

**JOB NO.: TCS00694/13**



**AGREEMENT NO. CE 45/2008 (CE)  
LIANTANG/HEUNG YUEN WAI  
BOUNDARY CONTROL POINT AND ASSOCIATED  
WORKS**

**24<sup>th</sup> QUARTERLY ENVIRONMENTAL MONITORING &  
AUDIT SUMMARY REPORT –  
(May to July 2019)**

**PREPARED FOR**

**CIVIL ENGINEERING AND DEVELOPMENT  
DEPARTMENT (CEDD)**

**Quality Index**

<b>Date</b>	<b>Reference No.</b>	<b>Prepared By</b>	<b>Certified By</b>
2 September 2019	TCS00694/13/600/R2172v3	 Nicola Hon (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

<b>Version</b>	<b>Date</b>	<b>Description</b>
1	22 August 2019	First Submission
2	30 August 2019	Amended against IEC's comment on 27 August 2019
3	2 September 2019	Amended against IEC's comment on 2 September 2019

This report has been prepared by Action-United Environmental Services & Consulting with all reasonable skill, care and diligence within the terms of the Agreement with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client. We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above. This report is confidential to the client and we accept no responsibility of whatsoever nature to third parties to whom this report, or any part thereof, is made known. Any such party relies upon the report at their own risk.



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Our ref: 7076192/L25039/AW/MCC/rw

3 September 2019

AECOM  
8/F, Grand Central Plaza, Tower 2  
138 Shatin Rural Committee Road  
Shatin, N.T.

Attention: Mr Owen NG

**By Email & Post**

Dear Sir

**Agreement No. CE 45/2008 (CE)  
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works  
Independent Environmental Checker – Investigation  
Quarterly EM&A Summary Report (No. 24) – May 2019 to July 2019**

With reference to the Quarterly EM&A Report No. 24 for May 2019 to July 2019 (Version 3) certified by the ET Leader and received by us on 2 September 2019, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Section 13.4 of the EM&A Manual.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995 8120 or by email to antony.wong@smec.com; or our Mr Arthur Chiu on tel. 3995 8144 or by email to arthur.chiu@smec.com.

Yours faithfully



**Antony WONG**

Independent Environmental Checker

cc	CEDD/BCP	-	Mr LU Pei Yu / Mr William CHEUNG	by fax: 3547 1659
	ArchSD	-	Mr William WL CHENG	by fax: 2804 6805
	AECOM	-	Mr Pat LAM / Mr Perry YAM	by email
	Ronald Lu	-	Mr Peter YAM / Mr Justin CHEUNG	by email
	AUES	-	Mr TW TAM	by email

**SMEC ASIA LIMITED**  
27/F Ford Glory Plaza  
37-39 Wing Hong Street  
Cheung Sha Wan, Kowloon, Hong Kong  
T +852 3995 8100 F +852 3995 8101 E hongkong@smec.com  
www.smec.com



## EXECUTIVE SUMMARY

ES.01. This is the 24<sup>th</sup> Quarterly EM&A Summary Report for the “Liantang/Heung Yuen Wai Boundary Control Point and Associated Works” under Environmental Permit No. EP-404/2011/D (hereinafter “the EP”), covering the period from **1 May to 31 July 2019** (hereinafter “Reporting Period”).

### ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02. In the Reporting Period, the construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project included Contract 2, Contract 3, Contract 6, Contract 7 and Contract SS C505. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Monitoring Parameters / Inspection	Reporting Period	
		Monitoring Locations / Contracts	Total Occasions
Air Quality	1-hour TSP	9	417
	24-hour TSP	9	144
Construction Noise	$L_{eq(30min)}$ Daytime	10	125
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C,	40 scheduled and 0 extra of sampling day
		WM2A & WM2A-Cx	40 scheduled and 1 extra of sampling day
		WM2B & WM2B-C	(*) 40 Scheduled
		WM3 & WM3-C	40 scheduled and 0 extra of sampling day
		WM4, WM4-CA & WM4-CB	40 scheduled and 0 extra of sampling day
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats	0
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	13
		Contract 3	13
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Note: Extra monitoring day was due to measurement results exceedance

(#) IEC only joined inspection for Contract SS C505 once per month.

(\*) During the whole reporting period, water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)

### BREACHES OF ACTION/LIMIT LEVELS

ES.03. In the Reporting Period, no noise exceedance and valid noise complaint was registered for construction noise. For air quality, no exceedance recorded for 1-hour and 24-hour TSP monitoring. For water quality monitoring, a total of 4 Limit Level exceedances were recorded under the Project. The summary of exceedance for the Reporting Period is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--
	24-hour TSP	0	0	0	--	--

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Construction Noise	L <sub>eq</sub> (30min) Daytime	0	0	0	--	--
Water Quality	DO	0	0	0	--	--
	Turbidity	0	2	2	• Refer to ES.04	The Contractor should fully implement water quality mitigation measure.
	SS	0	4	4		

ES.04. Investigation Report for all water quality exceedances was completed by ET. A total of six (6) Limit Level exceedances were recorded during water quality monitoring. The investigation report for exceedance recorded at WM2A(a) on 29 and 31 May 2019 and 26 June 2019 revealed that the Contractor had implemented the water quality mitigation measures, in view of inflow of muddy water was observed from upstream of control station, it was concluded that the exceedances were not related to the works under the Project. The investigation report for exceedance recorded at WM3x on 31 July 2019 revealed that the exceedances were related to the rainstorm and unlikely caused by the works under Contract 2. Nevertheless, the Contractor was reminded to fully implement the water quality mitigation measure throughout the construction phase as far as practicable.

#### ENVIRONMENTAL COMPLAINT

ES.05. In this Reporting Period, no environmental complaint was received.

#### NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.06. No environmental summons or successful prosecutions were recorded in the Reporting Period.

#### REPORTING CHANGES

ES.07. The project (except for the BCP building complex) was commenced on 26 May 2019. In view of the partial commencement of operation to be considered as the same as the commencement of operation for the entire project, all relevant requirements as stipulated in the EP and the approved EIA report (including the EM&A Manual) for the commencement of operation of the Project shall be strictly complied with. The implementation status of mitigation measures for operation phase in the Reporting Period will be presented in the Report.

#### FUTURE KEY ISSUES

ES.08. During wet season, preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River, Kwan Tei River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual.

ES.09. In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.

ES.10. Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

ES.11. Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.

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## 1 INTRODUCTION

### 1.1 PROJECT BACKGROUND

- 1.1.1. Civil Engineering and Development Department is the Project Proponent and the Permit Holder of Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/C granted on 12 March 2015 and the latest Environmental Permit number EP-404/2011/D granted on 20 January 2017.
- 1.1.2. The Project consists of two main components: Construction of a Boundary Control Point (hereinafter referred as “BCP”); and Construction of a connecting road alignment. Layout plan of the Project is shown in [Appendix A](#).
- 1.1.3. The proposed BCP is located at the boundary with Shenzhen near the existing Chuk Yuen Village, comprising a main passenger building with passenger and cargo processing facilities and the associated customs, transport and ancillary facilities. The connecting road alignment consists of six main sections:
- 1) Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;
  - 2) Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Cheung Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;
  - 3) North Tunnel – this section comprises the tunnel segment at Cheung Shan and includes a ventilation building at the portals on either end of the tunnel;
  - 4) Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;
  - 5) South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung;
  - 6) Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.
- 1.1.4. Action-United Environmental Services & Consulting has been commissioned as an Independent ET to implement the relevant EM&A programme in accordance with the approved EM&A Manual, as well as the associated duties.
- 1.1.5. This is the 24<sup>th</sup> Quarterly EM&A Summary Report presenting the monitoring results and inspection findings for the Reporting Period from **1 May to 31 July 2019**.

### 1.2 REPORT STRUCTURE

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

<b>Section 1</b>	Introduction
<b>Section 2</b>	Project Organization and Construction progress
<b>Section 3</b>	Summary of Impact monitoring Requirements
<b>Section 4</b>	Air Quality Monitoring
<b>Section 5</b>	Construction Noise Monitoring
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<b>Section 11</b>	Implementation Status of Mitigation Measures
<b>Section 12</b>	Conclusions and Recommendations

## 2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

### 2.1 CONSTRUCTION CONTRACT PACKAGING

2.1.1 To facilitate the project management and implementation, the Project would be divided by the following contracts:

- Contract 2 (CV/2012/08)
- Contract 3 (CV/2012/09)
- Contract 4 (NE/2014/02)
- Contract 5 (CV/2013/03)
- Contract 6 (CV/2013/08)
- Contract 7 (NE/2014/03)
- ArchSD Contract No. SS C505

2.1.2 The details of each contracts is summarized below and the delineation of each contracts is shown in [Appendix A](#).

#### Contract 2 (CV/2012/08)

2.1.3 Contract 2 has awarded in December 2013 and construction work was commenced on 19 May 2014. Major Scope of Work of the Contract 2 is listed below:

- construction of an approximately 5.2km long dual two-lane connecting road (with about 0.4km of at-grade road and 4.8km of tunnel) connecting the Fanling Interchange with the proposed Sha Tau Kok Interchange;
- construction of a ventilation adit tunnel and the mid-ventilation building;
- construction of the north and south portal buildings of the Lung Shan Tunnel and their associated slope works;
- provision and installation of ventilation system, E&M works and building services works for Lung Shan tunnel and Cheung Shan tunnel and their portal buildings;
- construction of Tunnel Administration Building adjacent to Wo Keng Shan Road and the associated E&M and building services works; and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

#### Contract 3 (CV/2012/09)

2.1.4 Contract 3 was awarded in July 2013 and construction work was commenced on 5 November 2013. Major Scope of Work of the Contract 3 is listed below:

- construction of four link roads connecting the existing Fanling Highway and the south portal of the Lung Shan Tunnel;
- realignment of the existing Tai Wo Service Road West and Tai Wo Service Road East;
- widening of the existing Fanling Highway (HyD's entrustment works);
- demolishing existing Kiu Tau vehicular bridge and Kiu Tau footbridge and reconstruction of the existing Kiu Tau Footbridge (HyD's entrustment works); and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

#### Contract 4 (NE/2014/02)

2.1.5 Contract 4 was awarded in mid-April 2016 and construction work will be commenced on 2 May 2017. The scope of work of the Contract 4 includes:

- design, supply, delivery, installation, testing and commissioning of a traffic control and surveillance system for the connecting road linking up the Liantang / Heung Yuen Wai Boundary Control Point and the existing Fanling Highway.

#### Contract 5 (CV/2013/03)



- 2.1.6 Contract 5 has awarded in April 2013 and construction work was commenced in August 2013. Major Scope of Work of the Contract 5 is listed below:
- site formation of about 23 hectares of land for the development of the BCP;
  - construction of an approximately 1.6 km long perimeter road at the BCP including a 175m long depressed road;
  - associated diversion/modification works at existing local roads and junctions including Lin Ma Hang Road;
  - construction of pedestrian subway linking the BCP to Lin Ma Hang Road;
  - provision of resite area with supporting infrastructure for reprovisioning of the affected village houses; and
  - construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

Contract 6 (CV/2013/08)

- 2.1.7 Contract 6 was awarded in June 2015 and construction work was commenced on 23 October 2015. Major Scope of Work of the Contract 6 would be included below:
- construction of an approximately 4.6km long dual two-lane connecting road (with about 0.6km of at-grade road, 3.3km of viaduct and 0.7km of tunnel) connecting the BCP with the proposed Sha Tau Kok Road Interchange and the associated ventilation buildings;
  - associated diversion/modification works at access roads to the resite of Chuk Yuen Village;
  - provision of sewage collection, treatment and disposal facilities for the BCP and the resite of Chuk Yuen Village;
  - construction of a pedestrian subway linking the BCP to Lin Ma Hang Road;
  - provisioning of the affected facilities including Wo Keng Shan Road garden; and
  - construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

Contract 7 (NE/2014/03)

- 2.1.8 Contract 7 was awarded in December 2015 and the construction work was commenced 15 February 2016. Major Scope of Work of the Contract 7 would be included below:
- construction of the Hong Kong Special Administrative Region (HKSAR) portion of four vehicular bridge
  - construction of one pedestrian bridge crossing Shenzhen (SZ) River (cross boundary bridges)

ArchSD Contract No. SS C505

- 2.1.9 SS C505 has been awarded in July 2015 and construction work was commenced on 1 September 2015. Major Scope of Work of the SS C505 would be included below:
- passenger-related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, the interior fitting works for the pedestrian bridge crossing Shenzhen River, etc.;
  - cargo processing facilities including kiosks for clearance of goods vehicles, customs inspection platforms, X-ray building, etc.;
  - accommodation for the facilities inside of the Government departments providing services in connection with the BCP;
  - transport-related facilities inside the BCP including road networks, public transport interchange, transport drop-off and pick-up areas, vehicle holding areas and associated road furniture etc;
  - a public carpark; and
  - other ancillary facilities such as sewerage and drainage, building services provisions and electronic systems, associated environmental mitigation measure and landscape works.

## 2.2 PROJECT ORGANIZATION

2.2.1 The project organization is shown in [Appendix B](#). The responsibilities of respective parties are:

### Civil Engineering and Development Department (CEDD)

2.2.2 CEDD is the Project Proponent and the Permit Holder of the EP of the development of the Project and will assume overall responsibility for the project. An Independent Environmental Checker (IEC) shall be employed by CEDD to audit the results of the EM&A works carried out by the ET.

### Architectural Services Department (ArchSD)

2.2.3 ArchSD acts as the works agent for Development Bureau (DEVB), for Contract SS C505 Liantang/ Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities.

### Environmental Protection Department (EPD)

2.2.4 EPD is the statutory enforcement body for environmental protection matters in Hong Kong.

### Ronald Lu & Partners (Hong Kong) Ltd (The Architect)

2.2.5 Ronald Lu & Partners (Hong Kong) Ltd is appointed by ArchSD as an Architect for Contract SS C505 Liantang/ Heung Yuen Wai Boundary Control Point (BCP) – BCP Buildings and Associated Facilities. It is responsible for overseeing the construction works of Contract SS C505 and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the Architect with respect to EM&A are:

- Monitor the Contractors' compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and their effectiveness
- Monitor Contractors' and ET's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual
- Facilitate ET's implementation of the EM&A programme
- Participate in joint site inspection by the ET and IEC
- Oversee the implementation of the agreed Event / Action Plan in the event of any exceedance
- Adhere to the procedures for carrying out complaint investigation
- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

### Engineer or Engineers Representative (ER)

2.2.6 The ER is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A are:

- Monitor the Contractors' compliance with contract specifications, including the implementation and operation of the environmental mitigation measures and their effectiveness
- Monitor Contractors', ET's and IEC's compliance with the requirements in the Environmental Permit (EP) and EM&A Manual
- Facilitate ET's implementation of the EM&A programme
- Participate in joint site inspection by the ET and IEC
- Oversee the implementation of the agreed Event / Action Plan in the event of any exceedance
- Adhere to the procedures for carrying out complaint investigation

- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's Regulation of Shenzhen River Stage 4 (RSR 4)" Project discussing regarding the cumulative impact issues.

The Contractor(s)

2.2.7 There will be one contractor for each individual works contract. The Contractor(s) should report to the ER. The duties and responsibilities of the Contractor are:

- Comply with the relevant contract conditions and specifications on environmental protection
- Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of EM & A Facilitate ET's monitoring and site inspection activities
- Participate in the site inspections by the ET and IEC, and undertake any corrective actions
- Provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts
- Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans
- Implement measures to reduce impact where Action and Limit levels are exceeded
- Adhere to the procedures for carrying out complaint investigation

Environmental Team (ET)

2.2.8 One ET will be employed for this Project. The ET shall not be in any way an associated body of the Contractor(s), and shall be employed by the Project Proponent/Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person who has at least 7 years' experience in EM&A and has relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under the Contract(s), to enable fulfillment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET shall report to the Project Proponent and the duties shall include:

- Monitor and audit various environmental parameters as required in this EM&A Manual
- Analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising
- Carry out regular site inspection to investigate and audit the Contractors' site practice, equipment/plant and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems
- Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications
- Audit environmental conditions on site
- Report on the environmental monitoring and audit results to EPD, the ER, the IEC and Contractor(s) or their delegated representatives
- Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans
- Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by IEC
- Advise the Contractor(s) on environmental improvement, awareness, enhancement measures etc., on site
- Adhere to the procedures for carrying out complaint investigation
- Liaison with the client departments, Engineer/Engineer's Representative, ET, IEC and the Contractor(s) of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

Independent Environmental Checker (IEC)

- 2.2.9 One IEC will be employed for this Project. The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor(s) or the ET for the Project. The IEC should be employed by the Permit Holder (i.e., CEDD) prior to the commencement of the construction of the Project. The IEC should have at least 10 years' experience in EM&A and have relevant professional qualifications. The duty of IEC should be:
- Provide proactive advice to the ER and the Project Proponent on EM&A matters related to the project, independent from the management of construction works, but empowered to audit the environmental performance of construction
  - Review and audit all aspects of the EM&A programme implemented by the ET
  - Review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET
  - Arrange and conduct regular, at least monthly site inspections of the works during construction phase, and ad hoc inspections if significant environmental problems are identified
  - Check compliance with the agreed Event / Action Plan in the event of any exceedance
  - Check compliance with the procedures for carrying out complaint investigation
  - Check the effectiveness of corrective measures
  - Feedback audit results to ET by signing off relevant EM&A proforma
  - Check that the mitigation measures are effectively implemented
  - Report the works conducted, the findings, recommendation and improvement of the site inspections, after reviewing ET's and Contractor's works, and advices to the ER and Project Proponent on a monthly basis
  - Liaison with the client departments, Engineer/Engineer's Representative, ET, IEC and the Contractor(s) of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

### 2.3 CONCURRENT PROJECTS

- 2.3.1 The concurrent construction works that may be carried out include, but not limited to, the following:
- (a) Regulation of Shenzhen River Stage IV;
  - (b) Widening of Fanling Highway – Tai Hang to Wo Hop Shek Interchange – Contract No. HY/2012/06;
  - (c) Construction of BCP facilities in Shenzhen.

### 2.4 CONSTRUCTION PROGRESS

- 2.4.1 In the Reporting Period, the major construction activity conducted under the Project is located in Contracts 2, 3, 4, 6, 7 and SS C505 and they are summarized in below.

#### Contract 2 (CV/2012/08)

- 2.4.2 Construction work of Contract 2 was commenced on May 2014, the following activities were conducted in the Reporting Period.

North Portal	<ul style="list-style-type: none"><li>• External backfilling and reinstatement</li><li>• Landscaping works</li></ul>
South Portal	<ul style="list-style-type: none"><li>• External backfilling and reinstatement</li><li>• Landscaping works</li></ul>

#### Contract 3 (CV/2012/09)

- 2.4.3 Contract commenced in November 2013, the following activities were conducted in the Reporting Period.
- Cable detection
  - Noise barrier construction (for May 2019)
  - Road pavement works

- Water main laying works (on Grade)
- Installation of Noise barrier panel (on Grade)
- Road Drainage Works
- Construction of Slope works
- Landscaping works

Contract 4 (NE/2014/02)

- 2.4.4 The Contract was awarded in mid-April 2016 and the construction work was commenced on 2 May 2017. In this Reporting Period, construction activities conducted are listed below:
- OPT & DLP of control room, TCSS & PA

Contract 5 (CV/2013/03)

- 2.4.5 The construction works under Contract 5 was substantially completed on 31 August 2016.

Contract 6 (CV/2013/08)

- 2.4.6 Contract 6 has awarded in June 2015 and construction work was commenced on 23 October 2015. In this Reporting Period, construction activities conducted are listed below:
- Water Pipe Connection Work
  - Sewage Treatment Plant Construction
  - Road Construction
  - Landscaping

Contract 7 (NE/2014/03)

- 2.4.7 Contract 7 has awarded in December 2015 and construction work was commenced on 15 February 2015. In this Reporting Period, construction activities conducted are listed below:
- Noise barrier construction at Bridge D & E (for May 2019)
  - Parapet installation at Bridge A & E
  - Drainage cleaning and CCTV inspection at perimeter road
  - Shenzhen River Reinstatement
  - Landscape Softwork at Portion Z

Contract SS C505

- 2.4.8 Contract SS C505 has awarded in July 2015 and construction work was commenced on 1 September 2015. In this Reporting Period, construction activities conducted are listed below:
- Building no. 2, 4-8, 10-14, 16-18, 26, 32-35, 37-40 constructions, integrated ABWF & MEP Works
  - Building no. 20 - PTB structure works, ABWF Works & MEP Installation
  - Building no. 20 - PTB External Works including Building 21-24
  - Bridge C Integrated ABWF & MEP Installation Works (C7 Portion)
  - Bridge 1 Phase 3 - retaining wall, bridge decks 1B RC works, road and finishes works
  - Bridge 2 to 5 Phase 3 - road and finishes works
  - External Works – Water Meter Room Connection (Inbound & outbound)
  - External Utilities Works - DSD inspection
  - External Road & Pavement Works - for inbound - Phase 1 FS inspection (concrete pavement) & for Phase 2 FS inspection
  - External Landscape – Inbound & Outbound Area
  - Testing & Commissioning Phase 1, 2 & 3
  - FS Inspection Phase 1 – 3

## 2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.5.1 In according to the EP, the required documents have submitted to EPD which listed in below:

- Project Layout Plans of Contracts 2, 3, 4, 5, 6, 7 and SS C505
- Landscape Plan
- Topsoil Management Plan
- Environmental Monitoring and Audit Programme
- Baseline Monitoring Report (TCS00690/13/600/R0030v3) for the Project
- Waste Management Plan of the Contracts 2, 3, 4, 5, 6, 7 and SS C505
- Contamination Assessment Plan (CAP) and Contamination Assessment Report (CAR) for Po Kat Tsai, Loi Tung and the workshops in Fanling
- Vegetation Survey Report
- Woodland Compensation Plan
- Habitat Creation Management Plan
- Wetland Compensation Plan

2.5.2 Summary of the relevant permits, licenses, and/or notifications on environmental protection for the Project of each contracts are presented in *Table 2-1*.

**Table 2-1 Status of Environmental Licenses and Permits of the Contracts**

Item	Description	License/Permit Status			
		Ref. no.	Effective Date	Expiry Date	
<b>Contract 2</b>					
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864	31 Dec 2013	Till Contract ends	
2	Chemical Waste Producer Registration	<i>North Portal</i> Waste Producers Number: No.5213-652-D2523-01	25 Mar 2014	Till Contract ends	
		<i>Mid-Vent Portal</i> Waste Producers Number: No.5213-634-D2524-01	25 Mar 2014	Till Contract ends	
		<i>South Portal</i> Waste Producers Number: No.5213-634-D2526-01	9 Apr 2014	Till Contract ends	
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014 (South Portal )	8 Oct 2014	30 Sep 2019	
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	8 Jan 2014	Till Contract ends	
5	Construction Noise Permit	GW-RN0063-19	North Portal	31-Jan-2019	31-May-2019
		GW-RN0065-19		31-Jan-2019	31-May-2019
		GW-RN0084-19		11-Feb-2019	31-May-2019
		GW-RN0099-19	Mid Vent	13-Feb-2019	31-May-2019
		GW-RN0098-19		13-Feb-2019	31-May-2019
		GW-RN0180-19	South Portal	03-Apr-2019	30-Jun-2019
		GW-RN0183-19		03-Apr-2019	30-Jun-2019
GW-RN0195-19	Admin Bldg	03-Apr-2019	30-Sep-2019		

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)	12-Apr-2016	11-Apr-2021
<b>Contract 3</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101	17 Jul 2013	Till Contract ends
2	Chemical Waste Producer Registration	Waste Producers Number: No.:5113-634-C3817-01	7 Oct 2013	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.:WT00032188 – 2018	20 Sep 2018	31 Aug 2023
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914	2 Aug 13	Till Contract ends
5	Construction Noise Permit	GW-RN0693-18	18 Dec 2018	25 May 2019
		GW-RN0694-18	19 Dec 2018	25 May 2019
		GW-RN0696-18	19 Dec 2018	25 May 2019
		GW-RN0699-18	18 Dec 2018	25 May 2019
		GW-RN0058-19	25 Feb 2019	24 Aug 2019
		GW-RN0064-19	06 Mar 2019	05 Sep 2019
		GW-RN0067-19	22 Feb 2019	21 Aug 2019
		GW-RN0208-19	6 Apr 2019	5 Oct 2019
		GW-RN0310-19	26 May 2019	25 Nov 2019
		GW-RN0312-19	26 May 2019	25 Nov 2019
		GW-RN0313-19	26 May 2019	25 Nov 2019
GW-RN0494-19	1 Aug 2019	26 Nov 2019		
<b>Contract 6</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390614	29 Jun 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-652-C3969-01	31 Aug 2015	Till the end of Contract
3	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022707	9 Jul 2015	Till the end of Contract
4	Water Pollution Control Ordinance - Discharge License	No.:WT00024574-2016	31 May 2016	31 May 2021
		No.:WT00024576-2016	31 May 2016	31 May 2021
		No.:WT00024742-2016	14 June 2016	30 June 2021
		No.:WT00024746-2016	14 June 2016	30 June 2021
5	Construction Noise Permit	GW-RN0212-19	3 Apr 2019	31 May 2019
<b>Contract SS C505</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	13 Jul 2015	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
2	Chemical Waste Producer Registration	Waste Producer No.: 5213-642-L1048-07	16 Sep 2015	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024865-2016	8 Jul 2016	30 Nov 2020
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022831	23 Jul 2015	Till the end of Contract
5	Construction Noise Permit	GW-RN0133-19	9 Mar 2019	8 May 2019
		GW-RN0258-19	15 Apr 2019	14 Jun 2019
		GW-RN0298-19	9 May 2019	8 Jul 2019
		GW-RN0422-19	20 Jun 2019	19 Aug 2019
<b>Contract 7</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024129	21 Jan 2016	Till the end of Contract
<b>Contract 4</b>				
1	Air pollution Control (Construction Dust) Regulation	Ref. No. 405353	22 July 2016	Till the end of Contract
2	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024973	13 May 2016	Till the end of Contract



### 3 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

#### 3.1 GENERAL

3.1.1 The Environmental Monitoring and Audit requirements are set out in the Approved 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.

3.1.2 A summary of construction phase EM&A requirements are presented in the sub-sections below.

#### 3.2 MONITORING PARAMETERS

3.2.1 The EM&A program of construction phase monitoring shall cover 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*.

**Table 3-1 Summary of EM&A Requirements**

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> <li>• 1-hour TSP by Real-Time Portable Dust Meter; and</li> <li>• 24-hour TSP by High Volume Air Sampler.</li> </ul>
Noise	<ul style="list-style-type: none"> <li>• <math>L_{eq(30min)}</math> in normal working days (Monday to Saturday) 07:00-19:00 except public holiday; and</li> <li>• 3 sets of consecutive <math>L_{eq(5min)}</math> on restricted hours i.e. 19:00 to 07:00 next day, and whole day of public holiday or Sunday</li> <li>• Supplementary information for data auditing, statistical results such as <math>L_{10}</math> and <math>L_{90}</math> shall also be obtained for reference.</li> </ul>
Water Quality	<b>In-situ Measurements</b> <ul style="list-style-type: none"> <li>• Dissolved Oxygen Concentration (mg/L);</li> <li>• Dissolved Oxygen Saturation (% );</li> <li>• Turbidity (NTU);</li> <li>• pH unit;</li> <li>• Water depth (m); and</li> <li>• Temperature (°C).</li> </ul>
	<b>Laboratory Analysis</b> <ul style="list-style-type: none"> <li>• Suspended Solids (mg/L)</li> </ul>

#### 3.3 MONITORING LOCATIONS

3.3.1 The designated monitoring locations as recommended in the *EM&A Manual* are shown in *Appendix C*. As the access to some of the designated monitoring locations was questionable due to safety reason or denied by the landlords, alternative locations therefore have had proposed. The latest alternative monitoring locations has been updated in the revised EM&A Programme (Rev.7) which approved by EPD on 7 April 2017. Besides, in view of Location AM1b was demolished and returned to the landlord on 27 April 2018, alternative location AM1c was proposed by ET and approved by EPD on 26 November 2018. *Table 3-2*, *Table 3-3* and *Table 3-4* are respectively listed the air quality, construction noise and water quality monitoring locations for the Project and a map showing these monitoring stations is presented in *Appendix D*.

**Table 3-2 Impact Monitoring Stations - Air Quality**

Station ID	Description	Works Area	Related to the Work Contract
AM1c(*)	Open area of Tsung Yuen Ha Village No. 63	BCP	SS C505 Contract 7

Station ID	Description	Works Area	Related to the Work Contract
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 6
AM3	Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village.	LMH to Frontier Closed Area	Contract 6
AM4b <sup>^</sup>	House no. 10B1 Nga Yiu Ha Village	LMH to Frontier Closed Area	Contract 6
AM5a <sup>^</sup>	Ping Yeung Village House	Ping Yeung to Wo Keng Shan	Contract 6
AM6	Wo Keng Shan Village House	Ping Yeung to Wo Keng Shan	Contract 6
AM7b <sup>@</sup>	Loi Tung Village House	Sha Tau Kok Road	Contract 2 Contract 6
AM8	Po Kat Tsai Village No. 4	Po Kat Tsai	Contract 2
AM9b <sup>#</sup>	Nam Wa Po Village House No. 80	Fanling	Contract 3

*# Proposal for the change of air quality monitoring location from AM9a to AM9b was submitted to EPD on 4 Nov 2013 after verified by the IEC and it was approved by EPD (EPD's ref.: (15) in EP 2/N7/A/52 Pt.10 dated 8 Nov 2013).*

*@ Proposal for the change of air quality monitoring location from AM7a to AM7b was submitted to EPD on 4 June 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (7) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).*

*^ Proposal for change of air quality monitoring locations was enclosed in the updated EM&A Programme which approval by EPD on 29 Mar 2016. Besides, Location AM1b was temporary suspended (24-hour TSP monitoring) since 27 April 2018 as the rented land was demolished and returned to the landlord.*

*\* Revised proposal for alternative location AM1c was submitted to EPD on 31 October 2018 after verified by the IEC and it was approved by EPD (EPD's ref.: ( ) in Ax (1) to EP 2/N7/A/52 Pt.26 dated 26 November 2018)*

**Table 3-3 Impact Monitoring Stations - Construction Noise**

Station ID	Description	Works Area	Related to the Work Contract
NM1	Tsung Yuen Ha Village House No. 63	BCP	SS C505 Contract 7
NM2a <sup>#</sup>	Village House near Lin Ma Hang Road	Lin Ma Hang to Frontier Closed Area	Contract 6
NM3	Ping Yeung Village House (facade facing northeast)	Ping Yeung to Wo Keng Shan	Contract 6
NM4	Wo Keng Shan Village House	Ping Yeung to Wo Keng Shan	Contract 6
NM5	Village House, Loi Tung	Sha Tau Kok Road	Contract 2, Contract 6
NM6	Tai Tong Wu Village House 2	Sha Tau Kok Road	Contract 2, Contract 6
NM7	Po Kat Tsai Village	Po Kat Tsai	Contract 2
NM8	Village House, Tong Hang	Fanling	Contract 2 Contract 3
NM9	Village House, Kiu Tau Village	Fanling	Contract 3
NM10	Nam Wa Po Village House No. 80	Fanling	Contract 3

*# Proposal for the change of construction noise monitoring location from NM2 to NM2a was verified by the IEC on 6 May 2016 and was effective on 9 May 2016.*

Table 3-4 Impact Monitoring Stations - Water Quality

Station ID	Description	Coordinates of Designated / Alternative Location		Nature of the location	Related to the Work Contract
WM1	Downstream of Kong Yiu Channel	833 679	845 421	Alternative location located at upstream 51m of the designated location	SS C505 Contract 6
WM1- Control	Upstream of Kong Yiu Channel	834 185	845 917	NA	SS C505 Contract 6
WM2A	Downstream of River Ganges	834 204	844 471	Alternative location located at downstream 81m of the designated location	Contract 6
WM2A(a)*	Downstream of River Ganges	834 191	844 474	Alternative location located at upstream 70m of the designated location	Contract 6
WM2A- Control#	Upstream of River Ganges	835 377	844 188	Alternative location located at upstream 160m of the designated location	Contract 6
WM2B	Downstream of River Ganges	835 433	843 397	NA	Contract 6
WM2B- Control	Upstream of River Ganges	835 835	843 351	Alternative location located at downstream 31m of the designated location	Contract 6
WM3x#	Downstream of River Indus	836 206	842 270	Alternative location located at downstream 180m of the designated location	Contract 2 Contract 6
WM3- Control	Upstream of River Indus	836 763	842 400	Alternative location located at downstream 26m of the designated location	Contract 2# Contract 6
WM4	Downstream of Ma Wat Channel	833 850	838 338	Alternative location located at upstream 11m of the designated location	Contract 2 Contract 3
WM4- Control A	Kau Lung Hang Stream	834 028	837 695	Alternative location located at downstream 28m of the designated location	Contract 2 Contract 3
WM4- Control B	Upstream of Ma Wat Channel	833760	837395	Alternative location located at upstream 15m of the designated location	Contract 2 Contract 3

Note: EPD has approved the revised EM&A Programme (Rev.7) which proposed that (1) if the measured water depth of the monitoring station is lower than 150 mm, alternative location based on the criteria were selected to perform water monitoring; and (2) If no suitable alternative location could be found within 15m far from the original location, the sampling at that location will be cancelled since sampling at too far from the designated location could not make a representative sample in accordance with the updated EM&A Programme (Rev. 07) (Section 4.1.4) (EPD ref.: ( ) in EP2/N7/A/52 Ax(1) Pt.20 dated 7 April 2017)

(\*) Proposal for the change of water monitoring location from WM2A to WM2A(a) was verified by the IEC and it was approved by EPD. (EPD's ref. (10) in EP 2/N7/A/52 Pt.19)

(#) Proposal for the change of water quality monitoring location (WM3x and WM2A-C) was included in the EM&A Programme Rev .05 which approved by EPD on 29 March 2016 (EPD ref.: (3) in EP2/N7/A/52 Ax(1) Pt.19)

### 3.4 MONITORING FREQUENCY AND PERIOD

3.4.1 The requirements of impact monitoring are stipulated in Sections 2.1.6, 3.1.5 and 4.1.6 of the approved EM&A Manual and presented as follows.

#### Air Quality Monitoring

3.4.2 Frequency of impact air quality monitoring is as follows:

- 1-hour TSP                      3 times every six days during course of works
- 24-hour TSP                    Once every 6 days during course of works.

Noise Monitoring

3.4.3 One set of  $L_{eq(30min)}$  as 6 consecutive  $L_{eq(5min)}$  between 0700-1900 hours on normal weekdays and once every week during course of works. If construction work necessary to carry out at other time periods, i.e. restricted time period (19:00 to 07:00 the next morning and whole day on public holidays) (hereinafter referred as “the restricted hours”), 3 consecutive  $L_{eq(5min)}$  measurement will depend on CNP requirements to undertake. Supplementary information for data auditing, statistical results such as  $L_{10}$  and  $L_{90}$  shall also be obtained for reference.

Water Quality Monitoring

3.4.4 The water quality monitoring frequency shall be 3 days per week during course of works. The interval between two sets of monitoring shall not be less than 36 hours.

**3.5 MONITORING EQUIPMENT**

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 approve.

3.5.2 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.3 All equipment to be used for air quality monitoring is listed in *Table 3-5*.

**Table 3-5                      Air Quality Monitoring Equipment**

Equipment	Model
<b>24-Hour TSP</b>	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5025A
<b>1-Hour TSP</b>	
Portable Dust Meter	Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter

Wind Data Monitoring Equipment

3.5.4 According to the approved EM&A Manual, wind data monitoring equipment shall also be provided and set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:

- 1) The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.
- 2) The wind data should be captured by a data logger. The data shall be downloaded for analysis at least once a month.
- 3) The wind data monitoring equipment should be re-calibrated at least once every six months.
- 4) Wind direction should be divided into 16 sectors of 22.5 degrees each.

3.5.5 ET has liaised with the landlords of the successful granted HVS installation premises. However, the owners rejected to provide premises for wind data monitoring equipment installation.

3.5.6 Under this situation, the ET proposed alternative methods to obtain representative wind data. Meteorological information as extracted from “the Hong Kong Observatory Ta Kwu Ling Station”

is alternative method to obtain representative wind data. For Ta Kwu Ling Station, it is located nearby the Project site. Moreover, this station is located at 15m above mean sea level while its anemometer is located at 13m above the existing ground which in compliance with the general setting up requirement. Furthermore, this station also can be to provide the humidity, rainfall, and air pressure and temperature etc. meteorological information. In Hong Kong of a lot development projects, weather information extracted from Hong Kong Observatory is common alternative method if weather station installation not allowed.

Noise Monitoring

- 3.5.7 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 m s<sup>-1</sup>.
- 3.5.8 Noise monitoring equipment to be used for monitoring is listed in *Table 3-6*.

**Table 3-6 Construction Noise Monitoring Equipment**

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238 and Rion NL-52
Calibrator	Rion NC-74 & Rion NC-75
Portable Wind Speed Indicator	Testo Anemometer

- 3.5.9 Sound level meters listed above comply with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications, as recommended in TM issued under the NCO. The acoustic calibrator and sound level meter to be used in the impact monitoring will be calibrated yearly.

Water Quality Monitoring

- 3.5.10 DO and water temperature should be measured in-situ by a DO/temperature meter. The instrument should be portable and weatherproof using a DC power source. It should have a membrane electrode with automatic temperature compensation complete with a cable. The equipment should be capable of measuring:
- DO level in the range of 0-20 mg/l and 0-200% saturation; and
  - temperature of between 0 and 45 degree Celsius.
- 3.5.11 A portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions accordingly to the APHA Standard Methods.
- 3.5.12 The instrument should be portable and weatherproof using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU.
- 3.5.13 A portable, battery-operated echo sounder or tape measure will be used for the determination of water depth at each designated monitoring station as appropriate.
- 3.5.14 A water sampler e.g. Kahlsico Water Sampler, which is a transparent PVC cylinder with capacity not less than 2 litres, will be used for water sampling if water depth over than 0.5m. For sampling from very shallow water depths e.g. <0.5 m, water sample collection will be directly from water surface below 100mm use sampling plastic bottle to avoid inclusion of bottom sediment or humus. Moreover, Teflon/stainless steel bailer or self-made sampling buckets maybe used for water sampling. The equipment used for sampling will be depended the sampling location and depth situations.
- 3.5.15 Water samples for laboratory measurement of SS will be collected in high density polythene bottles, packed in ice (cooled to 4 °C without being frozen), and delivered to the laboratory in the same day as the samples were collected.

- 3.5.16 Analysis of suspended solids should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 2 mg/L.
- 3.5.17 Water quality monitoring equipment used in the impact monitoring is listed in *Table 3-7*. Suspended solids (SS) analysis is carried out by a local HOKLAS-accredited laboratory, namely *ALS Technichem (HK) Pty Ltd*.

**Table 3-7 Water Quality Monitoring Equipment**

Equipment	Model
Water Depth Detector	Eagle Sonar or tape measures
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or teflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI Professional Plus /YSI PRO20 Handheld Dissolved Oxygen Instrument/ YSI 550A Multifunctional Meter/ YSI Professional DSS
pH meter	YSI Professional Plus / AZ8685 pH pen-style meter/ YSI 6820/ 650MDS/ YSI Professional DSS
Turbidimeter	Hach 2100Q/ YSI 6820/ 650MDS/ YSI Professional DSS
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-liter plastic cool box with Ice pad

### 3.6 MONITORING METHODOLOGY

#### 1-hour TSP Monitoring

- 3.6.1 The 1-hour TSP monitor was a brand named "Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter" which is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° 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.
- 3.6.2 The 1-hour TSP meter is used within the valid period as follow manufacturer's Operation and Service Manual.

#### 24-hour TSP Monitoring

- 3.6.3 The equipment used for 24-hour TSP measurement is Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The High Volume Air Sampler (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
- 3.6.4 The HVS is operated and calibrated on a regular basis in accordance with the manufacturer's

instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out in two month interval.

- 3.6.5 24-hour TSP is collected by the ET on filters of HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET keep all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% RH (Relative Humidity) and 25°C, for six months prior to disposal.

#### Noise Monitoring

- 3.6.6 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level ( $L_{eq}$ ) measured in decibels dB(A). Supplementary statistical results ( $L_{10}$  and  $L_{90}$ ) were also obtained for reference.
- 3.6.7 During the monitoring, all noise measurements were performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ).  $Leq_{(30min)}$  in six consecutive  $Leq_{(5min)}$  measurements were used as the monitoring parameter for the time period between 0700-1900 hours on weekdays; and also  $Leq_{(15min)}$  in three consecutive  $Leq_{(5min)}$  measurements is used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.
- 3.6.8 Prior of noise measurement, the accuracy of the sound level meter is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking was performed before and after the noise measurement.

#### Water Quality

- 3.6.9 Water quality monitoring is conducted at the designated locations. The sampling produce with the in-situ monitoring are presented as below:

#### *Sampling Procedure*

- 3.6.10 A Digital Global Positioning System (GPS) is used to identify the designated monitoring stations prior to water sampling. A portable, battery-operated echo sounder is used for the determination of water depth at each station. At each station, water sample would be collected from 0.1m below water surface or the water surface to prevent the river bed sediment for stirring.
- 3.6.11 If the water level of a monitoring station is too shallow when sampling, sediment would be disturbed which affecting the accuracy of water quality monitoring. In order to avoid disturbing sediment, depth limits should be set up for the water sampling for the ease of reference. When the measured water depth of the monitoring station (both control and impact stations) is lower than 150mm, water monitoring would not be to perform at that monitoring location. Instead, the monitoring location will be moved to a temporary alternative location monitoring location based on the criteria below:-
- (a) the alternative location should be either upstream or downstream of the original location and at the same the river/drain channel
  - (b) the alternative location should be within 15m far from the original location
  - (c) if no suitable alternative location could be found within 15m far from the original location, the sampling at that location will be cancelled since sampling at too far from the designated location could not make a representative sample.
- 3.6.12 The sample container will be rinsed with a portion of the water sample. The water sample then will be transferred to the high-density polythene bottles as provided by the laboratory, labeled with a unique sample number and sealed with a screw cap.
- 3.6.13 Before sampling, general information such as the date and time of sampling, weather condition as well as the personnel responsible for the monitoring would be recorded on the field data sheet.

- 3.6.14 A 'Willow' 33-liter plastic cool box packed with ice will be used to preserve the water samples prior to arrival at the laboratory for chemical determination. The water temperature of the cool box is maintained at a temperature as close to 4<sup>0</sup>C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

In-situ Measurement

- 3.6.15 Instrument including YSI PRO20 Handheld Dissolved Oxygen Instrument and YSI 550A Multifunctional Meter are used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation. Before each round of monitoring, the dissolved oxygen probe would be calibrated by the wet bulb method.
- 3.6.16 A portable AZ8685 pH pen-style meter or YSI Professional Plus is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1.
- 3.6.17 A portable Hach 2100Q Turbidimeter is used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU. StablCal<sup>®</sup> Standards of known NTU are used for calibration of the instrument before and after measurement.
- 3.6.18 All in-situ measurement equipment are calibrated by HOKLAS accredited laboratory of three month interval.

Laboratory Analysis

- 3.6.19 All water samples are analyzed with Suspended Solids (SS) as specified in the *EM&A Manual* by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS analysis is determined by the laboratory upon receipt of the water samples using *APHA Standard Methods 2540D* (namely ALS Method EA-025 as accredited HOKLAS Scheme) started within 48 hours of water sample receipt.

**3.7 EQUIPMENT CALIBRATION**

- 3.7.1 Calibration of the HVS is performed upon installation and thereafter at bimonthly intervals in accordance with the manufacturer's instruction using the certified standard calibrator (TISCH Model TE-5025A). Moreover, the Calibration Kit would be calibrated annually. The calibration data are properly documented and the records are maintained by ET for future reference.
- 3.7.2 The 1-hour TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment would 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.
- 3.7.3 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.
- 3.7.4 All water quality monitoring equipment is calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.7.5 The calibration certificates of all monitoring equipment used for the impact monitoring program in the Reporting Period and the HOKLAS accredited certificate of laboratory are presented in the relevant monthly EM&A reports.

**3.8 DERIVATION 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. According to the approved Environmental Monitoring and Audit Manual, the air quality, construction noise and water quality criteria were set up, namely Action and Limit



levels are listed in *Tables 3-8, 3-9 and 3-10*.

**Table 3-8 Action and Limit Levels for Air Quality Monitoring**

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )		Limit Level ( $\mu\text{g}/\text{m}^3$ )	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1b	265	143	500	260
AM2	268	149		
AM3	269	145		
AM4b	267	148		
AM5a	268	143		
AM6	269	148		
AM7b	275	156		
AM8	269	144		
AM9b	271	151		

**Table 3-9 Action and Limit Levels for Construction Noise**

Monitoring Location	Action Level	Limit Level in dB(A)
	Time Period: 0700-1900 hours on normal weekdays	
NM1, NM2a, NM3, NM4, NM5, NM6, NM7, NM8, NM9, NM10	When one or more documented complaints are received	75 dB(A) <sup>Note 1 &amp; Note 2</sup>

*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 3-10 Action and Limit Levels for Water Quality**

Parameter	Performance criteria	Monitoring Location				
		WM1	WM2A(a)	WM2B	WM3x	WM4
DO (mg/L)	Action Level	(*)4.23	(**)4.00	(*)4.74	(**)4.00	(*)4.14
	Limit Level	(#)4.19	(**)4.00	(#)4.60	(**)4.00	(#)4.08
Turbidity (NTU)	Action Level	51.3	24.9	11.4	13.4	35.2
	Limit Level	67.6	33.8	12.3	14.0	38.4
SS (mg/L)	Action Level	54.5	14.6	11.8	12.6	39.4
	Limit Level	64.9	17.3	12.4	12.9	45.5

**Remarks:**

(\*) The Proposed **Action Level** of Dissolved Oxygen is adopted to be used 5%-ile of baseline data

(\*\*) The Proposed **Action & Limit Level** of Dissolved Oxygen is used 4mg/L

(#) The Proposed **Limit Level** of Dissolved Oxygen is adopted to be used 1%-ile of baseline data

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 E](#).

**3.9 DATA MANAGEMENT AND DATA QA/QC CONTROL**

3.9.1 All monitoring data will be handled by the ET's in-house data recording and management system. The monitoring data recorded in the equipment will be downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data will input into a computerized database properly maintained by the ET. The laboratory results will be input directly into the computerized database and checked by personnel other than those who input the data.

- 3.9.2 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, construction works under the project have been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505 and air quality monitoring was performed at all designated locations.

### 4.2 SUMMARY OF MONITORING RESULTS

4.2.1 Summary of air quality monitoring results during the Reporting Period are tabulated in *Table 4-1*. The relevant graphical plots throughout the Reporting Period are presented in *Appendix F*.

**Table 4-1 Summary of Air Quality Monitoring Results**

Monitoring Location	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )			24-hour TSP ( $\mu\text{g}/\text{m}^3$ )		
	Max	Min	Mean	Max	Min	Mean
AM1c	127	34	64	60	13	32
Record Date	22-May-19	20-Jun-19	48 events	20-May-19	11-Jul-19	16 events
AM2	131	42	74	110	32	68
Record Date	22-May-19	20-Jun-19	48 events	14-May-19	24-Jun-19	16 events
AM3	129	40	71	109	14	59
Record Date	22-May-19	20-Jun-19	48 events	11-Jul-19	18-Jun-19	16 events
AM4b	86	41	61	57	14	35
Record Date	15-Jun-19	21-Jun-19	45 events	11-May-19	19-Jul-19	16 events
AM5a	83	37	61	121	30	48
Record Date	23-May-19	21-Jun-19	45 events	19-Jul-19	2-Jul-19	16 events
AM6	95	41	64	97	27	63
Record Date	15-Jun-19	21-Jun-19	45 events	14-Jun-19	31-Jul-19	16 events
AM7b	79	48	63	135	23	58
Record Date	4-Jun-19	21-Jun-19	45 events	13-Jul-19	6-May-19	16 events
AM8	80	45	60	56	10	26
Record Date	4-Jun-19	10-Jun-19	45 events	19-Jul-19	8-Jun-19, 25-Jul-19, 31-Jul-19	16 events
AM9b	128	34	57	88	12	37
Record Date	19-Jul-19	8-Jun-19	48 events	17-Jul-19	18-Jun-19	16 events

4.2.2 Breaches of air quality A/L levels and statistical analysis of compliance for the air quality monitoring results are summarized in *Table 4-2*.

**Table 4-2 Summaries of Breaches of Air Quality A/L Levels**

Location	Exceedance	1-hour TSP	24-hour TSP	Total
AM1	Action Level	0	0	0
	Limit Level	0	0	0
AM2	Action Level	0	0	0
	Limit Level	0	0	0
AM3	Action Level	0	0	0
	Limit Level	0	0	0
AM4a	Action Level	0	0	0
	Limit Level	0	0	0
AM5a	Action Level	0	0	0
	Limit Level	0	0	0
AM6	Action Level	0	0	0
	Limit Level	0	0	0
AM7b	Action Level	0	0	0

Location	Exceedance	1-hour TSP	24- hour TSP	Total
	Limit Level	0	0	0
AM8	Action Level	0	0	0
	Limit Level	0	0	0
AM9b	Action Level	0	0	0
	Limit Level	0	0	0

4.2.3 In the Reporting Period, all the 1-hour TSP and 24-hour TSP monitoring results were below the Action/Limit Levels.

4.2.4 The summary of weather conditions during the Reporting Period is presented in [Appendix G](#).

## 5 CONSTRUCTION NOISE MONITORING

### 5.1 GENERAL

5.1.1 In the Reporting Period, construction works under the project have been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505 and noise monitoring was performed at all designated locations.

### 5.2 SUMMARY OF MONITORING RESULTS

5.2.1 The sound level meter was set in 1m from the exterior of the building façade including noise monitoring locations NM1, NM2, NM3, NM4, NM5, NM6, NM7, NM8 and NM9. No façade correction (+3 dB(A)) is added according to acoustical principles and EPD guidelines. However, free-field status is performed at NM2a and NM10 and façade correction (+3 dB(A)) has added according to the requirement.

5.2.2 Summary of noise monitoring results during the Reporting Period are tabulated in *Table 5-1*. The relevant graphical plots throughout the Reporting Period are presented in *Appendix F*.

**Table 5-1 Summary of Construction Noise Monitoring Results**

Monitoring Location	Leq, 30min (dB(A))	
	Max	Min
NM1	61	52
Record Date	19-Jul-19	16-May-19
NM2a <sup>(*)</sup>	72	64
Record Date	28-May-19, 2-Jul-19	10-May-19, 25-Jul-19
NM3	60	55
Record Date	26-Jul-19	23-May-19
NM4	67	61
Record Date	17-May-19	4-Jun-19, 3-Jul-19
NM5	63	50
Record Date	17-May-19	4-Jun-19
NM6	64	56
Record Date	17-May-19	4-Jun-19
NM7	66	54
Record Date	17-May-19	3-Jul-19, 26-Jul-19
NM8	62	53
Record Date	20-Jun-19	22-May-19
NM9	66	52
Record Date	10-May-19, 14-Jun-19	22-May-19
NM10 <sup>(*)</sup>	68	57
Record Date	14-Jun-19	22-May-19

<sup>(\*)</sup> façade correction (+3 dB(A)) is added according to acoustical principles and EPD guidelines

5.2.3 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
NM1	0	0	N/A
NM2a	0		

Station	Limit Level	Action Level	Received Date
NM3	0		
NM4	0		
NM5	0		
NM6	0		
NM7	0		
NM8	0		
NM9	0		
NM10	0		

5.2.4 In this Reporting Period, the noise level measured at all designated monitoring locations were below 75dB(A). No Action level and Limit Level exceedance was triggered and no corrective action was required.

## 6 WATER QUALITY MONITORING

### 6.1 GENERAL

6.1.1 In the Reporting Period, construction works under the project has been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505 and water quality monitoring was performed at all designated locations.

### 6.2 SUMMARY OF MONITORING RESULTS

6.2.1 Summary of monitoring results during the Reporting Period are tabulated in *Tables 6-1 and 6-4*. The relevant graphical plots throughout the Reporting Period are presented in *Appendix F*.

6.2.2 In accordance with “*Event and Action Plan*”, the water quality monitoring frequency shall be increased to daily when exceedance recorded at the exceeded monitoring location. In the Reporting Period, forty (40) sampling days was scheduled to carry out for Locations WM1, WM2A(a), WM3x and WM4 with their control stations.. Moreover, 1 days of extra water sampling were conducted for WM2A(a) and its control station.

**Table 6-1 Summary of the Water Quality Monitoring Results – Contracts SS C505 ad 6**

Statistics	DO (mg/L)		Turbidity (NTU)		SS (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
Min	6.4	6.2	10.3	7.0	9.0	<2
Max	8.4	8.4	703.5	406.0	1665.0	7920.0
Average	7.5	7.2	70.0	45.9	96.0	276.7

**Table 6-2 Summary of the Water Quality Monitoring Results – Contracts 2 & 3**

Statistics	DO (mg/L)			Turbidity (NTU)			SS (mg/L)		
	WM4	WM4 - CA	WM4 - CB	WM4	WM4 - CA	WM4 - CB	WM4	WM4 - CA	WM4 - CB
Min	6.1	2.1	4.1	2.2	0.1	2.2	3.5	<2	4.0
Max	9.4	8.1	7.9	136.5	326.5	32.3	116.5	230.5	22.5
Average	7.2	5.0	6.0	12.7	10.4	9.4	11.7	24.3	10.7

**Table 6-3 Summary of the Water Quality Monitoring Results – Contract 6**

Statistics	DO (mg/L)				Turbidity (NTU)				SS (mg/L)			
	WM2A(a)	WM2A-C	WM2B	WM2B-C	WM2A(a)	WM2A-C	WM2B	WM2B-C	WM2A(a)	WM2A-C	WM2B	WM2B-C
Min	6.0	6.7	*	*	5.4	2.7	*	*	<2	<2	*	*
Max	8.1	8.7	*	*	179.0	379.5	*	*	145.0	231.5	*	*
Average	7.3	7.6	*	*	32.4	25.2	*	*	23.6	17.4	*	*

Remark: (\*) Since 10 Apr 2017, water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)

**Table 6-4 Summary of the Water Quality Monitoring Results – Contracts 2 & 6**

Statistics	DO (mg/L)		Turbidity (NTU)		SS (mg/L)	
	WM3	WM3-Control	WM3	WM3-Control	WM3	WM3-Control
Min	5.8	2.6	1.7	3.5	<2	<2
Max	8.6	8.7	70.2	136.0	54.5	67.0
Average	7.2	6.4	11.4	14.8	10.1	9.6

6.2.3 Breaches of water quality A/L levels and statistical analysis of compliance for the water quality monitoring results are summarized in *Tables 6-5*.

**Table 6-5 Summaries of Breaches of the Existing Water Quality A/L Levels**

Reporting Period	No. of sampling day	Location	DO (mg/L)		Turbidity (NTU)		SS (mg/L)	
			Action	Limit	Action	Limit	Action	Limit
May-19	14	WM1	0	0	0	0	0	0
	14	WM2A(a)	0	0	0	0	0	2
	0	WM2B	0	0	0	0	0	0
	14	WM3x	0	0	0	0	0	0
	14	WM4	0	0	0	0	0	0
Jun-19	12	WM1	0	0	0	0	0	0
	13	WM2A(a)	0	0	0	1	0	1
	0	WM2B	0	0	0	0	0	0
	12	WM3x	0	0	0	0	0	0
	12	WM4	0	0	0	0	0	0
Jul-19	14	WM1	0	0	0	0	0	0
	14	WM2A(a)	0	0	0	0	0	0
	0	WM2B	0	0	0	0	0	0
	14	WM3x	0	0	0	1	0	1
	14	WM4	0	0	0	0	0	0
Total	40	WM1	0	0	0	0	0	0
	41	WM2A(a)	0	0	0	1	0	3
	0	WM2B	0	0	0	0	0	0
	40	WM3x	0	0	0	1	0	1
	40	WM4	0	0	0	0	0	0
Sum			0	0	0	2	0	4

6.2.4 In the Reporting Period, a total of 6 Limit Level (LL) exceedances, namely 2 LL exceedance of turbidity and 4 LL exceedances of Suspended Solids were recorded. NOEs were issued to relevant parties upon confirmation of the results.

6.2.5 Investigation reports for the exceedance were conducted by the ET and the investigation results revealed that all exceedances were not related to the works under the project. The detailed investigation reports are summarized in *Table 6-6* and presented in the relevant monthly EM&A reports.

**Table 6-6 Summary of Water Quality Exceedance in the Reporting Period**

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
29 and 31 May 2019	WM2A(a)	SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. It is considered that the exceedances were related to the inflow of muddy water from upstream of the project after rainstorm and unlikely caused by the works under the Project.
26 June 2019	WM2A(a)	Turbidity & SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy



			runoff. It is considered that the exceedances were related to the inflow of muddy water from upstream of the project after rainstorm and unlikely caused by the works under the Project.
31 July 2019	WM3x	Turbidity & SS	<p>In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were related to the rainstorm and unlikely caused by the works under Contract 6.</p> <p>In our investigation, there was no adverse water quality impact observed during site inspection. It was considered that the exceedances were related to the rainstorm and unlikely caused by the works under Contract 2.</p>

## 7 ECOLOGY MONITORING

### 7.1 GENERAL

- 7.1.1 Ecology monitoring for woodland compensation shall be conducted at bi-monthly interval for the first year and the monitoring frequency would be reduced to quarterly from the second year.
- 7.1.2 The Ecology Monitoring for period of March 2019 to May 2019 was carried out on 23<sup>th</sup> and 24<sup>th</sup> April 2019 by transects inspection and quadrat monitoring. The Quarterly Ecological Monitoring Report (March to May 2019) was verified by IEC on 13 June 2019 and it has been submitted as a stand-alone copy to supplement the EM&A Report on 14 June 2019.

## 8 WASTE MANAGEMENT

### 8.1 GENERAL WASTE MANAGEMENT

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

### 8.2 RECORDS OF WASTE QUANTITIES

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

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

8.2.2 Whenever possible, materials were reused on-site as far as practicable. The quantities of waste for disposal in the Reporting Period are summarized in *Tables 8-1* and *8-2* and the Waste Flow Table is presented in *Appendix H*.

**Table 8-1 Summary of Quantities of Inert C&D Materials**

Type of Waste	Contract No	Quantity				Disposal Location
		May 2019	Jun 2019	Jul 2019	Total	
C&D Materials (Inert) (in '000m <sup>3</sup> )	2	1.0780	0.3100	2.2700	35.106	-
	3	4.291	1.345	1.105		-
	4	0	0	0		-
	6	4.090	1.1760	7.846		-
	7	2.076	0.845	0.381		-
	SS C505	3.936	1.605	2.752		-
Reused in this Project (Inert) (in '000m <sup>3</sup> )	2	0	0	0	0.013	-
	3	0	0	0		-
	4	0	0	0		-
	6	0	0	0		-
	7	0	0	0		-
	SS C505	0.013	0	0		-
Reused in other Projects (Inert) (in '000m <sup>3</sup> )	2	0	0	0	1.489	-
	3	0	0	0		-
	4	0	0	0		-
	6	0.009	0.315	1.165		NENT
	7	0	0	0		-
	SS C505	0	0	0		-
Disposal as Public Fill (Inert) (in '000m <sup>3</sup> )	2	1.0780	0.3100	2.2700	32.763	Tuen Mun 38 TKO 137
	3	3.877	1.345	1.105		
	4	0	0	0		
	6	4.081	0.861	6.681		
	7	2.076	0.845	0.381		
	SS C505	3.803	1.541	2.509		

Remark:

(#)The C&D materials were delivered to NENT for reuse by laying cover of the landfilling area.

**Table 8-2 Summary of Quantities of C&D Wastes**

Type of Waste	Contract No	Quantity				Disposal Location
		May 2019	Jun 2019	Jul 2019	Total	
Recycled Metal ('000kg) #	2	0	0	0	657.337	By licensed collector
	3	0	0	0		
	4	0	0	0		
	6	0	0	0		
	7	0.4	0.1	0.1		

	<b>SS C505</b>	<b>77.277</b>	<b>234.170</b>	<b>345.290</b>		
Recycled Paper / Cardboard Packing ('000kg) #	<b>2</b>	0	0	0	<b>2.08</b>	By licensed collector
	<b>3</b>	0	0	0		
	<b>4</b>	0	0	0		
	<b>6</b>	0	<b>0.270</b>	0		
	<b>7</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>		
	<b>SS C505</b>	<b>0.540</b>	<b>0.570</b>	<b>0.400</b>		
Recycled Plastic ('000kg) #	<b>2</b>	0	0	0	<b>3.353</b>	By licensed collector
	<b>3</b>	0	0	0		
	<b>4</b>	0	0	0		
	<b>6</b>	0	0	0		
	<b>7</b>	<b>0.001</b>	<b>0.001</b>	<b>0.001</b>		
	<b>SS C505</b>	<b>0.400</b>	<b>1.580</b>	<b>1.370</b>		
Chemical Wastes ('000kg) *	<b>2</b>	0	<b>2.4</b>	0	<b>2.4</b>	By licensed collector
	<b>3</b>	0	0	0		
	<b>4</b>	0	0	0		
	<b>6</b>	0	0	0		
	<b>7</b>	0	0	0		
	<b>SS C505</b>	0	0	0		
General Refuses ('000m <sup>3</sup> )	<b>2</b>	<b>0.1420</b>	<b>0.0535</b>	<b>0.0343</b>	<b>6.1878</b>	NENT
	<b>3</b>	<b>0.180</b>	<b>0.115</b>	<b>0.090</b>		
	<b>4</b>	0	0	0		
	<b>6</b>	<b>0.468</b>	<b>0.307</b>	<b>0.220</b>		
	<b>7</b>	<b>0.1</b>	<b>0.1</b>	<b>0.1</b>		
	<b>SS C505</b>	<b>1.086</b>	<b>1.664</b>	<b>1.528</b>		

Remark:

(#) Unit of recycled metal, recycled paper/ cardboard packing and recycled plastic for Contractor 3 was in ('000m<sup>3</sup>).

(\*) Unit of chemical waste for Contractor 3 was in m<sup>3</sup>.

- 8.2.3 To control the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge license and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the Environmental Monitoring and Audit Manual.

## 9 SITE INSPECTIONS

### 9.1 REQUIREMENTS

9.1.1 According to the approved EM&A Manual, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

#### Contract 2

9.1.2 During the Reporting Period, **13** events of the joint site inspections were undertaken at Contract 2 to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-1** and the details of site inspection can be found in relevant EM&A monthly report.

**Table 9-1 Summary of Reminders/Observations of Site Inspection – Contract 2**

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
May 2019	3, 10, 17, 23 and 31 May 2019	3	Completed
June 2019	6, 14, 21 and 28 June 2019	3	Completed
July 2019	5, 12, 19 and 26 July 2019	4	Completed

9.1.3 In the Reporting Period, no non-compliance was recorded; however, **10** observations/ reminders 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.

#### Contract 3

9.1.4 During the Reporting Period, **13** events of the joint site inspections were undertaken at Contract 3 to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-2** and the details of site inspection can be found in relevant EM&A monthly report.

**Table 9-2 Summary of Reminders/Observations of Site Inspection – Contract 3**

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
May 2019	2, 9, 16, 22 and 30 May 2019.	6	Completed
June 2019	6, 13, 19 and 27 June 2019	6	Completed
July 2019	4, 11, 17 and 25 July 2019	4	Completed

9.1.5 In the Reporting Period, no non-compliance was recorded; however, **16** observations/ reminders 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.

#### Contract 4

9.1.6 During the Reporting Period, **13** events of the joint site inspections were undertaken at Contract 4 to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-3** and the details of site inspection can be found in relevant EM&A monthly report.

**Table 9-3 Summary of Reminders/Observations of Site Inspection – Contract 4**

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
------------------	-------------------------	------------------------------	------------------

May 2019	3, 10, 14, 24 and 31 May 2019	0	Completed
June 2019	6, 10, 21 and 28 June 2019	0	Completed
July 2019	5, 12, 15 and 26 July 2019	0	Completed

9.1.7 In the Reporting Period, no non-compliance was recorded; however, no observations/ reminders was recorded during the site inspections. The environmental performance of the Project was therefore considered satisfactory.

**Contract 6**

9.1.8 During the Reporting Period, **13** events of the joint site inspections were undertaken at Contract 6 to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-4** and the details of site inspection can be found in relevant EM&A monthly report.

**Table 9-4 Summary of Reminders/Observations of Site Inspection – Contract 6**

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
May 2019	2, 9, 16, 23 and 30 May 2019	1	Completed
June 2019	6, 13, 20 and 27 June 2019	1	Completed
July 2019	4, 11, 18 and 25 July 2019	2	Completed

9.1.9 In the Reporting Period, no non-compliance was recorded; however, **4** observations/ reminders 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.

**Contract SS C505**

9.1.10 During the Reporting Period, **13** events of the joint site inspections were undertaken at Contract SS C505 to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-5** and the details of site inspection can be found in relevant EM&A monthly report.

**Table 9-5 Summary of Reminders/Observations of Site Inspection – Contract SS C505**

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
May 2019	8, 15, 22 and 29 May 2019	9	Completed
June 2019	5, 12, 19 and 26 June 2019	7	Completed
July 2019	3, 10, 17, 24 and 31 May 2019	7	Completed

9.1.11 In the Reporting Period, no non-compliance was recorded; however, **23** observations/ reminders 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.

**Contract 7**

9.1.12 During the Reporting Period, **13** events of the joint site inspections were undertaken at Contract SS C505 to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in **Table 9-6** and the details of site inspection can be found in relevant EM&A monthly report.

**Table 9-6 Summary of Reminders/Observations of Site Inspection – Contract 7**

<b>Reporting Period</b>	<b>Date of site inspection</b>	<b>Nos. of findings / reminders</b>	<b>Follow-Up Status</b>
May 2019	3, 10, 17, 21 and 31 May 2019	2	Completed
June 2019	6, 13, 18 and 28 June 2019	2	Completed
July 2019	4, 11, 16 and 26 July 2019	0	Completed

9.1.13 In the Reporting Period, no non-compliance was recorded; however, 4 observations/ reminder 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.

**Other Contracts**

9.1.14 Since the construction work of Contract 5 has substantially completed, no site inspection was performed.

## 10 NON-COMPLIANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND PROSECUTIONS

### 10.1 STATUS OF NON-COMPLIANCE ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

10.1.1 10.1.1 In the Reporting Period, no environmental complaints, summons and prosecution under the EM&A Programme was lodged for all Contracts. The status of the investigation report in previous months is summarized below.

10.1.2 The statistical summary table of environmental complaint, summons and prosecution are presented in **Tables 10-1, 10-2** and **10-3**.

**Table 10-1 Statistical Summary of Environmental Complaints**

Contract No	Reporting Period	Environmental Complaint Statistics			
		Frequency	Cumulative since commencement of project	Complaint Nature	Project related complaint
2	May 2019	0	38	<ul style="list-style-type: none"> <li>• (19) Water Quality</li> <li>• (10) Dust</li> <li>• (6) Noise</li> <li>• (1) dust &amp; noise</li> <li>• (1) waste management</li> <li>• (1) Water quality and dust</li> </ul>	(7) water quality (3) dust (1) noise (#)
	Jun 2019	0			
	Jul 2019	0			
3	May 2019	0	10	<ul style="list-style-type: none"> <li>• (3) Dust</li> <li>• (3) Water quality</li> <li>• (2) Noise</li> <li>• (2) site cleanliness (dust &amp; water quality)</li> </ul>	(1) site cleanliness (dust & water quality)
	Jun 2019	0			
	Jul 2019	0			
4	May 2019	0	0	NA	NA
	Jun 2019	0			
	Jul 2019	0			
6	May 2019	0	45	<ul style="list-style-type: none"> <li>• (24) Water Quality</li> <li>• (12) Dust</li> <li>• (3) Noise</li> <li>• (1) Nuisance</li> <li>• (1) Noise and dust</li> <li>• (3) Water quality and dust</li> <li>• (1) Water quality and noise</li> </ul>	(8) water quality (3) dust (1) nuisance (1) water quality and dust (1) water quality and noise
	Jun 2019	0			
	Jul 2019	0			
7	May 2019	0	4	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (3) Water quality and dust</li> </ul>	(1) water quality and dust
	Jun 2019	0			
	Jul 2019	0			
SS C505	May 2019	0	7	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (2) dust</li> <li>• (3) Water quality and dust</li> <li>• (1) Water quality</li> </ul>	(1) water quality and dust
	Jun 2019	0			
	Jul 2019	0			

Remark: (#) one complaint case was under investigation.

**Table 10-2 Statistical Summary of Environmental Summons**

Contract No	Reporting	Environmental Summons Statistics
-------------	-----------	----------------------------------



	Period	Frequency	Cumulative since commencement of project	Complaint Nature
2	May 2019	0	1	contravening the Water Pollution Control (General) Regulations
	Jun 2019	0		
	Jul 2019	0		
3	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
4	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
6	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
7	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
SS C505	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		

**Table 10-3 Statistical Summary of Environmental Prosecution**

Contract No	Reporting Period	Environmental Prosecution Statistics		
		Frequency	Cumulative since commencement of project	Complaint Nature
2	May 2019	0	1	contravening the Water Pollution Control (General) Regulations
	Jun 2019	0		
	Jul 2019	0		
3	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
4	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
6	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
7	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		
SS C505	May 2019	0	0	NA
	Jun 2019	0		
	Jul 2019	0		

10.1.3 Since the construction works at the Contract 5 was substantially completed, no environmental complaint, summons and prosecution under the EM&A Programme are registered.

## 11 IMPLEMENTATION STATUS OF MITIGATION MEASURES

### 11.1 GENERAL REQUIREMENTS

11.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in *Appendix I*.

#### Implementation of Mitigation Measures during Construction Phase

11.1.2 All contracts under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by Contracts 2, 3, 5, 6 and SS C505 in this Reporting Period are summarized in *Table 11-1*.

**Table 11-1 Environmental Mitigation Measures**

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> <li>Wastewater to be treated by the filtration systems i.e. sedimentation tank or AquaSed before to discharge.</li> </ul>
Air Quality	<ul style="list-style-type: none"> <li>Maintain damp / wet surface on access road</li> <li>Low vehicular speed within the works areas.</li> <li>All vehicles must use wheel washing facility before off site</li> <li>Sprayed water during breaking works</li> <li>A cleaning truck was regularly performed on the public road to prevent fugitive dust emission</li> </ul>
Noise	<ul style="list-style-type: none"> <li>Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday.</li> <li>Keep good maintenance of plants</li> <li>Place noisy plants away from residence or school</li> <li>Provide noise barriers or hoarding to enclose the noisy plants or works</li> <li>Shut down the plants when not in used.</li> </ul>
Waste and Chemical Management	<ul style="list-style-type: none"> <li>On-site sorting prior to disposal</li> <li>Follow requirements and procedures of the “Trip-ticket System”</li> <li>Predict required quantity of concrete accurately</li> <li>Collect the unused fresh concrete at designated locations in the sites for subsequent disposal</li> </ul>
General	<ul style="list-style-type: none"> <li>The site was generally kept tidy and clean.</li> </ul>

#### Implementation of Mitigation Measures during Operation Phase

11.1.3 The Heung Yuen Wai (HYW) Highway and connecting roads under the Project was opened on 26 May 2019. Since partial commencement of operation is the same as the commencement of operation for the entire project from EIAO perspective. All relevant requirements as stipulated in the EP and the approved EIA report (including the EM&A Manual) for the commencement of operation of the Project shall be strictly complied with.

11.1.4 In general, the recommended mitigation measures for operation stage of HYW Highway and connecting roads under the Project have been implemented. The implementation status of mitigation measures for operation phase in the Reporting Period are summarized in *Appendix J*.

11.1.5 For more details about the implementation status of mitigation measures for operation phase with photo illustration, an Environmental Monitoring and Audit report on the implementation of the mitigation measures for operation stage of the Project will be disposed to EPD not later than three months after the commencement of operation of the Project under EP-404/2011/D condition 5.5. The tentative submission date of the abovementioned report is 26 August 2019.

## 12 CONCLUSIONS AND RECOMMENDATIONS

### 12.1 CONCLUSIONS

- 12.1.1 This is the 24<sup>th</sup> Quarterly EM&A Summary Report presenting the monitoring results and inspection findings for the Reporting Period from **1 May to 31 July 2019**.
- 12.1.2 For air quality monitoring, no 1-hour TSP and 24-hour TSP monitoring results triggered the Action /Limit Level.
- 12.1.3 In the Reporting Period, no construction noise exceedances were recorded and no complaints (which triggered the Action Level exceedance) were received.
- 12.1.4 For water quality monitoring, a total of 6 LL exceedances, namely 2 LL exceedance of turbidity and 4 LL exceedances of Suspended Solids were recorded. Investigation report for exceedance recorded at WM2A(a) on 29 and 31 May 2019 and 26 June 2019 revealed that the Contractor had implemented the water quality mitigation measures, in view of inflow of muddy water was observed from upstream of control station, it was concluded that the exceedances were not related to the works under the Project. The investigation report for exceedance recorded at WM3x on 31 July 2019 revealed that the exceedances were related to the rainstorm and unlikely caused by the works under Contract 2. Nevertheless, the Contractor was reminded to fully implement the water quality mitigation measure throughout the constriction phase as far as practicable.
- 12.1.5 The Ecology Monitoring for period of March 2019 to May 2019 was carried out on 23<sup>th</sup> and 24<sup>th</sup> April 2019 by transects inspection and quadrat monitoring. The Quarterly Ecological Monitoring Report (March to May 2019) was verified by IEC on 13 June 2019 and it has been submitted as a stand-alone copy to supplement the EM&A Report on 14 June 2019.
- 12.1.6 In this Reporting Period, no environmental complaint was received.
- 12.1.7 No environmental summons or successful prosecutions were recorded in the Reporting Period.
- 12.1.8 During the Reporting Period, weekly joint site inspection by the RE, IEC, ET with the relevant Main-contractor were carried out for Contracts 2, 3, 4, 6 and 7 in accordance with the EM&A Manual stipulation. For Contract SS C505, weekly joint site inspection was carried out by the RE, IEC, ET and main-contractor whereas IEC performed monthly site inspection. No non-compliance observed during the site inspection.

### 12.2 RECOMMENDATIONS

- 12.2.1 During wet season, preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River, Kwan Tei River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual.
- 12.2.2 In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.
- 12.2.3 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.
- 12.2.4 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission. Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be kept to prevent mosquito breeding on site.

## **Appendix A**

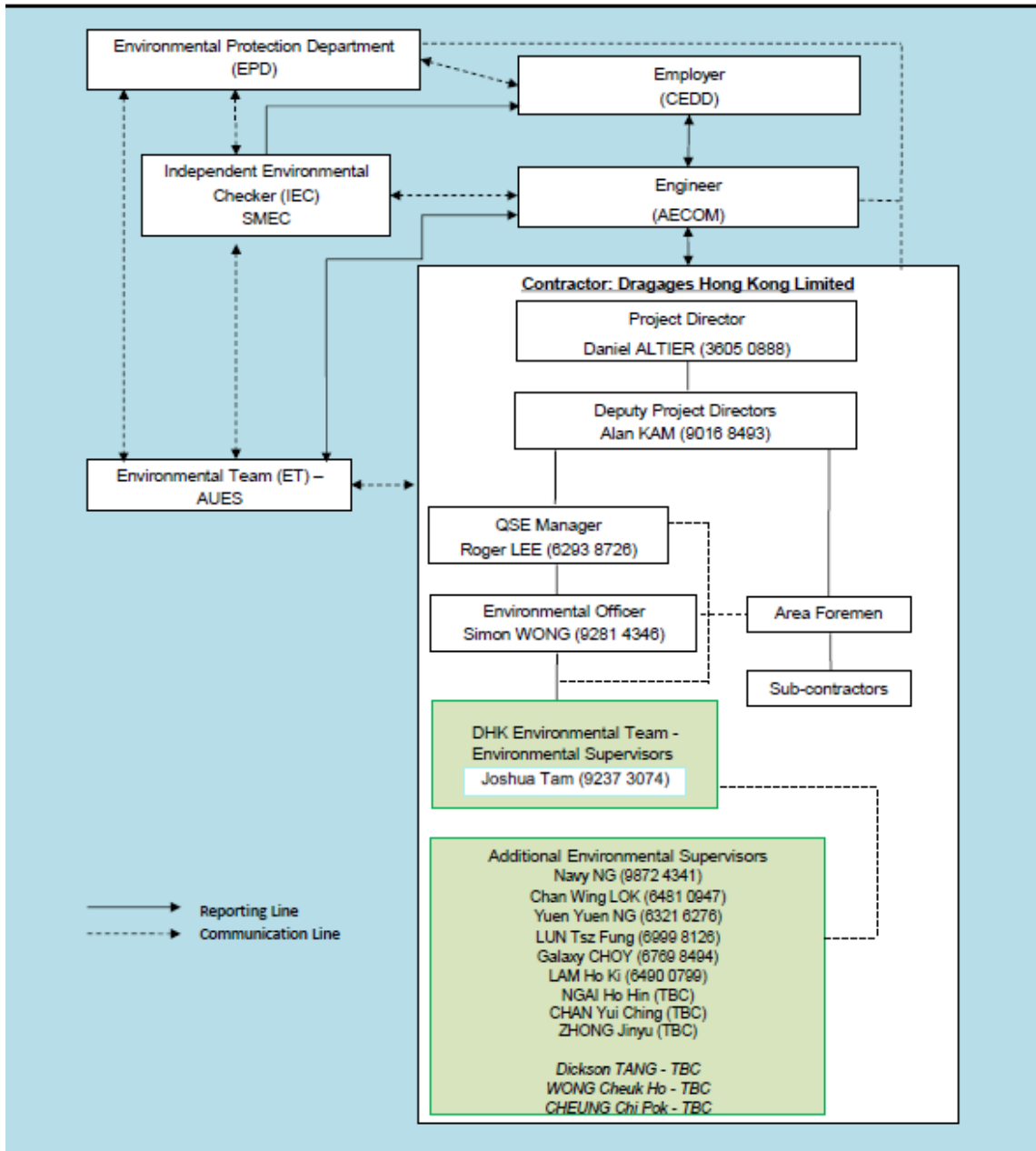
### **Layout plan of the Project**



## **Appendix B**

### **Environmental Management Organization Chart**

**Environmental Management Organization for Contract 2 - (CV/2012/08)**



**Environmental Management Organization for Contract 2 - (CV/2012/08)**

**Contact Details of Key Personnel for Contract 2 - CV/2012/08**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Edwin Ching	2171 3301	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Alan Kam	2170 3004	2171 3299
DHK	QSE Manager	Y. T. So	9307 8728	2171 3299
DHK	Environmental Officer	TBA	TBA	TBA
DHK	Environmental Supervisor	Joshua Tam	9237 3074	2171 3299
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

**Legend:**

*CEDD (Employer) – Civil Engineering and Development Department*

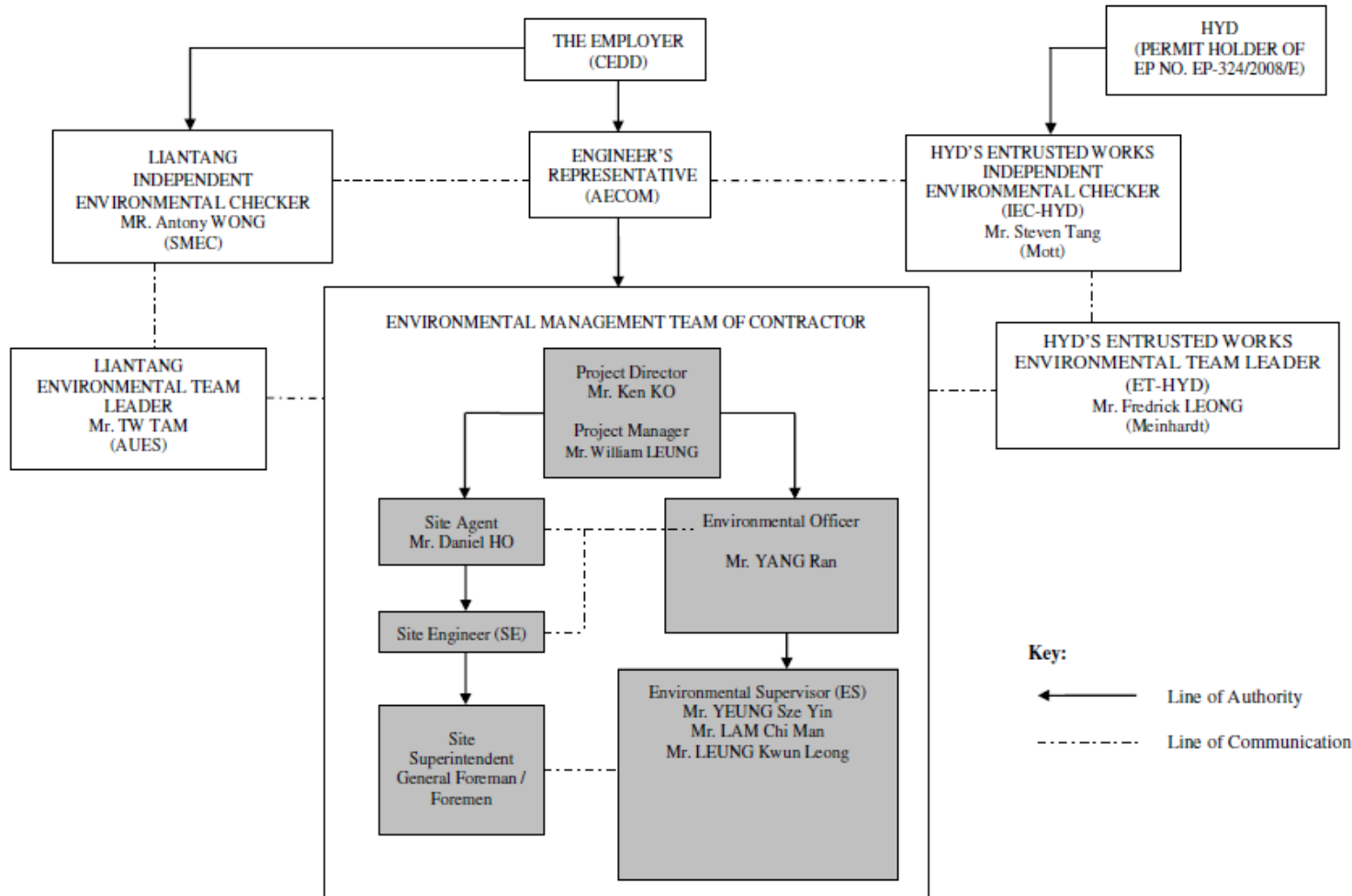
*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*DHK (Main Contractor) – Dragages Hong Kong Ltd.*

*SMEC (IEC) – SMEC Asia Limited*

*AUES (ET) – Action-United Environmental Services & Consulting*





**Environmental Management Organization for Contract 3 - (CV/2012/09)**

**Contact Details of Key Personnel for Contract 3 - CV/2012/09**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Alan Lee	2171 3303	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Chun Wo	Project Director	Ken Ko	3758 8735	2638 7077
Chun Wo	Project Manager	William Leung	2638 6136	2638 7077
Chun Wo	Site Agent	Daniel Ho #	2638 6144	2638 7077
Chun Wo	Environmental Officer	Mr. YANG Ran	2638 6151	2638 7077
Chun Wo	Environmental Supervisor	Frankie Leung	2638 6125	2638 7077
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

*Remark: (#) Site Agent Mr Daniel Ho was replaced by Mr Ken Lun in July 2019.*

**Legend:**

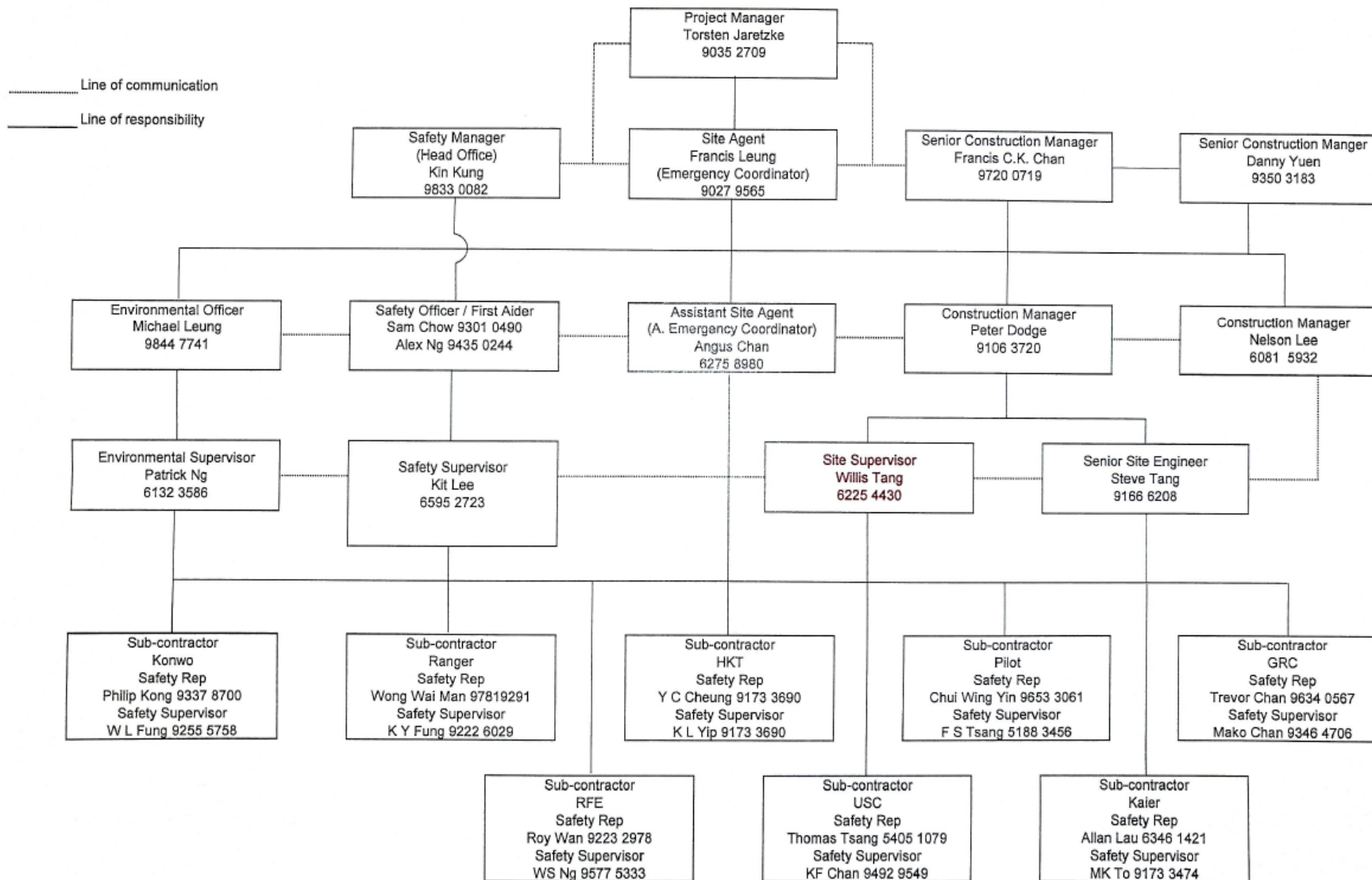
*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*Chun Wo (Main Contractor) – Chun Wo Construction Ltd.*

*SMEC (IEC) – SMEC Asia Limited*

*AUES (ET) – Action-United Environmental Services & Consulting*



**Environmental Management Organization for Contract 4 - NE/2014/02**

**Environmental Management Organization for Contract 4 - NE/2014/02**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Leo Lai	2171 3310	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Siemens	Project Manager	Torsetn Jaretzke	9444 5577	--
Siemens	Site Agent	Francis C K Chan	--	--
Siemens	Environmental Officer	Michael Leung	9844 7741	--
Siemens	Environmental Supervisors	Eric Lee	9092 3356	--
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

**Legend:**

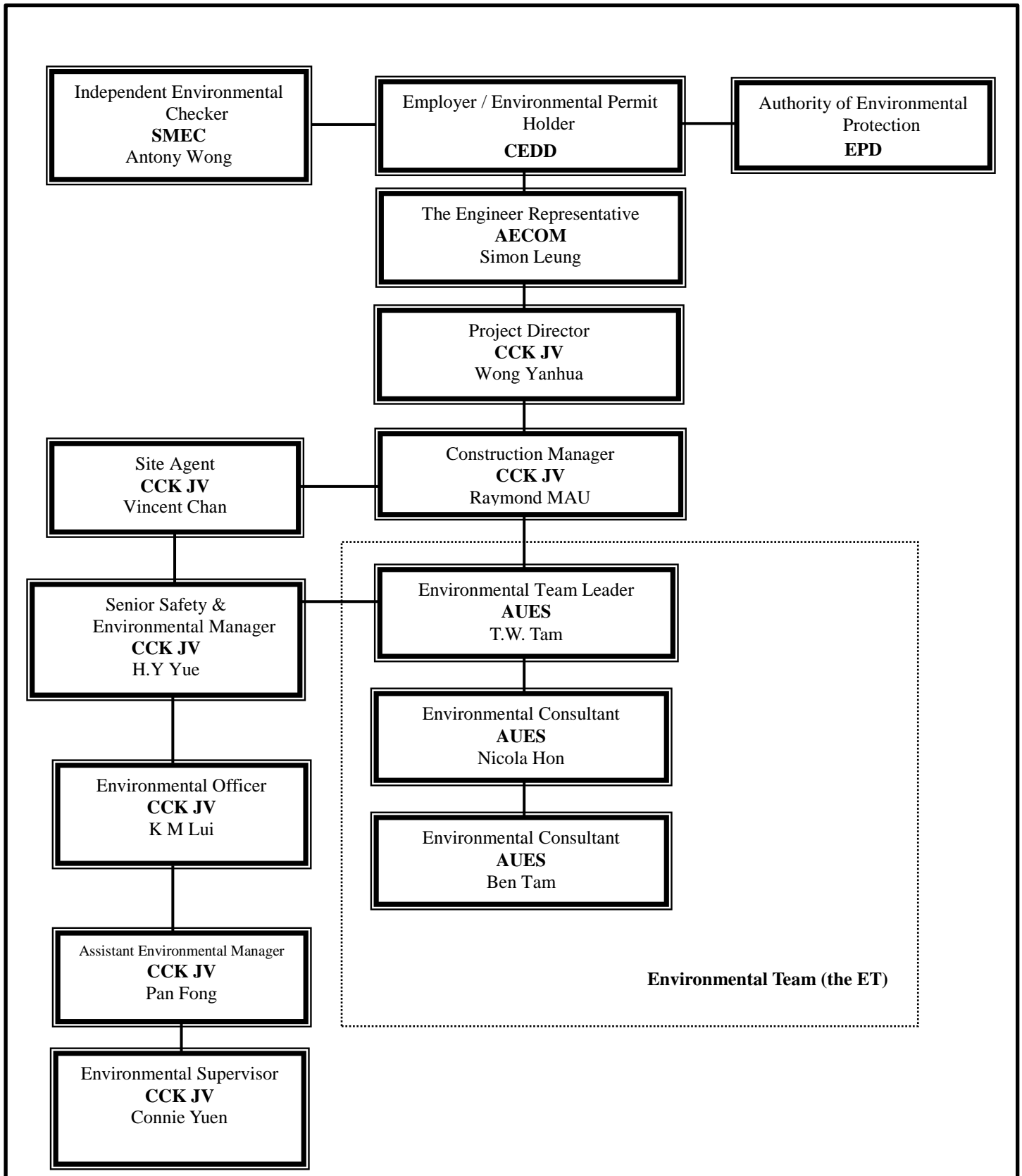
*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*Siemens (Main Contractor) – Siemens Ltd.*

*SMEC (IEC) – SMEC Asia Limited*

*AUES (ET) – Action-United Environmental Services & Consulting*



**Environmental Management Organization – CV/2013/08**

**Contact Details of Key Personnel for Contract 6 - CV/2013/08**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Owen Ng	2251 0688	2251 0698
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wang Yanhua	6190 4212	--
CCK JV	Project Manager	Raymond Mau Sai-Wai	9011 5340	--
CCK JV	Site Agent	Vincent Chan	9655 9404	--
CCK JV	Senior Safety & Environmental Manager	H.Y. Yue	9185 8186	--
CCK JV	Environmental Manager	K M Lui	5113 8223	--
CCK JV	Environmental Supervisor	Connie Yuen	6316 6931	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

**Legend:**

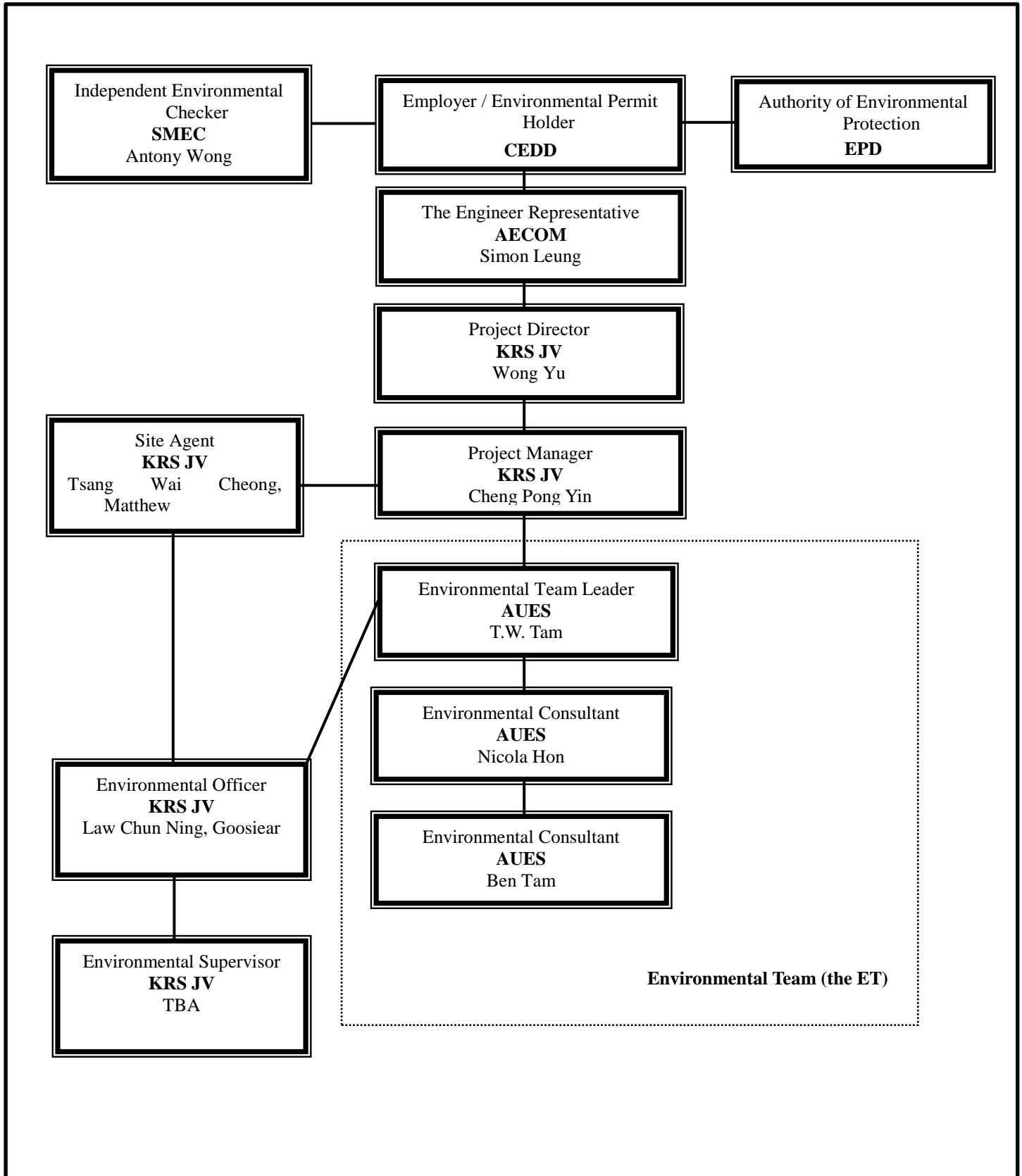
*CEDD (Employer) – Civil Engineering and Development Department*

*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*CCK JV (Main Contractor) – CRBE-CEC-Kaden Joint Venture*

*SMEC (IEC) – SMEC Asia Limited*

*AUES (ET) – Action-United Environmental Services & Consulting*



Environmental Management Organization –NE/2014/03

**Contact Details of Key Personnel for Contract 7 – NE/2014/03**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
AECOM	Engineer's Representative	Kelvin lee	2251 0609	2251 0698
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
KRSJV	Project Director	Wong Yu	2682 6691	2682 2783
KRSJV	Project Manager	Cheng Pong Yin	9023 4821	2682 2783
KRSJV	Site Agent	Tsang Wai Cheong, Matthew	9705 7536	2682 2783
KRSJV	Environmental Officer	Law Chun Ning, Goosiear	9625 2381	2682 2783
KRSJV	Environmental Supervisor	TBA	--	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

**Legend:**

*CEDD (Employer) – Civil Engineering and Development Department*

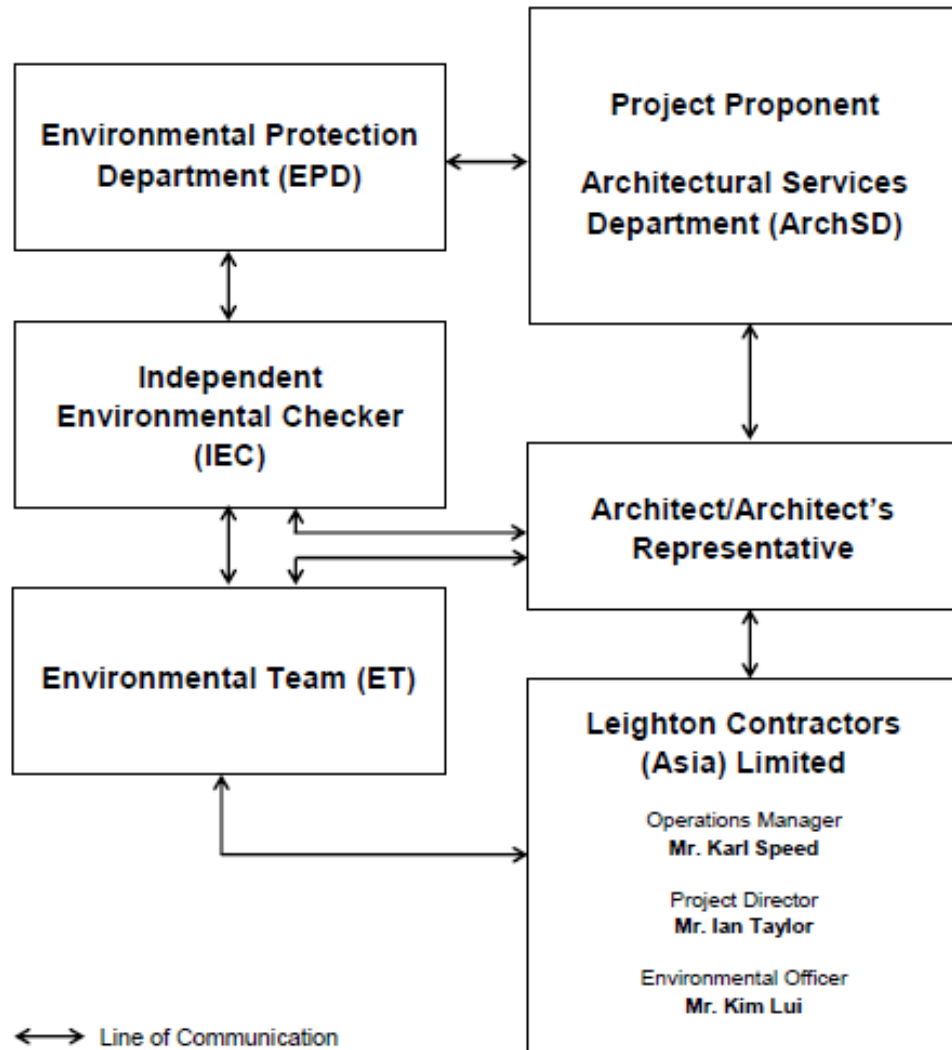
*AECOM (Engineer) – AECOM Asia Co. Ltd.*

*KRS JV (Main Contractor) –Kwan On-Richwell-SCG Joint Venture*

*SMEC (IEC) – SMEC Asia Limited*

*AUES (ET) – Action-United Environmental Services & Consulting*





Environmental Management Organigram

Environmental Management Organization for Contract SS C505

**Contact Details of Key Personnel for Contract SS C505**

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No.</b>	<b>Fax No.</b>
ArchSD	Works agent for the Development Bureau (DEVB)	Mr. William Cheng	2867 3904	2804 6805
Ronald Lu & Partners	Architect/ Architect's Representative	Mr. Justin Cheung	3189 9272	2834 5442
SMEC	Independent Environmental Checker	Mr. Antony Wong	3995 8120	3995 8101
Leighton	Operation Manager	Mr. Antony Zervaas	2823 1433	2529 8784
Leighton	Project Director	Mr. Steven Wong	2858 1519	2858 1899
Leighton	Site Agent	Mr. Ray Ho	2858 1519	2858 1899
Leighton	Environmental Officer	Mr. Legend Lam	3973 1003	-
Leighton	Assistant Environmental Officer	Mr. Alex Liu	3973 0818	-
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079

**Legend:**

*ArchSD (Project Proponent) – Architectural Services Department*

*Ronald Lu & Partners (Architect/ Architect's Representative) – Ronald Lu & Partners (Hong Kong) Ltd*

*Leighton (Main Contractor) – Leighton Contractors (Asia) Limited*

*SMEC (IEC) – SMEC Asia Limited*

*AUES (ET) – Action-United Environmental Services & Consulting*

## **Appendix C**

### **Designated Monitoring Locations as Recommended in the Approved EM&A Manual**

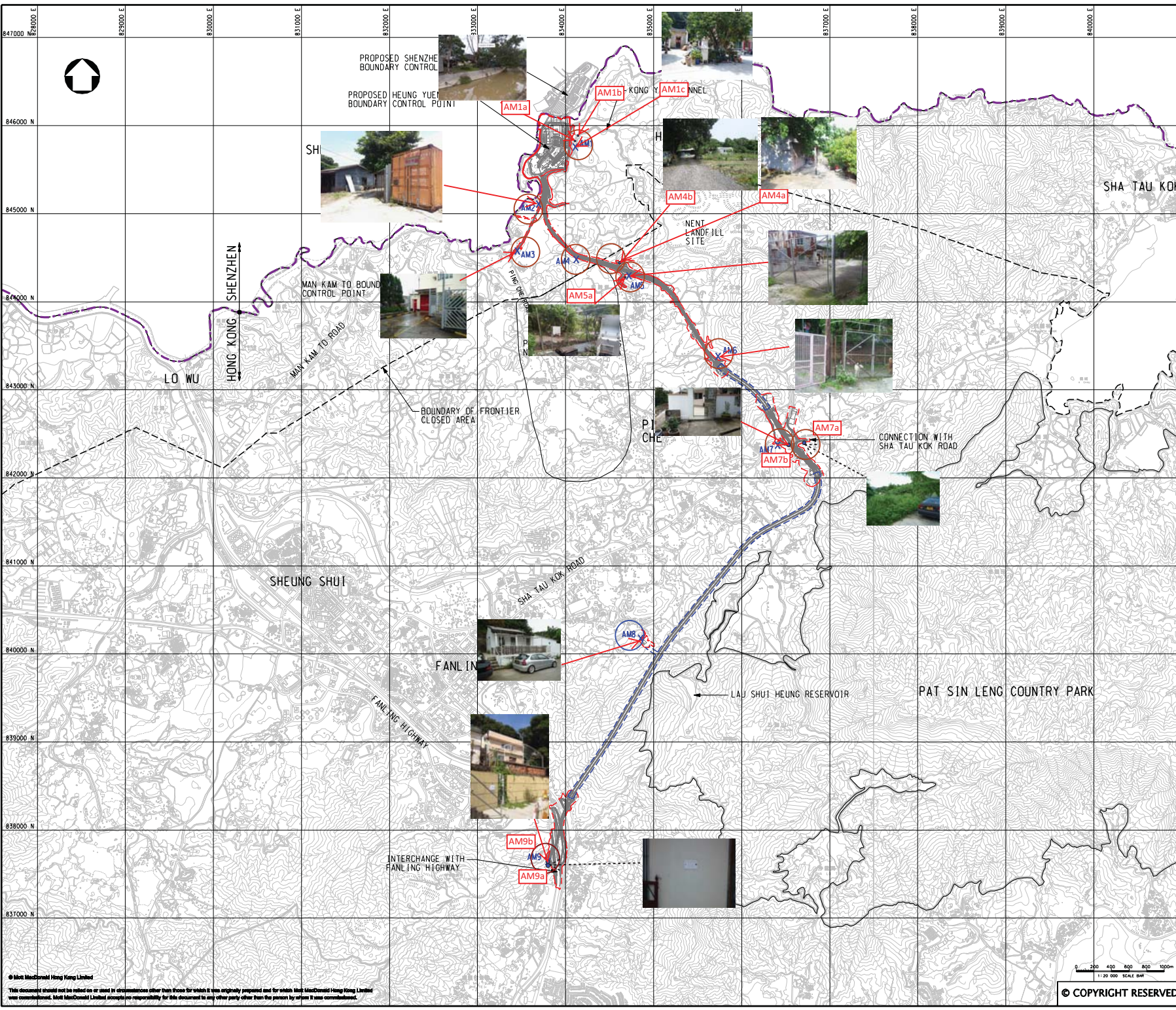






## **Appendix D**

### **Monitoring Locations for Impact Monitoring**




- LEGEND:**
- BOUNDARY OF HKSAR
  - WORKS AREA (ABOVE GROUND)
  - WORKS AREA (TUNNEL)
  - X Air Monitoring Stations in the EM&A Manual
  - Proposed Air Monitoring Stations

P1	AUG 10	MING	FIRST ISSUE	DC	HT
Rev	Date	Drawn	Description	Chk'd	App'd



20/F Two Landmark East  
100 Housling Street  
Kowloon, Hong Kong  
T +852 2518 5757  
F +852 2827 1823  
W www.mottmac.com.hk

Client



**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

Project  
 AGREEMENT NO. CE45/2008(CE)  
 LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title  
 PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

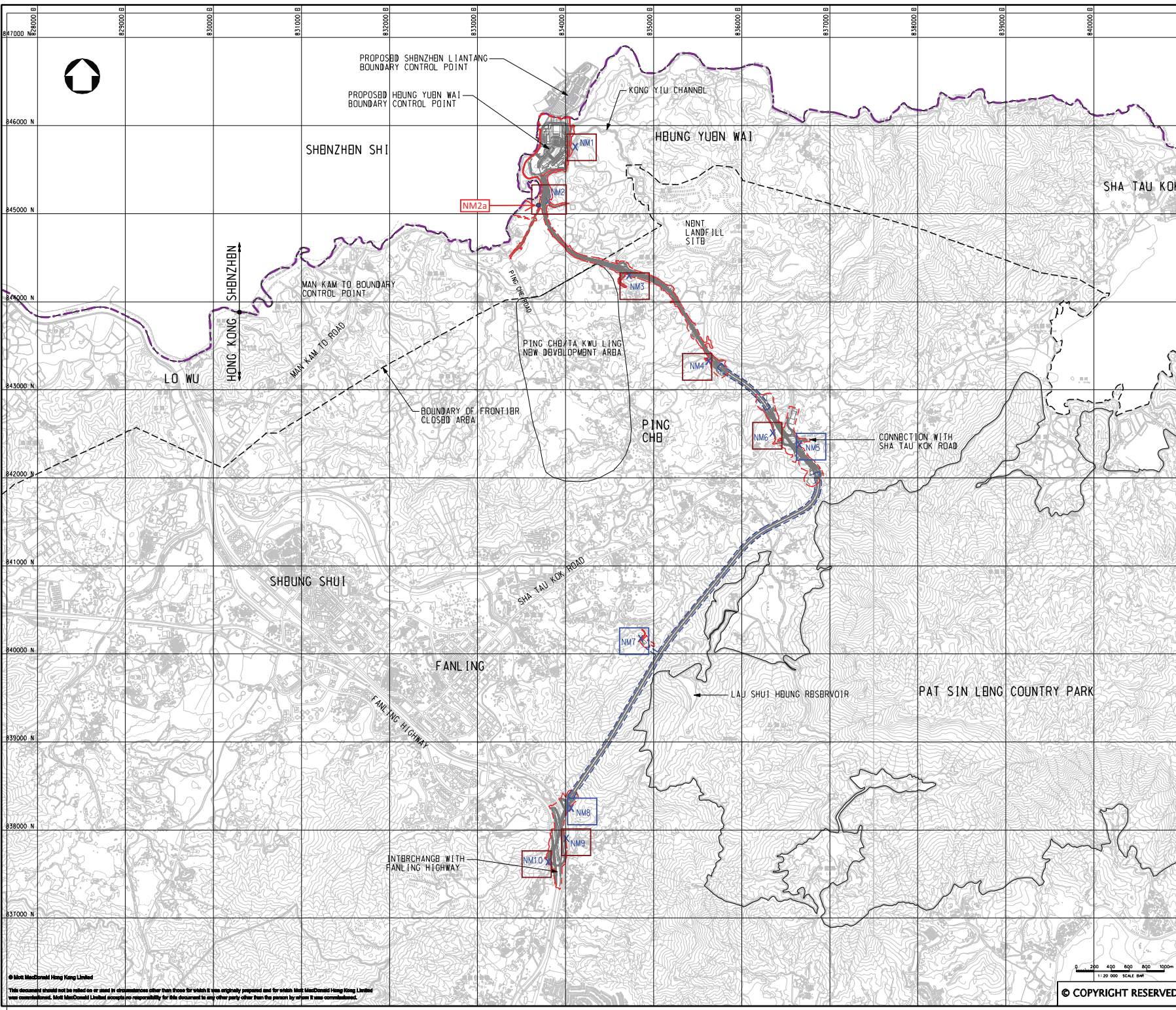
Designed	DC	Eng.Chk.	EC	
Drawn	MING	Coordination	EC	
Draw.Chk.	DC	Approved	HT	
Scale at A1	1:20000	Project	255228	Status
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Drawing No				Rev
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0 200 400 600 800 1000m  
 1:20 000 SCALE BM  
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FIGURE 2.1






- LEGEND:**
- BOUNDARY OF HKSAR
  - WORKS AREA (ABOVE GROUND)
  - WORKS AREA (TUNNELL)
  - X CONSTRUCTION NOISE MONITORING STATIONS
  - Proposed Noise Monitoring Stations

P1	AUG 10	MING	FIRST ISSUE	DC	HT
Rev	Date	Drawn	Description	CHK'd	App'd



20/F Two Landmark East  
100 Housiang Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2518 5757  
F +852 2827 1823  
W www.mottmac.com.hk

Client



**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

Project  
AGREEMENT NO. CB45/2008(CB)  
LIANTANG/HUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title  
PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

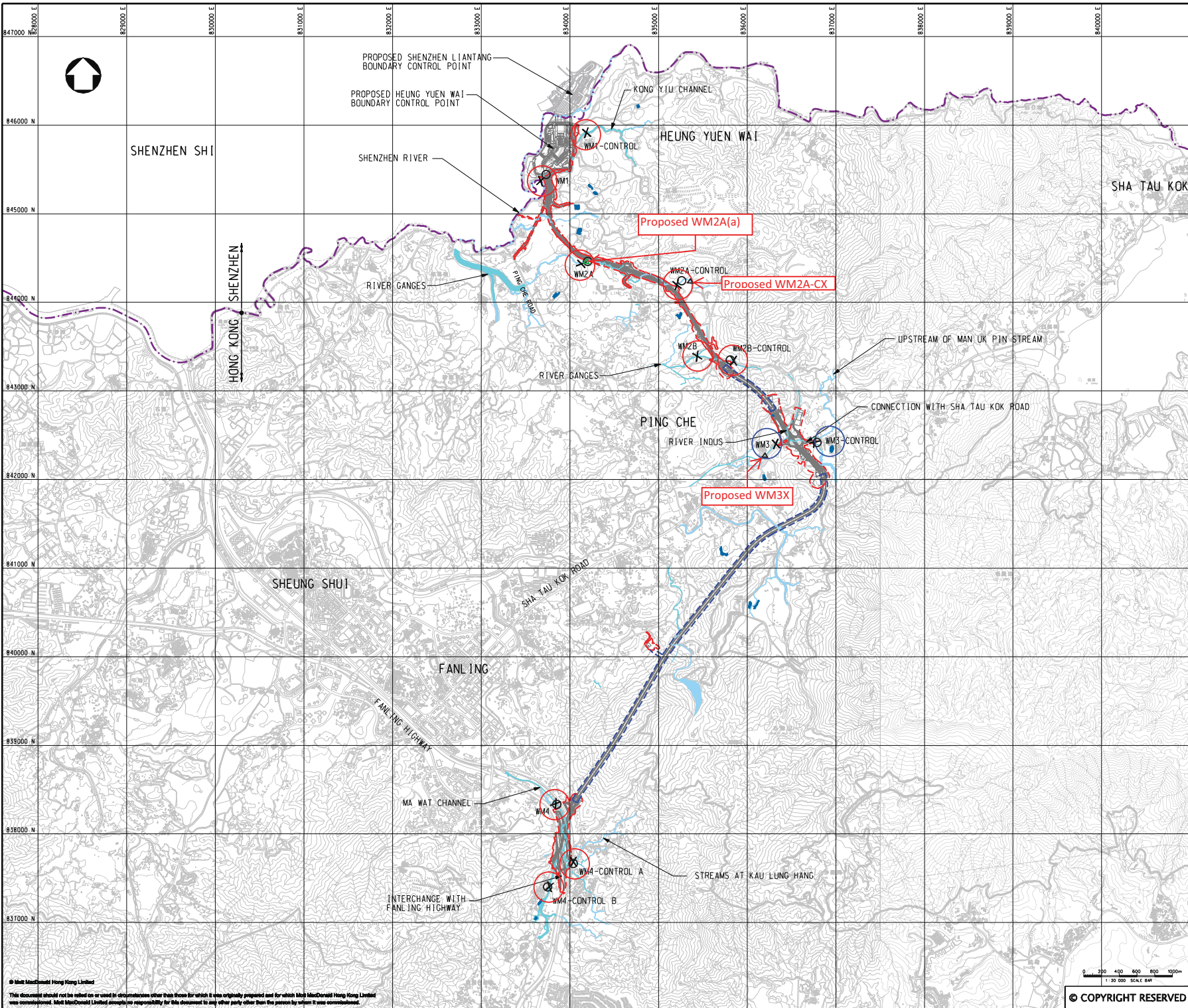
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Drawing No				Rev
				P1

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Scale at A1  
1:20000  
Scale BM  
0 200 400 600 800 1000m  
1:20 000 SCALE BM

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FIGURE 3.1



- LEGEND:**
- BOUNDARY OF HKSAR
  - LAND REQUIREMENT LIMIT (ABOVE GROUND)
  - LAND REQUIREMENT LIMIT (TUNNEL)
  - X Water Quality Monitoring Location Recommended in EM&A Manual
  - Alternative Water Quality Monitoring Location for EM&A Programme
  - △ New Proposed Water Quality Monitoring Location in November 2015
  - ▲ New Proposed Water Quality Monitoring Location in May 2016

Station ID	Location recommended in EM&A Manual		Location found during site visit	
	Coordinates		Coordinates	
	Easting	Northing	Easting	Northing
WM1	83456.835	84577.072	83457.1	84542.1
WM1-Control	83418.480	84591.662	83418.5	84517.3
WM2A	83418.319	84412.910	83420.4	84417.3
WM2A-Control	83505.329	84420.151	83527.0	84424.5
WM2B	83543.744	84339.606	83543.5	84339.7
WM2B-Control	83545.878	84343.625	83535.1	84355.1
WM3	83623.622	84205.377	83624.0	84202.7
WM3-Control	83673.415	84242.507	83673.5	84240.0
WM4	83840.781	83834.842	83850.0	83838.0
WM4-Control A	83408.837	83768.995	83402.8	83765.0
WM4-Control B	83769.123	83740.936	83760.0	83739.5

**New Proposed Water Quality Monitoring Location in November 2015**

Location ID	Easting	Northing
WM2A-C (Original)	0835270	0844243
WM2A-Cx (Proposed)	0835377	0844188
WM3 (Original)	0836324	0842402
WM3x (Proposed)	0836206	0842270

**New Proposed Water Quality Monitoring Location in May 2016**

Location ID	Easting	Northing
WM2A (Original)	834204	844471
WM2A(a) (Proposed)	834191	844474

Rev	Date	Drawn	Description	CHK'd	App'd
P2	NOV 10	MING	GENERAL REVISION	HC	HT
P1	OCT 10	MING	FIRST ISSUE	HC	HT

2007 Two Landmark East  
100 New King Street  
Kowloon, Hong Kong  
Tel: +852 2502 8787  
Fax: +852 2827 1823  
www.mottmac.com.hk

Client

**CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT**

Project: AGREEMENT NO. CE45/2008 (CE)  
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title: LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

Designed	HC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	HC	Approved	HT
Scale at A1	Project: 255228		Status: PRE
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Appendix C

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## **Appendix E**

### **Event and Action Plan**

### Event and Action Plan for Air Quality

Event	ET	IEC	ER	Action Contractor
<b>Action Level</b>				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Monitor the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
<b>Limit Level</b>				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Monitor the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	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. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. 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	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented;	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
	and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	the ER accordingly; 5. Monitor the implementation of remedial measures.	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.	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

Event		ET	IEC	ER	Action Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify ER, IEC and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IEC, ER and Contractor;</li> <li>4. Discuss with the IEC and Contractor on remedial measures required;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the investigation results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly;</li> <li>3. Advise the ER on the effectiveness of the proposed remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IEC and ER;</li> <li>2. Implement noise mitigation proposals.</li> </ol>	
Limit Level	<ol style="list-style-type: none"> <li>1. Inform IEC, ER, Contractor and EPD;</li> <li>2. Repeat measurements to confirm findings;</li> <li>3. Increase monitoring frequency;</li> <li>4. Identify source and investigate the cause of exceedance;</li> <li>5. Carry out analysis of Contractor's working procedures;</li> <li>6. Discuss with the IEC, Contractor and ER on remedial measures required;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented;</li> <li>4. Supervise the implementation of remedial measures;</li> <li>5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Submit further proposal if problem still not under control;</li> <li>5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.</li> </ol>	

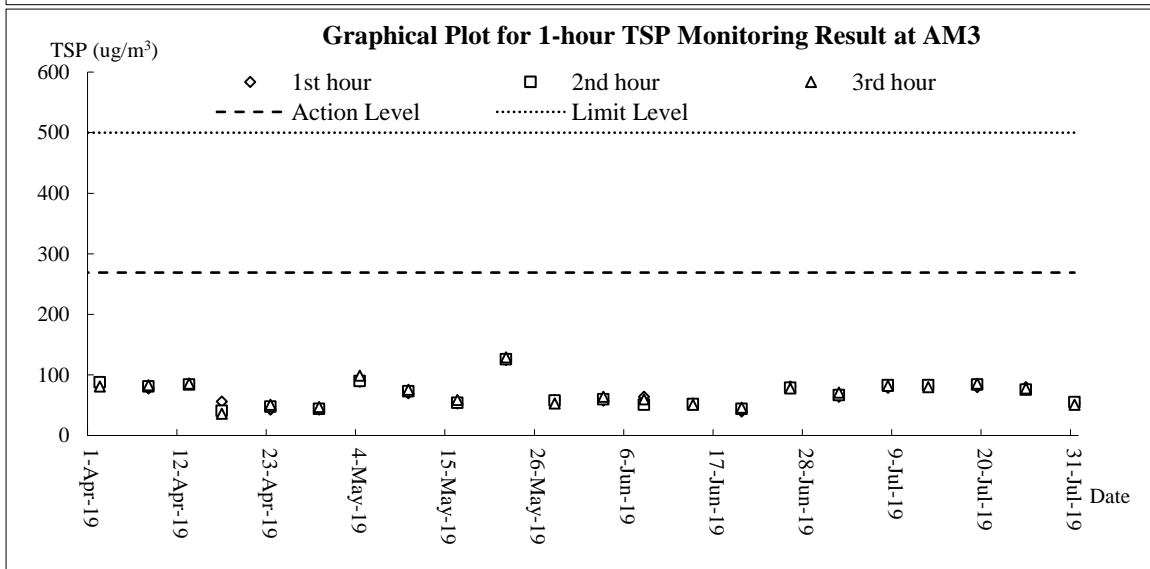
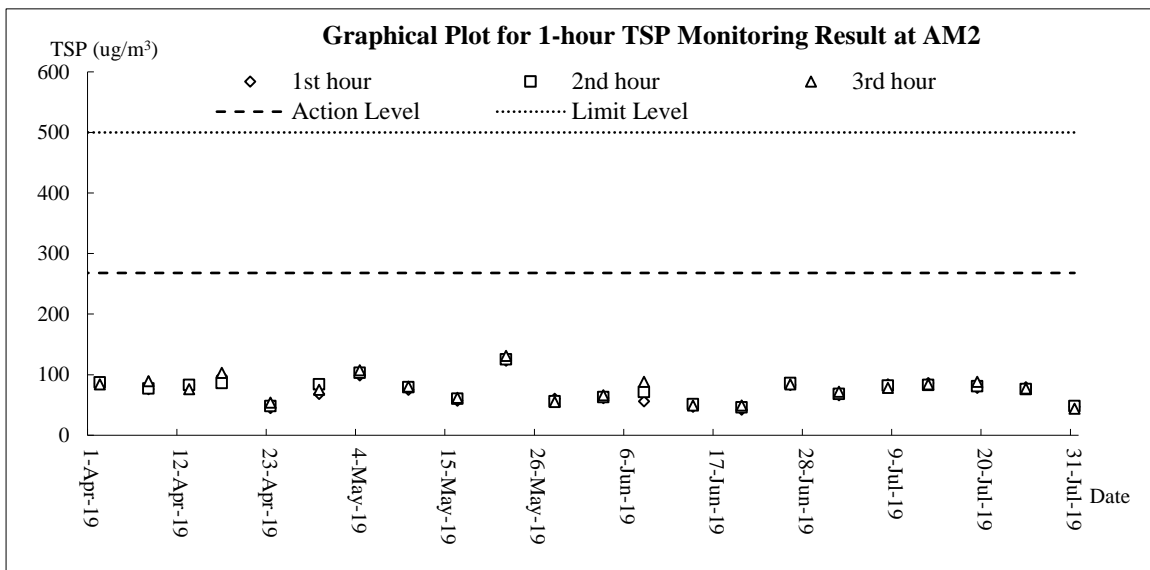
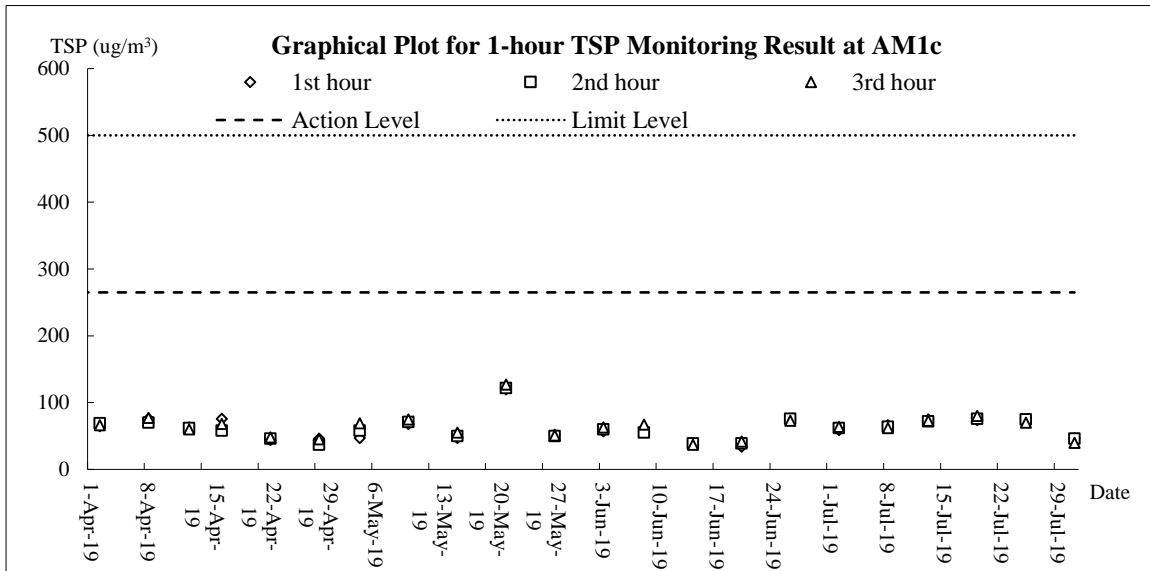
### Event and Action Plan for Water Quality

EVENT	ET	IEC	ER	ACTION CONTRACTOR
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC and Contractor;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC and Contractor;</li> <li>Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and ER;</li> <li>Implement the agreed mitigation measures.</li> </ol>
Action Level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC and Contractor;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Prepare to increase the monitoring frequency to daily;</li> <li>Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC on the proposed mitigation measures;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days;</li> <li>Implement the agreed mitigation measures.</li> </ol>
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC, Contractor and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC, ER and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>Request Contractor to critically review the working methods;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;</li> <li>Implement the agreed mitigation measures.</li> </ol>
Limit level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> <li>Repeat in-situ measurement to confirm findings;</li> <li>Identify reasons for non-compliance and sources of impact;</li> <li>Inform IEC, Contractor and EPD;</li> <li>Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>Discuss mitigation measures with IEC, ER and Contractor;</li> <li>Ensure mitigation measures are implemented;</li> <li>Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with ET and Contractor on the mitigation measures;</li> <li>Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>Request Contractor to critically review the working methods;</li> <li>Make agreement on the mitigation measures to be implemented;</li> <li>Assess the effectiveness of the implemented mitigation measures;</li> <li>Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>Inform the ER and confirm notification of the non-compliance in writing;</li> <li>Rectify unacceptable practice;</li> <li>Check all plant and equipment;</li> <li>Consider changes of working methods;</li> <li>Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;</li> <li>Implement the agreed mitigation measures;</li> <li>As directed by the ER, to slow down or to stop all or part of the construction activities.</li> </ol>

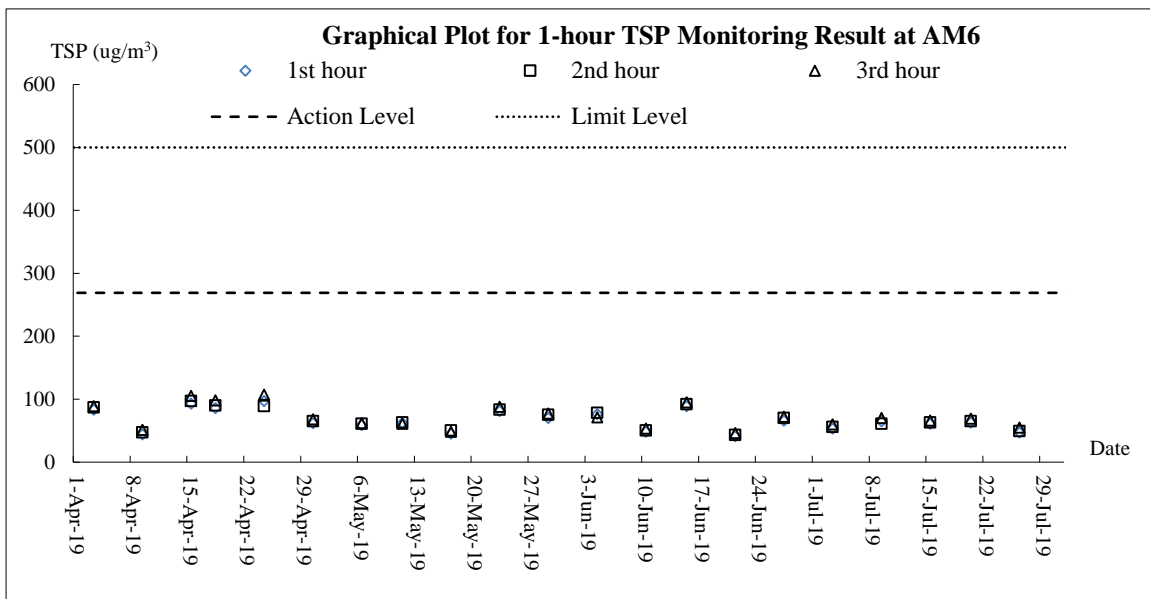
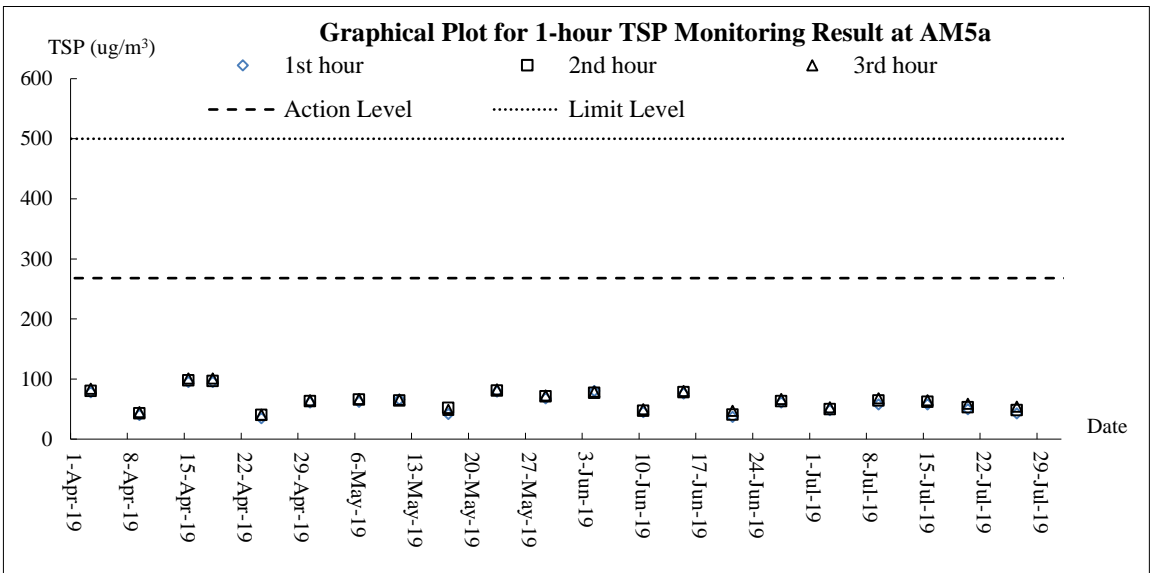
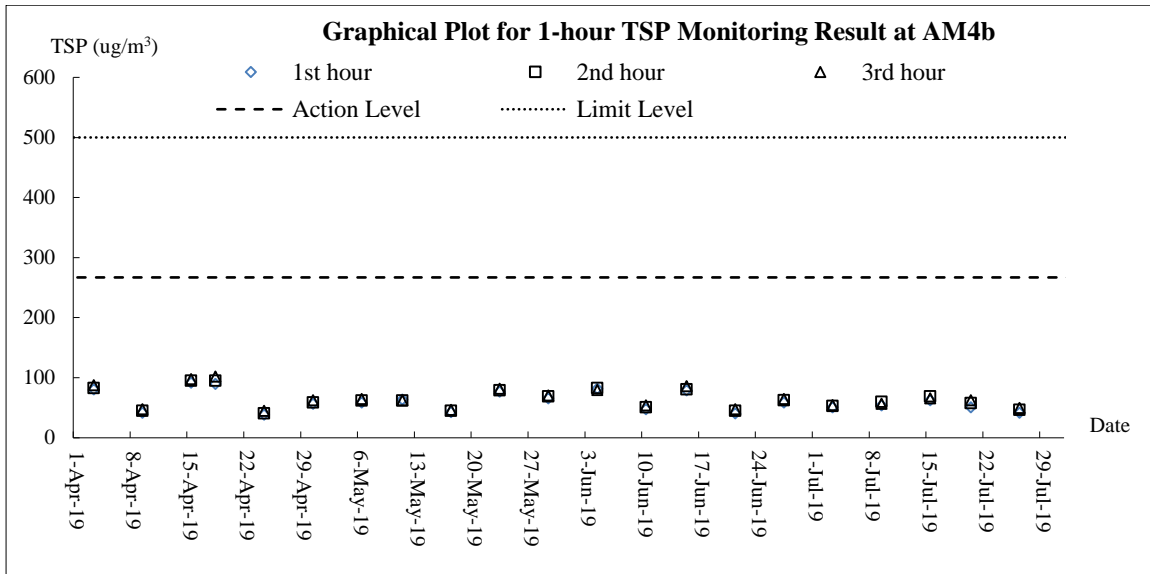
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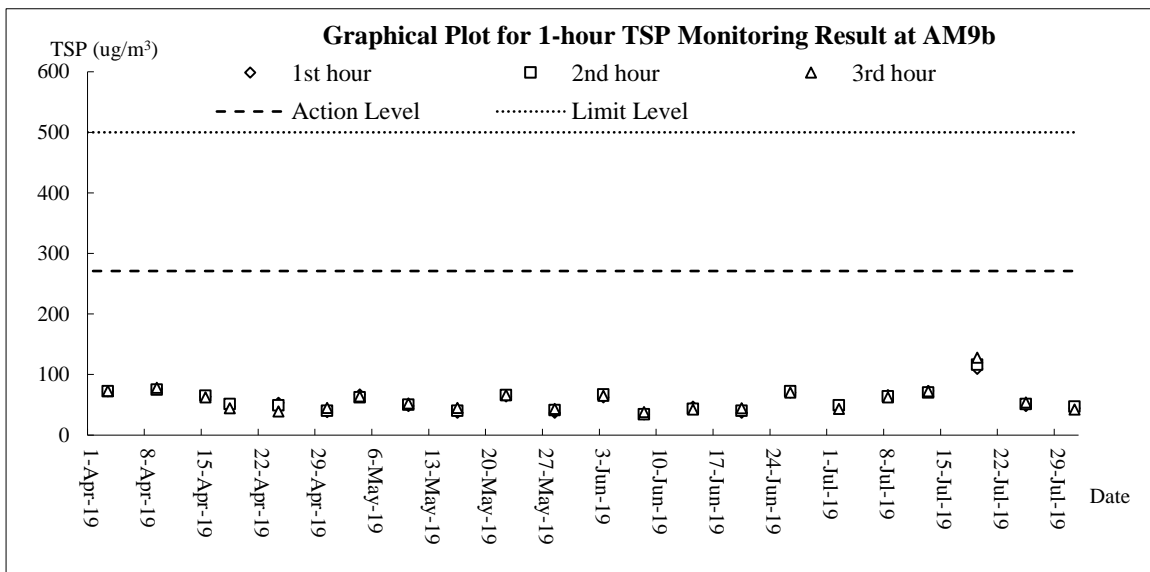
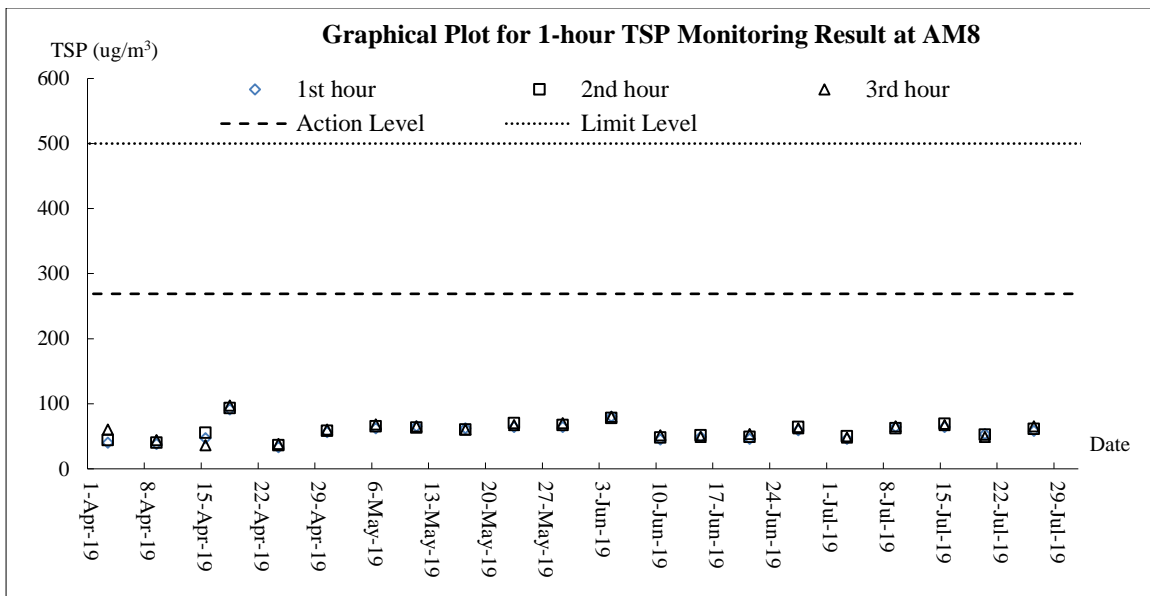
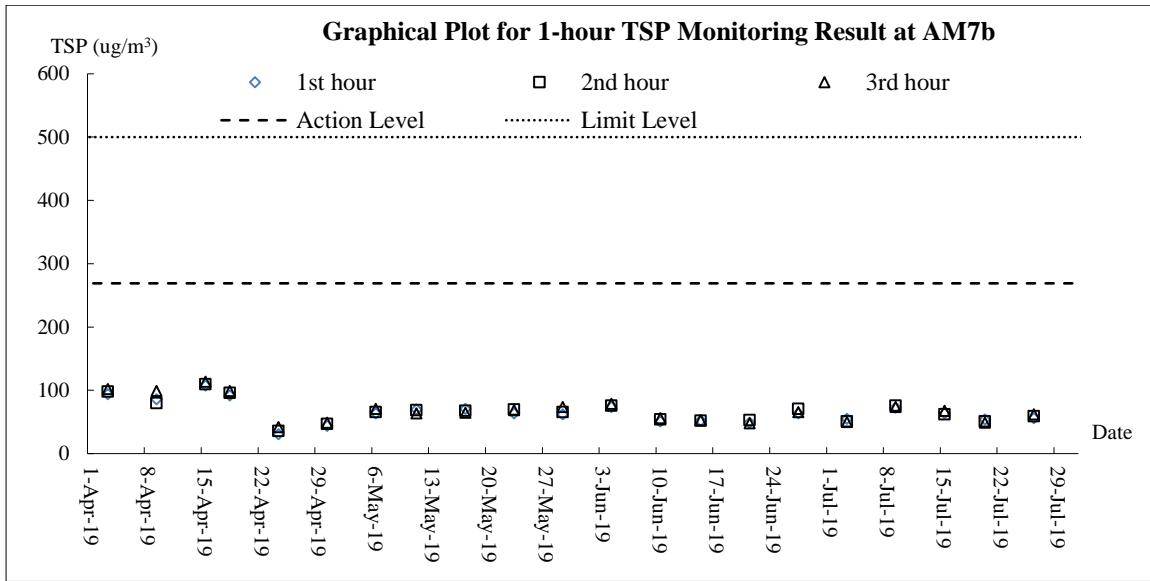
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**Air Quality – 1-hour TSP**

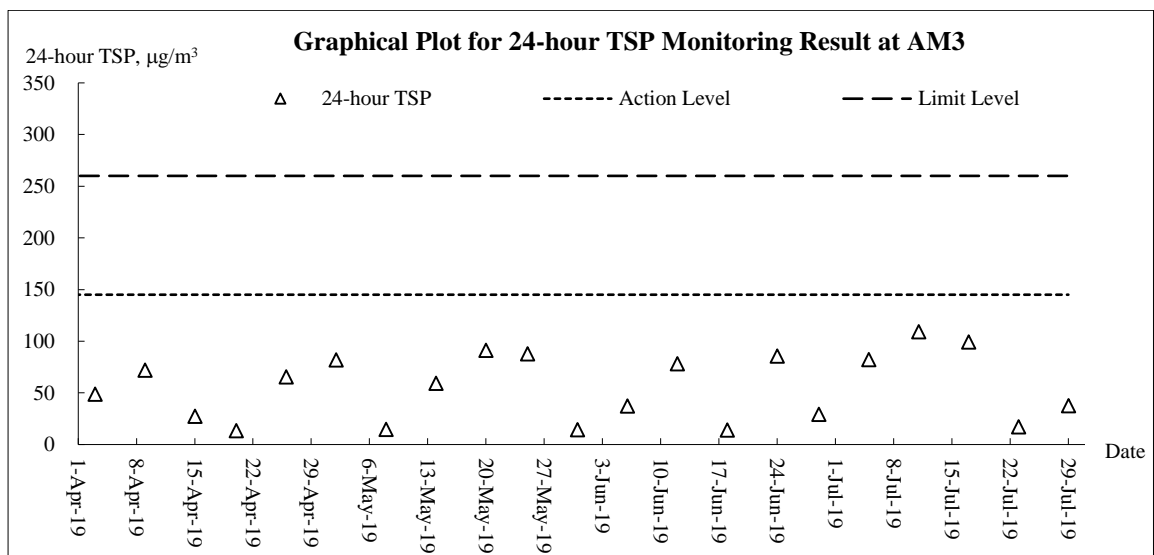
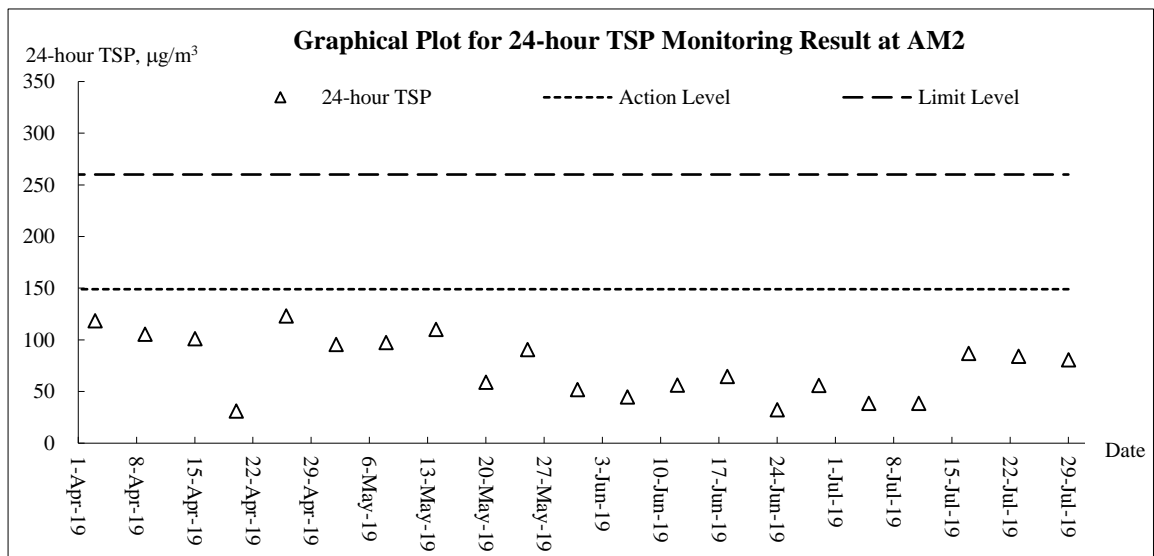
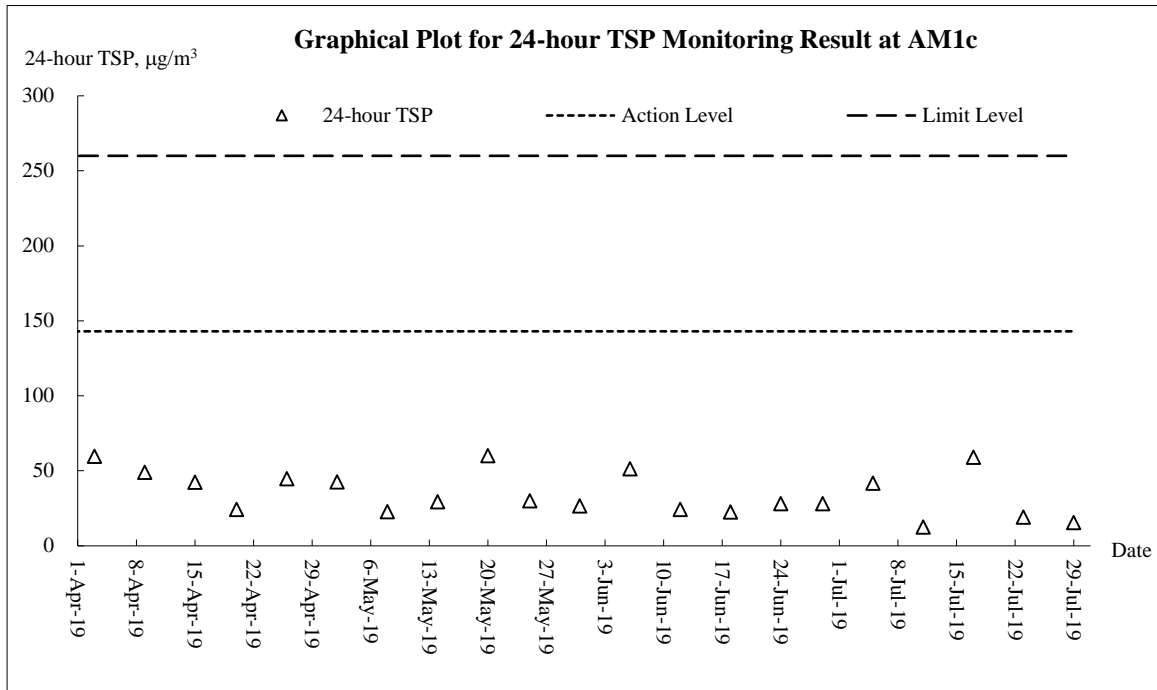


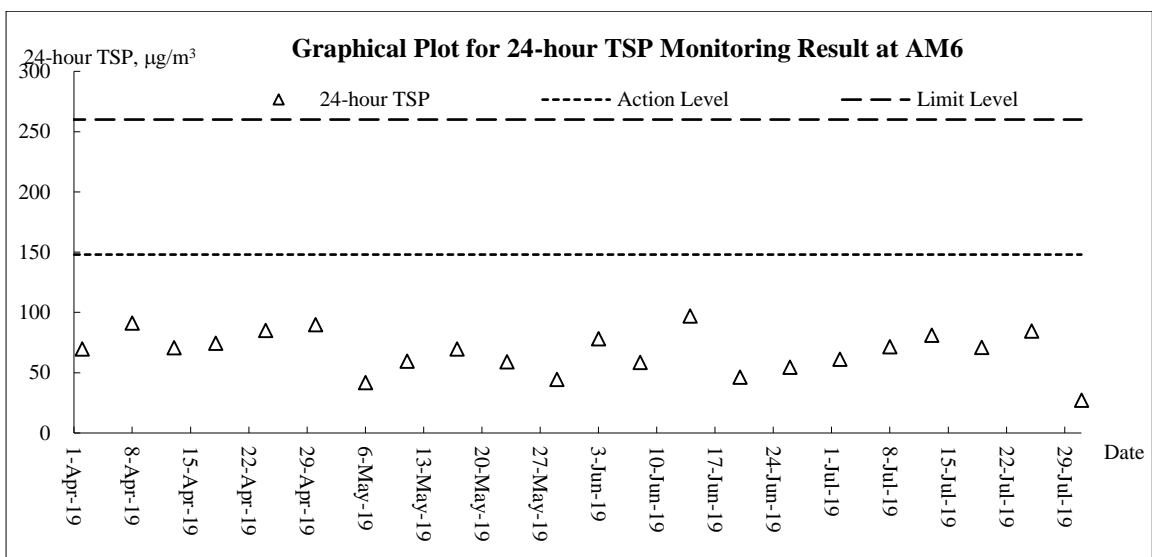
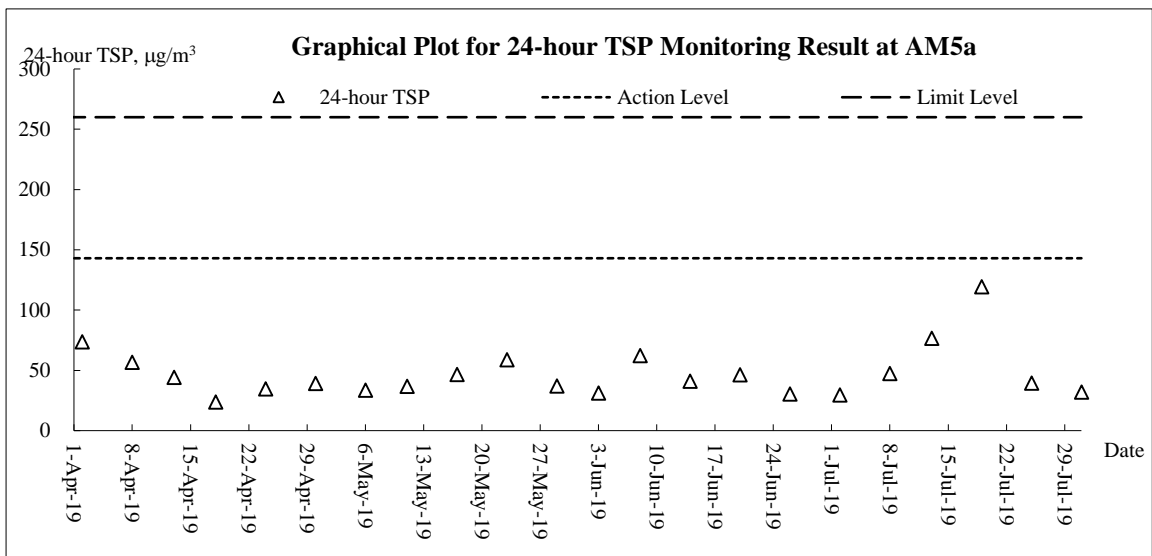
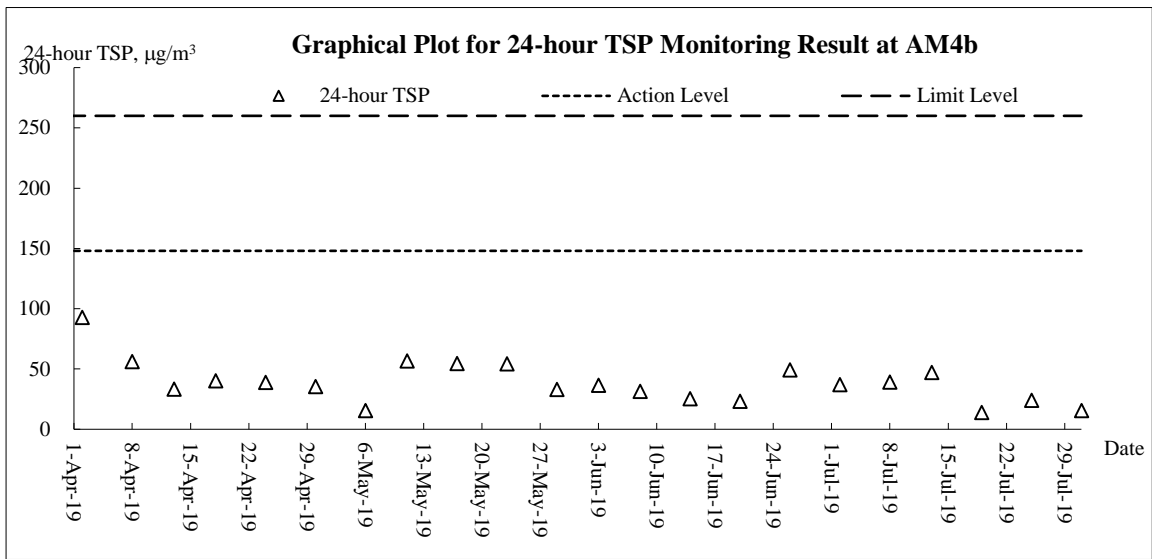


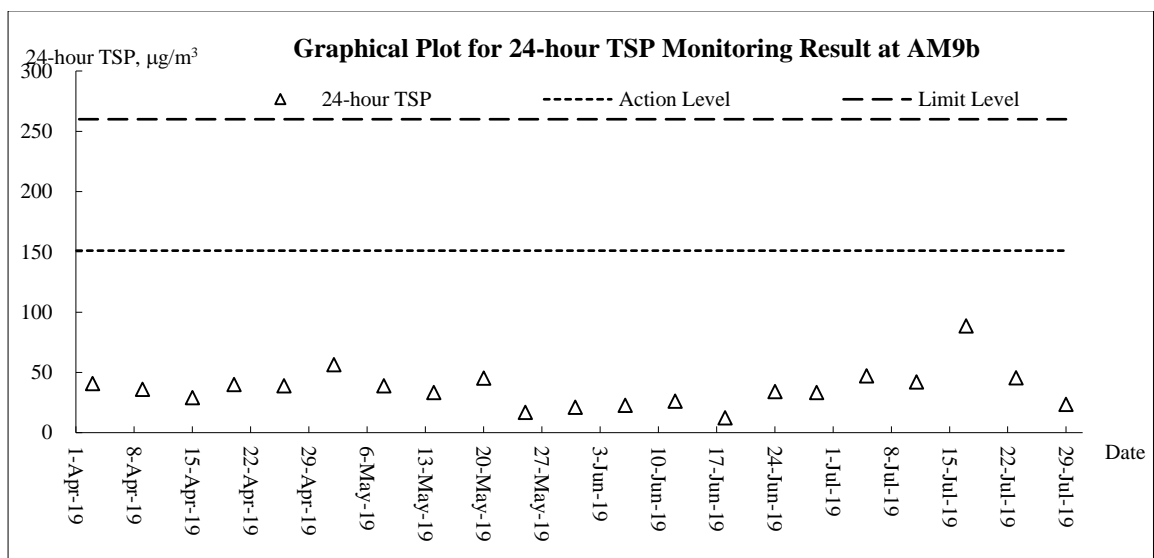
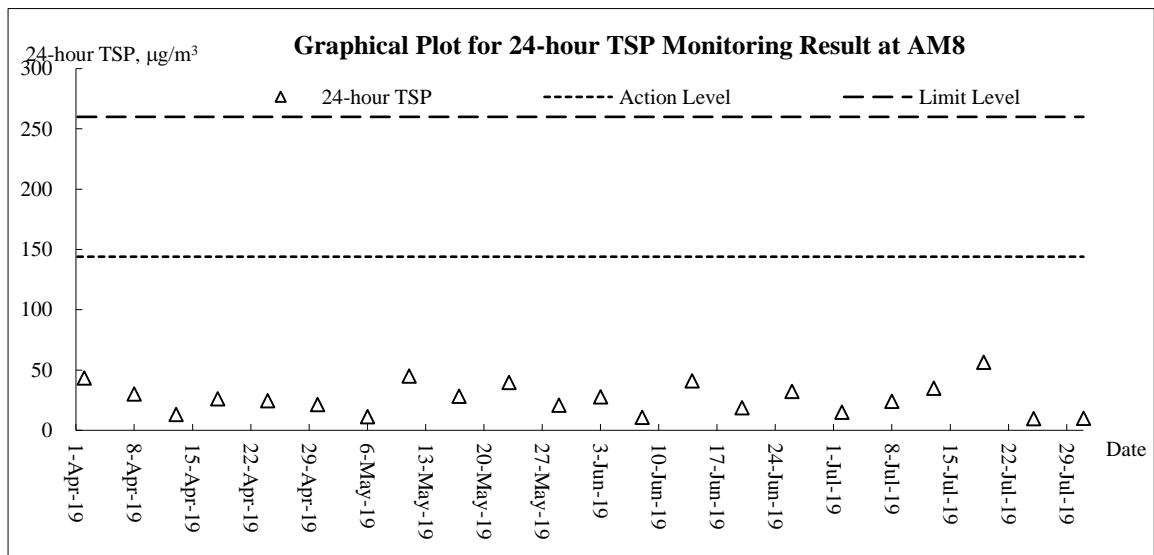
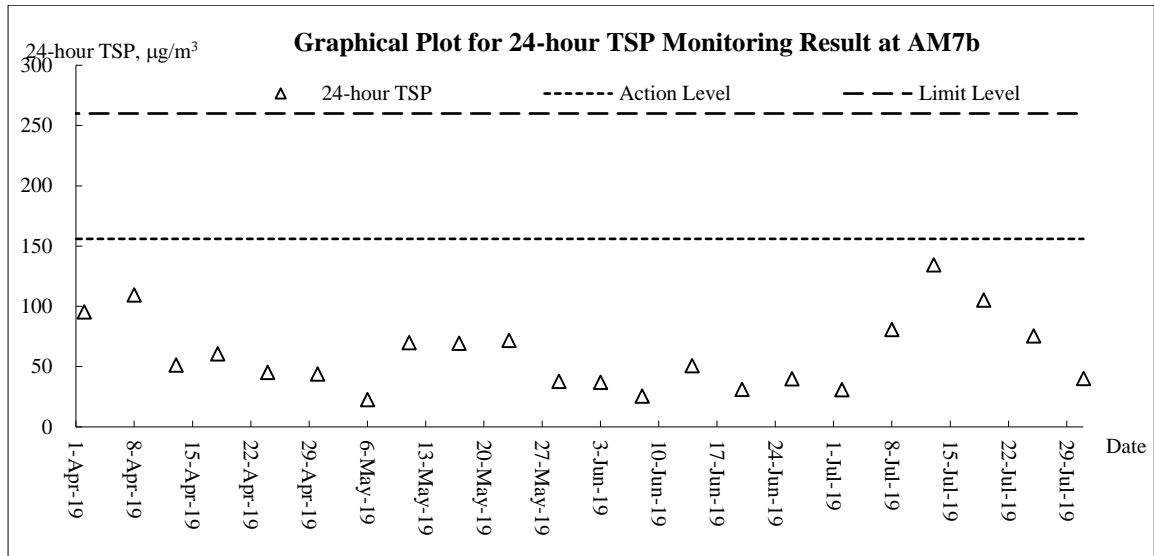




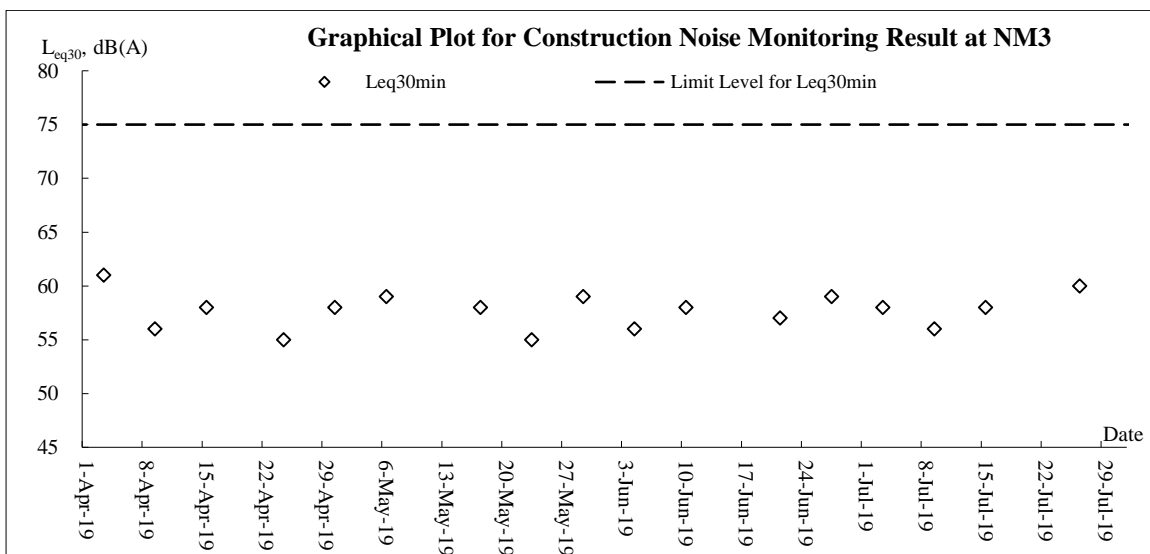
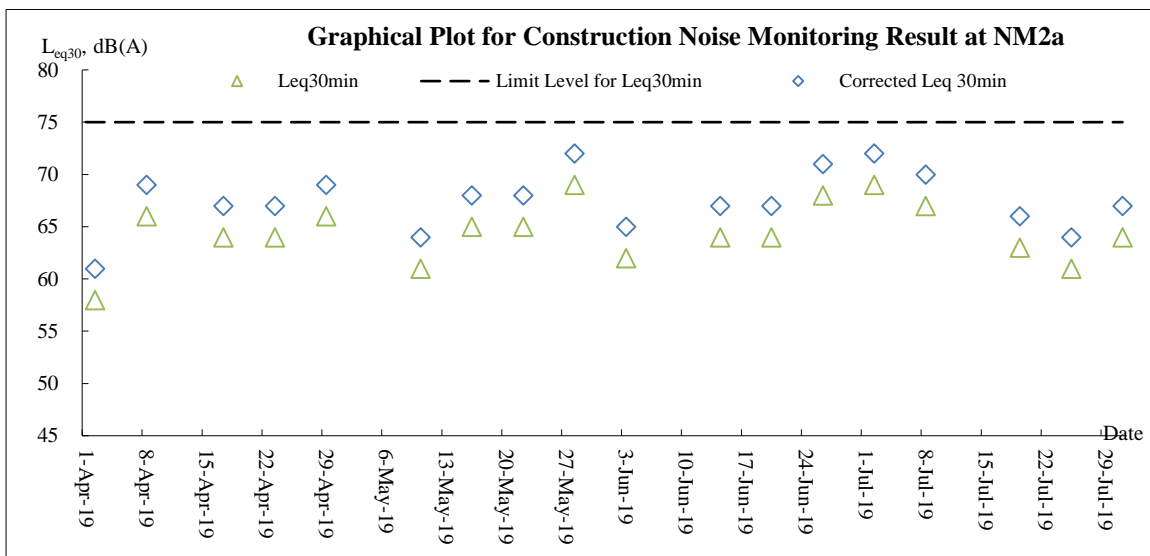
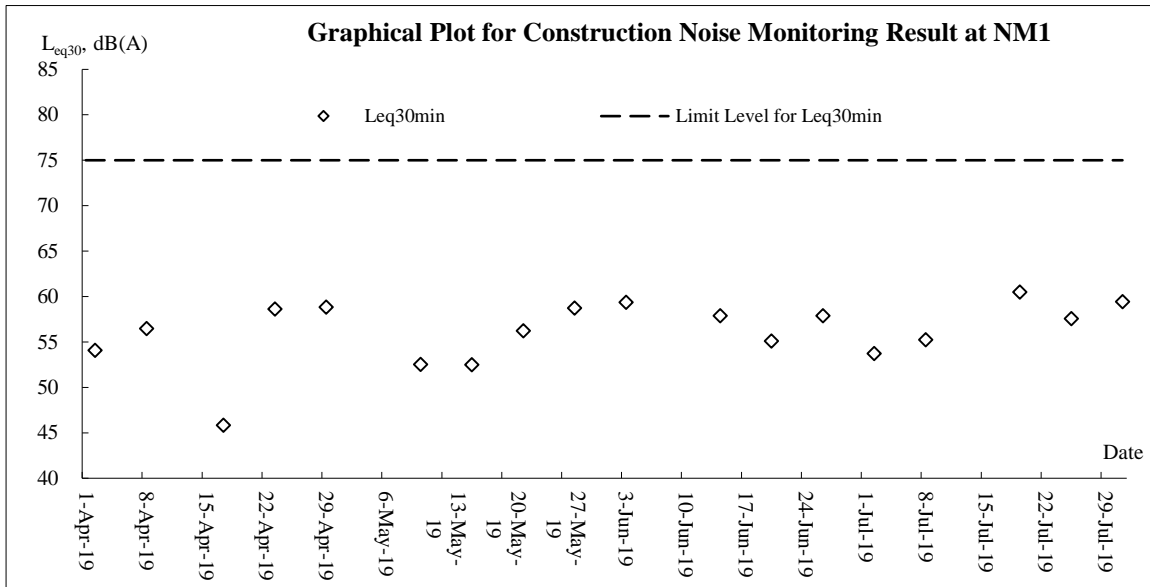
**Air Quality – 24-hour TSP**

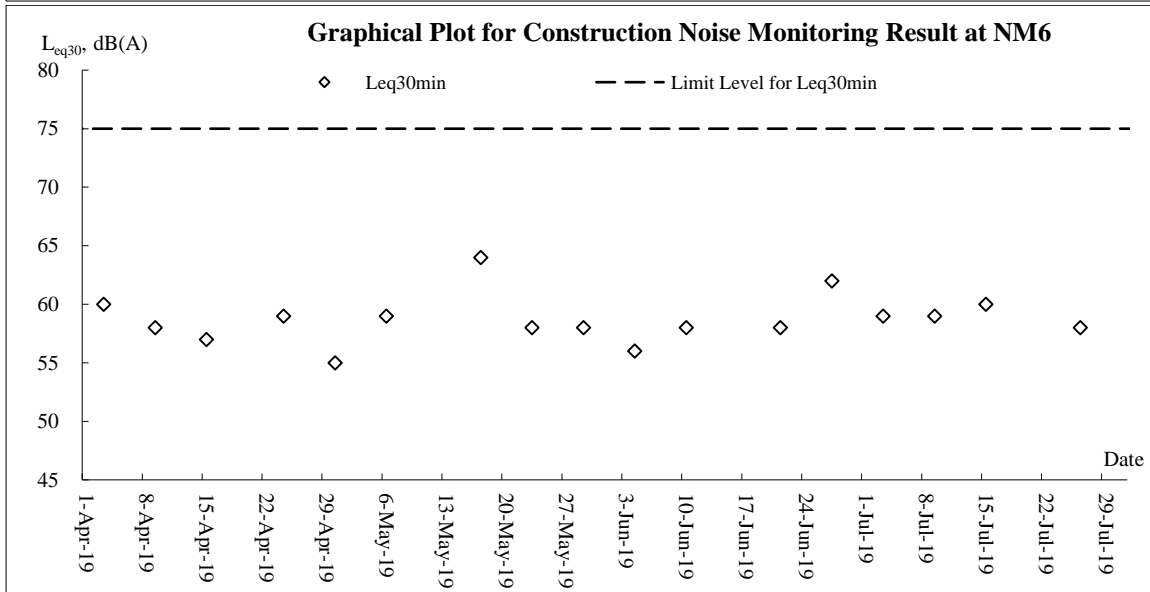
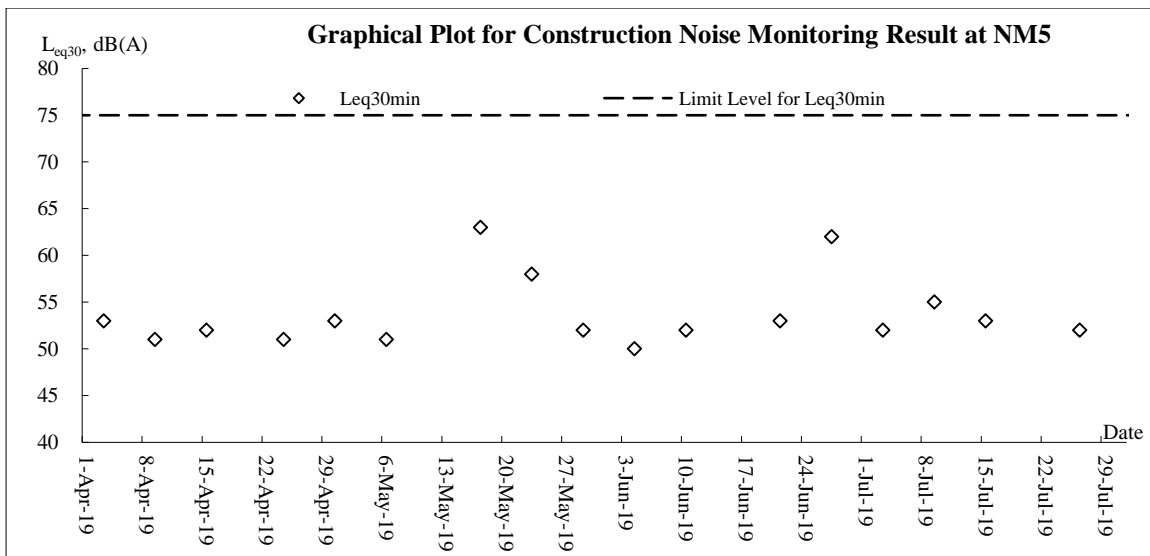
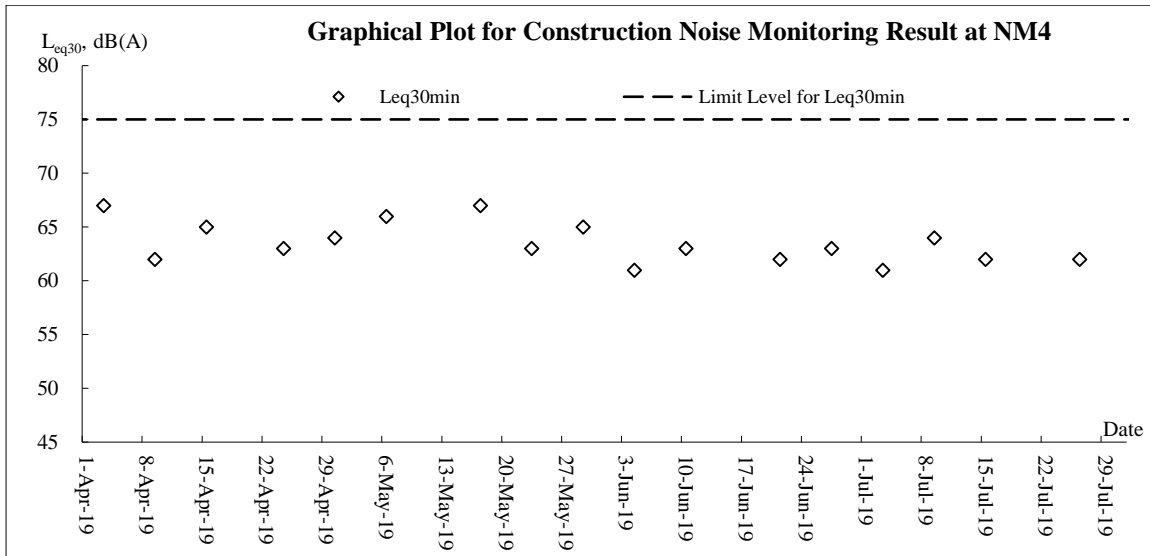


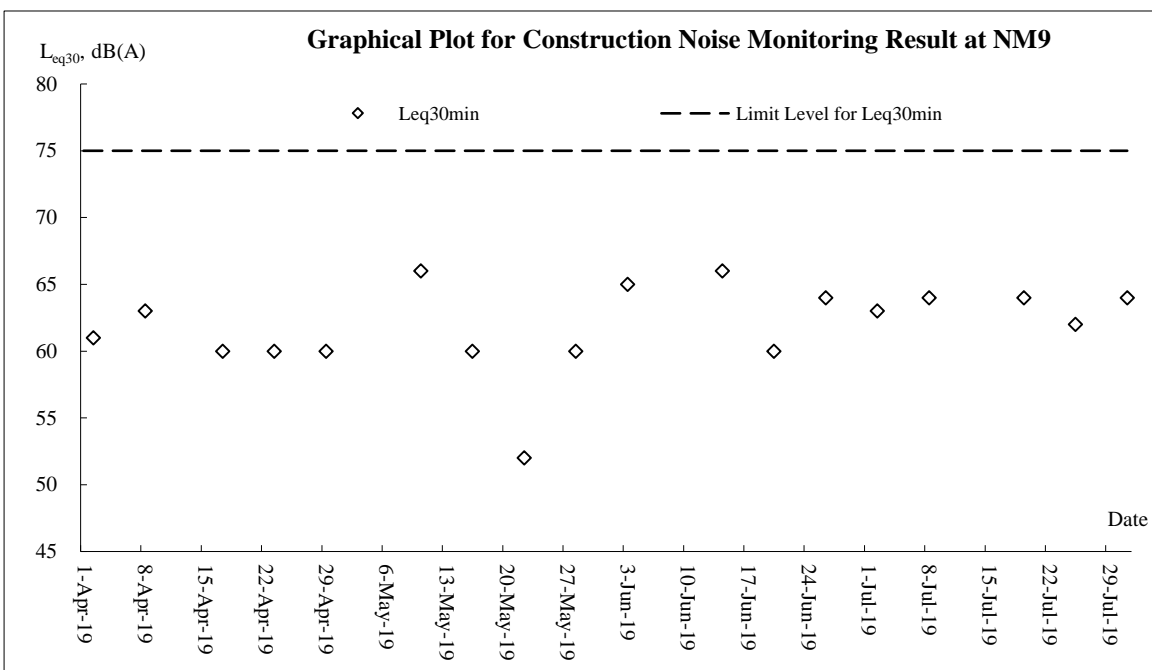
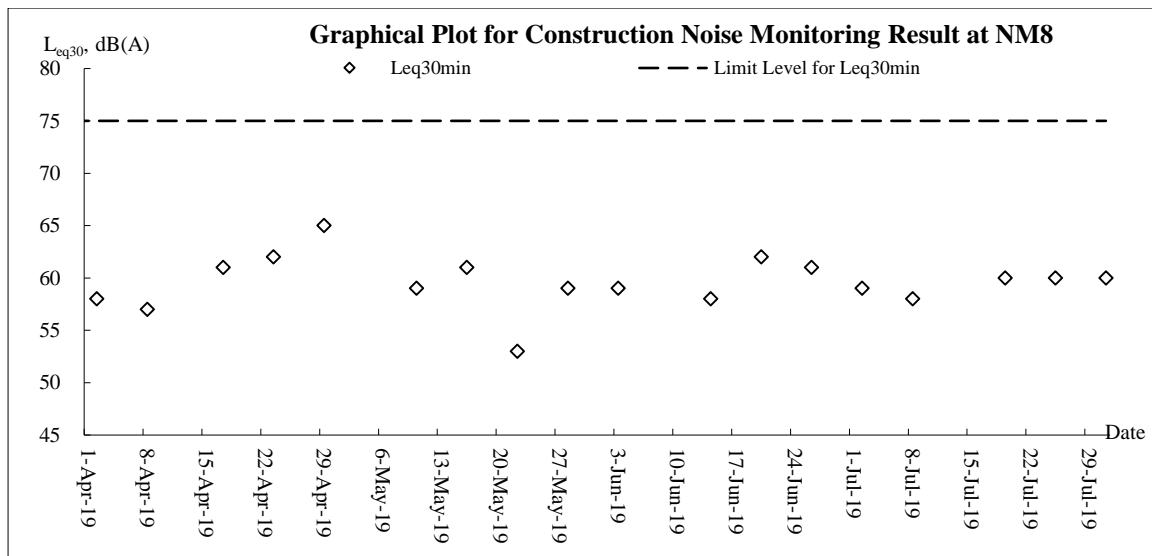
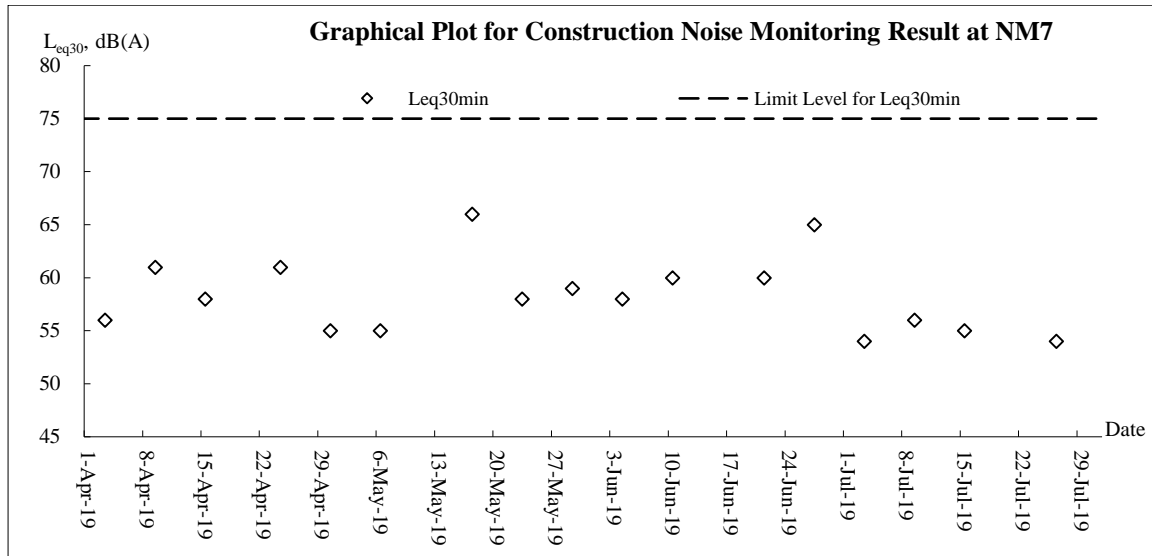




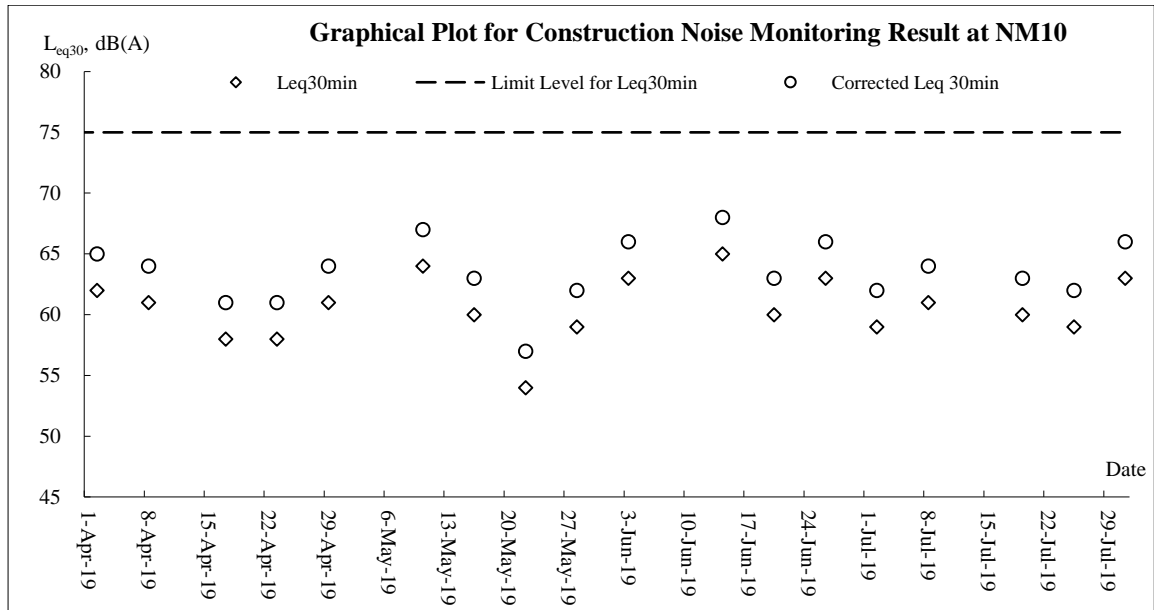
**Noise**



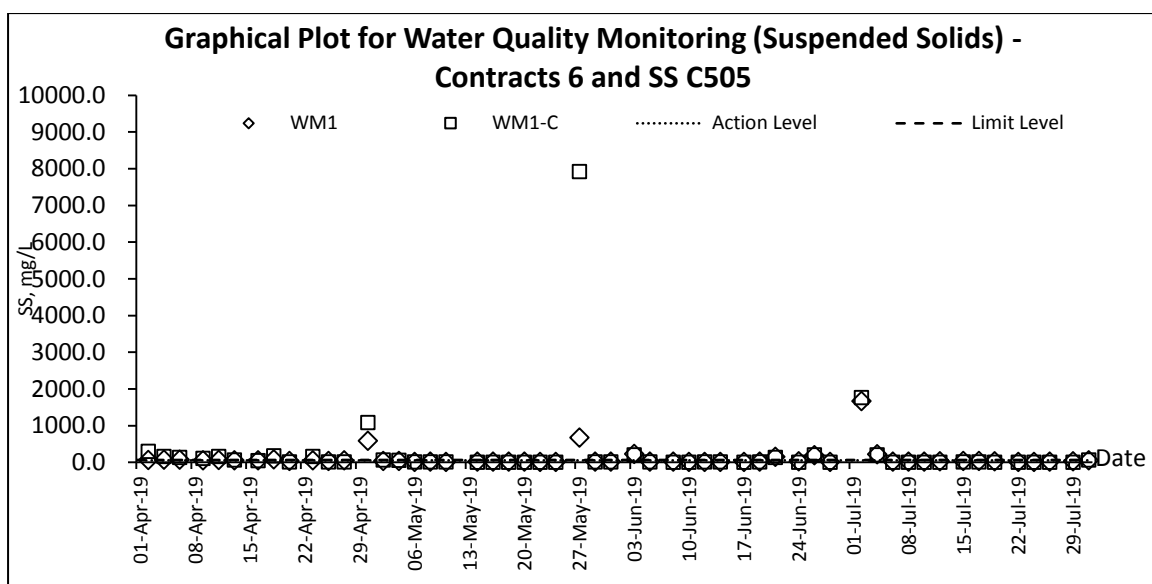
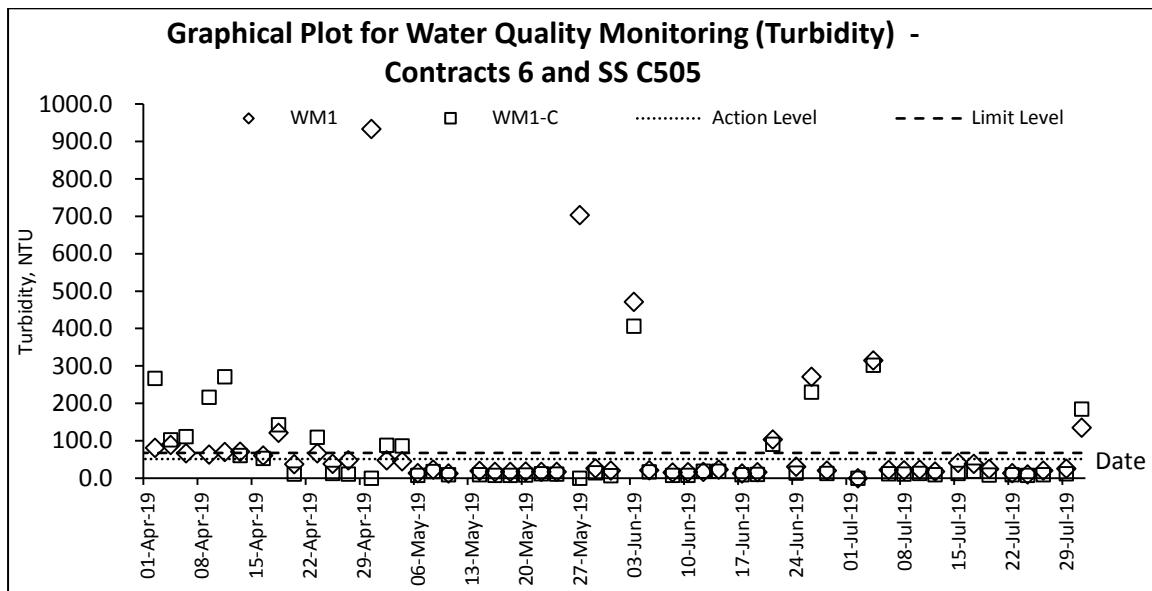
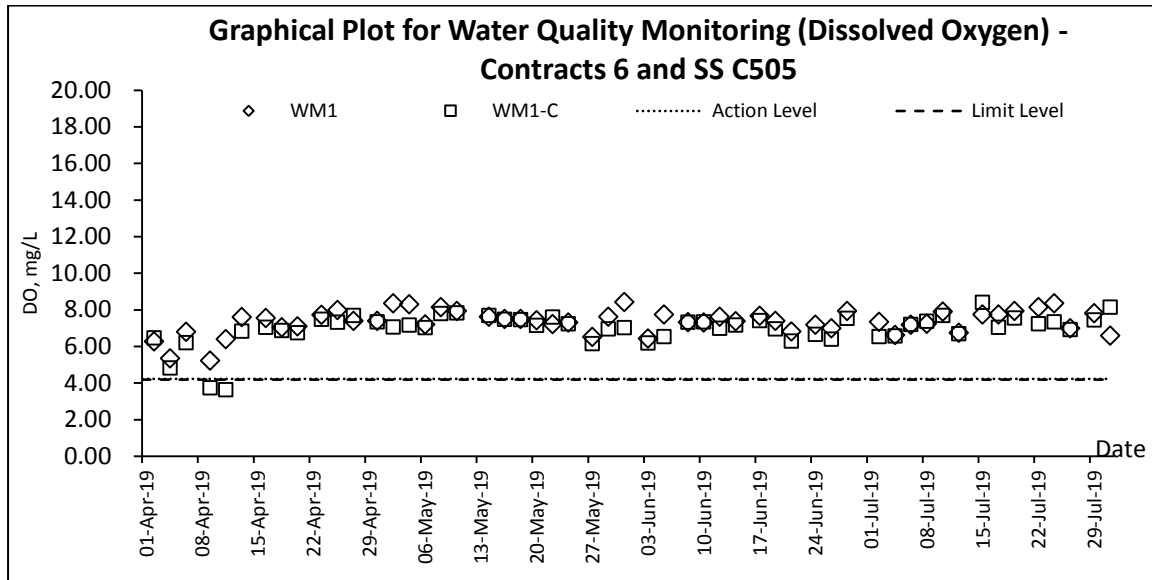


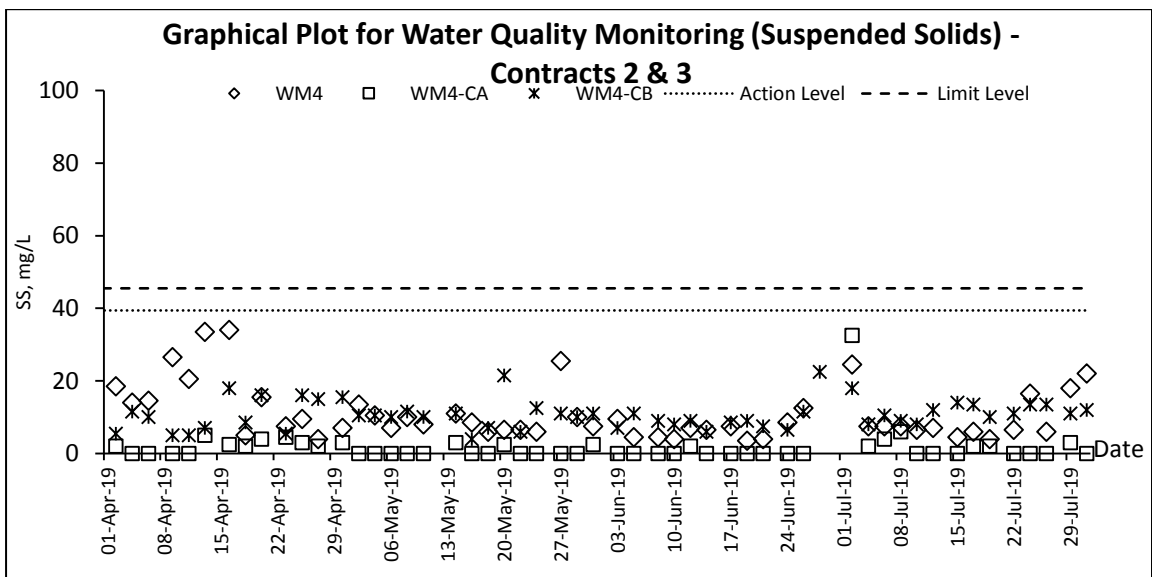
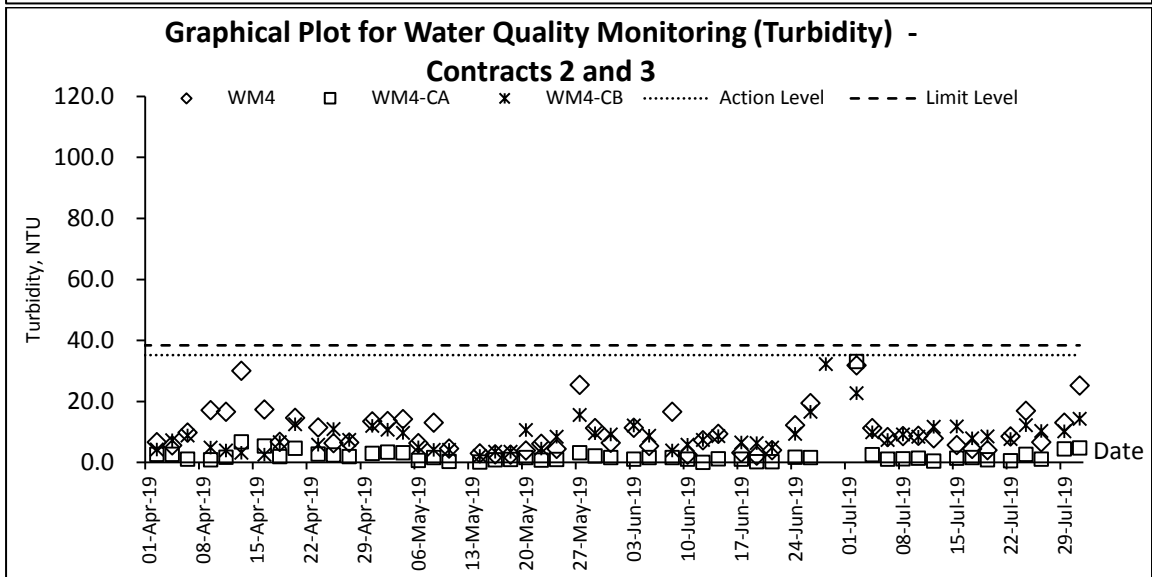
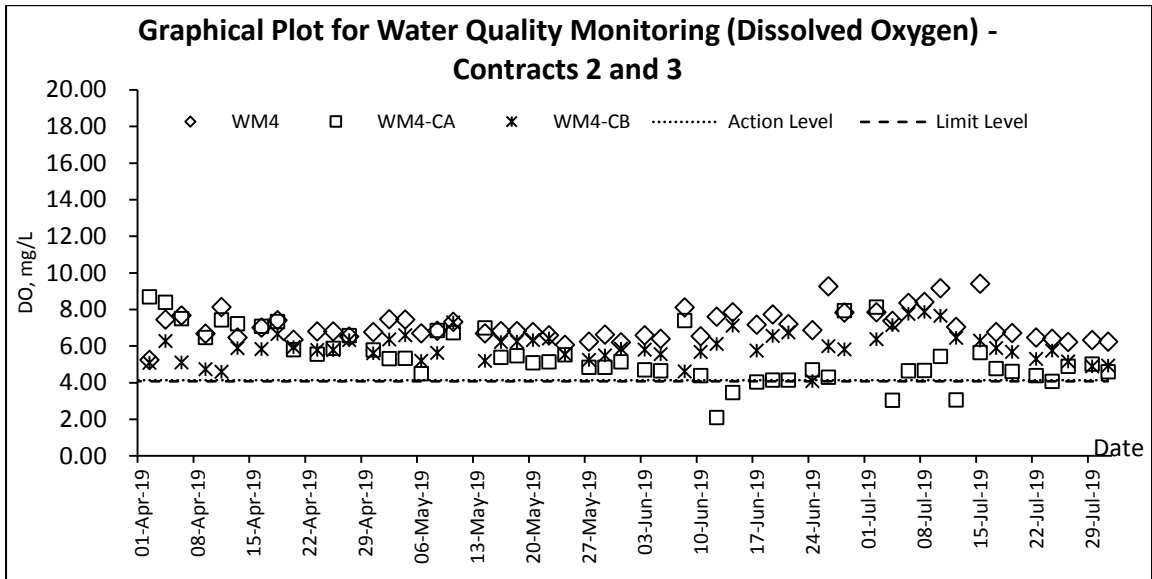


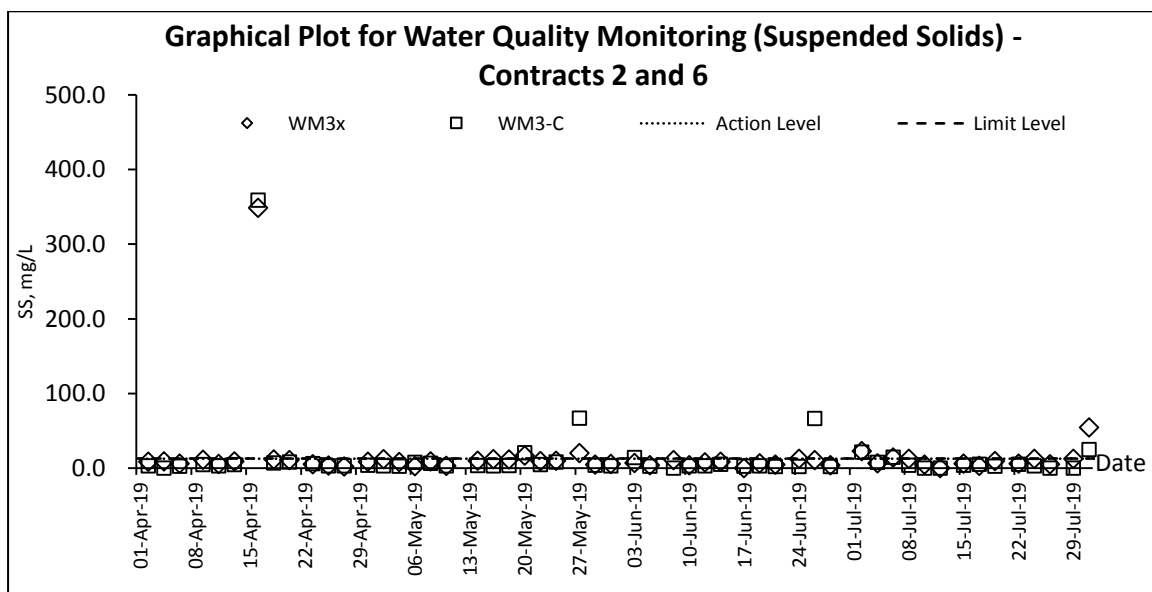
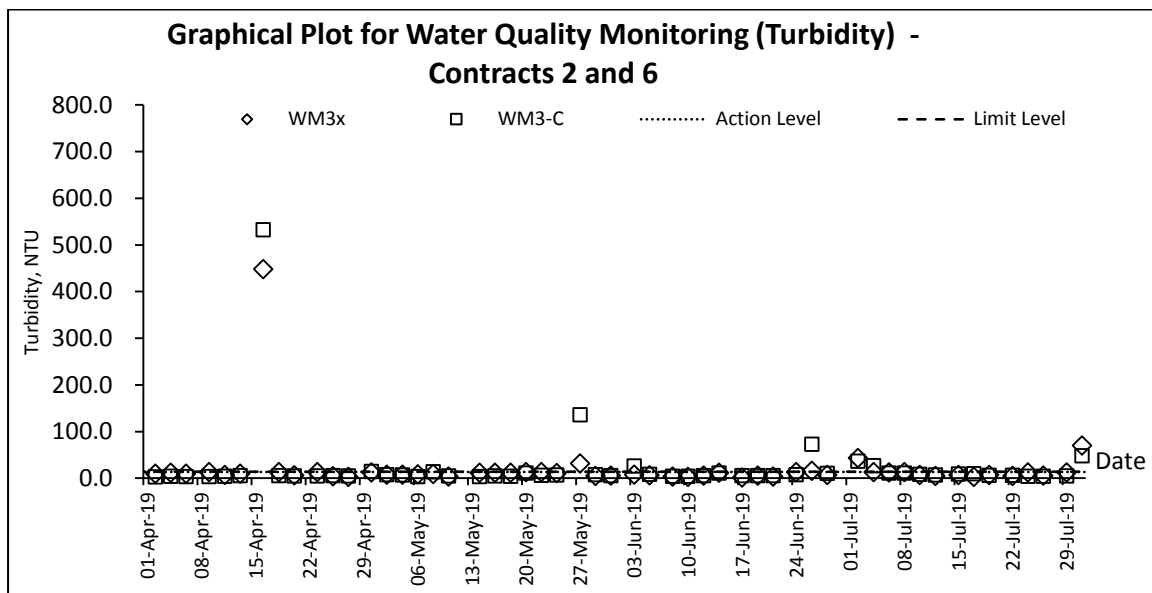
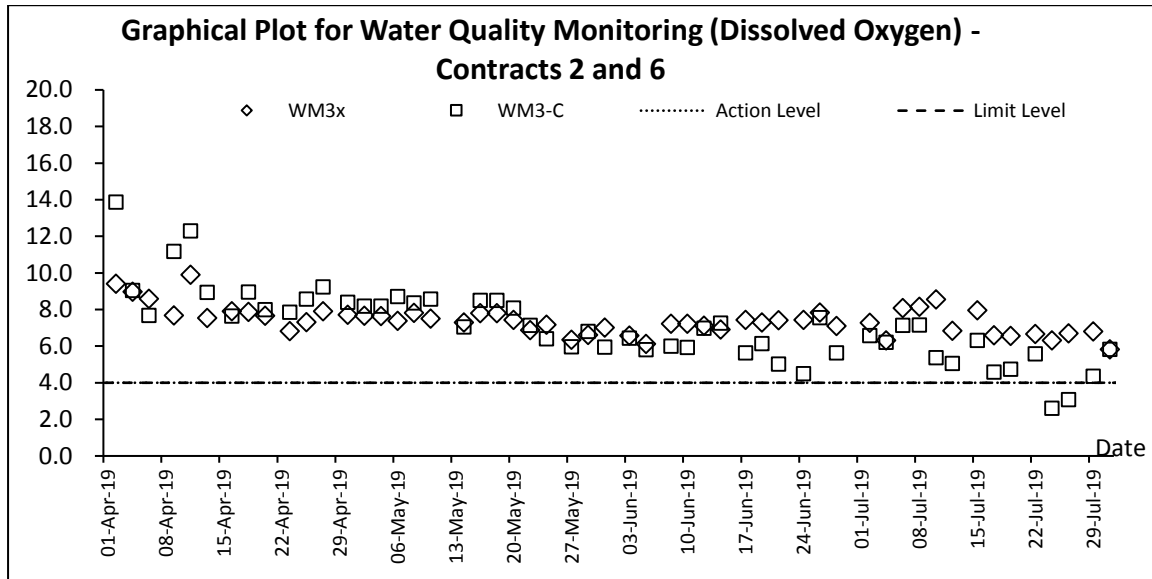


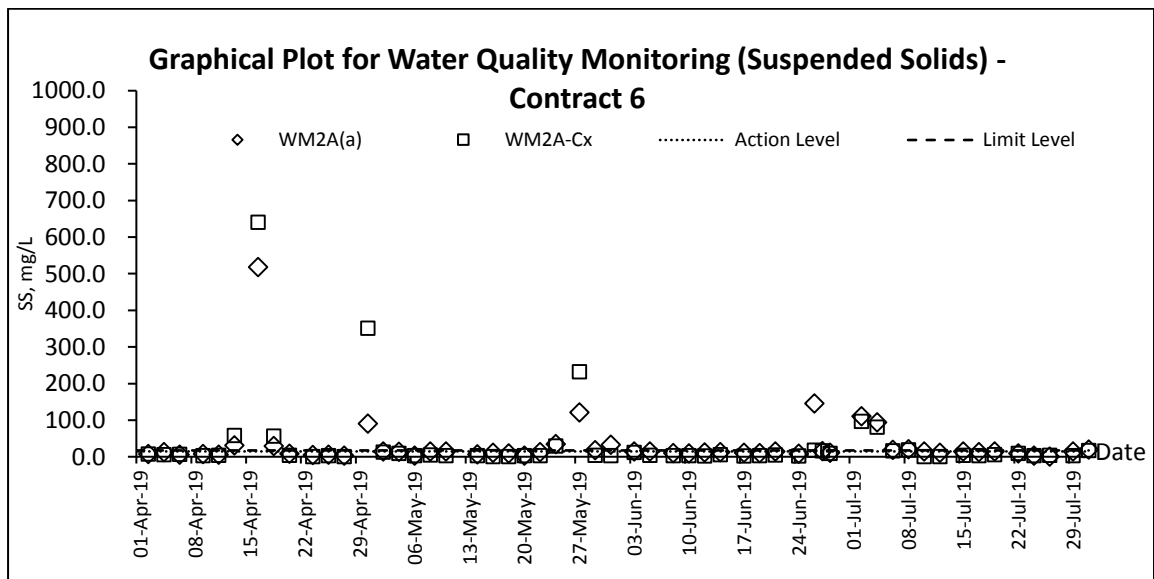
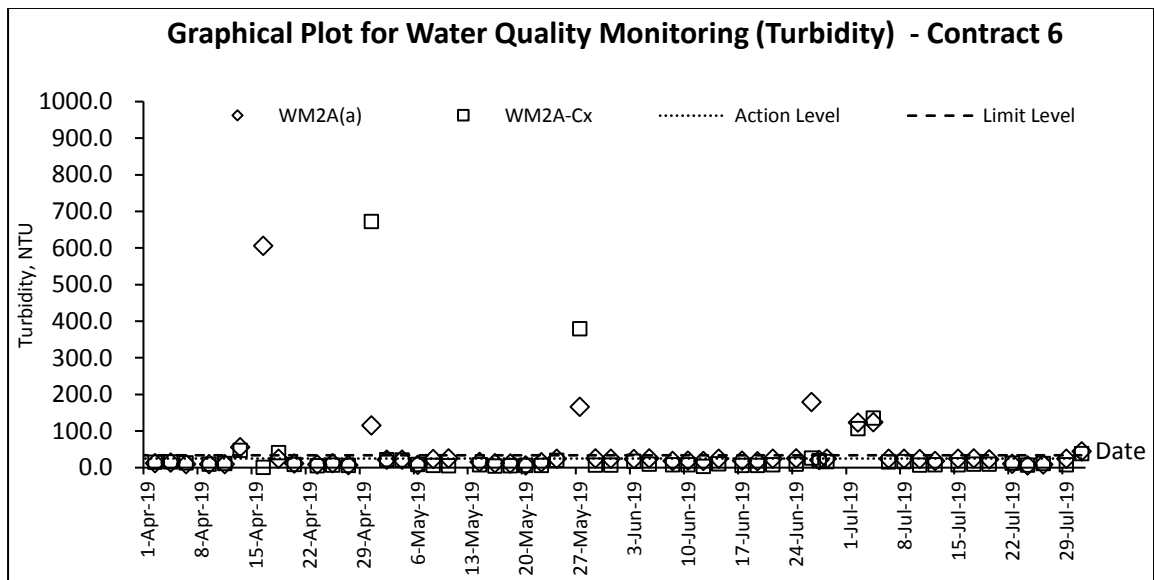
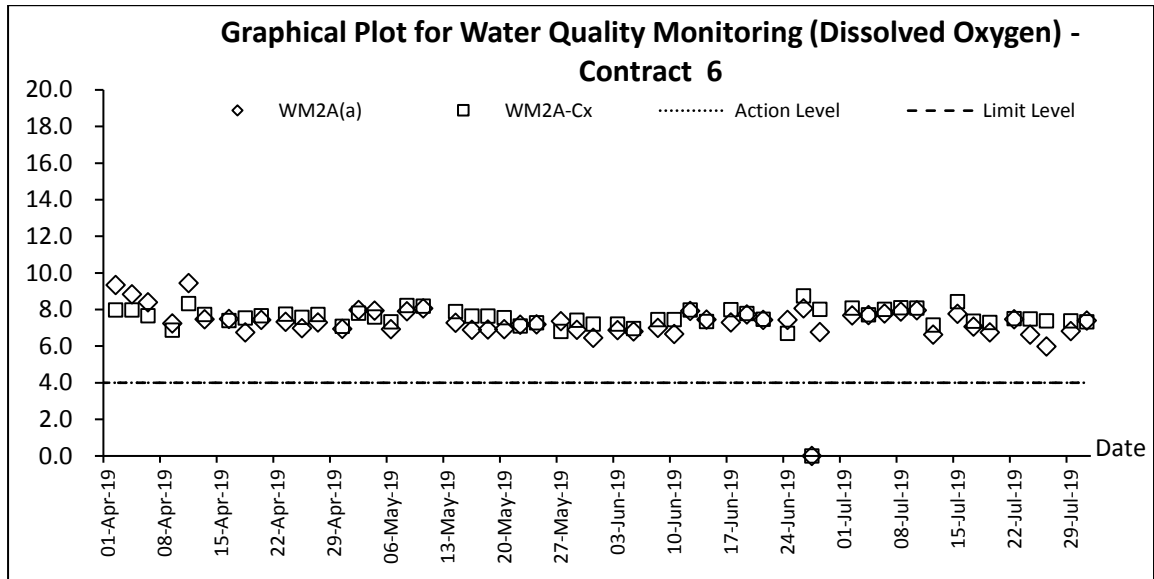


**Water Quality**









## **Appendix G**

### **Weather information**

## Weather Condition Extracted from HKO

### **The weather of May 2019**

With more than usual moisture content in the lower atmosphere over southern China, May 2019 was gloomier than usual in Hong Kong. The mean amount of cloud in the month was 83 percent, 7 percent above the normal of 76 percent and the duration of bright sunshine in the month was only 83.1 hours, about 41 percent lower than the normal figure of 140.4 hours and the second lowest on record for May. With less sunshine and the prevalence of the cooler easterlies in the early part of the month, the month was cooler than normal with the monthly mean temperature of 25.3 degrees, 0.6 degree below the normal figure of 25.9 degrees. Overall, attributing to the well above normal temperatures in March and April, the spring of Hong Kong in 2019 was still much warmer than usual with the mean temperature from March to May 2019 reaching 23.7 degrees, 1.2 degrees above the normal and one of the fifth highest on record for the same period. The monthly rainfall was 234.6 millimetres, about 23 percent below the normal of 304.7 millimetres. The accumulated rainfall recorded in the first five months of the year was 680.3 millimetres, about 6 percent above the normal figure of 640.8 millimetres for the same period.

### **The weather of June 2019**

Mainly attributing to the warmer than normal sea surface temperature and stronger than usual southerly flow in the lower atmosphere over the northern part of the South China Sea, June 2019 was much hotter than usual in Hong Kong. The monthly mean temperature of 29.0 degrees was 1.1 degree above the normal figure of 27.9 degrees, one of the third highest on record for June. Moreover, the first half of this year from January to June 2019 was exceptionally warm. The mean temperature of 23.0 degrees, mean minimum temperature of 21.3 degrees and mean maximum temperature of 25.4 degrees were all the highest on record for the same period. The monthly rainfall of June 2019 was 429.1 millimetres, about 6 percent below the normal of 456.1 millimetres. The accumulated rainfall recorded in the first six months of the year was 1109.4 millimetres, slightly higher than the normal figure of 1096.9 millimetres for the same period.

### **The weather of July 2019**

July 2019 was much hotter than usual in Hong Kong, mainly attributing to the warmer than normal sea surface temperature over the northern part of the South China Sea. The monthly mean minimum temperature of 27.7 degrees was 0.9 degree above the normal figure of 26.8 degrees, the highest on record for July. The monthly mean temperature of 29.5 degrees was 0.7 degree above the normal figure of 28.8 degrees, one of the sixth highest on record for July. The month was also cloudier than usual with the mean amount of cloud of 79%, about 10% above the normal figure of 69% and one of the fifth highest on record for July. The duration of bright sunshine in the month was only 150.5 hours, about 29% below the normal figure of 212.0 hours and the seventh lowest on record for July. The monthly rainfall was 328.5 millimetres, about 13 percent below the normal of 376.5 millimetres. The accumulated rainfall recorded in the first seven months of the year was 1437.9 millimetres, slightly lower than the normal figure of 1473.3 millimetres for the same period.

*Remark: The meteorological data during the Reporting Period is presented in the relevant monthly EM&A report.*

## Appendix H

### Waste Flow Table



Name of Department :       CEDD      

Contract No./ Work Order No. :       CV/2012/08      

### Appendix I - Monthly Summary Waste Flow Table for 2019

(All quantities shall be rounded off to 3 decimal places)

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (Recycled)	Chemical Waste	General Refuse (in '000 m3)
	[a+b+c+d]	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in kg)	(in '000kg)	(in '000m3)
January	8.1000	0.0000	0.0000	1.5360	6.5640	0.0000	0.0000	0.0000	0.0000	9.4000	0.3000
February	1.5710	0.0000	0.0000	0.2000	1.3710	0.0000	0.0000	0.0000	0.0000	0.0000	0.1060
March	3.4900	0.0000	0.0000	0.0000	3.4900	0.0000	0.0000	0.0000	0.0000	0.0000	0.1900
April	1.4100	0.0000	0.0000	0.0000	1.4100	0.0000	0.0000	0.0000	0.0000	0.0000	0.1240
May	1.0780	0.0000	0.0000	0.0000	1.0780	0.0000	0.0000	0.0000	0.0000	0.0000	0.1420
June	0.3100	0.0000	0.0000	0.0000	0.3100	0.0000	0.0000	0.0000	0.0000	2.4000	0.0535
Half-year total	15.9590	0.0000	0.0000	1.7360	14.2230	0.0000	0.0000	0.0000	0.0000	11.8000	0.9155
July	2.2700	0.0000	0.0000	0.0000	2.2700	0.0000	0.0000	0.0000	0.0000	0.0000	0.0343
August	0.0000										
September	0.0000										
October	0.0000										
November	0.0000										
December	0.0000										
Yearly Total	18.2290	0.0000	0.0000	1.7360	16.4930	0.0000	0.0000	0.0000	0.0000	11.8000	0.9498

Year	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (Recycled)	Chemical Waste	General Refuse (in '000 m3)
	[a+b+c+d]	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in kg)	(in '000kg)	(in '000m3)
2013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	220.6270	0.0000	0.0000	0.0000	0.0000
2014	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609
2015	570.9459	0.0000	20.8159	543.2162	6.9138	4.5492	37.6310	3.9220	11.9700	16.1920	1.1696
2016	905.0989	0.0000	7.4372	427.7834	469.8783	24.8350	430.5200	3.8500	18.7262	34.2936	1.9720
2017	741.9482	0.0000	8.0385	175.6792	558.2305	78.3865	1681.8000	4.0700	30.5175	48.7906	5.9610
2018	268.1000	0.0000	0.0000	31.3490	236.7584	13.0110	326.0200	3.0570	27.0700	100.8100	7.1200
2019	18.2290	0.0000	0.0000	1.7360	16.4930	0.0000	0.0000	0.0000	0.0000	11.8000	0.9498
Total	2929.7626	0.0000	39.0278	1556.1584	1334.5839	126.4062	2699.8080	15.3380	88.2907	222.7662	19.4333

Remark:

- 1) Density of C&D material to be       2.2       metric ton/m3  
 2) Density of General Refuse to be       1.6       metric ton/m3  
 3) Density of Spent Oil to be       0.88       metric ton/m3

(All quantities rounded off to 3 decimal places)

### Monthly Summary Waste Flow Table for 2019 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in m <sup>3</sup> )	(in '000m <sup>3</sup> )
Jan	2.937	0.927	0.000	0.000	2.010	0.997	0.000	0.000	0.000	0.000	0.145
Feb	4.659	0.841	0.000	0.000	3.818	0.030	0.000	0.000	0.000	0.000	0.075
Mar	5.146	0.376	0.000	0.000	4.770	0.000	0.000	0.000	0.000	0.000	0.075
Apr	0.787	0.138	0.006	0.000	0.644	0.000	0.000	0.000	0.000	0.000	0.145
May	4.291	0.414	0.000	0.000	3.877	0.000	0.000	0.000	0.000	0.000	0.180
Jun	1.345	0.000	0.000	0.000	1.345	0.301	0.000	0.000	0.000	0.000	0.115
<b>Sub-total</b>	<b>19.166</b>	<b>2.696</b>	<b>0.006</b>	<b>0.000</b>	<b>16.464</b>	<b>1.328</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.735</b>
Jul	1.105	0.000	0.000	0.000	1.105	0.048	0.000	0.000	0.000	0.000	0.090
Aug											
Sep											
Oct											
Nov											
Dec											
<b>Total</b>	<b>20.271</b>	<b>2.696</b>	<b>0.006</b>	<b>0.000</b>	<b>17.569</b>	<b>1.376</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	<b>0.825</b>

- Note:**
1. Assume the density of soil fill is 2 ton/m<sup>3</sup>.
  2. Assume the density of rock and broken concrete is 2.5 ton/m<sup>3</sup>.
  3. Assume each truck of C&D wastes is 5m<sup>3</sup>.
  4. The inert C&D materials except slurry and bentonite are disposed at Tuen Mun 38.
  5. The slurry and bentonite are disposed at Tseung Kwun O 137.
  6. The non-inert C&D wastes are disposed at NENT.
  7. Assume the density of metal is 7,850 kg/m<sup>3</sup>.
  8. Assume the density of plastic is 941 kg/m<sup>3</sup>.
  9. Assume the density of paper is 800 kg/m<sup>3</sup>.

Name of Department: CEDD

Contract No.: NE/2014/02

## Monthly Summary Waste Flow Table for 2016- 2019

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> )
2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2018	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.049	0.000	0.000	0.030
Jan-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mar-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.000
Apr-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
May-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug-19											
Sep-19											
Oct-19											
Nov-19											
Dec-19											
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.250	0.049	0.035	0.000	0.030

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> )
0.500	0.000	0.000	0.000	0.500	0.000	0.500	0.200	0.000	0.000	0.200

Notes :

- (1) The performance targets are given in PS Clause 1.84(14).
- (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Sites.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging materials.
- (4) Estimate 6m<sup>3</sup> capacity per dump truck

## Monthly Summary Waste Flow Table for 2019 (year)

Name of Person completing the record: K.M. Lui (EO)

Project : Liangtang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 6

Contract No.: CV/2013/08

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m <sup>3</sup> )
Jan	25.725	0	0	0.385	16.126	9.214	0	0.233	0	0	0.521
Feb	17.959	0	0	0.280	11.168	6.511	0	0	0	0	0.278
Mar	11.076	0	0	0.842	10.234	0	0	0.339	0	0	0.580
Apr	7.2850	0	0	0.689	6.596	0	0	0.463	0	0	0.389
May	4.0900	0	0	0.009	4.081	0	0	0	0	0	0.468
Jun	1.1760	0	0	0.315	0.861	0	0	0.270	0	0	0.307
Sub-total	67.311	0.000	0.000	2.520	49.066	15.725	0.000	1.305	0.000	0.000	2.543
Jul	7.846	0	0	1.165	6.681	0	0	0	0	0	0.220
Aug		0	0	0	0	0	0	0	0	0	0
Sep		0	0	0	0	0	0	0	0	0	0
Oct		0	0	0	0	0	0	0	0	0	0
Nov		0	0	0	0	0	0	0	0	0	0
Dec		0	0	0	0	0	0	0	0	0	0
Total	1111.766	0.000	166.627	287.438	641.978	111.037	0.000	12.446	0.007	34.045	21.613

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

(2) Plastics refer to plastic bottles/containers, plastic sheets/ foam from packaging materials.

(3) Broken concrete for recycling into aggregates.

**MONTHLY SUMMARY WASTE FLOW TABLE**Name of Department:           CEDD          

2788.6

1394

Contract Title: Liantang/ Heung Yuen Wai Boundary Control Point  
Site Formation and Infrastructure Works – Contract 7Contract No.:           NE/2014/03          **Monthly Summary Waste Flow Table for 2019 (year)**

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Non-Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> )
Jan	1.919	0.95	0	0	1.919	0	6.7	0.1	0.001	0	0.1
Feb	2.035	1.386	0	1.386	0.649	0	1.2	0.1	0.001	0	0.1
Mar	0.591	0.282	0	0.282	0.309	0	4.7	0.1	0.001	0	0.1
Apr	1.729	0.335	0	0.335	1.394	0	7.1	0.1	0.001	0	0.3
May	2.076	0	0	0	2.076	0	0.4	0.1	0.001	0	0.1
June	0.845	0	0	0	0.845	0	0.1	0.1	0.001	0	0.1
Sub-total	9.195	2.953	0	2.003	7.192	0	20.2	0.6	0.006	0	0.8
July	0.381	0	0	0	0.381	0	0.1	0.1	0.001	0	0.1
Aug											
Sept											
Oct											
Nov											
Dec											
Total	9.576	2.953	0	2.003	7.573	0	20.3	0.7	0.007	0	0.900

Notes: (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.  
(2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

Contract No. / Works Order No.: - SSC505**Monthly Summary Waste Flow Table for 2019** [year] [to be submitted not later than the 15<sup>th</sup> day of each month following reporting month]

(All quantities shall be rounded off to 3 decimal places.)

Month	Actual Quantities of Inert Construction Waste Generated Monthly				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Broken Concrete (see Note 4)	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )
Jan	4.815	1.963	0.160	0.000	2.691
Feb	4.609	0.598	0.150	0.000	3.861
Mar	4.233	0.300	0.026	0.000	3.907
Apr	2.852	0.141	0.013	0.000	2.698
May	3.936	0.120	0.013	0.000	3.803
Jun	1.605	0.065	0.000	0.000	1.541
Sub-total	22.049	3.188	0.362	0.000	18.499
Jul	2.752	0.243	0.000	0.000	2.509
Aug					
Sep					
Oct					
Nov					
Dec					
Total	24.801	3.431	0.362	0.000	21.008

Month	Actual Quantities of Non-inert Construction Waste Generated Monthly												
	Timber		Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Other Recyclable Materials (see Page 3)		General Refuse disposed of at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m <sup>3</sup> )
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	238.550	238.550	0.290	0.290	0.950	0.950	0.000	0.000	0.000	0.000	1.417
Feb	1.510	1.510	0.000	0.000	0.410	0.410	2.660	2.660	0.000	0.000	0.000	0.000	1.157
Mar	1.900	1.900	337.420	337.420	0.360	0.360	1.330	1.330	0.000	0.000	0.000	0.000	1.586
Apr	0.560	0.560	116.170	116.170	0.610	0.610	3.330	3.330	0.000	0.000	0.000	0.000	1.190
May	0.000	0.000	77.277	77.277	0.540	0.540	0.400	0.400	0.000	0.000	0.000	0.000	1.086
Jun	0.000	0.000	234.170	234.170	0.570	0.570	1.580	1.580	0.000	0.000	0.000	0.000	1.664
Sub-total	3.970	3.970	1,003.587	1,003.587	2.780	2.780	10.250	10.250	0.000	0.000	0.000	0.000	8.100
Jul	0.000	0.000	345.290	345.290	0.400	0.400	1.370	1.370	0.000	0.000	0.000	0.000	1.528
Aug													
Sep													
Oct													
Nov													
Dec													
Total	3.970	3.970	1,348.877	1,348.877	3.180	3.180	11.620	11.620	0.000	0.000	0.000	0.000	9.628

Description of mode and details of recycling if any for the month e.g. XX kg of used timber was sent to YY site for transformation into fertilizers					
486.250 tons of broken concrete were sent to Tailor Recycled Aggregates Ltd. for recycling.	400.0 kg of paper were sent to Lau Choi Kee Papers Co. Ltd. for recycling.	1,370.0 kg of plastic barrier were sent 3R HK International Eco-action Ltd	345.290 ton of scrap metal were sent to Fung Sun Metal Ltd. for recycling.		

- Notes:
- (1) The performance targets are given in the Particular Specification on Environmental Management Plan.
  - (2) The waste flow table shall also include construction waste that are specified in the Contract to be imported for use at the site.
  - (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
  - (4) Broken concrete for recycling into aggregates.
  - (5) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m<sup>3</sup> by volume.



Forecast of Total Quantities of C&D Materials to be Generated from the Contract										
Total Quantity Generated	Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastics	Chemical Waste	General refuse
(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m <sup>3</sup> )
341.601	16.090	49.216	0.000	188.097	88.253	20,677.736	21.136	22.903	5.000	44.075

# **Appendix I**

## **Implementation Schedule for Environmental Mitigation Measures**

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<b>Air Quality Impact (Construction)</b>							
3.6.1.1	2.1	<p><b>General Dust Control Measures</b></p> <p>The following dust suppression measures should be implemented:</p> <ul style="list-style-type: none"> <li>■ Frequent water spraying for active construction areas (4 times per day for active areas in Po Kak Tsai and 8 times per day for all other active areas), including areas with heavy construction and slope cutting activities</li> <li>■ 80% of stockpile areas should be covered by impervious sheets</li> <li>■ Speed of trucks within the site should be controlled to about 10 km/hr</li> <li>■ All haul roads within the site should be paved to avoid dust emission due to vehicular movement</li> </ul>	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation
3.6.1.2	2.1	<p><b>Best Practice for Dust Control</b></p> <p>The relevant best practices for dust control as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good site management</i></p> <ul style="list-style-type: none"> <li>■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust.</li> <li>■ Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimize the release of visible dust emission.</li> <li>■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly.</li> <li>■ Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimizing generation of fugitive dust emissions.</li> <li>■ The material should be handled properly to prevent fugitive dust emission before cleaning.</li> </ul> <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> <li>■ Each and every main temporary access should be paved with</li> </ul>	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</p> <ul style="list-style-type: none"> <li>Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.</li> </ul> <p><i>Exposed Earth</i></p> <ul style="list-style-type: none"> <li>Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.</li> </ul> <p><i>Loading, Unloading or Transfer of Dusty Materials</i></p> <ul style="list-style-type: none"> <li>All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.</li> </ul> <p><i>Debris Handling</i></p> <ul style="list-style-type: none"> <li>Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides.</li> <li>Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped.</li> </ul> <p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> <li>Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.</li> </ul> <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> <li>Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> </ul> <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> <li>Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.</li> <li>Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p><i>Site hoarding</i></p> <ul style="list-style-type: none"> <li>Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.</li> </ul> <p><i>Blasting</i></p> <ul style="list-style-type: none"> <li>The areas within 30m from the blasting area should be wetted with water prior to blasting.</li> </ul>					
<b><u>Air Quality Impact (Operation)</u></b>							
3.5.2.2	2.2	<p>The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site:</p> <ul style="list-style-type: none"> <li>The treatment work will be totally enclosed. Negative pressure ventilation will be provided within the enclosure to avoid any fugitive odorous emission from the treatment work.</li> <li>Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission.</li> <li>Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity.</li> <li>Chemical or biological deodorisation facilities with a minimum odour removal efficiency of 90% will be provided to treat potential odorous emissions from the treatment plant including sewage channels / tanks, filter press and screening facilities so as to minimize any potential odour impact to the nearby ASRs.</li> </ul>	To minimize potential odour impact from operation of the proposed sewage treatment work at BCP	DSD	BCP	Operation Phase	EIA recommendation
<b><u>Noise Impact (Construction)</u></b>							
4.4.1.4	3.1	<p><b>Adoption of Quieter PME</b></p> <p>Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in <b>Table 4.14</b>, which can be found in Hong Kong.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p><b>Use of Movable Noise Barrier</b></p> <p>The use of movable barrier for certain PME can further alleviate the construction noise impacts. In general, a 5 dB(A) reduction for movable PME and 10 dB(A) for stationary PME can be achieved depending on the actual design of the movable noise barrier. The Contractor shall be responsible for design of the movable noise barrier with due consideration given to the size of the PME and the requirement for intercepting the line of sight between the NSRs and PME. Barrier material with surface mass in excess of 7 kg/m<sup>2</sup> is recommended to achieve the predicted screening effect.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p><b>Use of Noise Enclosure/ Acoustic Shed</b></p> <p>The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and concrete pump. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the GW-TM.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p><b>Use of Noise Insulating Fabric</b></p> <p>Noise insulating fabric can be adopted for certain PME (e.g. drill rig, pilling auger etc). The insulating fabric should be lapped such that there are no openings or gaps on the joints. Technical data from manufacturers state that by using the Fabric, a noise reduction of over 10 dB(A) can be achieved on noise level.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p><b>Good Site Practice</b></p> <p>The good site practices listed below should be followed during each phase of construction:</p> <ul style="list-style-type: none"> <li>• Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;</li> <li>• Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme;</li> <li>• Mobile plant, if any, should be sited as far from NSRs as possible;</li> <li>• 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;</li> <li>• Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and</li> <li>• Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.</li> </ul>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
<b>Noise Impact (Operation)</b>							
<u>Road Traffic Noise</u>							
Table 4.42 and Figure 4.20.1 to 4.20.4	3.2	Erection of noise barrier/ enclosure along the viaduct section.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	EIAO and NCO
<u>Fixed Plant Noise</u>							
Table 4.46	3.2	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.5.2.4	3.2	<p>The following noise reduction measures shall be considered as far as practicable during operation:</p> <ul style="list-style-type: none"> <li>Choose quieter plant such as those which have been effectively silenced;</li> <li>Include noise levels specification when ordering new plant (including chillier and E/M equipment);</li> <li>Locate fixed plant/louver away from any NSRs as far as practicable;</li> <li>Locate fixed plant in walled plant rooms or in specially designed enclosures;</li> <li>Locate noisy machines in a basement or a completely separate building;</li> <li>Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and</li> <li>Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise.</li> </ul>	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIAO and NCO
<b>Water Quality Impact (Construction)</b>							
5.6.1.1	4.1	<p><b>Construction site runoff and drainage</b></p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> <li>At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractor prior to the commencement of construction.</li> <li>The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas.</li> </ul>	To control site runoff and drainage; prevent high sediment loading from reaching the nearby watercourses	Contractor	Construction Works Sites	Construction Phase	Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94)



EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Temporary ditches should be provided to facilitate the runoff discharge into stormwater drainage system through a sediment/silt trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates, if practical.</p> <ul style="list-style-type: none"> <li>▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractor prior to the commencement of construction.</li> <li>▪ 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 during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times.</li> <li>▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities.</li> <li>▪ If surface excavation works cannot be avoided during the wet season (April to September), temporarily exposed slope/soil surfaces should be covered by tarpaulin or other means, as far as practicable, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC Note PN 1/94.</li> <li>▪ The overall slope of the site should be kept to a minimum to reduce</li> </ul>					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>the erosive potential of surface water flows.</p> <ul style="list-style-type: none"> <li>▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains.</li> <li>▪ Open stockpiles of construction materials or construction wastes on-site 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.</li> <li>▪ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers.</li> <li>▪ Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes.</li> <li>▪ Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.</li> </ul>					
5.6.1.1	4.1	<p><b>Good site practices for works within water gathering grounds</b></p> <p>The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:</p>	To minimize water quality impacts to the water gathering grounds	Contractor	Construction Works Sites within the water gathering	Construction Phase	ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> <li>▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments.</li> <li>▪ No earth, building materials, oil or fuel, soil, toxic materials or any materials that may possibly cause contamination to water gathering grounds are allowed to be stockpiled on site.</li> <li>▪ All surplus spoil should be removed from water gathering grounds as soon as possible.</li> <li>▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks.</li> <li>▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time.</li> <li>▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion.</li> <li>▪ Facilities for washing the wheels of vehicles before leaving the site should be provided.</li> <li>▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately.</li> <li>▪ No maintenance activities which may generate chemical wastes should be undertaken in the water gathering grounds. Vehicle maintenance should be confined to designated paved areas only and any spillages should be cleared up immediately using absorbents and waste oils should be collected in designated tanks prior to disposal off site. All storm water run-off from these areas should be discharged via oil/petrol separators and sand/silt removal traps.</li> <li>▪ Any soil contaminated with fuel leaked from plant should be removed off site and the voids arising from removal of contaminated soil should be replaced by suitable material approved by the Director of Water Supplies.</li> <li>▪ Provision of temporary toilet facilities and use of chemicals or insecticide of any kind are subject to the approval of the Director of Water Supplies.</li> <li>▪ Drainage plans should be submitted for approval by the Director of</li> </ul>			grounds		

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Water Supplies.</p> <ul style="list-style-type: none"> <li>▪ An unimpeded access through the waterworks access road should always be maintained.</li> <li>▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March,</li> <li>▪ Advance notice must be given before the commencement of works on site quoting WSD's approval letter reference.</li> </ul>					
5.6.1.2	4.1	<p><b>Good site practices of general construction activities</b></p> <p>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</p> <p>Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</p>	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	<p><b>Sewage effluent from construction workforce</b></p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.</p>	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA Recommendation and Water Pollution Control Ordinance (WPCO)
5.6.1.4	4.1	<p><b>Hydrogeological Impact</b></p> <p>Grout injection works would be conducted before blasting, for sealing a limited area around the tunnel with a grout of a suitable strength for controlling the potential groundwater inflows. The pre-injection grouting method would be supplemented by post-injection grouting where necessary to further enhance the groundwater inflow control. On-site treatment for the groundwater ingress pumped out would be required to remove any contamination by grouting materials before discharge off-site.</p>	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
<b>Water Quality Impact (Operation)</b>							
No mitigation measure is required.							

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<b><u>Sewage and Sewerage Treatment Impact (Construction)</u></b>							
6.7	5	The sewage generated by the on-site workforce should be collected in chemical toilets and disposed of off-site by a licensed waste collector.	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA recommendation and WPCO
<b><u>Sewage and Sewerage Treatment Impact (Operation)</u></b>							
6.6.3	5	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.	To minimize water quality impacts	DSD	BCP	Operation phase	EIA recommendation and WPCO
6.5.3	5	Sewage generated from the Administration Building will be discharged to the existing local sewerage system.	To minimize water quality impacts	DSD	Administration Building	Operation phase	EIA recommendation and WPCO
<b><u>Waste Management Implication (Construction)</u></b>							
7.6.1.1	6	<p><b>Good Site Practices</b></p> <p>Adverse impacts related to waste management such as potential hazard, air, odour, noise, wastewater discharge and public transport as mentioned in section 3.4.7.2 (ii)(c) of the Study Brief are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> <li>▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site</li> <li>▪ Training of site personnel in proper waste management and chemical handling procedures</li> <li>▪ Provision of sufficient waste disposal points and regular collection of waste</li> <li>▪ Dust suppression measures as required under the Air Pollution Control (Construction Dust) Regulation should be followed as far as practicable. Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by covering trucks or in enclosed containers</li> <li>▪ General refuse shall be removed away immediately for disposal. As</li> </ul>	To minimize adverse environmental impact	Contractor	Construction works sites (general)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; Waste Disposal (Chemical Wastes) (General) Regulation; and ETWB TC(W) No. 19/2005, Environmental Management on Construction Site

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>such odour is not anticipated to be an issue to distant sensitive receivers</p> <ul style="list-style-type: none"> <li>▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road</li> <li>▪ Covers and water spraying system should be provided for the stockpiled C&amp;D material to prevent dust impact or being washed away</li> <li>▪ Designate different locations for storage of C&amp;D material to enhance reuse</li> <li>▪ Well planned programme for transportation of C&amp;D material to lessen the off-site traffic impact. Well planned delivery programme for offsite disposal and imported filling material such that adverse noise impact from transporting of C&amp;D material is not anticipated</li> <li>▪ Site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” should be adopted as far as practicable, such as cleaning and maintenance of drainage systems regularly</li> <li>▪ Provision of cover for the stockpile material, sand bag or earth bund as barrier to prevent material from washing away and entering the drains</li> </ul>					
7.6.1.2	6	<p><b>Waste Reduction Measures</b></p> <p>Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> <li>▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal</li> <li>▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force</li> <li>▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials</li> <li>▪ Plan and stock construction materials carefully to minimise amount</li> </ul>	To reduce the quantity of wastes	Contractor	Construction works sites (General)	Construction Phase	EIA recommendation and Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>of waste generated and avoid unnecessary generation of waste</p> <ul style="list-style-type: none"> <li>In addition to the above measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during handling, transportation and disposal of these wastes.</li> </ul>					
7.6.1.3	6	<p><b>C&amp;D Materials</b></p> <p>In order to minimise impacts resulting from collection and transportation of C&amp;D material for off-site disposal, the excavated materials should be reused on-site as backfilling material as far as practicable. The surplus rock and other inert C&amp;D material would be disposed of at the Government's Public Fill Reception Facilities (PFRFs) at Tuen Mun Area 38 for beneficial use by other projects in the HKSAR as the last resort. C&amp;D waste generated from general site clearance and tree felling works would require disposal to the designated landfill site. Other mitigation requirements are listed below:</p> <ul style="list-style-type: none"> <li>A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and</li> <li>In order to monitor the disposal of C&amp;D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) should be included.</li> </ul>	To minimize impacts resulting from C&D material	Contractor	Construction Works Sites (General)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; and ETWB TCW No. 31/2004
7.6.1.4	6	<p><b>General refuse</b></p> <p>General refuse should be stored in enclosed bins or compaction units separated from other C&amp;D material. A reputable waste collector is to be employed by the Contractor to remove general refuse from the site separately. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' litter.</p>	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
7.6.1.5	6	<p><b>Chemical waste</b></p> <p>If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical</p>	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

**Appendix J**

**Implementation Status of  
Mitigation Measures for Operation Phase**





EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	<p>(b) Gravity sewer, equalization and sludge holding tanks shall be designed with suitable sewer distance and retention time to prevent sewage septicity.</p> <p>3. <u>Deodorisation</u></p> <p>(a) Deodorisation facilities at the sewage treatment plant shall be designed with a minimum odour removal efficiency of 90%.</p>					Implemented	The deodorisation facilities was monitored by control room to ensure odour removal efficiency of 90%.
<b>Noise Impact (Operation)</b>							
<b>Road Traffic Noise</b>							
EP C3.5 / Table 4.42 and Figure 4.20.1 to 4.20.4	<p>Erection of noise barrier/ enclosure along the viaduct section.</p> <p>- To mitigate the traffic noise impact arising from the operation of the Project, the noise mitigation measures shall be implemented in accordance with Fig 4, 5, 6 and 7 attached to the EP, or otherwise approved by the Director subject to the submission of a Noise Mitigation Plan by the Permit Holder to cater for the final layout and design of the Project.</p>	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	Implemented	Noise barriers were installed in accordance with the Noise Mitigation Plan.
<b>Fixed Plant Noise</b>							

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
Table 4.46	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
4.6.2	Commissioning test should be conducted for all major fixed noise sources to ensure compliance of the operational for all major fixed noise sources before operation.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
4.5.2.4	The following noise reduction measures shall be considered as far as practicable during operation: <ul style="list-style-type: none"> <li>Choose quieter plant such as those which have been effectively silenced;</li> </ul>	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
	<ul style="list-style-type: none"> <li>Include noise levels specification when ordering new plant (including chillier and E/M equipment);</li> </ul>					BCP not yet commenced Implemented in Administration Building and all ventilation buildings	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	<ul style="list-style-type: none"> <li>Locate fixed plant/louver away from any NSRs as far as practicable;</li> </ul>					BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
	<ul style="list-style-type: none"> <li>Locate fixed plant in walled plant rooms or in specially designed enclosures;</li> </ul>					BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
	<ul style="list-style-type: none"> <li>Locate noisy machines in a basement or a completely separate building;</li> </ul>					BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
	<ul style="list-style-type: none"> <li>Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and;</li> </ul>					BCP not yet commenced Implemented in Administration Building and all ventilation buildings	

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	<ul style="list-style-type: none"> <li>Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise.</li> </ul>					BCP not yet commenced Implemented in Administration Building and all ventilation buildings	
<b><u>Sewage and Sewerage Treatment Impact (Operation)</u></b>							
6.6.3	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.	To minimize water quality impacts	DSD	BCP	Operation phase	Implemented	STP was implemented at BCP and it was handover to DSD on 29 July 2019 for operation.
6.5.3	Sewage generated from the Administration Building will be discharged to the existing local sewerage system.	To minimize water quality impacts	DSD	Administration Building	Operation phase	Implemented	
<b><u>Waste Management (Operation Phase)</u></b>							
7.6.2.1	<p><b>General refuse</b></p> <p>General refuse should be collected on daily basis and delivered to the refuse collection point accordingly. A reputable waste collector should be employed to remove general refuse regularly to avoid odour nuisance or pest and vermin</p>	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Managing Authority of the BCP	BCP and its Associated facilities	Operation phase	BCP not yet commenced.	NA

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EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
	problem. Recycling containers are recommended to be provided to encourage recycling of aluminium cans and waste paper.						

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7.6.2.2	<p><b>Chemical waste</b></p> <ul style="list-style-type: none"> <li>Register with the EPD as a chemical waste producer should be made and guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i> should be followed.</li> <li>Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc. Licensed collector should be deployed to transport and dispose of the chemical wastes, to the licensed Chemical Waste Treatment Centre, or licensed facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</li> </ul>	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Managing Authority of the BCP	BCP and its associated facilities	Operation phase	BCP not yet commenced.	NA

EP/EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concern to Address	Who to implement the measures?	Location of the measures	When to implement the measures?	Implementation Status	Remarks
<b>Ecological Impact</b>							
9.8	<b>Mitigation to Anthropogenic Disturbance</b> <ul style="list-style-type: none"> <li>Buffer planting shall be provided for screening the proposed structures and associated facilities.</li> </ul>	To screen the Proposed structures and associated facilities.	Contractors	Contractors	In proximity to proposed new development structures and associated facilities.	Refer to OM4 below	N/A
9.8	<b>Mitigation to Habitat Fragmentation</b> <ul style="list-style-type: none"> <li>Landscape fragmentation should be kept to a minimum and key wildlife routes preserved as far as possible (i.e. OM1 of EM&amp;A Manual Chapter 10).</li> <li>Provision of landscape plantings (i.e. OM3-7 of EM&amp;A Manual Chapter 10)</li> </ul>	To minimize the obstruction on wildlife movement	Contractors	All viaduct sections	Operation phase	Refer to OM1 below.  Refer to OM3 to 7 below.	N/A
EP C3.6	All measures recommended in the Vegetation Survey Report, updated Woodland Compensation Plan and the Habitat Creation and Management Plan approved under Condition 2.8, 2.9 and 2.10 of this Permit respectively shall be fully implemented and thereafter maintained.	N/A	N/A	N/A	Operation phase	Implemented.	<u>Vegetation Survey Report</u> <i>Euonymus kwangtungensis</i> has not been affected by the works and therefore no transplantation is necessary. All <i>Aquilaria sinensis</i> seedlings have been transplanted to the WCA. <u>Woodland Compensation Plan</u>



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							<p>The programme of woodland compensation has been commenced in early 2016 according to the Woodland Compensation Plan. Monitoring of initial planting is on-going.</p> <p><u>Habitat Creation and Management Plan</u>                      The revised HCMP has been submitted to EPD for comment. Site work is programmed to start in 2019.</p>
EP C3.7	To reduce collisions from birds, the design of noise barriers shall avoid/minimize the use of transparent / reflective materials or adopt bird-friendly design on such surfaces.	To avoid bird mortality due to collision with noise barrier	Contractor	Locations with erection of noise barrier	During detailed design and construction phases	Implemented in Designed, construction phase and operation phase	The steel works of noise barrier was painted in different tone of mat finished green and avoid use of transparent / reflective materials.
<b><u>Landscape, Visual and Glare Impact</u></b>							
3.8	<b>(OM1) Detailed Design Considerations</b> Detailed design of development components should aim to reduce landscape footprint and visibility of structures. The area allowed for any development components should be	To reduce architectural footprint on the land and minimize visibility of structures.	Detailed designer/ Consultants	Proposed new development structures.	During Detailed Design & Construction/ Operation Phase	Implemented in Designed and construction phase	The detail landscape design of the project is divided into 3 packages as described in the Landscape Plan.

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	reduced to a practical minimum.						
3.8	<b>(OM2) Aesthetically Pleasing Design</b> The form, textures, finishes and colours of the proposed development components should be compatible with the existing surroundings. Light earthy tone colours such as shades of green, shades of grey, shades of brown and off-white may be utilised where technically feasible to reduce the visibility of the development components, including all roadwork, buildings and noise barriers etc. To further improve visual amenity, natural building materials such as stone and timber, should be preferably adopted for architectural features, where technically feasible.	To reduce visibility of structures and increase their compatibility with the surrounding	Detailed designer/ Consultants	Proposed new development structures.	During Detailed Design & Construction/ Operation Phase	Implemented in Designed and construction. Partially implement in operation phase.	The steel works of noise barrier was painted in different tone of mat finished green to blend in with the surrounding environment. Refer to example photo showing the noise barrier.  Amenity shrub planting are provided along the noise barrier where applicable.
3.8	<b>(OM3) Compensatory Planting</b> All compensatory planting of trees is to be carried out in accordance with ETWB TCW No. 03/2006.	To compensate for loss of trees and some shrubs due to the Project.	Contractors	Proposed new development structures.	During Construction/ Operation Phase	Implemented (Compensatory planting is in 50% completed.)	The programme of woodland compensation has been commenced in early 2016 according to the Woodland Compensation Plan. Other compensatory planting shall refer to OM4 and OM10.
3.8	<b>(OM4) Buffer Tree Planting</b> Tree planting shall be provided to screen the proposed structures and associated	To screen the proposed structures and associated facilities	Contractors	In proximity to proposed new development	During Construction/ Operation Phase	Implemented (New plantings is in 60% completed)	New planting will be provided for Buffet Tree Planting.

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	facilities. In addition, the compensatory shrub and ground cover planting detailed in OM4 will provide screening and improve compatibility with the surrounding environment.	including roads.		structures and associated facilities.			
3.8	<b>(OM5) Aesthetic Improvement Planting - Viaduct Structure</b> Planters will be provided for trailer planting to soften the hard, straight edges of the viaduct. Where space allows for planters, climbers are proposed to cover vertical, hard surfaces of the piers.	To soften the hard edges on the viaduct and maximize greening opportunity.	Contractors	Viaduct Structure.	During Construction/ Operation Phase	Implemented	Shrub plantings have been provided on the viaduct planters.
3.8	<b>(OM6) Aesthetic Improvement Planting – under Viaduct</b> Shade tolerant plant will be planted, where light is insufficient, to improve value of areas under viaducts.	To soften the hard edges on the viaduct and maximize greening opportunity.	Contractors	Viaduct Structure.	During Construction/ Operation Phase	Implemented	Amenity palm and shrub has been planted under the viaduct structures connecting the existing Fanling Highway.  Hydroseeding has been provided at the areas underneath viaduct structures from Sha Tau Kok Interchange to BCP. Cluster of buffering trees will be planted by the side of viaducts.
3.8	<b>(OM7) Landscaped Slope</b> Where existing hillside slopes are anticipated to be modified (eg cut slope at	To prevent soil erosion and reduce visible impact of man-made	Contractors	Construction Site Works.	During Construction/ Operation Phase	Implemented	Varies format of landscape treatment had been applied on all

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	the portals of the tunnel sections and embankments along the alignment) the final slope surface will be landscaped by hydroseeding, tree or shrub planting where slope gradient allows.	slopes.					newly formed slope features, to suit the site conditions including slope gradient and soil depth.
3.8	<b>(OM8) Green Roof</b> Green roofing should be established on proposed buildings to reduce exposure to untreated concrete surfaces and mitigate visual impact to VSRs at high levels.	To reduce exposure to untreated concrete surfaces, reduce visual impact to VSRs at high levels and maximize greening opportunity.	Contractors	Proposed new buildings.	During Construction/ Operation Phase	Implemented (Green roof Plantings are in 70% completed.)	Suitable shrubs and ground covers has been planted in building roofs of Lung Shan Tunnel North and South Ventilation Building and Administration Building.
3.8	<b>(OM9) Vertical Greening</b> Vertical planting should be established to soften the hard, vertical surfaces of the proposed development components. These components will include walls of administration and ventilation buildings, retaining walls and road abutments.	To reduce visible impact of proposed new structures and facilities and maximize greening opportunity.	Contractors	Proposed new development structures.	During Construction/ Operation Phase	Implemented	Planters have been provided by the building edges in building roofs of Lung Shan Tunnel North and South Ventilation Building.
3.8	<b>(OM10) Roadside Amenity Planting</b> Roadside amenity planting should be provided, to enhance the landscape and visual quality of the existing and proposed transport routes and car parks.	To soften edges of the proposed engineer structures and associated facilities and enhance the landscape and visual quality of the existing and proposed road.	Contractors	Proposed new development structures.	During Construction/ Operation Phase	Implemented (Road side amenity planting is in 40% completed)	New planting will be provided for Roadside Amenity Planting
3.8	<b>(OM11) Reinstatement</b> Certain areas unavoidably disturbed by	Particularly aimed at temporarily disturbed	Contractors	Construction Site Works.	During Construction/ Operation Phase	Implemented	Reinstatement work to the disturbed existing

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	the Project will be re-provisioned.	areas, to reduce long term impact on landscape.					engineering channel Ma Wat River was implemented.
3.8	<b>(OM12) Light Control</b> Street and night time lighting glare will be controlled to minimize glare impact to adjacent VSRs during the operation stage.	To minimize glare impact to adjacent VSRs.	Contractors	Lit areas around proposed new development buildings and along roads.	During Operation Phase	Implemented	Light control at new buildings including STP, Mid-ventilation Building and Administration Building.
3.8	<b>(OM13) Re-provisioned LCSD Garden</b> The Open Space of Wo Keng Shan public garden falls within the Project Site and will be re-provisioned to re-provide the amenities of the garden on a one to one basis.	To compensate for loss of Open Space due to the Project.	Contractors	Contractors Near existing Wo Keng Shan public garden, subject to confirmation by CEDD and LCSD	During Construction/ Operation Phase	Implemented	1256.4m <sup>2</sup> of site area at the north of Sha Tau Kok Interchange will be converted to a re-provision LCSD Wo Keng Shan Garden is on-going.