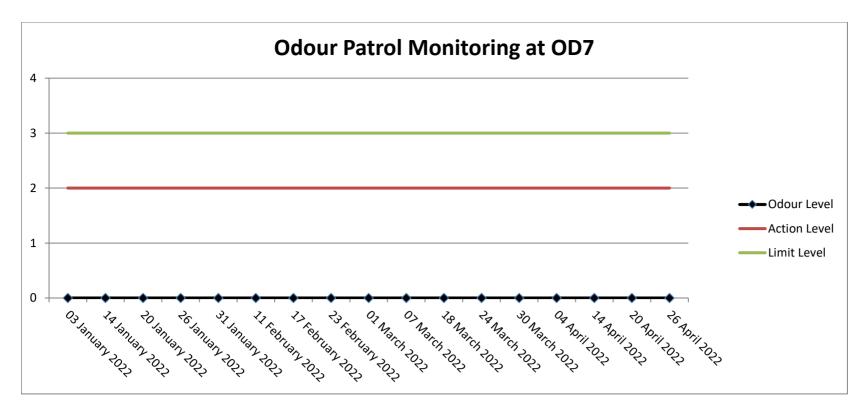
## Note:

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



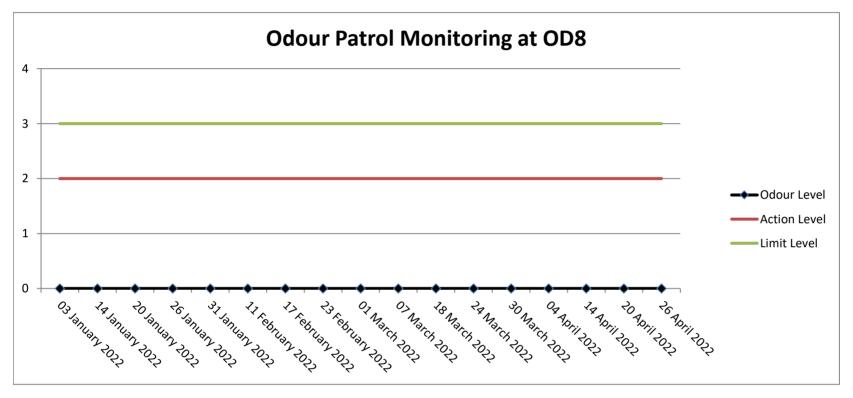
# Note:

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



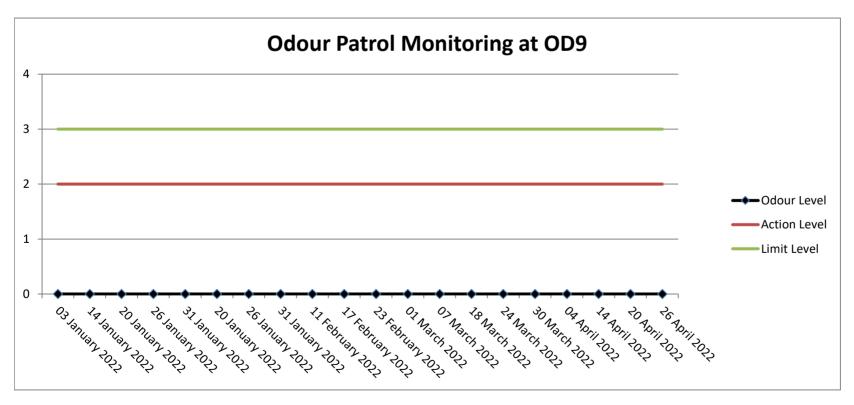
Note:

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



## Note:

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



# Note:

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

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

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E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0670

# Appendix E

Copy of the Calibration Certificates for Water Quality Monitoring Equipment



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 142626WA220802



Page 1 of 3

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

#### Information Supplied by Client

Client : Fugro To

: Fugro Technical Services Limited (MCL)

Client's address : 13/F, Fugro House – KCC2, No. 1 Kwai On Road, Kwai Chung,

N.T., H.K.

Sample description : One Aqua Troll 600 Multi-parameter Water Quality Meter

Client sample ID : Serial No. 525120

Test required : Calibration of the Aqua Troll 600 Multi-parameter Water Quality

Meter

**Laboratory Information** 

Lab. sample ID : WA220802/1

Date of calibration : 05/04/2022

Next calibration date : 04/07/2022

Test method used : In-house comparison method

Note: This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.:

142626WA220802

Page 2 of 3

#### 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	9.19	+0.01								
6.86	6.87	+0.01								

### B. Salinity calibration

Salinity, ppt										
Theoretical	Measured	Deviation	Maximum acceptab Deviation							
10	10.05	+0.05	± 0.5							
20	20.08	+0.08	± 1.0							
30	29.86	-0.14	± 1.5							
40	40.13	+0.13	± 2.0							

#### C. Dissolved Oxygen calibration

Trial No.	Dissolved oxygen content, mg/L									
	By calibrated D.O. meter	By D.O. meter								
1	7.42	7.43								
2	7.40	7.41								
3	7.40	7.40								
Average	7.41	7.41								

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

114/2011

Note: This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 142626WA220802

Page 3 of 3

Results:

#### D. Temperature calibration

Thermometer reading, °C	Meter reading, °C
25.03	24.98

## E. Turbidity calibration

N. C.	Turbidity, N.T.U.										
Theoretical	Measured	Deviation	Maximum acceptable Deviation								
4	4.08	+0.08	± 0.6								
8	8.07	+0.07	± 0.8								
40	39.83	-0.17	± 3.0								
80	79.63	-0.37	± 4.0								

Certified by

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

Date

\*\* End of Report \*\*

Note: This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.



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

# Certificate of Calibration

#### TEST REPORT

5906	
M9	
Down	
Sontek	
N/A	
RS232	
14.9	- SANGE S
4.02	
05/23/2017	
	M9 Down Sontek N/A RS232 14.9 4.02

#### **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**

95
96
95
101
93
95
91
100
88
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 TM	Enabled	
Stationary	Disabled	
GPS Compass Integration	Disabled	
RiverSurveyor	Enabled	
HydroSurveyor	Disabled	

Verified by: ainthasane

This report was generated on 5/24/2017.

ATTENTION: New Warranty Terms as of March 4, 2013:

This system is covered under a two year limited warranty that extends to all parts and labor for any malfunction due to workmanship or errors in the manufacturing process. The warranty is valid only if you properly maintain and operate this system under normal use as outlined in the User's Manual. The warranty does not cover shortcomings that are due to the design, or any incidental damages as a result of errors in the measurements.

SonTek will repair and/or replace, at its sole option, any product established to be defective with a product of like type. CLAIMS FOR LABOR COSTS AND/OR OTHER CHARGES RESULTING FROM THE USE OF SonTek GOODS AND/OR PRODUCTS ARE NOT COVERED BY THIS LIMITED WARRANTY.

SonTek DISCLAIMS ALL EXPRESS WARRANTIES OTHER THAN THOSE CONTAINED ABOVE AND ALL IMPLIED WARRANTIES, INCLUDING BUT NOT LIMITED TO WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR PURPOSE. SonTek DISCLAIMS AND WILL NOT BE LIABLE, UNDER ANY CIRCUMSTANCE, IN CONTRACT, TORT OR WARRANTY, FOR ANY SPECIAL, INDIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND, INCLUDING BUT NOT LIMITED TO LOST PROFITS, BUSINESS INTERRUPTION LOSSES, LOSS OF GOODWILL, OR LOSS OF BUSINESS OR CUSTOMER RELATIONSHIPS.

If your system is not functioning properly, first try to identify the source of the problem. If additional support is required, we encourage you to contact us immediately. We will work to resolve the problem as quickly as possible.

If the system needs to be returned to the factory, please contact SonTek to obtain a Service Request (SR) number. We reserve the right to refuse receipt of shipments without SRs. We require the system to be shipped back in the original shipping container using the original packing material with all delivery costs covered by the customer (including all taxes and duties). If the system is returned without appropriate packing, the customer will be required to cover the cost of a new packaging crate and material.

The warranty for repairs performed at an authorized SonTek Service Center is one year.

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

Tel : +852 2450 8233
Fax : +852 2450 6138
E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0670

# Appendix F

Results and Graphical Presentation of Water Quality Monitoring

Date   Tide Mode   Westlew   Condition   Time   Depth   (in)   Level   Level (in)   September   Condition   Cond												In-situ Measurement Labora								Laborato	ory Analysis					
A 27/4/2022 Mid-Ebb Fine Moderne 1925 17 S 1 1 821 8518 1501 902 4 69 41 500 741 5 0040 0.020 0.55 0.61 Mb 0.01 12 A 27/4/2022 Mid-Ebb Fine Moderne 1925 17 M 8.5 1 8.38 20.33 24.14 8.5 0.21 0.59 1.14 100.3 7 0.050 0.050 0.55 0.61 Mb 0.021 0.14 100.3 A 27/4/2022 Mid-Ebb Fine Moderne 1925 17 M 8.5 1 8.38 20.33 24.14 8.5 0.21 0.59 1.14 100.3 7 0.050 0.050 0.55 0.59 1.14 100.3 A 27/4/2022 Mid-Ebb Fine Moderne 1925 17 M 8.5 1 8.38 20.33 24.14 8.5 0.21 0.59 1.14 100.3 A 0.050 0.050 0.55 0.59 1.14 100.3 A 27/4/2022 Mid-Ebb Fine Moderne 1925 17 M 8.5 1 8.38 20.33 24.14 8.5 0.21 0.59 1.14 100.3 A 0.050 0.050 0.050 0.55 0.59 1.14 100.3 A 0.050 0.050 0.050 0.55 0.59 1.14 100.3 A 0.050 0.050 0.050 0.050 0.55 0.59 1.14 100.3 A 0.050 0.		Date	Tide Mode	Weather		Time	Depth			Replicate	рН			Saturation			Speed	Direction (degree	Suspended Solids	Nitrogen	Nitrogen (mg/L-	Nitrogen	Inorganic Nitrogen		phosphorus (solube and particulate)	BOD <sub>5</sub> (mg/L)
A 27/4/2022 Mid-Ebb Fine Moderate (925 17 N 8 1 2 825 2611 2501 902 0.48 4.3 0.09 77.5 5 0.044 0.020 0.52 0.58 1 0.002 12 1.4 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5											Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A 27/4/2022 Mid-Ebb Free Moderate (0.25 17 M 8.5 1.8 28 126.32 24.74 8.5 6.20 6.1 0.14 100.3 7 0.650 0.020 0.52 0.58 1.000 1.14 A 27/4/2022 Mid-Ebb Free Moderate (0.25 17 M 8.5 1.8 28 126.34 24.73 8.5 6.20 6.1 0.14 100.4 6 0.00 0.02 0.55 0.58 0.59 3.002 1.4 A 27/4/2022 Mid-Ebb Free Moderate (0.25 17 B 8.6 1.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0.2 0	Α	27/4/2022	Mid-Ebb	Fine	Moderate	09:25	17	S	1	1	8.24	26.14	25.02	90.4	6.49	4.1	0.09	74.1	5	0.040	0.020	0.55	0.61	ND	0.01	1.4
A 27/4/2022 Mis-Ebb Fine Moderate 109-25 17 M 8 8.5 2 8.29 28.34 24.73 87.4 6.20 6.1 0.14 101.4 6 0.04 0.02 0.63 0.69 3 0.02 1.4 A 27/4/2022 Mis-Ebb Fine Moderate 109-25 17 B 16 1 8.31 6.27 3.4 12.5 2 1.2 12.8 2 3 0.03 0.02 0.02 0.05 0.05 0.05 0.05 0.05 0.05	Α			Fine	Moderate				1	2	8.25						0.09		5					2		1.2
A										1														1		<1
A 2774/2022 Mid-Ebb   Fine   Modernte (0925 17   B   16   2   8.34   26.73   24.51   86.7   8.7   4.65   8.7   4.05   4.05   4.05   4.05   4.05										2														3		1.4
B 27/4/2022 Mid-Ebb Fine Moderate (0941 14 S 1 1 8,24 28.11 24.71 91.4 65.8 4.1 0.24 144.5 6 0.05 0.02 0.56 0.83 ND 0.02 1.1   B 27/4/2022 Mid-Ebb Fine Moderate (0941 14 S 1 2 8.24 28.11 24.71 91.4 65.8 4.2 0.02 141.7 6 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0.										1														11		1.6
B 2774/2022 Mid-Ebb Fine Moderate 10941 14 M 7 1 830 26.39 24.57 91.3 6.57 4.3 0.22 141.7 6 0.05 0.02 0.56 0.63 ND 0.02 1.0 B 2774/2022 Mid-Ebb Fine Moderate 10241 14 M 7 1 830 26.39 24.57 8.9 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0									16	_																1.8
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G 27/4/2022 Mid-Ebb Fine Moderate 11:12 22 S 1 2 8.22 27.32 24.64 85.3 6.03 4.2 0.12 70.8 5 0.07 0.02 0.32 0.41 41 0.01 1.4 G 27/4/2022 Mid-Ebb Fine Moderate 11:12 22 M 11 1 8.26 27.11 24.51 84.1 6.02 4.2 0.15 92.1 5 0.08 0.01 0.33 0.43 21 0.01 1.5 G 27/4/2022 Mid-Ebb Fine Moderate 11:12 22 B 21 1 8.24 27.14 24.44 84.1 6.03 3.4 0.13 101.4 4 0.08 0.01 0.35 0.45 14 0.01 1.5 G 27/4/2022 Mid-Ebb Fine Moderate 11:12 22 B 21 1 8.24 27.14 24.44 84.1 6.03 3.4 0.13 101.4 4 0.08 0.01 0.32 0.41 12 <0.01 1.8 G 27/4/2022 Mid-Ebb Fine Moderate 11:12 22 B 21 2 8.27 27.15 24.41 84.1 6.02 3.2 0.14 102.6 4 0.08 0.01 0.37 0.37 13 0.01 1.8 H 27/4/2022 Mid-Ebb Fine Moderate 11:28 19 S 1 1 8.22 27.03 24.59 84.9 5.84 3.1 0.21 144.1 4 0.08 0.01 0.37 0.37 13 0.01 1.8 H 27/4/2022 Mid-Ebb Fine Moderate 11:28 19 S 1 2 8.23 27.04 24.58 84.8 5.81 3.4 0.23 142.5 4 0.08 0.01 0.31 0.40 150 0.02 2.0 H 27/4/2022 Mid-Ebb Fine Moderate 11:28 19 M 9.5 1 8.26 27.24 24.51 84.7 5.77 4.2 0.12 164.1 4 0.08 0.02 0.39 0.49 410 0.01 0.20 12.0 H 27/4/2022 Mid-Ebb Fine Moderate 11:28 19 M 9.5 1 8.26 27.24 24.51 84.7 5.77 4.2 0.12 164.1 4 0.08 0.02 0.39 0.49 410 0.01 2.0 H 27/4/2022 Mid-Ebb Fine Moderate 11:28 19 M 9.5 1 8.26 27.24 24.51 84.7 5.77 4.2 0.14 166.2 4 0.09 0.01 0.33 0.39 0.49 26 0.00 1.2 C 0.01 0.01 0.01 0.01 0.01 0.01 0.01 0.									22	_																1.3
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H   27/4/2022   Mid-Ebb   Fine   Moderate   11:28   19   B   18   2   8.17   27:38   24:22   84.4   5.64   5.1   0.21   122.4   4   0.06   0.01   0.34   0.42   15   0.04   1.8	H	27/4/2022	Mid-Ebb	Fine	Moderate			В	18	2	• • • •		24.22	84.4	5.64	5.1	0.21	122.4	4	0.06	0.01	0.34	0.42	15	0.04	1.8

Note: 1. ND: Not Detected

Contain													I	n-situ Meas	sureme	nt						Laborato	ry Analysis	S		
A 27/4/2002 MicFlood Fine Moderate 17/91 15 S 1 1 8.26 55.1 25.77 87.2 87.2 87.0 87.0 827.3 3 0.04 0.02 0.58 0.58 0.57 NO. 20.2 1.1 A 27/4/2002 MicFlood Fine Moderate 17/91 15 M 7.5 1 8.31 25.38 2.591 86.3 60.07 8.7 0.13 341.9 3 0.07 0.02 0.51 0.57 NO. 0.02 1.1 A 27/4/2002 MicFlood Fine Moderate 17/91 15 M 7.5 1 8.31 25.38 2.591 86.3 60.07 8.7 0.13 341.9 3 0.07 0.02 0.43 0.52 1 0.01 1.1 A 27/4/2002 MicFlood Fine Moderate 17/91 15 M 7.5 1 8.31 25.38 2.591 86.3 60.07 8.7 0.13 341.9 3 0.07 0.02 0.44 0.53 NO. 0.01 1.1 A 27/4/2002 MicFlood Fine Moderate 17/91 15 M 7.5 1 8.31 25.38 2.591 86.3 60.07 8.7 0.13 341.9 3 0.07 0.02 0.44 0.53 NO. 0.01 1.1 A 27/4/2002 MicFlood Fine Moderate 17/91 15 M 7.5 1 8.31 25.38 2.591 86.3 60.0 8.1 0.00 1.1 0.1 0.1 0.1 0.1 0.1 0.1 0.1		Date	Tide Mode	Weather		Time	Depth	U	Ŭ	Replicate	рН			Saturation			Speed	Direction (degree	Suspended Solids	Nitrogen	Nitrogen (mg/L-	Nitrogen	Inorganic Nitrogen		phosphorus (solube and particulate)	BOD <sub>5</sub> (mg/L)
A 27/4/2002 Mid-Flood   Fine   Moderate   1701   15   S   1   2   8 / 4   25   13   25   64   8 / 74   6   13   4   2   0.28   32   27   3   0.04   0.02   0.51   0.57   ND   0.02   1.1											Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value	Value
A 2774/2022 Mid-Flood Fine Moderate 17/50 15 M 7.5 1 8.31 25/38 25/91 86.3 (6.07 8.7 0.13 341.9 3 0.07 0.02 0.43 0.52 1 0.001 1.7 A 2774/2022 Mid-Flood Fine Moderate 17/50 15 M 7.5 2 8.32 25/38 25/93 25/83 25/9	Α	27/4/2022	Mid-Flood	Fine	Moderate	17:01	15	S	1	1	8.26	25.11	25.77	87.2	6.12	4.1	0.21	324.5	3	0.04	0.02	0.48	0.54	3	0.02	1.0
A 2774/2022 Mid-Flood Fine Moderate (1701) 15 B 14 1 8.35 25.32 25.13 86.4 6.05 8.6 0.19 3382 3 0.07 0.02 0.44 0.53 ND 0.01 1.7  A 2774/2022 Mid-Flood Fine Moderate (1701) 15 B 14 2 6.35 25.62 25.14 81 5.89 26.0 5.01 17.35 1 4 0.05 0.02 0.55 0.55 ND 0.02 11.  A 2774/2022 Mid-Flood Fine Moderate (1641) 14 S 1 1 2 6.20 25.75 25.14 81.6 5.89 0.5 0.5 0.17 35.1 4 0.05 0.02 0.55 0.55 ND 0.02 11.  B 2774/2022 Mid-Flood Fine Moderate (1644) 14 M 7 7 1 2.6 25 25.91 25.14 81.6 5.80 0.5 0.5 0.17 35.1 4 0.05 0.02 0.47 0.54 1 0.03 0.5 1 1 0.03 0									1																	1.1
A 2774/2022 Mid-Flood Fine Moderne 17:01 15 B 14 1 8.36 25.82 26:14 84.1 6.89 8.4 0.18 3506 3 0.04 0.02 0.45 0.51 MD 0.02 1.1   B 2774/2023 Mid-Flood Fine Moderne 17:01 15 B 14 2 8.39 25.80 2.61 2.7   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.7   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.7   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 25.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 14 M 7 7 1 8.26 27.9   B 2774/2023 Mid-Flood Fine Moderne 16:44 15 B 1   B 2774/2023 Mid-Flood Fine Moderne 16:44 15 B 1   B 2774/2023 Mid-Flood Fine Moderne 16:44 15 B 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 2774/2023 Mid-Flood Fine Moderne 16:42 12 S 1   B 11 2 B 22 25.2   B 2774 2774 Mid-Flood Fine Moderne 16:42 12 S 1   B 11 2 B 22 25.2   B 2774 2774 Mid-Flood Fine Moderne 16:42 12 S 1   B 11 2 B 22 25.2   B 2774 2774 Mid-Flood Fine Moderne 16:42 12 S 1   B 11 2 B 2774/2023 Mid-Flood Fine Moderne 16:42 12																										1.1
A 2714/2022   Mid-Flood   Fine   Moderate   1701   15   B   14   2   8,39   25.80   26.12   84.2   5.00   9.5   0.17   352.1   3   0.04   0.02   0.51   0.56   1   0.02   1.1										2																1.3
B 2774/2022 MoFlood Fine Moderate 16:441 44 S 1 1 8;24 25.74 25.31 90.6 6:45 5.1 0,13 52.8 4 0,05 0.02 0.47 0.54 1 0.03 1.7 0.00										1														ND		
B   2774/2022   MicFlood   Fine   Moderate   1644   14   M   7   1   826   2591   2514   83   84   82   631   62   809   26.9   4   0.09   0.02   0.59   0.06   0.07   1   0.03   <									14	1														ND.		
B 2774/2022 Mid-Flood Fine Moderate (64-41 4 M 7 7 1 8.26 25-91 25-14 88.2 6.31 6.2 0.09 26-9 4 0.09 0.02 0.59 0.70 1 0.03 st 1 B 2774/2022 Mid-Flood Fine Moderate (64-41 4 M 7 7 1 8.26 25-91 25-14 88.3 6.31 6.4 0.08 26-4 7.3 0.13 37.2 3 0.04 0.02 0.55 0.66 1 0.02 1.1 B 2774/2022 Mid-Flood Fine Moderate (64-41 4 B 13) 1 8.21 26-14 25-02 86-9 6.24 7.3 0.13 37.2 3 0.04 0.02 0.46 0.52 ND 0.03 11.0 C 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1									1															1		<1
B 2774/2022 Md-Flood Fine Moderate (E44 14 M 7 7 2 8.26 25.93 25.11 88.3 6.33 6.4 0.08 26.4 4 0.09 0.02 0.55 0.66 1 0.02 1.1 8 2774/2022 Md-Flood Fine Moderate (E44 14 B 8 13) 1 8.21 26.14 25.02 86.9 6.24 7.3 0.13 37.2 3 0.04 0.02 0.48 0.52 ND 0.03 1.1 8 2774/2022 Md-Flood Fine Moderate (E44 14 B 8 13) 1 8.21 26.14 25.02 86.9 6.22 7.3 0.16 37.8 3 0.04 0.02 0.48 0.54 1 0.02 1.1 8 0.00 0.00 0.00 0.00 0.00 0.00 0.0									7	_									•					1		
B 2774/2022 Mid-Flood Fine Moderate 16:44 14 B 13 1 8:21 26:14 25:02 86:9 6:22 7.4 0.13 37.2 3 0.04 0.02 0.46 0.52 ND 0.03 1.1 C 2774/2022 Mid-Flood Fine Moderate 16:34 12 S 1 1 8:36 27.41 27.14 84.1 5.86 1.3 0.24 61:4 3 0.04 0.02 0.63 0.68 1 0.00 1.5 C 2774/2022 Mid-Flood Fine Moderate 16:34 12 S 1 1 8:36 27.41 27.14 84.1 5.86 1.3 0.24 61:4 3 0.04 0.02 0.63 0.68 1 0.00 1.5 C 2774/2022 Mid-Flood Fine Moderate 16:34 12 S 1 1 8:36 27.41 27.14 84.1 5.86 1.3 0.24 61:4 3 0.04 0.02 0.63 0.68 1 0.00 1.5 C 2774/2022 Mid-Flood Fine Moderate 16:34 12 S 1 1 8:36 27.41 27.18 84.2 5.57 14 0.05 0.02 0.05 0.02 0.05 0.05 0.05 0.05									7	2														1		1.1
B 2774/2022 Mid-Flood Fine Moderate [16:44 14 B 13 2 8:23 26:12 25:04 86.8 6:22 7.4 0.16 37.8 3 0.04 0.02 0.68 0.54 1 0.02 1.1 C 2774/2022 Mid-Flood Fine Moderate [16:24 12 S 1 1 2 8:24 27.42 27.16 84.1 5.86 1.3 0.24 61.4 3 0.04 0.02 0.63 0.69 1 0.00 1.1 C 2774/2022 Mid-Flood Fine Moderate [16:24 12 M 6 1 8.2 87.8 1.8 1.2 8.2 1.8 1.2 8.2 1.									13	1									3					ND		1.0
C 2774/20022 Mid-Flood Fine Moderate [6:24 12 S 1 1 8,26 27.41 27.14 84.1 5.86 1.3 0.24 61.4 3 0.04 0.02 0.63 0.69 1 c.0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 S 1 2.82 27.81 27.82 81.8 5.52 5.6 0.26 81.2 3 0.05 0.02 0.45 0.51 ND 0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 M 6 1 8.22 27.81 27.82 81.8 5.52 5.6 0.26 81.2 3 0.05 0.02 0.45 0.55 ND 0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 M 6 6 2 8.26 27.88 82.788 81.7 5.33 5.2 0.24 81.9 3 0.04 0.02 0.45 0.55 ND 0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 M 6 6 2 8.26 27.88 82.788 81.7 5.33 5.2 0.24 81.9 3 0.04 0.02 0.45 0.55 ND 0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 M 6 6 2 8.26 27.88 27.88 81.7 5.33 5.2 0.24 81.9 3 0.04 0.02 0.45 0.55 ND 0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 M 6 6 2 8.26 27.88 27.88 81.7 5.33 5.2 0.24 81.9 3 0.04 0.02 0.45 0.55 ND 0.01 1.5 C 2774/20022 Mid-Flood Fine Moderate [6:24 12 M 6 6 2 8.26 27.88 27.88 81.7 5.33 5.2 0.24 81.9 3 0.04 0.02 0.55 0.50 ND 0.01 1.5 C 2774/2002 Mid-Flood Fine Moderate [6:24 12 M 6 6 2 8.26 27.88 27.88 81.7 5.33 5.2 0.24 81.9 3 0.04 0.02 0.55 0.50 ND 0.01 1.5 C 2774/2002 Mid-Flood Fine Moderate [6:06 14 S 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	В							В		2									3					1		1.1
C 27/4/2022 Mid-Flood Fine Moderate [16:24   12 M 6 6   8   822   27   81   27.82   81.8   5.52   5.6   0.26   81.2   3   0.05   0.02   0.45   0.51   ND   0.01   1.1   C 27/4/2022 Mid-Flood Fine Moderate [16:24   12 B   11   8   82   82.62   78.88   81.7   5.53   5.2   0.24   81.9   3   0.04   0.02   0.04   8   0.55   0.01   1.1   C 27/4/2022 Mid-Flood Fine Moderate [16:24   12 B   11   8   87   82.80   28.26   80.2   5.41   7.7   0.20   64.7   3   0.04   0.02   0.54   0.60   ND   0.01   1.1   D 27/4/2022 Mid-Flood Fine Moderate [16:04   12 B   11   2   87   28.01   28.22   28.26   80.2   5.41   7.7   0.20   64.7   3   0.04   0.02   0.54   0.60   ND   0.01   1.1   D 27/4/2022 Mid-Flood Fine Moderate [16:08   14   S   1   1   8   81   12.71   24.30   84.2   4   0.05   0.02   0.68   0.02   0.68   0.07   0.1   1.1   D 27/4/2022 Mid-Flood Fine Moderate [16:09   14   M   7   1   8   14   27.11   24.30   84.2   4   0.05   0.02   0.68   0.07   0.07   0.01   1.1   D 27/4/2022 Mid-Flood Fine Moderate [16:09   14   M   7   2   8   15   27.33   24.02   83.1   5.86   6.3   0.09   184.5   3   0.05   0.02   0.07   0.75   0.82   3   0.00   1.1   D 27/4/2022 Mid-Flood Fine Moderate [16:09   14   M   7   2   8   15   27.33   24.02   83.1   5.86   6.3   0.09   182.7   3   0.05   0.02   0.72   0.79   2   0.00   1.2   D 27/4/2022 Mid-Flood Fine Moderate [16:09   14   B   13   8   18   27.53   24.02   83.1   5.86   6.3   0.09   17.2   4   0.05   0.02   0.72   0.79   2   0.00   1.2   D 27/4/2022 Mid-Flood Fine Moderate [16:09   14   B   13   8   18   27.53   24.02   83.1   5.86   6.3   0.09   17.1   4   0.05   0.02   0.72   0.79   2   0.00   1.2   E 27/4/2022 Mid-Flood Fine Moderate [16:09   14   B   13   8   18   27.58   23.79   82.6   5.64   9.9   0.08   17.1   4   0.05   0.02   0.72   0.79   2   0.00   1.2   E 27/4/2022 Mid-Flood Fine Moderate [16:09   14   B   13   8   8   27.58   23.79   82.4   5.63   9.1   0.07   17.34   4   0.05   0.02   0.72   0.79   2   0.00   1.2   E 27/4/2022 Mid-Flood Fine Moderate [16:04   14   B   13	С			Fine				S	1	1	8.26	27.41				1.3			3	0.04		0.63	0.69	1	< 0.01	1.3
C 27/4/2022 Mid-Flood Fine Moderate 16:24 12 M 6 2 8.26 27.88 27.88 27.88 11.7 5.53 5.2 0.24 81.9 3 0.04 0.02 0.48 0.55 1 0.01 1.1 C 27/4/2022 Mid-Flood Fine Moderate 16:24 12 B 11 1 8.29 28.26 80.2 5.41 7.7 0.20 64.7 3 0.04 0.02 0.54 0.60 ND 0.01 1.1 C 27/4/2022 Mid-Flood Fine Moderate 16:24 12 B 11 2 8.27 28.03 28.26 80.2 5.41 7.7 0.20 64.7 3 0.04 0.02 0.52 0.58 1 0.01 1.1 C 27/4/2022 Mid-Flood Fine Moderate 16:04 12 B 11 2 8.27 28.03 82.2 80.4 5.44 7.8 0.24 64.6 3 0.04 0.02 0.52 0.58 1 0.01 1.1 D 27/4/2022 Mid-Flood Fine Moderate 16:04 14 S 1 1 8.11 2.71 24.30 84.2 6.03 4.2 0.14 20.42 4 0.05 0.02 0.66 0.74 1 0.01 1.1 D 27/4/2022 Mid-Flood Fine Moderate 16:09 14 S 1 2 8.12 27.18 24.31 84.1 6.01 4.4 0.11 20.61 4 0.05 0.02 0.66 0.74 1 0.01 1.1 D 27/4/2022 Mid-Flood Fine Moderate 16:09 14 S 1 2 8.12 27.18 24.31 84.1 6.01 4.4 0.11 20.61 4 0.05 0.02 0.66 0.74 1 0.01 1.1 D 27/4/2022 Mid-Flood Fine Moderate 16:09 14 B 13 1 8.15 27.59 23.79 82.6 5.6 5.6 4 8.9 0.09 184.5 3 0.00 0.02 0.6 0.75 0.82 3 0.00 1.7 0.2 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7	С	27/4/2022	Mid-Flood	Fine	Moderate	16:24	12	S	1	2	8.24	27.42	27.16	84.2		1.4	0.21	60.3	3	0.04	0.02	0.37	0.73	ND	<0.01	1.0
C 27/4/2002 Mid-Flood Fine Moderate 16:24 12 B 11 1 8.29 28.02 28.26 80.2 5.41 7.7 0.20 64.7 3 0.04 0.02 0.54 0.60 ND 0.01 1.1 C 27/4/2002 Mid-Flood Fine Moderate 16:09 14 S 1 1 8.11 27.19 24.30 84.2 6.03 4.2 0.14 204.2 4 0.05 0.02 0.66 0.74 1 4.01 D 27/4/2002 Mid-Flood Fine Moderate 16:09 14 S 1 2 8.12 27.18 24.31 84.1 6.01 4.4 0.11 20.61 4 0.05 0.02 0.66 0.74 1 4.0.01 c1 D 27/4/2002 Mid-Flood Fine Moderate 16:09 14 S 1 2 8.12 27.18 24.31 84.1 6.01 4.4 0.11 20.61 4 0.05 0.02 0.62 0.69 ND 0.01 c1 D 27/4/2002 Mid-Flood Fine Moderate 16:09 14 M 7 1 8.14 27.34 24.01 83.2 5.87 6.2 0.09 184.5 3 0.05 0.02 0.75 0.82 3 4.0.01 1.2 D 27/4/2002 Mid-Flood Fine Moderate 16:09 14 M 7 2 8.15 27.33 24.02 83.1 5.86 6.3 0.09 182.7 3 0.05 0.02 0.71 0.78 1 4.0.01 1.2 D 27/4/2002 Mid-Flood Fine Moderate 16:09 14 M 7 2 8.15 27.33 24.02 83.1 5.86 6.3 0.09 182.7 3 0.05 0.02 0.71 0.78 1 4.0.01 1.2 D 27/4/2002 Mid-Flood Fine Moderate 16:09 14 B 13 1 8.16 27.59 23.79 82.6 5.64 8.9 0.08 171.2 4 0.05 0.02 0.72 0.79 2 4.0.01 1.2 E 27/4/2002 Mid-Flood Fine Moderate 16:09 14 B 13 2 8.16 27.59 23.79 82.6 5.64 8.9 0.08 171.2 4 0.05 0.02 0.72 0.79 2 4.0.01 1.2 E 27/4/2002 Mid-Flood Fine Moderate 16:09 14 B 13 2 8.16 27.59 23.79 82.6 5.64 8.9 0.08 171.2 4 0.05 0.02 0.72 0.79 2 4.0.01 1.2 E 27/4/2002 Mid-Flood Fine Moderate 16:47 14 S 1 1 8.31 28.12 24.55 87.1 6.44 2.2 0.14 91.2 5 0.02 0.02 0.66 0.73 1 0.00 1 1.2 E 27/4/2002 Mid-Flood Fine Moderate 16:47 14 S 1 1 8.31 28.12 24.55 87.1 6.44 2.2 0.14 91.2 5 0.02 0.02 0.39 0.43 13 0.01 1.2 E 27/4/2002 Mid-Flood Fine Moderate 16:47 14 S 1 1 8.31 28.12 24.55 87.1 6.44 2.2 0.14 91.2 5 0.02 0.02 0.39 0.43 13 0.01 1.2 E 27/4/2002 Mid-Flood Fine Moderate 16:47 14 S 1 1 8.31 28.12 24.2 8.30 8.2 8.3 8.1 1 8.3 8.1 1 8.3 8.2 24.8 8.3 8.1 1 8.3 8	С	27/4/2022	Mid-Flood	Fine	Moderate	16:24	12	M	6	1	8.22	27.81					0.26	81.2	3	0.05	0.02	0.45	0.51	ND	0.01	1.3
C 27/4/2022 Mid-Flood Fine Moderate 16:24 12 B 11 2 8,27 28:03 28:02 80.4 5.44 7.8 0.24 64.6 3 0.04 0.02 0.52 0.58 1 0.01 1.7 0.0										2	8.26															1.1
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H 27/4/2022 Mid-Flood Fine Moderate 14:53 19 M 9.5 1 8.26 27.56 24.11 84.1 6.03 5.8 0.06 164.8 6 0.04 0.01 0.38 0.43 8 0.02 1.8 H 27/4/2022 Mid-Flood Fine Moderate 14:53 19 M 9.5 2 8.27 27.55 24.12 84.2 6.04 5.9 0.05 166.1 6 0.03 0.01 0.41 0.46 35 0.02 2.4 10 0.05 0.05 0.05 0.05 0.05 0.05 0.05 0									1	2																2.1
H 27/4/2022 Mid-Flood Fine Moderate 14:53 19 M 9.5 2 8.27 27.55 24.12 84.2 6.04 5.9 0.05 166.1 6 0.03 0.01 0.41 0.46 35 0.02 2.4									9.5	1																1.8
										2																2.4
					Moderate																					2.2
	Н	27/4/2022					19	В	18	2	8.27	27.81			5.91	7.2	0.14		6	0.03	0.02	0.40	0.44		0.01	2.2

Note: 1. ND: Not Detected



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

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### Test Report on Analysis of Water

### Information Supplied by Client

Client

Fugro Technical Services Limited

Client's address

13/F, Fugro House - KCC2, No. 1 Kwai On Road, Kwai Chung,

N.T., H.K

Project

Contract No. CM 14/2016 Environmental Team for Operational

Environmental Monitoring and Audit for Siu Ho Wan Sewage

**Treatment Works** 

Sample description

Ninety-six samples of water taken by the staff of FTS on

27/04/2022

Client sample ID

Refer to pages 3 to 18

Tests required

1. Biochemical oxygen demand

2. Total suspended solids dried at 103°C - 105°C

3. Ammoniacal Nitrogen content

4. Nitrate-Nitrogen content

5. Nitrite-Nitrogen content

6. Total Inorganic Nitrogen content

7. Total phosphorus content

8. Total phosphorus content (Filtered)

9. E. coli count

### **Laboratory Information**

Lab. sample ID

Chemical tests	Microbiological tests
WA220748/1-96	WA220748/1B-96B

	Chemical tests	Microbiological tests
Container	Ninety-six 250 mL and 3 L plastic bottles	Ninety-six sterilized 250 mL plastic bottles with thiosulphate added
Appearance		Colorless
Temperature		Cooled

Date of receipt of sample :

27/04/2022

Date test commenced

27/04/2022

Date test completed

12/05/2022



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

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Test methods used

Biochemical oxygen demand

APHA 23ed. 5210B

Total suspended solids dried at 103°C - 105°C

APHA 23ed. 2540D

Ammoniacal Nitrogen content *APHA 23ed. 4500-NH₃ H* 

Nitrate-Nitrogen content APHA 23ed. 4500-NO<sub>3</sub> I

Nitrite-Nitrogen content

APHA 23ed. 4500-NO<sub>2</sub> A & NO<sub>3</sub> I

Total Inorganic Nitrogen content

In-house method E-T-112 (By Calculation)

Total phosphorus content

APHA 17ed. 4500-PB.5 (Digestion) & In-house method E-T-056 (Determination)

Total phosphorus content (Filtered)
APHA 17ed. 4500-PB.5 (Digestion) &
In-house method E-T-056 (Determination)

E. coli count

The Bacteriological Examination of Drinking Water Supplies 1982, DoE (1983) Membrane Filtration Procedure: Sections 7.8, 7.9.4.2 Bacterial Confirmation: Section 7.9.4.4 & in-situ urease test

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### Results:

Tootomotore			Sample id	Sample identification		
lest paralleters	A/S/E	A/S/E/Dup	A/M/E	A/M/E/Dup	A/B/E	A/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.4	1.2	٧	1.4	1.6	1.8
2. Total suspended solids dried at 103°C - 105°C, mg/L	2	5	7	9	3	3
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.05	0.04	0.03	0.04
4. Nitrate-Nitrogen content, mg/L	0.55	0.52	0.52	0.53	0.62	0.70
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.61	0.59	0.58	0.59	0.67	0.75
7. Total phosphorus content, mg/L	0.03	0.02	0.02	0.03	0.02	0.02
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.02	0.02	0.01	0.01
9. E. coli count, cfu/100ml	0	2*	*	3*	*	2*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Assistant General Manager - Laboratories Approved Signatory: HO Kin Man, John Certified by Date

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### Report No.: 181172WA220748

Results:

T			Sample ic	Sample identification		
פאן אם מוופופוא	B/S/E	B/S/E/Dup	B/M/E	B/M/E/Dup	B/B/E	B/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.3	1.0	1.8	1.2	1.2	1.2
2. Total suspended solids dried at 103°C - 105°C, mg/L	9	9	9	9	7	7
3. Ammoniacal nitrogen content, mg/L	0.05	0.05	0.05	0.04	0.04	0.04
4. Nitrate-Nitrogen content, mg/L	0.51	0.56	0.49	0.46	0.55	0.44
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.58	0.63	0.56	0.52	0.61	0.50
7. Total phosphorus content, mg/L	0.02	0.03	0.03	0.03	0.02	0.02
8. Total phosphorus content (Filtered), mg/L	0.01	0.02	0.02	0.02	0.01	0.02
9. E. coli count, cfu/100ml	2*	0	2*	*4	2*	*4
THE THE THE PROPERTY COUNTY THE	Management 1990					

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by

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

Date

13/5/20r

Fugro Development Centre Hong Kong 5 Lok Yi Street, Tai Lam Tuen Mun, NT

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### Results:

Report No.: 181172WA220748

Toctomotore			Sample Id	Sample identification		
lest paralleters	C/S/E	C/S/E/Dup	C/M/E	C/M/E/Dup	C/B/E	C/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.3	2.9	2.5	∇	1.5	2.7
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	5	2	5	5
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.04	0.04	0.03	0.03
4. Nitrate-Nitrogen content, mg/L	0.56	0.57	0.54	0.52	0.55	0.58
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.62	0.63	0.59	0.58	09.0	0.64
7. Total phosphorus content, mg/L	0.03	0.03	0.02	0.03	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	0.01	0.01	0.01	<0.01
9. E. coli count, cfu/100ml	*	2*	2*	*4	*n	*

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

Certified by:

Assistant General Manager - Laboratories Approved Signatory: HO Kin Man, John

Date

Fugro Development Centre 5 Lok Yi Street, Tai Lam Hong Kong Tuen Mun, NT

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### Results:

		)	Sample Identification		
	S/E D/S/E/Dup	Dup D/M/E	D/M/E/Dup	D/B/E	D/B/E/Dup
I. biochemical oxygen demand, mg/L	1.5	1.2	1.	1.4	1.7
2. Total suspended solids dried at 103°C - 105°C, mg/L 5	5 5	8	က	3	4
3. Ammoniacal nitrogen content, mg/L 0.07	70.0	7 0.04	0.04	0.05	0.05
4. Nitrate-Nitrogen content, mg/L 0.48	.48 0.52	2 0.48	0.46	0.49	0.53
5. Nitrite-Nitrogen content, mg/L 0.02	.02 0.02	2 0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L 0.57	.57 0.60	0 0.54	0.53	0.56	09.0
7. Total phosphorus content, mg/L 0.02	.02 0.03	3 0.02	0.02	0.03	0.03
8. Total phosphorus content (Filtered), mg/L <0.01	0.01	1 0.01	0.01	0.02	0.02
9. E. coli count, cfu/100ml	1*	1*	2*	2*	*4

\* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml. Remark:

Assistant General Manager - Laboratories Approved Signatory: HO Kin Man, John

Certified by

(3/8/m

Date

Fugro Development Centre Hong Kong 5 Lok Yi Street, Tai Lam Tuen Mun, NT

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Results:

	E/S/E	E/S/E/Dup	E/M/E	E/M/E/Dup	E/B/E	E/B/E/Dup
	1.2	2.7	1.4	1.8	2.0	1.3
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	4	4	4	4
3. Ammoniacal nitrogen content, mg/L 0.	0.07	0.07	0.07	0.07	0.07	90.0
4. Nitrate-Nitrogen content, mg/L 0.	0.52	0.49	0.50	0.43	0.43	0.45
5. Nitrite-Nitrogen content, mg/L 0.	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L 0.	0.61	0.58	0.59	0.52	0.52	0.54
7. Total phosphorus content, mg/L 0.	0.04	0.03	0.02	0.02	0.04	0.03
8. Total phosphorus content (Filtered), mg/L 0.	0.02	0.01	<0.01	<0.01	0.02	0.01
9. E. coli count, cfu/100ml	2.6 × 10	3.2 x 10	2.5 x 10	1.2 x 10	3.0 x 10	3.5 x 10

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## Report No.: 181172WA220748

Results:

Toot more toot			Sample id	Sample identification		
iest parameters	F/S/E	F/S/E/Dup	F/M/E	F/M/E/Dup	F/B/E	F/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.3	₹	₹	1.5	1.3	1.3
2. Total suspended solids dried at 103°C - 105°C, mg/L	8	က	က	8	က	က
3. Ammoniacal nitrogen content, mg/L	90.0	0.05	0.10	0.10	0.07	0.07
4. Nitrate-Nitrogen content, mg/L	0.46	0.44	0.55	0.57	0.50	0.56
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.55	0.51	0.67	0.69	0.59	0.65
7. Total phosphorus content, mg/L	0.03	0.03	0.02	0.03	0.02	0.03
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.01	0.01	0.01	0.01
9. E. coli count, cfu/100ml	2.2 × 10	1.9 x 10	2.0 × 10	2.6 x 10	2.0 × 10	1.6 x 10

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Report No.: 181172WA220748

### Results:

Tootomorphy			Sample id	Sample identification		
ו פאן סמומון פופוא	G/S/E	G/S/E/Dup	G/M/E	G/M/E/Dup	G/B/E	G/B/E/Dup
1. Biochemical oxygen demand, mg/L	1.5	1.4	1.5	1.3	1.8	1.8
2. Total suspended solids dried at 103°C - 105°C, mg/L	5	5	5	5	4	4
3. Ammoniacal nitrogen content, mg/L	0.07	0.07	0.08	0.08	0.08	0.08
4. Nitrate-Nitrogen content, mg/L	0.33	0.32	0.33	0.35	0.32	0.27
5. Nitrite-Nitrogen content, mg/L	0.01	0.02	0.01	0.01	0.01	0.01
6. Total Inorganic Nitrogen content, mg/L	0.41	0.41	0.43	0.45	0.41	0.37
7. Total phosphorus content, mg/L	0.03	0.03	0.03	0.03	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.02	0.01	0.01	0.01	<0.01	0.01
9. E. coli count, cfu/100ml	3.0 × 10	4.1 x 10	2.1 × 10	1.4 x 10	1.2 x 10	1.3 x 10

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Note: This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

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Report No. : 181172WA220748

### Results:

Tootomorea			Sample id	Sample identification		
l est parameters	H/S/E	H/S/E/Dup	H/M/E	H/M/E/Dup	H/B/E	H/B/E/Dup
1. Biochemical oxygen demand, mg/L	2.0	2.3	2.0	2.3	1.9	1.8
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	4	4	4	4
3. Ammoniacal nitrogen content, mg/L	0.08	0.08	0.08	0.09	90.0	90.0
4. Nitrate-Nitrogen content, mg/L	0.31	0.31	0.39	0.43	0.32	0.34
5. Nitrite-Nitrogen content, mg/L	0.01	0.01	0.02	0.01	0.01	0.01
6. Total Inorganic Nitrogen content, mg/L	0.40	0.41	0.49	0.53	0.39	0.42
7. Total phosphorus content, mg/L	0.03	0.04	0.02	0.02	0.12	0.12
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	0.01	0.01	0.03	0.04
9. E. coli count, cfu/100ml	$1.5 \times 10^{2}$	1.4 × 10 <sup>2</sup>	$4.1 \times 10^{2}$	$2.1 \times 10^{2}$	2.6 x 10	1.5 x 10

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Results:

Report No.: 181172WA220748

To the second second second			Sample id	Sample identification		
ופאן אמומוותנפוא	A/S/F	A/S/F/Dup	A/M/F	A/M/F/Dup	A/B/F	A/B/F/Dup
1. Biochemical oxygen demand, mg/L	1.0	1.1	1.1	1.3	1.0	1.1
2. Total suspended solids dried at 103°C - 105°C, mg/L	က	က	က	က	က	က
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	0.07	0.07	0.04	0.04
4. Nitrate-Nitrogen content, mg/L	0.48	0.51	0.43	0.44	0.45	0.51
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.54	0.57	0.52	0.53	0.51	0.56
7. Total phosphorus content, mg/L	0.04	0.03	0.13	0.13	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	0.01	0.01	0.02	0.02
9. E. coli count, cfu/100ml	*o	0	*	0	0	*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml. 2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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### Report No.: 181172WA220748

Results:

-105°C, mg/L	B/S/F/Dup <1	B/M/F <1	B/M/F/Dup 1.1	ことの日本の日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日本日	
- 105°C, mg/L	<u>^</u> 4	\ 4	1.1	B/B/F	B/B/F/Dup
- 105°C, mg/L	4	4		1.0	1.1
			4	က	8
	0.05	60.0	0.09	0.04	0.04
	0.47	0.59	0.55	0.46	0.48
	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L 0.57	0.54	0.70	99:0	0.52	0.54
7. Total phosphorus content, mg/L 0.03	0.03	0.03	0.02	0.03	0.02
8. Total phosphorus content (Filtered), mg/L 0.02	0.01	0.01	0.02	0.01	0.01
9. E. coli count, cfu/100ml 0	*	*-	*	0	*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml. 2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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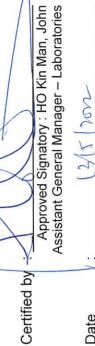
### Results:

Report No.: 181172WA220748

nand, mg/L         C/S/F         C/S/F/Dup         C/M/F           nand, mg/L         3         3         3           dried at 103°C - 105°C, mg/L         3         3         3           ntent, mg/L         0.04         0.04         0.05           mg/L         0.02         0.02         0.02           content, mg/L         0.09         0.73         0.04           nt, mg/L         0.02         0.03         0.04           nt, mg/L         0.02         0.03         0.04           nt, mg/L         <0.01         <0.03         0.04           nt (Filtered), mg/L         <0.01         <0.01         <0.01	Toctomotore			Sample id	Sample identification		
-105°C, mg/L 3 3 0.04 0.04 0.63 0.67 0.02 0.02 0.02 0.03 g/L <0.01 <0.03	col parameters	C/S/F	C/S/F/Dup	C/M/F	C/M/F/Dup	C/B/F	C/B/F/Dup
-105°C, mg/L 3 3 0.04 0.04 0.63 0.67 0.02 0.02 0.09 0.73 0.09 0.73 0.02 0.03 g/L <0.01	Biochemical oxygen demand, mg/L	1.3	1.0	1.3	1.1	1.1	1.1
0.04 0.04 0.63 0.67 0.02 0.02 0.69 0.73 0.02 0.03 9/L <0.01	Total suspended solids dried at 103°C - 105°C, mg/L	က	က	е	8	က	8
0.63 0.67 0.02 0.02 0.03 0.03 0.02 0.03 0.02 0.03 0.02 0.03 0.03	Ammoniacal nitrogen content, mg/L	0.04	0.04	0.05	0.04	0.04	0.04
0.02 0.02 0.69 0.73 0.02 0.03 9/L <0.01 <0.01	Nitrate-Nitrogen content, mg/L	0.63	0.67	0.45	0.48	0.54	0.52
0.69 0.73 0.02 0.03 g/L <0.01 <0.01	Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
0.02 0.03 <0.01 <0.01	Total Inorganic Nitrogen content, mg/L	69.0	0.73	0.51	0.55	09:0	0.58
<0.01 <0.01	Total phosphorus content, mg/L	0.02	0.03	0.04	0.03	0.03	0.02
**	Total phosphorus content (Filtered), mg/L	<0.01	<0.01	0.01	0.01	0.01	0.01
	9. E. coli count, cfu/100ml	*	0	0	*	0	*_

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.



Date

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Results:

Report No.: 181172WA220748

lest palallierers			Sample id	Sample identification		
(1991년) - 12 12 12 12 12 12 12 12 12 12 12 12 12	D/S/F	D/S/F/Dup	D/M/F	D/M/F/Dup	D/B/F	D/B/F/Dup
1. Biochemical oxygen demand, mg/L	₹	₹	1.2	1.2	1.2	1.2
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	က	က	4	4
3. Ammoniacal nitrogen content, mg/L	0.05	0.05	0.05	0.05	0.05	0.05
4. Nitrate-Nitrogen content, mg/L	99.0	0.62	0.75	0.71	0.72	99.0
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.74	69.0	0.82	0.78	0.79	0.73
7. Total phosphorus content, mg/L	0.03	0.03	0.03	0.03	0.02	0.02
8. Total phosphorus content (Filtered), mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
9. E. coli count, cfu/100ml	*_	0	*0	*	2*	*

Remarks: 1. '0' for E. coli count means the colonies counted was less than one cfu/100ml.

2. \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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## Report No.: 181172WA220748

Results:

l est parameters			Sample Ide	Sample identification		
	E/S/F	E/S/F/Dup	E/M/F	E/M/F/Dup	E/B/F	E/B/F/Dup
1. Biochemical oxygen demand, mg/L	2.1	1.8	1.6	1.5	1.4	1.1
2. Total suspended solids dried at 103°C - 105°C, mg/L	5	5	5	5	5	5
3. Ammoniacal nitrogen content, mg/L	0.02	0.03	0.04	0.04	0.04	0.04
4. Nitrate-Nitrogen content, mg/L	0.39	0.46	09:0	0.67	0.61	0.65
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.43	0.50	99.0	0.73	0.67	0.71
7. Total phosphorus content, mg/L	0.03	0.03	0.02	0.03	0.03	0.03
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	<0.01	<0.01	0.01	0.01
9. E. coli count, cfu/100ml	1.3 x 10	2.0 × 10	2.2 × 10	3.0 × 10	1.5 x 10	1.6 x 10

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## Report No.: 181172WA220748

Results:

Total more to T			Sample id	Sample identification		
lest parameters	F/S/F	F/S/F/Dup	F/M/F	F/M/F/Dup	F/B/F	F/B/F/Dup
1. Biochemical oxygen demand, mg/L	1.2	1.3	1.1	1.0	1.3	1.5
2. Total suspended solids dried at 103°C - 105°C, mg/L	4	4	5	5	9	9
3. Ammoniacal nitrogen content, mg/L	0.04	0.04	90.0	0.05	0.02	0.02
4. Nitrate-Nitrogen content, mg/L	0.62	0.64	0.52	0.57	0.44	0.43
5. Nitrite-Nitrogen content, mg/L	0.02	0.02	0.02	0.02	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.68	0.69	0.59	0.64	0.48	0.47
7. Total phosphorus content, mg/L	0.05	0.04	0.02	0.02	0.02	0.02
8. Total phosphorus content (Filtered), mg/L	0.02	0.02	<0.01	<0.01	<0.01	<0.01
9. E. coli count, cfu/100ml	2.2 x 10	1.4 × 10	3.5 x 10	2.1 x 10	1.6 x 10	2.1 × 10

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## Report No.: 181172WA220748

Results:

Total months of the second sec	- dp		Sample id	Sample identification		
lest parameters	G/S/F	G/S/F/Dup	G/M/F	G/M/F/Dup	G/B/F	G/B/F/Dup
1. Biochemical oxygen demand, mg/L	1.5	1.7	1.5	1.6	1.3	1.4
2. Total suspended solids dried at 103°C - 105°C, mg/L	9	9	9	9	9	9
3. Ammoniacal nitrogen content, mg/L	0.04	0.03	0.05	90:0	0.03	0.03
4. Nitrate-Nitrogen content, mg/L	0.38	0.36	0.42	0.46	0.55	0.53
5. Nitrite-Nitrogen content, mg/L	0.02	0.01	0.01	0.01	0.02	0.02
6. Total Inorganic Nitrogen content, mg/L	0.44	0.41	0.48	0.53	0.59	0.57
7. Total phosphorus content, mg/L	0.04	0.04	0.03	0.03	0.03	0.04
8. Total phosphorus content (Filtered), mg/L	0.01	0.01	0.02	0.02	<0.01	0.01
9. E. coli count, cfu/100ml	$3.9 \times 10^{2}$	$1.2 \times 10^2$	$1.6 \times 10^2$	$2.3 \times 10^{2}$	1.0 x 10	7*

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

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Report No.: 181172WA220748

Results:

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### H/B/F/Dup 0.03 0.40 0.44 0.03 0.02 9 H/B/F 0.42 0.03 0.04 0.02 0.37 2.2 9 H/M/F/Dup 0.03 0.41 0.46 0.03 0.01 Sample identification 9 H/M/F 0.43 0.04 0.38 0.04 0.01 1.8 9 H/S/F/Dup 0.45 0.05 0.39 0.03 0.01 2.1 9 H/S/F 0.42 0.03 0.38 0.03 6. 0.01 9 2. Total suspended solids dried at 103°C - 105°C, mg/L 6. Total Inorganic Nitrogen content, mg/L 3. Ammoniacal nitrogen content, mg/L . Biochemical oxygen demand, mg/L **Test parameters** Total phosphorus content, mg/L 4. Nitrate-Nitrogen content, mg/L 5. Nitrite-Nitrogen content, mg/L

Remark: \* Estimated for E. coli count means the colonies counted was not in the range of 10 to 100 cfu/100ml.

 $2.0 \times 10^{2}$ 

 $2.0 \times 10^{2}$ 

 $3.5 \times 10$ 

\*

1.0 x 10

 $2.4 \times 10$ 

0.01

0.01

0.02

0.02

0.01

0.01

8. Total phosphorus content (Filtered), mg/L

9. E. coli count, cfu/100ml

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\*\* End of Report \*\*

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### Note

Laboratory Duplicate, Quality Assurance/Quality Control Report

Biochemica	oxyger	Biochemical oxygen demand, mg/l				Nitrate-Nitrogen content, mg/L	noo uego	tent, mg/L			
Reporting	Anela	Spike		Laboratory Duplicate		Reporting	Jacid	Spike	Labor	Laboratory Duplicate	
Limit	Clark	recovery (%)		Original result   Duplicate result	RPD%	Limit	חשוב	recovery (%)	Original result	Original result   Duplicate result	RPD%
			1.52	1.44	5.41						
			1.28	1.23	3.98						
_	V	1	1.04	1.12	7.41	0.005	ı	ı	ı	1	1
			1.25	1.30	3.92						
			2.24	2.06	8.37						
Total suspe	nded so	lids dried at 10	Fotal suspended solids dried at 103°C – 105°C, mg/L	/L		Nitrite-Nitrogen content, mg/L	gen cont	ent, mg/L			
Reporting	Blank	Spike	Labor	Laboratory Duplicate		Reporting	Dionk	Spike	Labor	Laboratory Duplicate	
Limit	בופוב	recovery (%)	Original result	Duplicate result	RPD%	Limit	DIA	recovery (%)	Original result	Duplicate result	RPD%
		99.98	5.10	5.43	6.27		<0.005	103.25	0.021	0.020	4.88
		103.20	5.47	5.48	0.18		<0.005	107.50	0.014	0.014	0.00
-	V	101.20	2.92	3.02	3.37	0.005	<0.005	108.00	0.019	0.019	0.00
		100.40	4.10	3.80	7.59		<0.005	106.50	0.018	0.018	00.0
		98.80	5.90	5.74	2.75		<0.005	105.50	0.016	0.016	0.00



Date

Note: This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

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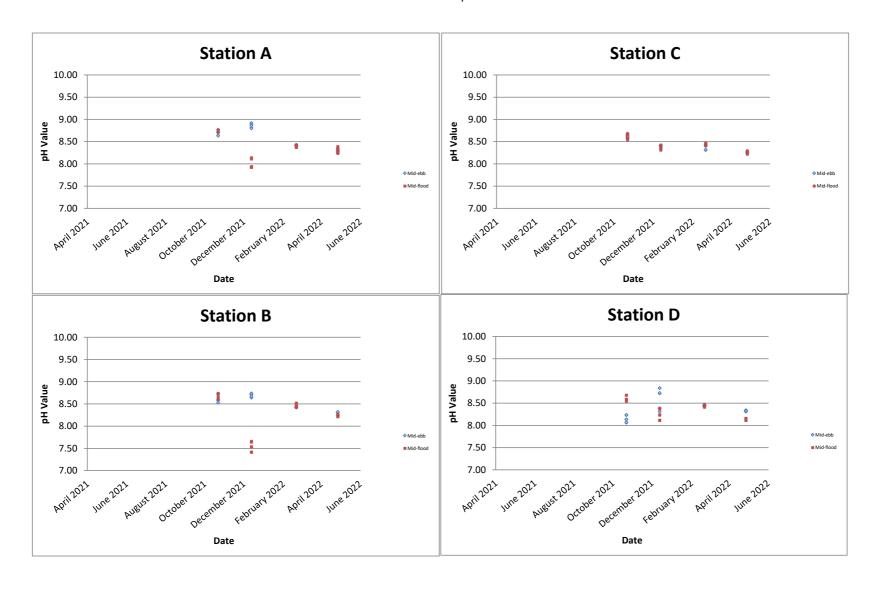
### Note

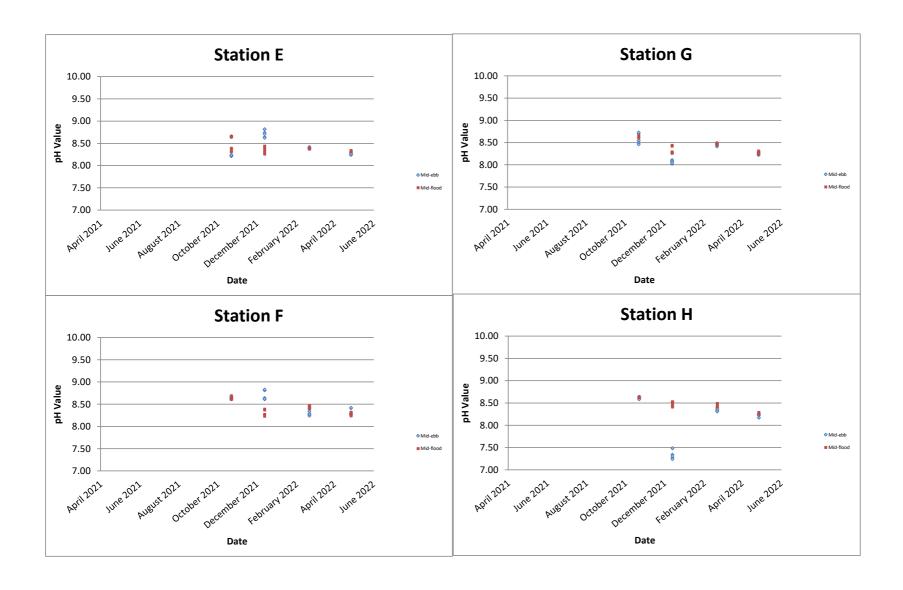
Laboratory Duplicate, Quality Assurance/Quality Control Report

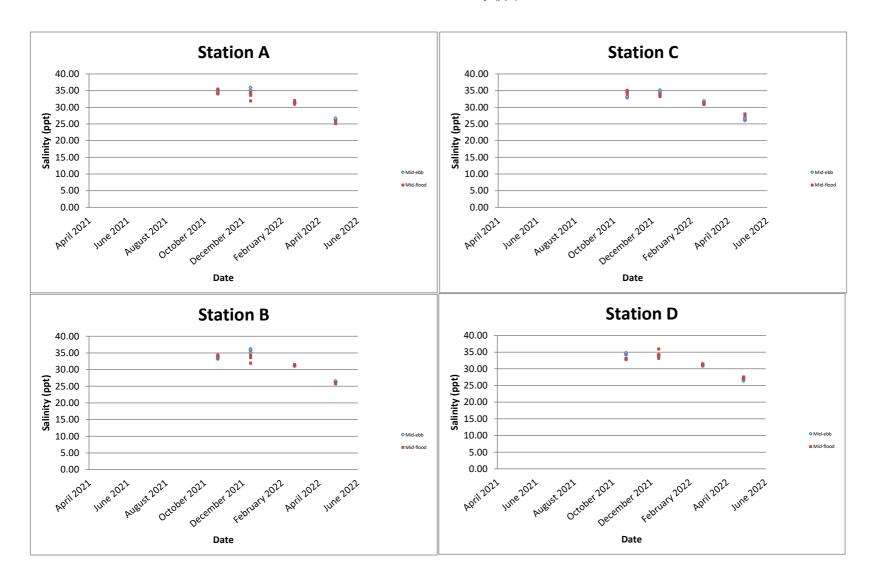
Laboratory	napilea a	ic, edanity As-	Eabolatoly Duplicate, Adamy Assalance, Adamy Control Nepolt	COLLEGE INCHOLL							
Ammoniac	al Nitroge	Ammoniacal Nitrogen content, mg/l	<b>/</b> L			Total Inorgar	nic Nitro	Total Inorganic Nitrogen content, mg/L	ıg/L		
Reporting	ם קבר	Spike	Labor	-aboratory Duplicate		Reporting	Juola	Spike	Labo	Laboratory Duplicate	
Limit	ב	recovery (%)	Original result	Duplicate result	RPD%	718	פופ	recovery (%)	Original result	Duplicate result	RPD%
	<0.005	94.90	0.068	0.068	0.15						
	<0.005	103.22	0.080	0.077	3.94						
0.005	<0.005	98.43	0.036	0.037	1.10	0.005	ť	ı	ı	•	L
	<0.005	102.30	0.040	0.039	1.27						
	<0.005	104.22	0.029	0.028	00.9						
Total phos	ohorus ca	Total phosphorus content, mg/L				Total phosph	norus co	Total phosphorus content (Filtered), mg/L	) , mg/L		
Reporting	Jacid	Spike	Labor	Laboratory Duplicate		Reporting	720	Spike	Labo	Laboratory Duplicate	
Limit	DIA	recovery (%)	Original result	Duplicate result	RPD%		DIATIK	recovery (%)	Original result	Duplicate result	RPD%
	<0.01	99.40	0.031	0.029	6.67		<0.01	99.90	0.013	0.014	7.41
	<0.01	100.90	0.027	0.028	3.64		<0.01	99.90	0.011	0.010	9.52
0.01	<0.01	100.30	0.024	0.025	4.08	0.01	<0.01	100.00	0.015	0.013	14.29
	<0.01	100.10	0.042	0.045	6.90		<0.01	100.00	0.020	0.022	9.52
	<0.01	99.60	0:030	0.032	6.45		<0.01	100.40	0.014	0.014	0.00
E. coli count, cfu/100ml	nt, cfu/10	0ml									
Reporting	Jucia	Spike	Laboi	Laboratory Duplicate							
Limit	DIALIK	recovery (%)	Original result	Duplicate result Precision	Precision						
			_	1	0						
			1.1 x 10	1.6 x 10	0.16						
_	0	j	_	-	0					(	
			1.6 x 10	1.2 x 10	0.12						
			$1.7 \times 10^2$	$2.3 \times 10^{2}$	0.13				7		
								Certified by			

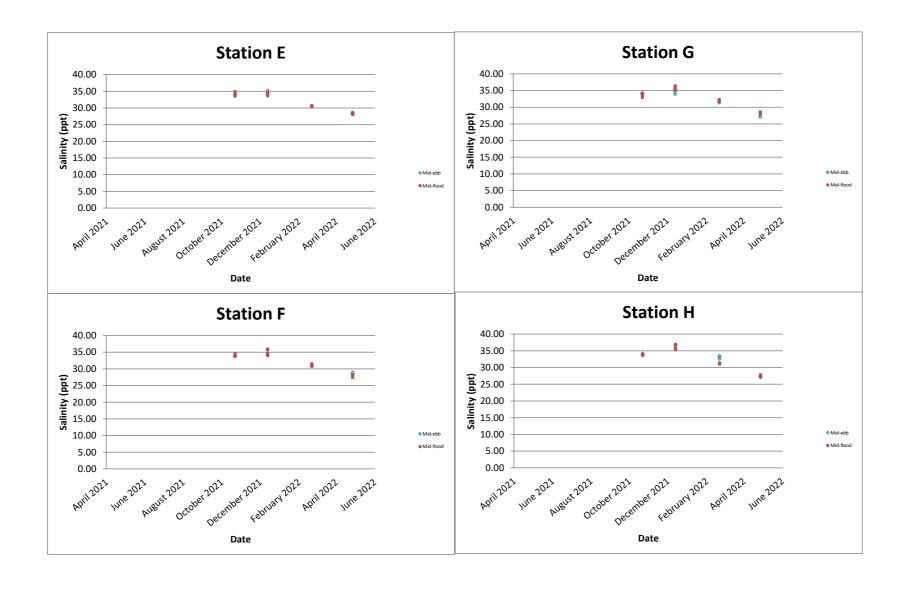
Assistant General Manager - Laboratories Approved Signatory: HO Kin Man, John

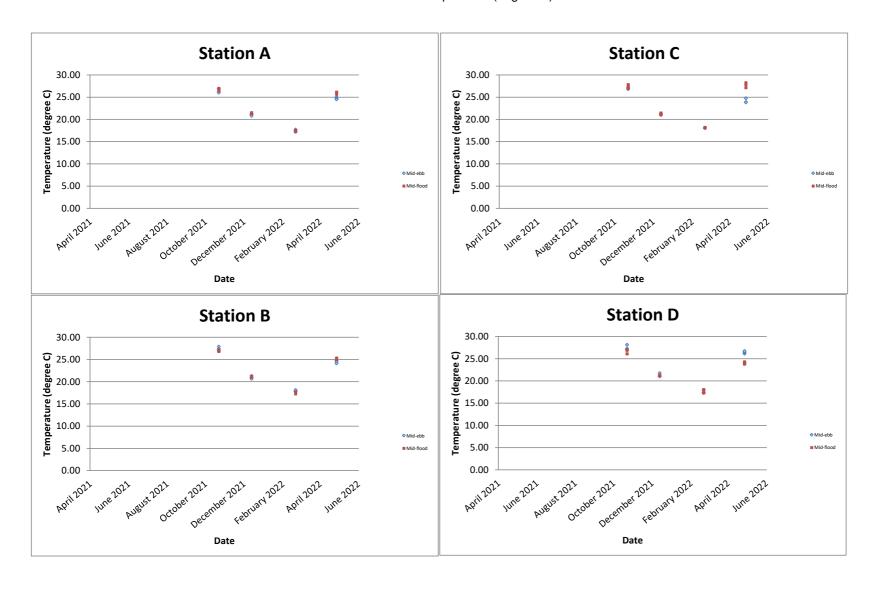
Date

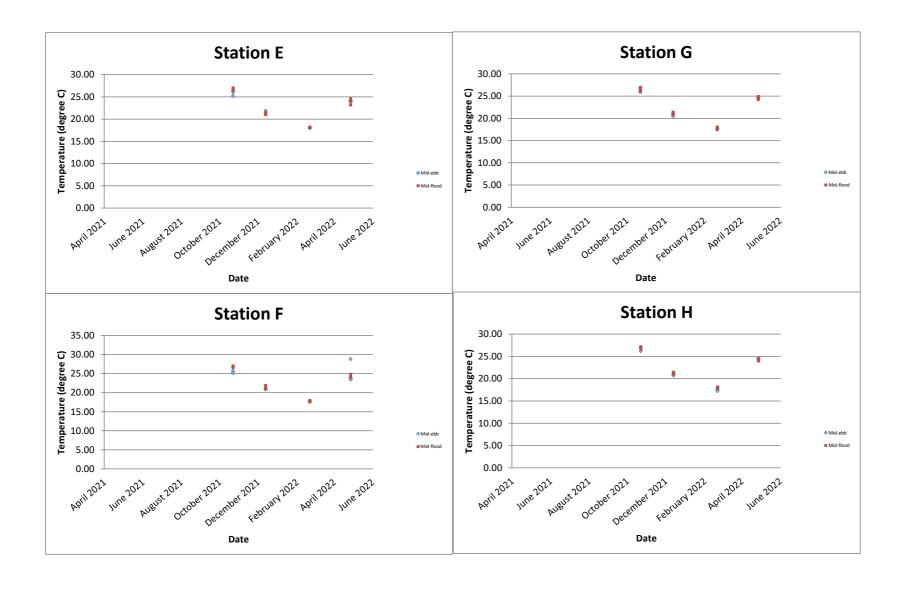


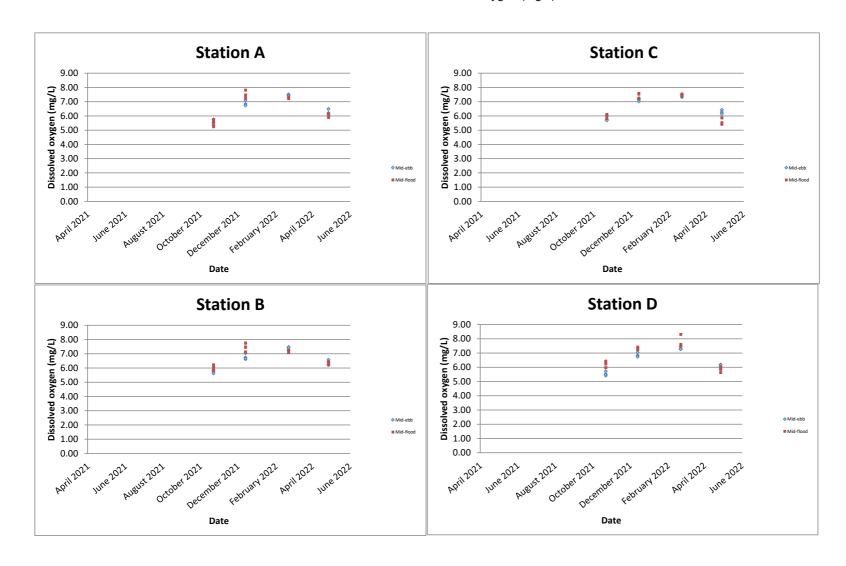


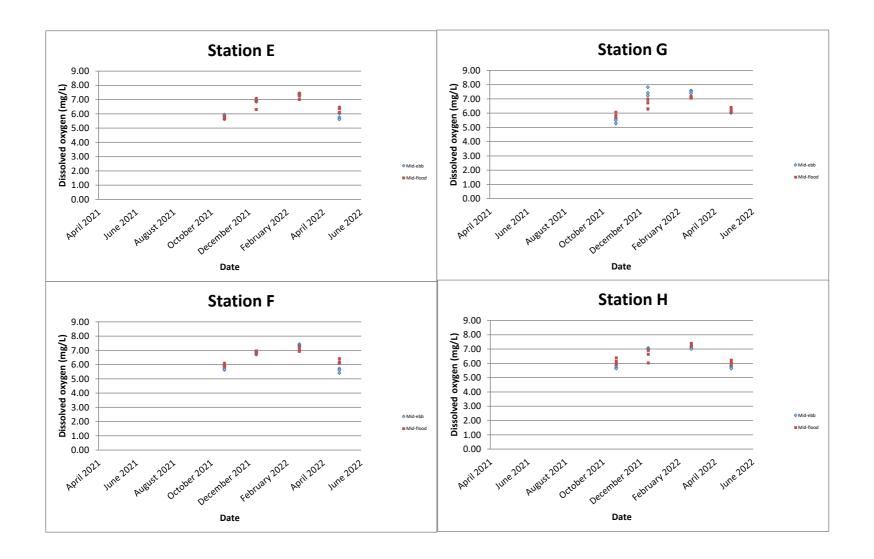


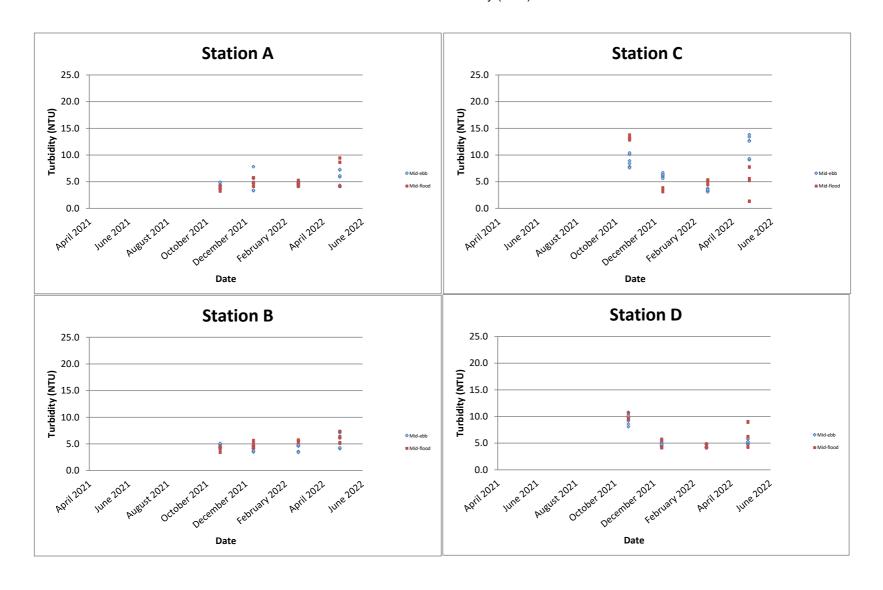


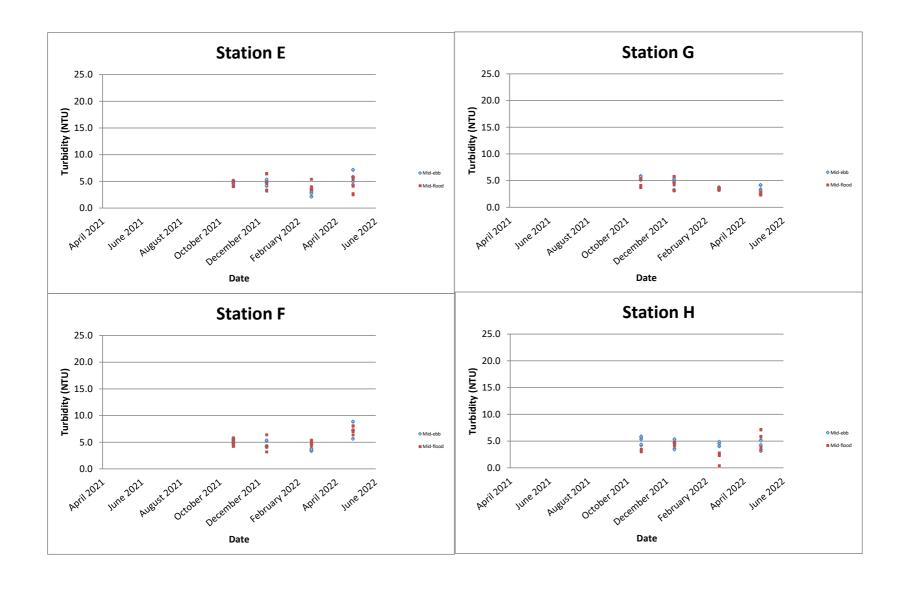


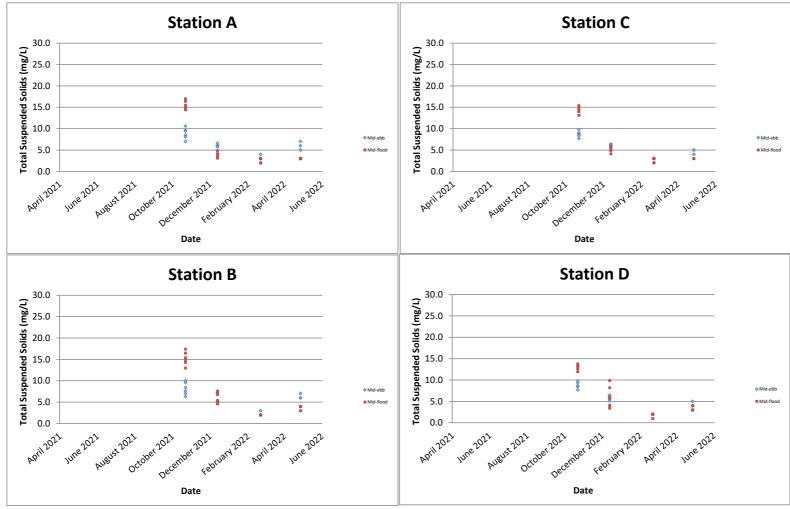




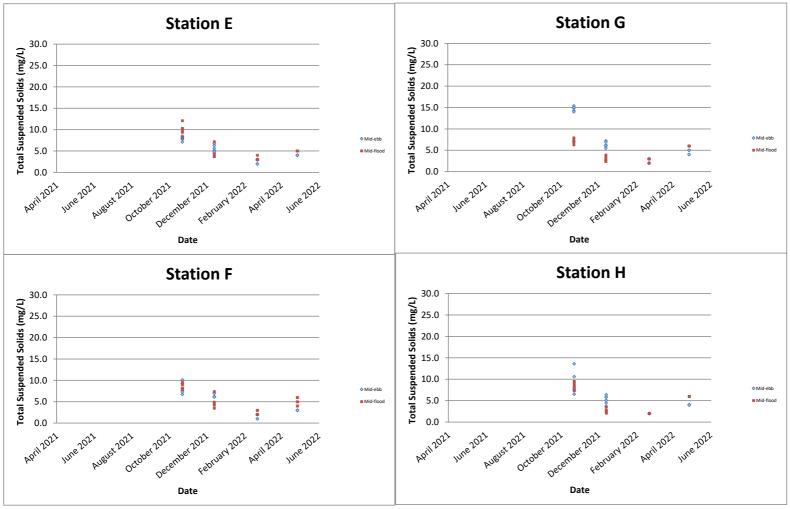




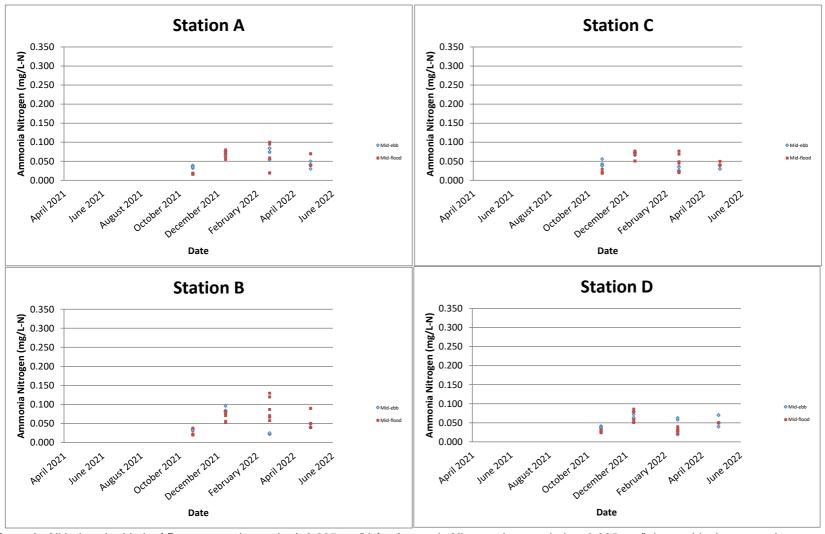




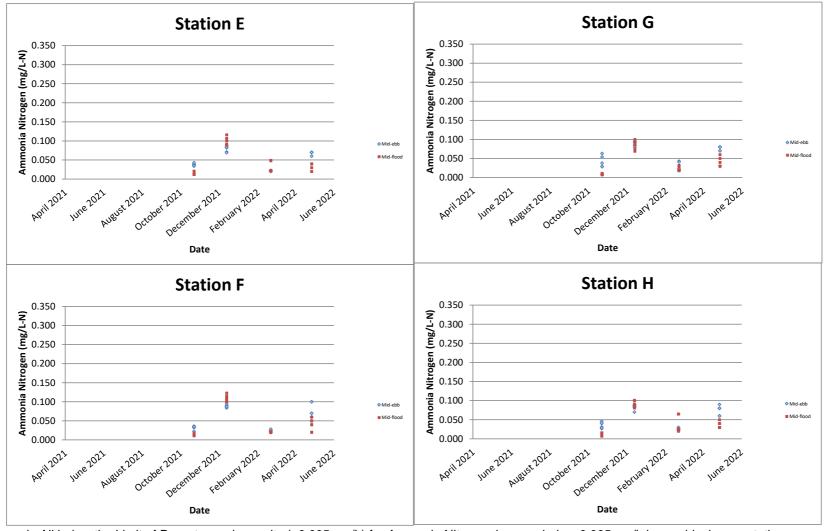
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.



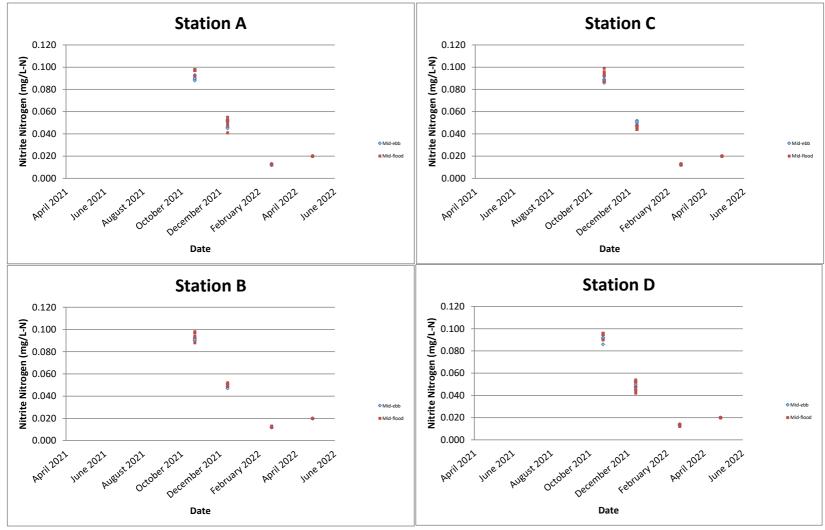
Remark: All below the Limit of Report sample results (<0.5 mg/L) for Total Suspended Solids is regarded as 0.5 mg/L in graphical presentation.



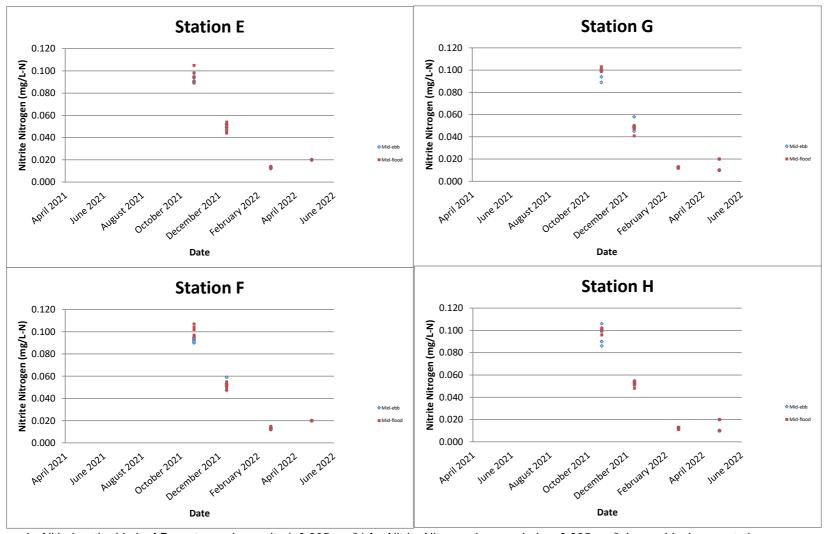
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.



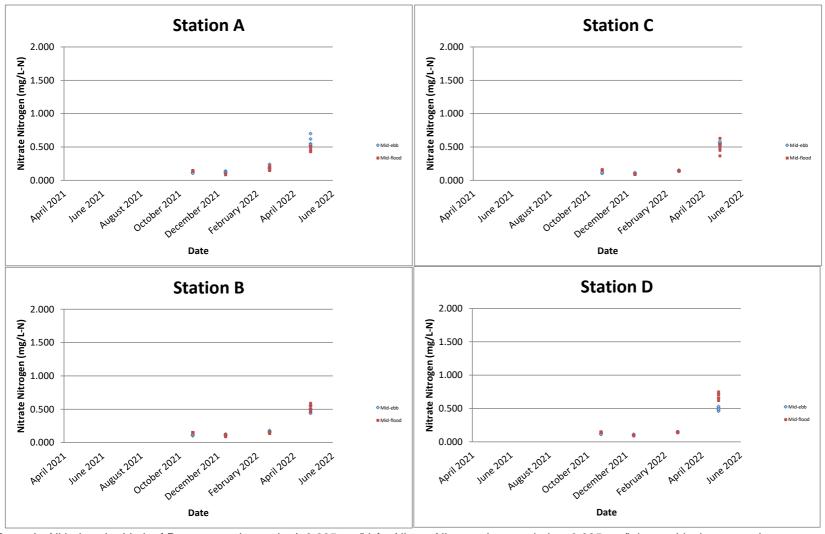
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Ammonia Nitrogen is regarded as 0.005 mg/L in graphical presentation.



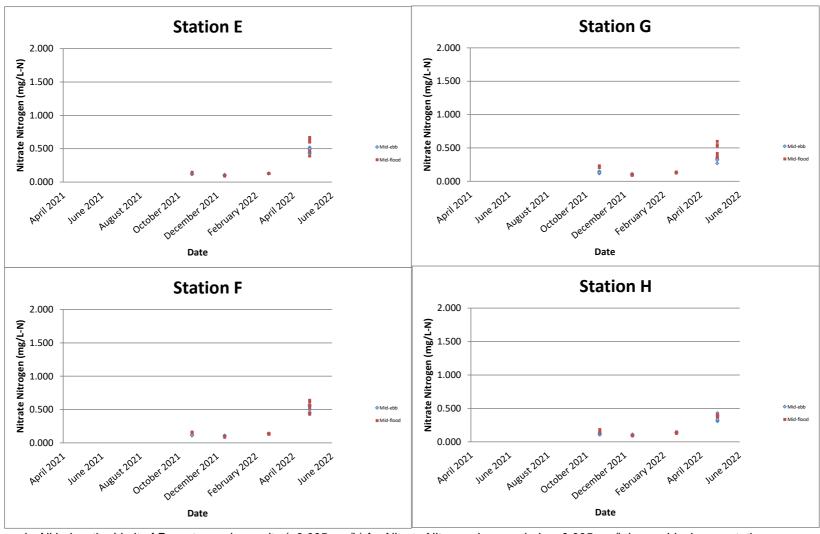
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.



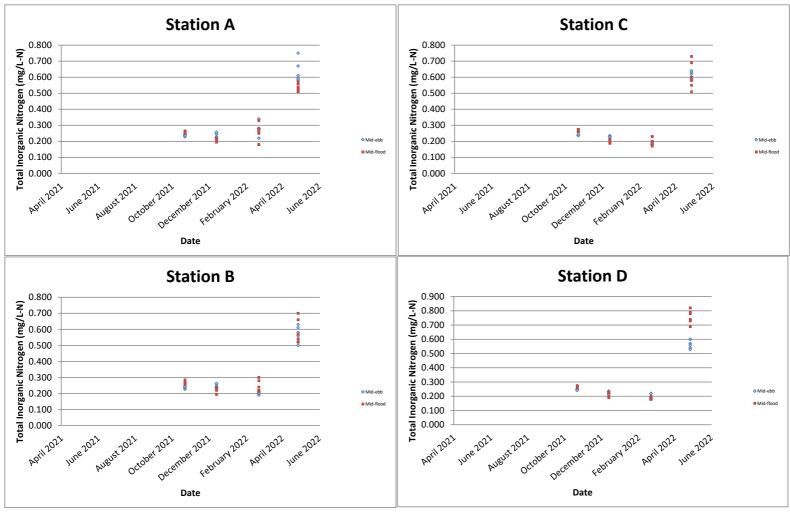
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrite Nitrogen is regarded as 0.005 mg/L in graphical presentation.



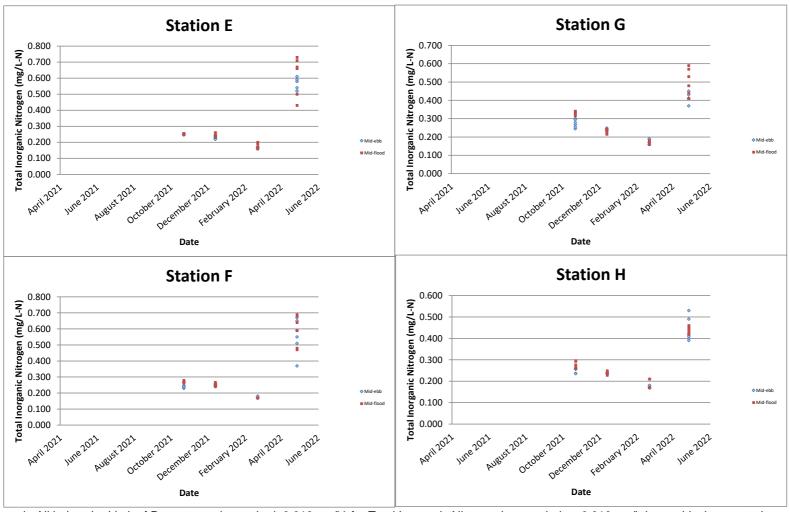
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.



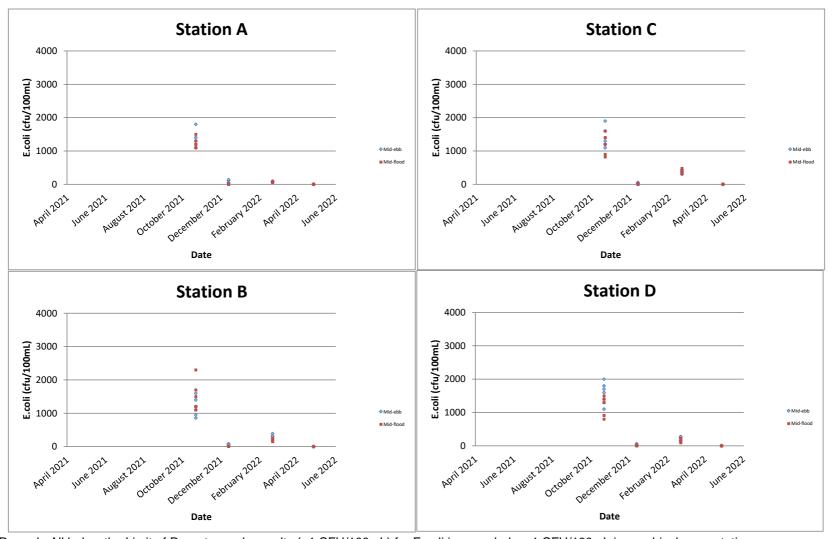
Remark: All below the Limit of Report sample results (<0.005 mg/L) for Nitrate Nitrogen is regarded as 0.005 mg/L in graphical presentation.



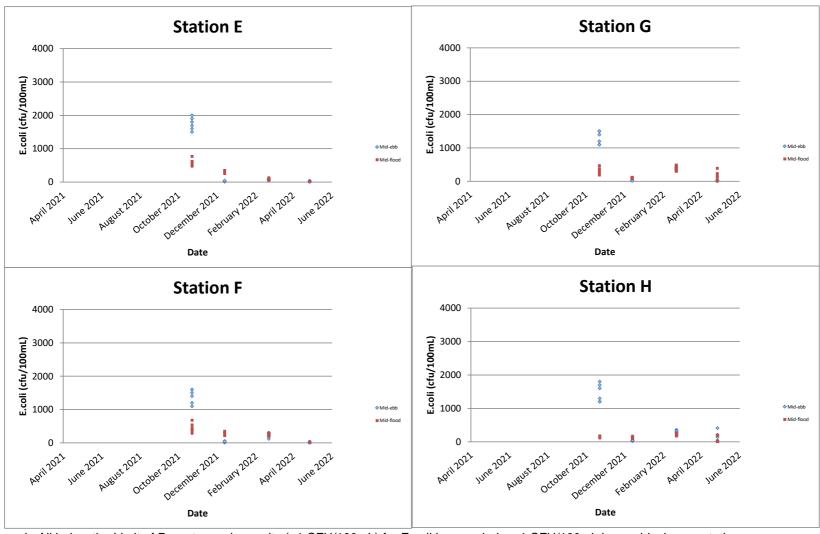
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.



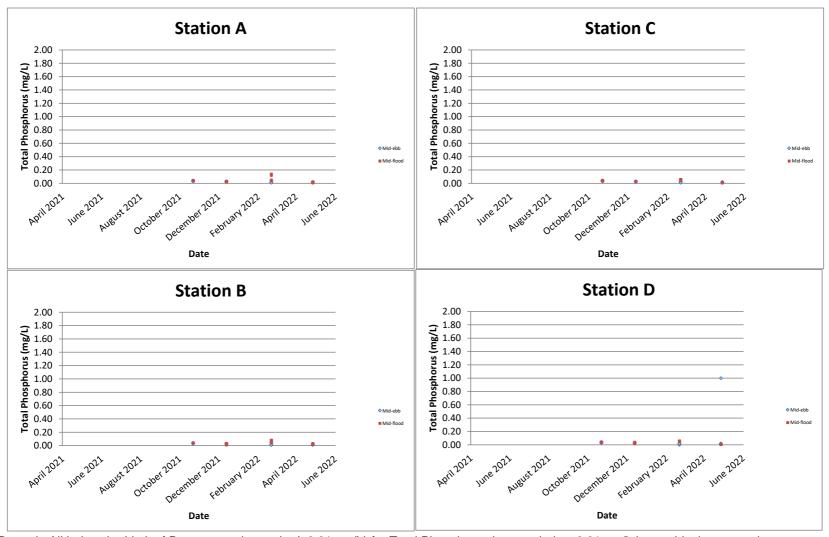
Remark: All below the Limit of Report sample results (<0.010 mg/L) for Total Inorganic Nitrogen is regarded as 0.010 mg/L in graphical presentation.



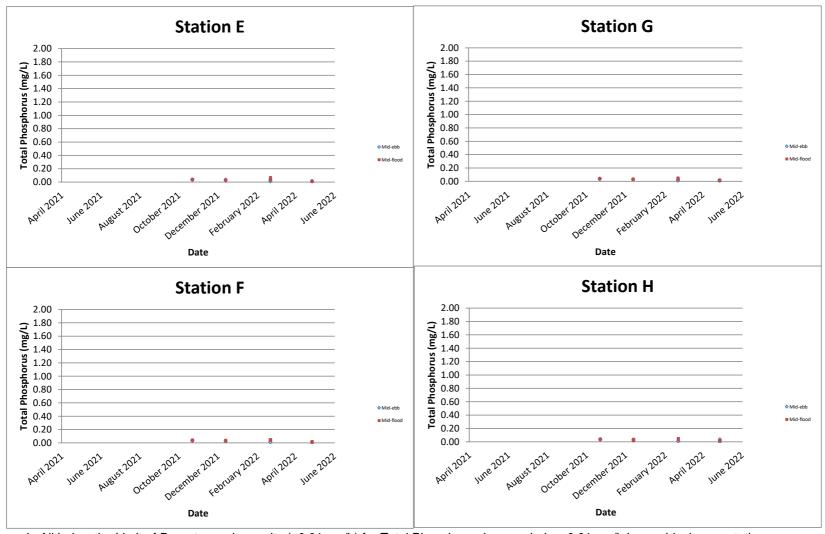
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.



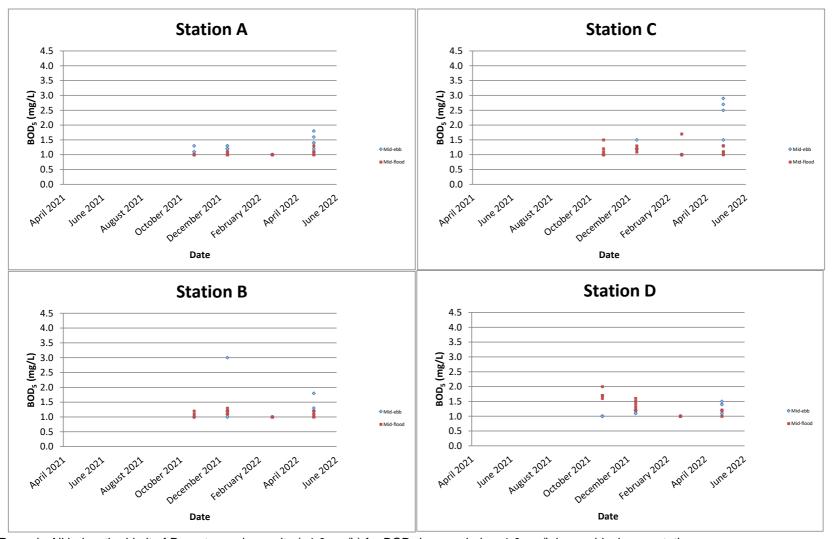
Remark: All below the Limit of Report sample results (<1 CFU/100mL) for E.coli is regarded as 1 CFU/100mL in graphical presentation.



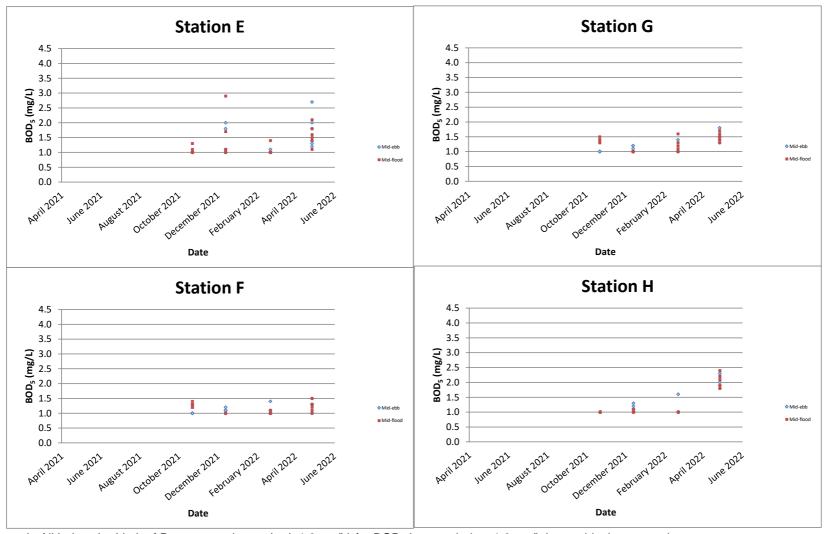
Remark: All below the Limit of Report sample results (<0.01 mg/L) for Total Phosphorus is regarded as 0.01 mg/L in graphical presentation.



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.



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD<sub>5</sub> is regarded as 1.0 mg/L in graphical presentation.



Remark: All below the Limit of Report sample results (<1.0 mg/L) for BOD<sub>5</sub> is regarded as 1.0 mg/L in graphical presentation.

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

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E-mail : matlab@fugro.com
Website : www.fugro.com



Report No.: 0041/17/ED/0670

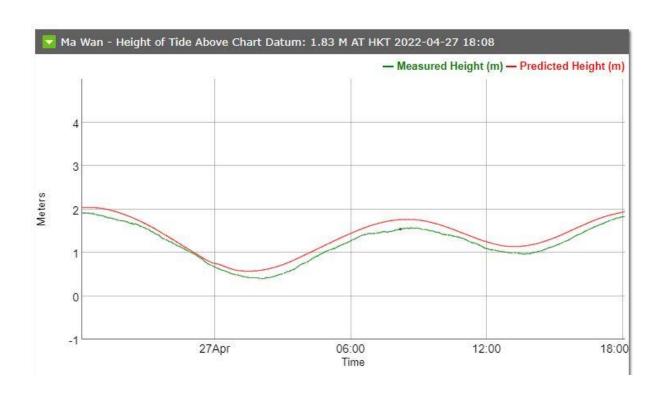
### Appendix G

Tidal Data obtained from Ma Wan Marine Traffic Station

Fugro Development Centre, 5 Lok Yi Street, Tai Lam, Tuen Mun, N.T., Hong Kong. Tel : +852 2450 8233 Fax : +852 2450 6138 E-mail : matlab@fugro.com Website : www.fugro.com



Report No.: 0041/17/ED/0670



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Report No.: 0041/17/ED/0670

### Appendix H

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

											Sediment Monitoring	ı					
Monitoring Location	Date	Weather	Sea Condition	Time	рН	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)
А	27/4/2022	Fine	Moderate	12:28	8.2	7.3	1200	490	<0.1	23	21	31	0.10	13	73	12	0.2
В	27/4/2022	Fine	Moderate	12:59	8.1	9.3	1100	450	<0.1	27	29	36	0.11	16	90	10	0.5
С	27/4/2022	Fine	Moderate	13:20	8.0	12	1100	480	<0.1	28	29	36	0.10	17	87	10	0.3
D	27/4/2022	Fine	Moderate	13:33	8.0	12	950	440	<0.1	28	29	36	0.14	16	89	10	0.3
E	27/4/2022	Fine	Moderate	13:52	8.0	15	930	460	<0.1	28	30	36	0.10	17	91	9.2	0.3
F	27/4/2022	Fine	Moderate	14:09	8.0	20	940	470	<0.1	22	37	33	0.21	13	87	9.4	0.3
G	27/4/2022	Fine	Moderate	14:27	8.8	6.0	920	740	<0.1	17	19	23	0.07	10	56	6.1	0.2
Н	27/4/2022	Fine	Moderate	14:44	8.2	8.0	910	380	<0.1	26	36	32	0.07	15	79	10	0.3

							Benthic Survey		
Monitoring Location	Date	Weather	Sea Condition	Time	Total Organic Carbon		Particle Size	Distrbution	
Location			Condition		(%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
A	27/4/2022	Fine	Moderate	12:28	0.33	8	33	26	33
В	27/4/2022	Fine	Moderate	12:59	0.68	0	13	43	44
С	27/4/2022	Fine	Moderate	13:20	0.79	0	3	47	50
D	27/4/2022	Fine	Moderate	13:33	0.70	0	7	47	46
E	27/4/2022	Fine	Moderate	13:52	0.75	0	3	48	49
F	27/4/2022	Fine	Moderate	14:09	0.86	0	2	51	47
G	27/4/2022	Fine	Moderate	14:27	0.57	43	25	17	15
Н	27/4/2022	Fine	Moderate	14:44	0.49	1	9	44	46



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172WA220748(1)



Page 1 of 3

### **Test Report on Analysis of Sediment**

### Information Supplied by Client

Client

Fugro Technical Services Limited

Client's address

13/F, Fugro House - KCC2, No. 1 Kwai On Road, Kwai Chung,

N.T., H.K

Project

Contract No. CM 14/2016 Environmental Team for Operational

Environmental Monitoring and Audit for Siu Ho Wan Sewage

Treatment Works

Sample description

Eight samples of sediment taken by the staff of FTS on

27/04/2022

Client sample ID

Refer to page 3

Tests required

1. pH value

2. Moisture content

3. Ammoniacal nitrogen content

4. Total nitrogen content 5. Total phosphorus content

6. Cadmium content

7. Chromium content

8. Copper content

9. Lead content

10. Mercury content

11. Nickel content

12. Zinc content

13. Arsenic content

14. Silver content

### **Laboratory Information**

Lab. sample ID

WA220748(1)/1-8

Date of receipt of sample:

27/04/2022

Date test commenced

03/05/2022

Date test completed

12/05/2022



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172WA220748(1)

Page 2 of 3

Test methods used

pH value

APHA 23ed. 4500-H<sup>+</sup>B

Moisture content

In house method E-T-186

Ammoniacal Nitrogen content In house method E-T-095

Total nitrogen

In house method E-T-114 (By Calculation),

In house method E-T-036 & APHA 23ed.4500-NO<sub>3</sub> -I

Total phosphorus content

APHA 17ed. 4500-PB.5 (Digestion) & In house method E-T-056 (Determination)

Cadmium, Chromium, Copper, Lead, Mercury, Nickel, Zinc,

Arsenic, Silver content

USEPA method 3050B (Digestion) & 6020A (Determination)

**Fugro Development Centre** 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Page 3 of 3

Report No.: 181172WA220748(1)

Results:								
Tootomotore				Sample ide	Sample identification			
lest parameters	A/Sediment	B/Sediment	C/Sediment	D/Sediment	E/Sediment	F/Sediment	G/Sediment	H/Sediment
1. pH value at 25°C	8.2	8.1	8.0	8.0	8.0	8.0	8.8	8.2
2. Moisture content, %	52.9	59.1	62.3	58.5	61.9	62.9	41.6	55.6
3. Ammoniacal nitrogen content, mg/kg	7.3	9.3	12	12	15	20	6.0	8.0
4. Total nitrogen, mg/kg	1200	1100	1100	950	930	940	920	910
5. Total phosphorus content, mg/kg	490	450	480	440	460	470	740	380
6. Cadmium content, mg/kg	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
7. Chromium content, mg/kg	23	27	28	28	28	22	17	26
8. Copper content, mg/kg	21	29	29	29	30	37	19	36
9. Lead content, mg/kg	31	36	36	36	36	33	23	32
10. Mercury content, mg/kg	0.10	0.11	0.10	0.14	0.10	0.21	0.07	0.07
11. Nickel content, mg/kg	13	16	17	16	17	13	10	15
12. Zinc content, mg/kg	73	06	87	89	91	87	99	62
13. Arsenic content, mg/kg	12	10	10	10	9.2	9.4	6.1	10
14. Silver content, mg/kg	0.2	9.0	0.3	0.3	0.3	0.3	0.2	0.3
				× 1				1

Certified by : 🔀

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

13/5/202

Date

\*\* End of Report \*\*

Note: This report refers only to the sample(s) tested and the result(s) applied to the sample(s) as received.

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Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

## Note

Laboratory Duplicate, Quality Assurance/Quality Control Report

pH value						Moisture content, %	intent, %				
Reporting	Ancia	Spike	Labor	Laboratory Duplicate		Reporting	Jucia	Spike	Labor	Laboratory Duplicate	
Limit	חשווא	-	Original result	recovery (%)   Original result   Duplicate result   RPD%	RPD%	Limit	DIGILIA	recovery (%)	Original result	recovery (%) Original result   Duplicate result   RPD%	RPD%
0.1	ı	Î	8.82	8.82	0.00	0.1	1	1	29.15	29.59	1.50
Ammoniac	al nitroge	Ammoniacal nitrogen content, mg/kg	kg			Total nitrogen, mg/kg	en, mg/k	g		7	
Reporting	Jucia	Spike	Labo	Laboratory Duplicate		Reporting	Jaclo	Spike	Labor	Laboratory Duplicate	
Limit	חשווא		Original result	recovery (%) Original result   Duplicate result   RPD%	RPD%	Limit	DIAIL	recovery (%)	Original result	recovery (%) Original result   Duplicate result   RPD%	RPD%
0.5	<0.5	Ē	E	ī	1	50	ı	L	ľ		Ľ
Total phosp	ohorus c	Total phosphorus content, mg/kg									
Reporting	Jucia	Spike	Labor	Laboratory Duplicate							
Limit	סומוצ	recovery (%)		Original result   Duplicate result	RPD%						
10	<10	1	382.24	384.33	0.55						
						,					



Fugro Development Centre 5 Lok Yi Street, Tai Lam Hong Kong Tuen Mun, NT

Note

Method Blank (MB), Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Heavy metals content. mg/kg

neavy metals	neavy metals content, mg/kg								
	Method Blank	Method Blank (MB) Report		M	atrix Spike	(MS) and Matrix 5	Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report	SD) Report	
ltem	LOR	Result	Spike	Spike recovery (%)	overy (%)	Recovery	Recovery limits (%)	R	RPD%
			Concentration	MS	MSD	Low	High	Value	Control Limited
Arsenic	9.0	< 0.5	10	88.5	1	75	125	1	1
Cadmium	0.1	< 0.1	2	98.7	1	75	125	τ	
Chromium	0.5	< 0.5	50	2.96	ı	75	125	ı	,
Copper	0.2	< 0.2	50	89.3	1	75	125	0	-
Lead	0.2	< 0.2	20	103.8	Ē.	75	125	E.	ı
Mercury	0.05	< 0.05	-	85.9	1	75	125	ı	1
Nickel	0.2	< 0.2	20	90.1	1	75	125	1	1
Silver	0.1	< 0.1	2	102.4	1	75	125	-	1
Zinc	0.5	< 0.5	200	96.1	1	75	125	ı	1

Ć. Remark:

µg/L - microgram per litre

Assistant General Manager - Laboratories Approved Signatory: HO Kin Man, John Certified by Date



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172WA220748(2)



Page 1 of 2

### Test Report on Analysis of Sediment

Information Supplied by Client

Client

Fugro Technical Services Limited

Client's address

13/F, Fugro House - KCC2, No. 1 Kwai On Road, Kwai Chung,

N.T., H.K

Project

Contract No. CM 14/2016 Environmental Team for Operational

Environmental Monitoring and Audit for Siu Ho Wan Sewage

**Treatment Works** 

Sample description

Eight samples of benthic survey sediment taken by the staff of

FTS on 27/04/2022

Client sample ID

Refer to page 2

Tests required

1. Moisture content

2. Total organic carbon content

Laboratory Information

Lab. sample ID

WA220748(1)/9-16

Date of receipt of sample:

27/04/2022

Date test commenced

27/04/2022

Date test completed

05/05/2022

Test methods used

1. In-house method E-T-186

APHA 23ed, 5310B

Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172WA220748(2)

Page 2 of 2

## Results:

				Sample identification	entification			
l est parameters	A/Benthic Survey	B/Benthic Survey	C/Benthic Survey	D/Benthic Survey	E/Benthic Survey	F/Benthic Survey	G/Benthic Survey	H/Benthic Survey
1. Moisture content, %	52.7	56.1	62.3	60.1	58.3	41.1	65.2	0.09
2. Total organic carbon content, %	0.33	0.68	0.79	0.70	0.75	0.86	0.57	0.49



\*\* End of Report \*\*



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

## Note

Laboratory Duplicate, Quality Assurance/Quality Control Report

		,									
Moisture content	ntent, %					Total organ	ic carbor	Total organic carbon content, %			
Reporting	Jucia	Spike	Labo	Laboratory Duplicate		Reporting   St	Jacid	Spike	Labor	Laboratory Duplicate	
Limit	חמוצ	recovery (%) O	Original result	Duplicate result RPD%	RPD%	Limit	DIAIIN	recovery (%)	recovery (%) Original result   Duplicate result   RPD%	Duplicate result	RPI
0.1		1	29.15	29.59	1.50	0.05	1	1	0.48	0.50	2.90





Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172EN220918



Page 1 of 2

### Test Report on Analysis of Water and Wastewater

### Information Supplied by Client

Client

Fugro Technical Services Limited

Client's address

Rm 723-726, 7/F, Profit Industrial Building, No.1-15, Kwai Fung

Crescent, Kwai Chung, N.T.

Project

Contract No. CM 14/2016 Environmental Team for Operational

Environmental Monitoring and Audit for Siu Ho Wan Sewage

**Treatment Works** 

Sampling date

27/04/2022

Sampling location

. .

Sample description

Eight sample(s) of Rinsate Blank

Sample identification

A/Rinsate Blank
 B/Rinsate Blank
 C/Rinsate Blank
 D/Rinsate Blank
 E/Rinsate Blank

6. F/Rinsate Blank 7. G/Rinsate Blank 8. H/Rinsate Blank

Test required

Total recoverable metals:

Arsenic content
 Cadmium content

Chromium content
 Copper content

5. Lead content

6. Mercury content

Nickel content
 Silver content

O. Zina content

9. Zinc content

### Laboratory Information

Lab sample ID

EN220918/1-8

Date of receipt of sample

27/04/2022

Date test completed

04/05/2022

Test method used

In-house method E-T-189 & E-T-190 (ICP-MS)



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172EN220918

Page 2 of 2

### Results:

		Client sample ID	A/Rinsate Blank	B/Rinsate Blank	C/Rinsate Blank	D/Rinsate Blank
Item	LOR	Unit				
In-house metho	d E-T-189	& E-T-190 (ICP-	MS)			
Arsenic	1	µg/L	< 1	< 1	< 1	< 1
Cadmium	0.2	µg/L	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	1	µg/L	1	1	1	< 1
Copper	1	µg/L	5	2	2	2
Lead	1	µg/L	< 1	< 1	< 1	< 1
Mercury	0.5	μg/L	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	1	μg/L	2	2	2	2
Silver	1	µg/L	< 1	< 1	< 1	< 1
Zinc	10	μg/L	20	20	10	10

		Client sample ID	E/Rinsate Blank	F/Rinsate Blank	G/Rinsate Blank	H/Rinsate Blank
Item	LOR	Unit				
In-house metho	d E-T-189	& E-T-190 (ICP-	MS)			
Arsenic	1	μg/L	< 1	< 1	< 1	< 1
Cadmium	0.2	µg/L	< 0.2	< 0.2	< 0.2	< 0.2
Chromium	1	µg/L	< 1	2	1	2
Copper	1	µg/L	1	2	2	2
Lead	1	µg/L	< 1	< 1	< 1	< 1
Mercury	0.5	μg/L	< 0.5	< 0.5	< 0.5	< 0.5
Nickel	1	µg/L	2	2	2	2
Silver	1	µg/L	< 1	< 1	< 1	< 1
Zinc	10	μg/L	10	10	20	10

Remark:

- The sampling procedure for the sample received in this report is outside the scope of 1. accreditation.
- µg/L microgram per litre 2.

Certified by

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

\*\* End of Report \*\*

Date



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Report No.: 181172EN220918

**Note** 

Method Blank (MB), Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

		d Blank Report	Mat	rix Spike (M	IS) and Ma	atrix Spike	Duplicate (M	ISD) Repo	rt
Item				Spike reco	very (%)	Recover	y limits (%)	RF	PD%
no	LOR	Result	Spike Concentration	MS	MSD	Low	High	Value	Contro
Arsenic	1	< 0.5	10	102.2%	-	75.0%	125.0%	-	-
Cadmium	0.2	< 0.1	10	99.3%		75.0%	125.0%		-
Chromium	1	< 0.5	10	100.8%	-	75.0%	125.0%		14.
Copper	1	< 0.5	10	100.4%	-	75.0%	125.0%	-	-
Lead	1	< 0.5	10	101.2%	-	75.0%	125.0%	-	-
Mercury	0.5	< 0.25	0.5	86.5%	-	75.0%	125.0%	-	Q
Nickel	1	< 0.5	10	100.5%	- c	75.0%	125.0%	-	-
Silver	1	< 0.5	10	101.4%	-	75.0%	125.0%	-	-
Zinc	10	< 5	100	100.0%	-	75.0%	125.0%		-

Certified by

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

Date

12/5/2020



Project

### **FUGRO TECHNICAL SERVICES LIMITED**

Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

Benthic Survey

SI 220155/1

FULL MIX

D

8295797

2.65

27.173

9.121

M160554SL220155 Test Report No. Page TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Information supplied by Client

Fugro Technical Services Limited

Client's Address

Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for

Siu Ho Wan Sewage Treatment Works

Description Service/Works Order No. Laboratory Information

Hydrometer Serial No.

Mass retained on 63um

Particle density

Initial dry mass\*

28-04-2022 Date sample received Date test commenced 03-05-2022

Test Result (Sieve Analysis)

(m<sub>2</sub>)

 $(m_3)$ 

 $(m_a)$ 

 $(m_5)$ 

 $(m_6)$ 

Initial dry mass (m<sub>1</sub>) g

Passing Riffled passing

Passing

Wash passing

Riffled passing

06-05-2022 Date test completed

Mass

retained

(g)

0.000

0.000

0.000

0.000

0.000

0.000

0.000

160.827

160.827

67.291

6.220

0.430

0.700

59.941

59.941

0.932

0.950

3.031

3.292

4.400

2.300

3.452

10.020

16,700

13.354

Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7 Method B Test method used Method of preparation

160.827

Sieve size

mm

100

75

63

50

37.5

28

20

20

20

14

10

6.3

6.3

6.3

5.0

3.35

2.00

1.18

0.600

0.425

0.300

0.212

0.150

0.063

Percent passing

(%)

100

100

100

100

100

100

100

96

96

95

95 94

92

90

88

86

84

78

67

59

Moist, brownish grey, slightly gravelly, slightly sandy SILT/CLAY Visual description

Sample type Location and Orientation within original sample (m)

To Test Result (Sedimentation Analysis)

(Assumed)

Client sample No. Borehole No.

From

From

To

Depth (m)

Sample origin

Laboratory sample I.D.

Specimen reference

Date	Time Started	Period min	Temp.	Hydro. Rdg	Hydro. Rdg#	Particle dia. mm	K %	K*
05-05-2022	10:35	0.5	25.00	11.0	0.5	0.071	62	59
	-	1	25.00	11.0	0.5	0.050	62	59
		2	25.00	10.5	0.5	0.036	59	56
		4	25.00	10.0	0.5	0.025	56	53
		8	25.00	10.0	0.5	0.018	56	53
		30	25.00	9.0	0.5	0.0094	50	48
		120	25,00	7.0	0.5	0.0048	38	37
		480	25.00	6.5	0.5	0.0024	35	34
		1440	25.00	6.0	0.5	0.0014	33	31

# Hydrometer reading in solution only (Ro')

K\* modified according to Geospec 3 (November 2001) Test Method 8.7

SUMMATION : GRAVEL SAND

% 9/2 : 8

33

SILT % 26 33 CLAY %

	(m <sub>t</sub> )			1.510						Maria de la companya della companya della companya della companya de la companya della companya				-	
					0.063	0.15	0.3	0.6	1.18	eve Size (mm)	5.	10	20	37.5	75
100		100	-77		0.00	1	-	1		-					-
90		-015		-1-	14-18				44-	-	-			100	
80										+	- 1-		-4	- 1	(+
70		1					/				111	111	-		- []
60				-1-		×			+++-}-				-1-	1 -	1
50						111			14++		+++	111	1	(1)	- 1
40						411		-1-1	1111	-+-+	111		-	90	
30					1-1-6	11	$\rightarrow$	111		-+-		1	-1	27	- 11
20			1991-	-10					1-1		111	133	1		1
10		1111	101					-+1	11-1-1	- + +	11				
0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.2	0.5	1	2	5	10	20	50	,
		PINE	MEDIUM	- 1	XXARSE I	PINE	PARTICLE	SIZE mm	COARSE	PE	NH T	MEDIUM	1 0	DARSE	COB
1	CLAY	PINE	SILT		UNKSE	PLAN		AND	COARGE	- "		GRAVEI.	-	JANUAL .	BLES

Abbreviations used Remarks

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored

Coefficient of Uniformity is undefined

Initial dry mass\* . The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

\*End of Report\*\*

Approved Signatory

Au Yeung Wai Kit - Laboratory Manager

Date

13 MAY 2022



В

D

Benthic Survey

SL220155/2

Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(1) Test Report No.

Page

From

TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Information supplied by Client Fugro Technical Services Limited Client

Client's Address

Date sample received

Date test commenced Date test completed

Project

Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for

Siu Ho Wan Sewage Treatment Works

Service/Works Order No.

28-04-2022

Laboratory Information

03-05-2022 06-05-2022

Test method used Method of preparation

Visual description

Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7 Method B

Moist, grey, slightly sandy SILT/CLAY.

Laboratory sample I.D. Specimen reference

Sample type Location and Orientation

Client sample No.

Borehole No.

Sample origin

Description

Depth (m)

within original sample (m)

From

**FULL MIX** 

	Sieve Analysis	)			Test Result	(Sedime	ntation A	(nalysis)					
nitial dry mass	s (m <sub>1</sub> ) g ;	142.569	Mass retained	Percent	Hydrometer S	Corial No.				1.1	8295797		
		Sieve size		passing (%)	Particle dens			(Assume	45		2.65		
		mm 100	(g) 0.000	100				(Assume			24.418		
		75	0.000	100	Initial dry mas		-		9		3.250		
				100	Mass retaine	a on oshi	m		g		3.230		
		63 50	0.000	100	Date	Time	Period	Tama	Lhoden	Hydro.	Particle dia.	K	K*
					Date	100073 1301	100 Sept 100 Sept 11	Temp.	Hydro.		100000000000000000000000000000000000000	%	%
		37.5	0.000	100	05 05 0000	Started	min	°C	Rdg	Rdg#	mm 0.069	86	87
		28	0.000	100	05-05-2022	10:30	0.5	25.00	13.5	0.5	0.069	86	87
	( iii )	20	0.000	100			1	25.00	13.5	0.5		82	84
Passing	(m <sub>2</sub> )	20	142.569			-	2	25.00	13.0	0.5	0.035		
Riffled passing		20	142.569				4	25.00	12.5	0.5	0.025	79	80
Nash passing	(m <sub>4</sub> )	20	19.820				8	25.00	11.5	0.5	0.018	72	74
		14	0.000	100			30	25.00	10.0	0.5	0.0093	62	64
		10	0.000	100		- 1	120	25.00	8.0	0.5	0.0047	49	50
		6.3	0.000	100		110	480	25,00	7.5	0.5	0.0024	46	47
Passing	(m <sub>5</sub> )	6.3	19.820			1	1440	25.00	6.5	0.5	0.0014	39	40
Riffled passing	g (m <sub>6</sub> )	6.3	19.820	1.0						www. Zucka			
		5.0	0.000	100					ig in soluti		4.		
		3.35	0.080	100		K.	modified	according	to Geosp	ec 3 (No	vember 2001)	Test Met	nod 8.7
		2.00	0.142	100									
		1.18	0.148	100									
		0.600	0.260	100									
		0,425	0.141	99		SU	MMAT	ION :	GRAVEL		% :	0	
		0.300	0.230	99					SAND		% :	13	
		0.212	0.540	99					SILT		% :	43	
		0.150	1,630	98					CLAY		% :	44	
		0.063	15,399	87									
Pan	(m <sub>f</sub> )		1.250										
						4	1.1	Sieve Si			10 20	225	-
100				0.063	0.15	0.3	0.6	1.16		5	10 20	37.5	75
		1.6331										. 12	- 1
100.1	-1			×								1.0	
90				- i- i-			1. 1. 1. 1	1		-11-11	1	1 1	
90													A 8
80								1		-			- 1
80										1	+		1
80													
80												+	
80												+	
80												+ 1	
80												-	
00 00 00 00 00 00 00 00 00 00 00 00 00												+	
80 70 70 80 80 80 80 80 80 80 80 80 80 80 80 80									1				
90 00 00 00 00 00 00 00 00 00 00 00 00 0													
80 70 70 88 88 88 88 88 88 88 88 88 88 88 88 88	0.002 0	005 0.01	0.02	0.05	0,5 0,2	0	5			5	10. 20		50
0 PERCENTAGE PASSING 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0.002 0	005 0.01	0.02	9.05		0 CLE SIZE r		1		5	10 20		50

Abbreviations used Remarks

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.

Coefficient of Uniformity is undefined.

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory

Au Yeung Wai Kit - Laboratory Manager

Date !

13 MAY 2022

\*\*End of Report\*\*



Project

### **FUGRO TECHNICAL SERVICES LIMITED**

Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(2) Test Report No. TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Information supplied by Client

Fugro Technical Services Limited Client

Client's Address

Client sample No.

Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for

Siu Ho Wan Sewage Treatment Works

Sample origin Description

Service/Works Order No.

Laboratory Information

28-04-2022 Date sample received Date test commenced 03-05-2022 Date test completed 06-05-2022

Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7 Test method used

Method B Method of preparation

Moist, grey, slightly sandy SILT/CLAY. Visual description

Specimen reference Sample type

Location and Orientation

Laboratory sample I.D.

Page

Borehole No

Depth (m)

within original sample (m)

From

From

To

**FULL MIX** 

of

C

AD

Benthic Survey

SL220155/3

0.001	0.002	0,005 0.01	0.02	0.05	01 02 PARTI	CLE SIZE		1	2	5	10 20		50
0			1.00			,	- 1	4			1.0		***
					11.		12 11 17	13					-
10 -	-		-		11 1	++-	1	1		-11			
20						1		1		111		11	- 3
						1		1					
PERCENTAGE PASSING						1		1		-		1 30	
Z 40				+ + + + 1		1-1-		1				1	
9 50 -		1 1 1 1 1 1 1		1 1		1			1				
g 00					1			1			1		
ASS 60						1						- 1	
N 70	-			1 1 1				1		111	1	1	
80 -						11		11		1111	1		
100			/			1				1115		1	
90		1-14-157					111	3				1	A 18
100				15	0.13	1		1		1	1	-	-
				0.063	0.15	0.3	0.6	Sieve Si		5	10 20	37.5	75
Pan	(m <sub>1</sub> )		0.790										
		0.063	2.462	97									
		0.150	0.180	99					CLAY		% :	50	
		0.212	0.160	99					SILT		% :	47	
		0.300	0.163	99			1011510/36	2561.4	SAND		% :	3	
		0.425	0.152	100		SU	MMAT	ION :	GRAVEL		% :	0	
		0.600	0.210	100									
		1.18	0.072	100									
		2.00	0.050	100				100					
		3.35	0.000	100		K*	modified	according	to Geosp	ec 3 (No	vember 2001)	Test Meth	nod 8.7
		5.0	0.000	100		#	Hydrome	eter readir	ng in soluti	on only (F	ξο')		
Riffled pass	sing (m <sub>6</sub> )	6.3	4.239	1.5							Con .		
Passing	(m <sub>5</sub> )	6.3	4.239			the I	1440	25.00	6.5	0.5	0.0014	48	47
		6.3	0.000	100			480	25.00	7.0	0.5	0.0024	52	51
		10	0.000	100			120	25.00	8.0	0.5	0.0047	60	59
		14	0.000	100		120-1	30	25.00	9,5	0.5	0.0093	72	71
Wash pass	sing (m <sub>4</sub> )	20	4.239				- 8	25.00	10.5	0.5	0.018	80	79
Riffled pass	sing (m <sub>3</sub> )	20	118.484				4	25.00	11.5	0.5	0.025	88	86
Passing	(m <sub>2</sub> )	20	118.484				2	25.00	12.0	0.5	0.035	92	90
		20	0.000	100		1	1	25.00	12.5	0.5	0.049	96	94
		28	0.000	100	05-05-2022	10:25	0.5	25.00	13.0	0.5	0.069	100	98
		37.5	0.000	100		Started	min	°C	Rdg	Rdg #	mm	%	%
		50	0.000	100	Date	Time	Period	Temp.	Hydro.	Hydro.	Particle dia.	K	K*
		63	0.000	100									
		75	0.000	100	Mass retaine	d on 63µ	m		g	2	0.810		
		100	0.000	100	Initial dry ma:	ss*			g	10	20.159		
		mm	(g)	(%)	Particle dens	ity		(Assume	d)		2.65		
		Sieve size	retained	passing	Hydrometer \$					2.	8295797		
nitial dry m	nass (m <sub>1</sub> )		Mass	Percent									

Abbreviations used Remarks

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored

Coefficient of Uniformity is undefined.

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory

Au Yeung Wai Kit - Laboratory Manager

Date:

13 MAY 2022

\*\*End of Report\*\*



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(3) Test Report No. TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL Page

Information supplied by Client

Fugro Technical Services Limited Client

Client's Address

Client sample No.

Project Contract No. CM 14/2016 Environmental Team for

Operational Environmental Monitoring and Audit for

From

Siu Ho Wan Sewage Treatment Works

To

Sample origin Description

Benthic Survey

D

Service/Works Order No. Laboratory Information

Date sample received Date test commenced 28-04-2022 03-05-2022 Date test completed 06-05-2022

Laboratory sample I.D. Specimen reference

Borehole No.

Depth (m)

(Assumed)

SL220155/4 D

Test method used

Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7

Sample type Location and Orientation

within original sample (m)

Method of preparation Method B Visual description

Moist, grey, slightly sandy SILT/CLAY.

From **FULL MIX** 

8295797

2.65 21.845 1.785

To

Test Result (Si	eve Analysis				Test Result	(Sedime	ntation A	Analysis)	
Initial dry mass	(m <sub>1</sub> ) g ;	130.134 Sieve size mm 100 75 63	Mass retained (g) 0.000 0.000 0.000	Percent passing (%) 100 100 100	Hydrometer : Particle dens Initial dry ma Mass retaine	ity ss*		(Assume	c
	_	50	0.000	100	Date	Time	Period	Temp.	1
		37.5	0.000	100	Date	Started	min	°C.	ı
		28	0.000	100	05-05-2022	10:20	0.5	25.00	t
		20	0.000	100	90 00 2022	10,20	1	25.00	1
Passing	(m <sub>2</sub> )	20	130.134	100			2	25.00	t
Riffled passing	(m <sub>3</sub> )	20	130.134				4	25.00	1
Wash passing	(m <sub>4</sub> )	20	9.722	77		5 = 40	8	25.00	1
	V-1-40	14	0.000	100	-	2 12 19	30	25.00	1
		10	0.000	100		, I	120	25.00	1
		6.3	0.000	100			480	25.00	1
Passing	(m <sub>5</sub> )	6.3	9.722				1440	25.00	1
Riffled passing	(m <sub>6</sub> )	6.3	9.722						•
		5.0	0.000	100		#	Hydrom	eter readir	1
		3.35	0.000	100		K*	modified	d accordin	Q
		2.00	0.070	100				100	
		1.18	0.090	100					
		0.600	0.173	100					
		0.425	0.152	100		SU	MMAT	ION :	
		0.300	0.200	99					
		0.212	0.284	99					
		0.150	0.710	99					
		0.063	7.693	93					
Pan	(m <sub>t</sub> )		0.350						
				0.063	0.15	0.3	0.6	Sieve 5	d
100		-		0.063	0.15	0.3	u.o	1.10	-
		11111		×	-				
90		-1-125-115-1-1	-	1			1-1-1-1	1	

Date	Time	Period	Temp.	Hydro.	Hydro.	Particle dia.	K %	K*
	Started	min	°C	Rdg	Rdg #	mm		-
05-05-2022	10:20	0.5	25.00	13.5	0.5	0.069	96	94
		1	25.00	13.0	0.5	0.049	92	90
		2	25.00	13.0	0.5	0.035	92	90
	J 4	4	25.00	12.0	0.5	0.025	85	83
	(S = 10)	8	25.00	11.0	0.5	0.018	77	76
	2 - 5	30	25.00	10.0	0.5	0.0093	70	69
	1	120	25.00	7.0	0.5	0.0048	48	47
		480	25.00	7.0	0.5	0.0024	48	47
		1440	25.00	6.5	0.5	0.0014	44	43

rometer reading in solution only (R<sub>0</sub>')

ified according to Geospec 3 (November 2001) Test Method 8.7

GRAVEL ATION : SAND

0/0 %

0

7

SILT % 47 CLAY % 46

Γ	CLAY	14	NE		LT	COAR	RSE	PU	NR .		EDIUM		COARSE	PINE	MEDIUM GRAVEL	-	COARSE	- O
											E SIZE mn					-		
0.501	0.0	002	0.005	0.01	0.0	2	0.05	0.1		2	0.5		Y	5	10	20		50
									- 1			111	1		(3) L	_	1	
10			1.1					LL.		1	-44	111	1		0.00	- 1	2	
20			1-1-	1111			1	1-1				1-1-1	1			1		
30 -		-	+		-		-	residents		1		1	1		-	1	- 5	
40	-		-11			-	111		+	-		111	11					
50			1	10-0-	-		++-		- 1-			111	1			1	1	
60 -			-		-	-	111		1			111	1		-11:	1	1	
70		-	-11	1			1	411	1				1			1		
80		-				/	+14	1111	1	- 1			1			-	1 1	
90			-			-		×	+				1			-	-11	
00	_	-	-	i i e i i		_	0.00	111		-	-	1			2 101	-	-	
							0.06	12	0.15	0.3		0.6	Sieve 50	5	10	20	37.5	75

Abbreviations used

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Remarks

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.

Coefficient of Uniformity is undefined

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory

Au Yeung Wai Kit - Laboratory Manage

Date

13 MAY 2022

\*\*End of Report\*\*



E

D

Benthic Survey

SL220155/5

**FULL MIX** 

of

Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(4) Test Report No. TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Information supplied by Client

Fugro Technical Services Limited Client

Client's Address

Laboratory Information

Test Result (Sieve Analysis)

Initial dry mass (m<sub>1</sub>) g

Passing

Passing

Riffled passing

Wash passing

Riffled passing

Date sample received

Project

Client sample No.

Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for

Siu Ho Wan Sewage Treatment Works

Sample origin

Service/Works Order No. Description

Percent

passing

(%)

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

100

99 97

Date test commenced 03-05-2022

Date test completed 06-05-2022

Test method used Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7

Method of preparation Method B

 $(m_3)$ 

 $(m_a)$ 

 $(m_5)$ 

 $(m_6)$ 

Visual description Moist, grey, slightly sandy SILT/CLAY

123.213

Sieve size

mm

100

75

63

50

37.5

28

20

20

20

20

14

10

6.3

6.3

6.3

5.0

2.00

1.18

0.600

0.425

0.300

0.212

0.150

0.063

Mass

retained

(g)

0.000

0.000

0.000

0.000

0.000

0.000

0.000

123.213

123.213

4.530

0.000

0.000

0.000

4.530 4.530

0.000

0,000

0.000

0.020

0.100

0.100

0.122

0.240

0.370

3.298

28-04-2022

within original sample (m) Test Result (Sedimentation Analysis)

8295797 Hydrometer Serial No. Particle density (Assumed) 2.65 Initial dry mass 21.650 g 0.821 Mass retained on 63um g

Hydro Time Period Temp Hydro. Particle dia Started min Rdg Rdg # 05-05-2022 10:15 25.00 0,069 93 97 25.00 13.0 0.5 0.049 93 97 25.00 125 0.5 0.035 89 93 4 25.00 12.0 0.5 0.025 85 89 8 25.00 11.5 0.5 0.018 82 85 30 25.00 10.0 0.5 0.0093 70 73 120 25.00 56 8.0 0.5 0.0047 58 48 50 25.00 0.5 0.0024 480 7.0 25.00 6.5 0.5 0.0014 46 1440

Page

Laboratory sample I.D. Specimen reference

Location and Orientation

From To

From

To

Borehole No.

Sample type

Depth (m)

# Hydrometer reading in solution only (Ro)

K\* modified according to Geospec 3 (November 2001) Test Method 8.7

GRAVEL 0 % SUMMATION: SAND % 3 SILT % 48

CLAY % 49

PARTICLE SIZE mm		CLAY	FINE		MEDIUS	4	COVE	S.ES	MIN	42	SA			UMRSE		ruvii		GRAVEL	_	COMPAGE		HLHS
90 80 70 60 50 90 90 90 90 90 90 90 90 90 90 90 90 90	_						CWO L THE	m I	105					CA DED	-	(m)	-	AMERICA		CYSAUSE	-	CONT
90 80 70 60 50 40 30 20	0.001	0.000	1	0.005	0.01	0.02		0.05	01				1		2	5		10	20		50	
90 80 70 60 50 40 30 20	0				60.1	- 55		- 1		- 1	-				1			-	-	-	-	-
90 80 70 60 50 40 30 20	10						-1		1111							1	444	-	- 1	- 17		15
90 80 70 60 50 40 30				Tib.		- 1		1	111	11			111	4	1		William		1			3
90 80 70 60 50 40										1			11.11	1	1							
90 80 70 60 50	30								131	1				9	- 1	13			-			
90 80 70 60	40			-			- 1		4-1-1-	1 1	1	-	111	3	-		-1	1		1		
90 80 70	50			-			-	+ 1	1111	1	-	1		- 2				1	- 1	23		
90 80 70	60			/	311					1			111		-		771	44	1	3		
90 80	200			1						3			1 11	1				1				1
90								13	ILL	9			111	1	1		11.11			- 1		
	80				1					1				1	1				-	- 1		18
00 x	90			44	7-1					- 1		1	444	1	-		-111	-		- 4		14
	100		_				715	1	×	-	-	3 1 1	1.17	11			100		- 1	-		+

Abbreviations used Remarks

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.

Coefficient of Uniformity is undefined.

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory

Au Yeung Wai Kit - Laboratory Manager

Date

13 MAY 2022

\*\*End of Report\*\*



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(5) Test Report No. TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Page of

Information supplied by Client

Fugro Technical Services Limited Client

Client's Address

Project

Client sample No.

Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for

Siu Ho Wan Sewage Treatment Works

Depth (m) Sample origin

Description

Borehole No

D

Benthic Survey

SL220155/6

Laboratory Information

Service/Works Order No.

Visual description

28-04-2022 Date sample received Date test commenced 03-05-2022 Date test completed 06-05-2022

Test method used Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7 Method of preparation

Method B

Moist, grey, slightly sandy SILT/CLAY.

Laboratory sample I.D. Specimen reference

Sample type Location and Orientation

within original sample (m)

From

To

**FULL MIX** From

Test Result (Si	eve An	alysis)				Test Result	(Sedime	ntation A	Analysis)					
nitial dry mass	(m <sub>1</sub> )		122.185 Sieve size mm 100 75 63	Mass retained (g) 0.000 0.000 0.000	Percent passing (%) 100 100	Hydrometer Particle dens Initial dry ma Mass retaine	Serial No sity ss*		(Assume	d) 9	20 20 20	8295797 2.65 19.725 0.479		
		_	50	0.000	100	Date	Time	Period	Temp.	Hydro.	Hydro.	Particle dia.	K	K*
		_	37.5	0.000	100	00.0	Started	min	°C	Rdg	Rdg#	mm	%	%
			28	0.000	100	05-05-2022	10:10	0.5	25.00	12.5	0.5	0.070	98	98
			20	0.000	100		1007	1	25.00	12.5	0.5	0.049	98	98
Passing	(m <sub>2</sub> )		20	122.185				2	25.00	12.0	0.5	0.035	94	94
Riffled passing	(m <sub>3</sub> )		20	122.185				4	25.00	11.5	0.5	0.025	90	90
Wash passing	(m <sub>4</sub> )		20	2.720				8	25.00	10.5	0.5	0.018	81	82
,			14	0.000	100			30	25.00	9.0	0.5	0.0094	69	70
			10	0.000	100			120	25.00	7.5	0.5	0.0048	57	57
			6.3	0.000	100			480	25.00	6.5	0.5	0.0024	49	49
Passing	(m <sub>5</sub> )		6.3	2.720				1440	25.00	6.0	0.5	0.0014	45	45
Riffled passing	(m <sub>6</sub> )		6.3	2.720	1	-								
			5.0	0.000	100		#	Hydrome	eter readir	ng in soluti	on only (F	₹₀')		
			3.35	0.000	100							vember 2001)	Test Met	hod 8.7
			2.00	0.000	100									
			1.18	0.030	100									
			0.600	0.060	100									
			0.425	0.072	100		SII	MMAT	ION :	GRAVEL		% :	0	
			0.300	0.093	100					SAND		% :	2	
			0.212	0.130	100					SILT		% :	51	
			0.150	0.150	100					CLAY		% :	47	
			0.063	1.585	98									
Pan	$(m_t)$			0.600										
					8.25	577.	45.			ze (mm)	5	10 20	37.5	75
100					0.063	0.15	0.3	0.6	1.18	2	3	10 20	3/2	75
					-			1 1 1 1	9				- 1	
90		-		/									- 1	- 1
80				/		-	-	11111	1			-	- 3	9 0
S 70					1 1 1 1	44 1 -	11			1		1	- 5	
88							1							- 1
DERCENTAGE PASSING							1 1		1			1	1	
D 50		+	1111				+ -	13111	1	1	-1	9		
E 40							1 .	1111	1			1	- 1	
30						3 1			1	1		J 2	1	
30		Ŧ					1		1			1		
20		1 1			111		1	11111	1	-		1 1	1	
10	-				1 1		1		1					
1000							1		1					
0,001	0.002	0.0	05 0.01	0.02	0.05	0.1 0.2 PART	ICLE SIZE		1	2	5	10 20		50
CLAY		FINE	MEDII	JM.	COARSE	PINE	MEDIUM		COARSE	PINE		MEDIUM	COARSE	COB-
CLAY			SIL.				SAND					GRAVEL		BLES

Abbreviations used Remarks

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.

Coefficient of Uniformity is undefined.

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory

Au Yeung Wai Kit - Laboratory Manager

Date:

13 MAY 2022

\*\*End of Report\*\*



G

D

8295797

2.65

Benthic Survey

SL220155/7

**FULL MIX** 

of

Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(6) Test Report No. TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Information supplied by Client

Client Fugro Technical Services Limited

Client's Address

Client sample No

Project Contract No. CM 14/2016 Environmental Team for

Operational Environmental Monitoring and Audit for

Siu Ho Wan Sewage Treatment Works

Sample origin Description

Service/Works Order No.

Laboratory Information

Test Result (Sieve Analysis)

(m<sub>2</sub>)

 $(m_3)$ 

 $(m_4)$ 

 $(m_5)$ 

 $(m_6)$ 

Initial dry mass (m<sub>1</sub>) g

Passing

Passing

Riffled passing

Wash passing

Riffled passing

Date sample received 28-04-2022 Date test commenced 03-05-2022 06-05-2022 Date test completed

Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7 Test method used

Method of preparation Method B

Visual description Moist, brown, very clayey, very silty, very sandy GRAVEL

Mass

retained

(g)

0.000

0.000

0.000

0.000

0.000

0.000

0.000

188.047

188 047

128.539

8.460

9.713

16,740

93,626

93.626

10.850 16.472

17.780

13.190

12.510

4.430

3.502

3.330

4.000

6.732

188.047

Sieve size

mm

100

75

63

50

37.5

20

20

20

14

6.3

6.3

6.3

5.0

2.00

1.18

0.600

0.425

0.300

0.212

0.150

0.063

with shell fragments.

Percent

passing

(%)

100

100

100

100

100

100

100

96

90

81

76

67

57

50

44

41

40

38

36

32

Test Result (Sedimentation Analysis) Hydrometer Serial No. Particle density (Assumed)

32,943 Initial dry mass g Mass retained on 63µm

article dia Time Temp Hydro Hydro Started Rdg Rdg# 25.00 25.00 05-05-2022 10:05 0.5 9.0 0.5 0.073 41 33 8.5 0.5 0.052 39 31 2 25.00 8.0 0.5 0.037 37 29 4 25.00 7.5 0.5 0.026 34 27 7.0 25 25.00 0.5 0.019 32 8 30 25.00 6.5 0.5 0.0097 29 23 17 25.00 0.5 0.0049 22 120 5.0 25.00 4.5 0.5 0.0025 16 480 25.00 4.0 0.0014

Page

Laboratory sample I.D.

Location and Orientation

within original sample (m)

Specimen reference

Sample type

From

From

To

To

Borehole No

Depth (m)

# Hydrometer reading in solution only (Ro)

SILT

CLAY

K\* modified according to Geospec 3 (November 2001) Test Method 8.7

GRAVEL SUMMATION: SAND

1/6 %

%

25 17 15

43

												Sieve S	Size (mm)						
							0.063	0.15	0.3	0.6		1.18	2	5	10	20	37.5		75
100	-	2000	11111	19.0	- 2	11.1	1 (1)	1			111	1 !	1	-	111		-		
90			110	1		-	111	1			111	1	1	-1-1-	1				
80			111			-1-1-			-		111	1	1	-1-1/					
70				+		+	- 11		-			<u> </u>							
60				-				1		446	-11	1	/						
50			+H	+		-						1	-	++	- 11	- 1			
40			111		-+-	+	1-811	1	_			1	1 +	-1-1-					
30		$\rightarrow$		+			×				+++	1	-	++	-111				
20	-					-+	- 611	1	-		+++	1	+	- + +	711				
10		-	111	-	-			1				1	1	11		-	-		
o L				ш_	-			1			111	11	-				-		-
0.00	0.002	0	005	0.01	0.02	0	05	0.1	PARTICLE	0.5 E SIZE mm			2	5	10	2		50	4
Ī	CLAY	PINE		MEDIUM	- [	COARSE		PINE		HDIUM		COARSE	P	INE	MEDI		COARS	ž.	COH-

Remarks

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored.

Coefficient of Uniformity is undefined.

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

Approved Signatory :

Au Yeung Wai Kit - Laboratory Manager

Date :

13 MAY 2022

\*\*End of Report\*\*



Fugro Development Centre 5 Lok Yi Street, Tai Lam Tuen Mun, NT Hong Kong

M160554SL220155(7) Test Report No. TEST REPORT ON PARTICLE SIZE DISTRIBUTION OF SOIL

Siu Ho Wan Sewage Treatment Works

Information supplied by Client

Fugro Technical Services Limited Client

Method B

Client's Address

Project

Client sample No.

Page

Borehole No.

Contract No. CM 14/2016 Environmental Team for Operational Environmental Monitoring and Audit for

Depth (m)

From

To

Sample origin

(Assumed)

Н

D

of

Description

Benthic Survey

SL220155/8

Service/Works Order No. Laboratory Information

Test method used Method of preparation

28-04-2022 Date sample received Date test commenced 03-05-2022 Date test completed

06-05-2022 Geospec 3 (November 2001) Test Method 8.1 & 8.5 & 8.7

Sample type Location and Orientation

Laboratory sample I.D.

Specimen reference

within original sample (m)

From

FULL MIX To

> 8295797 2.65

23.252

Test Result (Si	eve Analy	sis)				Test Result	(Sedime	nt
Initial dry mass	(m <sub>1</sub> ) g		135.854 Sieve size mm 100 75 63	Mass retained (g) 0.000 0.000 0.000	Percent passing (%) 100 100	Hydrometer : Particle dens Initial dry ma Mass retaine	sity ss*	
			50	0.000	100	Date	Time	ī
			37.5	0.000	100		Started	1
			28	0.000	100	05-05-2022	10:00	
			20	0.000	100			
Passing	(m <sub>2</sub> )		20	135.854				
Riffled passing	(m <sub>3</sub> )		20	135.854				
Wash passing	$(m_4)$		20	14.789			-	
			14	0.000	100			
			10	0.000	100			
			6.3	0.700	99			
Passing	(m <sub>5</sub> )		6.3	14.089				
Riffled passing	(m <sub>6</sub> )		6.3	14.089				
			5.0	0.000	99		#	H
			3.35	0.440	99		K*	n
			2.00	0.672	99			
			1.18	0.863	98			
			0.600	1.500	97			
			0.425	0.930	96		SU	N
			0.300	1.030	95			

0.212

0.150

0.063

1.443

1.780

94

93

Date	Time	Period	Temp.	Hydro.	Hydro.	Particle dia.	K	K.
	Started	min	°C	Rdg	Rdg #	mm	%	%
05-05-2022	10:00	0.5	25.00	12.5	0.5	0.070	83	90
		1	25.00	12.5	0.5	0.049	83	90
		2	25,00	12.0	0.5	0.035	79	86
		4	25.00	11.5	0.5	0.025	76	82
	-	8	25.00	11.0	0,5	0.018	.73	78
		30	25.00	9.5	0.5	0.0093	62	67
		120	25.00	8.0	0,5	0.0047	52	56
		480	25.00	7.0	0.5	0.0024	45	49
		1440	25.00	6.0	0.5	0.0014	38	41

g

# Hydrometer reading in solution only (Ro)

K\* modified according to Geospec 3 (November 2001) Test Method 8.7

SUMMATION :

Test Result (Sedimentation Analysis)

GRAVEL

SAND

SILT

CLAY

% %

%

44 46

9

90 4.741 Pan  $(m_t)$ 0.690 0.063 0.15 0.3 0.6 1.18 37.5 100 90 80 PERCENTAGE PASSING 70 60 50 40 30 20 PARTICLE SIZE mm COARSE COB-CLAY Abbreviations used

Sample type : U = undisturbed, P = piston, M = mazier, BLK = block, D = disturbed (bulk)

Remarks

Point x(s) on graph indicate(s) initial modified hydrometer reading(s) being ignored

Coefficient of Uniformity is undefined.

Initial dry mass\*: The initial dry mass of the test specimen in the Sedimentation Analysis was not enough according to the requirement of GEOSPEC 3 (2001)

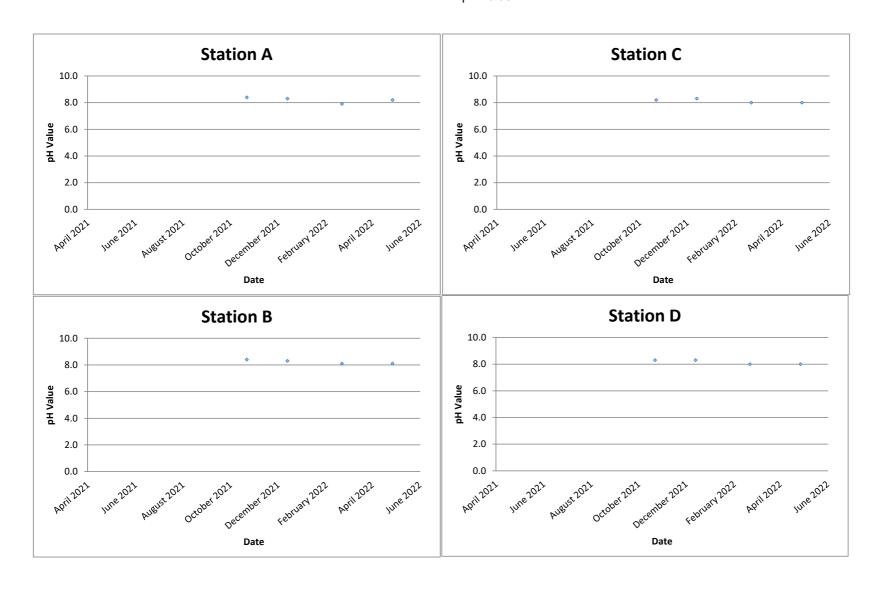
Approved Signatory:

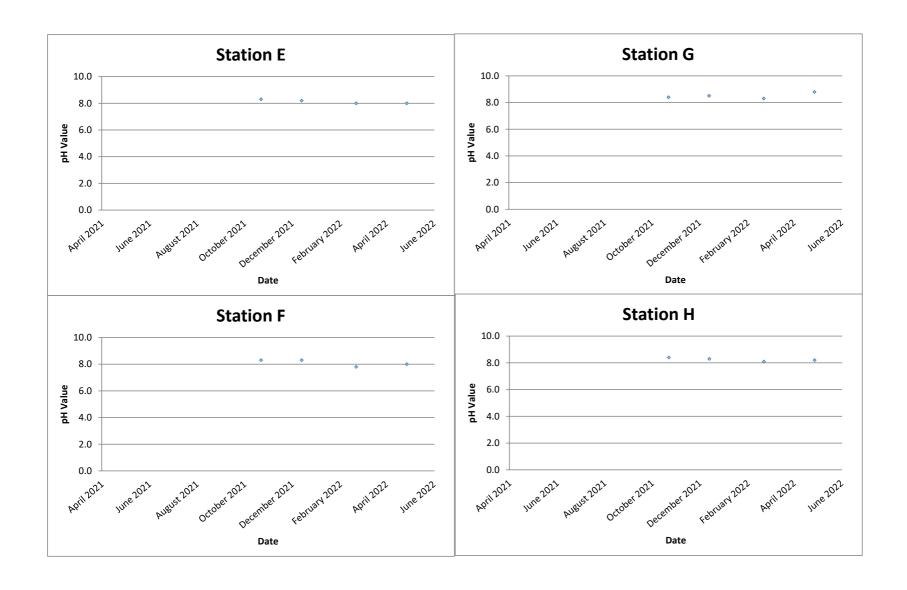
Au Yeung Wai Kit - Laboratory Manager

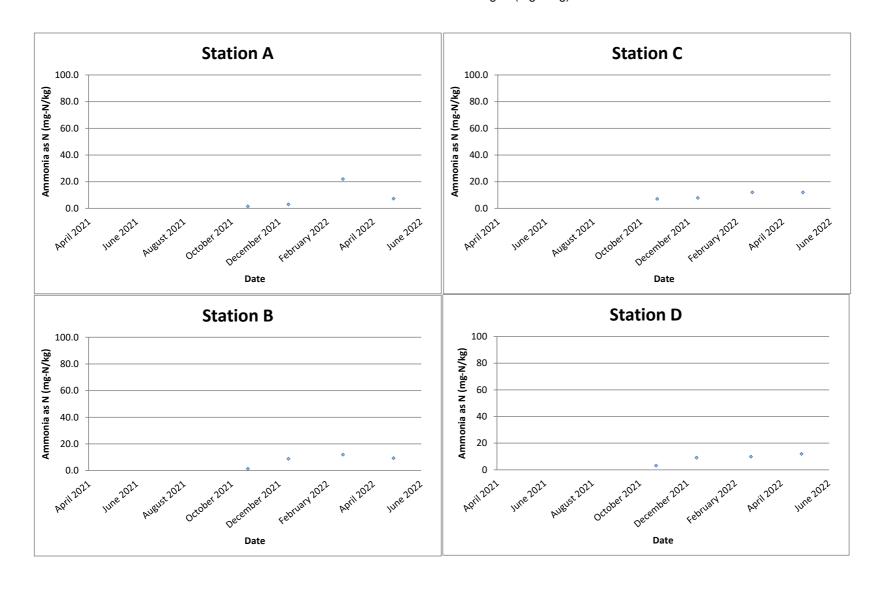
Date:

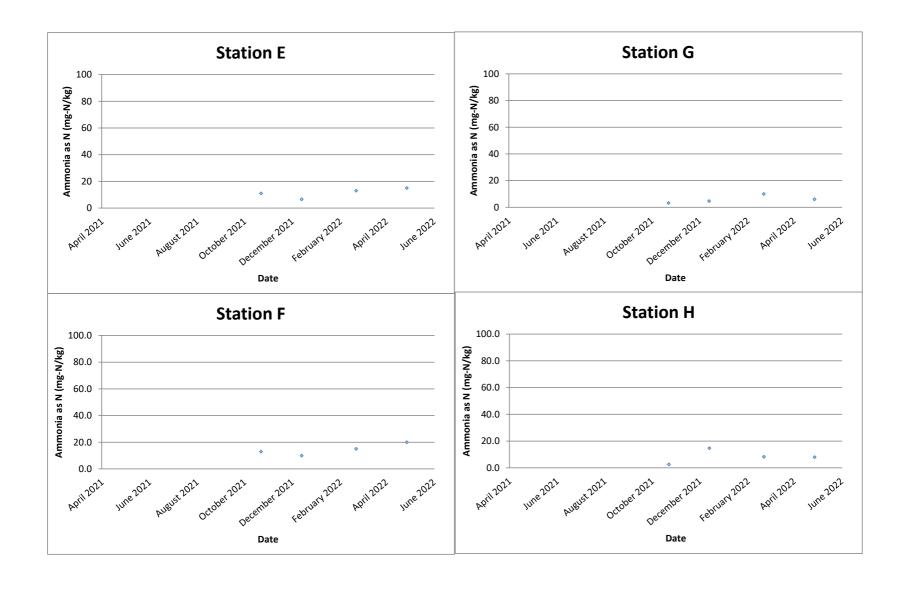
13 MAY 2022

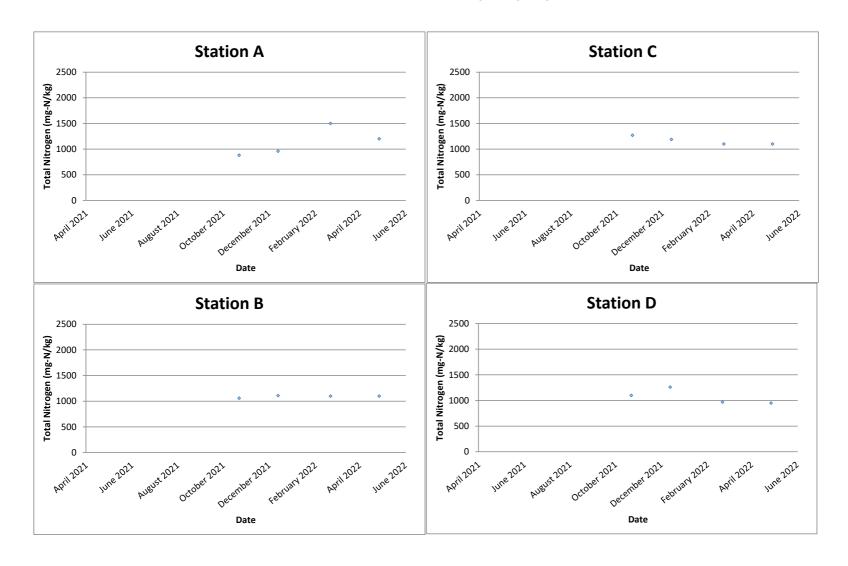
\*\*End of Report\*\*

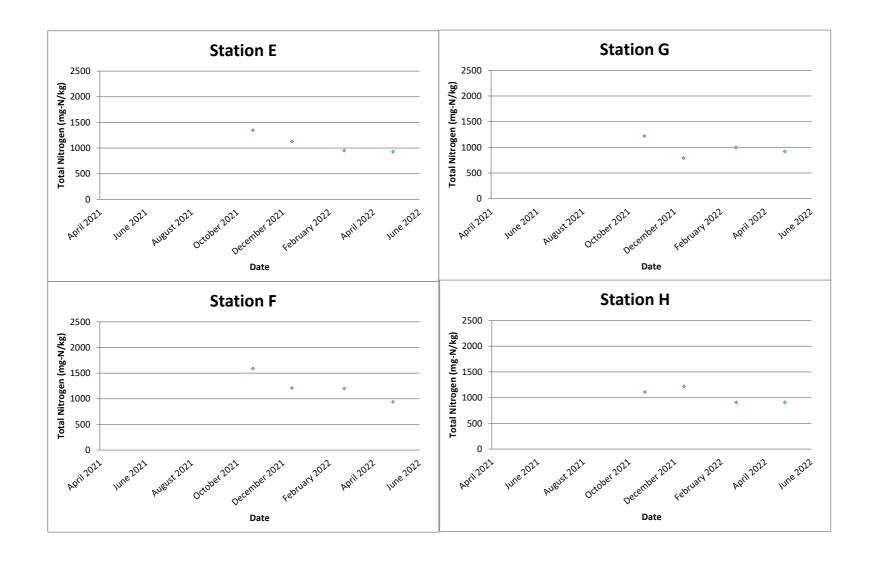


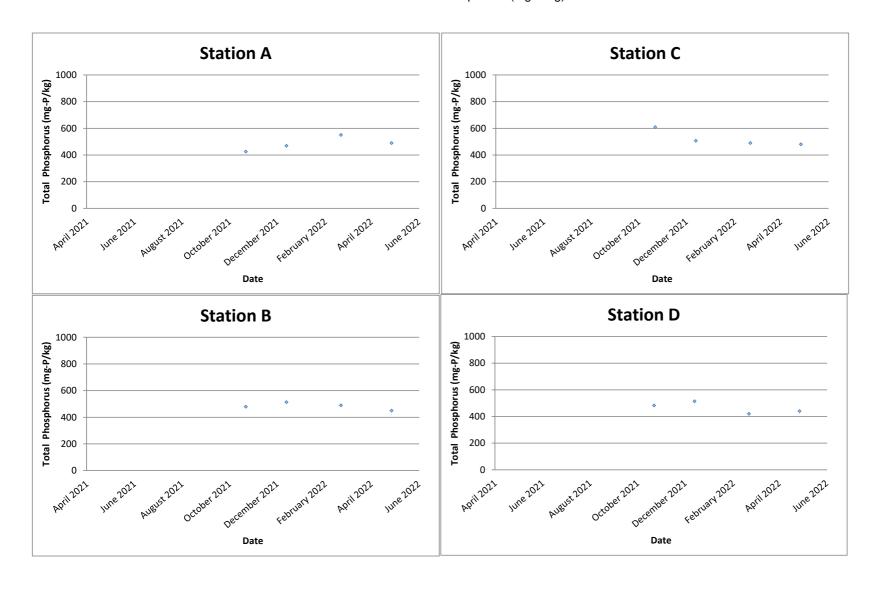


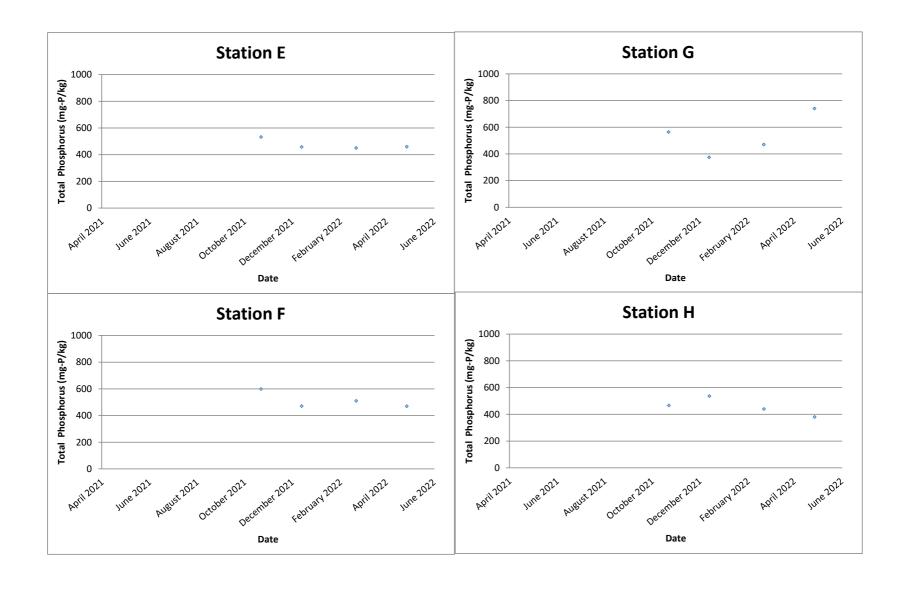


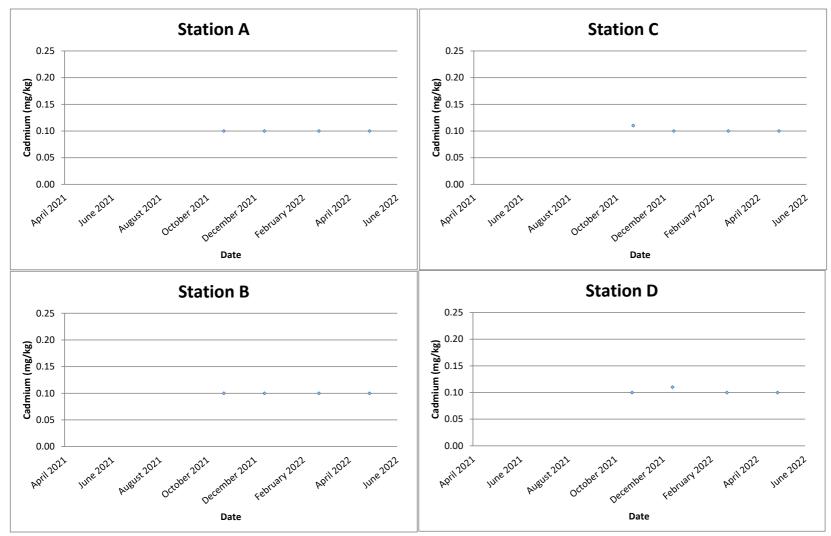




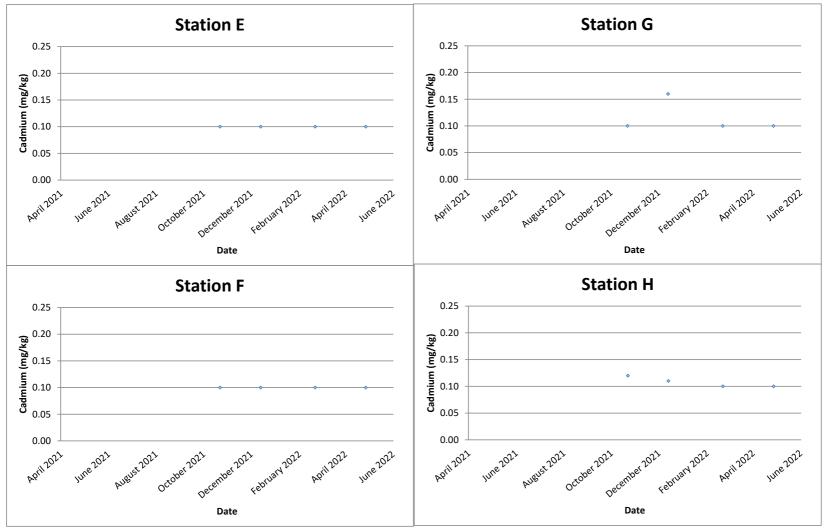




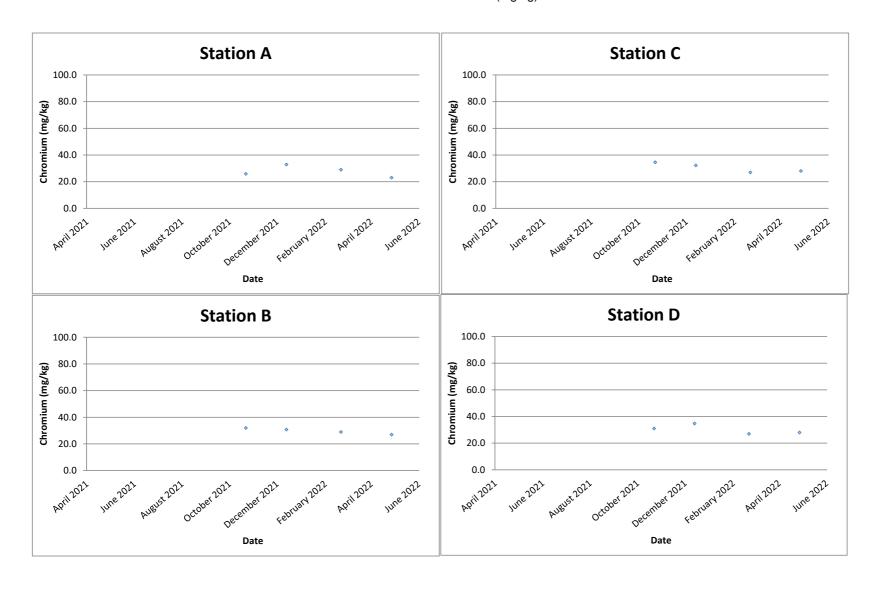


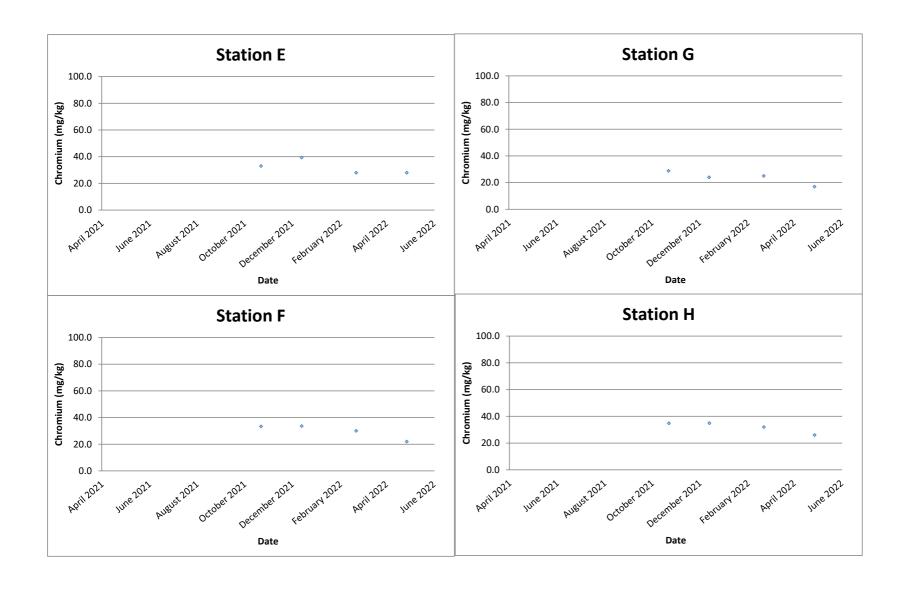


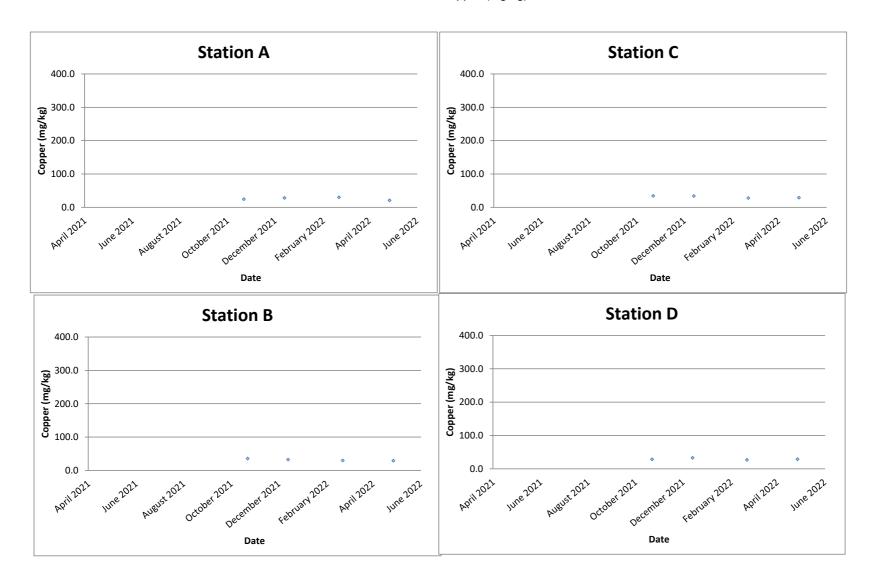
Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

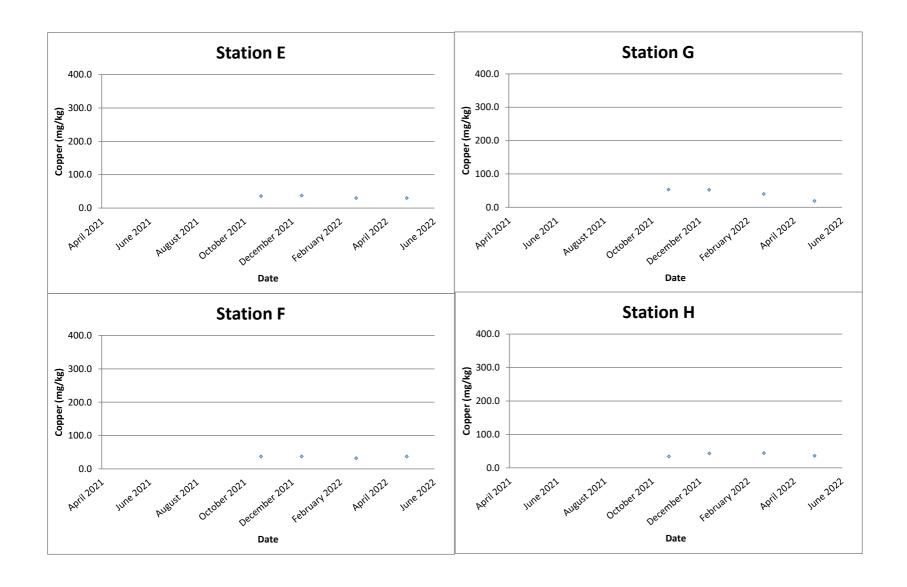


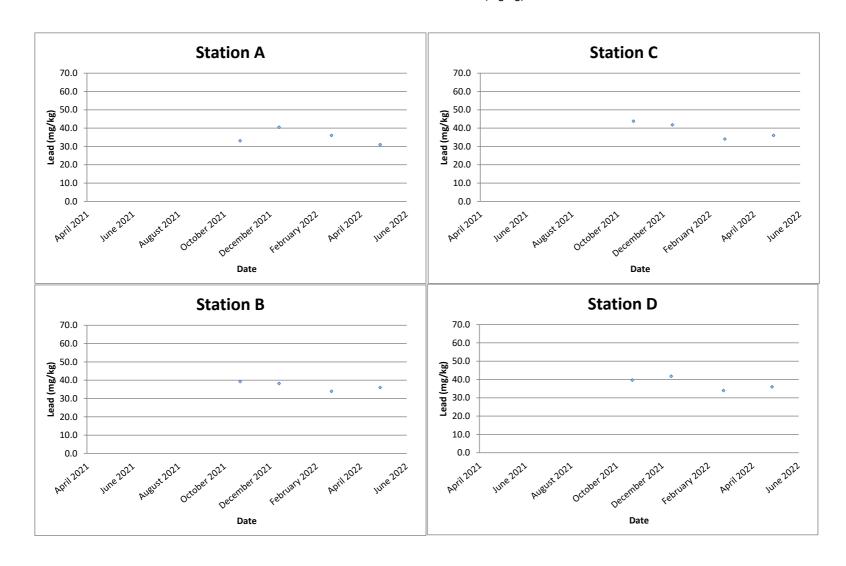
Remark: All below the Limit of Report sample results (<0.1 mg/kg) for Cadmium is regarded as 0.1 mg/kg in graphical presentation.

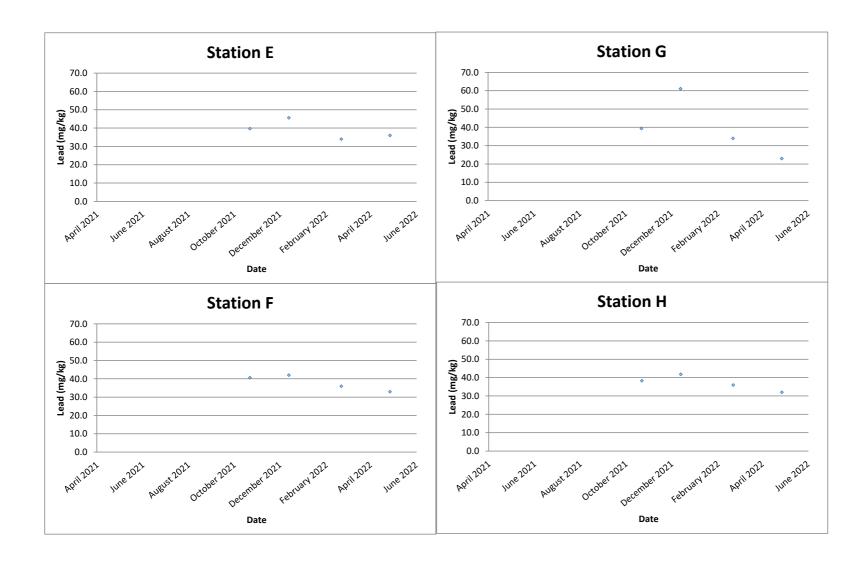


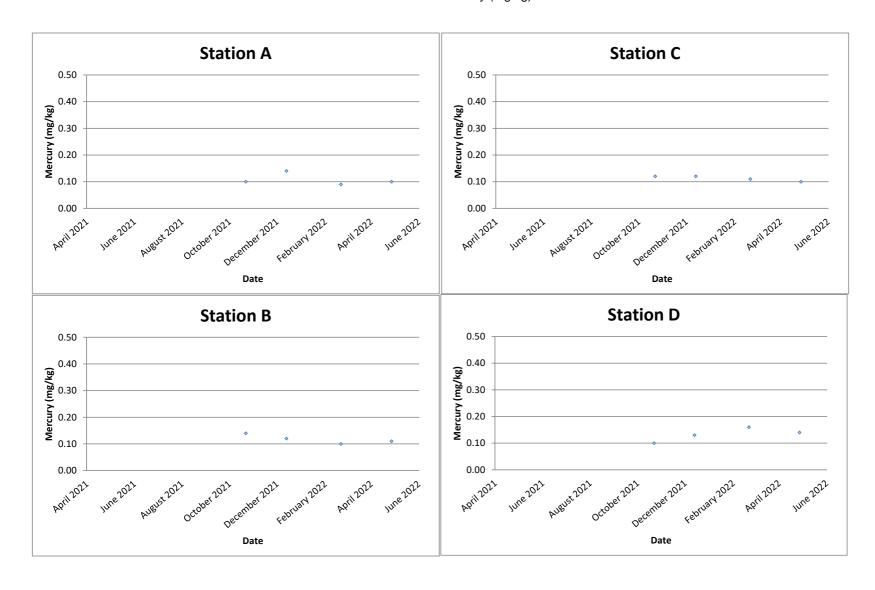


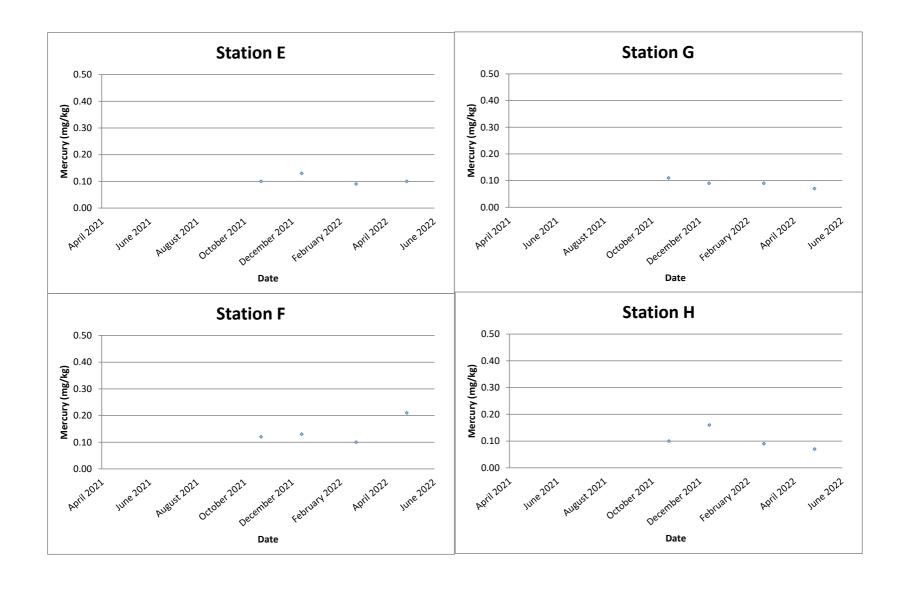


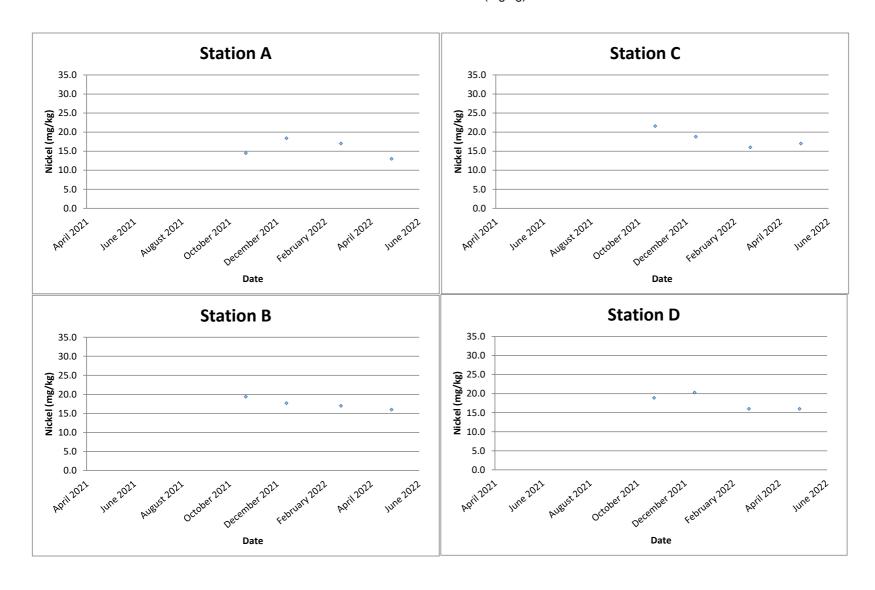


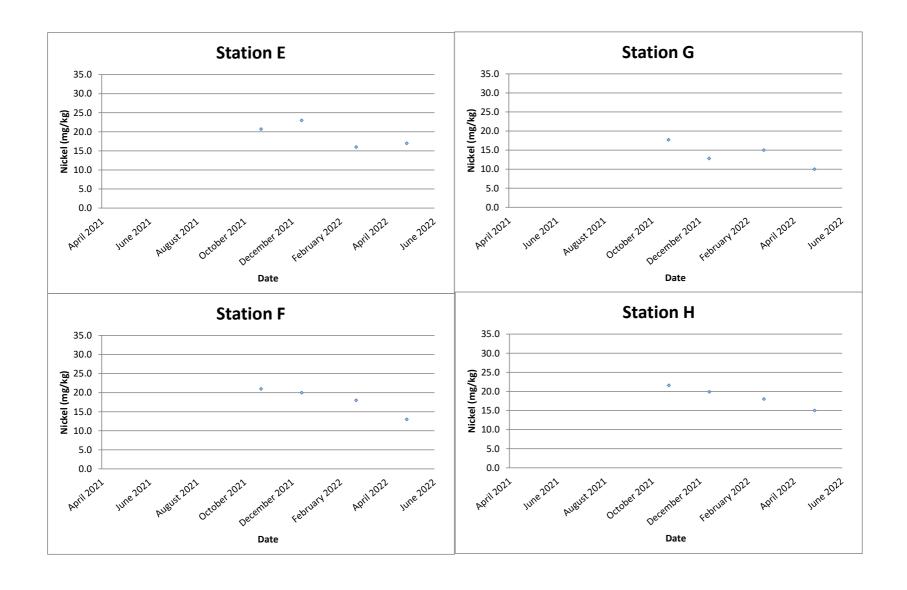


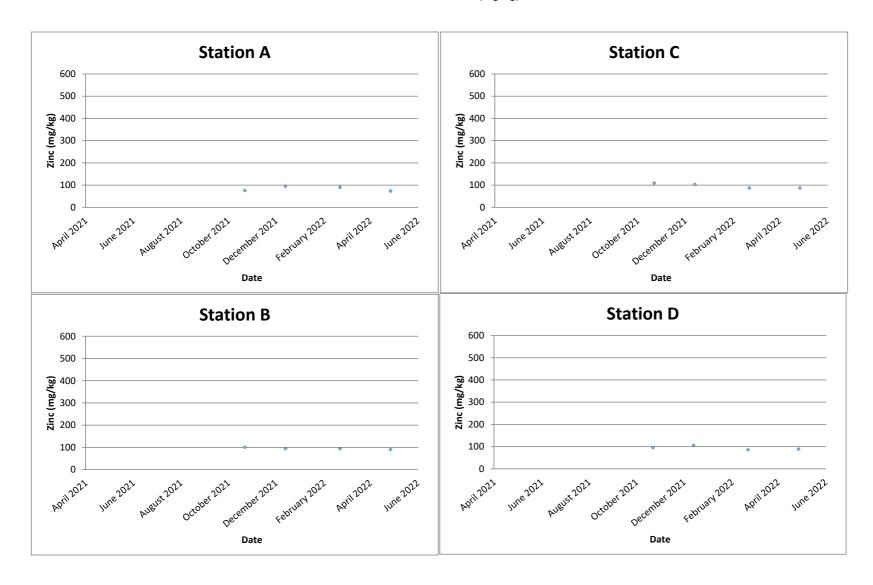


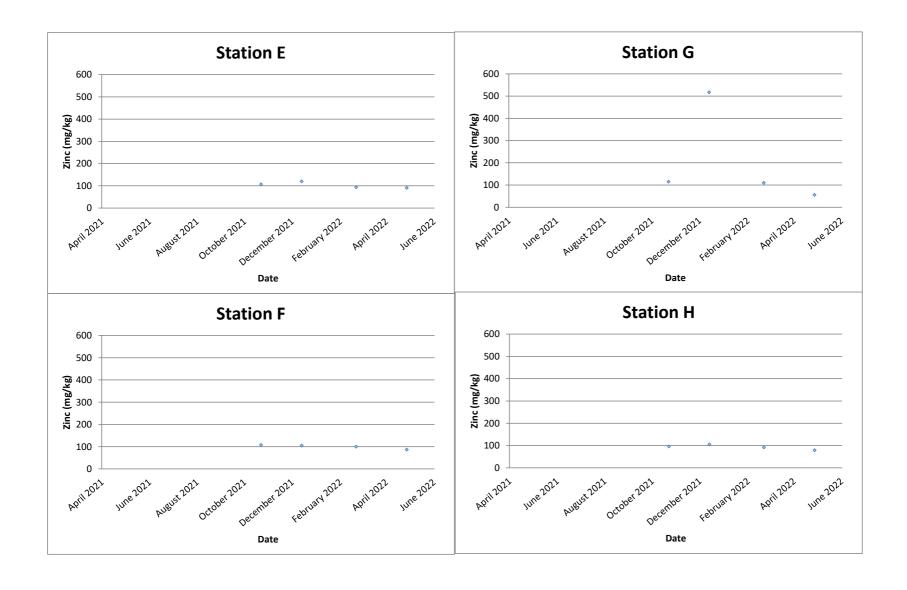


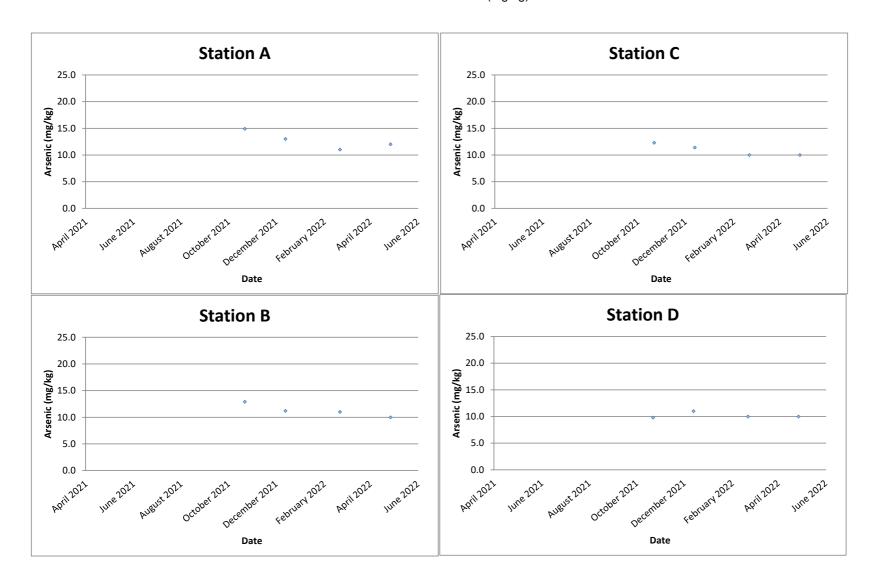


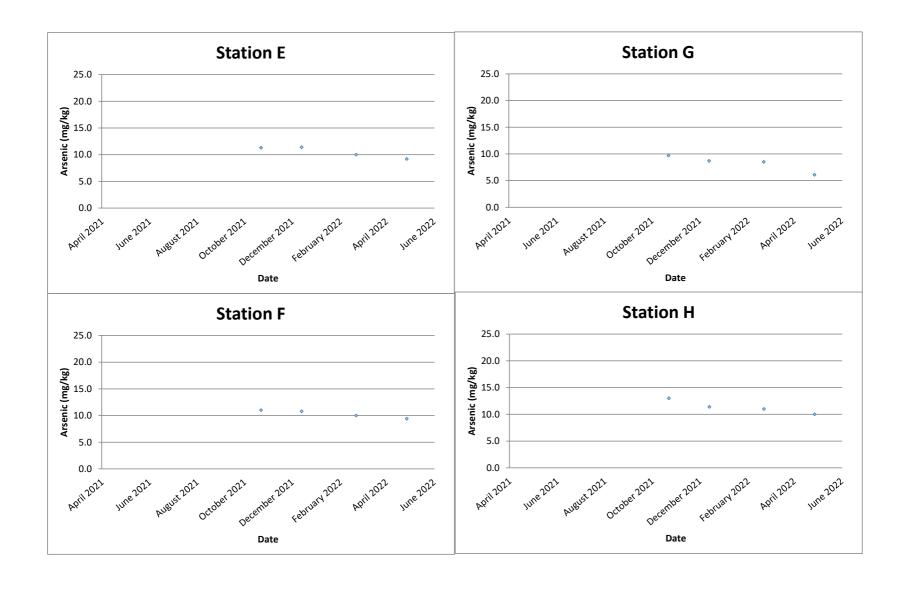


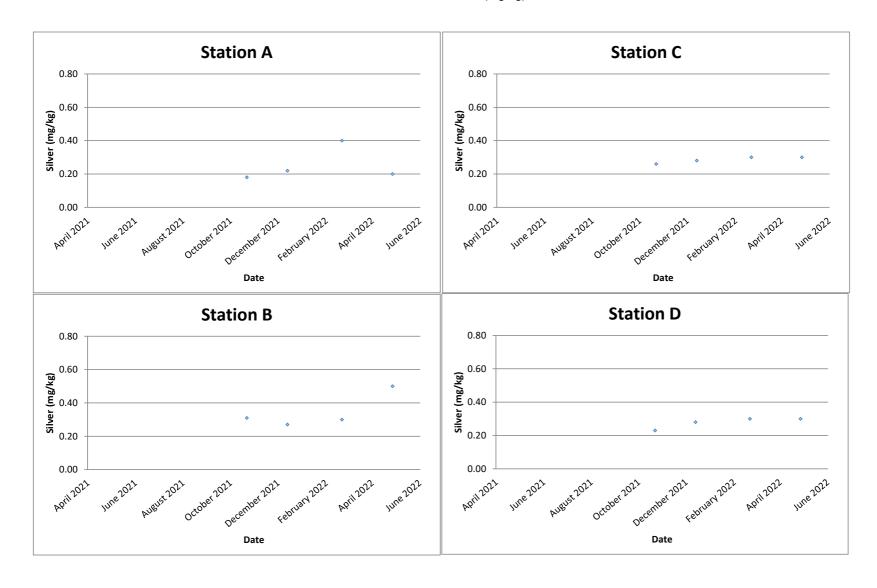


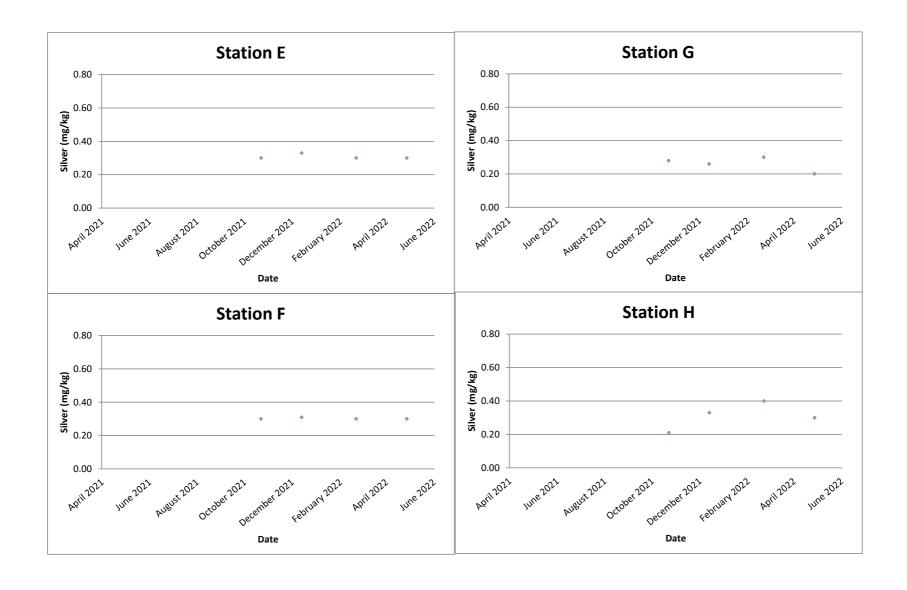












## **FUGRO TECHNICAL SERVICES LIMITED**

Fugro Development Centre, 5 Lok Yi Street, Tai Lam, Tuen Mun, N.T., Hong Kong. Tel : +852 2450 8233 Fax : +852 2450 6138 E-mail : matlab@fugro.com Website : www.fugro.com



Report No.: 0041/17/ED/0670

Appendix I

Benthic Survey Report

# **Benthic Survey Report (27 April 2022)**

### **Abundance**

A total of 373 benthic organisms was recorded from the eight monitoring stations during April 2022 monitoring period. Current monitoring results showed lower total monthly abundance compared to both dry (March 2004) and wet (August 2004) seasons baseline data results (**Figure 1**). Similar with previous monitoring periods, total monthly abundance of benthic organisms exhibits significant seasonal variation (F-value = 4.54; F-crit =1.55; p-value = 3.72E-10;  $\alpha$  = 0.05).

In terms of spatial distribution, the lowest abundance of 28 ind. was recorded in the reference station, Station G, while the highest (85 ind.) was also noted in other reference station, Station E (**Figure 2**). Total macrobenthic abundances, similar with the previous monitoring periods, showed statistically significant spatial distribution (F-value = 3.43; F-crit = 2.05; P-value = 0.002;  $\alpha$  = 0.05).

#### **Biomass**

The total wet biomass recorded in the eight monitoring stations was 26.05 g with the highest biomass recorded in the reference station, Station E (11.26 g) while the lowest biomass was observed in another reference station, Station G (0.49 g). Relative to the February 2022 period, a general decrease in biomass was observed during the current monitoring period (**Figure 3**). Most of the current decrease was attributed to the absence of *Trypauchen (T. vagina)* in the benthic community.

### **Taxonomic Composition**

A total of six phyla comprising of 24 families and about 28 genera were identified. During the current monitoring period, the molluscs (37.27%) dominated the macrobenthic assemblage, followed by the annelids (33.78%), and arthropods (26.54%) (**Figure 4**). Relative to February 2022 community assemblage, current results showed a shift to molluscs-dominated community.

Currently, a shift in the community assemblage was noted as shift in season started (from dry season to wet season).

### **Diversity**

Benthic diversity index (H') in the impact stations ranged from 1.71 to 2.03. In the reference stations, H' values ranged from 1.74 to 2.46. Currently, reference station, Station A had the highest diversity value among the different monitoring stations, while the lowest was the impact station, Station D. In terms of evenness index (J) values, impact Stations C and D were noted with relatively high values as compared to reference stations G, and H. Moreover, current monitoring results indicated an overall increase in both diversity and evenness values from the baseline survey condition.



## **Summary Tables**

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 assemblages and specimen are shown in the last pages of this benthic survey report.



# Figures

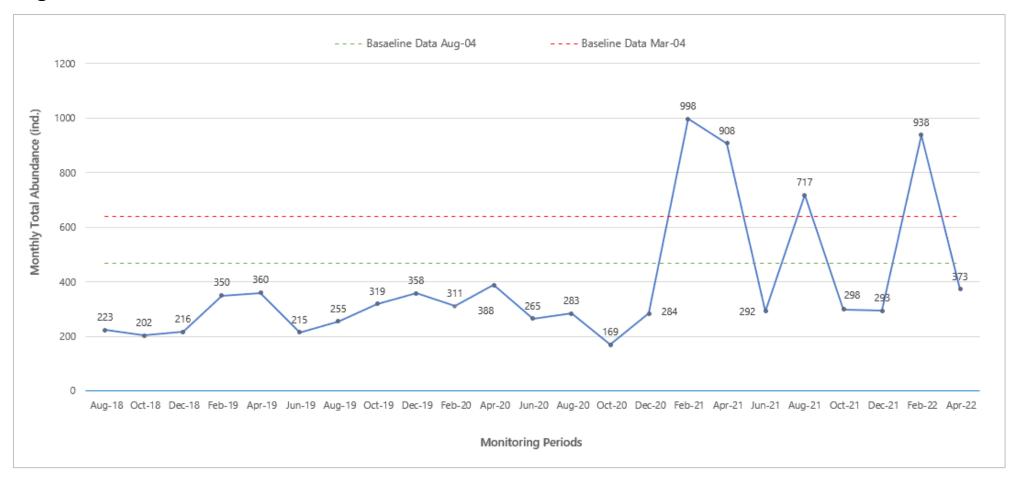


Figure 1: Monthly total abundance (ind.) of benthic organisms across monitoring periods



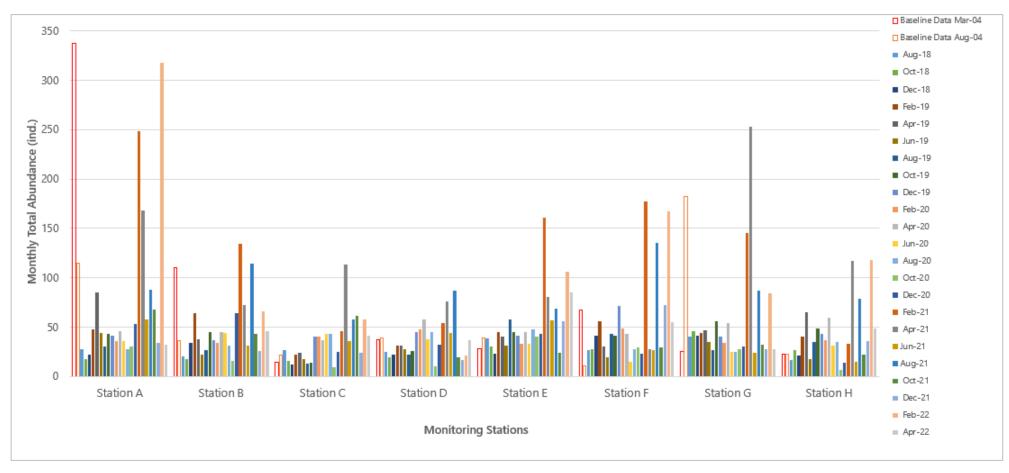


Figure 2: Monthly total abundance (ind.) of benthic organisms across monitoring stations



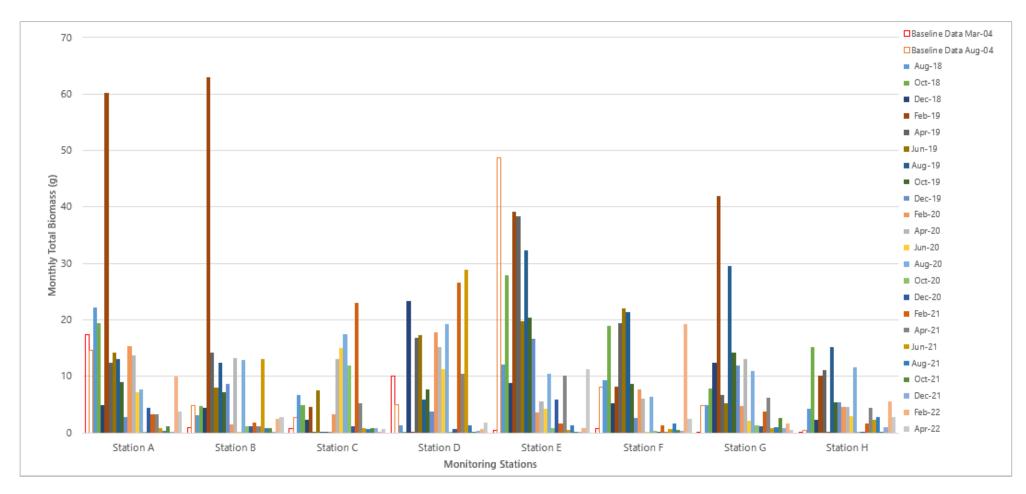


Figure 3: Monthly total biomass (g) of benthic organisms across monitoring stations



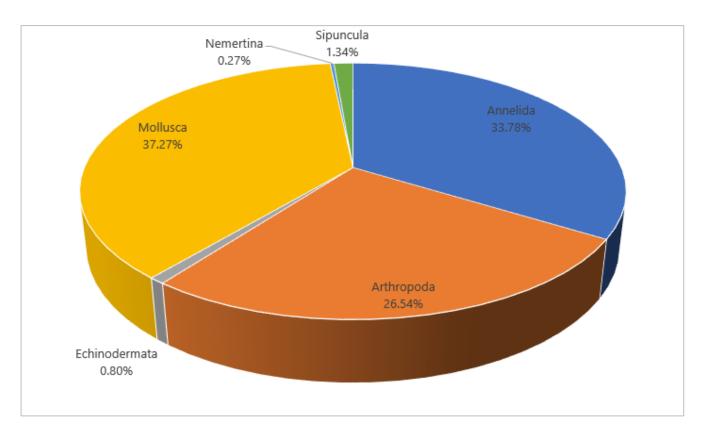


Figure 4: Percent composition of benthic organisms

# **Data Summaries**

Table 1: Abundance (ind.) of macrobenthic communities in the eight monitoring stations, 27 April 2022

District	Class	01	F	C				Monitorin	g Station	S		
Phylum	Class	Order	Family	Genus	Α	В	С	D	E	F	G	Н
				Aglaophamus								
Annelida	Polychaeta	Nereidida	Nephtyidae	(A. lyrochaeta)	2		1	1			2	2
Annelida	Polychaeta	Phyllodocida	Pilargidae	Sigambra	2							
Annelida	Polychaeta	Capitellida	Capitellidae	Capitella		8	9		14			
				Capitella (C.								
Annelida	Polychaeta	Capitellida	Capitellidae	capitata)		4	2		6			
Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	2							
Annelida	Polychaeta	Nereidida	Nereidae	Neanthes			1					
Annelida	Polychaeta	Nereidida	Nephtyidae	Nephtys	4	11	3	3	5			4
Annelida	Polychaeta	Aciculata	Nereidae	Nereis								1
Annelida	Polychaeta	Scolecida	Opheliidae	Ophelia								1
Annelida	Polychaeta	Sabellida	Oweniidae	Owenia	4	5	1		1	5		5
Annelida	Polychaeta	Errantia	Phyllodocidae	Phyllodoce		1		2			3	
Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	3		2				3	3
Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus							3	3
Arthropoda	Malacostraca	Amphipoda	Gammaridae	Gammarus		5	8	13	4	21	13	22
Arthropoda	Crustacea	Decapoda	Dotillidae	Ilyoplax	2	1						1
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile	1	1					1	
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	Amphioplus	1				2			
Mollusca	Bivalvia	Veneroida	Tellinidae	c.f. Angulus	6	3			6	6		3
Mollusca	Bivalvia	Cardiida	Cardiidae	Cardium		3		2	9	3		
Mollusca	Scaphopoda	-	Dentaliidae	-		1	1					
				c.f. Meretrix (M.								
Mollusca	Bivalvia	Veneroida	Veneridae	lusoria)	1							
Mollusca	Bivalvia	Veneroida	Dreissenidae	Mytilopsis			1					
Mollusca	Gastropoda	Buccinoidea	Nassariidae	Nassarius						5		
Mollusca	Bivalvia	Veneroida	Veneridae	Paphia (P. undulata)	2		11	11	5	11	1	3



Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	1	2		3	27	2		1
				Ruditapes (R.								
Mollusca	Bivalvia	Veneroida	Veneridae	philippinarum)					2		1	
Mollusca	Bivalvia	Veneroida	Pharellidae	Sinonovacula		1				2		
Mollusca	Bivalvia	Adapedonta	Solenidae	Solen	1				1		1	
Nemertea	Anopla	Heteronemertea	Lineidae	Cerebratulus					1			
Sipuncula	Sipunculidea	Sipunculiformes	Sipunculidae	Sipunculus			1	2	2			

Table 2: Biomass (g) of macrobenthic communities in the eight monitoring stations, 27 April 2022

District	Class	0	Familia	C	Monitoring Stations									
Phylum	Class	Order	Family	Genus	Α	В	С	D	E	F	G	Н		
Annelida	Polychaeta	Nereidida	Nephtyidae	Aglaophamus (A. lyrochaeta)	0.014		0.005	0.005			0.001	0.001		
Annelida	Polychaeta	Phyllodocida	Pilargidae	Sigambra	0.005									
Annelida	Polychaeta	Capitellida	Capitellidae	Capitella		0.027	0.025		0.041					
Annelida	Polychaeta	Capitellida	Capitellidae	Capitella (C. capitata)		0.013	0.007		0.020					
Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	0.003									
Annelida	Polychaeta	Nereidida	Nereidae	Neanthes			0.006							
Annelida	Polychaeta	Nereidida	Nephtyidae	Nephtys	0.029	0.079	0.025	0.022	0.036			0.029		
Annelida	Polychaeta	Aciculata	Nereidae	Nereis								0.005		
Annelida	Polychaeta	Scolecida	Opheliidae	Ophelia								0.136		
Annelida	Polychaeta	Sabellida	Oweniidae	Owenia	0.056	0.075	0.014		0.015	0.075		0.076		
Annelida	Polychaeta	Errantia	Phyllodocidae	Phyllodoce		0.001		0.003			0.004			
Annelida	Polychaeta	Spionida	Poecilochaetidae	Poecilochaetus	0.003		0.003				0.003	0.004		
Arthropoda	Crustacea	Decapoda	Alpheidae	Alpheus							0.006	0.008		
Arthropoda	Malacostraca	Amphipoda	Gammaridae	Gammarus		0.006	0.007	0.014	0.004	0.022	0.013	0.025		
Arthropoda	Crustacea	Decapoda	Dotillidae	Ilyoplax	2.235	1.163						0.393		
Arthropoda	Crustacea	Decapoda	Penaeidae	Shrimp juvenile	0.153	0.146					0.132			
Echinodermata	Ophiuroidea	Ophiurida	Amphiuridae	Amphioplus	0.030				0.005					
Mollusca	Bivalvia	Veneroida	Tellinidae	c.f. Angulus	0.329	0.162			0.398	0.354		0.164		
Mollusca	Bivalvia	Cardiida	Cardiidae	Cardium		0.489		0.321	1.422	0.451				

Mollusca	Scaphopoda	-	Dentaliidae	-		0.036	0.093					
Mollusca	Bivalvia	Veneroida	Veneridae	c.f. Meretrix (M.	0.098							
				lusoria)								
Mollusca	Bivalvia	Veneroida	Dreissenidae	Mytilopsis			0.035					
Mollusca	Gastropoda	Buccinoidea	Nassariidae	Nassarius						0.495		
Mollusca	Bivalvia	Veneroida	Veneridae	Paphia (P. undulata)	0.090		0.493	0.510	0.224	0.487	0.031	0.135
Mollusca	Bivalvia	Myoida	Corbulidae	Potamocorbula	0.282	0.564		0.842	7.623	0.564		1.896
Mollusca	Bivalvia	Veneroida	Veneridae	Ruditapes (R. philippinarum)					0.234		0.123	
Mollusca	Bivalvia	Veneroida	Pharellidae	Sinonovacula		0.016				0.032		
Mollusca	Bivalvia	Adapedonta	Solenidae	Solen	0.375				1.202		0.177	
Nemertea	Anopla	Heteronemertea	Lineidae	Cerebratulus					0.001			
Sipuncula	Sipunculidea	Sipunculiformes	Sipunculidae	Sipunculus			0.013	0.028	0.030			
Annelida	Polychaeta	Nereidida	Nephtyidae	Aglaophamus (A. lyrochaeta)	0.014		0.005	0.005			0.001	0.001
Annelida	Polychaeta	Phyllodocida	Pilargidae	Sigambra	0.005							
Annelida	Polychaeta	Capitellida	Capitellidae	Capitella		0.027	0.025		0.041			
Annelida	Polychaeta	Capitellida	Capitellidae	Capitella (C.capitata)		0.013	0.007		0.020			
Annelida	Polychaeta	Capitellida	Capitellidae	Mediomastus	0.003							
Annelida	Polychaeta	Nereidida	Nereidae	Neanthes			0.006					
Annelida	Polychaeta	Nereidida	Nephtyidae	Nephtys	0.029	0.079	0.025	0.022	0.036			0.029
Annelida	Polychaeta	Aciculata	Nereidae	Nereis								0.005
Annelida	Polychaeta	Scolecida	Opheliidae	Ophelia								0.136



Table 3: Summary of Benthic Survey Data, 27 April 2022

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
Α	32	3.70	14	2.46	0.93
В	46	2.78	13	2.25	0.88
C*	41	0.73	12	2.03	0.82
D*	37	1.75	8	1.71	0.82
E	85	11.26	14	2.17	0.82
F	55	2.48	8	1.77	0.85
G	28	0.49	9	1.74	0.79
Н	49	2.87	12	1.93	0.78

<sup>\*</sup>impact sites

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

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
Α	115	14.56	24	0.93	0.29
В	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
Н	23	0.49	11	0.81	0.34

<sup>\*</sup>impact sites

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

Stations	Abundance (ind.)	Total Biomass (g)	Number of Taxa	Diversity (H')	Evenness (J)
Α	337	17.39	38	0.78	0.21
В	110	0.9	21	0.82	0.27
C*	14	0.7	10	0.69	0.3
D*	37	10.07	20	1.01	0.34
Е	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
Н	23	0.15	11	0.44	0.18

<sup>\*</sup>impact sites

Table 6: Taxonomic Composition (%) of Benthic Survey

Таха	Mar-04	Aug-04	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20	Apr-20	Jun-20	Aug-20	Oct-20	Dec-20
Annelida	80.19	73.29	70.28	0.47	64.31	66.14	59.78	60.77	56.44	69.06	63.25	51.48	50.35
Sipuncula	0.78	0.21	0.00	0.00	1.57	1.25	0.00	1.29	0.52	1.13	0.35	1.78	1.06
Arthropoda	11.23	18.80	10.83	4.65	9.80	19.75	14.53	13.83	28.87	8.30	13.43	18.93	20.77
Echinodermata	0.62	3.63	4.72	0.47	5.10	3.13	1.68	1.61	0.77	2.26	3.53	2.96	2.82
Cnidaria	1.72	0.43	0.00	1.86	0.39	0.00	0.84	0.32	0.26	0.75	0.00	1.18	0.00
Mollusca	5.46	3.42	13.33	0.47	17.25	8.15	22.35	19.94	11.60	15.85	15.90	18.93	24.65
Chordata	0.00	0.21	0.56	0.47	1.18	0.94	0.00	0.32	0.52	1.13	1.41	0.00	0.35
Nemertea	0.00	0.00	0.28	98.60	0.39	0.63	0.84	1.93	1.03	1.51	2.12	4.73	0.00

Taxa	Feb-21	Apr-21	Jun-21	Aug-21	Oct-21	Dec-21	Feb-22	Apr-22
Annelida	22.75	31.72	73.63	78.52	64.43	45.05	15.57	33.78
Sipuncula	0.70	0.00	0.34	0.00	8.05	0.00	0.00	1.34
Arthropoda	70.14	55.95	10.27	9.90	11.41	36.86	78.25	26.54
Echinodermata	0.30	1.43	4.11	1.39	4.03	4.10	0.43	0.80
Cnidaria	0.00	0.00	0.00	0.00	0.00	0.68	0.00	0.00
Mollusca	5.81	10.90	11.64	10.04	11.74	9.22	5.22	37.27
Chordata	0.10	0.00	0.00	0.14	0.34	0.00	0.11	0.00
Nemertea	0.00	0.00	0.00	0.00	0.00	4.10	0.43	0.27

Table 7: Taxonomic Composition (Abundance) of Benthic Survey

Таха	Mar-04	Aug-04	Apr-19	Jun-19	Aug-19	Oct-19	Dec-19	Feb-20	Apr-20	Jun-20	Aug-20	Oct-20	Dec-20
Annelida	514	343	253	124	164	211	214	189	219	183	179	87	143
Sipuncula	5	1	0	0	4	4	0	4	2	3	1	3	3
Arthropoda	72	88	39	17	25	63	52	43	112	22	38	32	59
Echinodermata	4	17	17	10	13	10	6	5	3	6	10	5	8
Cnidaria	11	2	0	2	1	0	3	1	1	2	0	2	0
Mollusca	35	16	48	59	44	26	80	62	45	42	45	32	70
Chordata	0	1	2	2	3	3	0	1	2	3	4	0	1
Nemertea	0	0	1	1	1	2	3	6	4	4	6	8	0

Taxa	Feb-21	Apr-21	Jun-21	Aug-21	Oct-21	Dec-21	Feb-22	Apr-22
Annelida	227	288	215	563	192	132	146	126
Sipuncula	7	0	1	0	24	0	0	5
Arthropoda	700	508	30	71	34	108	734	99
Echinodermata	3	13	12	10	12	12	4	3
Cnidaria	0	0	0	0	0	2	0	0
Mollusca	58	99	34	72	35	27	49	139
Chordata	1	0	0	1	1	0	1	0
Nemertea	2	0	0	0	0	12	4	1

# Photos of Macrobenthic Assemblages



Station A



Station B



Station C



Station D



Station E



Station F



Station G



Station H

## Photos of Representative Taxa Identified



Solen



Cardium



Ilyoplax

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Appendix J

Photos of Grab Samplers

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Photo 1. A ponar grab sampler



Photo3. Grab dimension 2

Photo 2. Grab dimension 1



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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Report No.: 0041/17/ED/0670

**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.		

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## Appendix L

Environmental Mitigation Implementation Schedule (EMIS)

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Report No.: 0041/17/ED/0670

EP Ref.	EIA Ref.	WMP Ref.	Environmental Protection Measures	Location of the measures	Implementation Status
Air Qu	uality				
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	Manager	nent	-		•
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) should 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 deficient should be rectified promptly.	SHWSTW	Implemented

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Report No.: 0041/17/ED/0670

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
			protocols set out in the wivin Section 5.14.		