



JOB No.: TCS00874/16

**CEDD CONTRACT NO. CV/2012/05
DEVELOPMENT OF A BATHING BEACH AT LUNG MEI,
TAI PO**

**1ST ANNUAL ENVIRONMENTAL MONITORING AND AUDIT
REVIEW REPORT (DECEMBER 2017 – NOVEMBER 2018)**

**PREPARED FOR
WELCOME CONSTRUCTION CO., LTD**

Date	Reference No.	Prepared By	Certified By
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Version	Date	Remarks
1	21 June 2021	First Submission
2	24 June 2021	Amended according to the IEC's comments

Environmental Permit No. EP-388/2010

Development of a Bathing Beach at Lung Mei, Tai Po

Independent Environmental Checker Verification


Reference Document/Plan

Document/ Plan to be Certified / Verified:	Annual Environmental Monitoring and Audit Report (December 2017 – November 2018)
Date of Report:	24 June 2021
Date received by IEC:	28 June 2021

Reference EP Condition / Updated EM&A Manual Requirement

Environmental Permit Condition / Updated EM&A Manual Reference	Section 11.8
An annual EM&A report will be prepared by the ET at the end of each construction year during the course of the project.	

IEC Verification

I hereby verify that the above referenced document/ plan complies with the above referenced condition of EP-388/2010.	
Mr Terence Fong	Date: 28 June 2021
Independent Environmental Checker	

Our ref: P:\Projects\0206709 IEC for Lung Mei EM&A\07_ET Submission\41_Annual EM&A Report\01_1st Annual (Dec 17-Nov 18)\20210628\R0727v2

EXECUTIVE SUMMARY

- ES.01 Civil Engineering and Development Department (hereafter referred as “CEDD”) is the Project Proponent and the Permit Holder of *Agreement No. CE 59/2005 (EP) Development of a Bathing Beach at Lung Mei, Tai Po* (hereinafter referred as “the Project”), which is a Designated Project to be implemented under Environmental Permit number EP-388/2010 (hereinafter referred as “the EP-388/2010” or “the EP”).
- ES.02 Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) has been commissioned as the Environmental Team for the Project (hereinafter referred as “the ET”) to perform relevant Environmental Monitoring and Audit (EM&A) programme, including baseline and impact environmental monitoring in accordance with the EM&A Manual approved under the Environmental Impact Assessment Ordinance (EIAO).
- ES.03 The construction phase of the Project was commenced on 1st December 2017 and EM&A programme was commenced at the same day. The marine work under the Project was commenced on 24th January 2018 subsequently.
- ES.04 This is the **1st Annual EM&A Review Report** summarizing the monitoring results and inspection findings for the reporting period from **1st December 2017 to 30th November 2018** (hereinafter ‘the Reporting Period’).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

- ES.05 Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Issues	Environmental Monitoring Parameters / Inspection	Sessions ^{Note 1}
Air Quality	1-hour TSP	64
	24-hour TSP	64 (#)
Construction Noise	L _{Aeq(30min)} Daytime	53
Water Quality	Marine Water Sampling	127 ^(*)
Inspection / Audit	ET Regular Environmental Site Inspection	24
	IEC Monthly Environmental Site Audit	12

Note 1: Total sessions are counted by monitoring days.

- 1.) *The marine work under the Project was commenced on 24th January 2018*
- 2.) *(#) including 3 sessions of 24-hour TSP monitoring at Station A4 were suspended due to power supply issue.*
- 3.) *(*) Due to the inclement weather condition, marine water quality monitoring on 6 Jun, 23 Jun, 5 Jul and 13 Jul were cancelled. Moreover, monitoring at mid-ebb tide on 3 Jul, 12 Sep and 24 Sep as well as mid flood tide on 13 Jun, 19 Jun, 23 Jul and 17 Sep were cancelled.*

BREACH OF ACTION AND LIMIT (A/L) LEVELS

- ES.06 In the Reporting Period, no air quality and construction noise monitoring exceedance was recorded. For water quality monitoring, 214 Action Level and 861 Limit Level exceedances were recorded. NOEs were issued to relevant parties upon confirmation of the monitoring result and investigation for the causes of exceedances were carried out by ET subsequently. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Issues	Monitoring Parameters	Exceedance		Event & Action	
		Action Level	Limit Level	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	-	-
	24-hour TSP	0	0	-	-
Construction Noise	L _{Aeq(30min)}	0	0	-	-
Water Quality	DO	14	46	Not project-related	NA
	Turbidity	43	279	Not project-related.	NA
	SS	126	497	Not project-related.	NA

Environmental Issues	Monitoring Parameters	Exceedance		Event & Action	
		Action Level	Limit Level	Investigation	Corrective Actions
	Chlorophyll- <i>a</i>	31	39	Not project-related.	NA

ES.07 The marine work under the Project was commenced on 24th January 2018. Water quality mitigation measures such as silt curtains were properly implemented and maintained at locations in accordance with the EP. ET's site inspection was carried out regularly to assess the implementation of water quality mitigation measures and environmental performance of the construction site, and there were no adverse water quality impact was observed and recorded. Having reviewed environmental performance of the project site and the monitoring results of both reference and impact stations as well as the sensitive receiver stations, it is considered that all the exceedances were unlikely related to the works under the project, and no corrective actions were required. Nevertheless, the Contractor was reminded to strictly implement the water quality mitigation measure as recommended implementation schedule for environmental mitigation measures in the EM&A Manual and EP's condition.

ENVIRONMENTAL COMPLAINT

ES.08 No environmental complaint was recorded or received in this Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.09 No environmental summons or successful prosecutions were recorded in this Reporting Period.

FUTURE KEY ISSUES

ES.10 The forthcoming construction activities include site formation, construction of western open channel/box culvert and eastern box culvert, dredging and construction of groynes (East and West) and construction of retaining wall and seawall. The potential environmental impacts arising from the forthcoming construction activities include construction waste, air quality, construction noise and water quality.

ES.11 In regards to the marine works, special attention should be paid on the groynes construction (Eastern and Western) and dredging works in which water quality mitigation measures such as erection of silt curtain should be properly implemented and maintained.

ES.12 Dust mitigation measures, such as provide water spraying during dusty activities (such as breaking) and cover stockpile with impervious sheets, should be fully implemented as appropriate in order to minimize dust impact. Moreover, all dump trucks leaving the Site should be thoroughly washed by wheel washing facilities and provided with mechanical covers in good service condition.

ES.13 In addition, the Contractor is reminded to prevent surface runoff entering the sea or public area, such as cover the exposed slope by impervious sheets and maintain the temporary drain and wastewater treatment system in good function properly.

ES.14 Construction noise should be a key environmental impact during the works. Noise mitigation measures such as use of quiet plants and installation of temporary noise barrier at the construction noise predominate area should be fully implemented in accordance with the EM&A requirement.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department (hereafter referred as “CEDD”) is the Project Proponent and the Permit Holder of *Agreement No. CE 59/2005 (EP) Development of a Bathing Beach at Lung Mei, Tai Po* (hereinafter referred as “the Project”), which is a Designated Project to be implemented under Environmental Permit number EP-388/2010 (hereinafter referred as “the EP-388/2010” or “the EP”).
- 1.1.2 The major construction activities of the Project comprise construction of 200-metre long bathing beach with a groyne at each end, a shark prevention net; a public car park; retaining walls; and the associated roadworks, drainage and sewerage works. Layout plan of the Project is shown in *Appendix A*. Designated works of the Project under the EP shall include:
- (i) Construction of a 200m long beach with a groyne at each end of the beach which includes dredging and sandfilling works;
 - (ii) Construction of one culvert at the eastern side of the beach and another small section of culvert and open drainage channel with gabion embankments at the western end, both to collect and divert surface runoff from upstream locations; and
 - (iii) Construction of a beach building with associated beach building facilities, kiosk and a carpark and associated road improvement works adjoining the facility.
- 1.1.3 CEDD is Site Resident Engineers (hereinafter referred as “SRE”) responsible for the Project management; Welcome Construction CO., Ltd is a Main Contractor (hereinafter referred as “the Main Contractor”) responsible to construction of the Project Works; and Action-United Environmental Services & Consulting (hereinafter referred as “AUES”) has been commissioned as an Independent Environmental Team (hereinafter referred as “the ET”) to implement the relevant EM&A program in accordance with the approved EM&A Manual, as well as the associated duties. Moreover, Environmental Resources Management is Independent Environmental Checker (hereinafter referred as “IEC”) of the Project.
- 1.1.4 As part of the EM&A program, baseline monitoring to determine the ambient environmental conditions including air quality, noise and water quality were undertaken between **7 June 2017** and **21 October 2017**. After completed baseline monitoring, Baseline Monitoring Report for Air Quality and Noise (*AUES Ref.: TCS00874/16/600/R0022v3*) and Baseline Monitoring Report for Water Quality (*AUES Ref.: TCS00874/16/600/R0036v2*) has been verified by IEC and submitted to EPD for endorsement. These baseline monitoring reports has summarized the key findings of baseline condition and determined a set of Action and Limit Levels (A/L Levels) based on the baseline data. The A/L Levels will serve as the yardsticks for assessing the acceptability of the environmental impact during construction phase of the Project Works impact monitoring.
- 1.1.5 The construction phase of the Project was commenced on 1st December 2017 and EM&A programme was commenced at the same day. The marine work under the Project was commenced on 24th January 2018 subsequently.
- 1.1.6 This is the **1st Annual** EM&A Review Report summarizing the monitoring results and inspection findings for the reporting period from **1st December 2017** to **30th November 2018** (hereinafter ‘the Reporting Period).

1.2 REPORT STRUCTURE

- 1.2.1 The Annual EM&A Report is structured into the following sections:-

Section 1	Introduction
Section 2	Project Organization and Construction progress
Section 3	Summary of Impact Monitoring Requirements
Section 4	Air Quality Monitoring
Section 5	Construction Noise Monitoring

<i>Section 6</i>	Water Quality Monitoring
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<i>Section 10</i>	Environmental Complaint and non-compliance
<i>Section 11</i>	Implementation Status of Mitigation Measures
<i>Section 12</i>	Conclusion and Recommendation

2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 PROJECT ORGANIZATION AND MANAGEMENT STRUCTURE

2.1.1 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in [Appendix B](#).

2.2 CONSTRUCTION PROGRESS

2.2.1 The major construction activities undertaken in the Reporting Period are listed below:-

Table 2-1 Major Construction Activities of the Works during the Reporting Period

Month	Major Construction Activities
Dec 2017 – Feb 2018	<ul style="list-style-type: none"> • Tree felling • Site clearance • Construction of east groyne • Relocation of permanent marine buoy • Construction of western box culvert
Mar 2018 – May 2018	<ul style="list-style-type: none"> • Tree transplanting from Lung Mei to Pak Shek Kok's receptor site • Site formation • Construction of Groynes (Eastern and Western) • Construction of Western Box Culvert
Jun 2018 – Aug 2018	<ul style="list-style-type: none"> • Site formation • Construction of Western Open Channel / Box Culvert • Dredging and Construction of Groynes (East and West)
Sep 2018 – Nov 2018	<ul style="list-style-type: none"> • Site formation • Construction of Western Open Channel / Box Culvert • Construction of Eastern Box Culvert • Dredging and Construction of Groynes (East and West) • Construction of Retaining Wall • Construction of Seawall

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 Summary of currently relevant permits, licenses, and/or notifications on environmental protection for this Project in this Reporting Period is presented in [Table 2-2](#).

Table 2-2 Status of Environmental Licenses and Permits

Item	Description	License/Permit Status		
		Permit no./Account no./ Ref. no.	From	To
1	Air pollution Control (Construction Dust) Regulation	Ref. Number: 418137	N/A	N/A
2	Chemical Waste Producer Registration	Waste Producers Number (WPN): PN5213-728-W3437-01	21 August 2017	End of Project
3	Water Pollution Control Ordinance	License No.: WT00028905-2017	24 October 2017	31 October 2022
4	Waste Disposal (Charges for Disposal of Construction Waste) Regulation	Billing Account for Disposal of Construction Waste: Account No. 7017686	3 July 2013	End of Project
5	Construction Noise Permit (Noise Control Ordinance)	GW-RN0379-18	27 Jul 2018	26 Sep 2018
6	Construction Noise Permit (Noise Control Ordinance)	GW-RN0495-18	29 Sep 2018	28 Nov 2018
7	Construction Noise Permit (Noise Control Ordinance)	GW-RN0623-18	29 Nov 2018	28 Mar 2019

Item	Description	License/Permit Status		
		Permit no./Account no./ Ref. no.	From	To
8	Permit issued under the dumping at sea ordinance	Permit no. EP/MD/18-093	13 Aug 2018	12 Sep 2018
9	Permit issued under the dumping at sea ordinance	Permit no. EP/MD/18-094	13 Aug 2018	12 Sep 2018
10	Permit issued under the dumping at sea ordinance	Permit no. EP/MD/18-027	13 Sep 2018	12 Oct 2018
11	Permit issued under the dumping at sea ordinance	Permit no. EP/MD/18-044	13 Oct 2018	12 Nov 2018
12	Permit issued under the dumping at sea ordinance	Permit no. EP/MD/19-062	16 Nov 2018	15 Dec 2018

2.3.2 The submission status as under the EP requirement is presented in [Table 2-3](#).

Table 2-3 Submission Status as under the EP Stipulation

Item	EP condition	Description	Status
1	2.3	Management Organization of the Main Construction Companies	The updated version to be submitted in May 2018
2	2.4	Report for Capture and Relocation of Common Rat Snake	Approved by EPD on 15 Sep 2017 (EPD ref.: (15) in EP2/N5/C/46 Pt.6 dated 15 Sep 2017)
3	2.5	Landscape Plan	Submitted to EPD on 28 June 2017
4	3.12	Mangrove Seedling Planting Proposal	Not yet submitted
5	3.13	Detailed Landscape As-built Drawing(s)	Not yet submitted
6	4.3	Baseline Monitoring Report for Air Quality and Noise (AUES Ref.: TCS00874/16/600/R0022v3)	Approved by EPD on 8 Jan 2018 (EPD ref.: (36) in EP2/N5/C/46 Pt.6 dated 8 Jan 2018)
7		Baseline Monitoring Report for Water Quality (AUES Ref.: TCS00874/16/600/R0036v2)	Approved by EPD on 10 Jan 2018 (EPD ref.: (37) in EP2/N5/C/46 Pt.6 dated 10 Jan 2018)

3. SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

3.1.1 The Environmental Monitoring and Audit requirements are set out in the EM&A manual. Environmental issues such as air quality, construction noise and water quality were identified as the key issues during the construction phase of the Project. A summary of the EM&A requirements for air quality, noise monitoring and water quality are presented in the sub-sections below.

3.2 MONITORING PARAMETERS

3.2.1 According to the Project EM&A Manual, the Impact monitoring program covers the following environmental issues:

- Air Quality;
- Construction Noise; and
- Water Quality

3.2.2 A summary of the monitoring parameters is presented in *Table 3-1* below.

Table 3-1 Summary of EM&A Impact Monitoring Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP • 24-hour TSP
Noise	<ul style="list-style-type: none"> • Leq (30min) in six consecutive Leq(5 min) between 07:00-19:00 on normal weekdays
Water Quality	<p>In-situ Measurements</p> <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Salinity (mg/L); • Temperature (°C); • Turbidity (NTU); • pH unit; • Current direction (degree); • Current speed (m/s); and • Water depth (m) <p>Laboratory Analysis</p> <ul style="list-style-type: none"> • Suspended Solids (mg/L); and • Chlorophyll-a (µg/L)

3.3 MONITORING LOCATIONS

Air Quality

3.3.1 There are air quality monitoring locations (A4 and A6) recommended in Section 3.1 of the EM&A Manual. During liaison with the landlord of A6, he refused to provide access and location for installation of High Volume Air Sampler (HVAS). Therefore, alternative location (A7) was proposed by ET in accordance with Section 3.4 of the EM&A Manual. The proposed alternative locations are considered capable of effectively representing the baseline conditions at the impact monitoring locations. The proposal (*ref no.: TCS00874/16/300/L0016b*) for alternative monitoring locations was verified by IEC and it has been submitted to EPD for approval on 8 May 2017. The air quality monitoring locations are in *Table 3-2* and illustrated in *Appendix C*.

Table 3-2 Location of Air Quality Monitoring

Station ID	Location
A4	No. 101 Lung Mei Tsuen
A7	Hong Kong Eco-Farm

Construction Noise

3.3.2 According to Section 4.1 of the EM&A Manual, four designated noise sensitive receivers (N1, N2, N3 and N4) were recommended and they are listed in **Table 3-3**.

Table 3-3 Designated Noise Monitoring Station according to the EM&A Manual

NSR	Location
N1	Village house - No. 165A Lung Mei
N2*	Village house - No. 103 Lung Mei
N3	Village house - No. 70 Lo Tsz Tin
N4	Village house - No. 79 Lo Tsz Tin

Remarks: (*)Noise monitoring should be conducted at N2a (i.e House No. 101 Lung Mei) if it is changed to residential use during construction phase.

3.3.3 As confirmed on the first day of baseline monitoring, N2a (House no. 101 Lung Mei) has been changed to residential use. Therefore, the noise monitoring is conducted at N2a and to replace N2. Moreover, due to the lack of accessibility of noise monitoring at NSR N3 (Village house – No. 70 Lo Tsz Tin), alternative location was proposed to replace N3 to carry out the noise monitoring. Having reviewed the surrounding condition, NSR N3a (Village house – No. 66C Lo Tsz Tin) was proposed with the rationales summarized in below.

- 1) The distance between N3 and N3a is about 18 meter apart and N3a locates at close proximity of the project site and major site activities which are likely to have noise impacts;
- 2) N3a is a village type residential house and it is a noise sensitive receiver (NSR);
- 3) Accessibility for noise monitoring work at N3a is available; and
- 4) Minimal disturbance would be only caused to the proposed monitoring location N3a.

3.3.4 The proposal (*ref no.: TCS00874/16/300/L0016b*) for alternative monitoring locations was verified by IEC and it has been submitted to EPD for approval on 8 May 2017. The noise monitoring stations under the EM&A programme are listed in **Table 3-4** and illustrated in **Appendix C**.

Table 3-4 Noise Monitoring Stations of the EM&A Programme

Station ID	Address
N1	Village house No. 165A of Lung Mei
N2a	Village house No. 101 of Lung Mei
N3a	Village house No. 66C of Lo Tsz Tin
N4	Village house No. 79 of Lo Tsz Tin

Water Quality

3.3.5 According to *Section 5.1.2 of the Approved EM&A Manual*, two Reference Stations (R1 and R2), three impact stations (I1, I2 and I3), three sensitive receivers (FCZ1, W1 and M1) and one Gradient station (G1), were identified to perform water quality monitoring. Detailed and co-ordnance of water quality monitoring stations is described in **Table 3-5** and the graphical is shown in **Appendix C**.

Table 3-5 Location of Marine Water Quality Monitoring Station

Station	Coordinates		Description
	Easting	Northing	
G1	841483.9	835936.1	Gradient Station - to assist in the identification of the source of any impact.
R1	842307.4	835718.4	Reference Station - for the background water quality for Tolo Harbour as it is at the channel where the water exchange between the enclosed Plover Cove and Tolo Harbour take place. It is located at south of the Project dredging/sandfilling area.
R2	840739.4	836212.4	Reference Station - for the background water quality in the Plover Cove region. It is located at southwest of the Project

Station	Coordinates		Description
	Easting	Northing	
			dredging/sandfilling area.
I1	841338.5	836588.5	Impact Station - located outside the mixing zone of dredging/sandfilling works of the Project.
I2	841590.3	836601.2	Impact Station - located outside the mixing zone of dredging/sandfilling works of the Project.
I3	841807.0	836680.9	Impact Station - located outside the mixing zone of dredging/sandfilling works of the Project.
W1	841858.9	836571.0	Sensitive Receiver - located at the Water Sport Centre, which is about 0.25 km distance to the southeast of the dredging/sandfilling area.
M1	840822.2	836416.4	Sensitive Receiver - located at the Ting Kok SSSI, which is about 0.8 km distance to the west of the dredging/sandfilling area.
FCZ1	841180.6	835230.8	Sensitive Receiver - located at the Yim Tin Tsai East Fish Culture Zone, which is about 1.5 km distance to the southwest of the dredging/sandfilling area.

3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The frequency and the duration for impact monitoring are summarized below.

Air Quality Monitoring

- **Parameters:** 1-hour TSP and 24-hour TSP
- **Frequency:** 3 times every six days for 1-hour TSP and once every 6 days for 24-hour TSP
- **Duration:** Throughout the construction period

Noise Monitoring

- **Parameters:** $L_{Aeq(30min)}$ and statistical results L_{10} & L_{90}
- **Frequency:** $Leq(30min)$ in 6 consecutive $Leq(5min)$ for once a week during 07:00-19:00 on normal weekdays
- **Duration:** Throughout the construction period

Water Quality (Marine) Monitoring

- **Parameters:** In-situ measurements including water depth, Dissolved Oxygen (DO) concentration (mg/L) & saturation (%), Salinity (mg/L), Temperature (°C) and Turbidity (NTU); and Suspended Solids (mg/L) and Chlorophyll-*a* (µg/L) are analyzed by HOKLAS-accredited laboratory.
- **Frequency:** Three days a week, at mid ebb and mid flood tides. The interval between 2 sets of monitoring will be more than 36 hours.
- **Sampling Depth**
 - 1) Three depths: 1m below water surface, 1m above sea bottom and at mid-depth when the water depth exceeds 6m;
 - 2) If the water depth is between 3m and 6m, two depths: 1m below water surface and 1m above sea bottom; and
 - 3) If the water depth is less than 3m, 1 sample at mid-depth is taken
- **Duration:** During marine works proceeding such as the dredging and sand filling

3.4.2 In addition to the water quality parameters, other relevant data will also be to measure and record, which are included the location of the sampling stations, water depth, time, weather conditions, sea conditions, tidal stage, current water flow direction and speed, special phenomena and work activities undertaken around the monitoring and works area that may influence the monitoring results. Observations on any special phenomena and work underway at the Project site during the time of sampling will also be to record.

3.5 MONITORING INSTRUMENT

Air Quality Monitoring

3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable results to the HVS. The instrument should be calibrated regularly, and the 1-hour sampling shall be determined on yearly basis by the HVS to check the validity and accuracy of the results measured by direct reading method. The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.2 All equipment to be used for air quality monitoring is listed in **Table 3-6**.

Table 3-6 Air Quality Monitoring Equipment

Equipment	Model
24-Hour TSP	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Calibration Kit Mode TE-5025A
1-Hour TSP	
Portable Dust Meter	Sibata LD-3B Laser Dust Meter / TSI AM510 Laser Dust Monitor

Noise Monitoring

3.5.3 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1} for reference.

3.5.4 Monitoring equipment to be used for construction noise measurement is listed in **Table 3-7**.

Table 3-7 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	Rion NL-31 or Rion NL-52 or Brüel & Kjær 2238
Acoustic Calibrator	Rion NC-74 or Rion NC-73 or Brüel & Kjær 4231
Portable Wind Speed Indicator (#)	Anemometer AZ Instrument 8908

(#) Wind speed is reference data only and there is no calibration certificate for portable wind speed indicator.

Water Quality Monitoring

3.5.5 For water quality monitoring, the used equipment should be fulfill the requirements under *the Approved EM&A Manual Section 5.1.1*. Requirement of instruments is described in the following sections.

3.5.6 Instruments to be used for Water quality monitoring is listed in **Table 3-8**.

Table 3-8 Instrument of Water Quality Monitoring

Equipment	Model
A Digital Global Positioning System	GPS12 Garmin & Garmin eTrex
Water Depth Detector	Eagle Sonar CUDA 300 & Garmin ECHO 100
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or teflon/stainless steel bailer or self-made sampler & Aquatic Research Transparent PC Vertical Water Sampler 2.2L / 3L / 5L

Equipment	Model
Thermometer & DO meter	YSI Professional Plus Multifunctional Meter & YSI 6920V2-2-M Sonde & YSI 69201V2-M Multi-parameter water quality meter
pH meter	
Turbidimeter	
Salinometer	
Current Meter	Valeport Ltd – Model 106 Self Recording/Direct Reading Current Meter & Acoustic Doppler Current Profiler - RiverSurveyor M9
Storage Container	‘Willow’ 33-litre plastic cool box with Ice pad

3.6 MONITORING PROCEDURES

Air Quality

1-hour TSP

- 3.6.1 Operation of the 1-hour TSP meter will follow manufacturer’s Operation and Service Manual.
- 3.6.2 The 1-hour TSP monitor, brand named “Sibata LD-3B Laser Dust Meter” or “TSI AM510 Laser Dust Monitor” is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90⁰ light scattering. The 1-hour TSP monitor consists of the following:
- A pump to draw sample aerosol through the optic chamber where TSP is measured;
 - A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
 - A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.
- 3.6.3 The 1-hour TSP meter to be used will be within the valid period, calibrated by the manufacturer prior to purchasing. Zero response of the instrument will be checked before and after each monitoring event. Annually calibration with the High Volume Sampler (HVS) in same condition would be undertaken by the Laboratory.

24-hour TSP

- 3.6.4 The equipment used for 24-hour TSP measurement is the High Volume Sampler (hereinafter the “HVS”) brand named TISCH, Model TE-5170 TSP High Volume Air Sampler, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The HVS consists of the following:
- An anodized aluminum shelter;
 - A 8”x10” stainless steel filter holder;
 - A blower motor assembly;
 - A continuous flow/pressure recorder;
 - A motor speed-voltage control/elapsed time indicator;
 - A 7-day mechanical timer, and
 - A power supply of 220v/50 hz
- 3.6.5 For HVS for 24-hour TSP monitoring, the HVS is mounted in a metallic cage with a top for protection and also it is sat on the existing ground or the roof of building. The flow rate of the HVS between 0.6m³/min and 1.7m³/min will be properly set in accordance with the manufacturer’s instruction to within the range recommended in *EPA Code of Federal Regulation, Appendix B to Part 50*. Glass Fiber Filter 8" x 10" of TE-653 will be used for 24-Hour TSP monitoring and would be supplied by laboratory. The general procedures of sampling are described as below:-
- A horizontal platform with appropriate support to secure the samples against gusty wind should be provided;
 - No two samplers should be placed less than 2 meters apart;

- The distance between the sampler and an obstacle, such as building, must be at least twice the height that the obstacle protrudes above the sample;
- A minimum of 2 meters of separation from any supporting structure, measured horizontally is required;
- Before placing any filter media at the HVS, the power supply will be checked to ensure the sampler work properly;
- The filter paper will be set to align on the screen of HVS to ensure that the gasket formed an air tight seal on the outer edges of the filter. Then filter holder frame will be tightened to the filter hold with swing bolts. The holding pressure should be sufficient to avoid air leakage at the edge.
- The mechanical timer will be set for a sampling period of 24 hours (00:00 mid-night to 00:00 mid-night next day). Information will be recorded on the field data sheet, which would be included the sampling data, starting time, the weather condition at current and the filter paper ID with the initial weight;
- After sampling, the filter paper will be collected and transfer from the filter holder of the HVS to a sealed envelope and sent to a local HOKLAS accredited laboratory for quantifying.

3.6.6 All the sampled 24-hour TSP filters will be collected and put into the filter envelope provided by the laboratory. The sample will be kept in normal air conditioned room conditions, i.e. 70% HR (Relative Humidity) and 25°C and delivery to the office within 48 hours and sent to laboratory for analysis. The sampled filter will be kept in the laboratory for six months prior to disposal.

3.6.7 The HVS used for 24-hour TSP monitoring will be calibrated before the commencement for sampling, and after in two months interval for 1 point checking of maintenance and six months interval for five points calibrate in accordance with the manufacturer's instruction using the NIST-certified standard calibrator (TISCH Calibration Kit Model TE-5025A) to establish a relationship between the follow recorder meter reading in cfm (cubic feet per minute) and the standard flow rate, Qstd, in m³/min. Motor brushes of HVS will be regularly replaced of about five hundred hours per time.

Construction Noise

3.6.8 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804:1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

3.6.9 All noise measurements will be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq). Leq_(30 min) in six consecutive Leq_(5 min) measurements will be used as the monitoring parameter for the time period between 07:00-19:00 hours on weekdays.

3.6.10 The sound level meter will be mounted on a tripod at a height of 1.2 m and placed at the assessment point and oriented such that the microphone is pointed to the site with the microphone facing perpendicular to the line of sight. The windshield will be fitted for all measurements. Where a measurement is to be carried out at a building, the assessment point would normally be at a position 1 m from the exterior of the building façade. Where a measurement is to be made for noise being received at a place other than a building, the assessment point would be at a position 1.2 m above the ground in a free-field situation, i.e. at least 3.5 m away from reflective surfaces such as adjacent buildings or walls.

3.6.11 Immediately prior to and following each noise measurement the accuracy of the sound level meter will be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements will be accepted as valid only if the calibration level from

before and after the noise measurement agrees to within 1.0 dB.

- 3.6.12 Noise measurements will not be made in fog, rain, wind with a steady speed exceeding 5m/s or wind with gusts exceeding 10m/s. The wind speed will be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

Water Quality (Marine) Monitoring

- 3.6.13 Marine water quality monitoring will be conducted at the designated locations in accordance with EM&A Manual. The operating and analytical of sampling procedures are described as below:
- A Global Positioning System (GPS) will be used to ensure that the correct location was selected prior to sample collection. A portable, battery-operated echo sounder will be used for the determination of water depth at each designated monitoring station.
 - The marine water sampler will be lowered into the water body at a predetermined depth. The trigger system of the sampler is activated with a messenger and opening ends of the sampler are closed accordingly then the sample of water is collected.
 - During the sampling, the sampling container will be rinsed to use a portion of the marine water sample before the water sample is transferred to the container. Upon sampling completion, the container is sealed with a screw cap.
 - Before the sampling process, general information such as the date and time of sampling, weather condition and tidal condition as well as the personnel responsible for the monitoring will be recorded on the monitoring field data sheet.
 - In-situ measurement including water temperature, turbidity, dissolved oxygen, salinity, pH and water depth undertake at the identified monitoring point. At each station, marine water samples are collected at three depths: 1m below water surface, 1m above sea bottom and at mid-depth when the water depth exceeds 6m. Samples at 1m below water surface and 1m above sea bottom are collected when the water depth is between 3m and 6m. Only 1 sample at mid-depth is taken when the water depth is below 3m.
 - For the in-situ measurement, two consecutive measurements of sampling depth, temperature, dissolved oxygen, salinity, turbidity and pH concentration will be measured at the sea. The YSI Professional Plus Multifunctional Meter & YSI 6920V2-2-M Sonde & YSI 69201V2-M Multi-parameter water quality meter are retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set is more than 25% of the value of the first reading, the reading is discarded and further readings is taken.
 - Water sample would be collected by a water sampler and then filled in high-density polythene bottles. Before the water sample storage, the sampling bottles will be pre-rinsed with the same water sample. The sample bottles then is packed in cool-boxes (cooled at 4^oC without being frozen), and delivered to HOKLAS accredited laboratory for the chemical analysis as followed APHA Standard Methods.
 - The laboratory has been comprehensive quality assurance and quality control programmes. For QA/QC procedures, one duplicate samples of every batch of 20 samples is analyzed as followed the HOKLAS accredited requirement.
- 3.6.14 During marine water sampling period, all in-situ measurement equipment will be calibrated at three months interval accordingly. Except for the Current Velocity and Direction water flow meter will be calibrated every two years as recommended by the manufactory. Available calibration certificates will be issued to ensure the performance of equipment to use for in-situ measurement.
- 3.6.15 Before each round of monitoring, the dissolved oxygen probe will be calibrated by wet bulb method; a zero check in distilled water will be performed with the turbidity and salinity probes; 4 and 10 values of the standard solution will be undertaken to check the accuracy of pH value.
- 3.6.16 Valid calibration certificates of monitoring equipment of air quality, construction noise and water quality are shown in respectively monthly EM&A Reports.

LABORATORY ANALYSIS

3.6.17 Chemical analysis will be conducted for all water samples by a HOKALS accredited laboratory. The chemicals analysis method and reporting limit is shown *Table 3-9*.

Table 3-9 Testing Method and Reporting Limit of the Chemical Analysis

Parameter	Method Code	In-house Method Reference ¹	Reporting Limit
Total Suspended Solids	EA025	APHA 2540D	2 mg/L
Chlorophyll-a	EP008F	APHA 10200 H2&H3	0.1 µg/L

Note: The exact method shall depend on the laboratory accredited method. APHA = Standard Methods for the Examination of Water and Wastewater by the American Public Health Association.

3.7 METEOROLOGICAL INFORMATION

3.7.1 The meteorological information including wind direction, wind speed, humidity, rainfall, air pressure and temperature etc. during impact monitoring is extracted from the closest Hong Kong Observatory Station. To obtain the most appropriate meteorological information where available, Air Temperature/Pressure and Relative Humidity will be extracted from Tai Po Station and wind speed and direction will be extracted from Tai Mei Tuk Station. Details on meteorological data are reported in respectively monthly EM&A Reports.

3.8 DETERMINATION OF ACTION/LIMIT (A/L) LEVELS

3.8.1 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. A summary of the Action/Limit (A/L) Levels for air quality, construction noise and water quality are shown in *Table 3-10*, *3-11* and *3-12* respectively.

Table 3-10 Action and Limit Levels for Air Quality

Monitoring Station	Action Level (µg /m ³)		Limit Level (µg/m ³)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
A4	275	142	500	260
A7	274	141	500	260

Table 3-11 Action and Limit Levels for Construction Noise, dB(A)

Time Period: 0700-1900 hours on normal weekdays		
Monitoring Location	Action Level	Limit Level ^{Note 1 & Note 2}
N1, N2a, N3a, and N4	When one documented complaint is received	75

Note 1: Acceptable Noise Levels for school should be reduced to 70 dB(A) and 65 dB(A) during examination period

Note 2: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

Table 3-12 Action and Limit Levels for Water Quality

Monitoring Location	Action Level		Limit Level	
	Depth Average of SS (mg/L)		OR 130% of any reference stations at the same tide of the same day	
I1	7.0	OR 120% of any reference stations at the same tide of the same day	7.5	OR 130% of any reference stations at the same tide of the same day
I2	7.0		8.1	
I3	8.3		15.0	
W1	8.0		8.6	
M1	10.0		11.0	
FCZ1	7.0		8.0	
Monitoring Location	Dissolved Oxygen (mg/L)			
	Depth Average of Surface & Mid-depth	Bottom	Depth Average of Surface & Mid-depth	Bottom
I1	5.08	N/A	4.80	N/A

Monitoring	Action Level		Limit Level	
I2	5.26	3.64	4.88	3.37
I3	5.03	4.09	4.77	3.19
W1	4.67	2.41	4.54	2.33
M1	4.73	N/A	4.70	N/A
FCZ1	5.00	3.43	5.00	3.18
Monitoring Location	Depth Average of Turbidity (NTU)			
I1	2.8	OR 120% of any reference stations at the same tide of the same day	2.9	OR 130% of any reference stations at the same tide of the same day
I2	3.5		7.7	
I3	2.6		3.0	
W1	2.9		3.3	
M1	5.2		6.6	
FCZ1	3.2		3.4	
Monitoring Location	Surface, Middle & Bottom of Chlorophyll-a (µg/L)			
I1	11.1		12.1	
I2	11.0		13.1	
I3	11.3		14.5	
W1	11.3		16.1	
M1	16.9		42.4	
FCZ1	11.8		12.5	

Notes:

- (a) For DO, non-compliance of water quality limits occurs when monitoring result is lower than the limits
- (b) For SS, chlorophyll-a and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (c) Both Action and Limit Levels for DO (surface and middle) in the FCZ1 are less than 5 mg/L.

Event Action Plan

3.8.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan which presented in [Appendix D](#).

3.9 DATA MANAGEMENT AND DATA QA/QC CONTROL

3.9.1 The impact monitoring data were handled by the ET's in-house data recording and management system.

3.9.2 The monitoring data recorded in the equipment were downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data were input into a computerized database properly maintained by the ET. The laboratory results were input directly into the computerized database and checked by personnel other than those who input the data.

3.9.3 For monitoring parameters that require laboratory analysis, the local laboratory shall follow the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory tests.

4. AIR QUALITY MONITORING

4.1 GENERAL

4.1.1 In the Reporting Period, air quality monitoring was performed at the monitoring locations A4 and A7. Graphical plot showing trends of the air quality monitored parameters is presented in Appendix E and the associated meteorological information during the Reporting Period is presented in *Appendix F*.

4.2 RESULTS OF AIR QUALITY MONITORING

1-hour TSP

4.2.1 In the Reporting Period, there were total of 64 sessions (monitoring days) for 1-hour TSP at the designated monitoring stations A4 and A7. Graphical plots of 1-hr TSP monitoring results in *Appendix E* show the 1-hour TSP at monitoring stations A4 and A7 were well below the environmental quality criteria. No remedial actions associated with the exceedances were therefore taken during the Reporting Period. Summary of 1-hour TSP monitoring results during the Reporting Period are tabulated in *Table 4-1*.

Table 4-1 Summary of 1-hour TSP Monitoring Results

Monitoring Location	1-hour TSP ($\mu\text{g}/\text{m}^3$)			Baseline of 1-hour TSP ($\mu\text{g}/\text{m}^3$)
	Min	Max	Mean	Average (range)
A4	12	149	59	38 (18 – 69)
Recorded in the date	12-Jul-18	27-Apr-18	64 sessions	
A7	12	160	61	37 (22 – 63)
Recorded in the date	12-Jul-18	27-Apr-18	64 sessions	

24-hour TSP

4.2.2 In the Reporting Period, there were total of 61 and 64 sessions for 24-hour TSP at the designated monitoring stations A4 and A7 respectively, in which 3 sessions of 24-hour TSP monitoring at Station A4 were suspended due to power supply issue. Graphical plots of 24-hour TSP monitoring results in *Appendix E* show the 24-hour TSP at monitoring stations A4 and A7 were well below the environmental quality criteria. No remedial actions associated with the exceedances were therefore taken during the Reporting Period. Summary of 24-hour TSP monitoring results during the Reporting Period are tabulated in *Table 4-2*.

Table 4-2 Summary of 24-hour TSP Monitoring Results

Monitoring Location	24-hour TSP ($\mu\text{g}/\text{m}^3$)			Baseline of 24-hour TSP ($\mu\text{g}/\text{m}^3$)
	Min	Max	Mean	Average (range)
A4	17	130	54	18 (11– 29)
Recorded in the date	6-Jun-18	30-Jul-18	61 sessions (#)	
A7	16	106	48	17 (7– 28)
Recorded in the date	31-May-18	5-Oct-18	64 sessions	

(#) 3 sessions of 24-hour TSP monitoring at Station A4 were suspended due to power supply issue.

4.2.3 Breaches of air quality A/L levels and statistical analysis of compliance for the air quality monitoring results are summarized in *Table 4-3*.

Table 4-3 Summaries of Breaches of Air Quality A/L Levels

Location	Exceedance	1-hour TSP	24- hour TSP	Total
A4	Action Level	0	0	0
	Limit Level	0	0	0
A7	Action Level	0	0	0
	Limit Level	0	0	0

- 4.2.4 The weather throughout the Reporting Period is typical Hong Kong climate including rainy season (Apr to Sep) and dry season (Oct to Mar next year). The major dust sources in the Reporting Period are construction activities by the Project, as well as traffic emission from Ting Kok Road which are comparable with the EIA.
- 4.2.5 In this Reporting Period, all the 1-hour TSP and 24-hour TSP monitoring results were below the Action/Limit Levels. No Notification of Exceedance (NOE) was therefore issued. The baseline air quality monitoring was conducted in June 2017 during typical rainy season. The data collected therefore may not reflect the air quality condition of dry seasons in Hong Kong which normally significantly different. However, with implementation of construction dust suppression measures and good site practices provided by the Contractor, the impact monitoring results recorded zero exceedance of the environmental quality criteria of the parameter.
- 4.2.6 Precision of the prediction of the EIA on the adverse air quality impacts to be generated from the construction of the Project is acceptable. The air quality monitoring performed during the Reporting Period is effective for generating data with the necessary statistical power to categorically identify or confirm the presence or absence of the predicted environmental impacts attributable to the works under the Project. The construction dust suppression measures as recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) is also proven effective and adequate.
- 4.2.7 The air quality mitigation measures stipulated in ISEMM should be strictly observed throughout the construction period in future of others construction projects.
- 4.2.8 The summary of weather information during the Reporting Period is presented in [Appendix F](#).

5. CONSTRUCTION NOISE MONITORING

5.1 GENERAL

5.1.1 In the Reporting Period, construction noise quality was performed at the monitoring locations N1, N2a, N3a and N4. Graphical plot showing trends of the construction noise monitored Leq(30min) during the Reporting Period are presented in [Appendix E](#).

5.2 RESULTS OF NOISE MONITORING

5.2.1 In the Reporting Period, 53 sessions of noise monitoring were carried out at the designated locations. Free-field status were performed at N1 and N3a and façade correction (+3 dB(A)) has been added for the correction in according to the acoustical principles and EPD guidelines.

5.2.2 Graphical plots of Leq(30_{min}) monitoring results show the construction noise levels at all designated monitoring stations N1, N2a, N3a and N4, fluctuated well below the environmental quality criteria, i.e. Limit Level of 75 dB(A). No remedial actions associated with the exceedances were therefore taken during the Reporting Period. The noise monitoring results at the designated locations are summarized in [Tables 5-1](#).

Table 5-1 Summary of Construction Noise Monitoring Results

Monitoring Location	Leq, 30min (dB((A))		Baseline of Leq, 30min (dB((A))
	Min	Max	Range
N1 ^(*)	47	70	58 – 70
N2a	45	72	55 – 62
N3a ^(*)	49	74	54 – 64
N4	52	67	57 – 64

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

5.2.3 No exceedances of the Limit Level were recorded and no noise complaints were received (which trigger an Action Level) during the Reporting Period, implying no adverse noise nuisance was detected throughout the construction period of the Project. The breaches of construction noise A/L levels and statistical analysis of compliance for construction noise monitoring results are summarized in [Table 5-2](#).

Table 5-2 Summaries of Breaches of Construction Noise A/L Levels

Station	Limit Level	Action Level	Received Date
N1	0	0	N/A
N2a	0		
N3a	0		
N4	0		

5.2.4 Baseline noise monitoring was conducted in June 2017 and the background noise environmental is dominated by the road traffic noise from Ting Kok Road. In the Reporting Period, the major noise sources are construction activities by the Project, as well as road traffic noise from Ting Kok Road which are comparable with the EIA. With implementation of construction noise mitigation measures and good site practices provided by the Contractor, the impact monitoring results recorded zero exceedance of the environmental quality criteria of the parameter, which are comparable with the baseline and EIA.

5.2.5 The construction noise monitoring performed during the Reporting Period is effective for generating data with the necessary statistical power to categorically identify or confirm the presence or absence of the predicted environmental impacts attributable to the works under the Project.

- 5.2.6 $L_{eq(30min)}$ monitoring results registered consistent compliance of the parameter with environmental quality criteria throughout the Reporting Period, indicating that the prediction of Final EIA prediction on the adverse noise nuisance to be generated from the construction of the Project is in general acceptable and the recommended environmental mitigation measures as stipulated in ISEMM is also adequate.
- 5.2.7 In order to ensure full compliance of the construction noise with the environmental quality criteria, environmental mitigation measures as stipulated in ISEMM should be strictly observed throughout the remaining construction period..

6. WATER QUALITY MONITORING

6.1 GENERAL

6.1.1 The marine work under the Project was commenced on 24th January 2018. In the Reporting Period, marine water quality monitoring was performed at all designated monitoring locations. Graphical plot showing trends of the marine water quality during the Reporting Period are presented in [Appendix E](#).

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In this Reporting Period, a total of **127** sampling days were performed for marine water quality monitoring. Due to the inclement weather condition, marine water quality monitoring on 6 Jun, 23 Jun, 5 Jul and 13 Jul were cancelled. Moreover, monitoring at mid-ebb tide on 3 Jul, 12 Sep and 24 Sep as well as mid flood tide on 13 Jun, 19 Jun, 23 Jul and 17 Sep were cancelled. Monitoring results of 4 key parameters: dissolved oxygen (DO), turbidity, suspended solids and Chlorophyll-*a* are summarized in [Tables 6-1 to 6-5](#).

Table 6-1 Results Summary of Depth Average (Surface & Middle Layer) of DO (mg/L)

Tidal		G1	R1	R2	I1	I2	I3	W1	M1	FCZ1
Mid-Ebb	Average	7.48	7.37	7.35	7.39	7.34	7.30	7.10	7.23	7.45
	Min	3.61	5.28	4.5	3.12	4.66	3.96	4.92	4.89	4.71
	Max	10.81	9.57	9.84	10	10.31	9.81	9.41	9.18	10.29
Mid-Flood	Average	7.45	7.19	7.33	7.42	7.23	7.19	7.08	7.42	7.55
	Min	4	3.67	5.09	4.46	4.63	3.68	4.69	4.98	4.76
	Max	11.16	10.14	10.45	11	9.75	9.66	10.36	10.21	11.96
Baseline	Average (range)	6.30 (5.1 – 75.3)	5.97 (4.29 – 7.60)	6.27 (5.09 – 8.53)	6.02 (4.77 – 7.64)	6.07 (4.87 – 7.45)	6.0 (4.72 – 7.75)	5.77 (4.27 – 7.83)	5.99 (4.70 – 7.67)	6.50 (4.84 – 8.16)

Table 6-2 Results Summary of Bottom Depth of DO (mg/L)

Tidal		G1	R1	R2	I1	I2	I3	W1	M1	FCZ1
Mid-Ebb	Average	6.1	6.0	6.0	5.6	6.3	6.0	5.5	N/A	6.1
	Min	2.6	2.0	1.4	1.5	1.3	1.2	1.5	N/A	1.5
	Max	9.1	9.1	10.0	8.7	9.2	9.1	8.7	N/A	9.6
Mid-Flood	Average	6.2	5.9	6.1	5.8	6.2	6.0	5.5	N/A	6.3
	Min	2.2	1.6	1.6	2.5	1.1	1.2	0.6	N/A	1.4
	Max	9.9	10.6	9.8	8.7	9.4	9.5	9.7	N/A	10.3
Baseline	Average (range)	4.76 (2.63 – 7.53)	4.46 (2.82 – 5.74)	4.74 (2.09 – 5.71)	N/A	4.93 (3.35 – 6.24)	4.95 (3.18 – 5.94)	3.87 (2.3 – 5.9)	N/A	5.25 (3.15 – 7.71)

Table 6-3 Results Summary of Depth Average of Turbidity (NTU)

Tidal		G1	R1	R2	I1	I2	I3	W1	M1	FCZ1
Mid-Ebb	Average	1.6	1.6	1.8	1.5	1.4	1.4	1.5	1.9	1.5
	Min	0.2	0.2	0.4	0.2	0.1	0.2	0.2	0.1	0.2
	Max	4.2	4.5	4.2	5.9	4.2	4.3	4.4	6.5	6.9
Mid-Flood	Average	1.5	1.6	1.7	1.5	1.5	1.5	1.5	1.9	1.4
	Min	0.2	0.3	0.2	0.1	0.1	0.2	0.2	0.3	0.2
	Max	3.6	4.6	4.6	4.3	4.5	4.1	3.6	4.9	3.5
Baseline	Average (range)	1.9 (0.1 – 4.1)	1.7 (0.1 – 4.8)	1.9 (0.2 – 3.3)	1.7 (0.2 – 2.9)	1.9 (0.1 – 7.8)	1.6 (0.1 – 3.0)	1.7 (0.1 – 3.6)	2.9 (1.0 – 7.3)	1.8 (0.03 – 3.5)

Table 6-4 Results Summary of Depth Average of Suspended Solids (mg/L)

Tidal		G1	R1	R2	I1	I2	I3	W1	M1	FCZ1
Mid-Ebb	Average	4.2	4.2	4.3	4.8	4.6	4.7	4.5	5.2	4.4
	Min	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Max	19.3	24.8	26.0	35.5	24.5	25.5	19.8	24.0	23.8
Mid-Flood	Average	4.2	4.4	4.5	4.4	4.5	4.7	4.4	5.8	4.4
	Min	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
	Max	14.3	18.8	19.5	12.0	17.8	15.5	11.8	61.0	17.0
Baseline	Average (range)	4.1 (2 – 10)	3.9 (2 – 10)	3.9 (2 – 10)	3.7 (2 – 8)	3.9 (2 – 10)	4.2 (2 – 15)	3.8 (2 – 9)	5.4 (2 – 11)	4.3 (2 – 8)

Table 6-5 Results Summary of Depth Average of Chlorophyll-a (µg/L)

Tidal		G1	R1	R2	I1	I2	I3	W1	M1	FCZ1
Mid-Ebb	Average	4.5	4.5	4.5	4.4	5.2	4.9	4.9	3.6	4.9
	Min	0.9	0.8	0.9	0.6	1.2	1.0	0.9	0.4	0.9
	Max	31.3	16.4	16.9	23.7	64.4	44.0	17.3	17.3	25.7
Mid-Flood	Average	4.2	4.6	4.5	4.6	4.6	4.9	4.9	4.4	4.4
	Min	0.6	0.6	0.7	0.6	0.7	0.8	0.5	0.4	0.6
	Max	14.1	27.2	19.1	47.5	21.4	23.0	32.7	27.3	14.6
Baseline	Average (range)	4.5 (0.2 – 14.8)	3.7 (0.3 – 12.4)	7.1 (0.3 – 83.8)	4.3 (0.3 – 12.4)	3.7 (0.2 – 14.2)	4.0 (0.3 – 15.3)	4.1 (0.4 – 17.1)	6.0 (0.3 – 43.5)	5.5 (0.4 – 13.5)

6.2.2 A summary of exceedances for the four parameters: DO, turbidity, SS and chlorophyll-*a* are shown in *Table 6-6*.

Table 6-6 Summary of Water Quality Exceedance

Station	DO (Ave of Top & mid-depth)		DO (Bottom Depth)		Turbidity (Depth Ave)		SS (Depth Ave)		Chlorophyll- <i>a</i> (Depth Ave)		Total Exceedance for the Station	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
I1	0	2	0	0	6	48	27	79	4	6	37	135
I2	2	2	0	13	9	22	20	75	2	14	33	126
I3	0	4	11	10	6	37	13	94	6	7	36	152
W1	0	0	0	4	6	47	18	75	10	4	34	130
M1	0	0	0	0	8	85	27	96	4	0	39	181
FCZ1	0	2	1	9	8	40	21	78	5	8	35	137
No of Exceedance	2	10	12	36	43	279	126	497	31	39	214	861

6.2.3 In this Reporting Period, as shown in *Table 6-6*, a total of 214 Action Level and 861 Limit Level exceedances were recorded for the Project. NOEs were issued to relevant parties upon confirmation of the monitoring result. Investigation had been conducted by ET and the summary of investigation result for water quality exceedance is shown in *Table 6-7*.

Table 6-7 Summary of Investigation Result for Water Quality Exceedance

Month	Marine activities	Water quality mitigation measures	Investigation Result
December 2017 – February 2018	No marine works	Silt curtains were properly implemented and maintained at locations in accordance with EP's condition	<ul style="list-style-type: none"> No adverse water quality impact was observed and recorded during site inspection. Since there were no marine works undertaken, it was concluded that the elevated SS

Month	Marine activities	Water quality mitigation measures	Investigation Result
			levels were likely due to natural variation and not caused by the works under the project.
March – May 2018	<ul style="list-style-type: none"> No marine works carried out on 7 to 29 March, 6 to 30 April and 2 to 21 May 2018 Rock filling work was undertaken during 23 to 31 May 2018 at west groyne Marine construction activities were carried out on 2 and 5 March 2018 	Silt curtains were properly implemented and maintained at locations in accordance with EP's condition.	<ul style="list-style-type: none"> No adverse water quality impact was observed and recorded during site inspection. Having reviewed environmental performance of the project site and the monitoring results of the reference stations, impact stations as well as the sensitive receiver stations, it is considered that the turbidity, SS and chlorophyll-a exceedances were likely due to natural variation and not caused by the works under the project.
June 2018 – August 2018	<ul style="list-style-type: none"> Rock filling work using land-based excavator at west groyne in June 2018, 10 to 30 July 2018 and 1 to 17 August 2018 Marine dredging at West Gyrone was on 24 to 31 August 2018 No marine works carried out on 2 to 9 July 2018 and 20 August 2018 	Silt curtains were properly implemented and maintained at locations in accordance with EP's condition.	<ul style="list-style-type: none"> No adverse water quality impact was observed and recorded during site inspection. During the course of marine water quality monitoring, no abnormal and turbid discharge was observed from the construction site. Having reviewed environmental performance of the project site and the monitoring results of the reference stations, impact stations as well as the sensitive receiver stations and the weather condition during the monitoring days, it is considered that all the exceedances were not caused by the works under the Project.
September 2018 – November 2018	<ul style="list-style-type: none"> Marine dredging at West Groyne and rock fill at East Gyrone on 3 to 14, 26 and 28 September 2018, 2 to 16 and 18 to 24 October 2018 No marine work during 17 to 24 September, 26 to 31 October 2018 	Silt curtains were properly implemented and maintained at locations in accordance with EP's condition.	<ul style="list-style-type: none"> No adverse water quality impact was observed and recorded during site inspection. Having reviewed environmental performance of the project site and the monitoring results of the reference stations, impact stations as well as the sensitive receiver stations and the weather condition during the

Month	Marine activities	Water quality mitigation measures	Investigation Result
	and 2 to 30 November 2018		monitoring days, it is considered that all the exceedances were not caused by the works under the Project.

- 6.2.4 The weather throughout the Reporting Period is typical Hong Kong climate including rainy season (Apr to Sep) and dry season (Oct to Mar next year). The water quality impact sources in the Reporting Period are marine activities (degrading and sandfilling) under the Project, site runoff from Project site etc, which are comparable with the EIA.
- 6.2.5 Baseline monitoring was carried out during the period between 23 September 2017 and 21 October 2017. It is important to point out that the baseline SS and turbidity conditions at the monitoring locations may differ significantly during raining, in particular under high tide flow conditions. The monitoring results in the Reporting Period are comparable with the baseline. With implementation of water quality mitigation measures and good site practices provided by the Contractor, no project-related exceedances were recorded.
- 6.2.6 Overall, with the implementation of water quality mitigation measures, all the exceedances were likely related to natural variation and not caused by the works under the Project. No remedial actions associated with the exceedances were therefore taken during the Reporting Period. Nevertheless, the Contractor was reminded to strictly implement the water quality mitigation measure as recommended implementation schedule for environmental mitigation measures in the EM&A Manual and EP’s condition.
- 6.2.7 Precision of the prediction of the Final EIA on the adverse water quality impacts to be generated from the construction of the Project is acceptable. The water quality monitoring performed during the Reporting Period is effective for generating data with the necessary statistical power to categorically identify or confirm the presence or absence of the predicted environmental impacts attributable to the works under the Project. The water quality mitigation measures as recommended in MMIS are also proven effective and adequate.

7. WASTE MANAGEMENT

7.1 GENERAL

7.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

7.2 RECORDS OF WASTE QUANTITIES

7.2.1 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

7.2.2 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 7-1* and *7-2* and the Monthly Summary Waste Flow Table is shown in *Appendix G*. Whenever possible, materials were reused on-site as far as practicable.

Table 7-1 Summary of Quantities of Inert C&D Materials

Types of Waste	Quantity					Disposal Location
	Dec 17 – Feb 18	Mar 18 – May 18	Jun 18 – Aug 18	Sep 18 – Nov 18	Sum	
Total C&D Materials (Inert) ('000m ³)	0	2.949	1.14	1.304	5.393	NA
Reused in this Contract (Inert) ('000m ³)	0	0	0	0	0	NA
Reused in other Projects (Inert) ('000m ³)	0	0	0	0	0	NA
Disposal as Public Fill (Inert) ('000m ³)	0	2.949	1.14	1.304	5.393	Tuen Mun Area 38

Table 7-2 Summary of Quantities of C&D Wastes

Types of Waste	Quantity					Disposal Location
	Dec 17 – Feb 18	Mar 18 – May 18	Jun 18 – Aug 18	Sep 18 – Nov 18	Sum	
Recycled Metal ('000kg)	0	0	0	0	0	NA
Recycled Paper / Cardboard Packing ('000kg)	0	0	0	0	0	NA
Recycled Plastic ('000kg)	0	0	0	0	0	NA
Chemical Wastes ('000kg)	0	0	0	0	0	NA
General Refuse ('000m ³)	0.111	0.013	0	0.026	0.150	NENT

8. ECOLOGY

8.1 PRE-CONSTRUCTION PHASE (LAND)

Common Rat Snake

- 8.1.1 According to the approved EM&A Manual, a one day-time search of the Common Rat Snake within the land based Proposed Beach Development shall be undertaken. All recorded Common Rat Snake will be caught by hand and translocated to the shrubland at the north of the Study Area, immediately after the search.
- 8.1.2 The Capture survey of the snake has been done by a qualified ecologist systematically throughout the proposed survey area on 24th March 2017 and no snake was noticed/captured during the survey period. The report for capture and relocation of Common Rat Snake which was certified by ET and verified by IEC has been submitted to EPD on 10th August 2017 and approved by EPD on 15th September 2017.

8.2 ECOLOGY MONITORING (MARINE-BASED)

Marine Fauna Translocation (Except seahorses)

Fauna Translocation Surveys

- 8.2.1 In the Reporting Period, fauna translocation surveys were conducted on 7th, 8th, 11th, 12th, 13th, 18th, 29th and 30th of December 2017; 2nd, 4th, 5th, 15th and 16th January 2018 respectively. For the Fauna Translocation Survey up to December 2017, a total of 43 individuals of *Favonigobius reichei* and 2 individuals of *Takifugu niphobles*, which are two of the particular target fish species listed on EP, were captured and relocated to Ting Kok East. Moreover, three species of target echinoderms were recorded during the survey. In total, 334 individuals of *Archaster typicusm*; 81 individuals of *Salmacis sphaeroides* and 9 individuals of *Holothuria atram*, were captured and relocated to Ting Kok East. For January, 3 individuals of *Favonigobius reichei*, which is one of the particular target fish species listed on EP, were captured and relocated to Ting Kok East. Moreover, three target echinoderm species were recorded during fauna translocation. In total, 1069 individuals of *Archaster typicusm*; 20 individuals of *Holothuria atra* and 10 individuals of *Salmacis sphaeroides* were recorded and relocated to Ting Kok East.

Seahorse Translocation Surveys

- 8.2.2 The seahorse translocation work was conducted during the period of 17th, 18th, 19th and 20th January 2018; and 1st, 2nd, 6th, 8th, 9th, 11th, 12th, 13th, 23rd and 25th February 2018. In January, two female seahorse *Hippocampus kuda* (*H. kuda*) with torso length of 3.3 cm and 4.2 cm were found on 20th January 2018 afternoon. Both two seahorses were captured, tagged underwater, put in Kordon Bags and translocated to Ting Kok East in the afternoon of the same day. Both captured seahorses are female with good health condition during translocation.

Post-translocation monitoring of Seahorse

- 8.2.3 Post-translocation monitoring of the seahorse was commenced from 21 January 2018 in accordance with the endorsed method statement (Seahorses Translocation Plan (Version 1, 11 January 2018) refers). During the first 7 days post-translocation monitoring on 21 to 27 January 2018, the two tagged seahorses were not recorded but other seahorses were located at the Ting Kok East reception site in this reporting period. Therefore, option 2 monitoring program (according to the method statement) will be followed which shall be conducted three times per week during the second to fourth week and undertaken weekly during the second to fourth months. Monthly survey shall be undertaken during the fifth to twelve months.
- 8.2.4 The corresponding post-translocation monitoring reports will be submitted as standalone apart from the EM&A Report. The summary of post-translocation monitoring of the seahorse in the Reporting Period is shown in **Table 8-1**.

Table 8-1 Summary of Post-translocation Monitoring in the Reporting Period

Post-translocation monitoring location	Survey Date	Working Day	Result
First 7 days			
Ting Kok East	21 to 27 Jan 2018	7	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded. Three female local seahorses <i>H. kuda</i> were recorded
Second week			
Ting Kok East	30 th Jan and 1 st to 2 nd Feb 2018	3	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded. One female seahorse <i>H. kuda</i> were recorded on 2 February 2018
Third week			
Ting Kok East	6 th , 8 th and 9 th Feb 2018	3	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Forth week			
Ting Kok East	11 th to 13 th Feb 2018	3	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Second Month (Weekly Survey)			
Ting Kok East	23 rd , 25 th Feb, 1 st , 2 nd , 8 th , 9 th , 12 th , 13 th Mar 2018	8	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded. One female local seahorse was recorded during on 24 th February 2018 at depth of 3m.
Third Month (Weekly Survey)			
Ting Kok East	21 st , 22 nd , 28 th , 29 th Mar, 3 rd , 4 th , 11 th , 12 th Apr 2018	8	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Fourth Month (Weekly Survey)			
Ting Kok East	16 th , 17 th , 23 rd , 27 th , 30 th April, 2 nd , 7 th , 11 th May 2018	8	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Fifth Month (Monthly Survey)			
Ting Kok East	5 and 6 July 2018	2	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Sixth Month (Monthly Survey)			
Ting Kok East	17 and 18 Jul 2018	2	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Seventh Month (Monthly Survey)			
Ting Kok East	21, 22 and 23 Aug 2018	3	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded. A rare species of Japan seahorse <i>Hippocampus mohnikei</i> together with a pregnant <i>Hippocampus kuda</i> were recorded during the monitoring survey. Both the seahorses were found at the depth of 3 m to 3.5 m

Post-translocation monitoring location	Survey Date	Working Day	Result
			of sandy bottom with scattered rocks
Eighth Month (Monthly Survey)			
Ting Kok East	20 and 21 Sep 2018	2	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Ninth Month (Monthly Survey)			
Ting Kok East	15 and 16 Oct 2018	2	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.
Tenth Month (Monthly Survey)			
Ting Kok East	15 and 16 Nov 2018	2	Two tagged seahorses #051 and #052 translocate from Lung Mei were not recorded.

9. SITE INSPECTION

9.1 REQUIREMENTS

9.1.1 According to the approved EM&A Manual, the environmental site inspection shall be formulation by ET Leader. The site inspection and audits should be conducted twice per month by ET.

9.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

9.2.1 In this Reporting Period, **24** events of weekly joint site inspection were carried out to evaluate site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-1** and the details of site inspection were presented in relevant EM&A monthly report.

Table 9-1 Summary of Site Observations

Reporting Period	Date of site inspection	Nos. of Findings/ Deficiencies	Follow-Up Status
Dec 2017 – Feb 2018	14 th and 19 th December 2017 4 th and 19 th January 2018 2 nd and 23 th February 2018	9	Completed
Mar 2018 – May 2018	15 th and 21 st March 2018 6 th and 24 th April 2018 10 th and 29 th May 2018	18	Completed
Jun 2018 – Aug 2018	13 th and 29 th June 2018 13 th and 30 th July 2018 10 th and 27 th August 2018	9	Completed
Sep 2018 – Nov 2018	12 th and 27 th September 2018 9 th and 25 th October 2018 14 th and 30 th November 2018	8	Completed

9.2.2 In the Reporting Period, no non-compliance was recorded; however, **44** observations were recorded during the site inspections. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.

10. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

10.1.1 In the Reporting Period, no environmental complaint, summons and prosecution was received.

10.1.2 In the Reporting Period, no summons and prosecution under the EM&A Programme was lodged for the project. The statistical summary table of environmental complaint is presented in *Tables 10-1, 10-2 and 10-3*.

Table 10-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
Dec 2017 – Feb 2018	0	0	NA
Mar 2018 – May 2018	0	0	NA
Jun 2018 – Aug 2018	0	0	NA
Sep 2018 – Nov 2018	0	0	NA

Table 10-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Summons Nature
Dec 2017 – Feb 2018	0	0	NA
Mar 2018 – May 2018	0	0	NA
Jun 2018 – Aug 2018	0	0	NA
Sep 2018 – Nov 2018	0	0	NA

Table 10-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Prosecution Nature
Dec 2017 – Feb 2018	0	0	NA
Mar 2018 – May 2018	0	0	NA
Jun 2018 – Aug 2018	0	0	NA
Sep 2018 – Nov 2018	0	0	NA

11. IMPLEMENTATION STATUS OF MITIGATION MEASURES

11.1 GENERAL

- 11.1.1 The environmental mitigation measures that recommended in the ISEMM in the approved EM&A Manual covered the issues of dust, noise, water, ecology and waste etc. and they are summarized presented in [Appendix H](#).
- 11.1.2 The Contractor had been implementing the required environmental mitigation measures according to the Environmental Monitoring and Audit Manual subject to the site condition. Environmental mitigation measures generally implemented by the Contractor in this Reporting Period are summarized in [Table 11-1](#).

Table 11-1 Environmental Mitigation Measures in the Reporting Period

Issues	Environmental Mitigation Measures
Construction Noise	<ul style="list-style-type: none"> • Regularly to maintain all plants, so only the good condition plants were used on-site ; • If possible, all mobile plants onsite operation has located far from NSRs; • When machines and plants (such as trucks) were not in using, it was switched off; • Wherever possible, plant was prevented oriented directly the nearby NSRs; • Provided quiet powered mechanical equipment to use onsite; • Moveable noise barriers were temporary used for construction work, where necessary; and • Weekly noise monitoring was conducted to ensure construction noise meet the criteria.
Air Quality	<ul style="list-style-type: none"> • Stockpile of dusty material was covered entirely with impervious sheeting or sprayed with water so as to maintain the entire surface wet; • The construction plants regularly maintained to avoid the emissions of black smoke; • The construction plants switched off when it not in use; • Water spraying on haul road and dry site area was provided regularly; • Where a vehicle leaving the works site is carrying a load of dusty materials, the load has covered entirely with clean impervious sheeting; and • Before any vehicle leaving the works site, wheel watering has been performed.
Water Quality	<ul style="list-style-type: none"> • Impervious sheeting was provided on exposed soil surfaces to reduce the potential of soil erosion; • Debris and refuse generated on-site collected daily; • Stockpiles of the cement and other construction materials were covered when not being used; • Oils and fuels were stored in designated areas with locks; • The chemical waste storage as sealed area provided with locks; • Sedimentation facilities was provided to remove silt particles from groundwater; • Site hoarding with sealed foot were provided surrounding the boundary of working site to prevent wastewater or site surface water runoff get into public areas; and • Portable chemical toilets were provided on-site. A licensed contractor was regularly disposal and maintenance of these facilities. • Silt curtain was installed and maintained in accordance with EP condition

Issues	Environmental Mitigation Measures
Waste and Chemical Management	<ul style="list-style-type: none"> • Excavated material reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible; • Waste arising kept to a minimum and be handled, transported and disposed of in a suitable manner; • Disposal of C&D wastes to any designated public filling facility and/or landfill followed a trip ticket system; and • Chemical waste handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.
General	<ul style="list-style-type: none"> • The site is generally kept tidy and clean. • Mosquito control is performed to prevent mosquito breeding on site.

11.2 IMPACT FORECAST

11.2.1 Tentative construction activities to be undertaken in the coming year are listed below:-

- Site formation
- Construction of East Box Culvert and Western Open Channel / Box Culvert
- Construction of Eastern Box Culvert
- Dredging and Construction of Groynes (East and West)
- Construction of Retaining Wall
- Construction of Seawall

11.2.2 Potential environmental impacts arising from the works include:

- Construction waste
- Air quality
- Construction noise
- Water quality (particularly site runoff during rainy seasons)

11.2.3 In regard to the marine works, special attention should be paid on the groynes construction and water quality mitigation measures for erection of silt curtain should be properly implemented and maintained. Moreover, the Contractor was reminded to prevent surface runoff entering the sea or public area such as cover the exposed slope by impervious sheets and maintain the temporary drain and wastewater treatment system effectively.

11.2.4 It is reminded that dust mitigation measures, such as provide water spraying during dusty activities (such as breaking) and cover stockpile with impervious sheets, should be fully implemented as appropriate in order to minimize dust impact. Moreover, all dump trucks leaving the Site should be thoroughly washed by wheel washing facilities and provided with mechanical covers in good service condition.

11.2.5 Construction noise should be a key environmental impact during the works. Noise mitigation measures such as use of quiet plants and installation of temporary noise barrier at the construction noise predominate area should be fully implemented in accordance with the EM&A requirement.

11.2.6 Environmental mitigation measures will be properly implemented and maintained as per the Mitigation Implementation Schedule in [Appendix H](#) to ensure site environmental performance is acceptable.

12. CONCLUSIONS AND RECOMMENTATIONS

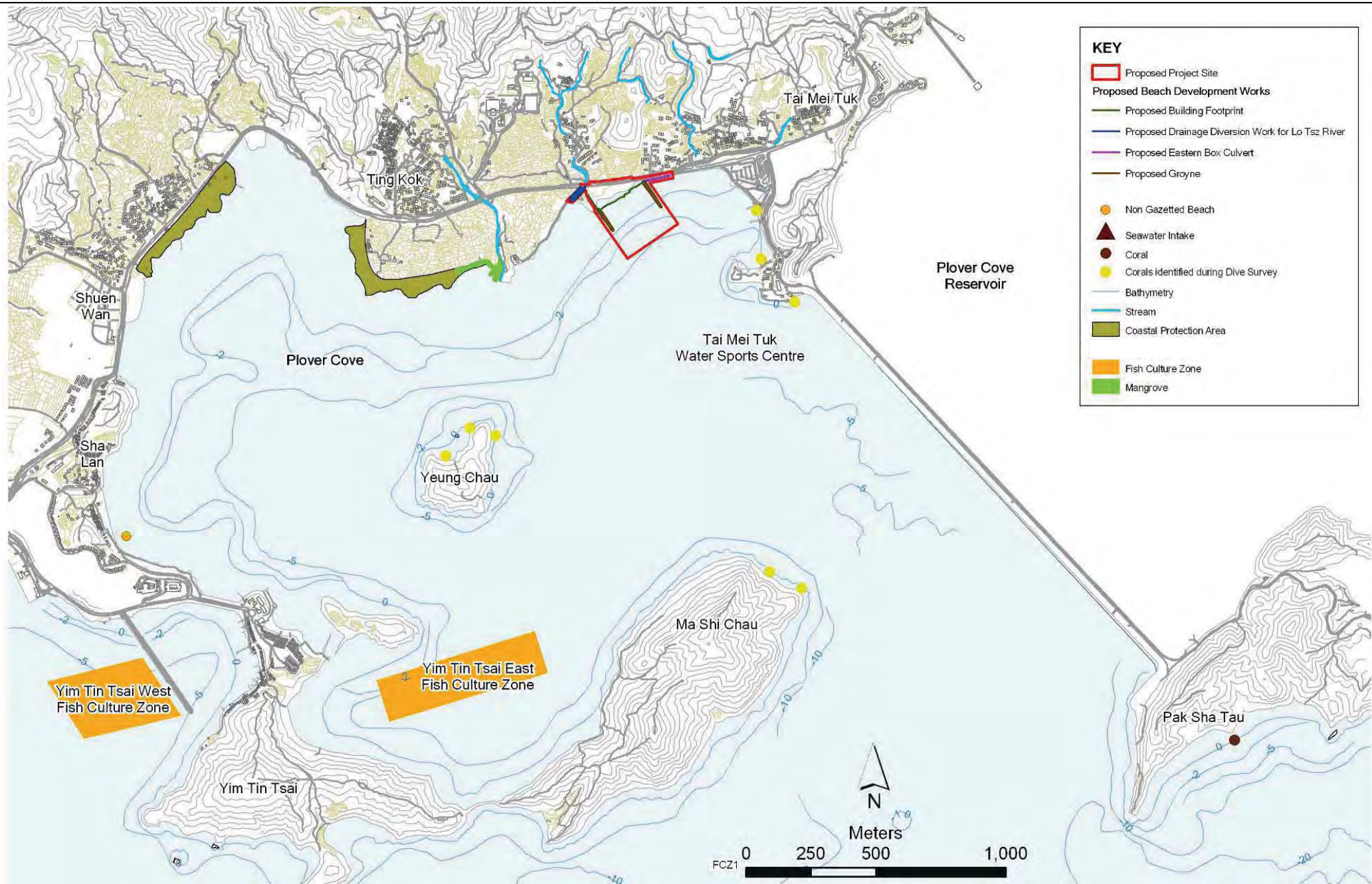
12.1 CONCLUSIONS

- 12.1.1 This is the **1st Annual** EM&A Review Report summarizing the monitoring results and inspection findings for the reporting period from **1st December 2017** to **30th November 2018**.
- 12.1.2 In this Reporting Period, no construction noise monitoring results that triggered the Limit Level was recorded. No NOE or the associated corrective actions were therefore issued. Moreover, no noise complaint (which is an Action Level exceedance) was received for the Project.
- 12.1.3 In this Reporting Period, no air quality monitoring exceedance was recorded. No NOE or the associated corrective actions were therefore issued.
- 12.1.4 For marine water quality monitoring, there were 214 Action Level and 861 Limit Level exceedances recorded in this Reporting Period. Since marine work under the Project commenced on 24th January 2018, water quality mitigation measures such as silt curtains were properly implemented and maintained at locations in accordance with the EP. Having reviewed environmental performance of the project site and the monitoring results of both reference and impact stations as well as the sensitive receiver stations, it is considered that all the exceedances were unlikely related to the works under the project, and no corrective actions were required. Nevertheless, the Contractor was reminded to strictly implement the water quality mitigation measure as recommended implementation schedule for environmental mitigation measures in the EM&A Manual and EP's condition.
- 12.1.5 No environmental complaints, notification of summons or successful prosecution were received in this Reporting Period.
- 12.1.6 Precision of the prediction of the EIA on the adverse air quality, noise and water quality impacts to be generated from the construction of the Project is acceptable. The monitoring performed during the Reporting Period is effective for generating data with the necessary statistical power to categorically identify or confirm the presence or absence of the predicted environmental impacts attributable to the works under the Project.
- 12.1.7 In conclusion, monitoring results of air quality, construction noise and water quality in general indicated satisfactory environmental performance of the Project. The environmental mitigation measures as recommended in the MMIS are also proven effective and adequate.

Appendix A

Layout plan of the Project

(The content of Appendix A is modified from the previous EM&A Manual - Development of a Bathing Beach at Lung Mei, Tai Po (Register No. AEIAR-123/2008): Environmental Monitoring and Audit (EM&A) Manual (November 2007))



KEY

- Proposed Project Site
- Proposed Beach Development Works
- Proposed Building Footprint
- Proposed Drainage Diversion Work for Lo Tsz River
- Proposed Eastern Box Culvert
- Proposed Groyne
- Non Gazetted Beach
- ▲ Seawater Intake
- Coral
- Corals identified during Dive Survey
- Bathymetry
- Stream
- Coastal Protection Area
- Fish Culture Zone
- Mangrove

Client CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Main Contractor 偉金建築有限公司 Welcome Construction Co., Ltd.	Agreement No.: CE 59/2005(EP) Project Title: DEVELOPMENT OF A BATHING BEACH AT LUNG MEI, TAI PO	ENVIRONMENTAL MONITORING AND AUDIT MANUAL Figure Title: PROJECT LOCATION AND ENVIRONMENTAL SENSITIVE RECEIVERS	FIGURE 1.1 <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">Checked</td> <td style="width: 25%;">TF</td> <td style="width: 25%;">Scale</td> <td style="width: 25%;">AS SHOWN</td> <td style="width: 25%;">Rev.</td> <td style="width: 25%;">1</td> </tr> <tr> <td>Designed</td> <td>-</td> <td>Drawn</td> <td>AM</td> <td>Date</td> <td>13/03/2007</td> </tr> </table>	Checked	TF	Scale	AS SHOWN	Rev.	1	Designed	-	Drawn	AM	Date	13/03/2007
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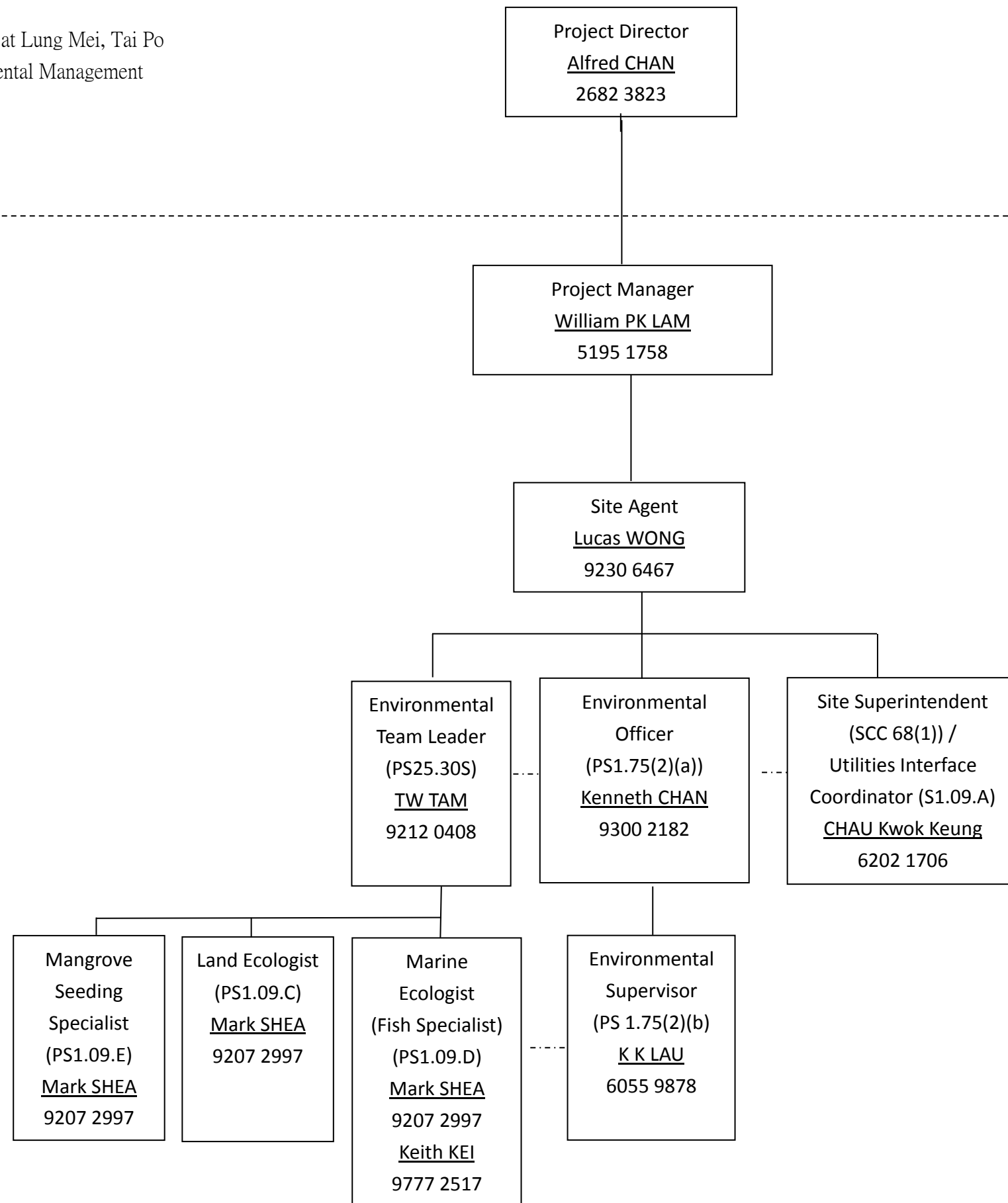
Appendix B

Organization structure and contact details

Welcome Construction Co. Ltd.
Contract No. CV/2012/05 Bathing Beach at Lung Mei, Tai Po
Project Organization Chart On Environmental Management
2018/7/10

Head Office

Site Management



Contact Details of Key Personnel – CV/2012/05

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Engineer's Representative	Mr. K F Chan	2762 5532	2714 2054
ERM	Independent Environmental Checker	Mr. Terence Fong	2271 3113	2723 5660
Welcome	Project Manager	Mr. Marco Wong (#)	6329 9750	2682 3222
		Mr. William Lam	5195 1758	
Welcome	Site Agent	Mr. Lucas Wong	9230 6467	2682 3222
Welcome	Environmental Officer	Mr. Kenneth Chan	9300 2182	2682 3222
Welcome	Environmental Supervisor	Mr. K K Lau	6055 9878	2682 3222
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

(#) *Project manager for the period of Dec 2017 to Aug 2018*

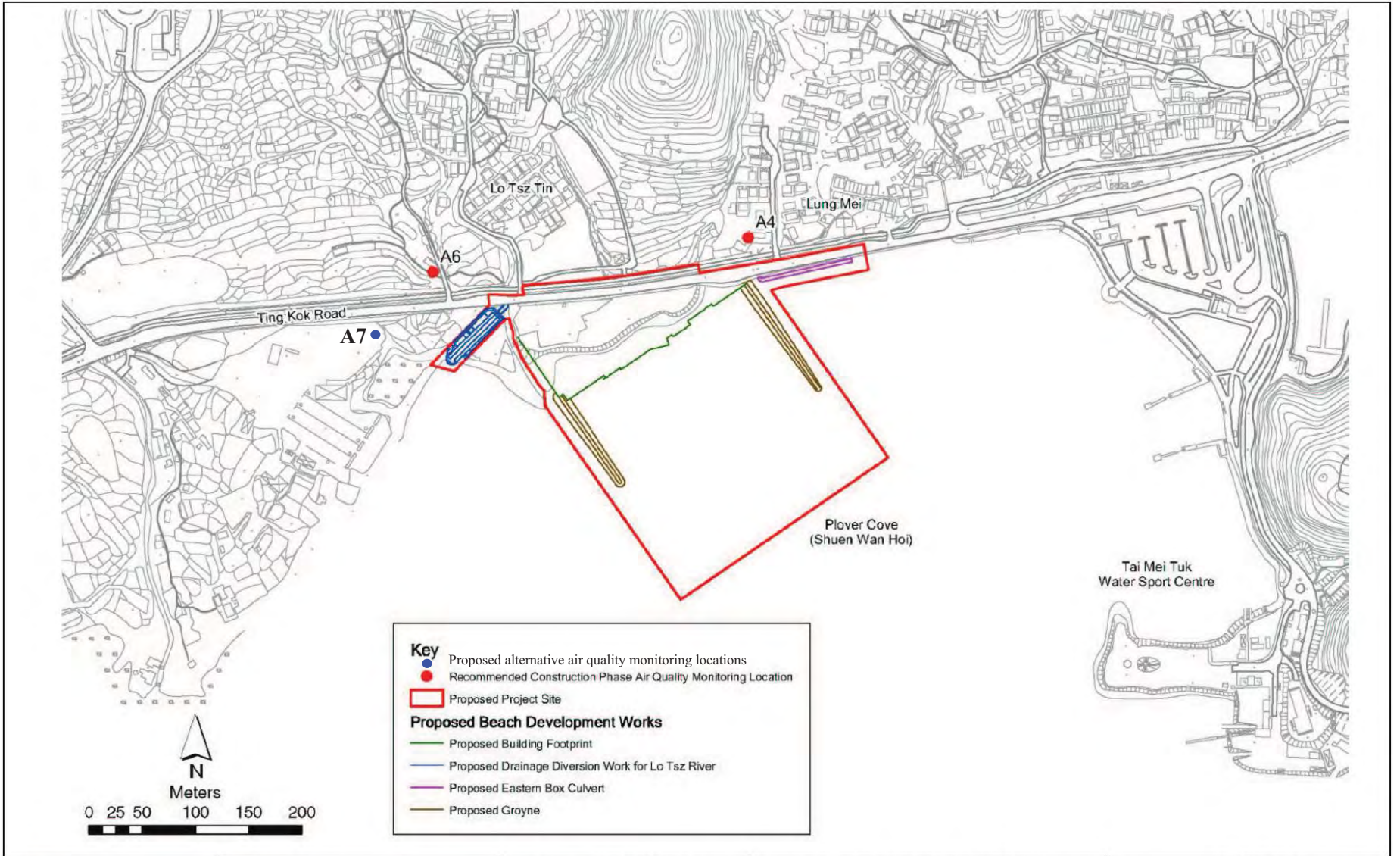
Legend:



*CEDD (Engineer) – Civil Engineering and Development Department
Welcome (Main Contractor) – Welcome Construction Company Limited
ERM (IEC) – Environmental Resources Management
AUES (ET) – Action-United Environmental Services & Consulting*

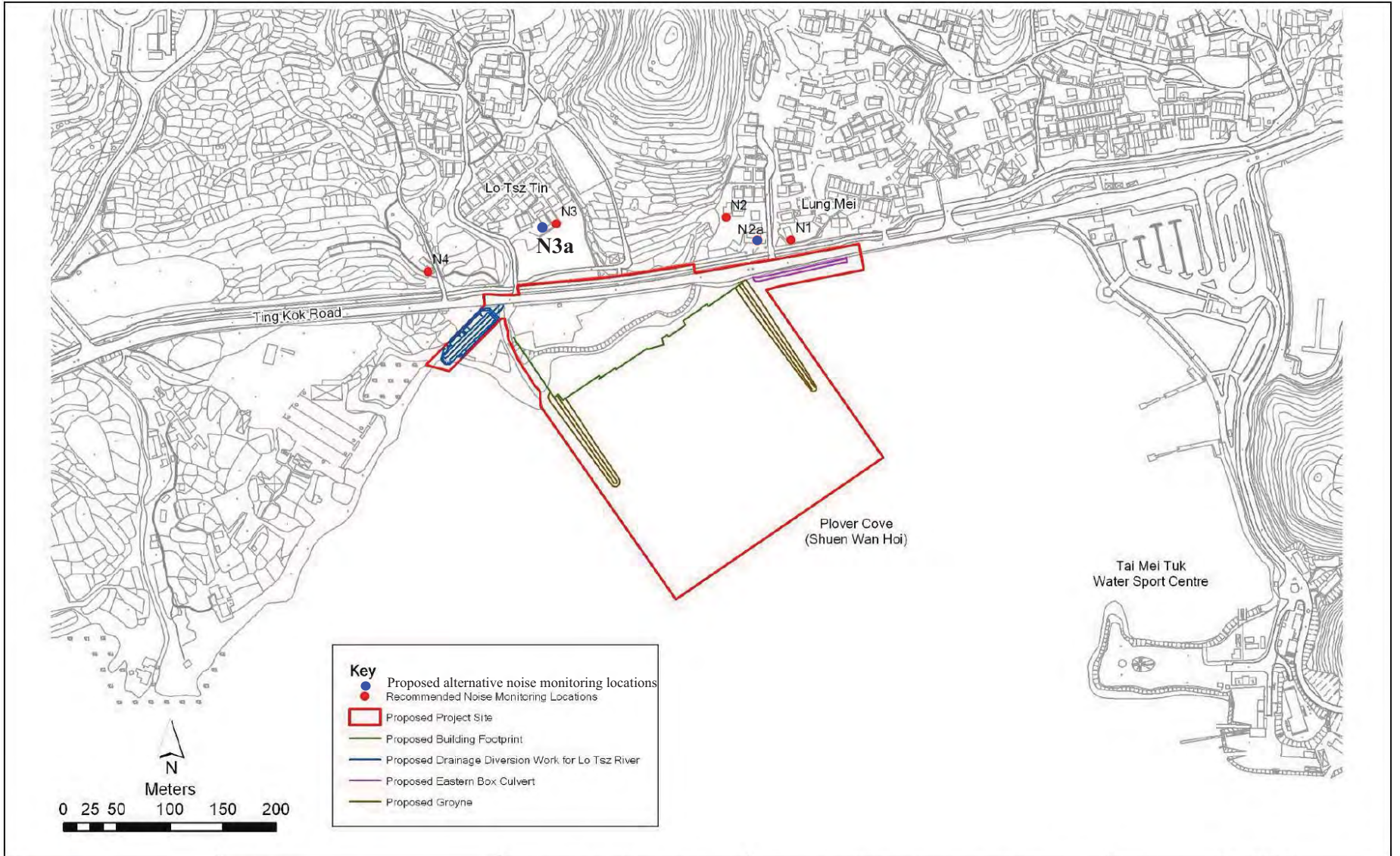
Appendix C



Monitoring Location

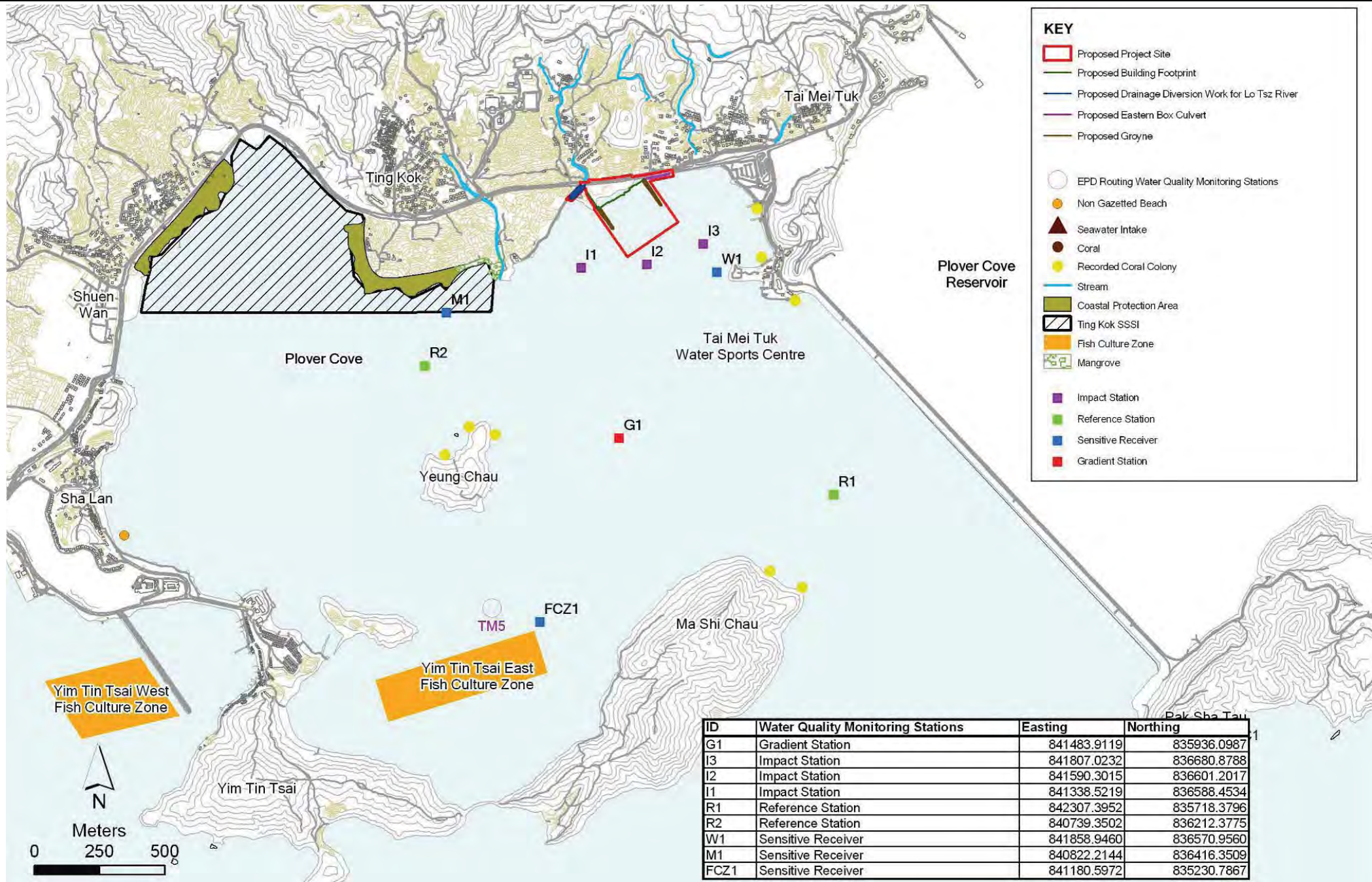
(The Figures of Appendix D are modified from the previous EM&A Manual - Development of a Bathing Beach at Lung Mei, Tai Po (Register No. AEIAR-123/2008): Environmental Monitoring and Audit (EM&A) Manual (November 2007))



Client  CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	Main Contractor  偉全建築有限公司 Welcome Construction Co., Ltd.	Agreement No.: CE 59/2005(EP)	ENVIRONMENTAL MONITORING AND AUDIT MANUAL	FIGURE 3.1			
		Project Title: DEVELOPMENT OF A BATHING BEACH AT LUNG MEI, TAI PO	Figure Title: CONSTRUCTION PHASE AIR QUALITY MONITORING LOCATIONS	Checked: TF	Scale: AS SHOWN	Rev.: 2	Designed: -



Client  CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT	 偉全建築有限公司 Welcome Construction Co., Ltd.	Agreement No.: CE 59/2005(EP)	ENVIRONMENTAL MONITORING AND AUDIT MANUAL	FIGURE 4.1		
		Project Title: DEVELOPMENT OF A BATHING BEACH AT LUNG MEI, TAI PO	Figure Title: CONSTRUCTION PHASE NOISE MONITORING LOCATIONS	Checked: TF	Scale: AS SHOWN	Rev.: 2
				Designed: -	Drawn: KK	Date: 29/08/2007



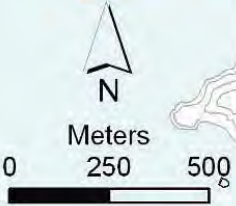
KEY

- Proposed Project Site
- Proposed Building Footprint
- Proposed Drainage Diversion Work for Lo Tsz River
- Proposed Eastern Box Culvert
- Proposed Groyne

- EPD Routing Water Quality Monitoring Stations
- Non Gazetted Beach
- ▲ Seawater Intake
- Coral
- Recorded Coral Colony
- Stream
- Coastal Protection Area
- Ting Kok SSSI
- Fish Culture Zone
- Mangrove

- Impact Station
- Reference Station
- Sensitive Receiver
- Gradient Station

ID	Water Quality Monitoring Stations	Easting	Northing
G1	Gradient Station	841483.9119	835936.0987
I3	Impact Station	841807.0232	836680.8788
I2	Impact Station	841590.3015	836601.2017
I1	Impact Station	841338.5219	836588.4534
R1	Reference Station	842307.3952	835718.3796
R2	Reference Station	840739.3502	836212.3775
W1	Sensitive Receiver	841858.9460	836570.9560
M1	Sensitive Receiver	840822.2144	836416.3509
FCZ1	Sensitive Receiver	841180.5972	835230.7867



Photograph Records for Air Quality Monitoring

Air Quality Monitoring (24-Hour TSP & 1-Hour TSP)



A4



A7

Photograph Records for Noise Monitoring

Noise Monitoring



N1



N2a

Noise Monitoring



N3a



N4

Appendix D

Event and Action Plan

Event and Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	ER	Contractor
Action Level Exceedance for One Sample	<ol style="list-style-type: none"> Identify source(s) of impact; Inform the IEC and the ER; Repeat measurement to confirm findings; Carry out investigation for the cause of exceedance, if the exceedance is project-related, increase monitoring frequency to daily 	<ol style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method 	<ol style="list-style-type: none"> Notify Contractor 	<ol style="list-style-type: none"> Rectify any unacceptable practice; Amend working methods if appropriate
Action Level Exceedance for Two or More Consecutive Samples	<ol style="list-style-type: none"> Identify source(s) of impact; Inform the IEC and ER; Repeat measurement to confirm findings; Carry out investigation for the cause of exceedance, if the exceedance is project-related, increase monitoring frequency to daily Discuss with IEC and Contractor on remedial action required; If exceedance continues, arrange meeting with IEC and ER; If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the ER on the effectiveness of the proposed remedial measures; Supervise implementation of remedial measures 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Notify Contractor; Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> Submit proposals for remedial actions to IEC within 3 working days of notification; Implement the agreed proposals; Amend proposal if appropriate
Limit Level Exceedance for One Sample	<ol style="list-style-type: none"> Identify source(s) of impact; Inform the EPD and the ER; Repeat measurement to confirm findings; Carry out investigation for the cause of exceedance, if the exceedance is project-related, increase monitoring frequency to daily 	<ol style="list-style-type: none"> Check monitoring data submitted by ET; Check Contractor's working method; Discuss with ET and Contractor on possible remedial measures; Advise the ER on the effectiveness of the proposed 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Notify Contractor; Ensure remedial measures properly implemented 	<ol style="list-style-type: none"> Take immediate action to avoid further exceedance; Submit proposals for remedial actions to IEC within 3 working days of notification; Implement the agreed proposals; Amend proposal if

EVENT	ACTION			
	ET	IEC	ER	Contractor
	5. Assess effectiveness of Contractor’s remedial actions and keep IEC, EPD and ER informed of results	remedial measures; 5. Supervise implementation of remedial measures		appropriate
Limit Level Exceedance for Two or More Consecutive Samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source(s) of impact; 3. Repeat measurement to confirm findings; 4. Carry out investigation for the cause of exceedance, if the exceedance is project-related, increase monitoring frequency to daily 5. Carry out analysis of Contractor’s working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor’s remedial action and keep IEC, EPD and ER informed of the result; 8. If exceedance stop, cease additional monitoring	1. Discuss amongst ER, ET and Contractor on the potential remedial actions; 2. Review Contractor’s remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

Event and Action Plan for Construction Noise

EXCEEDANCE	ACTION			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 1. Notify IEC, ER, EPD and Contractor; 2. Identify source; 3. Carry out investigation; 4. Report the results of investigation to the IEC and Contractor; 5. Discuss with the Contractor and formulate remedial measures; 6. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals

Event and Action Plan for Water Quality

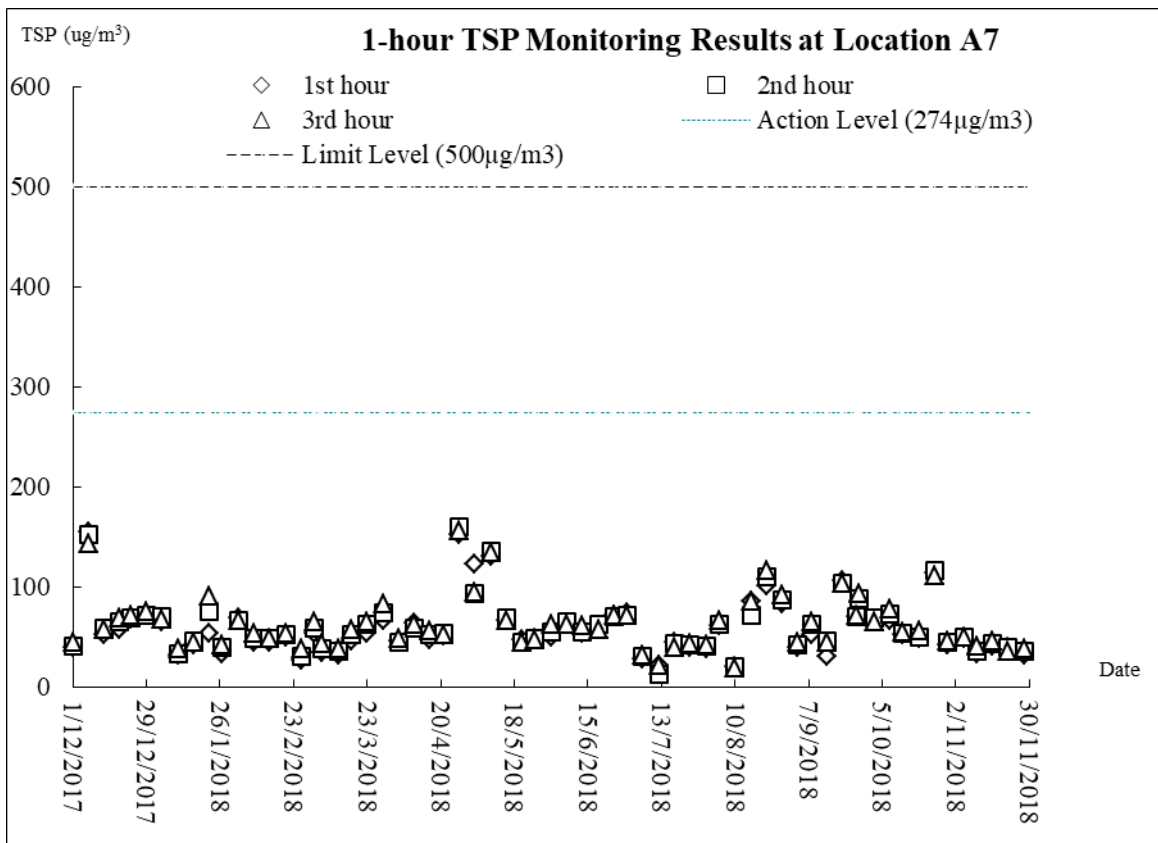
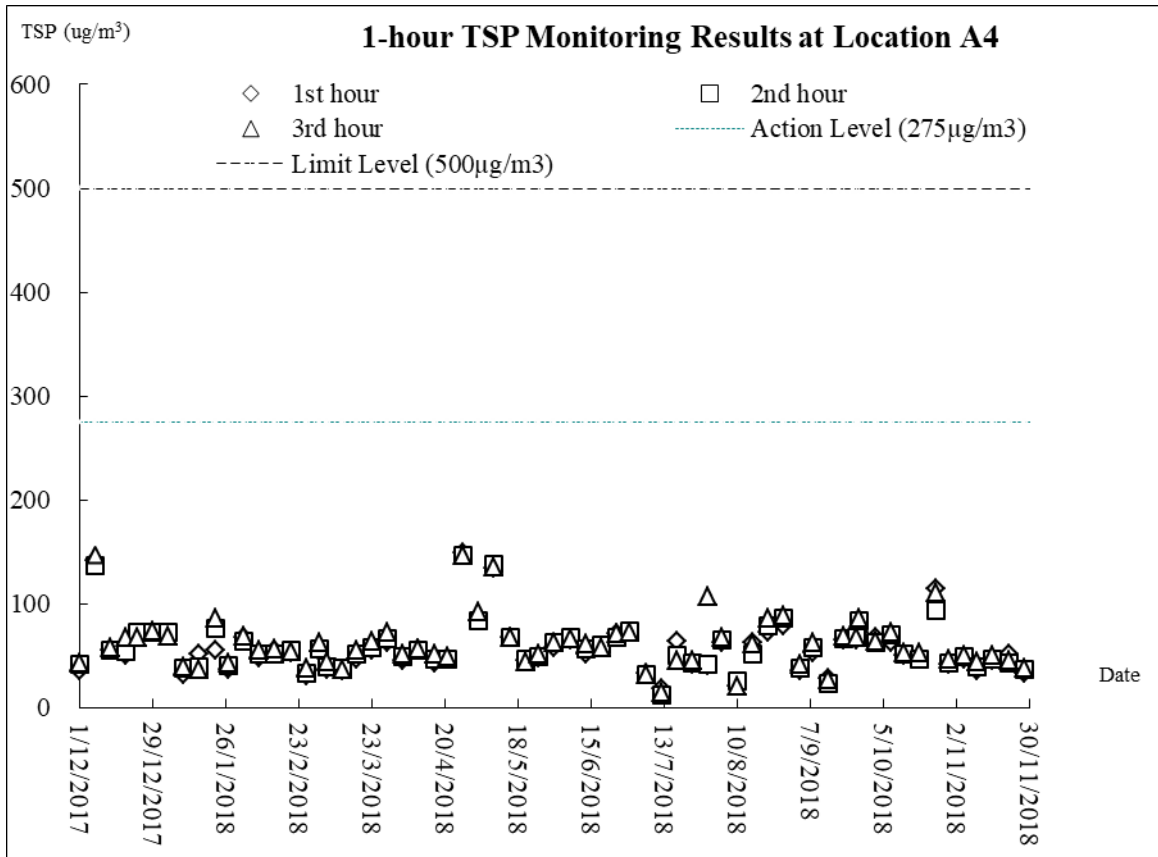
EVENT	ACTION			
	ET	IEC	ER	Contractor
Action Level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC and the Contractor; 4. Check monitoring data, all plant, equipment and the Contractor's working methods; 5. Discuss mitigation measures with the IEC and the Contractor; 	<ol style="list-style-type: none"> 1. Discuss with the ET and the Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with the IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET and the IEC and propose mitigation measures to the IEC and ER; 6. Implement the agreed mitigation measures.
Action Level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC and the Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with the IEC and the Contractor; 6. Ensure mitigation measures are implemented; 	<ol style="list-style-type: none"> 1. Discuss with the ET and the Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor accordingly; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with the IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the noncompliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET and the IEC and propose mitigation measures to the IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by one consecutive sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC, the Contractor and the EPD; 4. Check monitoring data, all plant, equipment and the Contractor's working methods; 5. Discuss mitigation measures with 	<ol style="list-style-type: none"> 1. Discuss with the ET / Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with the IEC, the ET and the Contractor on the proposed mitigation measures; 2. Request the Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the noncompliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET, the IEC and the ER and propose mitigation

EVENT	ACTION			
	ET	IEC	ER	Contractor
	the IEC, the ER and the Contractor; 6. Ensure mitigation measures are implemented.		4. Assess the effectiveness of the implemented mitigation measures.	measures to the IEC and the ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by more than one consecutive sampling days	1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform the IEC, the Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with the IEC, the ER and the Contractor; 6. Ensure mitigation measures are implemented;	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by the Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with the IEC, the ET and the Contractor on the proposed mitigation measures; 2. Request Contractor to critically review working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the marine work until no exceedance of Limit Level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with the ET, the IEC and the ER and propose mitigation measures to the IEC and the ER within 3 working days; 6. Implement the agreed mitigation measures; 7. As directed by the ER, slow down or stop all or part of the construction activities.

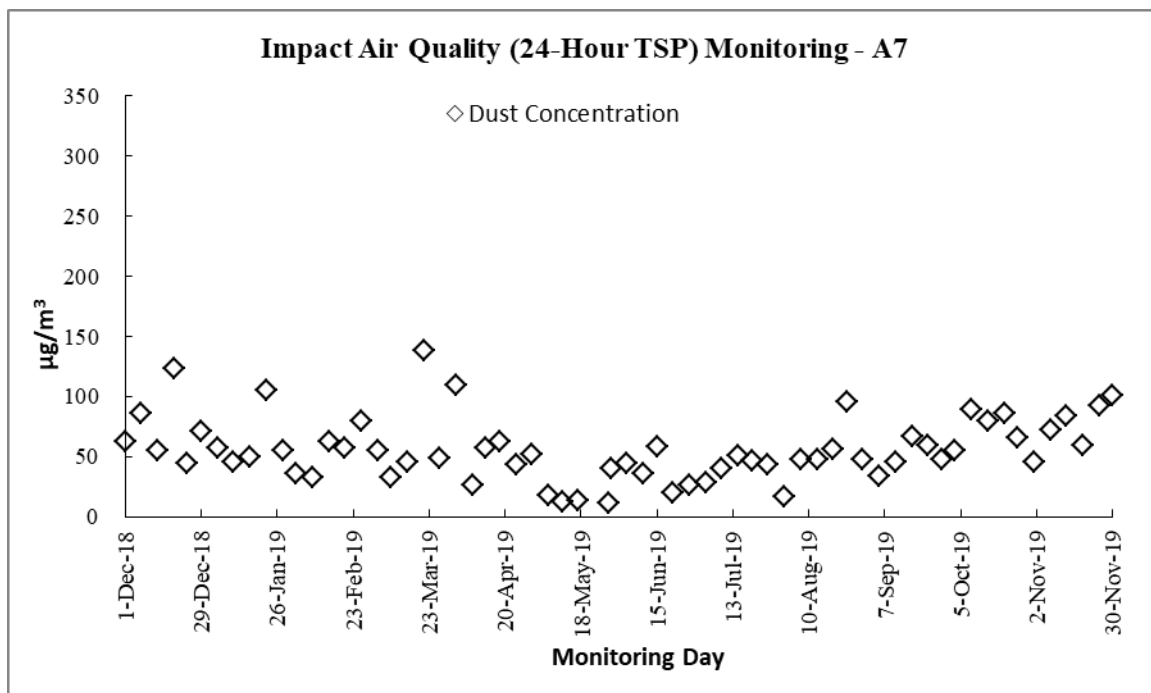
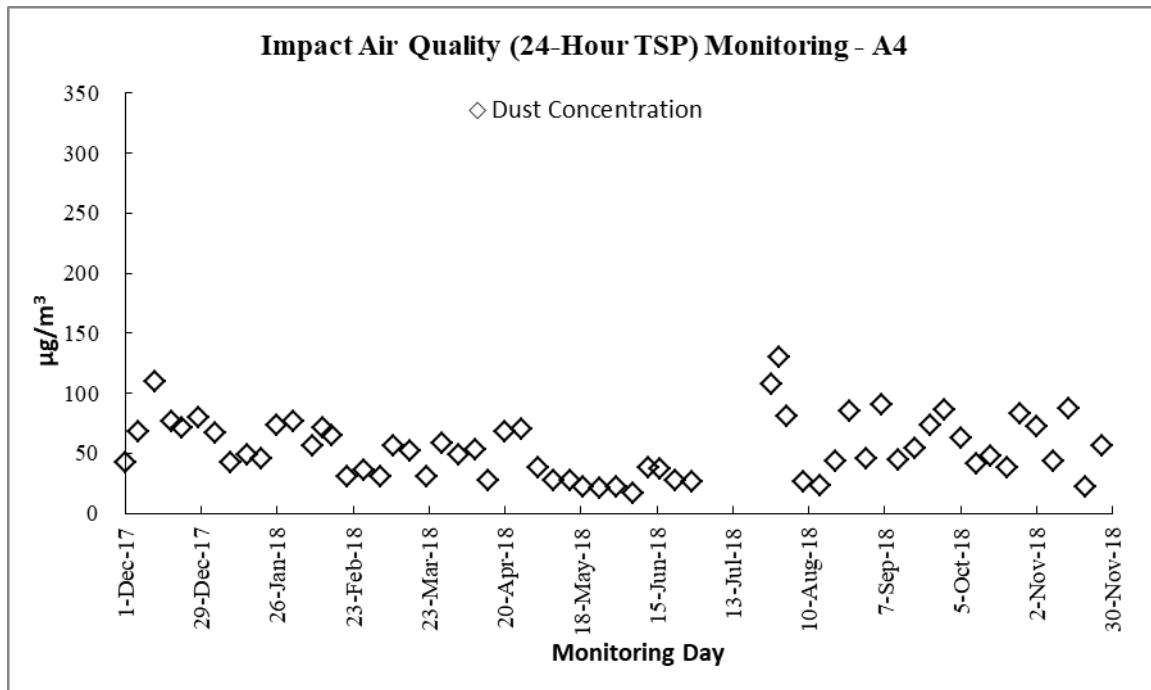
Appendix E

Graphical Plots for Monitoring Results

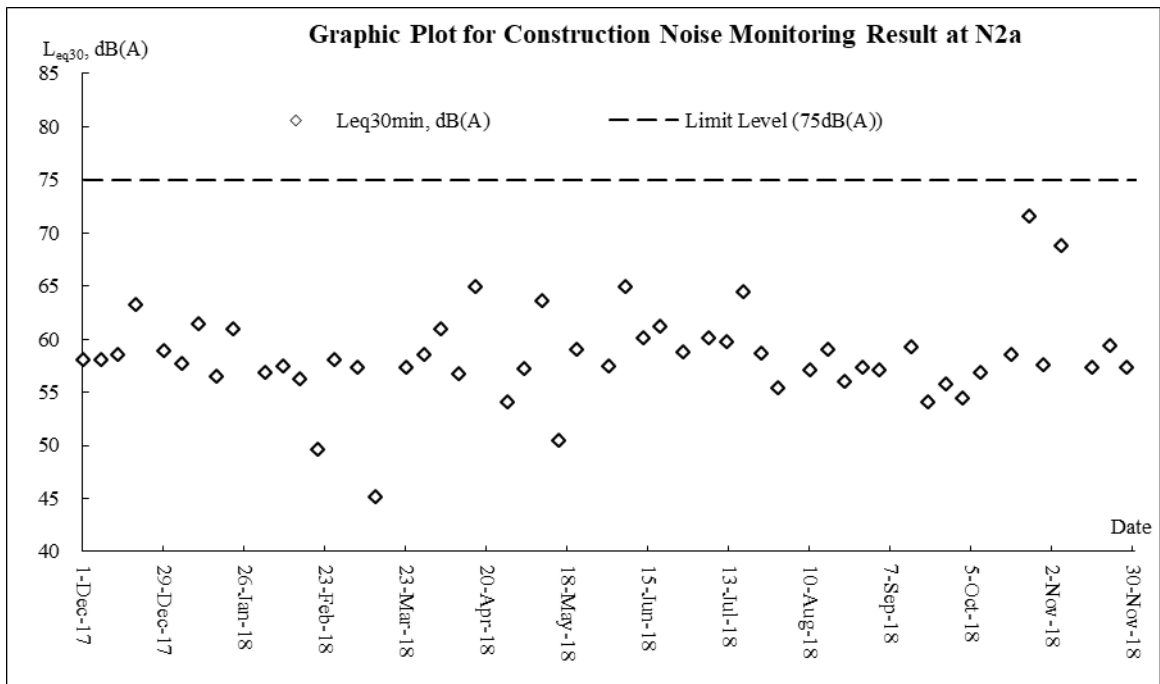
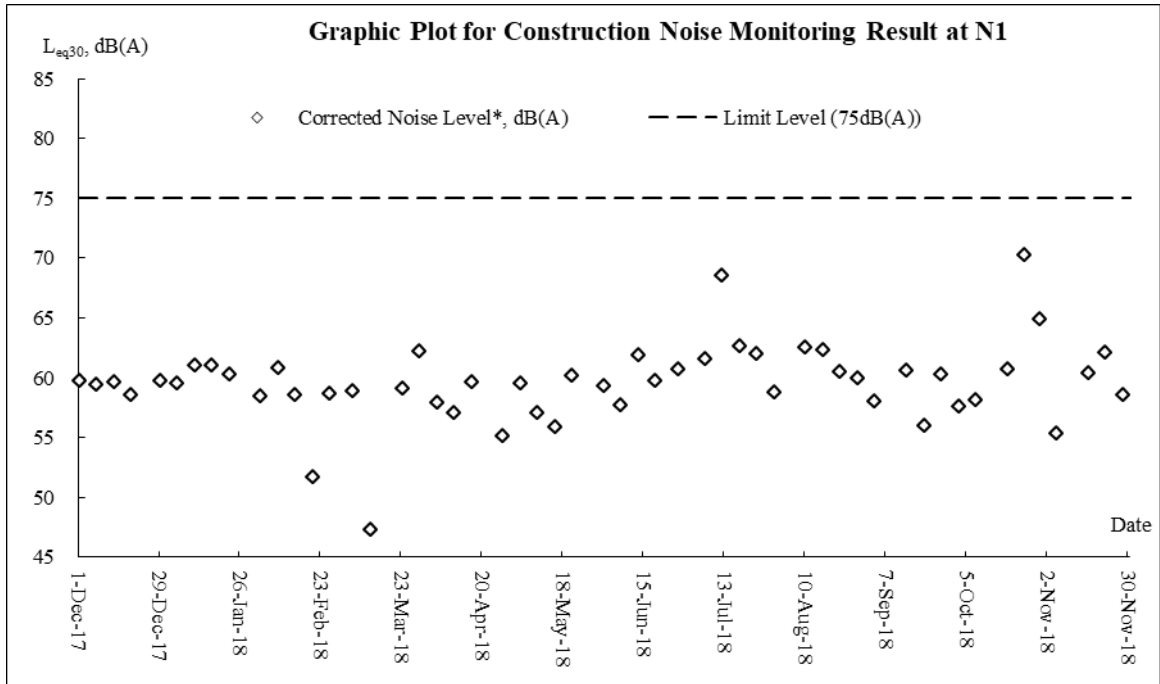
Air Quality – 1-hour TSP

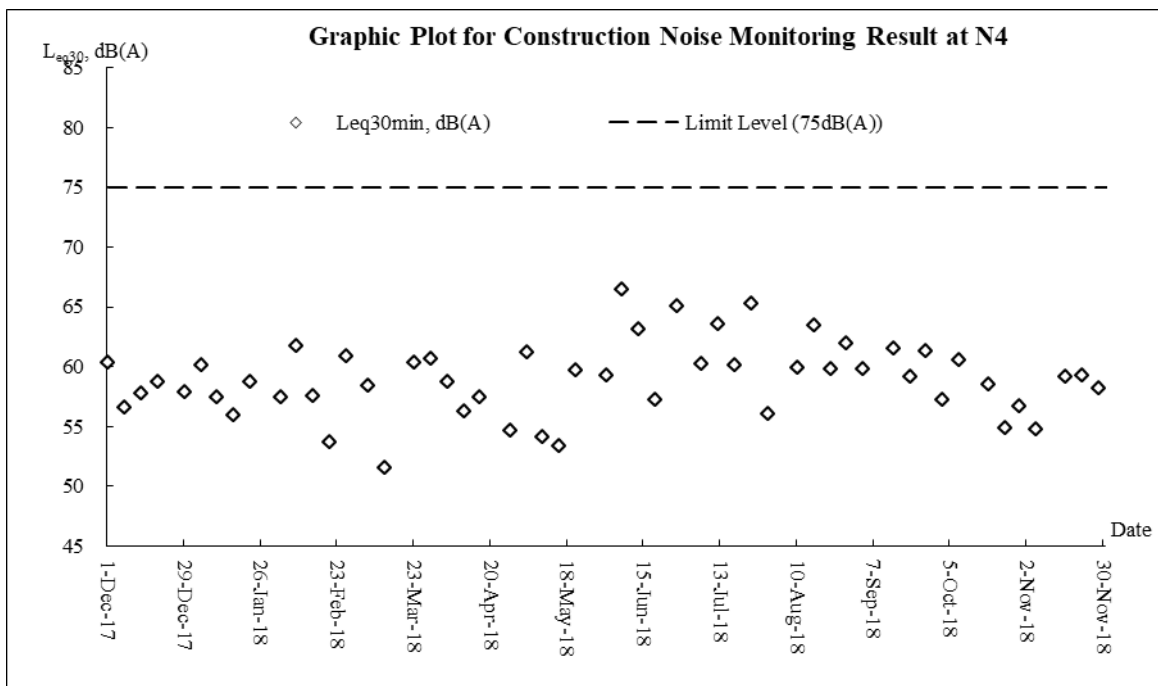
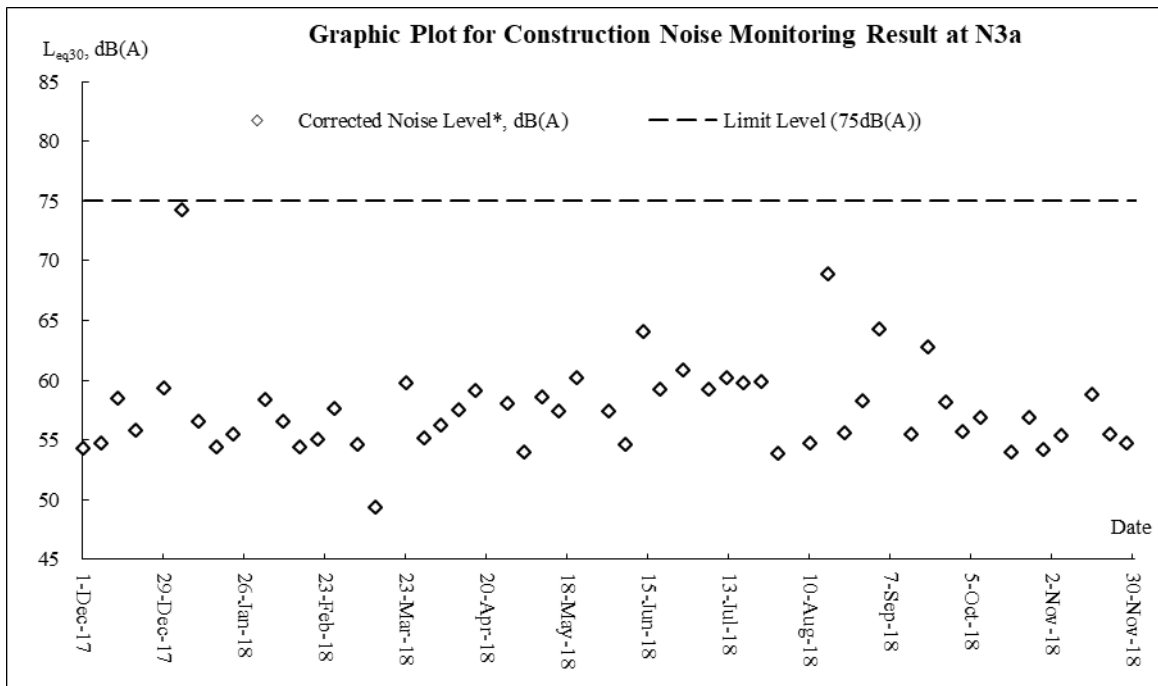


Air Quality – 24-hour TSP

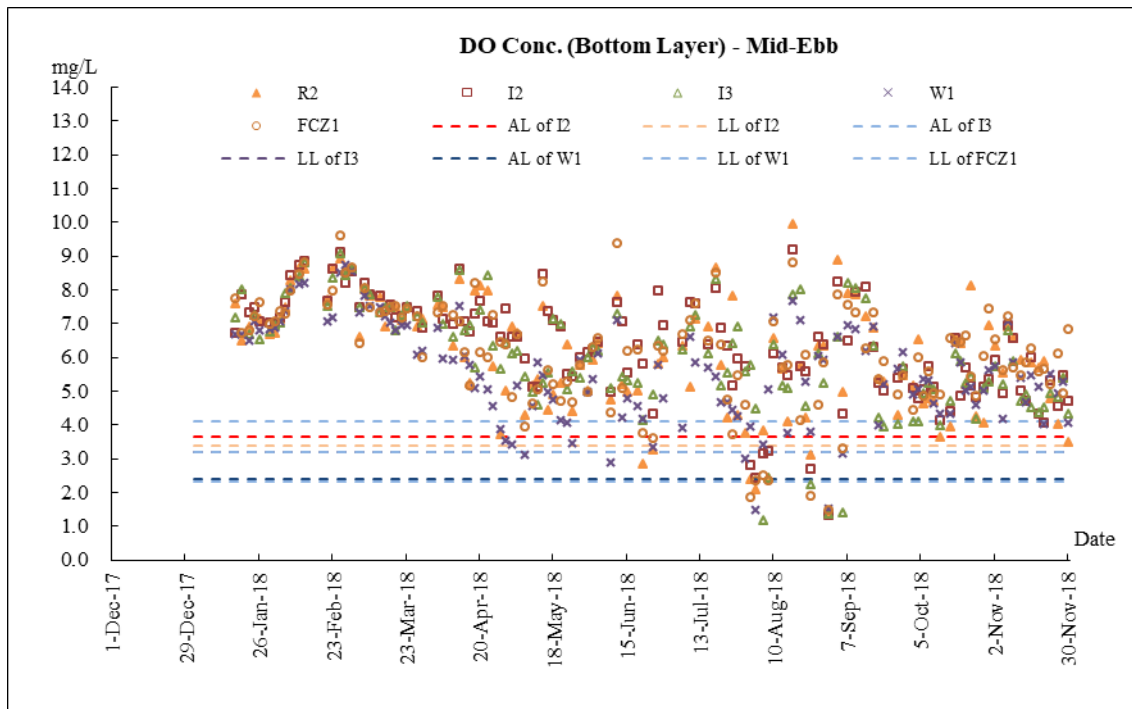
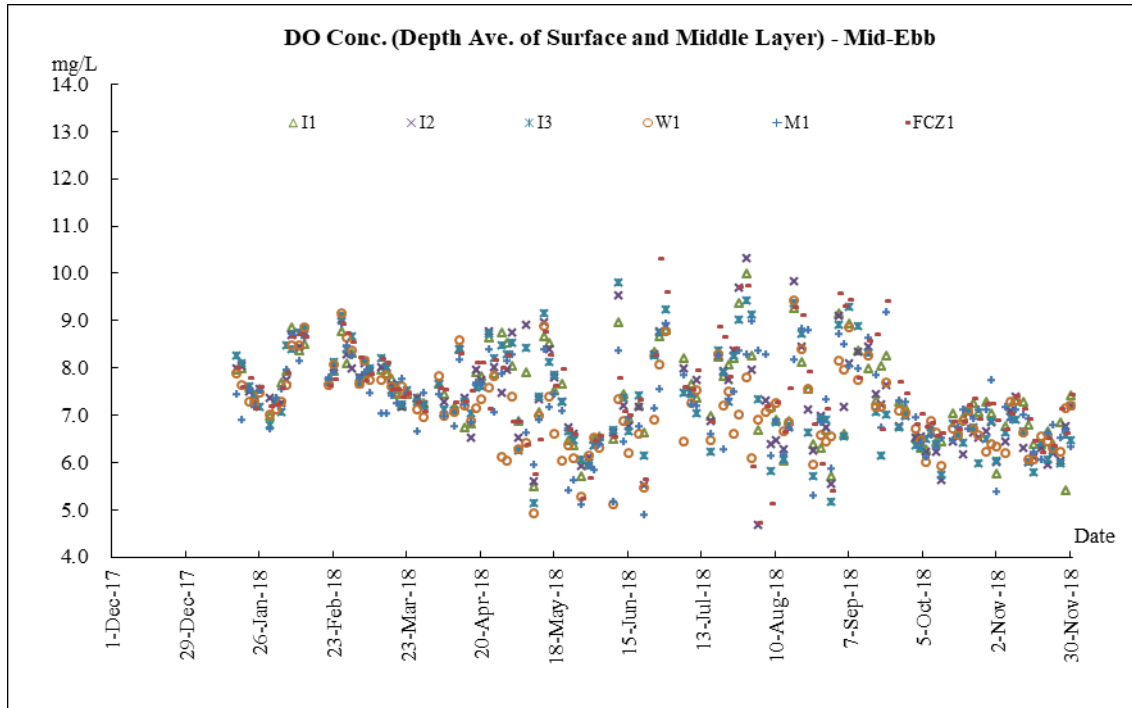


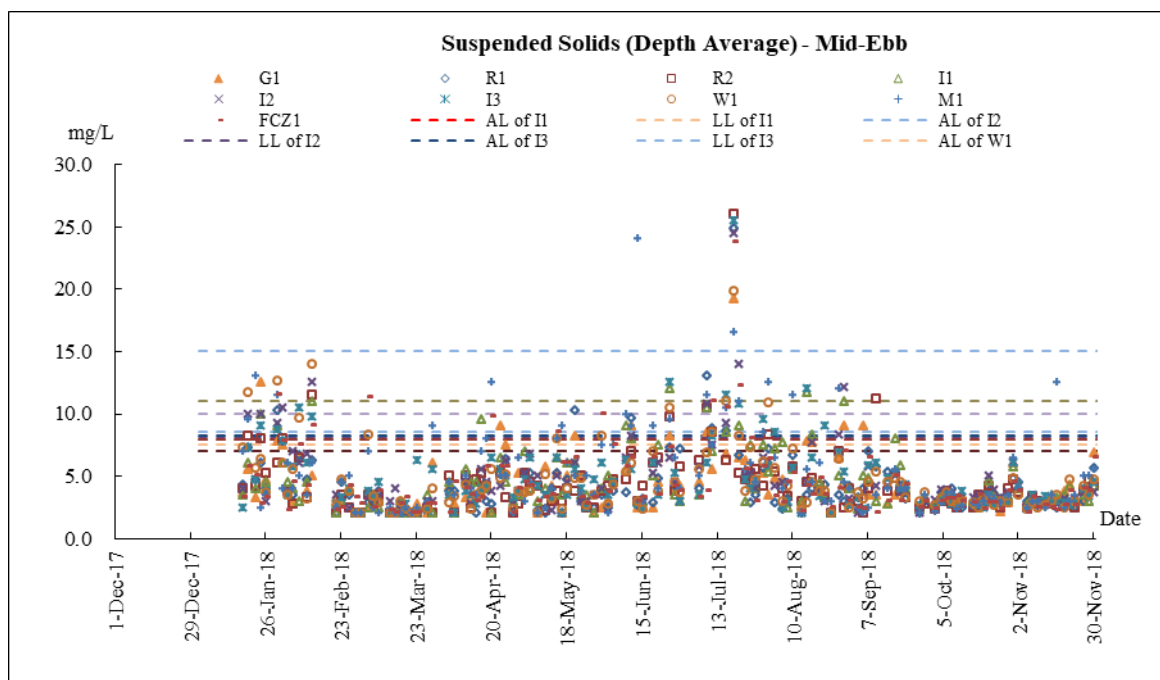
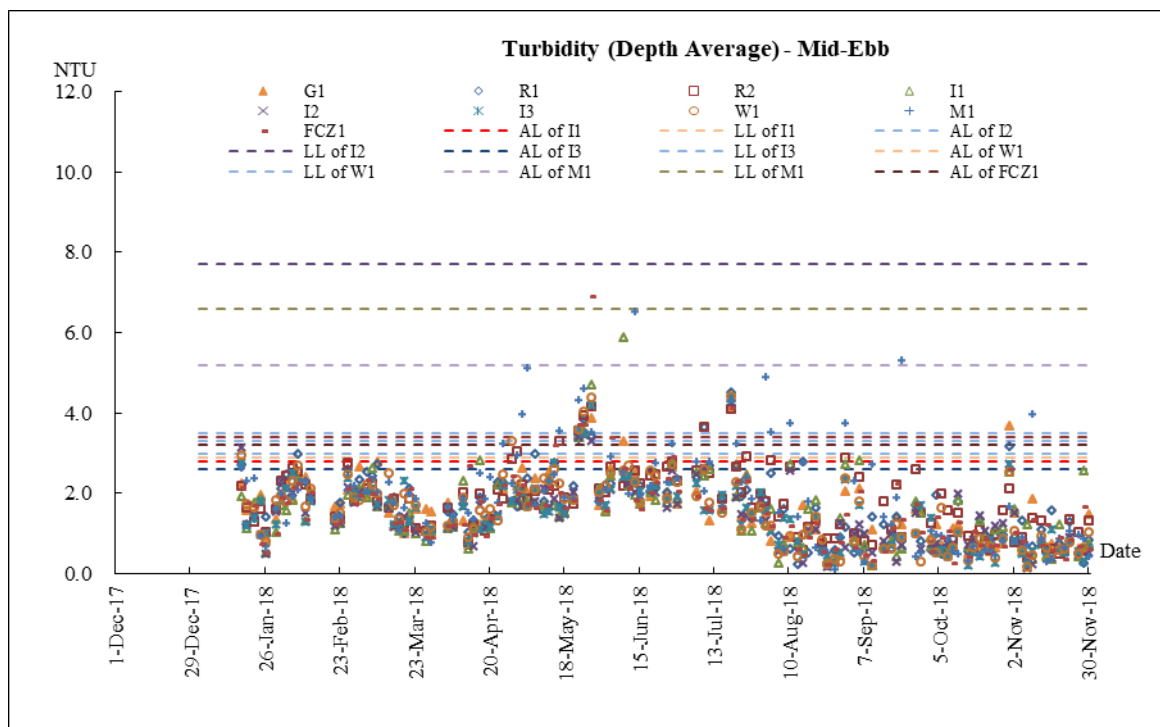
Construction Noise

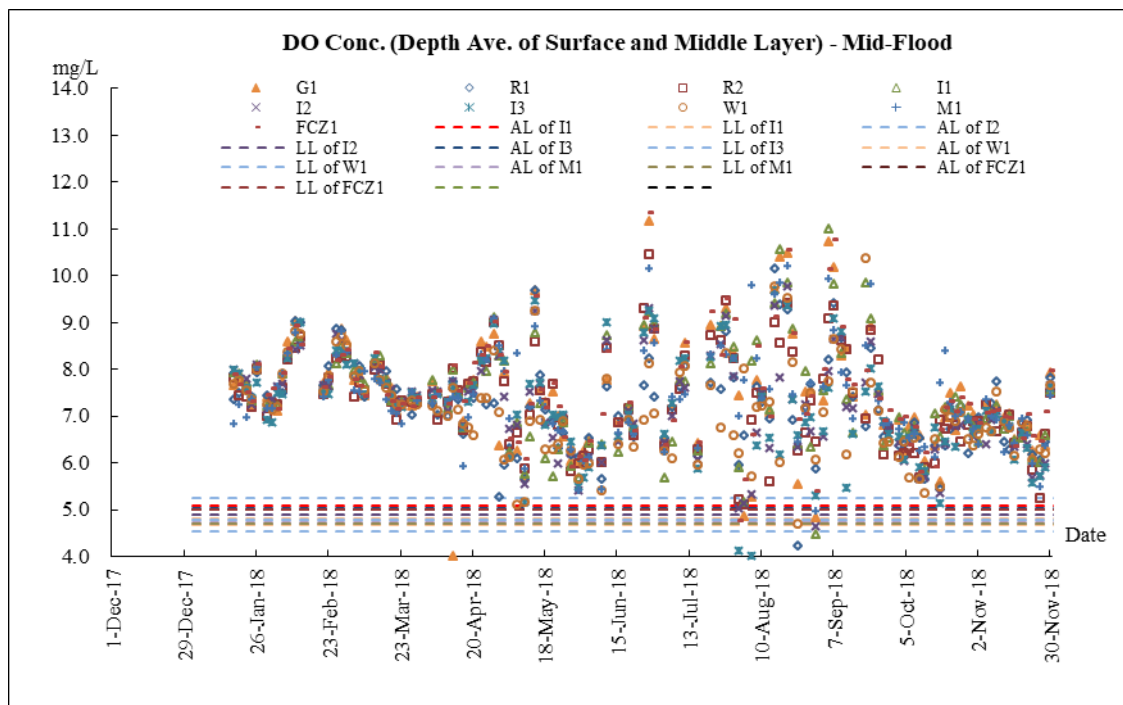
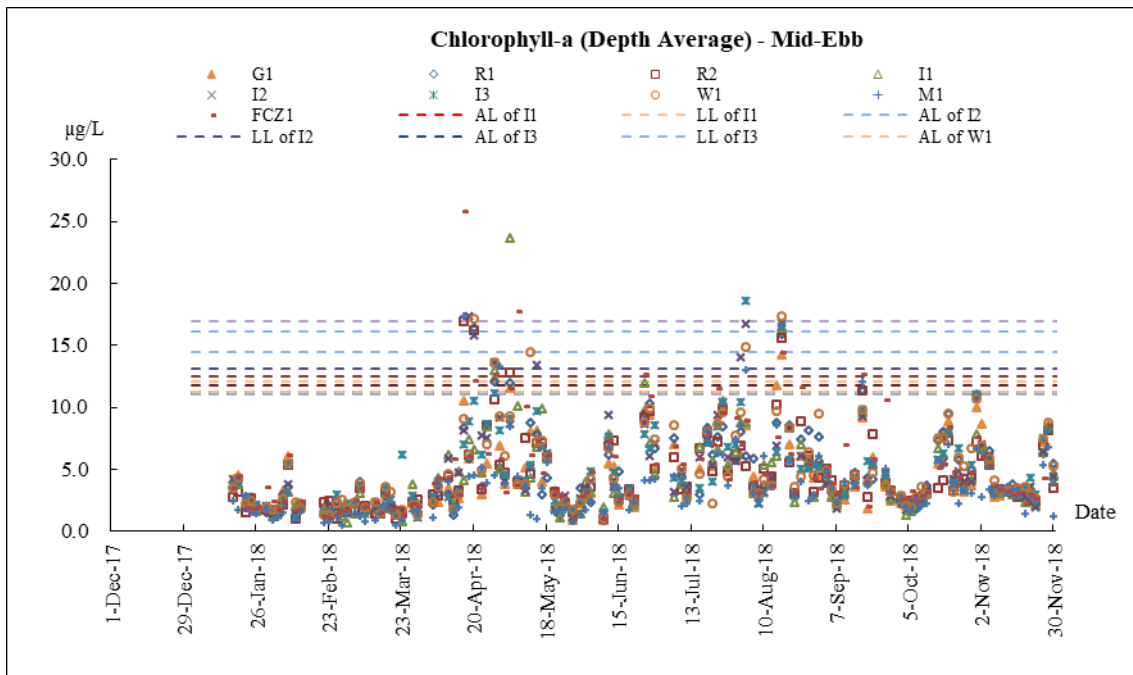


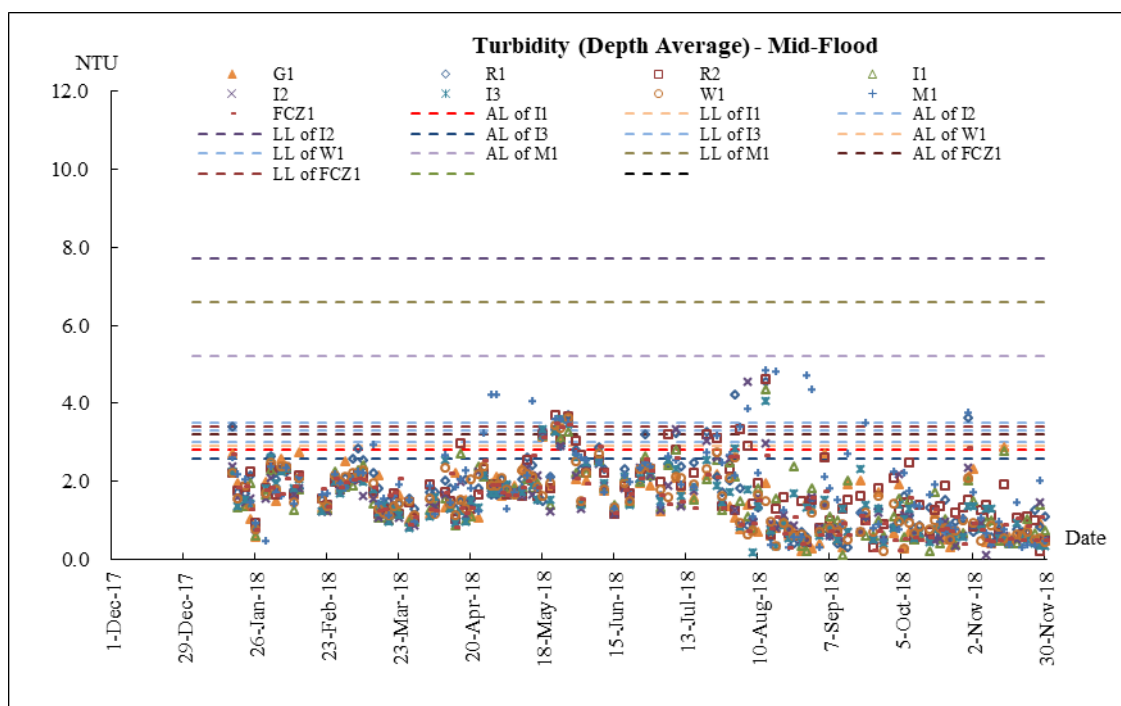
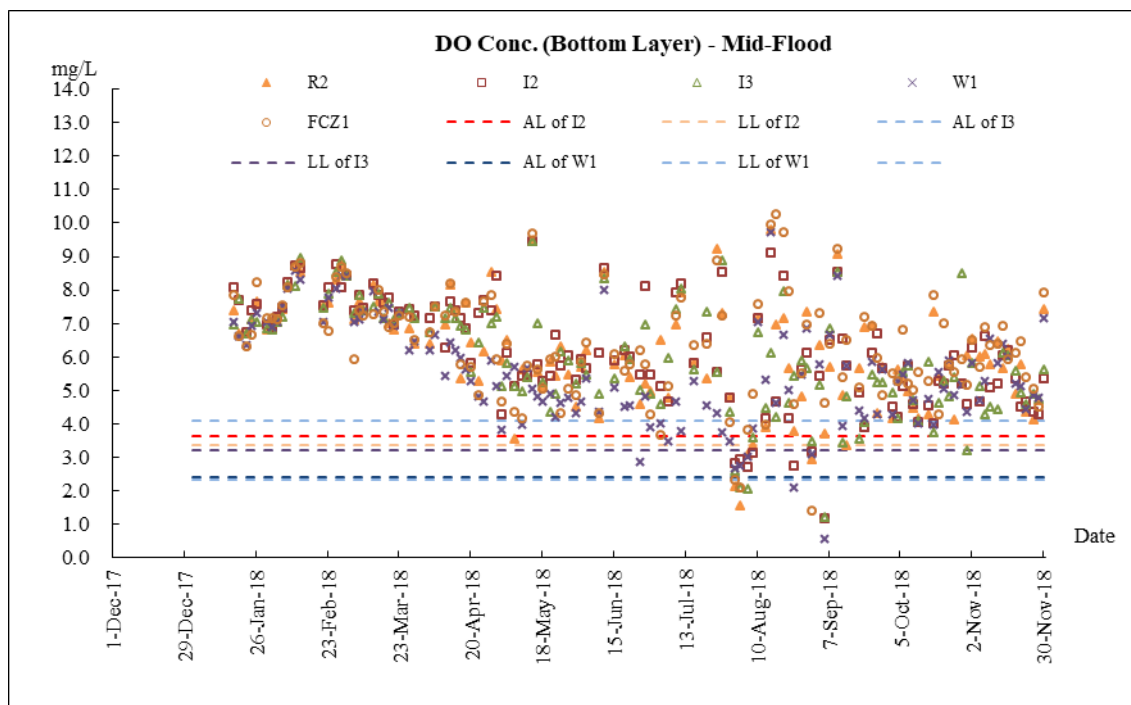


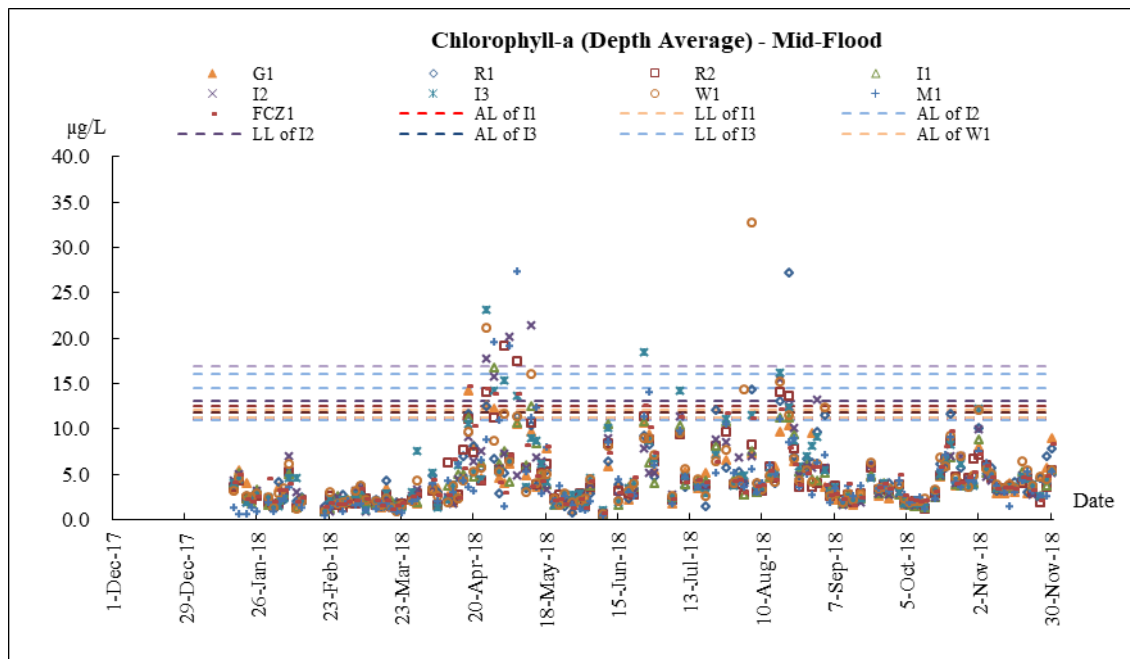
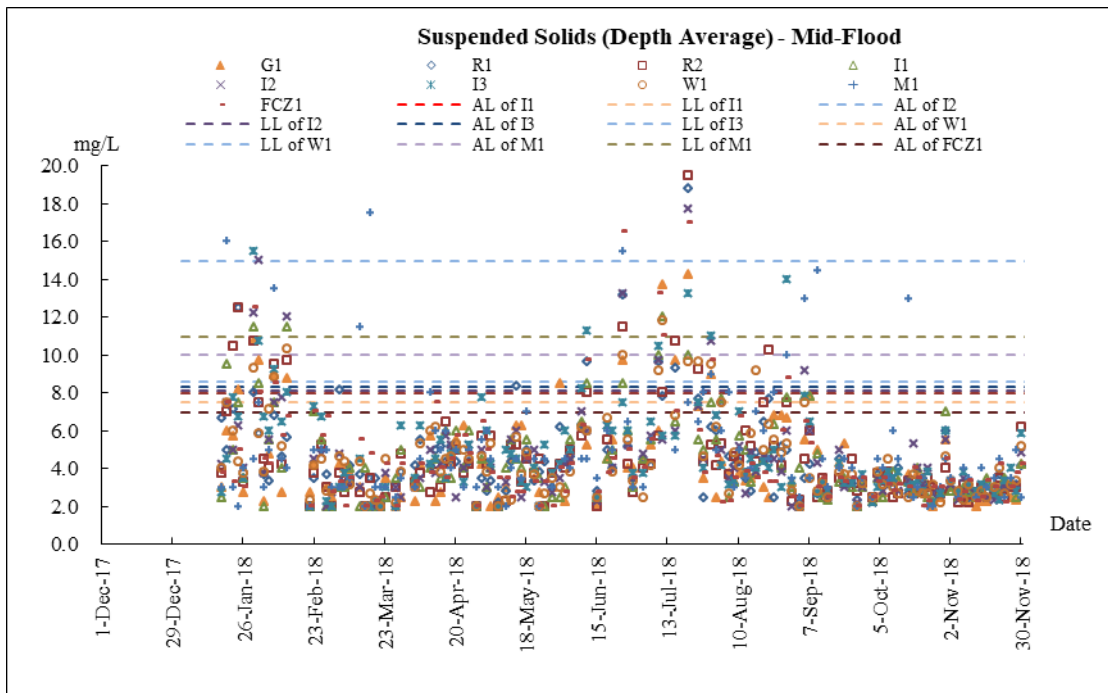
Water Quality











Appendix F

Weather Information

Summary of Weather Condition in the Reporting Period

Month	Mean Pressure (hPa)	Air Temperature			Mean Dew Point (deg. C)	Mean Relative Humidity (%)	Mean Amount of Cloud (%)	Total Rainfall (mm)	Mean Wind Speed (km/h)
		Mean Daily Max. (deg. C)	Mean (deg. C)	Mean Daily Min. (deg. C)					
December 17	1020.6	20.1	17.8	16.0	11.2	66	54	Trace	29.6
January 18	1018.4	18.5	16.1	14.1	11.7	77	69	62.2	29.5
February 18	1019.7	18.7	16.0	13.9	10.4	70	73	4.5	23.7
March 18	1016.1	24.4	20.8	18.6	16.2	76	56	22.7	20.8
April 18	1014.1	26.9	23.6	21.7	19.4	78	71	28.1	16.1
May 18	1010.5	31.7	28.3	26.1	23.7	77	62	57.5	20.2
June 18	1004.8	31.3	28.6	26.8	24.7	80	79	458.8	24.6
July 18	1004.0	31.8	29.1	27.0	25.4	81	77	341.1	24.2
August 18	1001.9	31.0	28.6	26.7	25.5	84	84	615.1	19.9
September 18	1008.8	31.0	28.0	26.0	23.7	78	68	383.3	19.5
October 18	1015.5	28.0	25.3	23.4	18.7	69	59	104.3	24.3
November 18	1017.2	24.8	22.9	21.4	18.6	78	79	73.4	29.1

Appendix G

Waste Flow Table

Year	Mth	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of Import Fill	Actual Quantities of Non-inert C&D Waste Generated Monthly				
		Total Quantities Generated	Broken Concrete (see Note 3)	Reused in the Contract	Reused in Other Projects	Disposed in Public Fill		Metal	Paper / Cardboard Packaging	Plastics (see Note 2)	Chemical Waste	Others: tree branches, root and leaves
		(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
2013	Jun	0	0	0	0	0	0	0	0	0	0	0
	Jul	0	0	0	0	0	0	0	0	0	0	0
	Aug	0	0	0	0	0	0	0	0	0	0	0
	Sep	0	0	0	0	0	0	0	0	0	0	0
	Oct	0	0	0	0	0	0	0	0	0	0	0
	Nov	0	0	0	0	0	0	0	0	0	0	0
	Dec	0	0	0	0	0	0	0	0	0	0	0
2014-2016	Jan	0	0	0	0	0	0	0	0	0	0	0
	:	0	0	0	0	0	0	0	0	0	0	0
	Jun	0	0	0	0	0	0	0	0	0	0	0
	Sub-total:	0	0	0	0	0	0	0	0	0	0	0
	:	0	0	0	0	0	0	0	0	0	0	0
2016	Oct	0	0	0	0	0	0	0	0	0	0	0
	Nov	0	0	0	0	0	0	0	0	0	0	0
	Dec	0	0	0	0	0	0	0	0	0	0	0
	Total:	0	0	0	0	0	0	0	0	0	0	0
2017	Jan	0	0	0	0	0	0	0	0	0	0	0
	Feb	0	0	0	0	0	0	0	0	0	0	0.0024
	Mar	0	0	0	0	0	0	0	0	0	0	0
	Apr	0	0	0	0	0	0	0	0	0	0	0
	May	0	0	0	0	0	0	4.97	0	0	0	0.103644
	Jun	0	0	0	0	0	0	0	0	0	0	0.0064
	Sub-total:	0	0	0	0	0	0	4.97	0	0	0	0.112444
	Jul	0	0	0	0	0	0	0	0	0	0	0.01104
	Aug	0	0	0	0	0	0	0	0	0	0	0
	Sep	0	0	0	0	0	0	0	0	0	0	0.02883
	Oct	0	0	0	0	0	0	0	0	0	0	0
	Nov	0.04875	0	0	0	0.04875	0	0	0	0	0	0.26
	Dec	0	0	0	0	0	0	0	0	0	0	0.0325
	Total:	0.04875	0	0	0	0.04875	0	4.97	0	0	0	0.444814
2018	Jan	0	0	0	0	0	0	0	0	0	0	0.078
	Feb	0	0	0	0	0	0	0	0	0	0	0
	Mar	1.633125	0	0	0	1.633125	0	0	0	0	0	0.0065
	Apr	1.31625	0	0	0	1.31625	0.62548	0	0	0	0	0
	May	0	0	0	0	0	1.94848	0	0	0	0	0.0065
	Jun	0	0	0	0	0	2.728	0	0	0	0	0
	Sub-total:	2.998125	0	0	0	2.998125	5.30196	4.97	0	0	0	0.535814
	Jul	0	0	0	0	0	4.88	0	0	0	0	0
	Aug	1.14	0	0	0	1.14	4.832	0	0	0	0	0
	Sep	1.08	0	0	0	1.08	2.472	0	0	0	0	0
	Oct	0	0	0	0	0	3.608	0	0	0	0	0.0195
	Nov	0.224	0	0	0	0.224	0.548	0	0	0	0	0.0065
Dec												
	Total:	5	0	0	0	5.442125	21.64196	4.97	0	0	0	0.561814

Appendix H

**Implementation Schedule for
Environmental Mitigation Measures**

EIA Ref.	EM&A Ref	Environmental Protection Measures	Objectives of the Recommended Measure & Main Concerns to address	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Implementation Stage				Relevant Legislation Guidelines
						Des	C	O	Dec	
<i>Air Quality – Construction Phase</i>										
4.5.1	-	<u>Dust Control</u>								
		a Vehicle washing facilities should be provided at the designated vehicle exit point;	To ensure dust emission is controlled and compliance with relevant statutory requirements	Project Site / During construction	Contractor	✓				<i>Air Pollution Control (Construction Dust) Regulations</i>
		b Every vehicle should be washed to remove any dusty materials from its body and wheels immediately before leaving the worksite;								
		c The load carried by the trucks should be covered entirely to ensure no leakage from the vehicles;								
		d Hoarding of not less than 2.4 m high from ground level should be provided along the entire length of that portion of the site boundary adjoining a road or other area accessible to the public except for a site entrance or exit;								
		e The main haul road should be kept clear of dusty materials and should be sprayed with water so as to maintain the entire road surface wet at all the time;								
		f The stockpile of dusty materials should be either covered entirely by								

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		impervious sheets; place in an area sheltered on the top and three sides; or sprayed with water to maintain the entire surface wet at all the time; g Belt conveyor system should be enclosed on the top and two sides; h The height of the belt conveyor should be kept as low as possible to avoid delivery at height; and i All the exposed area should be kept wet always to minimise dust emission.								
4.5.1	-	<u>Air Quality Control</u>								
		a All dump trucks entering or leaving the Project Site should be provided with mechanical covers in good service condition; and	To ensure air quality standards compliance with relevant statutory requirements	Project Site / During construction	Contractor		✓			ETWB TCW No 19/2005
		b Ultra-low-sulphur diesel (ULSD) should be used for all construction plant on site.								
4.7.1	-	<u>EM&A Requirements</u>								
		Regular site audits (at a frequency of not								

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		less than once every two weeks) are recommended.	To ensure that appropriate dust control measures are implemented and good site practices are adopted	Project Site / During construction	ET and Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>
4.7.1	3.0-3.7	Implementation of a construction dust monitoring in every six days	To ensure compliance with the relevant criterion during the construction works.	ASRs A4 (No. 101 Lung Mei Tsuen) and A6 (No. 79 Lo Tsz Tin tsuen) / during construction	ET and Contractor		✓			<i>Air Pollution Control (Construction Dust) Regulations</i>
Noise – Construction Phase										
5.6.1		Site hoardings at the particular work site boundary may be provided for achieving screening effect, provided that the hoardings have no openings or gaps and meet the same specifications for movable noise barriers. The proposed movable noise barriers should be at least 3m high with a surface density of not less than 7 kg m ⁻² , which could provide a minimum of 5 dB(A) attenuation. Skid footing of movable noise barriers should be located at a distance not more than a few metres of stationary plant and mobile plant such that the NSRs would not have direct line of sight to the plant. The length of the barriers should also be at least five times greater than its height.	To reduce the construction noise impact.	Project Site / During construction	ET and Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1	-	The following Quiet Powered Mechanical	To reduce the construction	Project Site / During	Contractor		✓			<i>Noise Control</i>

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(Table 5.12)		<p>Equipment (PME) should be used during the construction Phase.</p> <ul style="list-style-type: none"> Mobile Crane, SWL listed in the data base of quality powered mechanical equipment prepared by the Noise Control Authority, 107 dB(A); Tracked Loader, British Standard 5228 – Table C3, Reference No. 16, 104 dB(A); Pneumatic breaker, British Standard 5228 – Table C2, Reference No. 10, 110 dB(A); Concrete Lorry Mixer British Standard 5228 – Table C6, Reference No. 23, 100 dB(A); and Excavator British Standard 5228 - Table C3, Reference No. 97, 105 dB(A). 	noise impact.	construction phase					<i>Ordinance (NCO) and Annex 5 of the EIAO-TM</i>	
5.7.1 (Table 5.13)	-	<p><u>Construction Works on Land</u></p> <p>Movable noise barrier should be provided for excavator and mobile crane;</p> <p>Timber sawing machine should be operated behind site hoarding/ movable noise barrier; and</p> <p>Concrete lorry mixer should be operated behind site hoarding/movable noise barrier.</p>	To reduce the construction noise impact.	Project Site / During the Site Formation, construction of seawall, ramp, staircase, retaining walls, sump tanks for grey water system and superstructure	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>

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5.7.1 (Table 5.13)	-	Timber sawing machine should be operated behind movable noise barrier; and Movable noise barrier should be provided for excavator and mobile crane.	To reduce the construction noise impact.	Project Site / During the localised road widening works along Ting Kok Road	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	<u>Car Park Paving</u> Movable noise barrier should be provided for excavator.	To reduce the construction noise impact.	Project Site / During the car park paving	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	<u>Building Works</u> Movable noise barrier should be provided for excavator, mobile crane and earth auger; and Timber sawing machine should be operated behind site hoarding/ movable noise barrier.	To reduce the construction noise impact.	Project Site / During foundation and tanking works	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	Movable noise barrier should be provided for mobile crane; and Timber sawing machine should be operated behind site hoarding/ movable noise barrier.	To reduce the construction noise impact.	Project Site / During superstructure works	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>

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5.7.1 (Table 5.13)	-	Movable noise barrier should be provided for mobile crane.	To reduce the construction noise impact.	Project Site / During building finishes & internal fitting-out	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	<u>Rock filling for the Groynes</u> Movable noise barrier should be provided for excavator and derrick lighter.	To reduce the construction noise impact.	Project Site / During the construction of gabion channel	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	<u>Box Culvert Construction</u> Movable noise barrier should be provided for excavator.	To reduce the construction noise impact.	Project Site / During the construction of gabion channel	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	Movable noise barrier should be provided for excavator, mobile crane; and Concrete lorry mixer should be operated behind site hoarding/movable noise barrier.	To reduce the construction noise impact.	Project Site / During the construction of western culvert	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	Concrete lorry mixer should be operated behind site hoarding/movable noise barrier.	To reduce the construction noise impact.	Project Site / During the construction of eastern culvert	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1	-	Site hoarding should be provided for work	To reduce the construction	Project Site / During	Contractor		✓			<i>Noise Control</i>

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(Table 5.13)		site.	noise impact.	the construction of 90m box culvert						<i>Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1 (Table 5.13)	-	<u>Sand Filling</u> Movable noise barrier should be provided for excavator.	To reduce the construction noise impact.	Project Site / During the construction of gabion channel	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
5.7.1	-	<u>Good Site Practice</u> Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; Mobile plant, if any, should be sited as far from NSRs as possible; Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; Plant known to emit noise strongly in one direction should, wherever possible, be	To reduce the construction noise impact.	Project Site / Throughout the construction period	Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>

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		orientated so that the noise is directed away from the nearby NSRs; and Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.								
5.9.1	4.1	<u>EM&A Requirements</u> Implementation of weekly construction noise monitoring at the representative NSRs.	To ensure compliance with the relevant criterion during the construction works.	N1, N2/N2a, N3 & N4/ Throughout the construction period	ET and Contractor		✓			<i>Noise Control Ordinance (NCO) and Annex 5 of the EIAO-TM</i>
Water Quality – Construction Phase										
6.6.1	-	<u>Dredging and Sandfilling Operations</u> Sandfilling works should be carried out after the completion of groyne construction.	To further minimise the SS level during sandfilling works	Project Site / During sandfilling	Contractor		✓			-
6.6.1 and Figure 6.20	-	A movable cage type / metal frame type silt curtain will be deployed around the dredging area next to the grab dredger prior to commencement of dredging works.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			<i>Annex 6 of the EIAO-TM</i>
6.6.1 and Figure 6.21	-	Standing type silt curtains will be deployed around the proposed sandfilling extent prior to commencement of sandfilling works.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			<i>Annex 6 of the EIAO-TM</i>
6.6.1	-	A hourly dredging rate of a closed grab dredger (with a minimum grab size of 3 m ³) should be less than 31 m ³ hr ⁻¹ , with	To further minimise the SS level during the dredging works	Project Site / During dredging	Contractor		✓			-

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		reference to the maximum rate for dredging, which was derived in the EIA.								
6.6.1	-	A daily filling rate should be less than 1,000 m ³ day ⁻¹ , which was defined in the EIA.	To further minimise the SS level during the sandfilling works	Project Site / During sandfilling	Contractor		✓			-
6.6.1	-	Mechanical grabs should be designed and maintained to avoid spillage and should seal tightly while being lifted.	To further minimise the SS level during the dredging works	Project Site / During dredging	Contractor		✓			-
6.6.1	-	Barges or hoppers should have tight fitting seals to their bottom openings to prevent leakage of material.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			-
6.6.1	-	Loading of barges or hoppers shall be controlled to prevent splashing of dredged material to the surrounding water.	To further minimise the SS level during the dredging works	Project Site / During dredging	Contractor		✓			-
6.6.1	-	Barges or hoppers should not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			-
6.6.1	-	Excess material should be cleaned from the decks and exposed fittings of barges or hoppers before the vessel is moved.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			-
6.6.1	-	Adequate freeboard should be maintained on barges to reduce the likelihood of decks being washed by wave action.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			-
6.6.1	-	All vessels should be sized such that adequate clearance is maintained between vessels and the seabed at all states of the	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			-

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		tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.								
6.6.1	-	The works should not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the Project Site.	To further minimise the SS level during the dredging and sandfilling works	Project Site / During dredging and sandfilling	Contractor		✓			<i>ProPECC PN 1/94</i>
6.6.1	-	<u>Construction Site Runoff</u> The excavation works for the drainage diversions should be carried out to minimise any seawater influx entering the works area and hence to keep the works area dry as much as possible.	To ensure the works area will be kept dry as much as possible and hence avoid construction site runoff	Project Site / During excavation for the drainage diversions	Contractor		✓			-
6.6.1 and Figure 6.21	-	Silt curtains at the inshore waters should be deployed to enclose the works area before the commencement of the excavation works for two drainage diversions until the completion of the diversions.	To avoid any adverse water quality impacts resulting from the site runoff due to heavy rainfall	Project Site / During excavation for the drainage diversions	Contractor		✓			-
6.6.1	-	At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed and internal drainage works and erosion and sedimentation control facilities implemented. Channels, earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of efficient silt removal facilities should be based on the guidelines in <i>Appendix A1</i> of <i>ProPECC PN 1/94</i> .	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			<i>ProPECC PN 1/94</i>
6.6.1	-	All the surface runoff should be collected by	To minimise the	Project Site / During	Contractor		✓			<i>ProPECC PN</i>

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		the on-site drainage system and diverted through the silt traps prior to discharge into storm drain.	construction site runoff	land based construction works						1/94
6.6.1	-	All exposed earth areas should be completed as soon as possible after earthworks have been completed, or alternatively, within 14 days of the cessation of earthworks, where practicable. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or by other means.	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			ProPECC PN 1/94
6.6.1	-	All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas.	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			ProPECC PN 1/94
6.6.1	-	Measures should be taken to reduce the ingress of site drainage into excavations. If the excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			ProPECC PN 1/94

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		facilities.								
6.6.1	-	Open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than 50 m ³ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system.	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			<i>ProPECC PN 1/94</i>
6.6.1	-	Manholes (including newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system.	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			<i>ProPECC PN 1/94</i>
6.6.1	-	Precautions to be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in <i>Appendix A2 of ProPECC PN 1/94</i> . Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			<i>ProPECC PN 1/94</i>
6.6.1	-	Oil interceptors should be provided in the	To minimise the	Project Site / During	Contractor		✓			<i>ProPECC PN</i>

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		drainage system and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain.	construction site runoff	land based construction works						1/94
6.6.1	-	All temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge should be adequately designed for the controlled release of storm flows. All sediment traps should be regularly cleaned and maintained. The temporary diverted drainage should be reinstated to the original condition when the construction work has finished or the temporary diversion is no longer required.	To minimise the construction site runoff	Project Site / During land based construction works	Contractor		✓			ProPECC PN 1/94
6.6.1	-	<u>Sewage Generated by Workforce</u> Sewage from toilets should be collected by a licensed waste collector.	To prevent contamination to nearby environment	Project Site / During land based construction works	Contractor		✓			Water Pollution Control Ordinance
6.6.1	-	<u>Storage and Handling of Oil, Other Petroleum Products and Chemicals</u> Waste streams classifiable as chemical wastes should be properly stored, collected and treated for compliance with <i>Waste Disposal Ordinance or Disposal (Chemical Waste) (General) Regulation</i> requirements.	To prevent contamination to nearby environment	Project Site / During land based construction works	Contractor		✓			Waste Disposal Ordinance
6.6.1	-	All fuel tanks and chemical storage areas should be provided with locks and be sited	To prevent contamination to	Project Site / During land based construction	Contractor		✓			Waste Disposal

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		on paved areas.	nearby environment	works						<i>Ordinance</i>
6.6.1	-	The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled oil, fuel and chemicals from reaching the receiving waters.	To prevent contamination to nearby environment	Project Site / During land based construction works	Contractor		✓			<i>Waste Disposal Ordinance</i>
6.6.1	-	Oil leakage or spillage should be contained and cleaned up immediately. Waste oil should be collected and stored for recycling or disposal, in accordance with the <i>Waste Disposal Ordinance</i> . The Contractors should prepare guidelines and procedures for immediate clean-up actions following any spillages of oil, fuel or chemicals.	To prevent contamination to nearby environment	Project Site / During land based construction works	Contractor		✓			<i>Waste Disposal Ordinance</i>
6.6.1	-	Vehicle and plant servicing areas, vehicle wash bays and lubrication bays should, as far as possible, be located within roofed areas. The drainage in these covered areas should be connected to foul sewers via a petrol interceptor.	To prevent contamination to nearby environment	Project Site / During land based construction works	Contractor		✓			<i>Waste Disposal Ordinance</i>
6.9.1 and 11.6.1	5.1	<u>EM&A Requirements</u> Monitoring of marine water quality during the construction phase is considered necessary to evaluate whether any impacts would be posed by these marine works on the surrounding waters during the operation of dredging and filling works.	To ensure the construction works would not arise any impacts to the surrounding waters	Marine water outside the Project Site / During dredging and filling works	ET and Contractor		✓			-

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Water Quality – Post-Construction Phase (After the completion of the construction and before the operation of the beach)

6.9.2 and 11.6.2	5.2	<u>EM&A Requirements</u> <i>E. coli</i> monitoring should be conducted at the outlet of two diverted drains and at EPD’s beach water monitoring stations for the identification of pollution loading and to establish relationship between the loading and EPD’s beach monitoring programme.	To investigate the pollution loading of <i>E. coli</i> and to establish relationship with EPD’s beach monitoring data	Two diverted drains and the Bathing Beach/ Within six weeks after the completion of the construction works	ET					Post-Construction Phase (After the completion of the construction and before the operation of the beach)
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Water Quality – Operational Phase

6.6.2	-	<u>Surface Runoff from Project Site</u> A petrol interceptor should be provided in the drainage system and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain. Where appropriate, the design should follow or of similar functions as stated in the <i>ProPECC PN</i>	To prevent contamination to nearby environment	Beach Park area / During operation	Operator	✓	✓			<i>Water Pollution Control Ordinance and ProPECC PN 1/94</i>
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		<i>1/94.</i>								
6.6.2	-	Oil leakage or spillage should be contained and cleaned up immediately. Waste oil should be collected and stored for recycling or disposal in accordance with the <i>Waste Disposal Ordinance</i> .	To prevent contamination to nearby environment	Beach Building Facility / During operation	Operator	✓		✓		<i>Waste Disposal Ordinance</i>
Waste Management – Construction Phase										
7.6	-	The Contractor should submit the plan to Project Proponent’s Engineer Representative for endorsement prior to the commencement of the construction works. The plan should incorporate site-specific factors, such as the designation of areas for the segregation and temporary storage of reusable and recyclable materials.	To ensure that adverse environmental impacts are prevented	Project Site / Contract mobilisation and during construction	Contractor	✓	✓			-
7.6	-	It will be the Contractor’s responsibility to ensure that only reputable licensed waste collectors are used and that appropriate measures to reduce adverse impacts, including windblown litter and dust from the transportation of these wastes, are employed.	To ensure that adverse environmental impacts are prevented	Project Site / Contract mobilisation and during construction	Contractor	✓	✓			-
7.6	-	The Contractor must ensure that all the necessary permits or licences required under the Waste Disposal Ordinance are obtained for the construction phase.	To ensure compliance with relevant statutory requirements	Project Site / Contract mobilisation and during construction	Contractor	✓	✓			-
7.6	-	<u>Waste Management Hierarchy</u> <ul style="list-style-type: none"> Nomination of approved personnel to be responsible for good site practices, 	To ensure that adverse environmental impacts are prevented	Project Site / Contract mobilisation and during construction	Contractor	✓	✓			<i>Waste Disposal (Charges for Disposal of</i>

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		<p>arrangements for collection and effective disposal to an appropriate facility of all wastes generated at the site;</p> <ul style="list-style-type: none"> • Training of site personnel in proper waste management and chemical handling procedures; • Provision of sufficient waste disposal points and regular collection for disposal; • Appropriate measures to reduce windblown litter and dust transportation of waste by either covering trucks or by transporting wastes in enclosed containers; • Separation of chemical wastes for special handling and appropriate treatment at the Chemical Waste Treatment Centre; • Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; and • A recording system for the amount of wastes generated/recycled and disposal sites. 								<p><i>Construction Waste) Regulation;</i></p> <p><i>ETWB TCW No.31/2004; and</i></p> <p><i>Appendix C of ETWB TCW No. 19/2005</i></p>
-		<p><u>Waste Reduction Measures</u></p> <ul style="list-style-type: none"> • Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse 	To reduce construction waste generation	Project Site / During construction	Contractor		✓			-

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		<p>or recycling of material and their proper disposal;</p> <ul style="list-style-type: none"> • Encourage collection of aluminium cans and waste paper by individual collectors during construction with separate labelled bins being provided to allow the segregation of these wastes from other general refuse generated by the workforce; • Any unused chemicals and those with remaining functional capacity be recycled as far as possible; • Use of reusable non-timber formwork to reduce the amount of C&D materials; • Prior to disposal of construction waste, wood, steel and other metals should be separated, to the extent practical for re-use and/or recycling to reduce the quantity of waste to be disposed at landfills; • Proper storage and site practices to reduce the potential for damage or contamination of construction materials; and • Plan and stock construction materials carefully to reduce amount of waste generated and avoid unnecessary generation of waste. 								

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7.6.1	-	<p><u>Dredging Materials</u></p> <p>The final disposal site for the dredged sediments should be determined by the MFC and a dumping licence should be obtained from EPD prior to the commencement of the dredging works. Uncontaminated sediments should be disposed of at open sea disposal sites designated by the MFC. For contaminated sediments requiring Type 2 confined marine disposal, relevant contract documents should specify the allocation conditions of the MFC and EPD.</p>	To ensure adverse environmental impacts are prevented	Dredging area / During construction	Contractor		✓			<i>Dumping at Sea Ordinance</i>
7.6.2	-	<p><u>Excavated Materials and C&D Waste</u></p> <p><i>Management of Waste Disposal</i></p> <p>The contractor should open a billing account with EPD in accordance with the Waste Disposal (Charges for Disposal of Construction Waste) Regulation for the payment of disposal charges. Every waste load transferred to Government waste disposal facilities such as public fill, sorting facilities, or landfills should require a valid “chit” which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system should be established in accordance with TCW No. 6/2010 to monitor the reuse of surplus excavated materials off-site and disposal of construction waste and general refuse at</p>	To properly handle the excavated materials and C&D waste and thus avoid any adverse impacts	Project Site / During construction	Contractor		✓			<i>Waste Disposal (Charges for Disposal of Construction Waste) Regulation</i>

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		transfer stations/landfills, and to control fly-tipping. The billing “chit” and trip-ticket system should be included as one of the contractual requirements and implemented by the contractor. Regular audits of the waste management measures implemented on-site as described in the Waste Management Plan should be conducted. A recording system (similar to summary table as shown in Annex 4 and Annex 5 of Appendix C of ETWB TWC No. 19/2005) for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established during the construction phase.								
7.6.2	-	<i>Reduction of C&D Materials Generation</i> Public fill and construction waste should be segregated and stored in different containers or skips to facilitate reuse or recycling of the public fill and proper disposal of the construction waste. Specific areas of the work site should be designated for such segregation and storage if immediate use is not practicable. To reduce the potential dust and water quality impacts of site formation works, C&D materials should be wetted as quickly as possible to the extent practicable after excavation/filling.	To reduce the generation of C&D waste	Project Site / During construction	Contractor		✓			-

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7.6.3	-	<p><u>Chemical Waste</u></p> <p>The Contractor should register as a chemical waste producer with the EPD. Chemical waste, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes. Containers used for the storage of chemical wastes should:</p> <ul style="list-style-type: none"> • Be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; • Have a capacity of less than 450 L unless the specifications have been approved by the EPD; and • Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations. <p>The storage area for chemical wastes will:</p> <ul style="list-style-type: none"> • Be clearly labelled and used solely for the storage of chemical waste; • Be enclosed on at least 3 sides; 	To ensure proper handling of chemical waste	Project Site / During construction	Contractor	✓				<i>Code of Practice on the Packaging, Handling and Storage of Chemical Wastes</i>

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- Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
- Have adequate ventilation;
- Be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and
- Be arranged so that incompatible materials are appropriately separated.

Chemical waste should be collected by a licensed chemical waste collector to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility.

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7.6.4	-	<p><u>Sewage</u></p> <p>An adequate number of portable toilets should be provided for the on-site construction workforce during construction phase. All portable toilets should be maintained in a state that will not deter the users from using them. Night soil should be regularly collected by a licensed collector for disposal. The sewage generated from the visitors during operation of the Proposed Beach Development should be discharged to the adjacent foul sewer conveying to Tai Po Sewage Treatment Works for treatment.</p>	To ensure proper handling of sewage	Project Site / During construction	Contractor	✓				-
7.6.5	-	<p><u>General Refuse</u></p> <p>General refuse should be stored in enclosed bins or compaction units separately from construction and chemical wastes. A reputable waste collector should be employed to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to reduce odour, pest and litter impacts. The burning of refuse on construction sites is prohibited by law.</p> <p>Recycling bins should be provided at strategic locations to facilitate recovery of aluminium cans and waste paper from the Project Site. Materials recovered should be sold for recycling.</p>	To ensure proper handling of general refuse	Project Site / During construction	Contractor	✓				-

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7.6.6	-	<p><u>Staff Training</u></p> <p>Training should be provided to workers on the concept of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling at the beginning of the construction works.</p>	To ensure that adverse environmental impacts are prevented	Project Site / Contract mobilisation and during construction	Contractor	✓	✓			-
7.7	6.1	<p><u>EM&A Requirements</u></p> <p>Joint site audits by the Environmental Team and the Contractor should be undertaken on a weekly basis. Particular attention should be given to the Contractor’s provision of sufficient spaces, adequacy of resources and facilities for on-site sorting and temporary storage of C&D materials. The C&D materials to be disposed of from the Project Site should be visually inspected. The public fill for delivery to the off-site stockpiling area should contain no observable non-inert materials (e.g., general refuse, timber, etc).</p> <p>The waste to be disposed of at refuse transfer stations or landfills should as far as possible contains no observable inert or reusable/recyclable C&D materials (e.g., soil, broken rock, metal, and paper/cardboard packaging, etc). Any irregularities observed during the weekly site audits should be raised promptly to the Contractor for rectification.</p>	To ensure that adverse environmental impacts are prevented	Project Site / During construction	ET and Contractor		✓			-

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<i>Ecology – Construction Phase</i>										
8.10.2	7.1	<p><u>Measures for Common Rat Snake</u></p> <p>To undertake a search of the Common Rat Snake within the land based Project Site just before the commencement of the construction works. Due to the small size of the Project Site and given that there are no optimal habitats for Common Rat Snake, one day-time search is considered sufficient. The surveyor(s) should actively search the areas within the Project Site and pay special attention to the leaf litters and rocks. All recorded Common Rat Snake should be caught by hand and translocated to the shrubland at the north of the Study Area, immediately after the search. The Common Rat Snake search and translocation works should be undertaken by a qualified ecologist with relevant experience in faunal translocation works.</p>	To ensure that adverse impacts arising from the Project to Common Rat Snake are prevented	Project Site (land based) / prior to commencement of construction works	ET / Qualified Ecologist	✓				-
-	7.2	<p><u>Measures for marine ecology</u></p> <p>(1) To translocate target marine fauna, including fishes, starfish, sea urchins and sea cucumbers, from the intertidal area of the Site at Lung Mei to the intertidal area at the reception site of Ting Kok East before commencement of sand filling works or any other works that may cause disturbances to the</p>	To ensure that adverse impacts arising from the Project to marine ecology	Project Site (marine based) / prior to commencement of marine works	ET / Qualified Ecologist	✓				

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		<p>existing marine ecology. The translocation works shall cover capturing, handling, holding transporting and releasing of the captured target marine fauna.</p> <p>(2) Translocation of seahorses, including identifying, capturing, handling, protecting, transporting and placing the target seahorse species from Site at Lung Mei to the reception site of Ting Kok East, as well as pre- and post-translocation monitoring and post-construction monitoring shall be conducted. Seahorse translocation shall be undertaken before the commencement of marine construction works. The identifying, capturing, handling, protecting, transporting and placing of seahorses shall be led and supervised by the Fish Specialist.</p>								
8.10.2	-	<p><u>Dredging and Sand Filling Operations</u></p> <p>It is predicted that the sediment plume and the sediment deposition will not be large in extent and no unacceptable water impacts including DO depletion, release of contaminants and nutrients are expected. Although no unacceptable water quality impacts would result, the following good construction site practice and proactive precautionary measures are recommended to</p>	To minimise ecological impacts arising from dredging and sand filling works	Project Site / During dredging and sand filling works	Contractor		✓			-

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		<p>ensure dredging and sandfilling operations would be undertaken in such a manner as to avoid any uncontrolled or unexpected incidents during the marine works:</p> <ul style="list-style-type: none"> • A movable cage type / metal frame type silt curtain should be deployed around the dredging area next to the grab dredger prior to commencement of dredging works; • Standing type silt curtains should be deployed around the proposed sandfilling extent prior to commencement of sandfilling works; and <p>Proper equipment, dredging rate, filling rate and good construction practices should be implemented, details refer to <i>Section 6.6.1</i>.</p>								
8.10.2	-	<p><u>Measures for Controlling Construction Runoff</u></p> <ul style="list-style-type: none"> • Storm water run-off from the construction site should be directed into existing drainage channel via adequately designed sand/silt removal facilities such as sand/silt traps and oil interceptors. Channels, earth bunds or sand bag 	To minimise ecological impacts of construction runoff	Project Site / During dredging and filling works	Contractor		✓			-

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		barriers should be provided on site to properly direct storm water to such silt removal facilities.								
8.10.2	-	<p><u>Planting along the Western Drainage Diversion</u></p> <ul style="list-style-type: none"> Provide tree/ shrub/ climber planting along the gabion wall of the new drainage channel. Regular monitoring and removal of the weed plant <i>Mikania micrantha</i> during the establishment and maintenance period. 	To provide an ecological habitat	Along gabion wall of the new western drainage channel/ After completion of the gabion	Contractor		✓	✓		-
8.10.2	-	<p><u>Good Construction Practices</u></p> <ul style="list-style-type: none"> Erect fences along the boundary of the Extension Site before the commencement of works to prevent vehicle movements, and encroachment of personnel, onto adjacent areas; and Regularly check the work site boundaries to ensure that they are not breached and that damage does not occur to surrounding areas. 	To avoid any adverse ecological impacts	Project Site / During construction works	Contractor		✓			-
<i>Fisheries – Construction Phase</i>										
9.10.1	-	<p><u>EM&A Requirements</u></p> <p>EM&A is not required during the</p>	To ensure that no water quality deterioration in the	Details refer to Section 12.6 of the EM&A	ET and Contractor		✓			<i>Environmental Impact</i>

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		construction phase of the Project. However, water quality monitoring will be conducted at the Yim Tin Tsai Fish Culture Zone. Details should be referred to the Water Quality Section.	Fish Culture Zone as a result of the dredging and sandfilling works	Manual.						<i>Assessment Ordinance, Annex 21 of the EIAO-TM</i>
Landscape and Visual Impact – Construction Phase										
10.5.1	-	<u>Landscape Mitigation</u> A Landscape Plan will be submitted before the commencement of Works.	To provide landscaping work.	Before commencement of construction phase	ET and Contractor	✓				-
10.6.10	-	<i>Cultivation of areas impacted during construction.</i> Areas impacted during the construction phase that are not required during the operation phase, are to be cultivated to a depth of 300mm in accordance with accepted Hong Kong practice and guidelines. The cultivation shall involve ripping of compacted soil by mechanical means and the addition gypsum and/or organic fertiliser if required.	To improve the soil allowing plants to thrive	Project Site / During construction	Contractor		✓			-
10.6.10	-	<i>Car Park Tree Planting.</i> Advanced trees are to be planted in the car park.	To provide shade to the carpark areas and to reduce the mass of the paved areas	Project Site / During construction	Contractor		✓			-
10.6.10	-	<i>Tree and shrub planting.</i> All planting of trees and shrubs is to be carried out in accordance with the relevant best practice guidelines. Plant densities are to be provided in future detailed design documents and are to be selected so as to achieve a finished landscape that matches	To improve the appearance of the development	Project Site / During construction	Contractor			✓		-

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		the surrounding, undisturbed, equivalent landscape types. Regular monitoring and removal of the weed plant <i>Mikania micrantha</i> during the establishment and maintenance period.								
10.6.10	-	<i>Roof Terrace Planting.</i> Trees, shrubs and climbers shall be established in planters on the roof terraces of the new structures where possible.	To improve the appearance of the development by softening the building element	Project Site / During construction	Contractor		✓			-
10.6.10	-	<i>Natural Rock Groynes</i> New rock groynes are needed to contain the sand of the new beach. Natural stones will be used for construction of the Groynes.	To improve the appearance of the development to make the man-made feature be more compatible with the surroundings	Project Site / During construction	Contractor		✓			-
10.6.10	-	<i>Inter-Tidal Re-generation.</i> It is likely that a build up of sediment and sand will occur at the outer edges of the rock groyne. This is a natural process and the development proponent has no control over the implementation of this mitigation measure.	To improve the appearance of the development	Adjacent areas	Nil			✓		-
10.6.10	-	<i>Mangrove Re-generation.</i> Mangroves of similar species to existing to be manually established by planting of droppings.	To improve the ecological value of the project	Project Site / During post-construction	Contractor		✓			-
10.6.10	-	<i>Buffer Planting.</i> Trees and shrubs are to be planted along Ting Kok road to screen the development from the nearby Village/Developed Areas.	To improve the appearance of the development	Project Site / During post-construction	Contractor		✓			-

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10.6.10	-	<i>Early Planting Works</i> Where technically feasible, new plantings are to be installed during the construction works to reduce landscape impacts.	To improve the appearance of the development	Project Site / During construction	Contractor		✓			-
10.6.10	-	<i>Tree Protection/Transplantation.</i> Where technically feasible, existing trees in the Trees/Backshore Vegetation LR are to be retained. Those trees that cannot be retained that are of value are to be transplanted.	To improve the appearance of the development	Project Site / Before commencement of construction	Contractor		✓			-
10.7.9	-	<u>Visual Mitigation</u> <i>Design of Structures.</i> The structure shown in the photomontages are to illustrate the mass of the structures only. During the design phase of the development, features such as the location of doors, windows, eaves etc. will be detailed. All of these elements will greatly improve the appearance of the structures. Where possible, built structures will utilise appropriate designs to complement the surrounding landscape. Materials and finishes will also be considered during detailed design.	To reduce visual impacts and improve the appearance of the development	Project Site / During construction	Architect		✓			-
10.7.9	-	<i>Colour Scheme.</i> Colours for the structures can be used to complement the surrounding area. Lighter colours such as shades of light grey, off-white and light brown may be utilised where technically feasible to reduce the visibility of the structures.	To reduce visual impacts and improve the appearance of the development	Project Site / During construction	Architect		✓			-
10.7.9	-	<i>Plantings.</i> In addition to the landscape	To help integrate the new	Project Site / During	Contractor		✓			-

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		mitigation plantings proposed in Section 10.5.9 of the EIA report, appropriate new plantings will be installed as appropriate to help integrate the new structures into the surrounding landscape.	structures into the surrounding landscape	post-construction						
10.7.9	-	<i>Colour of Site Hoardings.</i> In order to mitigate the visual impact of these temporary hoardings, it is recommended that the hoardings be erected at a uniform height, with a uniform colour that complements the existing surrounding landscape.	To mitigate the visual impact of temporary hoardings	Project Site / During construction	Contractor		✓			-
-	9.2	<u>EM&A Requirements</u> A specialist Landscape Sub-Contractor should be employed for the implementation of landscape construction works and subsequent maintenance operations during a 12-month establishment period. A Registered Landscape Architect should be employed to supervise the specialist Landscape Sub-contractor for the implementation of landscape works, both hard and soft, involved. Measures undertaken by both the Contractor(s) and the specialist Landscape Sub-Contractor during the construction phase and first year post-construction will be audited by the Registered Landscape Architect of the ET. Site inspections should be undertaken at	To check the implementation and maintenance of landscape mitigation measures and ensure that they are fully realised and that potential conflicts between the proposed landscape measures and any other project works and operational requirements are resolved at the earliest practical date and without compromise to the intention of the mitigation measures	Project Site / During construction and post-construction phase	Specialist Landscape Sub-contractor, Registered Landscape Architect and ET		✓			-

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		least once every two weeks throughout the landscaping plants establishment period when planting works are being undertaken.								
		<p>A tree survey should be prepared, for DLO submission, and for the purpose of existing trees protection. Removal of existing trees to be minimized. The Contractor should consider to employ a certified arborist when sizable and valuable existing tree(s) protection of transplant is required.</p> <p>Post-construction phase auditing will be restricted to the 12-month establishment works of the landscaping proposals.</p> <p>Advance planting- monitoring of implementation and maintenance of planting, and against potential incursion, physical damage, fire, pollution, surface erosion, etc.</p> <p>Protection of trees to be retained-identification and demarcation of trees / vegetation to be retained, erection of physical protection (e.g. fencing), monitoring against potential incursion, physical damage, fire, pollution, surface erosion, etc.</p> <p>Clearance of existing vegetation-identification and demarcation of trees / vegetation to be cleared, checking of</p>								

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		<p>extent of works to reduce damage, monitoring of adjacent areas against potential incursion, physical damage, fire, pollution, surface erosion, etc.</p> <p>Transplanting of trees-identification and demarcation of trees / vegetation to be transplanted, monitoring of extent of pruning / lifting works to reduce damage, timing of operations, implementation of the stages of preparatory and translocation works, and maintenance of transplanted vegetation, etc.</p> <p>Plant supply-monitoring of operations relating to the supply of specialist plant material (including the collecting, germination and growth of plants from seed) to ensure that plants will be available in time to be used within the construction works.</p> <p>Soiling, planting, etc-monitoring of implementation and maintenance of soiling and planting works and against potential incursion, physical damage, fire, pollution, surface erosion, etc.</p> <p>Architectural design and treatment of all structures (where practicable), retaining walls, elevated road structures and other engineering works-implementation and maintenance of mitigation measures, to ensure conformity with agreed designs.</p> <p>Erection of Site Hoardings/Fences-</p>								

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		Erection of site hoardings/fences during the construction phase to reduce visual impacts.								
		Establishment Works- monitoring of implementation of maintenance operations during Establishment Period.								

Remark: Des – Design; C – Construction; O – Operation; Dec – Decommissioning