



**JOB No.: TCS00694/13**

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

**MONTHLY ENVIRONMENTAL MONITORING AND AUDIT  
REPORT (NO.59) – JUNE 2018**

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

Date	Reference No.	Prepared By	Certified By
16 July 2018	TCS00694/13/600/R1659v2	 Nicola Hon (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	11 July 2018	First Submission
2	16 July 2018	Amended according to the IEC's comment on 11 and 14 July 2018

Our ref: 7076192/L23253/AB/AW/MCC/rw

16 July 2018

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

**By Email & Post**

Attention: Mr Simon LEUNG

Dear Sir

**Agreement No. CE 45/2008 (CE)  
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works  
Independent Environmental Checker – Investigation  
Monthly EM&A Report (No. 59) – June 2018**

With reference to the Monthly EM&A Report No. 59 for June 2018 (Version 2) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/D.

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
	CW	-	Mr Daniel HO	by email
	DHK	-	Mr Daniel ALTIER	by email
	CCKJV	-	Mr Vincent CHAN	by email
	KRSJV	-	Mr Matthew TSANG	by email
	Leighton	-	Mr Ray HO	by email
	Siemens	-	Mr Patrick LEUNG	by email
	AUES	-	Mr TW TAM	by email



## EXECUTIVE SUMMARY

ES01 This is the 59<sup>th</sup> monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 30 June 2018** (hereinafter ‘the Reporting Period’).

### ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 To facilitate the project management and implementation, Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project is divided to seven CEDD contracts including 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) and Contract 7 (NE/2014/03) and an ArshSD contract (Contract SS C505).

ES03 In the Reporting Period, the major construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project included Contract 2, Contract 3, Contract 4, 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	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	150
	24-hour TSP	9	54
Construction Noise	L <sub>eq</sub> (30min) Daytime	10	45
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C	13 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	13 Scheduled & 8 extra
		WM2B & WM2B-C	13 Scheduled & 0 extra (*)
		WM3x & WM3-C	13 Scheduled & 3 extra
		WM4, WM4-CA & WM4-CB	13 Scheduled & 1 extra
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats and transect	0
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	5
		Contract 3	4
		Contract 4	5
		Contract 6	4
		Contract 7	5
		Contract SS C505 (#)	4

Remark: (#) IEC only joined one (1) event of site inspection for Contract SS C505.

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

### ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

ES04 In the Reporting Period, no air quality and construction noise exceedance and valid noise complaint was recorded. For water quality monitoring, a total of thirty-seven (37) Action/Limit Level exceedances were recorded under the Project. The summary of exceedance in the Reporting Period is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	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 Result	Project related exceedance	Corrective Actions
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	0	--	--	--
Water Quality	DO	0	0	0	-	--	--
	Turbidity	0	19	19	-	Exceedances at WM3x and WM4 were not Project related	The Contractor should fully implement water quality mitigation measure.
	SS	1	17	18	-	Exceedances at WM2A(a) on 6 to 15 June 2018 were not Project related Exceedances at WM2A(a) on 23, 25 and 26 June 2018 are still under investigation.	

- ES05 Investigation results revealed that the Contractor had properly implemented water quality mitigation measures such as well-maintained the wastewater treatment facility and covered the expose area with impervious sheet. It was concluded that all exceedances recorded at WM3x and WM4 and exceedances recorded at WM2A(a) during 6 to 15 June 2018 were related to the rainstorm or external inflow of muddy water and unlikely caused by the works under the Project. Besides, the investigation report for exceedances at WM2A(a) on 23, 25 and 26 June 2018 is still under review by IEC and the investigation result will be presented in next Monthly EM&A Report. The Contractor was reminded to fully implement the water quality mitigation measure throughout the construction phase as far as practicable.

#### ENVIRONMENTAL COMPLAINT

- ES06 In this Reporting Period, no environmental complaints were received under the EM&A programme.

#### NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES07 No environmental summons and prosecutions were recorded in the Reporting Period.

#### REPORTING CHANGE

- ES08 No reporting changes were made in the Reporting Period.

#### SITE INSPECTION

- ES09 In this Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 2** has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22 and 29 June 2018**. No non-compliance was noted during the site inspection.
- ES10 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 3** has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 20 and 28 June 2018**. No non-compliance was noted during the site inspection.
- ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 4** has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22 and 25 June 2018**. No non-compliance was noted.
- ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 6** has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 21 and 28 June 2018**. No non-compliance was noted during the site inspection.
- ES13 In the Reporting Period, joint site inspection for **Contract 7** to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 19 and 29 June 2018**. No non-compliance was noted during the site inspection.

- ES14 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract SS C505** has been carried out by the RE, ET and the Contractor on **8, 13, 20 and 27 June 2018** in which IEC joined the site inspection on **27 June 2018**. No non-compliance was noted during the site inspection.

**FUTURE KEY ISSUES**

- ES15 During rainy 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, in particular for working areas near Ma Wat Channel and Ping Yuen River.
- ES16 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.
- ES17 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.
- ES18 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.

## Table of Contents

<b>1</b>	<b>INTRODUCTION</b>	<b>1</b>
1.1	PROJECT BACKGROUND	1
1.2	REPORT STRUCTURE	1
<b>2</b>	<b>PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS</b>	<b>3</b>
2.1	CONSTRUCTION CONTRACT PACKAGING	3
2.2	PROJECT ORGANIZATION	5
2.3	CONCURRENT PROJECTS	7
2.4	CONSTRUCTION PROGRESS	7
2.5	SUMMARY OF ENVIRONMENTAL SUBMISSIONS	9
<b>3</b>	<b>SUMMARY OF IMPACT MONITORING REQUIREMENTS</b>	<b>14</b>
3.1	GENERAL	14
3.2	MONITORING PARAMETERS	14
3.3	MONITORING LOCATIONS	14
3.4	MONITORING FREQUENCY AND PERIOD	16
3.5	MONITORING EQUIPMENT	17
3.6	MONITORING METHODOLOGY	19
3.7	EQUIPMENT CALIBRATION	21
3.8	DERIVATION OF ACTION/LIMIT (A/L) LEVELS	21
3.9	DATA MANAGEMENT AND DATA QA/QC CONTROL	22
<b>4</b>	<b>AIR QUALITY MONITORING</b>	<b>23</b>
4.1	GENERAL	23
4.2	AIR QUALITY MONITORING RESULTS	23
<b>5</b>	<b>CONSTRUCTION NOISE MONITORING</b>	<b>26</b>
5.1	GENERAL	26
5.2	NOISE MONITORING RESULTS	26
<b>6</b>	<b>WATER QUALITY MONITORING</b>	<b>27</b>
6.1	GENERAL	27
6.2	RESULTS OF WATER QUALITY MONITORING	27
<b>7</b>	<b>ECOLOGY MONITORING</b>	<b>32</b>
7.1	GENERAL	32
<b>8</b>	<b>WASTE MANAGEMENT</b>	<b>33</b>
8.1	GENERAL WASTE MANAGEMENT	33
8.2	RECORDS OF WASTE QUANTITIES	33
<b>9</b>	<b>SITE INSPECTION</b>	<b>34</b>
9.1	REQUIREMENTS	34
9.2	FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH	34
<b>10</b>	<b>ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE</b>	<b>38</b>
10.1	ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTIONS	38
<b>11</b>	<b>IMPLEMENTATION STATUS OF MITIGATION MEASURES</b>	<b>40</b>
11.1	GENERAL REQUIREMENTS	40
11.2	TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH	40
11.3	KEY ISSUES FOR THE COMING MONTH	42
<b>12</b>	<b>CONCLUSIONS AND RECOMMENDATIONS</b>	<b>43</b>
12.1	CONCLUSIONS	43
12.2	RECOMMENDATIONS	43

## LIST OF TABLES

TABLE 2-1	STATUS OF ENVIRONMENTAL LICENSES AND PERMITS OF THE CONTRACTS
TABLE 3-1	SUMMARY OF EM&A REQUIREMENTS
TABLE 3-2	IMPACT MONITORING STATIONS - AIR QUALITY
TABLE 3-3	IMPACT MONITORING STATIONS - CONSTRUCTION NOISE
TABLE 3-4	IMPACT MONITORING STATIONS - WATER QUALITY
TABLE 3-5	AIR QUALITY MONITORING EQUIPMENT
TABLE 3-6	CONSTRUCTION NOISE MONITORING EQUIPMENT
TABLE 3-7	WATER QUALITY MONITORING EQUIPMENT
TABLE 3-8	ACTION AND LIMIT LEVELS FOR AIR QUALITY MONITORING
TABLE 3-9	ACTION AND LIMIT LEVELS FOR CONSTRUCTION NOISE
TABLE 3-10	ACTION AND LIMIT LEVELS FOR WATER QUALITY
TABLE 4-1	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM1C
TABLE 4-2	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM2
TABLE 4-3	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM3
TABLE 4-4	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM4B
TABLE 4-5	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM5A
TABLE 4-6	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM6
TABLE 4-7	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM7B
TABLE 4-8	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM8
TABLE 4-9	SUMMARY OF 24-HOUR AND 1-HOUR TSP MONITORING RESULTS – AM9B
TABLE 5-1	SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS
TABLE 5-2	SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS
TABLE 6-1	WATER QUALITY MONITORING RESULTS ASSOCIATED OF CONTRACTS 2 AND 3
TABLE 6-2	WATER QUALITY MONITORING RESULTS ASSOCIATED OF CONTRACTS 6 AND SS C505
TABLE 6-3	WATER QUALITY MONITORING RESULTS ASSOCIATED ONLY CONTRACT 6
TABLE 6-4	WATER QUALITY MONITORING RESULTS ASSOCIATED CONTRACTS 2 AND 6
TABLE 6-5	ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE RECORDED
TABLE 6-6	SUMMARY OF WATER QUALITY EXCEEDANCE IN THE REPORTING PERIOD
TABLE 8-1	SUMMARY OF QUANTITIES OF INERT C&D MATERIALS FOR THE PROJECT
TABLE 8-2	SUMMARY OF QUANTITIES OF C&D WASTES FOR THE PROJECT
TABLE 9-1	SITE OBSERVATIONS FOR CONTRACT 2
TABLE 9-2	SITE OBSERVATIONS FOR CONTRACT 3
TABLE 9-3	SITE OBSERVATIONS FOR CONTRACT 4
TABLE 9-4	SITE OBSERVATIONS FOR CONTRACT 6
TABLE 9-5	SITE OBSERVATIONS FOR CONTRACT SS C505
TABLE 9-6	SITE OBSERVATIONS FOR CONTRACT 7
TABLE 10-1	STATISTICAL SUMMARY OF ENVIRONMENTAL COMPLAINTS
TABLE 10-2	STATISTICAL SUMMARY OF ENVIRONMENTAL SUMMONS
TABLE 10-3	STATISTICAL SUMMARY OF ENVIRONMENTAL PROSECUTIONS
TABLE 11-1	ENVIRONMENTAL MITIGATION MEASURES

**LIST OF APPENDICES**

APPENDIX A	LAYOUT PLAN OF THE PROJECT
APPENDIX B	ORGANIZATION CHART
APPENDIX C	3-MONTH ROLLING CONSTRUCTION PROGRAM
APPENDIX D	DESIGNATED MONITORING LOCATIONS AS RECOMMENDED IN THE APPROVED EM&A MANUAL
APPENDIX E	MONITORING LOCATIONS FOR IMPACT MONITORING
APPENDIX F	CALIBRATION CERTIFICATE OF MONITORING EQUIPMENT AND HOKLAS-ACCREDITATION CERTIFICATE OF THE TESTING LABORATORY
APPENDIX G	EVENT AND ACTION PLAN
APPENDIX H	IMPACT MONITORING SCHEDULE
APPENDIX I	DATABASE OF MONITORING RESULT
APPENDIX J	GRAPHICAL PLOTS FOR MONITORING RESULT
APPENDIX K	METEOROLOGICAL DATA
APPENDIX L	WASTE FLOW TABLE
APPENDIX M	IMPLEMENTATION SCHEDULE FOR ENVIRONMENTAL MITIGATION MEASURES
APPENDIX N	INVESTIGATION REPORT FOR EXCEEDANCE
APPENDIX O	INVESTIGATION REPORT FOR COMPLAINT (NOT USED)

## 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/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 program in accordance with the approved EM&A Manual, as well as the associated duties. As part of the EM&A program, the baseline monitoring has carried out between **13 June 2013** and **12 July 2013** for all parameters including air quality, noise and water quality before construction work commencement. The Baseline Monitoring Report summarized the key findings and the rationale behind determining a set of Action and Limit Levels (A/L Levels) from the baseline data. Also, the Project baseline monitoring report which verified by the IEC has been submitted to EPD on **16 July 2013** for endorsement. The major construction works of the Project was commenced on **16 August 2013** in accordance with the EP Section 5.3 stipulation.
- 1.1.5 This is **59<sup>th</sup>** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **30 June 2018**.

### 1.2 REPORT STRUCTURE

- 1.2.1 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

<b>Section 1</b>	<i>Introduction</i>
<b>Section 2</b>	<i>Project Organization and Construction Progress</i>
<b>Section 3</b>	<i>Summary of Impact Monitoring Requirements</i>
<b>Section 4</b>	<i>Air Quality Monitoring</i>
<b>Section 5</b>	<i>Construction Noise Monitoring</i>
<b>Section 6</b>	<i>Water Quality Monitoring</i>

<b>Section 7</b>	<i>Ecology Monitoring</i>
<b>Section 8</b>	<i>Waste Management</i>
<b>Section 9</b>	<i>Site Inspections</i>
<b>Section 10</b>	<i>Environmental Complaints and Non-Compliance</i>
<b>Section 11</b>	<i>Implementation Status of Mitigation Measures</i>
<b>Section 12</b>	<i>Conclusions and Recommendations</i>



## 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 has awarded in mid-April 2016 and construction work was 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 has 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 has awarded in December 2015 and the construction works of Contract 7 was commenced on 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 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 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's, 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. Once the contractors are appointed, EPD, ET and IEC will be notified the details of the contractor.
- 2.2.8 The Contractor for Contracts under CEDD should report to the ER. For ArchSD Contract, the Contractor should report to the Architect or Architect's Representative (AR). 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)

- 2.2.9 Once the ET is appointed, the EPD, CEDD, ER, Architect and IEC will be notified the details of the ET.
- 2.2.10 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 Architect, the IEC and Contractor 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)

- 2.2.11 One IEC will be employed for this Project. Once the IEC is appointed, EPD, ER, the Architect and ET will be notified the details of the IEC.
- 2.2.12 The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor 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 appointment of IEC should be subject to the approval of EPD. The IEC should:
- 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
  - Verify the log-book(s) mentioned in Condition 2.2 of the EP, notify the Director by fax, within one working day of receipt of notification from the ET Leader of each and every occurrence, change of circumstances or non-compliance with the EIA Report and/or the EP, which might affect the monitoring or control of adverse environmental impacts from the Project
  - 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, the Architect, ET, IEC and the Contractor 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, 6, 7 and SS C505 and they are summarized in below. Moreover, 3-month rolling construction program for all the current contracts is enclosed in **Appendix C**.

Contract 2 (CV/2012/08)

2.4.2 The contract commenced in May 2014. In this Reporting Period, construction activities conducted are listed below:

Mid-Vent Portal	<ul style="list-style-type: none"> <li>• Cavern internal structure and tunnel E&amp;M activities</li> <li>• Construction of C&amp;C structure and permanent drainage</li> <li>• Structure connecting adit and ventilation building</li> <li>• Construction of fence wall and portal backfilling</li> <li>• Ventilation building fitting out and E&amp;M installation</li> </ul>
North Portal	<ul style="list-style-type: none"> <li>• Dismantling of TBM</li> <li>• Installation of VE panel inside the tunnel</li> <li>• Construction of cross passage and internal structure</li> <li>• Tunnel backfilling and E&amp;M installation</li> <li>• North ventilation building structure and internal structure</li> <li>• Construction of retaining wall and permanent drainage</li> <li>• Site formation and construction of slip road</li> <li>• Construction of connecting structure between the tunnel and the NVB</li> <li>• Construction of temporary utility bridge across the mid-platform</li> </ul>
South Portal	<ul style="list-style-type: none"> <li>• Installation of E&amp;M and VE panel inside the tunnel</li> <li>• Construction of tunnel internal structure and cross passage</li> <li>• Portal backfilling activities and construction of slip road</li> <li>• SVB external wall finishing and fit out</li> <li>• E&amp;M installation and T&amp;C for ventilation fan inside the SVB</li> <li>• Soft landscaping work</li> </ul>
Admin Building	<ul style="list-style-type: none"> <li>• External works finishing</li> <li>• Internal fit out, permanent drainage and E&amp;M installation.</li> <li>• Soft landscaping work.</li> </ul>

Contract 3 (CV/2012/09)

2.4.3 The Contract commenced in November 2013. In this Reporting Period, construction activities conducted are listed below:

- Cable Detection and Trial Trenches
- Remaining Works on new Kiu Tau Footbridge
- Noise Barrier Construction
- Road pavement works
- Water main laying works (on Grade and on bridge deck)
- Installation of Noise barrier steel column & panel, and sign gantry
- Parapet Installation on bridge deck
- Road Drainage Work
- Construction of Profile Barrier & Planter Wall on Bridge Deck
- Stressing of External Tendon
- Bitumen paving on bridge deck
- Installation of deck cell inside the bridge deck
- Installation of movement joint on the bridge
- Construction of Retaining Wall
- 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:

- E&M installation at Admin Building
- E&M installation at Ventilation Building
- E&M installation at OHVD in tunnel
- High mast erection



- Sign fabrication

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:

- Bridge construction
- Tunneling Works
- Sewage Treatment Plant Construction
- Tunnel Ventilation Building Construction
- Slip Road/At-grade Road/Periphery Road Construction

Contract 7 (NE/2014/03)

2.4.7 Contract 7 has awarded in December 2015 and construction work was commenced on 15 February 2016. In this Reporting Period, construction activities conducted are listed below:

- Abutment and deck construction at Bridge E
- Profile barrier construction at Bridges A, B, D & E
- Installation of Façade at Bridge C
- Installation of BMU at roof at Bridge C
- Waterproofing works at roof of Bridge C
- Drainage and watermains at perimeter road
- Bitumen pavement perimeter road

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. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 41 constructions
- Constructions of Steel Canopies (Building no. 32, 33, 34 and 35)
- Constructions of Master Water Meter Room 1, 2 and 3 (Building no. 42, 43, 44)
- Tower crane operation
- Bridge 1 - 5 construction works including retaining wall, road and finishes works
- Underground drainage works, Road Works, CLP Cable laying and Landscaping
- Formwork and falsework for PTB's slab and internal wall construction
- Construction PTB M/F, 1/F, 2/F and Roof flat slab
- Construction PTB non-structural wall, Underground Drainage and Utilities, Fence Wall, On Grade Ground Slab and Paving
- PTB Southern Entrance Construction & Curtain Wall Installation
- Backfilling works
- PTB Major Plant Rooms ABWF & MEP Installation, Lift and Escalator Installation by NSC
- Integrated ABWF & MEP Works in PTB, Building no. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 18, 36 and 41
- Elevated Walkway E1, E2, E3 and E4 construction
- Tower Crane Dismantling Works

## 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	
Contract 2					
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864	31 Dec 2013	Till Contract ends	
2	Chemical Waste Producer Registration	North Portal Waste Producers Number: No.5213-652-D2523-01	25 Mar 2014	Till Contract ends	
		Mid-Vent Portal Waste Producers Number: No.5213-634-D2524-01	25 Mar 2014	Till Contract ends	
		South Portal 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)	3 Mar 2014	28 Feb 2019	
		No. WT00023063-2015 (North Portal)	18 Dec 2015	31 Mar 2019	
		No.: W5/1I392 (Admin Building)	28 Mar 2014	31 Mar 2019	
		No.: WT00025594-2016 (Mid-Vent Portal)	7 Oct 2016	31 Mar 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-RN0839-17	North Portal	25-Dec-2017	17-Jun-2018
		GW-RN0211-18		10-May-2018	09-Nov-2018
		GW-RN0212-18		10-May-2018	09-Nov-2018
		GW-RN0307-18		18-Jun-2018	17-Dec-2018
		GW-RN0047-18	Mid Vent	05-Feb-2018	01-Aug-2018
		GW-RN0049-18		05-Feb-2017	31-Jul-2018
		GW-RN0238-17	South Portal	01-Jun-2018	30-Nov-2018
		GW-RN0110-18		22-Mar-2018	21-Sep-2018
		GW-RN0788-17		06-Dec-2017	05-Jun-2018



Item	Description	License/Permit Status			
		Ref. no.		Effective Date	Expiry Date
		GW-RN0176-18		30-Apr-2018	27-Oct-2018
		GW-RN0253-18		06-Jun-2018	05-Dec-2018
		GW-RN0142-18	Admin Bldg	5-Apr-2018	27-Sep-2018
	GW-RN0140-18	Cheung Shan Tunnel	3-Apr-2018	22-Sep-2018	
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)		12 Apr 2016	11 Apr 2021
Contract 3					
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.:WT00016832 – 2013		28 Aug 13	31 Aug 2018
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-RN0785-17		19 Dec 2017	16 Jun 2018
		GW-RN0786-17		24 Dec 2017	18 Jun 2018
		GW-RN0801-17		22 Dec 2017	21 Jun 2018
		GW-RN0863-17		17 Jan 2018	5 Jul 2018
		GW-RN0043-18		25 Feb 2018	24 Aug 2018
		GW-RN0044-18		22 Feb 2018	21 Aug 2018
		GW-RN0102-18		14 Mar 2018	31 Aug 2018
		GW-RN0123-18		28 Mar 2018	5 Sep 2018
		GW-RN0259-18		19 Jun 2018	17 Dec 2018
		GW-RN0305-18		22 Jun 2018	17 Dec 2018
Contract 5					
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 359338		13 May 2013	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-642-S3735-01		8 Jun 2013	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: W5/1G44/1		8 Jun 13	30 Jun 2018

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017351	29 Apr 13	Till the end of Contract
Contract 6				
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-RW0668-17	16 Jan 2018	15 Jul 2018
		GW-RW0086-18	1 Mar 2018	31 Aug 2018
		GW-RW0121-18	30 Apr 2018	29 Oct 2018
Contract SS C505				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	13 Jul 2015	Till the end of Contract
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-RN0114-18	5 Apr 2018	4 Oct 2018
		GW-RN0198-18	8 May 2018	7 Nov 2018
Contract 7				
1	Air pollution Control (Construction Dust)	Ref. No: 397015	21 Dec 2015	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Regulation			
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
5	Construction Noise Permit	GW-RN0206-18	8 May 2018	4 Nov 2018
<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 SUMMARY OF IMPACT MONITORING REQUIREMENTS

#### 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 D**. 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. The proposal for alternative location AM1c which verified by IEC 5 June 2018 has been submitted to EPD for approval on 6 June 2018 and it is under review by EPD. **Table 3-2**, **Table 3-3** and **Table 3-4** 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 E**.

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

Station ID	Description	Works Area	Related to the Work Contract
AM1b^	Open area at Tsung Yuen Ha Village	BCP	SS C505 Contract 7

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
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^	House no. 10B1 Nga Yiu Ha Village	LMH to Frontier Closed Area	Contract 6
AM5a^	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@	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#	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.

\* Proposal for alternative location AM1c which verified by the IEC on 5 June 2018 was submitted to EPD on 6 June 2018 and it is under review by EPD.

**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#	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
		Easting	Northing		
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 upstream 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-Controlx#	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-Cx) 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

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



- 3.4.1 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

- 3.4.2 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”), additional weekly impact monitoring for  $L_{eq(5min)}$  measurement shall be employed during respective restricted hours periods.. Supplementary information for data auditing, statistical results such as  $L_{10}$  and  $L_{90}$  shall also be obtained for reference.

Water Quality Monitoring

- 3.4.3 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-Hr 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*

\* Instrument was used in the Reporting Period and the calibration certificate could be referred in Appendix F.

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.

- 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*
Calibrator	Rion NC-74* and Rion NC-73*
Portable Wind Speed Indicator	Testo Anemometer

\* Instrument was used in the Reporting Period and the calibration certificate could be referred in Appendix F.

- 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:
- a DO level in the range of 0-20 mg/l and 0-200% saturation; and
  - a 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

\* Instrument was used in the Reporting Period and the calibration certificate could be referred in Appendix F.

### 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.) A pump to draw sample aerosol through the optic chamber where TSP is measured;
  - (b.) A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
  - (c.) 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:
- (a.) An anodized aluminum shelter;
  - (b.) A 8”x10” stainless steel filter holder;
  - (c.) A blower motor assembly;

- (d.) A continuous flow/pressure recorder;
- (e.) A motor speed-voltage control/elapsed time indicator;
- (f.) A 7-day mechanical timer, and
- (g.) 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 would be 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 will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays;  $Leq_{(5min)}$  measurements would be 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 is performed before and after the noise measurement.

#### **Water Quality**

- 3.6.9 Water quality monitoring is conducted at the designated or alternative locations. The sampling procedures 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 or tape measurement 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 YSI PRO20 Handheld Dissolved Oxygen Instrument is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation.
- 3.6.16 A portable AZ Model 8685 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.
- 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 analyzed Suspended Solids (SS) will be carried out by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS determination using *APHA Standard Methods 2540D* as specified in the *EM&A Manual* will start 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 would be 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 attached in **Appendix F**.

### **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
AM1c	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
		AND 120% of upstream control station of the same day				
	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
		AND 120% of upstream control station of the same day				
	Limit Level	64.9	17.3	12.4	12.9	45.5
		AND 130% of upstream control station of the same day				

**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 G**.

### 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 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. Hence, air quality monitoring was performed at all designated locations.
- 4.1.2 The air quality monitoring schedule is presented in *Appendix H* and the monitoring results are summarized in the following sub-sections.

### 4.2 AIR QUALITY MONITORING RESULTS

- 4.2.1 In the Reporting Period, a total of **150** events of 1-hour TSP and **54** events 24-hours TSP monitoring were carried out and the monitoring results are summarized in *Tables 4-1 to 4-9*. The detailed 24-hour TSP monitoring data are presented in *Appendix I* and the relevant graphical plots are shown in *Appendix J*.

**Table 4-1 Summary of 24-hour and 1-hour TSP Monitoring Results – AM1c**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
1-Jun-18	36	6-Jun-18	9:17	24	32	34
7-Jun-18	18	12-Jun-18	9:11	66	63	68
13-Jun-18	38	15-Jun-18	13:16	70	72	76
19-Jun-18	40	21-Jun-18	10:15	63	64	57
25-Jun-18	37	27-Jun-18	9:13	61	55	56
30-Jun-18	47					
Average (Range)	<b>36 (18-47)</b>	Average (Range)		<b>57 (24 – 76)</b>		

**Table 4-2 Summary of 24-hour and 1-hour TSP Monitoring Results – AM2**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
1-Jun-18	114	6-Jun-18	9:13	48	48	47
7-Jun-18	34	12-Jun-18	9:45	68	71	68
13-Jun-18	56	15-Jun-18	9:47	61	62	64
19-Jun-18	78	21-Jun-18	10:08	78	79	77
25-Jun-18	41	27-Jun-18	9:27	69	64	54
30-Jun-18	60					
Average (Range)	<b>64 (34 – 114)</b>	Average (Range)		<b>64 (47 – 79)</b>		

**Table 4-3 Summary of 24-hour and 1-hour TSP Monitoring Results – AM3**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
1-Jun-18	63	6-Jun-18	9:10	46	49	45
7-Jun-18	25	12-Jun-18	13:11	70	66	69
13-Jun-18	43	15-Jun-18	9:39	52	59	64
19-Jun-18	63	21-Jun-18	10:05	79	74	77
25-Jun-18	31	27-Jun-18	9:44	53	42	40
30-Jun-18	51					
Average	<b>46</b>	Average		<b>59</b>		

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
(Range)	(25 – 63)	(Range)		(40 – 79)		

**Table 4-4 Summary of 24-hour and 1-hour TSP Monitoring Results – AM4b**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Jun-18	38	1-Jun-18	9:22	82	79	82
8-Jun-18	55	7-Jun-18	9:36	63	69	72
14-Jun-18	35	13-Jun-18	9:30	60	70	54
20-Jun-18	58	19-Jun-18	10:52	61	68	69
26-Jun-18	31	25-Jun-18	10:15	59	58	53
30-Jun-18	48	30-Jun-18	8:47	65	58	49
Average (Range)	44 (31 – 58)	Average (Range)		65 (49 – 82)		

**Table 4-5 Summary of 24-hour and 1-hour TSP Monitoring Results – AM5a**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Jun-18	59	1-Jun-18	9:19	88	90	91
8-Jun-18	19	7-Jun-18	9:34	62	64	71
14-Jun-18	41	13-Jun-18	9:45	68	79	63
20-Jun-18	43	19-Jun-18	10:44	72	88	79
26-Jun-18	25	25-Jun-18	10:18	57	56	51
30-Jun-18	46	30-Jun-18	8:48	63	57	46
Average (Range)	39 (19 – 59)	Average (Range)		69 (46 – 91)		

**Table 4-6 Summary of 24-hour and 1-hour TSP Monitoring Results – AM6**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Jun-18	60	1-Jun-18	9:15	85	81	83
8-Jun-18	25	7-Jun-18	9:26	62	64	66
14-Jun-18	84	13-Jun-18	9:35	66	77	61
20-Jun-18	65	19-Jun-18	10:55	80	87	84
26-Jun-18	31	25-Jun-18	10:40	62	60	56
30-Jun-18	53	30-Jun-18	8:53	58	52	42
Average (Range)	53 (25 – 84)	Average (Range)		68 (42 – 87)		

**Table 4-7 Summary of 24-hour and 1-hour TSP Monitoring Results – AM7b**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Jun-18	143	1-Jun-18	9:10	89	91	93
8-Jun-18	46	7-Jun-18	9:22	64	63	67
14-Jun-18	56	13-Jun-18	9:08	49	51	48



Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
20-Jun-18	76	19-Jun-18	9:19	73	72	74
26-Jun-18	28	25-Jun-18	9:18	77	73	74
30-Jun-18	55	30-Jun-18	9:01	63	55	49
Average (Range)	<b>67</b> <b>(28 – 143)</b>	Average (Range)		<b>68</b> <b>(48– 93)</b>		

**Table 4-8 Summary of 24-hour and 1-hour TSP Monitoring Results – AM8**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
2-Jun-18	46	1-Jun-18	9:00	49	49	47
8-Jun-18	59	7-Jun-18	9:11	60	64	72
14-Jun-18	51	13-Jun-18	13:28	45	47	50
20-Jun-18	32	19-Jun-18	12:56	74	74	75
26-Jun-18	31	25-Jun-18	13:07	73	71	70
30-Jun-18	39	30-Jun-18	9:09	61	52	38
Average (Range)	<b>43</b> <b>(31 – 59)</b>	Average (Range)		<b>60</b> <b>(38 – 75)</b>		

**Table 4-9 Summary of 24-hour and 1-hour TSP Monitoring Results – AM9b**

Date	24-hour TSP ( $\mu\text{g}/\text{m}^3$ )	1-hour TSP ( $\mu\text{g}/\text{m}^3$ )				
		Date	Start Time	1 <sup>st</sup> reading	2 <sup>nd</sup> reading	3 <sup>rd</sup> reading
1-Jun-18	67	6-Jun-18	13:15	59	54	49
7-Jun-18	26	12-Jun-18	9:24	94	103	108
13-Jun-18	18	15-Jun-18	9:06	72	71	67
19-Jun-18	22	21-Jun-18	9:33	65	67	65
25-Jun-18	31	27-Jun-18	9:35	78	80	74
30-Jun-18	25					
Average (Range)	<b>32</b> <b>(18 – 67)</b>	Average (Range)		<b>74</b> <b>(49 – 108)</b>		

4.2.2 As shown in *Tables 4-1 to 4-9*, all the 1-hour TSP and 24-hour TSP monitoring results were below the Action/Limit Levels. No Notification of Exceedance (NOE) was issued in this Reporting Period.

4.2.3 The meteorological data during the impact monitoring days are summarized in *Appendix K*.

## 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.
- 5.1.2 The noise monitoring schedule is presented in *Appendix H* and the monitoring results are summarized in the following sub-sections.

### 5.2 NOISE MONITORING RESULTS

- 5.2.1 In the Reporting Period, a total of **45** events noise measurements were carried out at the designated locations. The sound level meter was set in 1m from the exterior of the building façade including noise monitoring locations NM1, NM3, NM4, NM5, NM6, NM7, NM8 and NM9. Therefore, no façade correction (+3 dB(A)) is added according to acoustical principles and EPD guidelines. However, free-field status were performed at NM2a and NM10 and façade correction (+3 dB(A)) has added according to the requirement in this month. The noise monitoring results at the designated locations are summarized in *Tables 5-1 and 5-2*. The detailed noise monitoring data are presented in *Appendix I* and the relevant graphical plots are shown in *Appendix J*.

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

Construction Noise Level ( $L_{eq30min}$ ), dB(A)					
Date	NM1	NM2a <sup>(*)</sup>	NM8	NM9	NM10 <sup>(*)</sup>
6-Jun-18	67	72	59	59	61
12-Jun-18	58	68	62	62	64
21-Jun-18	63	67	58	60	66
27-Jun-18	57	68	60	59	62
<b>Limit Level</b>	<b>75 dB(A)</b>				

Remarks

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

**Table 5-2 Summary of Construction Noise Monitoring Results**

Construction Noise Level ( $L_{eq30min}$ ), dB(A)					
Date	NM3	NM4	NM5	NM6	NM7
1-Jun-18	60	64	63	63	62
7-Jun-18	64	65	53	59	62
13-Jun-18	63	63	53	57	59
19-Jun-18	59	61	59	59	64
25-Jun-18	63	60	59	61	64
<b>Limit Level</b>	<b>75 dB(A)</b>				

- 5.2.2 As shown in *Tables 5-1 and 5-2*, no construction noise measurement results that exceeded the Limit Level were recorded. Moreover, no valid noise complaint (which triggered Action Level exceedance) was recorded in the Reporting Period.



## 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. The water quality monitoring schedule is presented in **Appendix H**. The monitoring results are summarized in the following sub-sections.

### 6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of **thirteen (13)** sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances were recorded at WM2A(a), WM3x and WM4, according to “*Event and Action Plan*” stipulation, **8, 3 and 1** additional water quality monitoring day were conducted for WM2A(a), WM3x and WM4 respectively and their control stations.

6.2.2 The key monitoring parameters including Dissolved Oxygen, Turbidity and Suspended Solids are summarized in **Tables 6-1 to 6-5**. Breaches of water quality monitoring criteria are shown in **Table 6-6**. Detailed monitoring database including in-situ measurements and laboratory analysis data are shown in **Appendix I** and the relevant graphical plot are shown in **Appendix J**.

**Table 6-1 Water Quality Monitoring Results Associated of Contracts 2 and 3**

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
2-June-18	4.3	5.2	4.0	14.2	4.9	11.7	9.0	6.5	8.5
4-June-18	5.4	4.1	5.1	12.0	6.1	10.8	41.0	23.0	35.0
6-June-18	5.3	4.5	3.6	69.3	40.5	64.3	38.5	16.5	34.5
8-June-18	8.4	7.2	5.8	67.4	36.4	56.7	62.0	3.5	97.0
11-June-18	6.6	6.6	7.0	102.5	3.0	144.5	17.0	7.0	16.5
13-June-18	5.9	5.8	4.3	22.1	15.2	19.5	12.0	<2	7.0
15-June-18	6.9	9.9	5.1	27.7	13.1	10.4	4.0	3.0	<2
19-June-18	6.9	8.2	5.4	13.8	6.4	8.0	27.5	2.0	7.5
21-June-18	5.5	7.6	4.0	<b>48.2</b>	6.6	9.9	23.0	5.0	10.0
22-June-18 #	#	#	#	<b>58.0</b>	3.8	6.1	193.5	111.0	181.5
23-June-18	7.7	8.2	7.5	225.5	166.5	194.0	17.0	<2	8.0
25-June-18	7.6	8.2	4.9	34.7	8.7	19.6	10.5	2.5	10.0
28-June-18	7.8	7.9	6.4	19.9	4.9	15.6	36.5	3.0	6.0
30-June-18	7.5	8.3	5.7	32.8	11.8	10.0	9.0	6.5	8.5

Remarks: bold and underline indicated Limit Level exceedance

(#) Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance.

**Table 6-2 Water Quality Monitoring Results Associated of Contracts 6 and SS C505**

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
2-Jun-18	4.3	4.4	7.0	11.8	4.0	10.5
4-Jun-18	4.6	6.2	8.7	18.2	8.5	17.5
6-Jun-18	5.4	5.5	over range	over range	1170.0	1275.0
8-Jun-18	5.3	6.7	247.5	255.0	175.0	167.0
11-Jun-18	6.1	6.5	11.1	5.3	14.5	8.5
13-Jun-18	6.8	4.2	14.1	38.6	16.0	27.0
15-Jun-18	6.3	6.8	16.2	8.9	13.5	5.5
19-Jun-18	5.8	7.5	18.8	11.7	9.5	5.0
21-Jun-18	6.1	5.2	48.5	14.3	27.0	2.5
23-Jun-18	5.5	6.8	170.5	304.0	93.5	122.0
25-Jun-18	4.9	6.0	32.8	30.0	19.5	15.0
28-Jun-18	6.4	7.2	26.4	17.0	23.5	9.0

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
30-Jun-18	6.7	7.6	44.2	14.9	29.0	7.5

**Table 6-3 Water Quality Monitoring Results Associated only Contract 6**

Date	Dissolved Oxygen (mg/L)				Turbidity (NTU)				Suspended Solids (mg/L)			
	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C
2-Jun-18	5.3	4.4	*	*	24.1	14.0	*	*	13.0	5.0	*	*
4-Jun-18	5.9	5.8	*	*	20.5	13.3	*	*	10.0	2.0	*	*
6-Jun-18	5.6	6.3	*	*	<b><u>967.5</u></b>	243.0	*	*	<b><u>444.5</u></b>	126.5	*	*
7-Jun-18#	#	#	*	*	<b><u>345.5</u></b>	27.8	*	*	<b><u>266.0</u></b>	27.0	*	*
8-Jun-18	6.4	8.6	*	*	<b><u>over range</u></b>	263.5	*	*	<b><u>785.0</u></b>	70.0	*	*
9-Jun-18#	#	#	*	*	<b><u>183.0</u></b>	5.1	*	*	<b><u>80.0</u></b>	2.0	*	*
11-Jun-18	6.1	6.6	*	*	<b><u>64.1</u></b>	6.0	*	*	<b><u>54.5</u></b>	3.0	*	*
12-Jun-18#	#	#	*	*	<b><u>84.7</u></b>	4.2	*	*	<b><u>38.0</u></b>	2.0	*	*
13-Jun-18	5.4	7.6	*	*	<b><u>242.0</u></b>	24.8	*	*	<b><u>150.0</u></b>	6.5	*	*
14-Jun-18#	#	#	*	*	<b><u>90.5</u></b>	10.8	*	*	<b><u>54.0</u></b>	6.0	*	*
15-Jun-18	6.4	7.4	*	*	<b><u>65.1</u></b>	14.3	*	*	<b><u>40.5</u></b>	2.0	*	*
16-Jun-18#	#	#	*	*	24.1	6.1	*	*	<b><u>15.0</u></b>	<2	*	*
19-Jun-18	6.2	6.8	*	*	<b><u>265.5</u></b>	11.3	*	*	<b><u>136.0</u></b>	<2	*	*
20-Jun-18#	#	#	*	*	24.0	7.8	*	*	11.0	2.0	*	*
21-Jun-18	4.9	7.4	*	*	21.5	11.5	*	*	14.0	5.5	*	*
23-Jun-18	7.5	8.0	*	*	<b><u>586.0</u></b>	101.5	*	*	<b><u>201.0</u></b>	21.0	*	*
25-Jun-18	7.3	7.5	*	*	<b><u>106.5</u></b>	18.7	*	*	<b><u>60.5</u></b>	5.5	*	*
26-Jun-18	#	#	*	*	<b><u>46.6</u></b>	7.1	*	*	<b><u>28.0</u></b>	6.0	*	*
27-Jun-18	#	#	*	*	21.8	6.9	*	*	14.5	6.0	*	*
28-Jun-18	6.8	7.7	*	*	24.9	22.1	*	*	16.0	18.0	*	*
30-Jun-18	7.2	7.8	*	*	12.5	8.3	*	*	14.5	4.0	*	*

Remarks: \* water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)

(#) Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance.

Bold and underline indicated Limit Level exceedance

Bold and italic indicated Action Level exceedance

**Table 6-4 Water Quality Monitoring Results Associated Contracts 2 and 6**

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-C	WM3x	WM3-C	WM3x	WM3-C
2-Jun-18	6.4	5.2	13.1	3.2	9.0	<2
4-Jun-18	6.9	6.3	11.6	12.8	11.0	16.5
6-Jun-18	5.2	5.3	<b><u>624.0</u></b>	70.8	<b><u>472.5</u></b>	57.0
7-Jun-18	#	#	69.1	70.0	54.0	58.0
8-Jun-18	6.1	6.2	89.5	240.0	40.0	122.5
11-Jun-18	6.2	7.1	13.0	6.7	13.5	13.0
13-Jun-18	6.8	5.9	<b><u>73.6</u></b>	16.1	<b><u>51.0</u></b>	16.0
14-Jun-18	#	#	<b><u>33.2</u></b>	3.6	<b><u>30.0</u></b>	17.0
15-Jun-18	5.5	7.6	<b><u>24.0</u></b>	7.3	<b><u>22.0</u></b>	6.5
16-Jun-18	#	#	7.9	4.0	4.0	4.0
19-Jun-18	6.4	6.9	5.5	3.8	3.0	<2
21-Jun-18	5.3	4.9	12.8	14.9	7.0	29.0
23-Jun-18	7.4	7.4	263.0	223.5	204.5	189.5
25-Jun-18	6.5	7.5	10.7	10.4	4.0	<2
28-Jun-18	6.7	7.2	13.1	3.4	12.5	9.0

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-C	WM3x	WM3-C	WM3x	WM3-C
30-Jun-18	6.8	7.5	13.0	5.6	11.5	4.5

Remarks: **bold and underline indicated Limit Level exceedance**

(#) Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance.

**Table 6-5 Action and Limit (A/L) Levels Exceedance Recorded**

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance		Project Related exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
WM1	0	0	0	0	0	0	0	0	0	0
WM2A	0	0	0	<b>13</b>	<b>1</b>	<b>13</b>	<b>1</b>	<b>26</b>	#	#
WM2B	0	0	0	0	0	0	0	0	0	0
WM3x	0	0	0	<b>4</b>	0	<b>4</b>	0	<b>8</b>	0	0
WM4	0	0	0	<b>2</b>	0	<b>0</b>	0	<b>2</b>	0	0
No of Exceedance	0	0	0	<b>19</b>	<b>1</b>	<b>17</b>	<b>1</b>	<b>36</b>	0	0

# The exceedances at WM2A(a) on 23, 25 and 26 June 2018 are still under investigation.

6.2.3 In this Reporting Period, a total of thirty-seven (37) Action/ Limit Level exceedances, namely nineteen (19) Limit Level exceedance of turbidity and eighteen (18) Action/ Limit Level exceedances of Suspended Solids were recorded for the Project and they are summarized in Table 6-5. Investigation Reports for water quality exceedances have been conducted by ET accordingly. Investigation results revealed that the Contractor had properly implemented water quality mitigation measures such as well-maintained the wastewater treatment facility and covered the expose area with impervious sheet. It was concluded that all exceedances recorded at WM3x and WM4 and exceedances recorded at WM2A(a) during 6 to 15 June 2018 were related to the rainstorm or external inflow of muddy water and unlikely caused by the works under the Project. The investigation report for exceedances at WM2A(a) on 23, 25 and 26 June 2018 is still under review by IEC and the investigation result will be presented in next Monthly EM&A Report.

6.2.4 NOE was issued to relevant parties upon confirmation of the monitoring result. The investigation results and summary of exceedances are summarized in **Table 6-6**. The details of the completed investigation reports for the exceedances are attached in **Appendix N**.

**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
21 and 22 June 2018	WM4	Turbidity	In our investigation, the Contractor had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There were no adverse water quality impacts observed during the site inspection. However, inflow of unknown source of muddy water was observed from outside the site boundary of the construction site which affecting the water quality of the stream. It was concluded that the exceedances were not related to the works under the Project.
6, 13, 14 and 15 June 2018	WM3x	Turbidity & SS	There were heavy rainstorm recorded on 6 and 13 June 2018 and Amber Rainstorm Warning Signal were in force in both days. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. On 6

			<p>June 2018, muddy water was observed throughout the Ng Tung River including upstream of the project due to heavy rainstorm. Moreover, as reported by the Contractor, large amount of silts were washed downstream from a villager's backfilled site situated at upper section of Loi Tung Stream. In our investigation, the Contractor had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified during site inspection. In view of the external source of muddy water observed due to rainstorm, it is considered that the exceedances were related to other source of turbid water and not caused by the works under the Project.</p>
6, 7, 8, 9 and 11 June 2018	WM2A(a)	NTU & SS	<p>There were heavy rainstorm recorded during 5 to 8 June 2018, in which Amber Rainstorm Warning Signal was in force on 6 and 8 June 2018 and Red Rainstorm Warning Signal was in force on 8 June 2018. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. On 9 June 2018, it was observed that muddy water from upstream after rainstorm was being trapped at the Nylon Dam which located at intermediate of the construction site. On 11 June 2018, deflation of Nylon Dam was observed and muddy water was generated by the stirred up sediment accumulated at the river bed. In our investigation, the Contractor had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection and the site condition was general in order after the rainstorm. Since muddy water was observed from upstream during rainstorm and got trapped at Nylon Dam in the following days, it is considered that the exceedances on 6 to 8 June 2018 were due to rainstorm while on 9 and 11 June 2018 were related to the residual impact of rainstorm.</p>
12, 13, 14 and 15 June 2018	WM2A(a)	NTU & SS	<p>There were heavy rainstorm recorded during 12 to 14 June 2018 in which Amber Rainstorm Warning Signal was in force on 13 June 2018. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. Moreover, it was observed that muddy water generated under rainstorm was being trapped at the Nylon Dam which located at intermediate of the construction site. Deflation of Nylon Dam was observed during the monitoring and muddy water was generated by the stirred up sediment accumulated at the river bed. In our investigation, the Contractor had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection and the site condition was general in order. It is concluded that the exceedances on 12 to 15 June 2018 were due to</p>

			stirred up sediment during deflation of Nylon Dam and not related to the works under the Project.
16 and 19 June 2018	WM2A(a)	NTU & SS	As reported by the Contractor on 19 June 2018, inflow of muddy water was observed at WM2A-C from upstream of the construction site in the morning time before the water monitoring. Besides, there was no rainfall recorded on 16 June 2018 while trace amount of rainfall was recorded on 19 June 2018. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection and the site condition was general in order. It is considered that the exceedance on 16 June 2018 was unlikely due to the contract work while the exceedances on 19 June 2018 were likely related to the external source of muddy water from upstream of the Project and not caused by the works under the Project.
23, 25 and 26 June 2018	WM2A(a)	NTU & SS	The draft IR made by ET was submitted to IEC on 12 July 2018 and IEC issued comments on 13 July.  The revised IR provided by ET on 13 July 2018 is under review by IEC.

## **7 ECOLOGY MONITORING**

### **7.1 GENERAL**

- 7.1.1 Ecology monitoring for woodland compensation was 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 last Quarterly Ecological Monitoring Report (March to May 2018) was submitted to EPD in May 2018 in standalone copy as supplementary of the EM&A Report. There was no ecological monitoring conducted in the Reporting Period.

## 8 WASTE MANAGEMENT

### 8.1 GENERAL WASTE MANAGEMENT

8.1.1 Waste management was carried out in accordance with the Waste Management Plan (WMP) for each contract.

### 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; and
- Excavated Soil.

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

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Qty.
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m <sup>3</sup> )	8.5257	--	0.862	--	0	--	2.206	--	0	--	6.828	--	18.4217
Reused in this Contract (Inert) (in '000 m <sup>3</sup> )	0	--	0.515	--	0	--	0	--	0	--	0.376	--	0.891
Reused in other Contracts/ Projects (Inert) (in '000 m <sup>3</sup> )	3.1916	Recycling facility as approved alternative site	0	--	0	--	0.9775	NENT	0	--	0	--	4.1691
Disposal as Public Fill (Inert) (in '000 m <sup>3</sup> )	5.3341	Tuen Mun 38	0.265	Tuen Mun 38	0	--	1.228	Tuen Mun 38	0	--	5.792	TKO 137	12.6191

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
Recycled Metal ('000kg) #	31.7800	Licensed collector	0	-	0	--	0	--	6.0	Licensed collector	138.850	Licensed collector	176.63
Recycled Paper / Cardboard Packing ('000kg) #	0.2870	Licensed collector	0	-	0	-	0.270	Licensed collector	0.4	Licensed collector	0.990	Licensed collector	1.947
Recycled Plastic ('000kg) #	2.3000	Licensed collector	0	-	0	--	0	--	0.001	Licensed collector	0	--	2.301
Chemical Wastes ('000kg) #	0.1760	Licensed collector	0	-	0	--	0	--	0	--	1.200	Licensed collector	1.376
General Refuses ('000m <sup>3</sup> )	0.7534	NENT	0.110	NENT	0	--	0.714	NENT	0.05	NENT	2.997	NENT	4.6244

Remark #: Unit of recycled metal, recycled paper/ cardboard packing, recycled plastic and chemical waste for Contract 3 was in ('000m<sup>3</sup>) while the unit of chemical waste for Contract 3 was in (m<sup>3</sup>).



## 9 SITE INSPECTION

### 9.1 REQUIREMENTS

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

### 9.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

#### Contract 2

- 9.2.1 In the Reporting Period, joint site inspection for Contract 2 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22 and 29 June 2018**. No non-compliance was noted.
- 9.2.2 The findings / deficiencies of **Contract 2** that observed during the weekly site inspection are listed in **Table 9-1**.

**Table 9-1 Site Observations for Contract 2**

Date	Findings / Deficiencies	Follow-Up Status
1 June 2018	<ul style="list-style-type: none"> <li>Drip tray should be provided for all chemical storage on-site and proper chemical label should be displayed on chemical containers. (North Portal)</li> </ul>	<ul style="list-style-type: none"> <li>Oil drums without drip tray were removed.</li> </ul>
8 June 2018	<ul style="list-style-type: none"> <li>Turbid water overflow from de-silting system was observed. All water discharged from site should be treated by proper de-silting facilities and fully comply with discharge license requirement. (South Portal)</li> </ul>	<ul style="list-style-type: none"> <li>No turbid water was observed and the water was treated properly before discharge.</li> </ul>
15 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA.</li> </ul>
22 June 2018	<ul style="list-style-type: none"> <li>NRMM label should be displayed properly for NRMM using on site. (Generator) (South portal)</li> <li>Proper maintenance should be provided for de-silting facilities. (North portal)</li> <li>The contractor was reminded to provide sand bags to seal up the footing of site hoarding to prevent site surface runoff flowing to public area. (South Portal)</li> </ul>	<ul style="list-style-type: none"> <li>NRMM label has been displayed on the generator.</li> <li>The damaged pipe has been repaired.</li> <li>Not required for reminder.</li> </ul>
29 June 2018	<ul style="list-style-type: none"> <li>The Contractor was reminded to maintain cleanliness and tidiness of the site exit. Sand and debris cumulated near the site exit should be cleared more frequency. (Admin Building)</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder.</li> </ul>

#### Contract 3

- 9.2.3 In the Reporting Period, joint site inspection for Contract 3 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 20 and 28 June 2018**. No non-compliance was noted.
- 9.2.4 The findings / deficiencies of **Contract 3** that observed during the weekly site inspection are listed in **Table 9-2**.

**Table 9-2 Site Observations for Contract 3**

Date	Findings / Deficiencies	Follow-Up Status
7 June 2018	<ul style="list-style-type: none"> <li>It was reminded that wastewater generated from the project site should be properly treated</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder.</li> </ul>

Date	Findings / Deficiencies	Follow-Up Status
	before discharge. <ul style="list-style-type: none"> <li>The Contractor was reminded that the water diversion system at BC02 should be maintained to prevent overflow.</li> <li>It was reminded that stagnant water accumulated in site after rain should be treated before discharge.</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder.</li> <li>Not required for reminder.</li> </ul>
14 June 2018	<ul style="list-style-type: none"> <li>The Contractor was reminded to remove stagnant water on site after rainy days.</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder.</li> </ul>
20 June 2018	<ul style="list-style-type: none"> <li>Construction activities carried out next to the temporary division channel was observed, the Contractor was advised to lengthen the earth bund of the works area to reduce the risk of muddy water flowing into the stream.(Location: BC02)</li> <li>The Contractor was reminded to divert the stagnant water to the wastewater treatment facilities for treatment prior charge off site.</li> </ul>	<ul style="list-style-type: none"> <li>The earth bund of the works area was lengthened.</li> </ul>
28 June 2018	<ul style="list-style-type: none"> <li>Not enough proper mitigation along stream at work area of BC02 was observed. The Contractor should provide proper mitigation measure along the river to avoid potential surface runoff into the stream.</li> <li>The Contractor was reminded to replace broken sand bags near river at work area of AB 1.</li> </ul>	<ul style="list-style-type: none"> <li>Open slope was covered with tarpaulin sheet to avoid potential surface runoff out of the site.</li> </ul>

#### **Contract 4**

9.2.5 In the Reporting Period, joint site inspection for Contract 4 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22 and 25 June 2018**. No non-compliance was noted.

9.2.6 The findings / deficiencies of **Contract 4** that observed during the weekly site inspection are listed in **Table 9-3**.

**Table 9-3 Site Observations for Contract 4**

Date	Findings / Deficiencies	Follow-Up Status
1 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
8 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
15 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
22 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
25 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>

#### **Contract 6**

9.2.7 In the Reporting Period, joint site inspection for Contract 6 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 21 and 28 June 2018**. No non-compliance was noted.

9.2.8 The findings / deficiencies of **Contract 6** that observed during the weekly site inspection are listed in **Table 9-4**.

**Table 9-4 Site Observations for Contract 6**

Date	Findings / Deficiencies	Follow-Up Status
7 June 2018	• No adverse environmental issue was observed.	• NA
14 June 2018	• No adverse environmental issue was observed.	• NA
21 June 2018	• Overflow of muddy runoff from site boundary to public area at Chuk Yuen Village and Bridge Y were observed. The Contractor should clean up the muddy runoff immediately at public area and provide proper mitigation measure such as proper temporary drainage diversion for muddy surface runoff.	• Proper mitigation measure was provided at site boundary to avoid surface runoff out of site.
28 June 2018	• No adverse environmental issue was observed.	• NA

**Contract SS C505**

9.2.9 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, ET and the Contractor on **8, 13, 20 and 27 June 2018** in which IEC joined the site inspection on **27 June 2018**. No non-compliance was noted.

9.2.10 The findings / deficiencies of **Contract SS C505** that observed during the weekly site inspection are listed in **Table 9-5**.

**Table 9-5 Site Observations for Contract SS C505**

Date	Findings / Deficiencies	Follow-Up Status
8 June 2018	• The Contractor was reminded to place oil drums with drip tray underneath.	• Not required for reminder.
13 June 2018	<ul style="list-style-type: none"> <li>• Accumulation of wastes were observed on the ground next to building 7. The Contractor was advised to dispose the waste regularly and provide proper storage area.</li> <li>• Chemical containers were observed on the roof of building 5. The Contractor should place chemical containers inside drip tray.</li> <li>• The Contractor was reminded to clean stagnant water within site area after raining.</li> </ul>	<ul style="list-style-type: none"> <li>• Proper storage area for waste was provided on-site.</li> <li>• Chemical containers were relocated in proper storage area.</li> </ul>
20 June 2018	<ul style="list-style-type: none"> <li>• Stockpiles of cement bags were observed on the ground of building 4. The Contractor should cover it with tarpaulin sheet to avoid dust emission.</li> <li>• The Contractor was reminded to clear the stagnant water within site area after rain.</li> </ul>	• Stockpiles of cement bags were covered with tarpaulin Sheets
27 June 2018	<ul style="list-style-type: none"> <li>• The fork lift near site office was observed without NRMM label. The Contractor should provide NRMM label for fork lift on-site.</li> <li>• The Contractor was reminded to cover open cement bags properly.</li> <li>• The Contractor was reminded to improve house-keeping within site area.</li> <li>• The Contractor was reminded to clear stagnant water within site area.</li> </ul>	<ul style="list-style-type: none"> <li>• NRMM label was provided for fork lift.</li> <li>• Not required for reminder.</li> <li>• Not required for reminder.</li> <li>• Not required for reminder.</li> </ul>

**Contract 7**

9.2.11 In the Reporting Period, joint site inspection for Contract 7 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 19 and 29 June 2018**. No non-compliance was noted.

9.2.12 The findings / deficiencies of **Contract 7** that observed during the weekly site inspection are listed in **Table 9-6**.

**Table 9-6 Site Observations for Contract 7**

Date	Findings / Deficiencies	Follow-Up Status
1 June 2018	<ul style="list-style-type: none"> <li>No adverse environmental issue was observed.</li> </ul>	<ul style="list-style-type: none"> <li>NA</li> </ul>
8 June 2018	<ul style="list-style-type: none"> <li>Accumulation of general refuse was observed at the ground. The Contractor should dispose waste regularly.</li> </ul>	<ul style="list-style-type: none"> <li>General refuse was disposed regularly.</li> </ul>
15 June 2018	<ul style="list-style-type: none"> <li>The Contractor was reminded to clean the stagnant water under Bridge C.</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder</li> </ul>
19 June 2018	<ul style="list-style-type: none"> <li>Accumulation of stagnant water under Bridge C was observed after raining. The Contractor was advised to clean the stagnant water to avoid mosquito breeding.</li> <li>The Contractor was reminded to clean the stagnant water under Bridge C.</li> </ul>	<ul style="list-style-type: none"> <li>Stagnant water was removed and filled with mud.</li> <li>Not required for reminder</li> </ul>
29 June 2018	<ul style="list-style-type: none"> <li>The Contractor was reminded to replace the sandbag to ensure no site runoff discharge from site without proper treatment.</li> </ul>	<ul style="list-style-type: none"> <li>Not required for reminder</li> </ul>

9.2.13 General housekeeping such as daily site tidiness and cleanliness should be maintained for all Contracts. Furthermore, the Contractors were reminded to implement Waste Management Plan of the Project.

## 10 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

### 10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTIONS

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

10.1.2 The statistical summary of environmental complaint is presented in *Tables 10-1, 10-2 and 10-3*.

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

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
19 May 2014 – 31 May 2018	Contract 2	0	35	<ul style="list-style-type: none"> <li>• (19) Water Quality</li> <li>• (8) Dust</li> <li>• (5) Noise</li> <li>• (1) dust &amp; noise</li> <li>• (1) waste management</li> <li>• (1) Water quality and dust</li> </ul>	(7) water quality (2) dust (1) noise
06 Nov 2013 – 31 May 2018	Contract 3	0	6	<ul style="list-style-type: none"> <li>• (2) Dust</li> <li>• (3) Water quality</li> <li>• (1) Noise</li> </ul>	0
16 Aug 2013 – 31 May 2018	Contract 5	0	4	<ul style="list-style-type: none"> <li>• (3) Dust</li> <li>• (1) Noise</li> </ul>	0
16 Aug 2013 – 31 May 2018	Contract 6	0	38	<ul style="list-style-type: none"> <li>• (23) Water Quality</li> <li>• (8) Dust</li> <li>• (3) Noise</li> <li>• (1) Nuisance</li> <li>• (1) Noise and dust</li> <li>• (2) Water quality and dust</li> </ul>	(7) water quality (3) dust (1) Nuisance (1) Water quality and dust
15 Feb 2016 – 31 May 2018	Contract 7	0	3	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (2) Water quality and dust</li> </ul>	(1) Water quality and dust
16 Aug 2013 – 31 May 2018	SS C505	0	5	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (1) dust</li> <li>• (2) Water quality and dust</li> <li>• (1) Water quality</li> </ul>	(1) Water quality and dust
1 – 30 June 2018	Contract 2	0	35	<ul style="list-style-type: none"> <li>• (19) Water Quality</li> <li>• (8) Dust</li> <li>• (5) Noise</li> <li>• (1) dust &amp; noise</li> <li>• (1) waste management</li> <li>• (1) Water quality and dust</li> </ul>	NA
	Contract 3	0	6	<ul style="list-style-type: none"> <li>• (2) Dust</li> <li>• (3) Water quality</li> <li>• (1) Noise</li> </ul>	NA
	Contract 4	0	0	NA	NA
	Contract 6	0	38	<ul style="list-style-type: none"> <li>• (23) Water Quality</li> <li>• (8) Dust</li> <li>• (3) Noise</li> <li>• (1) Nuisance</li> <li>• (1) Noise and dust</li> <li>• (2) Water quality and dust</li> </ul>	NA

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
	Contract 7	0	3	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (2) Water quality and dust</li> </ul>	NA
	SS C505	0	5	<ul style="list-style-type: none"> <li>• (1) Noise</li> <li>• (1) dust</li> <li>• (2) Water quality and dust</li> <li>• (1) Water quality</li> </ul>	NA

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

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 May 2018	Contract 2	0	1	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 31 May 2018	Contract 3	0	0	NA
16 Aug 2013 – 31 May 2018	Contract 5	0	0	NA
16 Aug 2013 – 31 May 2018	Contract 6	0	0	NA
15 Feb 2016 – 31 May 2018	Contract 7	0	0	NA
16 Aug 2013 – 31 May 2018	SS C505	0	0	NA
1 – 30 June 2018	Contract 2	0	1	NA
	Contract 3	0	0	NA
	Contract 4	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

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

Reporting Period	Contract No	Environmental Prosecutions Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 May 2018	Contract 2	0	1	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 31 May 2018	Contract 3	0	0	NA
16 Aug 2013 – 31 May 2018	Contract 5	0	0	NA
16 Aug 2013 – 31 May 2018	Contract 6	0	0	NA
15 Feb 2016 – 31 May 2018	Contract 7	0	0	NA
16 Aug 2013 – 31 May 2018	SS C505	0	0	NA
1 – 30 June 2018	Contract 2	0	1	NA
	Contract 3	0	0	NA
	Contract 4	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

## 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 M**.
- 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, 4, 5, 6, 7 and Contract 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 wastewater treatment facilities i.e. sedimentation tank or similar facility before 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>

### 11.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

- 11.2.1 As advised by the ER, the construction works under Contract 5 was substantially completed on 31 August 2016. Construction activities for other Contracts in the coming month are listed below:

#### Contract 2

Mid-Vent Portal	<ul style="list-style-type: none"> <li>Construction of Cut and Cover and backfilling activities</li> <li>Construction of adit enlargement internal structure</li> <li>Stud tunnel internal structure and E&amp;M installation</li> <li>Building fit out and E&amp;M installation</li> <li>Structure connecting adit tunnel and ventilation building</li> <li>Permanent drainage &amp; underground utilities</li> </ul>
North Portal	<ul style="list-style-type: none"> <li>Construction of retaining wall, permanent drainage, site formation and slip road</li> <li>Tunnel backfilling, VE panel and E&amp;M installation</li> <li>Construction of tunnel cross passage and internal structure</li> <li>North ventilation building superstructure, internal structure and backfilling</li> <li>Drainage cleansing and construction of temporary utility bridge across the mid-platform</li> </ul>
South Portal	<ul style="list-style-type: none"> <li>Waterproofing and lining activities inside the tunnel</li> <li>Construction of tunnel cross passage, tunnel backfilling and E&amp;M installation</li> </ul>



	<ul style="list-style-type: none"> <li>• South ventilation building fit out and E&amp;M installation</li> <li>• Backfilling and construction of slip road</li> <li>• Relocation of site office and water treatment system</li> </ul>
Admin Building	<ul style="list-style-type: none"> <li>• Building fit out, permanent drainage and E&amp;M installation and soft landscaping works</li> </ul>

### Contract 3

- Cable detection and trial trenches
- Remaining works on new Footbridge
- Noise barrier construction
- Road pavement works
- Water main laying works (on Grade and on bridge deck)
- Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
- Parapet Installation on bridge deck
- Road Drainage Works
- Construction of profile barrier & Planter wall on Bridge deck
- Stressing of external tendon
- Bitumen paving on bridge deck
- Installation of deck cell light inside the bridge deck
- Installation of movement joint on the bridge
- Construction of retaining wall
- Landscaping works

### Contract 4

- E&M installation at Admin Building
- E&M installation at Ventilation Building
- E&A installation at OHVD in tunnel
- High mast erection
- Sign fabrication

### Contract 6

- Bridge construction
- Tunnel Works
- Sewage Treatment Plant Construction
- Tunnel Ventilation Building Construction
- Slip Road/At-grade Road/Periphery Road Construction

### Contract 7

- Profile barrier construction at Bridges A, B, D and E
- Construction of Façade and BMU at Bridge C
- Waterproofing and drainage works at Roof of Bridge C
- Drainage and watermain at perimeter road
- Bitumen pavement at perimeter road

### Contract SS C505

- Building no. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30 and 31 constructions
- Constructions of Steel Canopies (Building no. 32, 33, 34 and 35)
- Constructions of Master Water Meter Room 1, 2 and 3 (Building no. 42, 43, 44)
- Tower crane operation
- Bridge 1 - 5 construction works including retaining wall, road and finishes works
- Underground drainage works, Road Works, CLP Cable laying and Landscaping
- Formwork and falsework for PTB's internal and External wall construction

- Construction PTB non-structural wall, Underground Drainage and Utilities, Fence Wall, On Grade Ground Slab and Paving
- PTB Southern Entrance Construction & Curtain Wall Installation
- Backfilling works
- PTB Major Plant Rooms ABWF & MEP Installation, Lift and Escalator Installation by NSC
- Integrated ABWF & MEP Works in PTB, Building no. 1, 2, 3, 4, 5, 6, 7, 8, 10, 11, 12, 14, 15, 16, 17 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36 and 41
- Elevated Walkway E1, E2, E3 and E4 construction
- Integrated ABWF and MEP Works at Bridge C (C7 Portion)
- Tower Crane Dismantling Works

### 11.3 KEY ISSUES FOR THE COMING MONTH

- 11.3.1 Key issues to be considered in the coming month for Contracts 2, 3, 4, 6, 7 and SS C505 include:
- Implementation of control measures for rainstorm;
  - Regular clearance of stagnant water during wet season;
  - Implementation of dust suppression measures at all times;
  - Potential wastewater quality impact due to surface runoff;
  - Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
  - Disposal of empty engine oil containers within site area;
  - Ensure dust suppression measures are implemented properly;
  - Sediment catch-pits and silt removal facilities should be regularly maintained;
  - Management of chemical wastes;
  - Discharge of site effluent to the nearby wetland, stockpiling or disposal of materials, and any dredging or construction area at this area are prohibited;
  - Follow-up of improvement on general waste management issues; and
  - Implementation of construction noise preventative control measures

## 12 CONCLUSIONS AND RECOMMENDATIONS

### 12.1 CONCLUSIONS

- 12.1.1 This is the 59<sup>th</sup> monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 30 June 2018.
- 12.1.2 For air quality monitoring, no 1-hour TSP and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded.
- 12.1.3 In the Reporting Period, no construction noise measurement results that exceeded the Limit Level were recorded. Moreover, no valid noise complaint which triggered an Action Level exceedance was recorded.
- 12.1.4 For water quality monitoring, a total of 37 AL/LL exceedances, namely 19 LL exceedance of turbidity and 18 AL/LL exceedances of SS were recorded. ES05 Investigation results revealed that the Contractor had properly implemented water quality mitigation measures such as well-maintained the wastewater treatment facility and covered the expose area with impervious sheet. It was concluded that all exceedances recorded at WM3x and WM4 and exceedances recorded at WM2A(a) during 6 to 15 June 2018 were related to the rainstorm or external inflow of muddy water and unlikely caused by the works under the Project. Besides, the investigation report for exceedances at WM2A(a) on 23, 25 and 26 June 2018 is still under review by IEC and the investigation result will be presented in next Monthly EM&A Report.
- 12.1.5 In this Reporting Period, no environmental complaints, environmental summons and prosecution were received under the EM&A programme.
- 12.1.6 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.

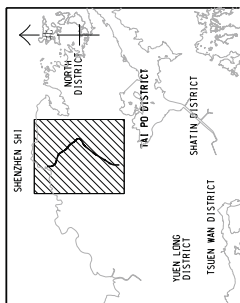
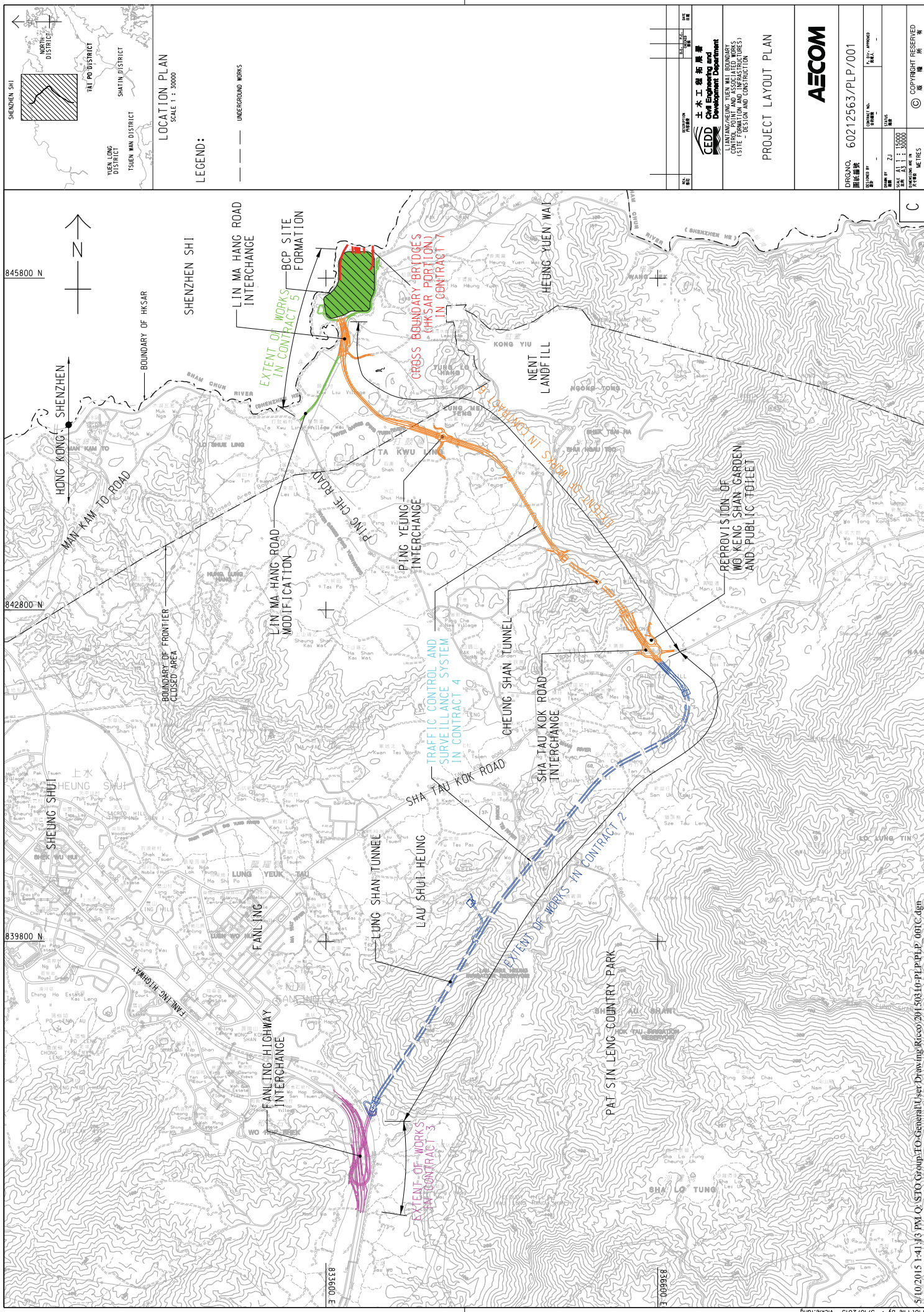
### 12.2 RECOMMENDATIONS

- 12.2.1 During rainy 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, in particular for working areas near Ma Wat Channel and Ping Yuen River.
- 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.
- 12.2.5 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**





LOCATION PLAN  
SCALE 1 : 3000

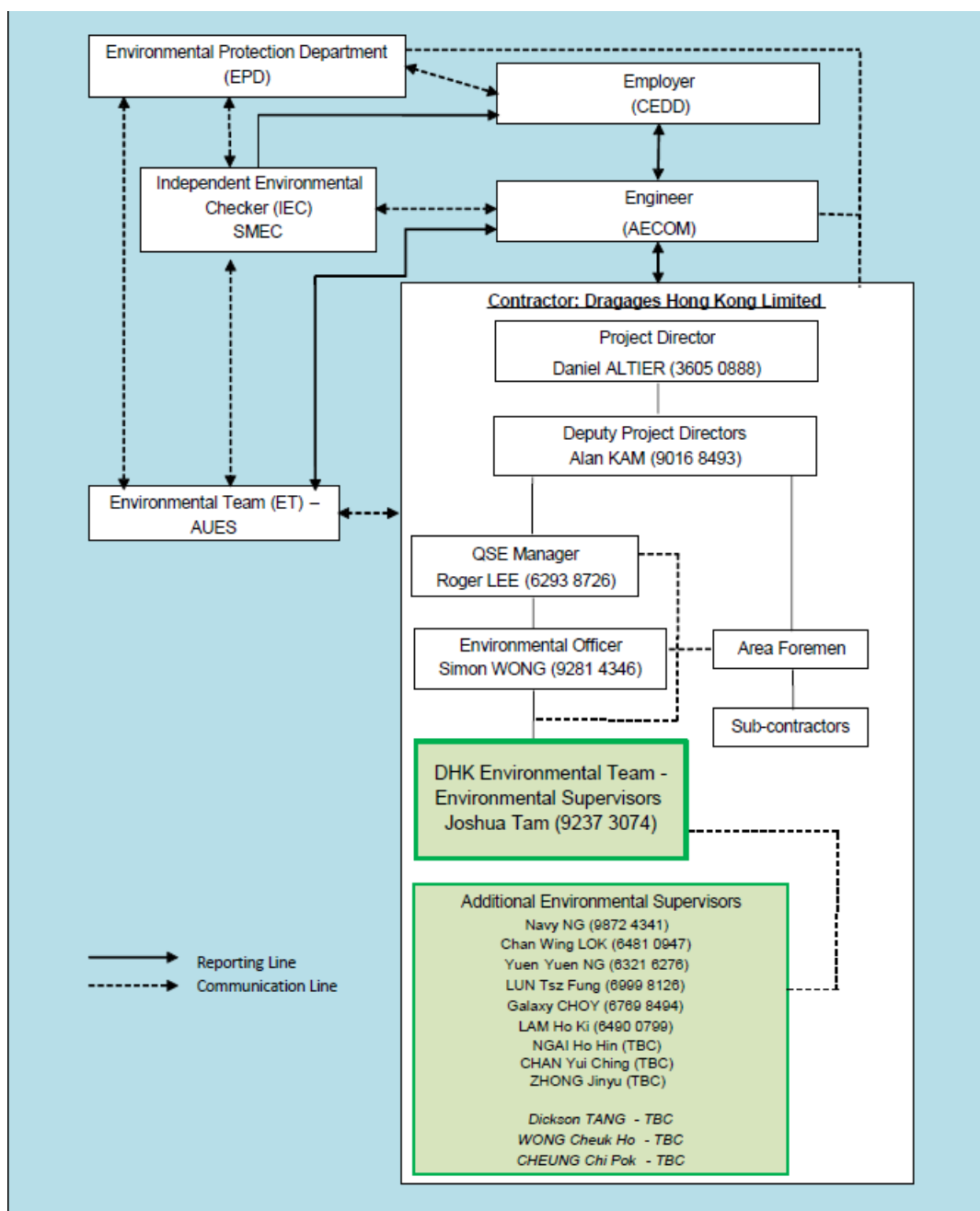
LEGEND:

UNDERGROUND WORKS

PROJECT NO.	60212563/PLP/001
CONTRACT NO.	
DATE	2/1/2015
SCALE	1:3000
PROJECT NAME	PROJECT LAYOUT PLAN
DESIGNER	CECO Engineering and Development Department
CLIENT	LAND AND NATURAL RESOURCES DEPARTMENT (SITE FORMATION AND INFRASTRUCTURE) DESIGN AND CONSTRUCTION
PROJECT NO.	60212563/PLP/001
CONTRACT NO.	
DATE	2/1/2015
SCALE	1:3000
PROJECT NAME	PROJECT LAYOUT PLAN
DESIGNER	CECO Engineering and Development Department
CLIENT	LAND AND NATURAL RESOURCES DEPARTMENT (SITE FORMATION AND INFRASTRUCTURE) DESIGN AND CONSTRUCTION
PROJECT NO.	60212563/PLP/001
CONTRACT NO.	
DATE	2/1/2015
SCALE	1:3000
PROJECT NAME	PROJECT LAYOUT PLAN
DESIGNER	CECO Engineering and Development Department
CLIENT	LAND AND NATURAL RESOURCES DEPARTMENT (SITE FORMATION AND INFRASTRUCTURE) DESIGN AND CONSTRUCTION

## **Appendix B**

### **Organization Chart**



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



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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Edwin Ching	2171 3301	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	3605 0888	2171 3299
DHK	Deputy Project Manager	Alan Kam	9016 8493	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3017	2171 3299
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:**

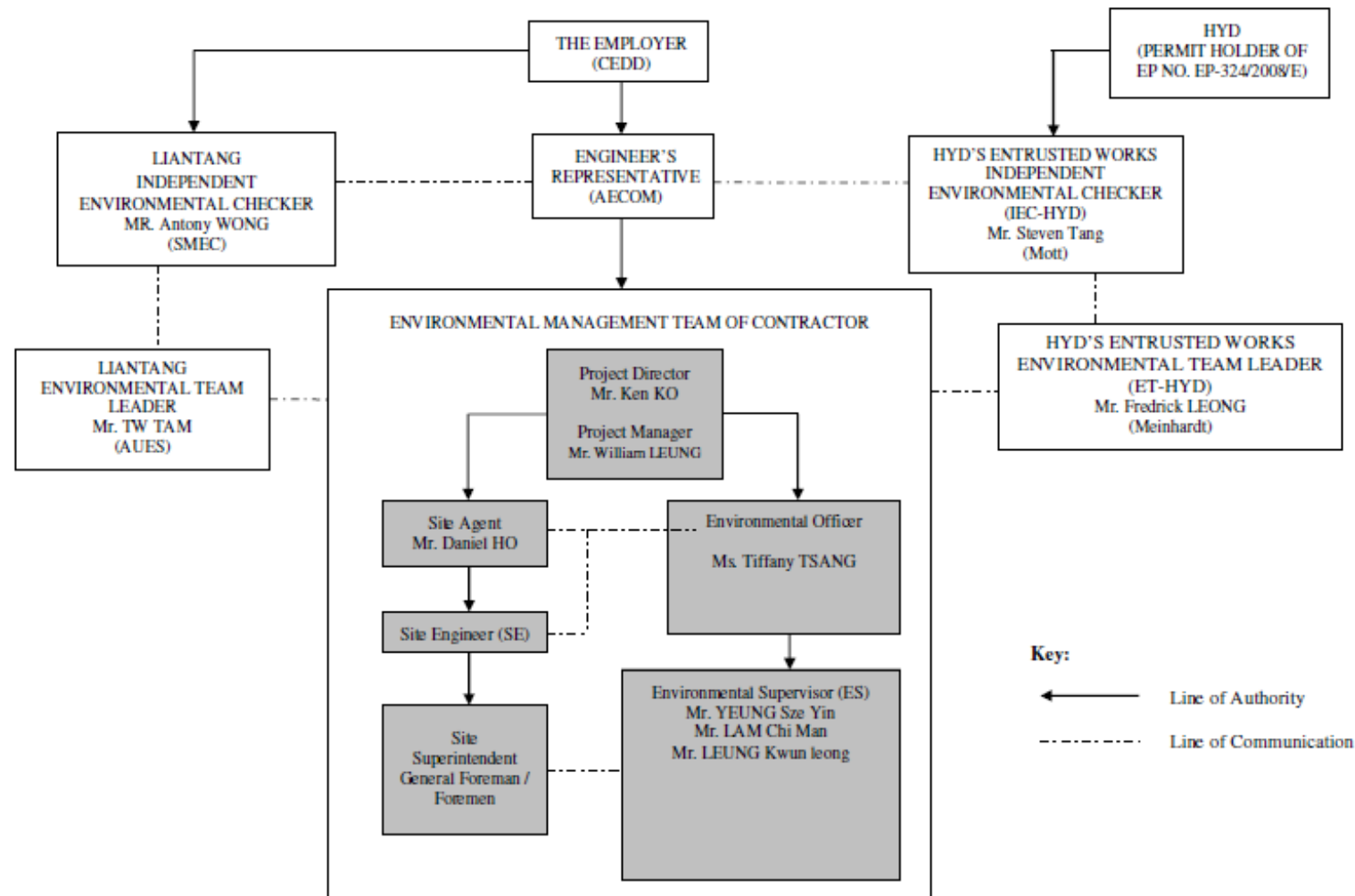
*CEDD (Employer) – Civil Engineering and Development Department*

*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	Tiffany Tsang	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

**Legend:**

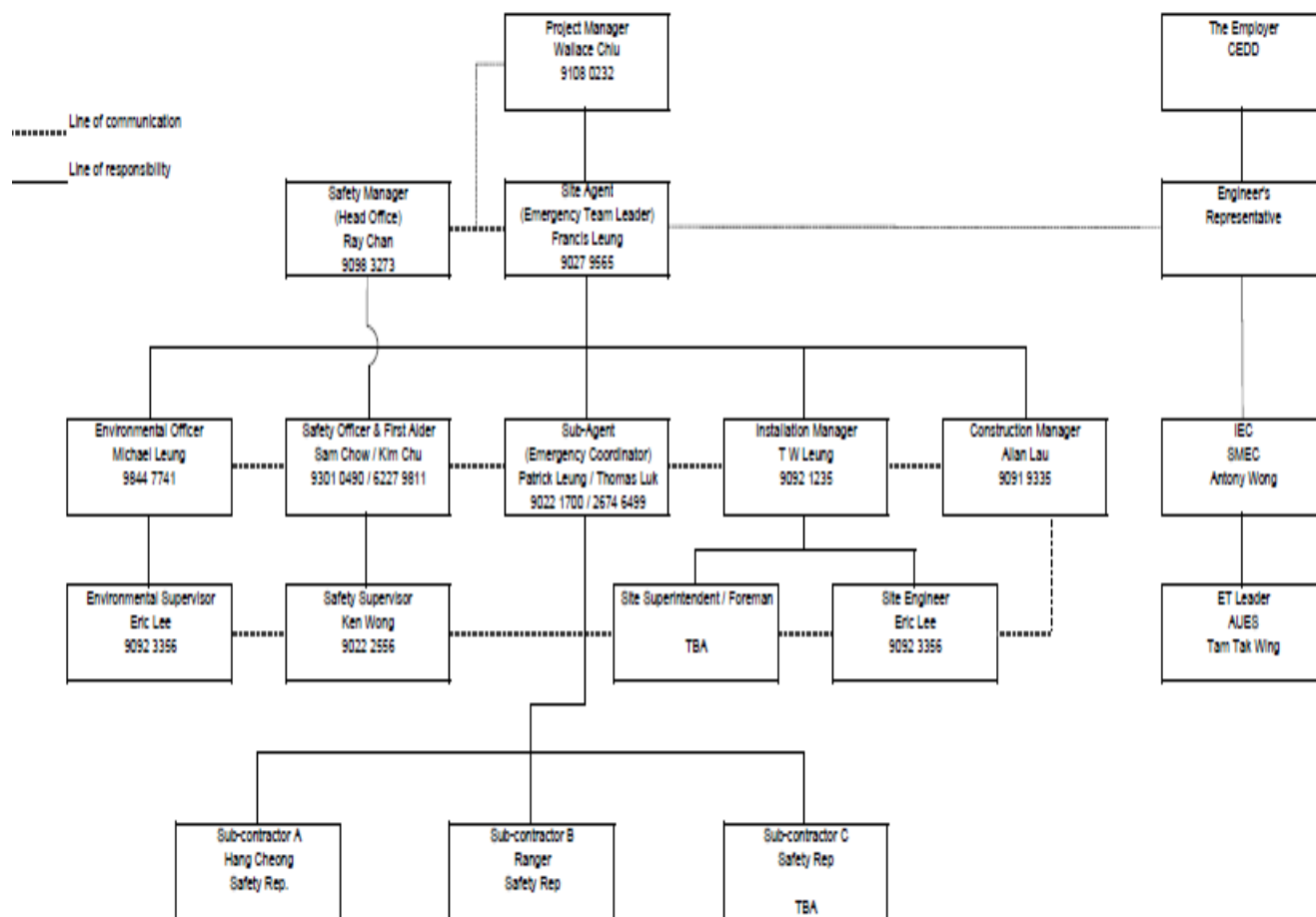
*CEDD (Employer) – Civil Engineering and Development Department*

*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**

**Contact Details of Key Personnel 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	Wallace Chiu	9108 0232	--
Siemens	Site Agent	Francis Leung	9027 9565	--
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:**

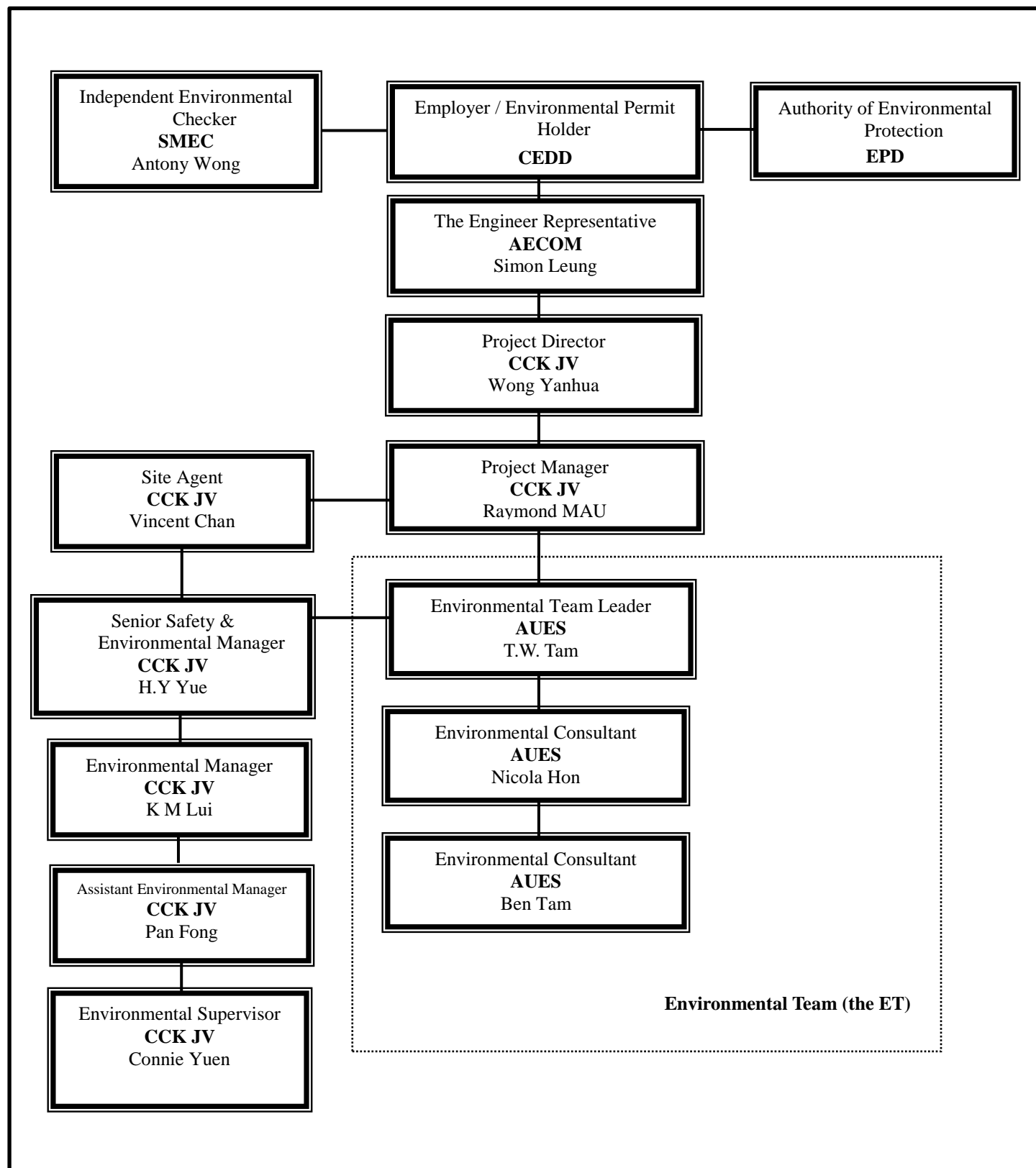
*CEDD (Employer) – Civil Engineering and Development Department*

*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	Simon Leung	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	51138223	--
CCK JV	Assistant Environmental Manager	Pan Fong	9436 9432	--
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*

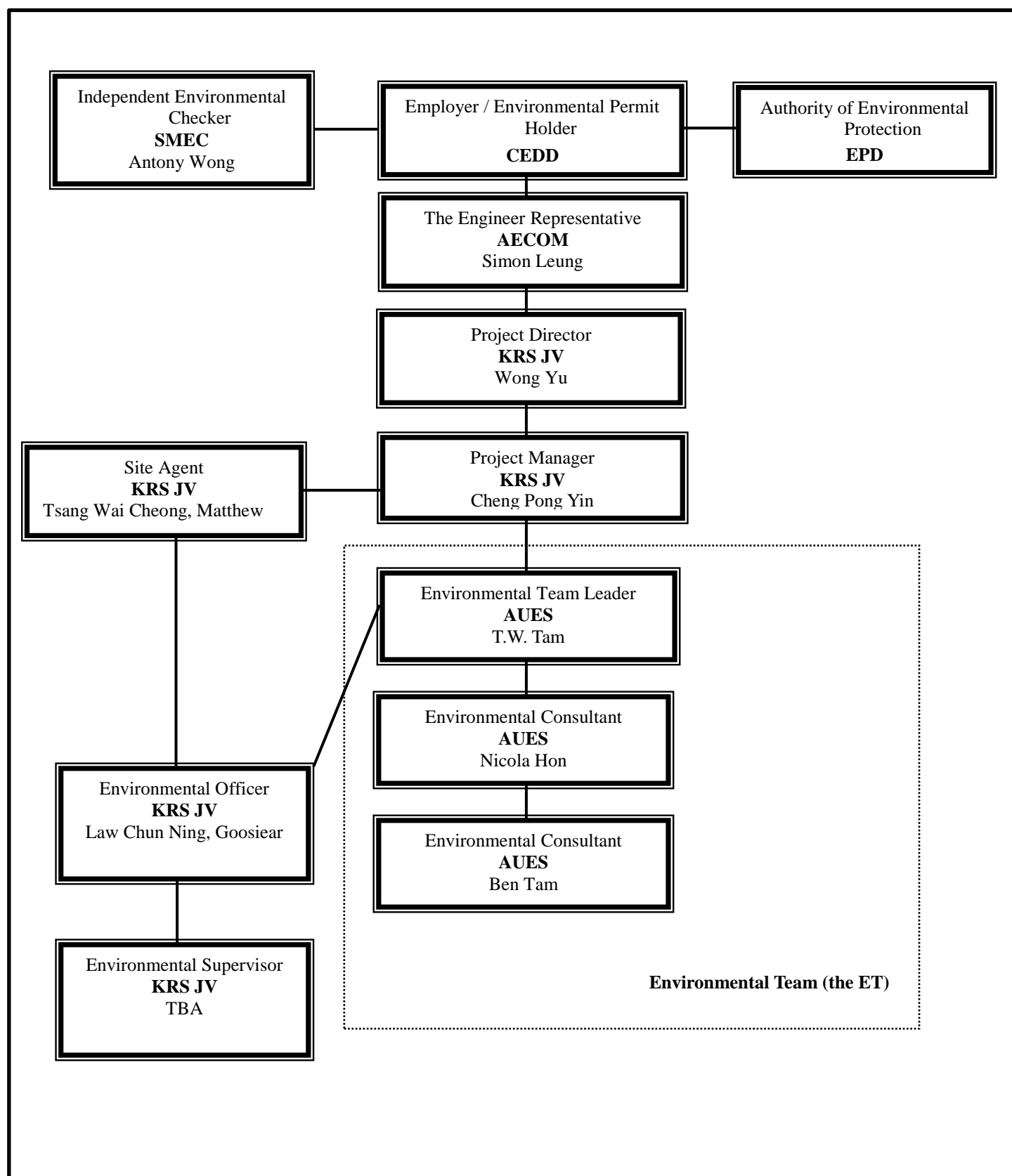
*AECOM (Engineer) – AECOM Asia Co. Ltd.*

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

*SMEC (IEC) – SMEC Asia Limited*

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





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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
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	6592 3084	2682 2783
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:**

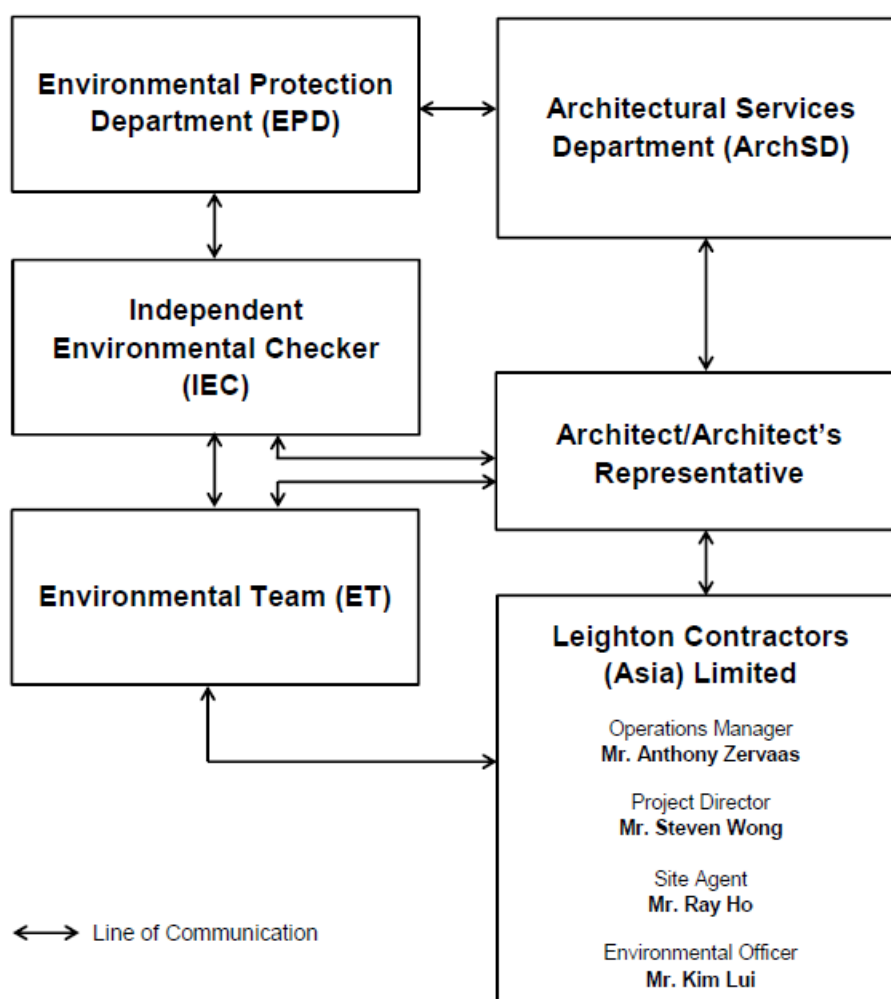
*CEDD (Employer) – Civil Engineering and Development Department*

*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. Kim Lui	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**

### **3-month rolling construction program**

## **Contract 2**

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works

CEDD Contract No: CV/2012/08

Main Contractor: Dragages Hong Kong Ltd



### Tentative Three Months (June, July and Aug 2018) Construction Rolling Program

Item	Construction Activities
1	Admin Bldg - Building fit out, permanent drainage and E&M installation and soft landscaping works.
2	Mid Vent Portal - Construction of C&C structure and backfilling activities
3	Mid Vent Portal - Construction of adit enlargement internal structure
4	Mid Vent Portal - Stud tunnel internal structure and E&M installation
5	Mid-Vent Portal - Building fit out and E&M installation
6	Mid Vent Portal - Structure connecting adit tunnel and ventilation building
7	Mid-Vent Portal - Permanent drainage & underground utilities
8	North Portal - Construction of retaining wall, permanent drainage, site formation and slip road
9	North Portal - Tunnel backfilling, VE panel and E&M installation
10	North Portal - Construction of tunnel cross passage and internal structure
11	North Portal - North ventilation building superstructure, internal structure and backfilling
12	North Portal - Drainage cleansing and construction of temporary utility bridge across the mid-platform
13	South Portal - Waterproofing and lining activities inside the tunnel
14	South Portal - Construction of tunnel cross passage, tunnel backfilling and E&M installation
15	South Portal - South ventilation building fit out and E&M installation
16	South Portal - Backfilling and construction of slip road
17	South Portal - Relocation of site office and water treatment system



## **Contract 3**

**Main Contractor: Chun Wo Construction Ltd**

[illegible]

## **Contract 4**

**Site Information for EM&A Report**

- **Complaint Log**

Date / Time	Location	Compliant Details	Contact Person & Telephone
Nil	Nil	Nil	Nil

- **Updated Construction Program**

No Change

- **Updated Environmental Licensing Status**

Statutory Reference	Description	Permit /Reference No.	Status
EIAO	Environmental Permit	EP-381/2009	Valid
APCO	Notification of Construction Work	405353	Valid
WDO	Bill Account for disposal	7024973	Valid

- **Works undertaken during the Reporting Period ( Jun 2018)**

Item	Construction Activities
1	E&M installation at admin building
2	E&M installation at ventilation building
3	E&M installation at OHVD & tunnel

- **Works to be undertaken in the forthcoming month (From July 2018 to Aug 2018)**

Item	Construction Activities
1	E&M installation at admin building
2	E&M installation at ventilation building
3	E&M installation at OHVD & tunnel
4	High mast erection
5	Sign fabrication

- **Waste flow table**

Refer to attachment

- **Updated Environmental Organisation**

Environmental personnel	Name	Telephone Number
Environmental Officer	Michael Leung	9844 7741
Environmental Supervisor(s)	Eric Lee	9790 2810
Environmental Team Leader	T.W. Tam	2959 6059
Independent Environmental Checker	Anthony Wong	3995 8120

## **Contract 6**

**Main Contractor: CRBE-CEC-Kaden Joint Venture**

[illegible]

## **Contract 7**



**Main Contractor: Kwan On-Richwell-SCG Joint Venture**

[illegible]

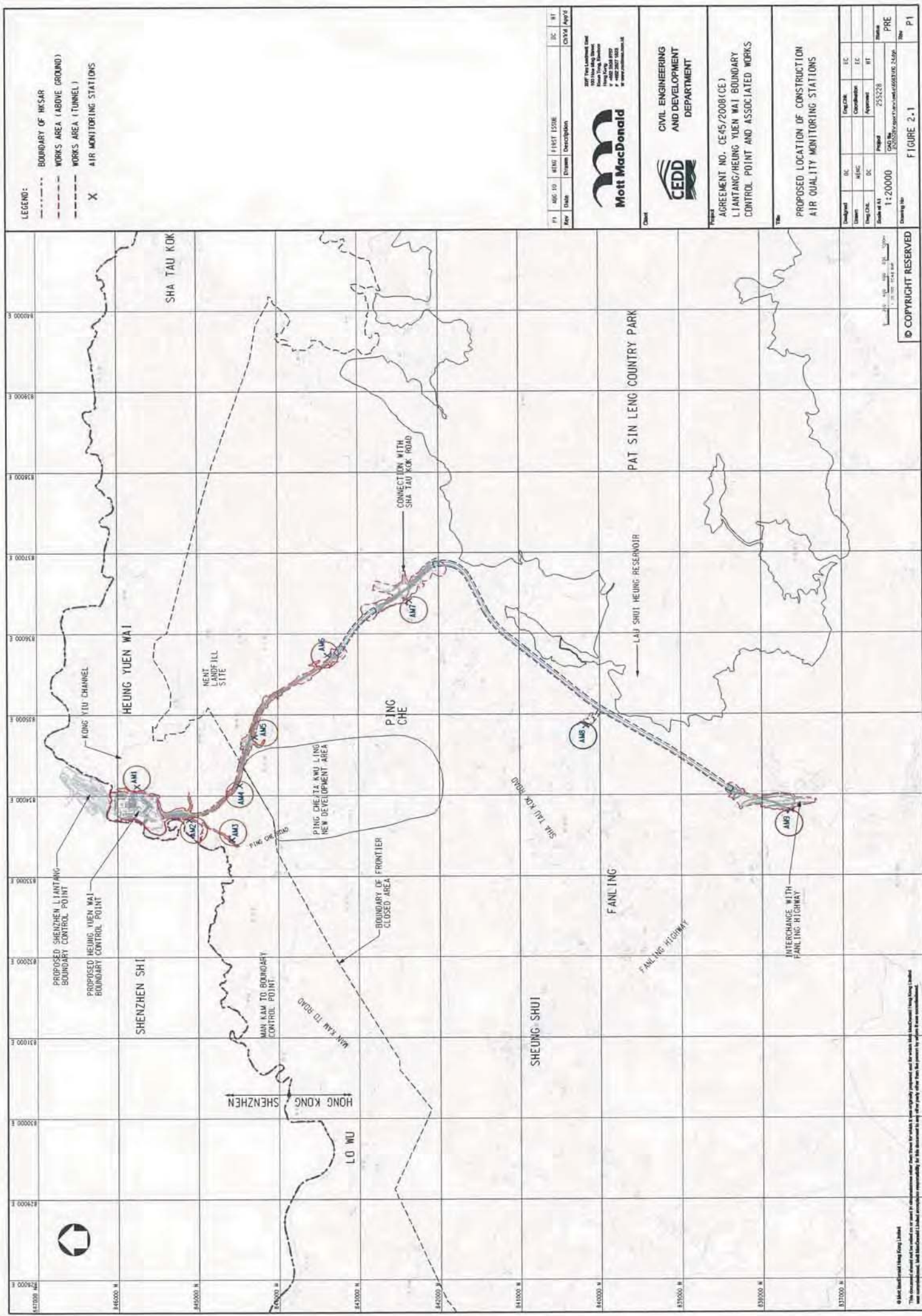
## **Contract SS C505**

## Tentative Three Months (June, July and August 2018) Construction Rolling Program

Item	Construction Activities
1	Passenger Terminal Building (PTB) G/F - Structure Works, Backfilling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
2	PTB ABWF Works & Integrated MEP Installation - Nonstructure Wall Erection, Front/Back of House Area ABWF Works & MEP Installation, Curtain Wall Installation and Southern Entrance Construction
3	PTB Major Plant Room ABWF Works & MEP Installation from G/F to 2/F, E&MF Major Plant Rooms ABWF Works & MEP Installation, Lift & Escalator Installation, CLP Installation to Transformer Room, MVAC Vertical Connection and LPG Installation
4	PTB Podium & Hall End User Rooms
5	PTB M/F External Wall Structure & ABWF Works
6	PTB Roof & Upper Roof Roofing Works - Structure Works and Concrete Repair, Waterproofing, BMU System & Fall Arrest System, Soft and Hard Landscaping
7	PTB Podium Coach Canopy - Coach Canopy Construction & MEP Installation
8	PTB - Coach & Private Car Kiosks (Inbound / East) - Superstructure, ABWF Works, MEP Installation & End User Rooms
9	PTB - Private Car Examination Buildings and MXRVSS (Inbound / East) - Superstructure, ABWF works, MEP Installation & End User Rooms
10	C&ED Detector Dog Base - Integrated ABWF & MEP G/F & R/F Works
11	HKPF Building and Observation Tower - Structures, External Works, Integrated ABWF & MEP Works, End User Rooms
12	Fire Station and Drill Tower - External Works, Integrated ABWF & MEP Works, End User Rooms / System
13	Cargo Examination Building (Inbound) - External Works, Integrated ABWF & MEP Works, G/F & 1/F End User Rooms
14	Cargo Examination Building (Outbound) - External Works, Integrated ABWF & MEP Works, G/F & 1/F End User Rooms
15	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) - Structures, External Works, Integrated ABWF & MEP Works, G/F & 1/F End User Rooms
16	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) - Structures, External Works and Integrated ABWF & MEP Works
17	MXRVSS (Inbound) - Structure Works, Integrated ABWF and MEP Works
18	MXRVSS (Outbound) - Structure Works, Integrated ABWF and MEP Works
19	GV Kiosk (Inbound) - Structures Works, On-Grade Slab Construction, Steel Structure Works, Integrated ABWF and MEP Works, End User Rooms
20	GV Kiosk (Outbound) - Structures Works, On-Grade Slab Construction, Steel Structure Works, Integrated ABWF & MEP Works, End User Rooms
21	Public Toilets (Inbound) - Structure Works, Integrated ABWF and MEP Works
22	Public Toilets (Outbound) - Structures Works, Integrated ABWF and MEP Works
23	Disinsection Facilities (Inbound) - Structure Works, Integrated ABWF & MEP Works
24	Disinsection Facilities (Outbound) - Substructure and Structure Works, Integrated ABWF & MEP Works
25	Weigh Station - Structure Works, Integrated ABWF and MEP Works, End User Room Equipment Installation
26	EUVSS & Monitoring Room - Structure Works, Integrated ABWF & MEP Works, End User Room Equipment Installation
27	Refuse Collection Point - Integrated ABWF and MEP Works
28	Traffic Control Office (Inbound) - Structure Works, Integrated ABWF and MEP Works
29	Traffic Control Office (Outbound) - Structure Works, Integrated ABWF and MEP Works
30	Inspection Post - Structure Works, Integrated ABWF and MEP Work
31	Guard Booth (Inbound/Outbound/Vehicle Detention Area) - Structure Works, Integrated ABWF and MEP Works
32	Steel Canopies - Structure Works, Integrated ABWF and MEP Works
33	Fire Hydrant Tank & Pump Room - Integrated ABWF and MEP Works
34	Irrigation Pump Room - Integrated ABWF & MEP Works

## **Appendix D**

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



**LEGEND:**

- BOUNDARY OF HK SAR
- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- X AIR MONITORING STATIONS

Rev	Date	Drawn	Description	EC	WT
1					



Client  
CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT

Project  
AGREEMENT NO. CE-45/2008(CE)  
LIANTANG/HUNG YUEN WAI BOUNDARY  
CONTROL POINT AND ASSOCIATED WORKS

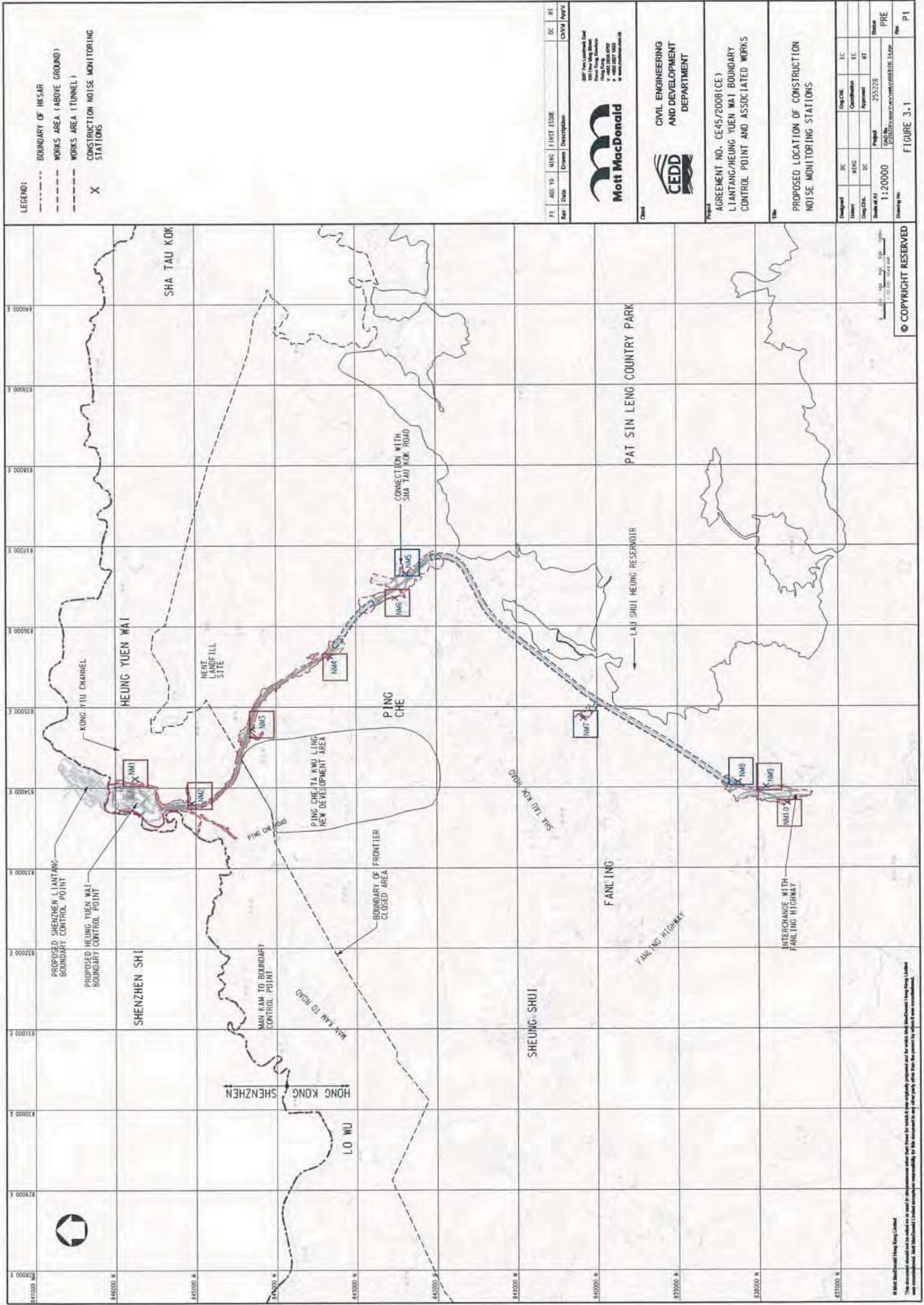
Title  
PROPOSED LOCATION OF CONSTRUCTION  
AIR QUALITY MONITORING STATIONS

Designed	Checked	EC	WT
Eng. CMC	Eng. CMC	EC	WT
1:20000	25/5/2008		
Scale of A1	25/5/2008		
Drawing No.	CE-45/2008(CE)-001		
Sheet No.	1		
PRE			
P1			

© COPYRIGHT RESERVED

This document is confidential and its use is restricted to the project for which it was prepared. It is not to be distributed outside the project team without the prior written consent of Mott MacDonald. All rights reserved.





LEGEND:

- BOUNDARY OF HK SAR
- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- X CONSTRUCTION NOISE MONITORING STATIONS

Rev	Date	Drawn	Description	DC	RE
1					



2007 The Government of the Hong Kong Special Administrative Region  
 2007 The Government of the Hong Kong Special Administrative Region  
 2007 The Government of the Hong Kong Special Administrative Region  
 2007 The Government of the Hong Kong Special Administrative Region



CIVIL ENGINEERING  
 AND DEVELOPMENT  
 DEPARTMENT

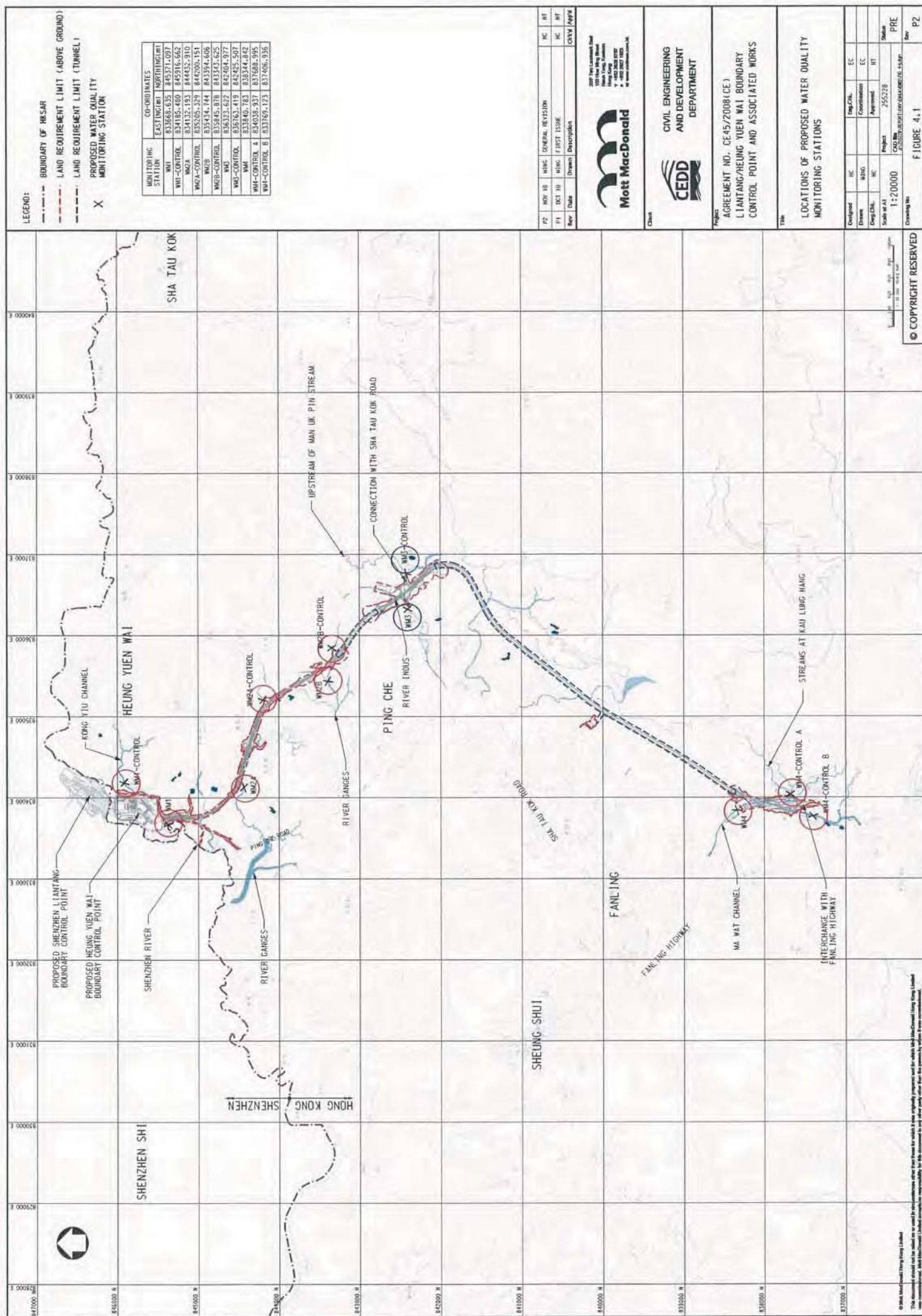
Project  
 AGREEMENT NO. CE45/2008(CE)  
 LIANTANG/HEUNG YUEN WAI BOUNDARY  
 CONTROL POINT AND ASSOCIATED WORKS

Title  
 PROPOSED LOCATION OF CONSTRUCTION  
 NOISE MONITORING STATIONS

Designated	DC	HEUNG	DC	Project	EC	EC
Station						
Scale at A1	1:20000			255228		
Drawing No.						
PRE						
P1						

© COPYRIGHT RESERVED

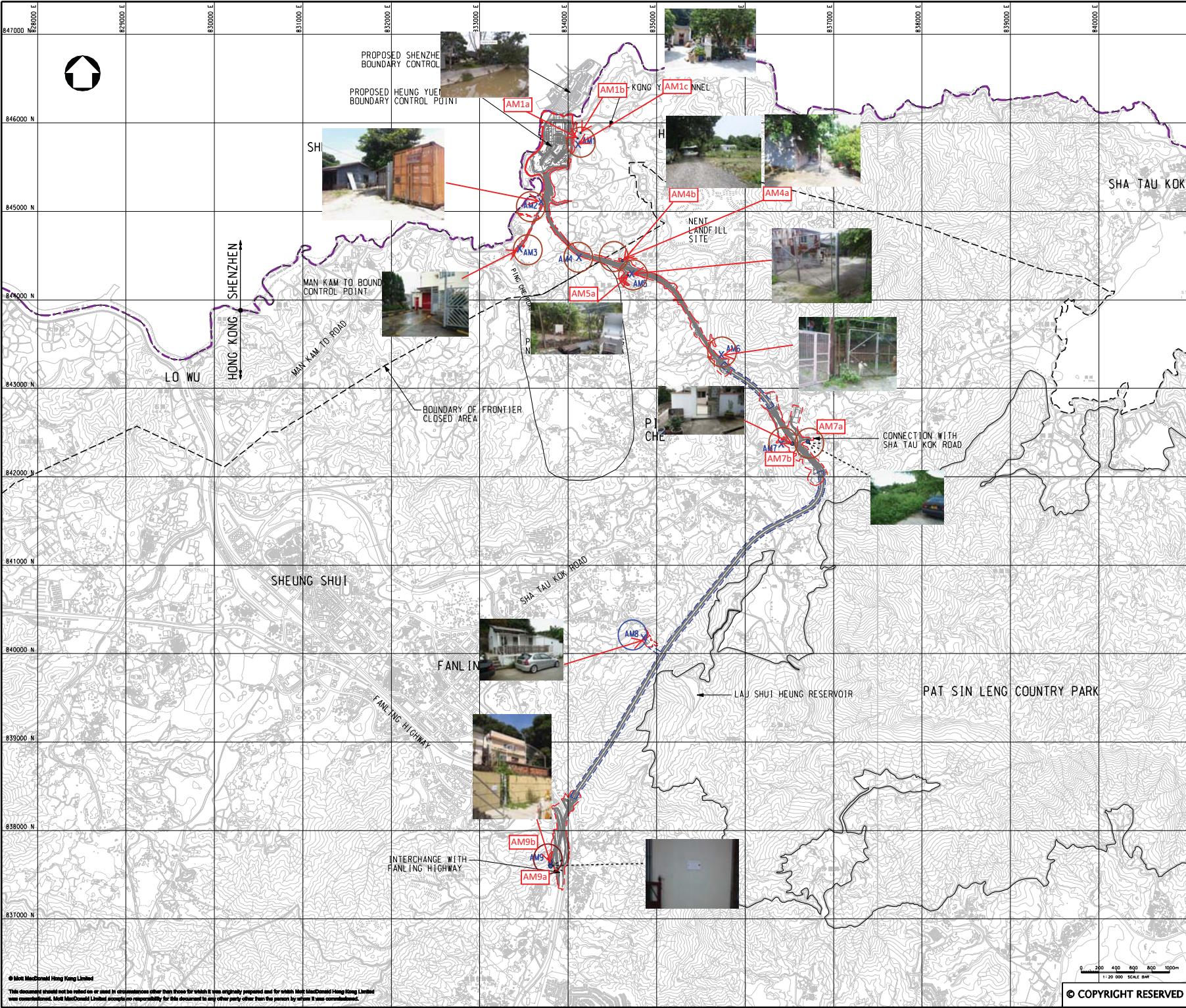
Mott MacDonald Hong Kong Limited  
 This document is the property of Mott MacDonald Hong Kong Limited and is not to be reproduced or used in any form without the prior written permission of Mott MacDonald Hong Kong Limited.  
 This document is the property of Mott MacDonald Hong Kong Limited and is not to be reproduced or used in any form without the prior written permission of Mott MacDonald Hong Kong Limited.





## **Appendix E**

### **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



202' Two Landmark East  
100' Hoo Ming Street  
Kowloon  
Hong Kong  
T +852 2518 5757  
F +852 2827 1823  
W www.mottmac.com.hk



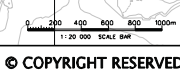
CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT

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

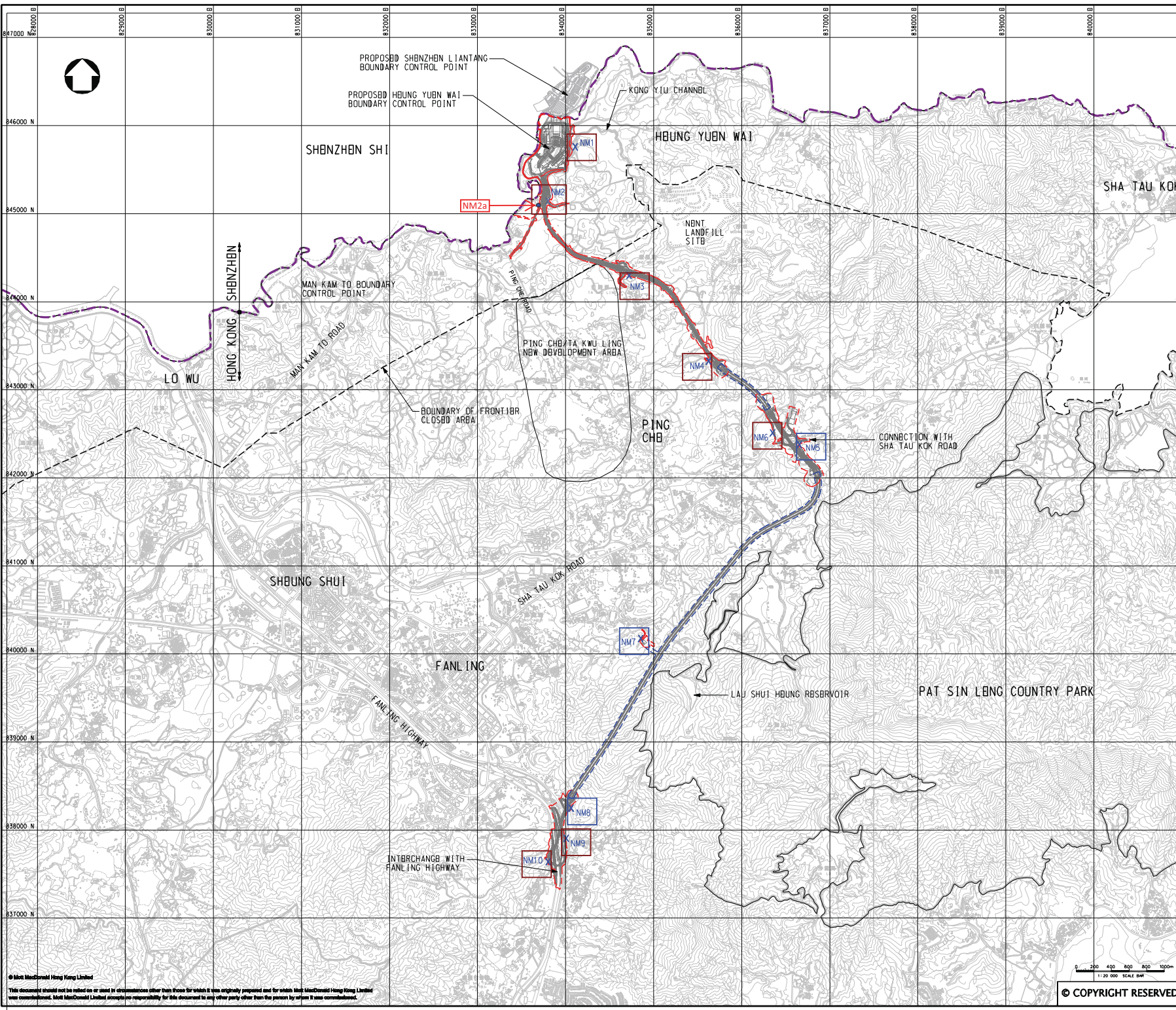
Title  
PROPOSED LOCATION OF CONSTRUCTION  
AIR QUALITY MONITORING STATIONS

Designed	DC	Eng.Chk.	EC	
Drawn	MING	Coordination	EC	
Dep.Chk.	DC	Approved	HT	
Scale at A1	1:20000	Project	255228	Status
Drawing No		CAD file	h:\255228\report\env\em&a\008311\1_21.dgn	PRE
				Rev
				P1

© Mott MacDonald Hong Kong Limited  
This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald Hong Kong Limited  
was commissioned. Mott MacDonald Limited accepts no responsibility for this document to any other party other than the person by whom it was commissioned.








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

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



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



CIVIL ENGINEERING  
AND DEVELOPMENT  
DEPARTMENT

Client

Project

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

Title

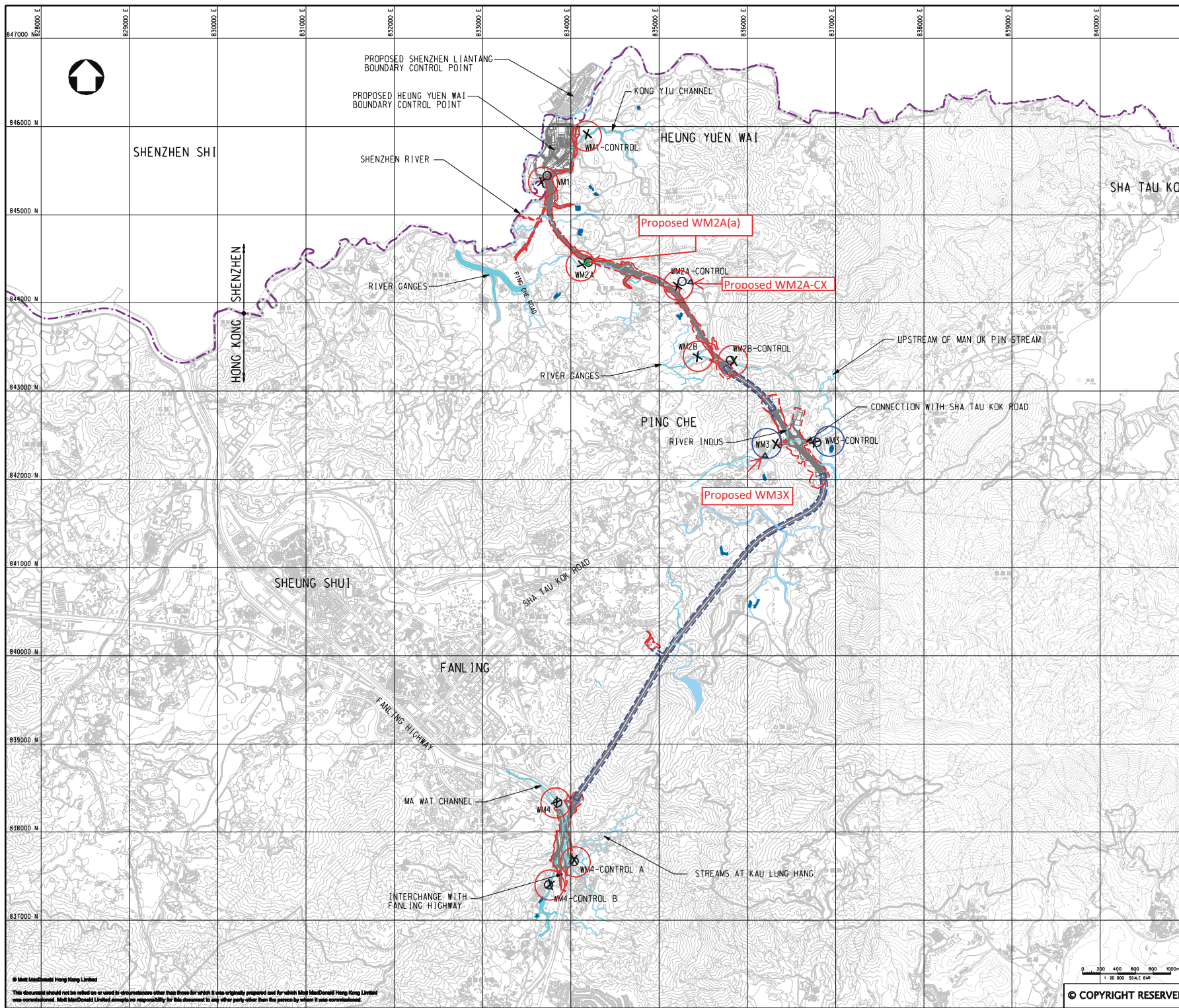
PROPOSED LOCATION OF CONSTRUCTION  
NOISE MONITORING STATIONS

Designed	BC	Eng.Chk.	BC	
Drawn	MING	Coordination	BC	
Sup.Chk.	BC	Approved	HT	
Scale at A1	1:20000	Project	255228	Status
		CAD file	h:\255228\report\env\env\env\0083\1\16_3_1.dgn	PRB
Drawing No				Rev
				P1

© Mott MacDonald Hong Kong Limited

This document should not be relied on or used in circumstances other than those for which it was originally prepared and for which Mott MacDonald Hong Kong Limited was commissioned. Mott MacDonald Limited accepts no responsibility for this document to any other party other than the person by whom it was commissioned.





**LEGEND:**

- BOUNDARY OF HK SAR
- - - 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	
	Eastings	Northings	Eastings	Northings
WM1	833658.835	845171.072	833679	845421
WM1-Control	834185.480	845193.662	834185	845117
WM2A	834182.319	844182.910	834204	844173
WM2A-Control	835205.329	844200.151	835270	844243
WM2B	835434.744	843394.606	835435	843397
WM2B-Control	835645.878	843343.625	835835	843351
WM3	836123.622	842404.377	836124	842402
WM3-Control	836763.415	842423.507	836763	842400
WM4	835840.781	838344.842	835850	838358
WM4-Control A	836018.937	837648.995	836028	837656
WM4-Control B	83709.123	837406.936	837160	837395

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

Location ID	Eastings	Northings
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	Eastings	Northings
WM2A (Original)	834204	844471
WM2A(a) (Proposed)	834191	844474

P2	NOV 10	MING	GENERAL REVISION	HC	HT
P1	OCT 10	MING	FIRST ISSUE	HC	HT

Rev	Date	Drawn	Description	CHK'd	App'd

**Mott MacDonald**

2007 Two Landmark East  
100 New King Street  
Kowloon, Kowloon  
Hong Kong  
T +852 2508 8787  
F +852 2827 1823  
W www.mottmac.com.hk

Client

**CEDD** 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.Ch.	EC
Drawn	MING	Coordination	EC
Dwg.Ch.	HC	Approved	HT

Scale at A1

1:20000

Project

255228

Status

PRE

Drawing No

Appendix C

Rev

P2

## **Appendix F**

### **Calibration Certificate of Monitoring Equipment and HOKLAS-accreditation Certificate of the Testing Laboratory**

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village	Date of Calibration: 28/5/2018
Location ID : AM1c	Next Calibration Date: 28/7/2018
	Technician: Eric

### CONDITIONS

Sea Level Pressure (hPa)	1009	Corrected Pressure (mm Hg)	756.75
Temperature (°C)	30.3	Temperature (K)	303

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.02017
Model-> 5025A	Qstd Intercept -> -0.03691
Serial # -> 1612	

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	-6.7	12.2	1.728	51	50.44	Slope = 32.7488 Intercept = -6.4736 Corr. coeff. = 0.9994
13	4.4	-5.6	10.0	1.567	45	44.51	
10	3.4	-4.6	8.0	1.403	40	39.56	
7	2.2	-3.4	5.6	1.177	32	31.65	
5	1.3	-2.5	3.8	0.973	26	25.72	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

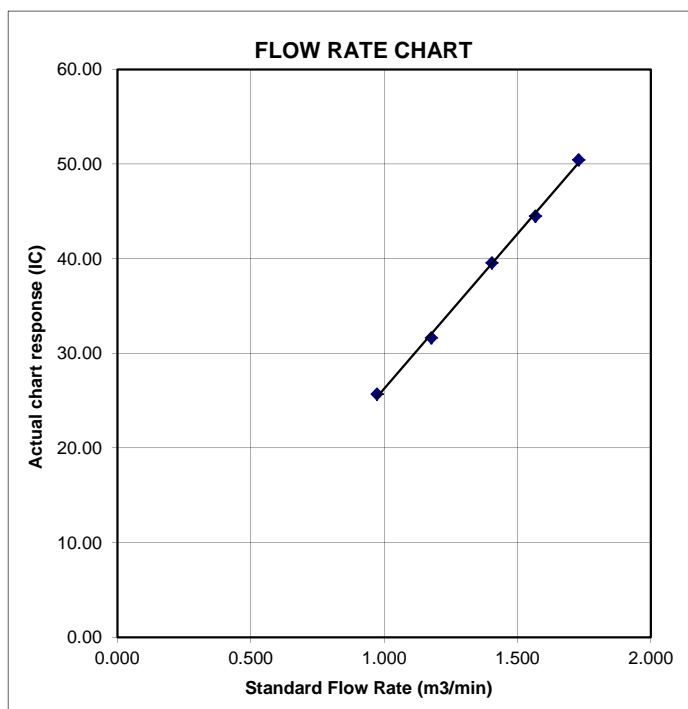
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road  
Location ID : AM2

Date of Calibration: 10/4/2018  
Next Calibration Date: 10/6/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 1014.7  
Temperature (°C) 23.8

Corrected Pressure (mm Hg) 761.025  
Temperature (K) 297

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.752	53	53.14	Slope = 27.8827 Intercept = 3.8583 Corr. coeff. = 0.9982
13	4.9	4.9	9.8	1.572	47	47.13	
10	3.6	3.6	7.2	1.350	41	41.11	
7	2.5	2.5	5.0	1.128	36	36.10	
5	1.5	1.5	3.0	0.878	28	28.08	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760))-b)$$

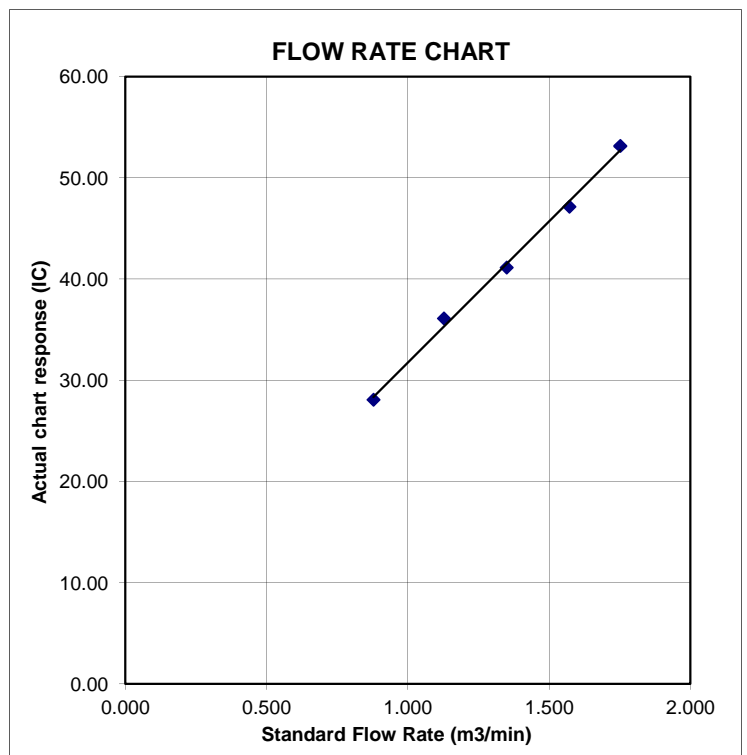
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station  
Location ID : AM3

Date of Calibration: 10/4/2018  
Next Calibration Date: 10/6/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 1014.7  
Temperature (°C) 23.8

Corrected Pressure (mm Hg) 761.025  
Temperature (K) 297

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.766	54	54.15	Slope = 26.7795 Intercept = 6.1535 Corr. coeff. = 0.9963
13	4.8	4.8	9.6	1.556	48	48.13	
10	3.8	3.8	7.6	1.387	42	42.11	
7	2.4	2.4	4.8	1.106	35	35.09	
5	1.2	1.2	2.4	0.787	28	28.08	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

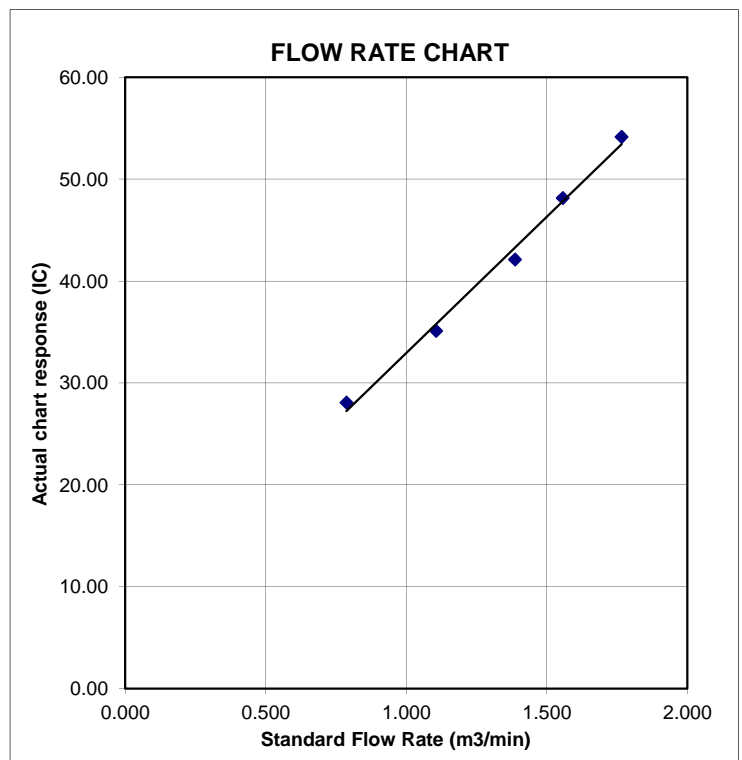
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village	Date of Calibration:	10/4/2018
Location ID : AM4b	Next Calibration Date:	10/6/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1014.7	Corrected Pressure (mm Hg)	761.025
Temperature (°C)	23.8	Temperature (K)	297

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.738	62	62.17	Slope = 34.1193 Intercept = 3.0874 Corr. coeff. = 0.9974
13	4.7	4.7	9.4	1.540	55	55.15	
10	3.7	3.7	7.4	1.368	50	50.13	
7	2.4	2.4	4.8	1.106	42	42.11	
5	1.4	1.4	2.8	0.849	31	31.08	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

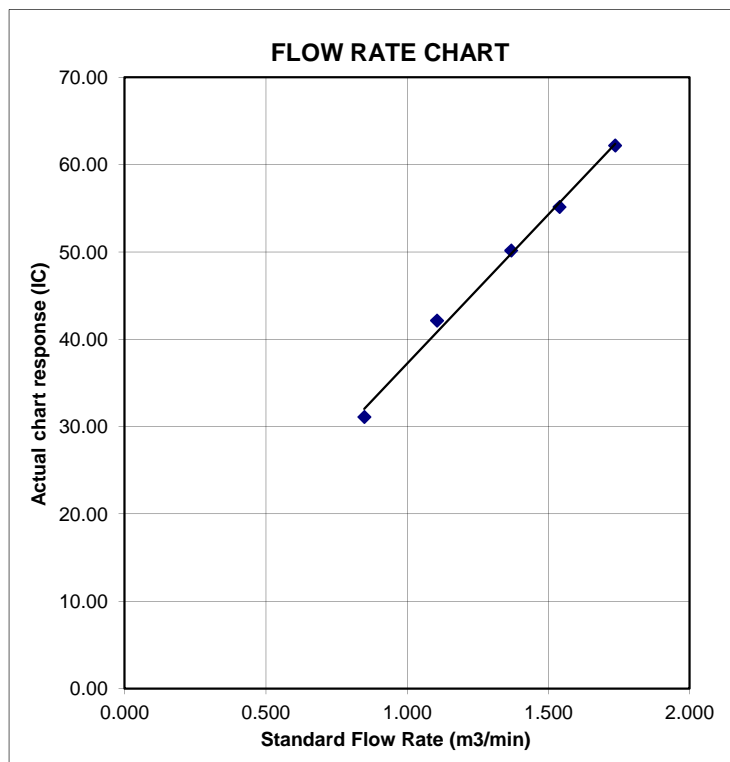
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House  
Location ID : AM5a

Date of Calibration: 10/4/2018  
Next Calibration Date: 10/6/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 1014.7  
Temperature (°C) 23.8

Corrected Pressure (mm Hg) 761.025  
Temperature (K) 297

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.5	6.5	13.0	1.808	50	50.13	Slope = 29.2106 Intercept = -3.5289 Corr. coeff. = 0.9969
13	5.1	5.1	10.2	1.603	43	43.12	
10	4	4	8.0	1.422	37	37.10	
7	2.4	2.4	4.8	1.106	28	28.08	
5	1.5	1.5	3.0	0.878	23	23.06	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

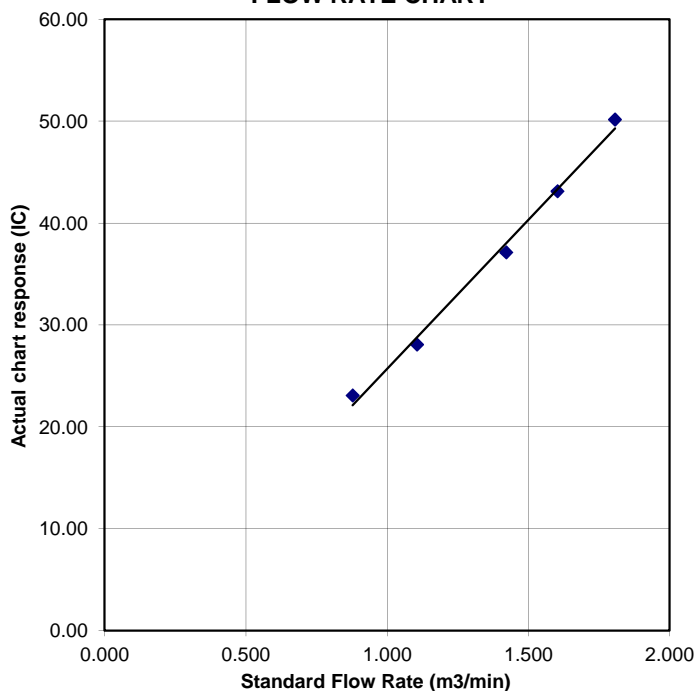
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House  
Location ID : AM6

Date of Calibration: 10/4/2018  
Next Calibration Date: 10/6/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 1014.7  
Temperature (°C) 23.8

Corrected Pressure (mm Hg) 761.025  
Temperature (K) 297

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.738	57	57.15	Slope = 39.4850 Intercept = -11.2216 Corr. coeff. = 0.9983
13	4.7	4.7	9.4	1.540	50	50.13	
10	3.7	3.7	7.4	1.368	43	43.12	
7	2.5	2.5	5.0	1.128	32	32.09	
5	1.5	1.5	3.0	0.878	24	24.06	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

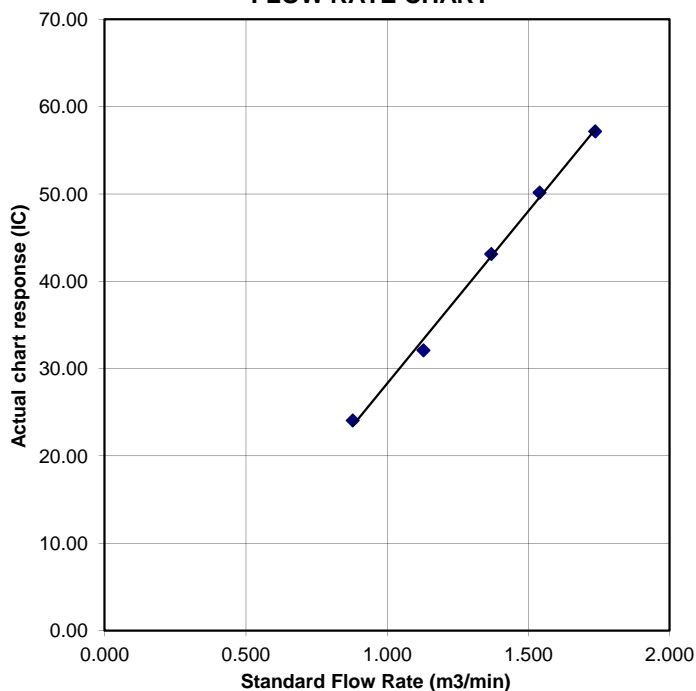
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village  
Location ID : AM7b

Date of Calibration: 10/4/2018  
Next Calibration Date: 10/6/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 1014.7  
Temperature (°C) 23.8

Corrected Pressure (mm Hg) 761.025  
Temperature (K) 297

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.794	62	62.17	Slope = 31.8679 Intercept = 4.3254 Corr. coeff. = 0.9945
13	4.8	4.8	9.6	1.556	54	54.15	
10	3.9	3.9	7.8	1.404	47	47.13	
7	2.3	2.3	4.6	1.083	40	40.11	
5	1.5	1.5	3.0	0.878	32	32.09	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

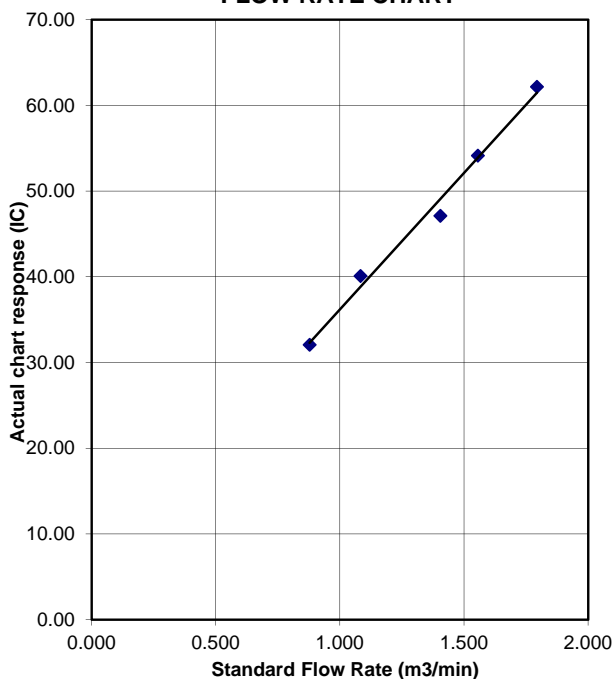
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4

Location ID : AM8

Date of Calibration: 10/4/2018

Next Calibration Date: 10/6/2018

Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)

1014.7

Temperature (°C)

23.8

Corrected Pressure (mm Hg)

761.025

Temperature (K)

297

### CALIBRATION ORIFICE

Make-> TISCH

Model-> 5025A

Serial # -> 1612

Qstd Slope ->

2.02017

Qstd Intercept ->

-0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.9	5.9	11.8	1.723	57	57.15	Slope = 41.7043 Intercept = -15.3326 Corr. coeff. = 0.9975
13	4.9	4.9	9.8	1.572	50	50.13	
10	3.8	3.8	7.6	1.387	41	41.11	
7	2.3	2.3	4.6	1.083	31	31.08	
5	1.6	1.6	3.2	0.906	22	22.06	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

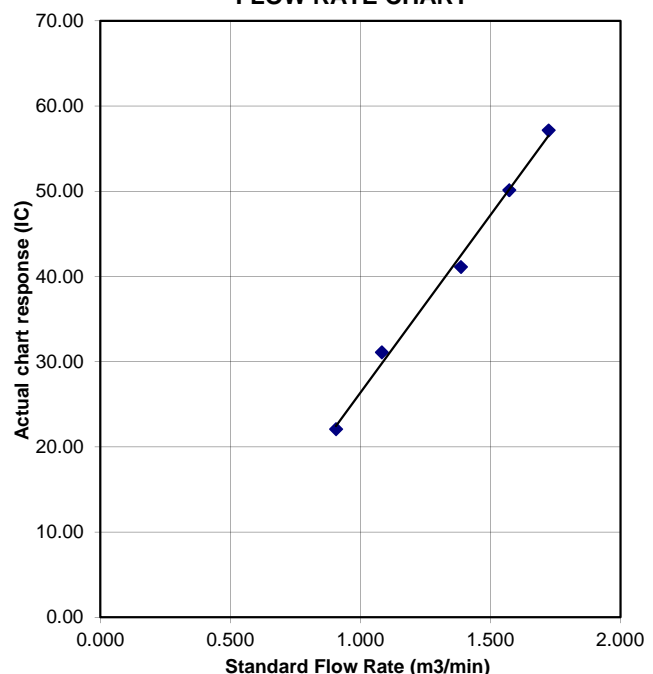
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80	Date of Calibration:	10/4/2018
Location ID : AM9b	Next Calibration Date:	10/6/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	1014.7	Corrected Pressure (mm Hg)	761.025
Temperature (°C)	23.8	Temperature (K)	297

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.02017
Model-> 5025A	Qstd Intercept ->	-0.03691
Serial # -> 1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.780	55	55.15	Slope = 29.4730 Intercept = 1.6349 Corr. coeff. = 0.9935
13	5.1	5.1	10.2	1.603	48	48.13	
10	3.8	3.8	7.6	1.387	41	41.11	
7	2.3	2.3	4.6	1.083	35	35.09	
5	1.5	1.5	3.0	0.878	27	27.07	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

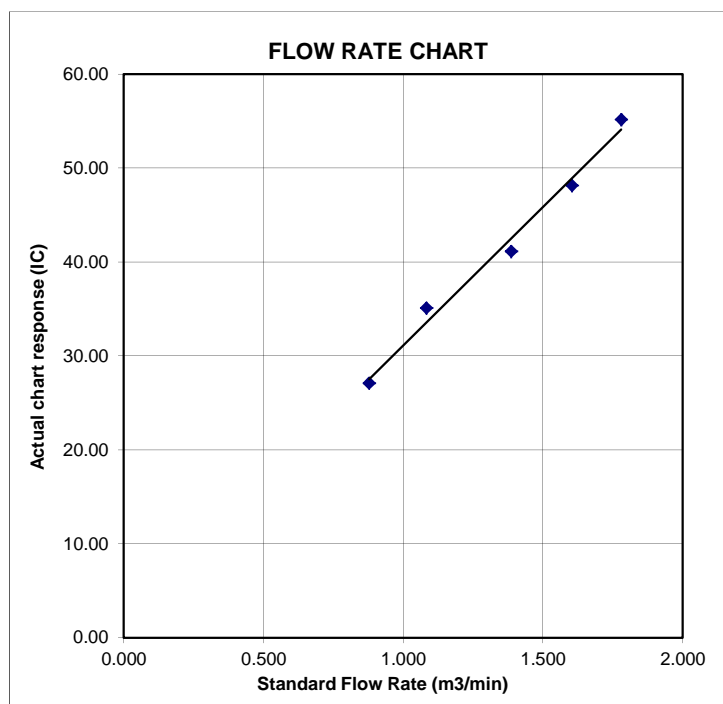
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road  
Location ID : AM2

Date of Calibration: 9/6/2018  
Next Calibration Date: 9/8/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 999.1  
Temperature (°C) 28.6

Corrected Pressure (mm Hg) 749.325  
Temperature (K) 302

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.639	50	49.35	Slope = 32.9618 Intercept = -4.4771 Corr. coeff. = 0.9996
13	4.3	4.3	8.6	1.451	44	43.43	
10	3.3	3.3	6.6	1.273	38	37.51	
7	2.1	2.1	4.2	1.020	30	29.61	
5	1.3	1.3	2.6	0.806	22	21.71	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

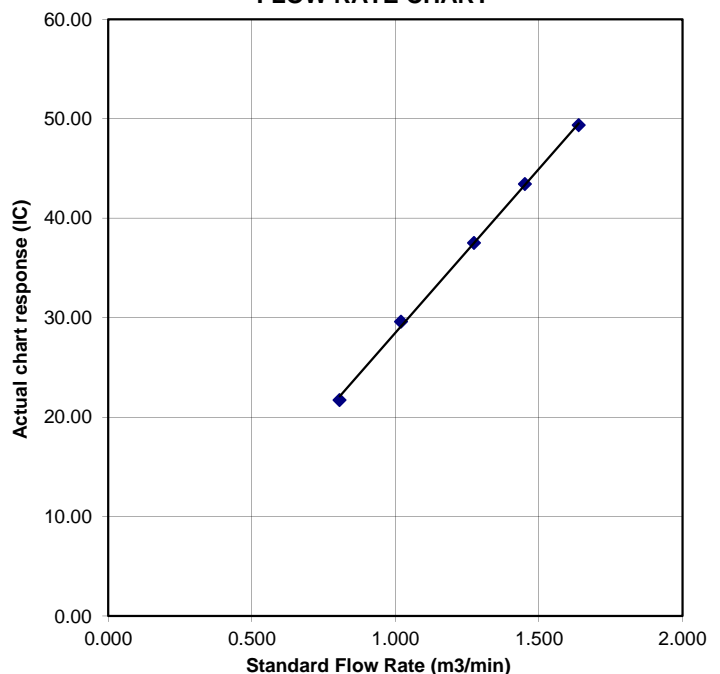
Qstd = standard flow rate  
IC = corrected chart responses  
I = actual chart response  
m = calibrator Qstd slope  
b = calibrator Qstd intercept  
Ta = actual temperature during calibration ( deg K )  
Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760))]-b)$$

m = sampler slope  
b = sampler intercept  
I = chart response  
Tav = daily average temperature  
Pav = daily average pressure

**FLOW RATE CHART**





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station  
Location ID : AM3

Date of Calibration: 9/6/2018  
Next Calibration Date: 9/8/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	999.1	Corrected Pressure (mm Hg)	749.325
Temperature (°C)	28.6	Temperature (K)	302

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.639	50	49.35	Slope = 28.6872 Intercept = 2.7120 Corr. coeff. = 0.9990
13	4.4	4.4	8.8	1.468	46	45.40	
10	3.4	3.4	6.8	1.292	40	39.48	
7	2.3	2.3	4.6	1.066	34	33.56	
5	1.3	1.3	2.6	0.806	26	25.66	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760))]-b)$$

m = sampler slope

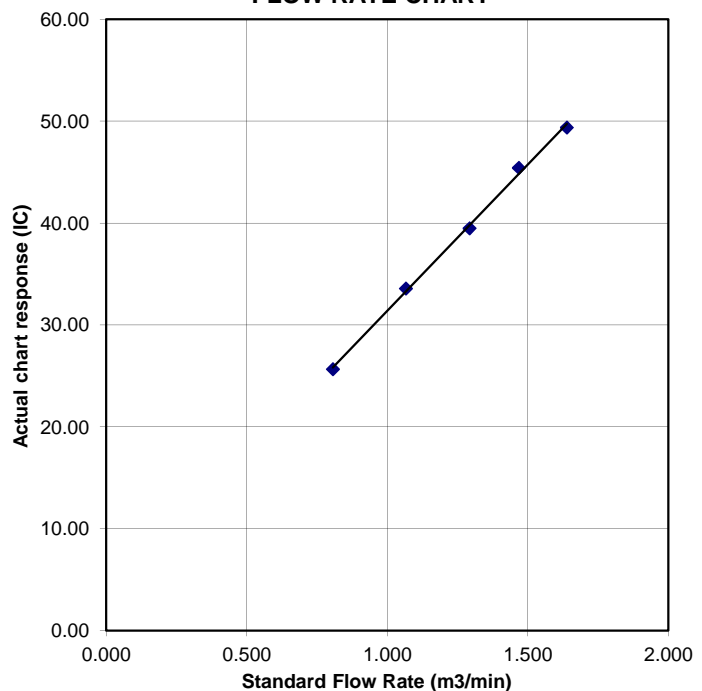
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village

Location ID : AM4b

Date of Calibration: 9/6/2018

Next Calibration Date: 9/8/2018

Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)

999.1

Temperature (°C)

28.6

Corrected Pressure (mm Hg)

749.325

Temperature (K)

302

### CALIBRATION ORIFICE

Make-> TISCH

Model-> 5025A

Serial # -> 1612

Qstd Slope ->

2.02017

Qstd Intercept ->

-0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.639	52	51.32	Slope = 31.4046
13	4.8	4.8	9.6	1.532	46	45.40	Intercept = -1.8086
10	3.8	3.8	7.6	1.365	40	39.48	Corr. coeff. = 0.9932
7	2.2	2.2	4.4	1.043	32	31.58	
5	1.3	1.3	2.6	0.806	24	23.69	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

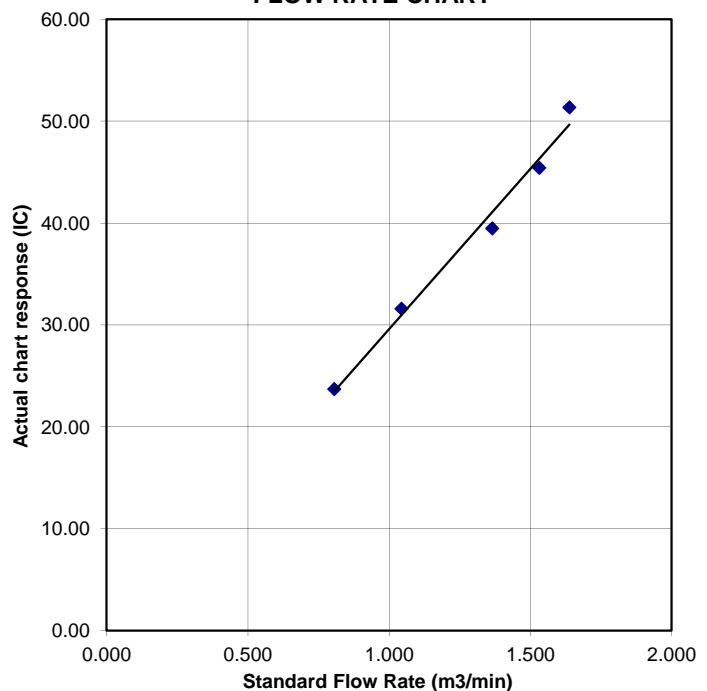
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House  
Location ID : AM5a

Date of Calibration: 9/6/2018  
Next Calibration Date: 9/8/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 999.1  
Temperature (°C) 28.6

Corrected Pressure (mm Hg) 749.325  
Temperature (K) 302

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.8	5.8	11.6	1.682	42	41.45	Slope = 28.4657 Intercept = -6.6993 Corr. coeff. = 0.9986
13	4.9	4.9	9.8	1.548	38	37.51	
10	3.4	3.4	6.8	1.292	30	29.61	
7	2.1	2.1	4.2	1.020	22	21.71	
5	1.4	1.4	2.8	0.836	18	17.77	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

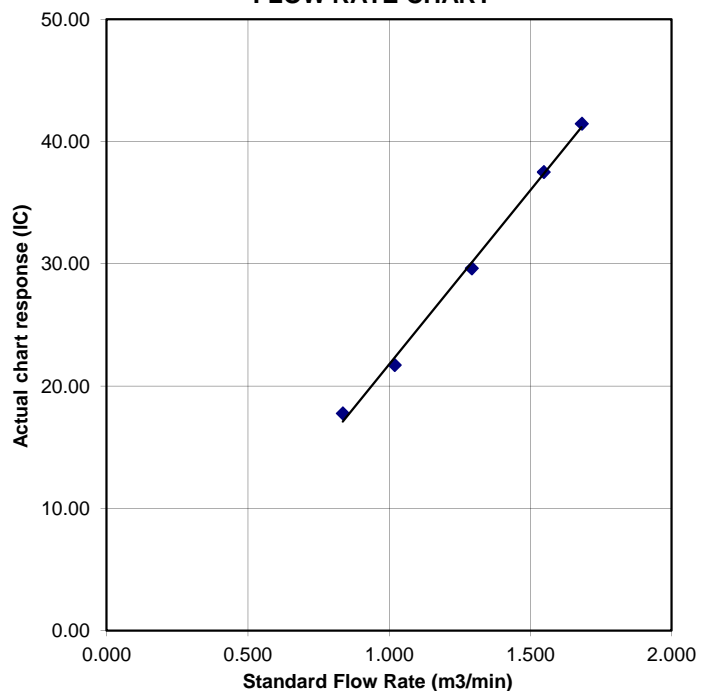
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House  
Location ID : AM6

Date of Calibration: 9/6/2018  
Next Calibration Date: 9/8/2018  
Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa) 999.1  
Temperature (°C) 28.6

Corrected Pressure (mm Hg) 749.325  
Temperature (K) 302

### CALIBRATION ORIFICE

Make-> TISCH  
Model-> 5025A  
Serial # -> 1612

Qstd Slope -> 2.02017  
Qstd Intercept -> -0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.4	5.4	10.8	1.624	54	53.30	Slope = 36.3047 Intercept = -5.7026 Corr. coeff. = 0.9963
13	4.2	4.2	8.4	1.434	46	45.40	
10	3.2	3.2	6.4	1.254	42	41.45	
7	2	2	4.0	0.995	30	29.61	
5	1.3	1.3	2.6	0.806	24	23.69	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

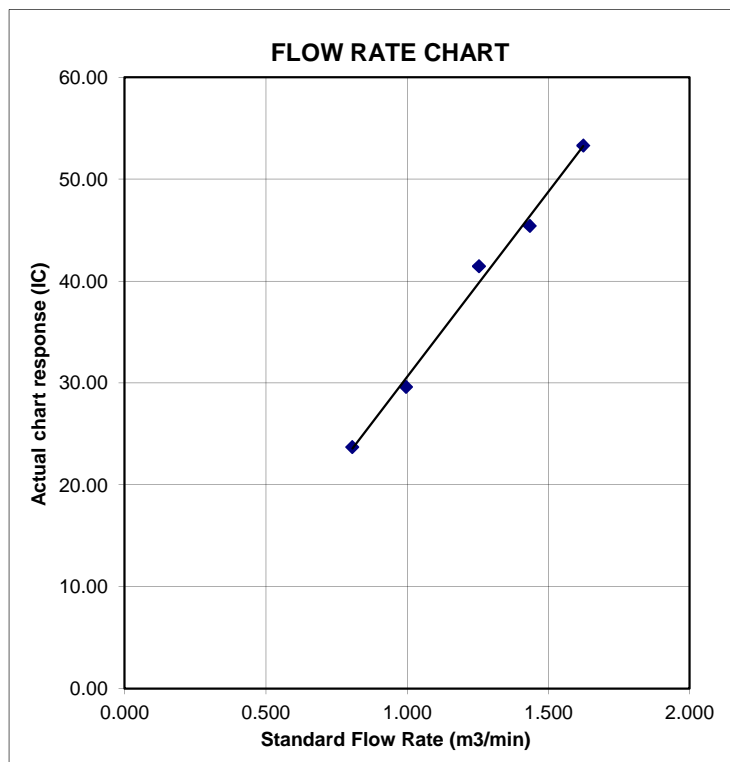
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village	Date of Calibration: 9/6/2018
Location ID : AM7b	Next Calibration Date: 9/8/2018
	Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)	999.1	Corrected Pressure (mm Hg)	749.325
Temperature (°C)	28.6	Temperature (K)	302

### CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.02017
Model-> 5025A	Qstd Intercept -> -0.03691
Serial # -> 1612	

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.639	56	55.27	Slope = 37.5797 Intercept = -5.9717 Corr. coeff. = 0.9989
13	4.3	4.3	8.6	1.451	50	49.35	
10	3.4	3.4	6.8	1.292	43	42.44	
7	2.2	2.2	4.4	1.043	33	32.57	
5	1.3	1.3	2.6	0.806	25	24.68	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

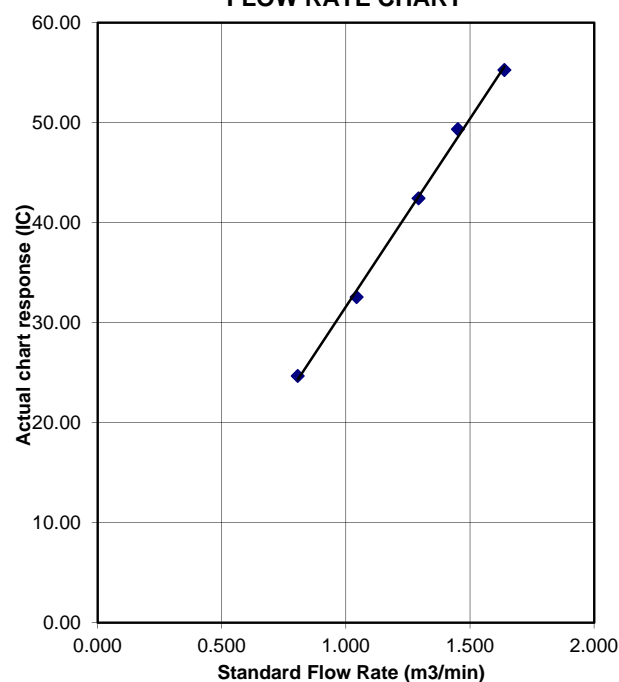
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4

Location ID : AM8

Date of Calibration: 9/6/2018

Next Calibration Date: 9/8/2018

Technician: Fai So

### CONDITIONS

Sea Level Pressure (hPa)

999.1

Temperature (°C)

28.6

Corrected Pressure (mm Hg)

749.325

Temperature (K)

302

### CALIBRATION ORIFICE

Make-> TISCH

Model-> 5025A

Serial # -> 1612

Qstd Slope ->

2.02017

Qstd Intercept ->

-0.03691

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.668	58	57.25	Slope = 41.4013 Intercept = -11.6316 Corr. coeff. = 0.9960
13	4.6	4.6	9.2	1.500	50	49.35	
10	3.4	3.4	6.8	1.292	44	43.43	
7	2.1	2.1	4.2	1.020	32	31.58	
5	1.4	1.4	2.8	0.836	22	21.71	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

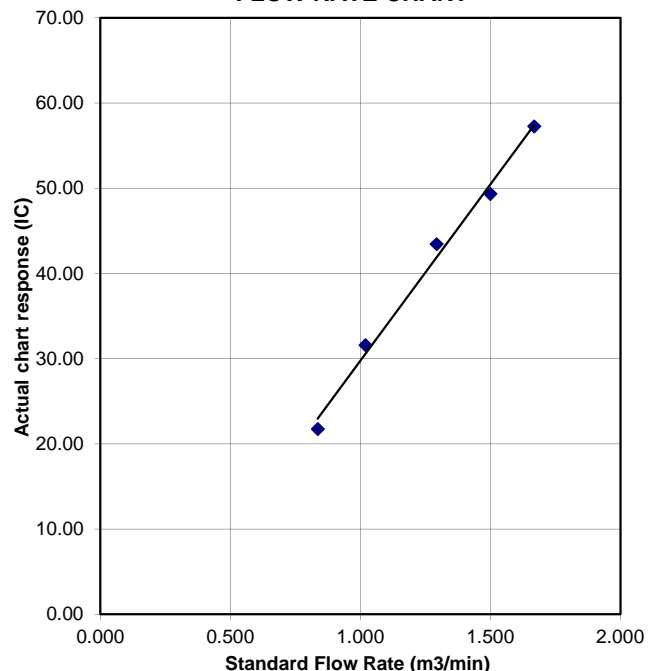
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80	Date of Calibration:	9/6/2018
Location ID : AM9b	Next Calibration Date:	9/8/2018
	Technician:	Fai So

### CONDITIONS

Sea Level Pressure (hPa)	999.1	Corrected Pressure (mm Hg)	749.325
Temperature (°C)	28.6	Temperature (K)	302

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Serial # ->	1612		

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.639	53	52.31	Slope = 36.1791 Intercept = -6.2482 Corr. coeff. = 0.9961
13	4.2	4.2	8.4	1.434	46	45.40	
10	3.2	3.2	6.4	1.254	41	40.47	
7	2	2	4.0	0.995	31	30.60	
5	1.3	1.3	2.6	0.806	22	21.71	

#### Calculations :

$$Q_{std} = 1/m[\sqrt{(H2O(Pa/P_{std})(T_{std}/T_a))}-b]$$

$$IC = I[\sqrt{(Pa/P_{std})(T_{std}/T_a)}]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I)[\sqrt{(298/T_{av})(P_{av}/760)}]-b)$$

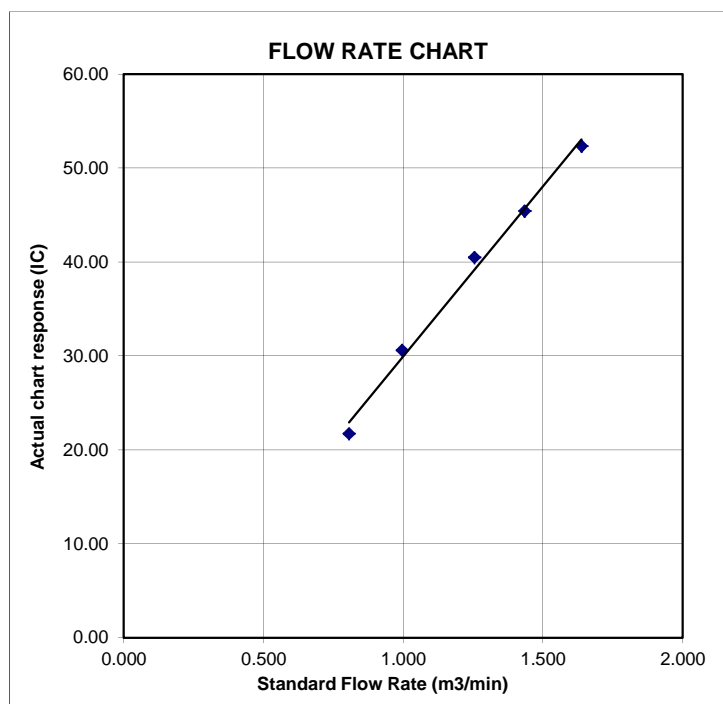
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





# Certificate of Calibration

## Calibration Certification Information

Cal. Date: February 13, 2018

Rootsmeter S/N: 438320

Ta: 293

°K

Operator: Jim Tisch

Pa: 763.3

mm Hg

Calibration Model #: TE-5025A

Calibrator S/N: 1612

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.3970	3.2	2.00
2	3	4	1	1.0000	6.3	4.00
3	5	6	1	0.8900	7.9	5.00
4	7	8	1	0.8440	8.7	5.50
5	9	10	1	0.7010	12.6	8.00

## Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left( \frac{Ta}{Pa} \right)}$ (y-axis)
1.0172	0.7281	1.4293	0.9958	0.7128	0.8762
1.0130	1.0130	2.0213	0.9917	0.9917	1.2392
1.0109	1.1358	2.2599	0.9896	1.1120	1.3854
1.0098	1.1964	2.3702	0.9886	1.1713	1.4530
1.0046	1.4331	2.8586	0.9835	1.4030	1.7524
<b>QSTD</b>	m=	<b>2.02017</b>	<b>QA</b>	m=	<b>1.26500</b>
	b=	<b>-0.03691</b>		b=	<b>-0.02263</b>
	r=	<b>0.99988</b>		r=	<b>0.99988</b>

## Calculations

$$Vstd = \Delta Vol / ((Pa - \Delta P) / Pstd) (Tstd / Ta)$$

$$Va = \Delta Vol / ((Pa - \Delta P) / Pa)$$

$$Qstd = Vstd / \Delta Time$$

$$Qa = Va / \Delta Time$$

For subsequent flow rate calculations:

$$Qstd = 1/m \left( \left( \sqrt{\Delta H \left( \frac{Pa}{Pstd} \right) \left( \frac{Tstd}{Ta} \right)} \right) - b \right)$$

$$Qa = 1/m \left( \left( \sqrt{\Delta H \left( \frac{Ta}{Pa} \right)} \right) - b \right)$$

## Standard Conditions

Tstd: 298.15 °K

Pstd: 760 mm Hg

## Key

ΔH: calibrator manometer reading (in H2O)

ΔP: rootsmeter manometer reading (mm Hg)

Ta: actual absolute temperature (°K)

Pa: actual barometric pressure (mm Hg)

b: intercept

m: slope

## RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30



## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
Manufacturer: Sibata LD-3B  
Serial No. 2X6145  
Equipment Ref: EQ105  
Job Order HK1815073

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
Location & Location ID: AUES office (calibration room)  
Equipment Ref: HVS 018  
Last Calibration Date: 1 December 2017

### Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	511	4.0
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	598	4.9
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2111	16.5

Sensitivity Adjustment Scale Setting (Before Calibration) 583 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 583 (CPM)

### Linear Regression of Y or X

Slope (K-factor): 0.0022

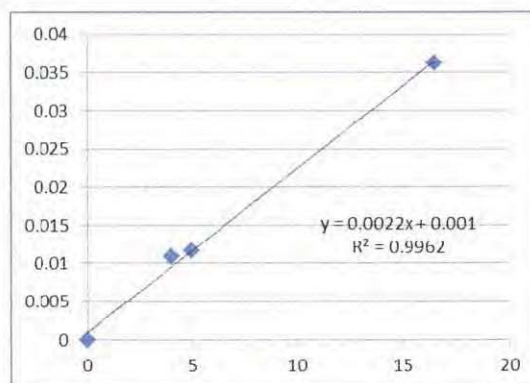
Correlation Coefficient 0.9981

Date of Issue 9 January 2018

### Remarks:

1. **Strong** Correlation ( $R > 0.8$ )
2. Factor 0.0022 should be apply for TSP monitoring

\*If  $R < 0.5$ , repair or re-verification is required for the equipment



Operator : Martin Li Signature :  Date : 9 January 2018

QC Reviewer : Ben Tam Signature :  Date : 9 January 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 1-Dec-17
Location ID :	Calibration Room	Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	21.2	Temperature (K)	294

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

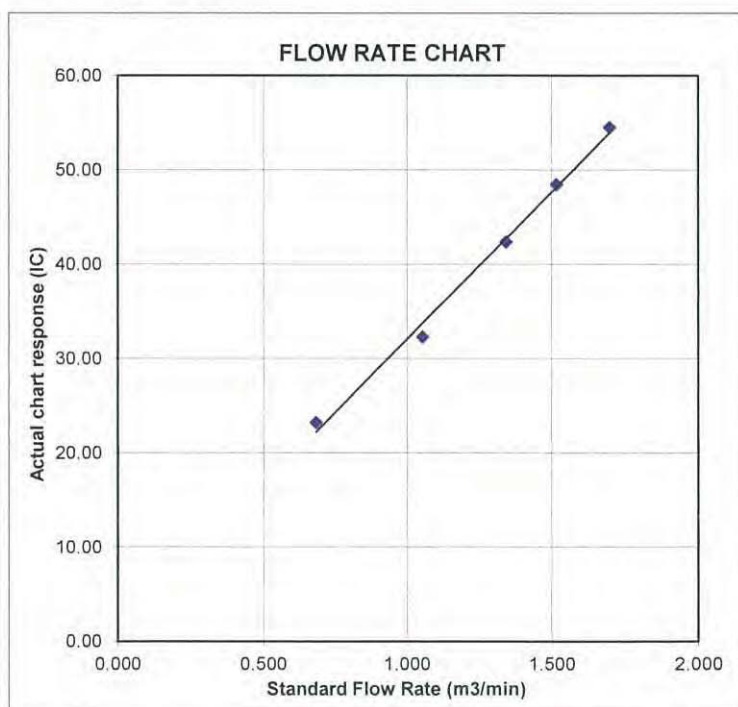
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
Manufacturer: Sibata LD-3B  
Serial No. 366409  
Equipment Ref: EQ109  
Job Order HK1815078

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
Location & Location ID: AUES office (calibration room)  
Equipment Ref: HVS 018  
Last Calibration Date: 1 December 2017

### Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	474	3.7
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	577	4.8
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2097	16.4

Sensitivity Adjustment Scale Setting (Before Calibration) 520 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 521 (CPM)

### Linear Regression of Y or X

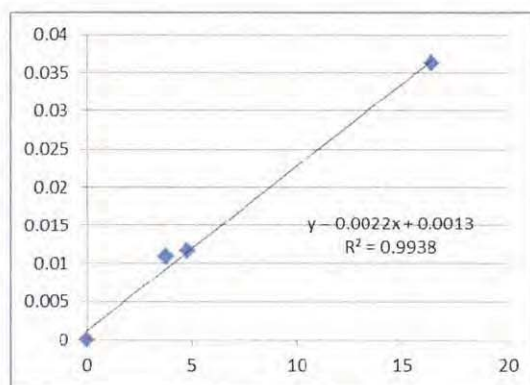
Slope (K-factor): 0.0022

Correlation Coefficient 0.9967

Date of Issue 9 January 2018

### Remarks:

1. **Strong** Correlation ( $R > 0.8$ )
  2. Factor 0.0022 should be apply for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment



Operator: Martin Li Signature:  Date: 9 January 2018

QC Reviewer: Ben Tam Signature:  Date: 9 January 2018

## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
Manufacturer: Sibata LD-3B  
Serial No. 366410  
Equipment Ref: EQ110  
Job Order HK1815072

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
Location & Location ID: AUES office (calibration room)  
Equipment Ref: HVS 018  
Last Calibration Date: 1 December 2017

### Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	498	3.9
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	571	4.7
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2095	16.4

Sensitivity Adjustment Scale Setting (Before Calibration) 670 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 669 (CPM)

### Linear Regression of Y or X

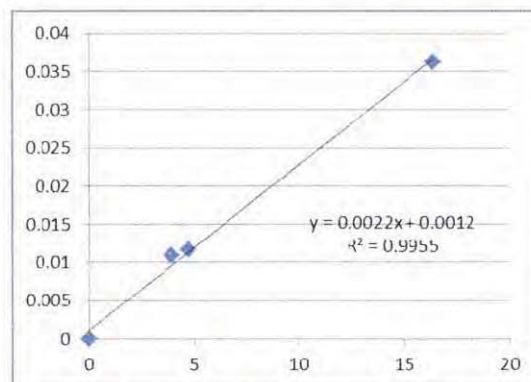
Slope (K-factor): 0.0022

Correlation Coefficient 0.9977

Date of Issue 9 January 2018

### Remarks:

1. **Strong** Correlation ( $R > 0.8$ )
  2. Factor 0.0022 should be apply for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment



Operator : Martin Li Signature :  Date : 9 January 2018

QC Reviewer : Ben Tam Signature :  Date : 9 January 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung  
 Location ID : Calibration Room

Date of Calibration: 1-Dec-17  
 Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa) 1018.8  
 Temperature (°C) 21.2

Corrected Pressure (mm Hg) 764.1  
 Temperature (K) 294

### CALIBRATION ORIFICE

Make-> TISCH  
 Model-> 5025A  
 Calibration Date-> 28-Feb-17

Qstd Slope -> 2.11965  
 Qstd Intercept -> -0.02696  
 Expiry Date-> 28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

#### Calculations :

$$Q_{std} = 1/m[\sqrt{H_2O(P_a/P_{std})(T_{std}/T_a)} - b]$$

$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\sqrt{298/T_{av}}(P_{av}/760)] - b)$$

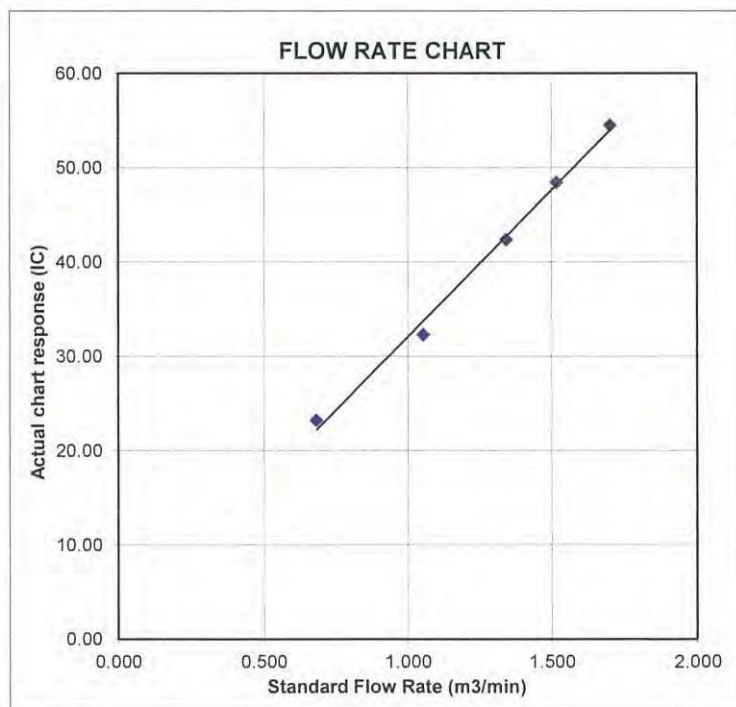
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 1-Dec-17
Location ID :	Calibration Room	Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	21.2	Temperature (K)	294

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta)) - b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)] - b)$$

m = sampler slope

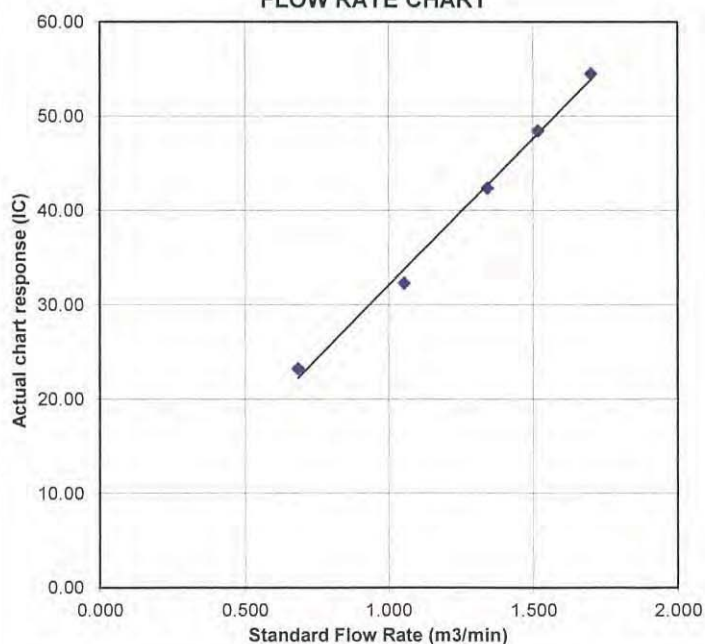
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
Manufacturer: Sibata LD-3B  
Serial No. 3Y6503  
Equipment Ref: EQ112  
Job Order HK1815077

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
Location & Location ID: AUES office (calibration room)  
Equipment Ref: HVS 018  
Last Calibration Date: 1 December 2017

### Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	521	4.1
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	674	5.6
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2077	16.3

Sensitivity Adjustment Scale Setting (Before Calibration) 661 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 661 (CPM)

### Linear Regression of Y or X

Slope (K-factor): 0.0022

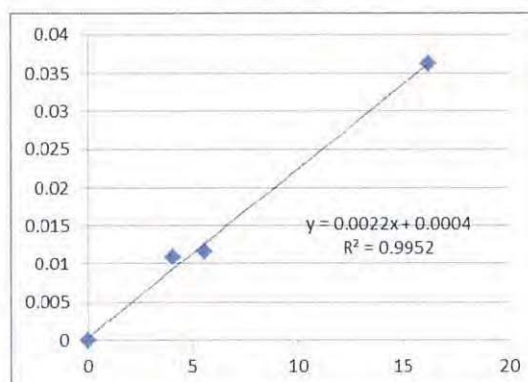
Correlation Coefficient 0.9976

Date of Issue 9 January 2018

### Remarks:

1. **Strong** Correlation ( $R > 0.8$ )
2. Factor 0.0022 should be apply for TSP monitoring

\*If  $R < 0.5$ , repair or re-verification is required for the equipment



Operator: Martin Li Signature:  Date: 9 January 2018

QC Reviewer: Ben Tam Signature:  Date: 9 January 2018



## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 1-Dec-17
Location ID :	Calibration Room	Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	21.2	Temperature (K)	294

### CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Calibration Date->	28-Feb-17	Expiry Date->	28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

m = sampler slope

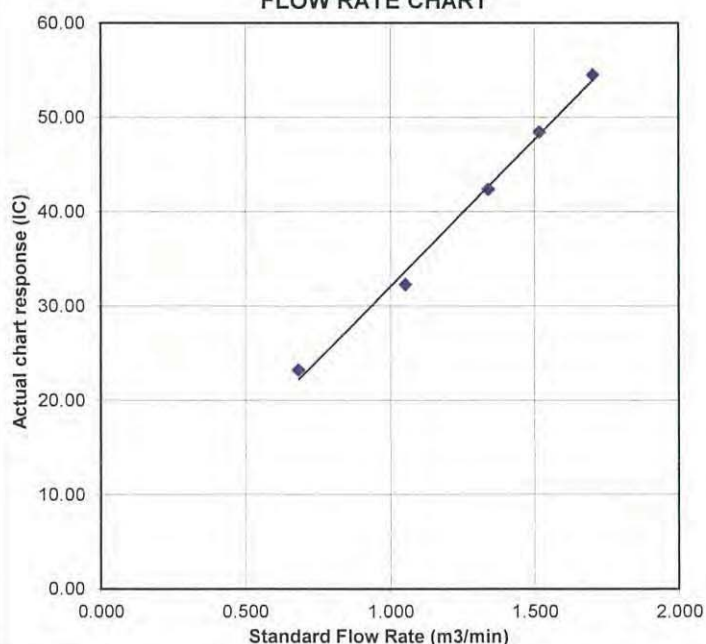
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

**FLOW RATE CHART**



## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
Manufacturer: Sibata LD-3B  
Serial No. 3Y6505  
Equipment Ref: EQ114  
Job Order HK1815074

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
Location & Location ID: AUES office (calibration room)  
Equipment Ref: HVS 018  
Last Calibration Date: 1 December 2017

### Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	677	5.3
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	601	5.0
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2064	16.2

Sensitivity Adjustment Scale Setting (Before Calibration) 591 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 590 (CPM)

### Linear Regression of Y or X

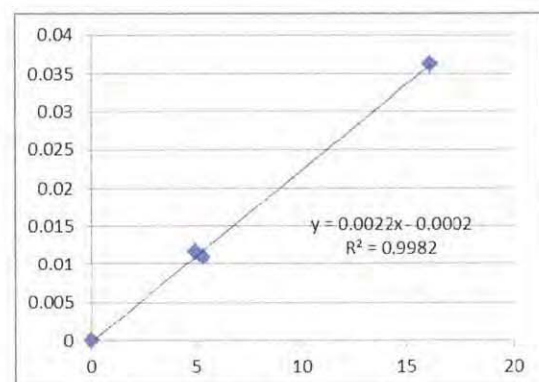
Slope (K-factor): 0.0022

Correlation Coefficient 0.9991

Date of Issue 9 January 2018

### Remarks:

1. **Strong** Correlation ( $R > 0.8$ )
  2. Factor 0.0022 should be apply for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment



Operator : Martin Li Signature :  Date : 9 January 2018

QC Reviewer : Ben Tam Signature :  Date : 9 January 2018

## TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung  
 Location ID : Calibration Room

Date of Calibration: 1-Dec-17  
 Next Calibration Date: 1-Mar-18

### CONDITIONS

Sea Level Pressure (hPa) 1018.8  
 Temperature (°C) 21.2

Corrected Pressure (mm Hg) 764.1  
 Temperature (K) 294

### CALIBRATION ORIFICE

Make-> TISCH  
 Model-> 5025A  
 Calibration Date-> 28-Feb-17

Qstd Slope -> 2.11965  
 Qstd Intercept -> -0.02696  
 Expiry Date-> 28-Feb-18

### CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

#### Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration ( deg K )

Pstd = actual pressure during calibration ( mm Hg )

#### For subsequent calculation of sampler flow:

$$1/m((I) [\text{Sqrt}(298/Tav)(Pav/760)]-b)$$

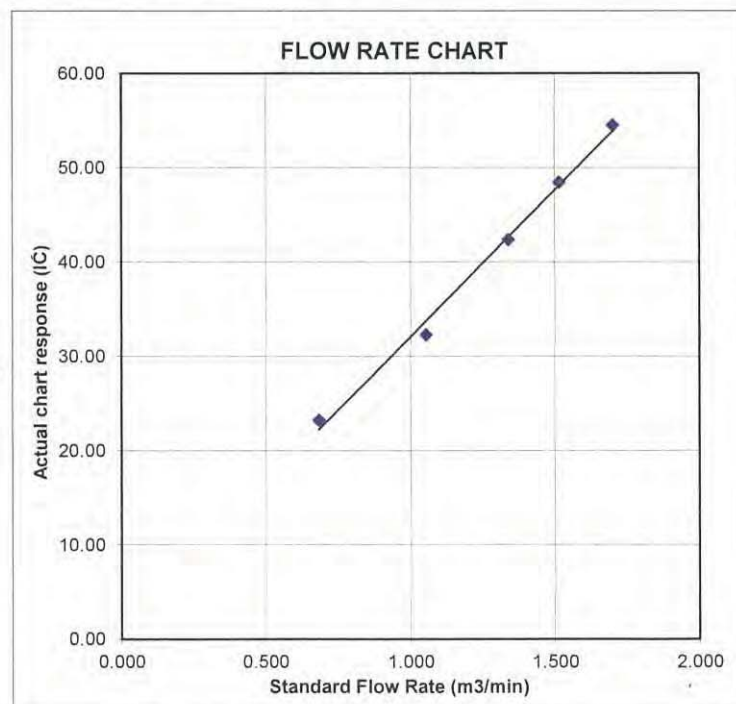
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





# Certificate of Calibration

## 校正證書

Certificate No. : C174096  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 14 July 2017

Description / 儀器名稱 : Integrating Sound Level Meter (EQ008)  
Manufacturer / 製造商 : Brüel & Kjær  
Model No. / 型號 : 2238  
Serial No. / 編號 : 2285690  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 July 2017


### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

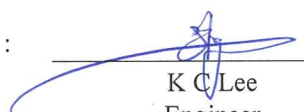
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By  
測試

  
H T Wong  
Technical Officer

Certified By  
核證

  
K C Lee  
Engineer

Date of Issue :  
簽發日期

25 July 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C174096  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	93.8

- 6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.1	± 0.7

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.1 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C174096  
證書編號

### 6.2 Time Weighting

#### 6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.1	Ref.
	L <sub>ASP</sub>		S			94.1	± 0.1
	L <sub>AIP</sub>		I			94.1	± 0.1

#### 6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L <sub>AFP</sub>	A	F	106.0	Continuous	106.0	Ref.
	L <sub>AFMax</sub>				200 ms	105.0	-1.0 ± 1.0
	L <sub>ASP</sub>	S	Continuous		106.0	Ref.	
	L <sub>ASMax</sub>		500 ms		102.0	-4.1 ± 1.0	

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>AFP</sub>	A	F	94.00	31.5 Hz	54.7	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



# Certificate of Calibration

## 校正證書

Certificate No. : C174096  
證書編號

### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>CFP</sub>	C	F	94.00	31.5 Hz	91.1	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

### 6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L <sub>Aeq</sub>	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
						1/10 <sup>2</sup>		90	90.1	± 0.5
			60 sec.			1/10 <sup>3</sup>		80	79.8	± 1.0
			5 min.			1/10 <sup>4</sup>		70	69.8	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812706

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB : 31.5 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



# Certificate of Calibration

## 校正證書

Certificate No. : C174098

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 14 July 2017

Description / 儀器名稱 : Integrating Sound Level Meter (EQ010)

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 2238

Serial No. / 編號 : 2285721

Supplied By / 委託者 : Action-United Environmental Services and Consulting

Unit A, 20/F., Gold King Industrial Building,

35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 July 2017

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification.

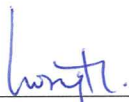
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA


Tested By  
測試

:

  
H T Wong  
Technical Officer

Certified By  
核證

:

  
K C Lee  
Engineer

Date of Issue  
簽發日期

:

25 July 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C174098  
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.
- Results :

### 5.1 Sound Pressure Level

#### 5.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT	IEC 60651
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Type 1 Spec. (dB)
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0	± 0.7

#### 5.1.2 Linearity

UUT Setting				Applied Value		UUT
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

### 5.2 Time Weighting

#### 5.2.1 Continuous Signal

UUT Setting				Applied Value		UUT	IEC 60651
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Type 1 Spec. (dB)
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0	Ref.
	L <sub>ASP</sub>		S			94.0	± 0.1
	L <sub>AIP</sub>		I			94.1	± 0.1

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C174098  
證書編號

### 5.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L <sub>AFP</sub>	A	F	106.0	Continuous	106.0	Ref.
	L <sub>AFMax</sub>				200 ms	105.0	-1.0 ± 1.0
	L <sub>ASP</sub>	S	Continuous		106.0	Ref.	
	L <sub>ASMax</sub>		500 ms		102.0	-4.1 ± 1.0	

### 5.3 Frequency Weighting

#### 5.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>AFP</sub>	A	F	94.00	31.5 Hz	54.7	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.7	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.8	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

#### 5.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>CFP</sub>	C	F	94.00	31.5 Hz	91.2	-3.0 ± 1.5
					63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



# Certificate of Calibration 校正證書

Certificate No. : C174098  
證書編號

## 5.4 Time Averaging

UUT Setting				Applied Value					UUT	IEC 60804
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)	Reading (dB)	Type 1 Spec. (dB)
30 - 110	L <sub>Aeq</sub>	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
						1/10 <sup>2</sup>		90	90.1	± 0.5
			60 sec.			1/10 <sup>3</sup>		80	79.9	± 1.0
			5 min.			1/10 <sup>4</sup>		70	69.8	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2658547

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :	94 dB	: 31.5 Hz - 125 Hz	: ± 0.35 dB
		250 Hz - 500 Hz	: ± 0.30 dB
		1 kHz	: ± 0.20 dB
		2 kHz - 4 kHz	: ± 0.35 dB
		8 kHz	: ± 0.45 dB
		12.5 kHz	: ± 0.70 dB
	104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
	114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
	Burst equivalent level		: ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司－校正及檢測實驗所

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: [www.suncreation.com](http://www.suncreation.com)

# Certificate of Calibration

## 校正證書

Certificate No. : C173482

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 20 June 2017

Description / 儀器名稱 : Integrating Sound Level Meter (EQ009)

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 2238

Serial No. / 編號 : 2285722

Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 28 June 2017

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification.

The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By

測試

:

H T Wong

Technical Officer

Certified By

核證

:

K C Lee

Engineer

Date of Issue

簽發日期

:

29 June 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C173482

證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

### 6.1 Sound Pressure Level

#### 6.1.1 Reference Sound Pressure Level

##### 6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.2

##### 6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0	± 0.7

##### 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



# Certificate of Calibration

## 校正證書

Certificate No. : C173482

證書編號

### 6.2 Time Weighting

#### 6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L <sub>AFP</sub>	A	F	94.00	1	94.0	Ref.
	L <sub>ASP</sub>		S			94.0	± 0.1
	L <sub>AIP</sub>		I			94.1	± 0.1

#### 6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L <sub>AFP</sub>	A	F	106.0	Continuous	106.0	Ref.
	L <sub>AFMax</sub>				200 ms	105.0	-1.0 ± 1.0
	L <sub>ASP</sub>	S	Continuous		106.0	Ref.	
	L <sub>ASMax</sub>		500 ms		102.0	-4.1 ± 1.0	

### 6.3 Frequency Weighting

#### 6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>AFP</sub>	A	F	94.00	31.5 Hz	54.5	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.8	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C173482  
證書編號

### 6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L <sub>CFP</sub>	C	F	94.00	31.5 Hz	90.9	-3.0 ± 1.5
					63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	93.9	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.1	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.7	-6.2 (+3.0 ; -6.0)

### 6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L <sub>Aeq</sub>	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
			1/10 <sup>2</sup>			90		89.7	± 0.5	
			1/10 <sup>3</sup>			80		79.2	± 1.0	
			1/10 <sup>4</sup>			70		69.2	± 1.0	

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812707

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB : 31.5 Hz - 125 Hz	: ± 0.35 dB
250 Hz - 500 Hz	: ± 0.30 dB
1 kHz	: ± 0.20 dB
2 kHz - 4 kHz	: ± 0.35 dB
8 kHz	: ± 0.45 dB
12.5 kHz	: ± 0.70 dB
104 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz	: ± 0.10 dB (Ref. 94 dB)
Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C174094  
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 14 July 2017

Description / 儀器名稱 : Sound Level Calibrator (EQ085)  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NC-73  
Serial No. / 編號 : 10655561  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$   
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 July 2017

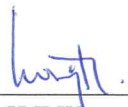
### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification & user's specified acceptance criteria.  
The results are detailed in the subsequent page(s).

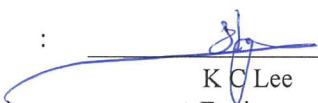
The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By  
測試

  
H T Wong  
Technical Officer

Certified By  
核證

  
K C Lee  
Engineer

Date of Issue :  
簽發日期

25 July 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。



# Certificate of Calibration

## 校正證書

Certificate No. : C174094

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	93.9	$\pm 0.5$	$\pm 0.2$

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	User's Spec.	Uncertainty of Measured Value (Hz)
1	0.954	1 kHz $\pm 6\%$	$\pm 1$

Remarks : - The user's specified acceptance criteria (user's spec.) is a customer pre-defined operating tolerance of the UUT, suitable for one's own intended use.

- The uncertainties are for a confidence probability of not less than 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C174095

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 14 July 2017

Description / 儀器名稱 : Sound Calibrator  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NC-74  
Serial No. / 編號 : 34657231  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

Line Voltage / 電壓 : ---

### TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 July 2017

### TEST RESULTS / 測試結果

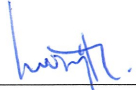
The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

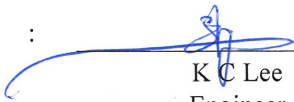
Tested By  
測試

:

  
H T Wong  
Technical Officer

Certified By  
核證

:

  
K C Lee  
Engineer

Date of Issue  
簽發日期

:

25 July 2017

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F. Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



# Certificate of Calibration

## 校正證書

Certificate No. : C174095  
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	$\pm 0.3$	$\pm 0.2$

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.001	1 kHz $\pm 1\%$	$\pm 1$

Remark : The uncertainties are for a confidence probability of not less than 95 %.

### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606

Fax/傳真: 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

# Certificate of Calibration

## 校正證書

Certificate No. : C173479

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924)

Date of Receipt / 收件日期 : 20 June 2017

Description / 儀器名稱 : Sound Calibrator (EQ086)  
Manufacturer / 製造商 : Rion  
Model No. / 型號 : NC-74  
Serial No. / 編號 : 34657230  
Supplied By / 委託者 : Action-United Environmental Services and Consulting  
Unit A, 20/F., Gold King Industrial Building,  
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

### TEST CONDITIONS / 測試條件

Temperature / 溫度 :  $(23 \pm 2)^{\circ}\text{C}$   
Line Voltage / 電壓 : ---

Relative Humidity / 相對濕度 :  $(55 \pm 20)\%$

### TEST SPECIFICATIONS / 測試規範

Calibration check

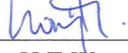
DATE OF TEST / 測試日期 : 28 June 2017

### TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.  
The results do not exceed manufacturer's specification.  
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By :   
測試 : H T Wong  
Technical Officer

Certified By :   
核證 : K C Lee  
Engineer

Date of Issue : 30 June 2017  
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

# Certificate of Calibration

## 校正證書

Certificate No. : C173479

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 3 measurements at each calibration point.
3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

### 5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	$\pm 0.3$	$\pm 0.2$

### 5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.002	1 kHz $\pm 1$ %	$\pm 1$

Remark : The uncertainties are for a confidence probability of not less than 95 %.

#### Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR BEN TAM  
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING  
ADDRESS: RM A 20/F., GOLD KING IND BLDG,  
NO. 35-41 TAI LIN PAI ROAD,  
Kwai Chung,  
N.T., HONG KONG.

WORK ORDER: HK1831632  
SUB-BATCH: 0  
LABORATORY: HONG KONG  
DATE RECEIVED: 25-May-2018  
DATE OF ISSUE: 31-May-2018

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test: Dissolved Oxygen and Temperature  
Equipment Type: Dissolved Oxygen Meter  
Brand Name: YSI  
Model No.: 550A  
Serial No.: 16A104433  
Equipment No.: --  
Date of Calibration: 30 May, 2018

### NOTES

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

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic

*This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.*



# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1831632  
SUB-BATCH: 0  
DATE OF ISSUE: 31-May-2018  
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter  
Brand Name: YSI  
Model No.: 550A  
Serial No.: 16A104433  
Equipment No.: --  
Date of Calibration: 30 May, 2018

Date of Next Calibration: 30 August, 2018

## PARAMETERS:

Dissolved Oxygen Method Ref: APHA (21st edition), 4500-O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.42	2.51	+0.09
4.93	4.87	-0.06
7.54	7.42	-0.12
Tolerance Limit (mg/L)		±0.20

## Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	10.3	+0.3
20.5	21.1	+0.6
39.0	38.5	-0.5
Tolerance Limit (°C)		±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic





## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1831630
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	25-May-2018
		DATE OF ISSUE:	31-May-2018

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	pH Value and Temperature
Equipment Type:	pH meter
Brand Name:	AZ
Model No.:	8685
Serial No.:	1141943
Equipment No.:	--
Date of Calibration:	30 May, 2018

### NOTES

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

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic

*This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.*

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1831630  
 SUB-BATCH: 0  
 DATE OF ISSUE: 31-May-2018  
 CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: pH meter  
 Brand Name: AZ  
 Model No.: 8685  
 Serial No.: 1141943  
 Equipment No.: --  
 Date of Calibration: 30 May, 2018      Date of Next Calibration: 30 August, 2018

## PARAMETERS:

pH Value

Method Ref: APHA (21st edition), 4500H:B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.2	+0.20
7.0	6.9	-0.10
10.0	9.8	-0.20
	Tolerance Limit (pH unit)	±0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
11.0	11.8	+0.8
21.0	22.2	+1.2
38.5	37.9	-0.6
	Tolerance Limit (°C)	±2.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu  
 Assistant Manager - Inorganic



## REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1831623
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	25-May-2018
		DATE OF ISSUE:	01-Jun-2018

### COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.

The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.

The "Next Calibration Date" is recommended according to best practice principle as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Hach
Model No.:	2100Q
Serial No.:	12060C18266
Equipment No.:	--
Date of Calibration:	30 May, 2018

### NOTES

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

Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic

*This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.*

# REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1831623  
SUB-BATCH: 0  
DATE OF ISSUE: 01-Jun-2018  
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter  
Brand Name: Hach  
Model No.: 2100Q  
Serial No.: 12060C18266  
Equipment No.: --  
Date of Calibration: 30 May, 2018

Date of Next Calibration: 30 August, 2018

## PARAMETERS:

Turbidity

Method Ref: APHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.14	--
4	4.37	+9.3
40	43.0	+7.5
80	86.8	+8.5
400	434	+8.5
800	863	+7.9
	Tolerance Limit (%)	±10.0

Remark: "Displayed Reading" presents the figures shown on item under calibration / checking regardless of equipment precision or significant figures.

Ms. Lin Wai Yu  
Assistant Manager - Inorganic



Hong Kong Accreditation Service  
香港認可處

**Certificate of Accreditation**  
**認可證書**

*This is to certify that*  
特此證明

**ALS TECHNICHEM (HK) PTY LIMITED**

**11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong**  
香港新界葵涌永業街1-3號忠信針織中心11樓

*has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a*  
為香港認可處執行機關根據認可諮詢委員會建議而接受的

**HOKLAS Accredited Laboratory**  
「香港實驗所認可計劃」認可實驗所

*This laboratory meets the requirements of ISO / IEC 17025 : 2005 – General requirements for the competence*  
此實驗所符合ISO / IEC 17025 : 2005 – 《測試及校正實驗所能力的通用規定》所訂的要求，  
*of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as*  
獲認可進行載於香港實驗所認可計劃《認可實驗所名冊》內下述測試類別中的指定  
*listed in the HOKLAS Directory of Accredited Laboratories within the test category of*  
測試或校正工作

**Environmental Testing**  
環境測試

*This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.*  
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。

*This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory*  
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作  
*quality management system (see joint IAF-ILAC-ISO Communiqué).*  
(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

*The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive*  
香港認可處根據認可處執行機關的權限在此蓋上通用印章

CHAN Sing Sing, Terence, Executive Administrator  
執行幹事 陳成城  
Issue Date : 5 May 2009  
簽發日期：二零零九年五月五日

Registration Number : **HOKLAS** 066  
註冊號碼：

Date of First Registration : 15 September 1995  
首次註冊日期：一九九五年九月十五日





## **Appendix G**

### **Event and Action Plan**

**Event and Action Plan for Air Quality**

<b>Event</b>	<b>ET</b>	<b>IEC</b>	<b>ER</b>	<b>Action Contractor</b>
<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	1. Notify ER, IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Advise the ER on the effectiveness of the proposed remedial measures.	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. Supervise the implementation of remedial measures.	1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, Contractor and EPD; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contractor's working procedures; 6. Discuss with the IEC, Contractor and ER on remedial measures required; 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.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.	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. Supervise the implementation of remedial measures; 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.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.

## Event and Action Plan for Water Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and sources of impact;</li> <li>3. Inform IEC and Contractor;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC and Contractor;</li> <li>6. Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC on the proposed mitigation measures;</li> <li>2. Make agreement on the mitigation measures to be implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET and IEC and propose mitigation measures to IEC and ER;</li> <li>6. 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>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and sources of impact;</li> <li>3. Inform IEC and Contractor;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC and Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Prepare to increase the monitoring frequency to daily;</li> <li>8. Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC on the proposed mitigation measures;</li> <li>2. Make agreement on the mitigation measures to be implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 2 working days;</li> <li>6. Implement the agreed mitigation measures.</li> </ol>
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and sources of impact;</li> <li>3. Inform IEC, Contractor and EPD;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, ER and Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase the monitoring frequency to daily until no exceedance of Limit Level.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>2. Request Contractor to critically review the working methods;</li> <li>3. Make agreement on the mitigation measures to be implemented;</li> <li>4. Assess the effectiveness of the implemented mitigation measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;</li> <li>6. 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>1. Repeat in-situ measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and sources of impact;</li> <li>3. Inform IEC, Contractor and EPD;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IEC, ER and Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. 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>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;</li> <li>2. Request Contractor to critically review the working methods;</li> <li>3. Make agreement on the mitigation measures to be implemented;</li> <li>4. Assess the effectiveness of the implemented mitigation measures;</li> <li>5. 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>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days;</li> <li>6. Implement the agreed mitigation measures;</li> <li>7. As directed by the ER, to slow down or to stop all or part of the construction activities.</li> </ol>

## **Appendix H**

### **Impact Monitoring Schedule**



**Impact Monitoring Schedule for Reporting Period – June 2018**

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Fri	1-Jun-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Sat	2-Jun-18		AM4b, AM5, AM6, AM7b & AM8		
Sun	3-Jun-18				
Mon	4-Jun-18				All Water Quality Monitoring Locations
Tue	5-Jun-18				
Wed	6-Jun-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Thu	7-Jun-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Fri	8-Jun-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sat	9-Jun-18				
Sun	10-Jun-18				
Mon	11-Jun-18				All Water Quality Monitoring Locations
Tue	12-Jun-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Wed	13-Jun-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Thu	14-Jun-18		AM4b, AM5, AM6, AM7b & AM8		
Fri	15-Jun-18	AM1b, AM2, AM3 & AM9b			All Water Quality Monitoring Locations
Sat	16-Jun-18				
Sun	17-Jun-18				
Mon	18-Jun-18				
Tue	19-Jun-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Wed	20-Jun-18		AM4b, AM5, AM6, AM7b & AM8		
Thu	21-Jun-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Fri	22-Jun-18				
Sat	23-Jun-18				All Water Quality Monitoring Locations
Sun	24-Jun-18				
Mon	25-Jun-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Tue	26-Jun-18		AM4b, AM5, AM6, AM7b & AM8		
Wed	27-Jun-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Thu	28-Jun-18				All Water Quality Monitoring Locations
Fri	29-Jun-18				
Sat	30-Jun-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations

	Monitoring Day
	Sunday or Public Holiday

**Impact Monitoring Schedule for next Reporting Period – July 2018**

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Sun	1-Jul-18				
Mon	2-Jul-18				
Tue	3-Jul-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Wed	4-Jul-18				
Thu	5-Jul-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Fri	6-Jul-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Sat	7-Jul-18				All Water Quality Monitoring Locations
Sun	8-Jul-18				
Mon	9-Jul-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Tue	10-Jul-18				
Wed	11-Jul-18		AM4b, AM5, AM6, AM7b & AM8		
Thu	12-Jul-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Fri	13-Jul-18				
Sat	14-Jul-18	AM1c, AM2, AM3 & AM9b			All Water Quality Monitoring Locations
Sun	15-Jul-18				
Mon	16-Jul-18				All Water Quality Monitoring Locations
Tue	17-Jul-18		AM4b, AM5, AM6, AM7b & AM8		
Wed	18-Jul-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Thu	19-Jul-18				
Fri	20-Jul-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Sat	21-Jul-18				
Sun	22-Jul-18				
Mon	23-Jul-18		AM4b, AM5, AM6, AM7b & AM8		
Tue	24-Jul-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Wed	25-Jul-18				
Thu	26-Jul-18	AM1c, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Fri	27-Jul-18				
Sat	28-Jul-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sun	29-Jul-18				
Mon	30-Jul-18	AM4b, AM5, AM6, AM7b & AM8	AM1c, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Tue	31-Jul-18				

	Monitoring Day
	Sunday or Public Holiday

## **Appendix I**

### **Database of Monitoring Result**

**24-hour TSP Monitoring Data**

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP (µg/m³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m³/min)	(std m³)	INITIAL	FINAL	(g)	
AM1c – Open Area, Tsung Yuen Ha Village No.63															
1-Jun-18	22716	14561.37	14585.87	1470.00	35	35	35.0	30.2	1009.9	1.26	1845	2.7217	2.7878	0.0661	36
7-Jun-18	22718	14585.87	14610.28	1464.60	38	38	38.0	27.2	1006.6	1.35	1977	2.7182	2.7533	0.0351	18
13-Jun-18	22746	14610.28	14634.49	1452.60	30	30	30.0	26.6	998.2	1.10	1604	2.6929	2.7542	0.0613	38
19-Jun-18	22753	14634.49	14658.49	1440.00	28	28	28.0	29.6	1003.6	1.04	1501	2.7071	2.7665	0.0594	40
25-Jun-18	22884	14658.49	14682.49	1440.00	46	46	46.0	28.1	1008.9	1.59	2292	2.6672	2.7518	0.0846	37
30-Jun-18	22917	14682.49	14706.54	1443.00	25	25	25.0	30.4	1004.1	0.95	1372	2.6834	2.7478	0.0644	47
AM2 - Village House near Lin Ma Hang Road															
1-Jun-18	22701	10163.78	10187.50	1423.20	37	37	37.0	30.2	1009.9	1.17	1672	2.7058	2.8972	0.1914	114
7-Jun-18	22717	10187.50	10211.50	1440.00	34	34	34.0	27.2	1006.6	1.07	1544	2.7182	2.7701	0.0519	34
13-Jun-18	22744	10211.50	10235.08	1414.80	34	34	34.0	26.6	998.2	1.16	1637	2.7037	2.7953	0.0916	56
19-Jun-18	22752	10235.08	10258.78	1422.00	34	34	34.0	29.6	1003.6	1.15	1642	2.6838	2.8126	0.1288	78
25-Jun-18	22883	10258.78	10282.51	1423.80	34	34	34.0	28.1	1008.9	1.16	1651	2.6803	2.7477	0.0674	41
30-Jun-18	22916	10282.51	10306.14	1417.80	36	36	36.0	30.4	1004.1	1.21	1720	2.6733	2.7769	0.1036	60
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
1-Jun-18	22699	11301.38	11325.28	1434.00	36	36	36.0	30.2	1009.9	1.10	1578	2.7074	2.8069	0.0995	63
7-Jun-18	22720	11325.28	11349.28	1440.00	32	32	32.0	27.2	1006.6	0.96	1378	2.7216	2.7560	0.0344	25
13-Jun-18	22745	11349.28	11373.28	1440.00	33	33	33.0	26.6	998.2	1.04	1504	2.6897	2.7546	0.0649	43
19-Jun-18	22855	11373.28	11397.28	1440.00	34	34	34.0	29.6	1003.6	1.08	1549	2.6855	2.7826	0.0971	63
25-Jun-18	22882	11397.28	11421.29	1440.60	34	34	34.0	28.1	1008.9	1.08	1559	2.6905	2.7391	0.0486	31
30-Jun-18	22915	11421.29	11445.29	1440.00	32	32	32.0	30.4	1004.1	1.01	1449	2.6921	2.7663	0.0742	51
AM4b - House no. 10B1 Nga Yiu Ha Village															
2-Jun-18	22697	13300.96	13324.97	1440.00	44	44	44.0	29.1	1010.5	1.19	1711	2.6911	2.7553	0.0642	38
8-Jun-18	22721	13324.97	13348.97	1440.00	38	38	38.0	27.8	1001	1.01	1456	2.6945	2.7742	0.0797	55
14-Jun-18	22751	13348.97	13372.97	1440.00	38	38	38.0	26.8	998.3	1.25	1807	2.6928	2.7563	0.0635	35
20-Jun-18	22858	13372.97	13396.97	1440.00	40	40	40.0	30.2	1005.5	1.32	1894	2.6874	2.7975	0.1101	58
26-Jun-18	22911	13396.97	13421.22	1440.00	40	40	40.0	29.2	1010.6	1.32	1902	2.6770	2.7369	0.0599	31
30-Jun-18	22923	13421.22	13445.22	1440.00	40	40	40.0	30.4	1004.1	1.31	1892	2.6820	2.7727	0.0907	48
AM5a - Ping Yeung Village House															
2-Jun-18	22696	12132.31	12156.82	1470.60	40	40	40.0	29.1	1010.5	1.48	2175	2.6906	2.8190	0.1284	59
8-Jun-18	22722	12156.82	12181.28	1467.60	36	36	36.0	27.8	1001	1.34	1967	2.6884	2.7249	0.0365	19

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP ( $\mu\text{g}/\text{m}^3$ )
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(°C)	(hPa)	(m <sup>3</sup> /min)	(std m <sup>3</sup> )	INITIAL	FINAL	(g)	
14-Jun-18	22750	12181.28	12205.68	1464.00	42	42	42.0	26.8	998.3	1.70	2482	2.6958	2.7970	0.1012	41
20-Jun-18	22857	12205.68	12229.98	1458.00	30	30	30.0	30.2	1005.5	1.28	1861	2.6929	2.7737	0.0808	43
26-Jun-18	22888	12229.98	12254.36	1462.80	40	42	41.0	29.2	1010.6	1.66	2434	2.6625	2.7224	0.0599	25
30-Jun-18	22922	12254.36	12278.86	1470.00	40	40	40.0	30.4	1044.1	1.65	2424	2.6803	2.7918	0.1115	46
<b>AM6 - Wo Keng Shan Village House</b>															
2-Jun-18	22695	9733.56	9757.56	1440.00	28	28	28.0	29.1	1010.5	0.99	1422	2.7099	2.7958	0.0859	60
8-Jun-18	22723	9757.56	9781.56	1440.00	26	26	26.0	27.8	1001.0	0.94	1347	2.7089	2.7425	0.0336	25
14-Jun-18	22749	9781.56	9805.56	1440.00	30	30	30.0	26.8	998.3	0.97	1404	2.7050	2.8225	0.1175	84
20-Jun-18	22879	9805.56	9829.57	1440.60	25	25	25.0	30.2	1005.5	0.84	1206	2.6768	2.7555	0.0787	65
26-Jun-18	22912	9829.57	9853.57	1440.00	30	30	30.0	29.2	1010.6	0.98	1406	2.6919	2.7358	0.0439	31
30-Jun-18	22921	9853.57	9877.57	1440.00	32	32	32.0	30.4	1004.1	1.03	1478	2.6732	2.7519	0.0787	53
<b>AM7b - Loi Tung Village House</b>															
2-Jun-18	22694	18780.25	18804.26	1440.60	44	44	44.0	29.1	1010.5	1.23	1777	2.7133	2.9670	0.2537	143
8-Jun-18	22724	18804.26	18828.26	1440.00	46	46	46.0	27.8	1001	1.29	1861	2.6884	2.7744	0.0860	46
14-Jun-18	22748	18828.26	18852.27	1440.60	40	40	40.0	26.8	998.3	1.21	1746	2.7037	2.8014	0.0977	56
20-Jun-18	22856	18852.27	18876.27	1440.00	40	40	40.0	30.2	1005.5	1.21	1742	2.7020	2.8337	0.1317	76
26-Jun-18	22887	18876.27	18900.27	1440.00	42	42	42.0	29.2	1010.6	1.27	1825	2.6887	2.7400	0.0513	28
30-Jun-18	22920	18900.27	18924.27	1440.00	40	40	40.0	30.4	1004.1	1.21	1741	2.6930	2.7881	0.0951	55
<b>AM8 - Po Kat Tsai Village No. 4</b>															
2-Jun-18	22693	12677.81	12701.82	1440.60	28	28	28.0	29.1	1010.5	1.03	1489	2.7052	2.7744	0.0692	46
8-Jun-18	22725	12701.82	12725.91	1445.40	20	20	20.0	27.8	1001	0.84	1217	2.7197	2.7917	0.0720	59
14-Jun-18	22747	12725.91	12749.92	1440.60	30	30	30.0	26.8	998.3	1.00	1438	2.6946	2.7681	0.0735	51
20-Jun-18	22859	12749.92	12773.92	1440.00	34	34	34.0	30.2	1005.5	1.09	1572	2.6813	2.7312	0.0499	32
26-Jun-18	22886	12773.92	12797.92	1440.00	34	34	34.0	29.2	1010.6	1.10	1577	2.6907	2.7402	0.0495	31
30-Jun-18	22919	12797.92	12821.92	1440.00	34	34	34.0	30.4	1004.1	1.09	1571	2.6931	2.7543	0.0612	39
<b>AM9b - Nam Wa Po Village House No. 80</b>															
1-Jun-18	22698	20056.58	20080.58	1440.00	34	34	34.0	30.2	1009.9	1.09	1564	2.6980	2.8027	0.1047	67
7-Jun-18	22719	20080.58	20104.59	1440.60	30	32	31.0	27.2	1006.6	0.99	1425	2.7091	2.7455	0.0364	26
13-Jun-18	22743	20104.59	20128.61	1441.20	32	32	32.0	26.6	998.2	1.05	1511	2.6974	2.7251	0.0277	18
19-Jun-18	22754	20128.61	20152.62	1440.60	40	40	40.0	29.6	1003.6	1.26	1822	2.7078	2.7473	0.0395	22
25-Jun-18	22885	20152.62	20176.62	1440.00	33	34	33.5	28.5	1004.9	1.09	1569	2.6847	2.7332	0.0485	31
30-Jun-18	22918	20176.62	20200.62	1440.00	40	40	40.0	30.4	1004.1	1.26	1819	2.6821	2.7272	0.0451	25



**Construction Noise Monitoring Results, dB(A)**

Date	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	L10	L90	2 <sup>nd</sup> Leq <sub>5min</sub>	L10	L90	3 <sup>rd</sup> Leq <sub>5min</sub>	L10	L90	4 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	5 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	6 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	Leq30	façade correction
<b>NM1 - Tsung Yuen Ha Village House No. 63</b>																					
6-Jun-18	14:40	72.9	69.0	56.4	65.8	67.8	62.5	65.4	68.3	60.5	65.1	68.9	58.5	58.6	61.5	55.3	59.4	61.1	54.7	67	NA
12-Jun-18	10:03	60.3	63.5	54.5	58.5	61.0	54.0	54.8	57.5	50.5	55.6	58.5	51.0	58.0	60.5	54.0	58.4	61.0	53.5	58	NA
21-Jun-18	10:41	61.4	65.5	48.0	58.0	62.0	47.5	58.8	63.0	42.5	64.6	68.0	53.0	65.2	69.0	52.5	63.1	67.0	52.0	63	NA
27-Jun-18	10:34	57.0	61.5	49.5	58.1	60.5	50.5	56.4	60.0	49.0	54.2	62.0	50.5	56.1	60.5	50.0	56.6	61.0	49.5	57	NA
<b>NM2a - Village House near Lin Ma Hang Road</b>																					
6-Jun-18	10:17	72.0	70.1	59.8	62.2	64.3	57.9	64.5	69.3	58.7	68.1	70.9	63.6	69.0	72.1	64.3	72.4	72.9	65.5	69	72
12-Jun-18	10:49	62.9	66.0	55.5	64.7	67.5	56.0	66.6	70.0	54.5	66.2	69.5	58.5	65.4	68.0	59.0	66.2	69.0	59.0	65	68
21-Jun-18	10:08	61.1	64.0	50.0	63.9	68.0	48.5	64.0	68.0	50.0	64.2	67.5	55.5	66.1	68.5	59.5	65.6	67.5	58.5	64	67
27-Jun-18	9:59	65.1	68.5	56.0	64.8	69.5	57.0	66.1	69.5	55.5	63.8	69.5	57.0	66.7	70.5	57.0	64.2	69.0	56.0	65	68
<b>NM3 - Ping Yeung Village House</b>																					
1-Jun-18	10:37	58.1	62.4	50.1	63.0	66.7	51.4	58.5	60.5	52.4	58.3	57.9	52.8	57.5	60.4	52.1	59.7	63.3	51.0	60	NA
7-Jun-18	9:31	65.8	61.0	51.2	61.4	60.4	50.1	63.5	63.7	49.0	65.6	65.5	51.0	65.2	63.2	52.0	62.4	63.3	52.4	64	NA
13-Jun-18	10:20	58.4	62.0	51.5	60.4	62.0	52.5	60.3	63.5	50.5	62.7	64.5	54.5	65.9	68.0	57.0	64.5	67.0	55.0	63	NA
19-Jun-18	10:45	58.6	60.5	54.0	61.5	64.0	53.5	58.2	61.5	50.5	54.3	55.0	50.0	54.8	55.5	49.0	61.0	62.5	49.0	59	NA
25-Jun-18	10:51	68.2	66.0	52.0	57.0	59.5	52.0	58.8	61.0	51.5	61.6	65.0	52.5	58.9	58.5	52.0	59.4	61.0	52.0	63	NA
<b>NM4 - Wo Keng Shan Village House</b>																					
1-Jun-18	9:56	66.0	61.7	53.3	61.3	59.1	52.1	67.5	69.2	52.3	58.3	59.5	51.4	62.4	62.9	51.2	61.8	58.1	51.4	64	NA
7-Jun-18	10:21	66.6	64.9	52.6	64.9	61.8	52.6	63.8	62.8	51.5	65.8	64.7	50.4	63.8	63.3	48.2	64.0	65.2	48.3	65	NA
13-Jun-18	11:07	61.4	65.0	51.5	60.4	63.5	51.5	60.3	63.5	50.5	62.5	65.5	54.5	65.9	68.0	56.1	64.5	68.0	56.0	63	NA
19-Jun-18	10:58	62.3	63.5	55.0	61.6	64.5	54.5	60.9	63.0	54.5	59.6	64.0	54.0	62.1	64.5	53.5	61.9	63.0	54.0	61	NA
25-Jun-18	11:33	58.0	58.0	49.0	52.5	55.0	47.0	51.8	54.5	47.5	65.2	65.5	49.5	58.9	62.5	52.0	55.1	58.5	49.0	60	NA
<b>NM5- Ping Yeung Village House</b>																					
7-Jun-18	11:01	54.6	55.2	50.4	52.9	55.7	49.4	53.5	56.6	50.4	54.2	55.0	49.8	51.3	55.3	48.9	51.2	54.3	48.9	53	NA
12-Jun-18	9:28	51.6	55.3	48.9	52.4	55.7	49.6	51.8	54.6	48.3	54.6	56.2	45.9	52.8	54.1	45.3	51.9	54.6	44.1	53	NA
19-Jun-18	9:17	58.0	61.0	53.0	57.7	60.5	53.0	59.0	61.5	53.0	58.5	61.5	54.0	58.9	62.0	53.0	59.9	63.0	53.5	59	NA
25-Jun-18	9:38	64.0	71.5	55.5	55.4	58.5	52.5	55.3	56.4	52.0	56.4	59.0	52.0	56.1	59.0	51.5	57.1	59.0	52.0	59	NA
<b>NM6 – Tai Tong Wu Village House 2</b>																					
1-Jun-18	14:04	63.9	66.3	60.7	63.2	65.9	60.1	62.7	65.4	59.9	63.5	66.8	60.3	63.5	67.1	60.9	63.2	67.0	59.9	63	NA
7-Jun-18	11:34	58.6	61.2	52.4	58.9	61.7	52.4	57.5	59.6	50.4	58.2	61.0	51.8	60.3	62.3	50.9	58.2	61.3	50.9	59	NA
12-Jun-18	10:31	55.7	61.4	52.8	56.9	60.7	53.4	55.8	60.9	52.6	56.4	62.8	51.9	57.8	62.6	51.9	58.4	61.3	50.6	57	NA
19-Jun-18	10:08	58.7	61.5	52.5	57.9	60.5	52.0	60.6	65.5	53.5	60.1	55.0	53.0	53.2	55.5	52.5	59.2	64.0	53.0	59	NA
<b>NM7 – Po Kat Tsai Village</b>																					

Date	Start Time	1 <sup>st</sup> Leq <sub>5min</sub>	L10	L90	2 <sup>nd</sup> Leq <sub>5min</sub>	L10	L90	3 <sup>rd</sup> Leq <sub>5min</sub>	L10	L90	4 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	5 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	6 <sup>th</sup> Leq <sub>5min</sub>	L10	L90	Leq30	façade correction
1-Jun-18	13:18	61.3	62.3	57.4	61.5	64.6	57.9	62.1	65.4	58.9	63.6	66.1	59.7	62.4	64.3	58.0	62.6	64.9	58.9	62	NA
7-Jun-18	13:18	65.6	62.1	53.2	60.9	61.6	54.4	56.6	58.8	54.4	61.8	61.2	52.8	61.2	61.5	51.0	60.3	60.1	51.1	62	NA
12-Jun-18	13:31	58.7	61.9	52.4	57.6	60.2	53.3	57.9	60.4	53.2	57.6	59.4	52.6	58.7	60.3	52.5	60.7	62.3	53.6	59	NA
19-Jun-18	13:05	63.0	65.5	57.0	62.4	65.5	56.5	64.9	68.0	58.5	64.0	67.0	57.0	65.7	68.5	58.0	65.8	68.5	58.0	64	NA
25-Jun-18	13:13	62.6	65.5	55.5	64.3	67.0	57.0	64.9	67.5	59.0	63.6	66.5	55.5	64.9	67.5	58.0	64.1	67.0	56.0	64	NA
<b>NM8 - Village House, Tong Hang</b>																					
6-Jun-18	9:26	58.6	63.4	54.1	59.7	63.8	55.6	60.1	64.6	54.2	59.9	62.2	55.6	58.6	62.4	54.3	59.6	61.7	55.3	59	NA
12-Jun-18	10:50	61.3	66	51.9	58.4	65.7	50.6	61.3	67.3	51	63.3	69	52	61.8	64.2	49.4	62	66.2	50.4	62	NA
21-Jun-18	11:11	56.6	59	54	55.3	56.5	53.5	55.9	58.5	53	61.4	64.5	53.5	57.7	60	54	57.6	59	55	58	NA
27-Jun-18	11:26	58.6	60.5	55	58.5	60.5	56	60.4	63.5	56	58.9	60.5	56	59.4	61	56.5	60.8	63	56.5	60	NA
<b>NM9 - Village House, Kiu Tau Village</b>																					
6-Jun-18	10:29	57.4	62.6	54.6	60.9	62.9	54.8	60.2	63.4	54.9	56.2	59.4	53.2	57.8	60.7	53.1	57.4	59.6	53.8	59	NA
12-Jun-18	10:09	61.6	63.5	58.3	63.2	65.6	58.0	61.1	63.0	58.0	61.1	62.7	57.8	62.5	64.4	57.1	60.7	62.1	57.1	62	NA
21-Jun-18	10:17	60.5	63.0	55.5	64.7	68.0	57.5	57.9	59.0	56.0	57.9	59.0	56.0	58.1	59.5	56.0	58.6	60.0	56.5	60	NA
27-Jun-18	10:37	59.2	61.5	54.5	59.3	62.0	55.0	60.2	62.5	56.0	59.5	61.5	56.0	59.2	61.0	56.5	59.0	61.0	56.0	59	NA
<b>NM10 - Nam Wa Po Village House No. 80</b>																					
6-Jun-18	13:29	58.1	60.7	54.6	57.3	59.2	53.1	58.6	59.6	53.4	58.9	60.2	54.1	57.7	61.7	55.8	57.4	61.9	54.9	58	61
12-Jun-18	9:21	61.8	62.8	58.2	60.5	62.4	58.8	60.7	62.4	58.9	61.2	63.8	59.8	61.3	63.0	60.9	62.2	64.0	60.8	61	64
21-Jun-18	9:28	65.8	67.5	60.5	62.5	63.5	60.0	61.1	61.5	59.5	61.6	63.5	59.5	63.1	62.5	59.0	59.3	61.0	57.5	63	66
27-Jun-18	9:40	56.9	58.0	51.5	57.8	60.5	49.5	59.9	62.5	53.0	60.4	61.5	54.5	59.3	61.0	55.0	58.0	60.5	50.0	59	62

**Water Quality Monitoring Data for Contract 6 and SS C505**

Date	2-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:30	0.30	28.6	28.6	4.44	4.4	57.2	56.0	11.6	11.8	8.34	8.3	11	10.5
			28.6		4.26		54.7		11.9		8.34		10	
WM1	9:38	0.20	27.6	27.6	4.45	4.3	56.5	54.6	7.2	7.0	7.77	7.8	4	4.0
			27.6		4.14		52.6		6.9		7.77		4	

Date	4-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:49	0.20	29.6	29.6	6.15	6.2	79.5	80.6	17.9	18.2	7.9	7.9	18	17.5
			29.6		6.21		81.7		18.5		7.9		17	
WM1	9:37	0.14	28.9	28.9	4.53	4.6	59.1	59.9	8.9	8.7	8.2	8.2	9	8.5
			28.9		4.6		60.7		8.6		8.2		8	

Date	6-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.35	26.6	26.6	5.5	5.5	68.3	68.0	over	over range	8.9	8.9	1230	1275.0
			26.6		5.44		67.7		range		8.9		1320	
WM1	10:10	0.30	26.5	26.5	5.44	5.4	67.7	66.7	over	over range	8.22	8.2	1160	1170.0
			26.5		5.28		65.6		range		8.22		1180	

Date	8-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.50	25.8	25.8	6.75	6.7	82.9	82.9	256.0	255.0	7.48	7.5	167	167.0
			25.8		6.74		82.8		254.0		7.48		167	
WM1	10:10	1.50	25.7	25.7	5.32	5.3	65.1	65.3	251.0	247.5	7.11	7.1	178	175.0
			25.7		5.33		65.4		244.0		7.11		172	

Date	11-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:40	0.35	26.3	26.3	6.38	6.5	79.0	80.0	4.7	5.3	7.4	7.4	9	8.5
			26.3		6.53		81.0		6.0		7.4		8	
WM1	10:30	0.22	26.2	26.2	5.97	6.1	74.0	75.1	11.1	11.1	7.71	7.7	15	14.5
			26.2		6.14		76.2		11.1		7.71		14	

Date	13-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:10	0.60	26.2	26.2	4.08	4.2	50.5	52.2	38.6	38.6	7.35	7.4	28	27.0
			26.2		4.35		53.8		38.5		7.35		26	
WM1	10:00	0.50	25.8	25.8	7.03	6.8	56.3	68.8	13.6	14.1	8.15	8.2	16	16.0
			25.8		6.61		81.2		14.5		8.15		16	

Date	15-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:35	0.30	25.7	25.7	6.8	6.8	83.4	83.8	9.1	8.9	7.23	7.2	6	5.5
			25.7		6.86		84.2		8.7		7.23		5	
WM1	9:45	0.30	25.5	25.5	6.24	6.3	76.3	76.6	16.6	16.2	7	7.0	13	13.5
			25.5		6.29		76.9		15.7		7		14	

Date	19-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:25	0.30	27.8	27.8	7.5	7.5	95.9	96.2	11.4	11.7	7.37	7.4	5	5.0
			27.8		7.56		96.4		11.9		7.37		5	
WM1	10:20	0.20	27.5	27.5	5.81	5.8	73.6	73.9	17.9	18.8	7.51	7.5	9	9.5
			27.5		5.85		74.1		19.6		7.51		10	

Date	21-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:00	0.30	28.8	28.8	5.3	5.2	68.7	67.7	15.0	14.3	7.53	7.5	3	2.5
			28.8		5.17		66.7		13.6		7.53		2	
WM1	10:50	0.20	28.5	28.5	6.02	6.1	77.6	77.9	49.6	48.5	7.44	7.4	27	27.0
			28.5		6.09		78.2		47.4		7.44		27	

Date	23-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:45	0.35	26.9	26.9	6.74	6.8	84.4	84.5	307.0	304.0	6.4	6.4	127	122.0
			26.9		6.77		84.6		301.0		6.4		117	
WM1	10:35	0.25	26.8	26.8	5.5	5.5	68.8	68.9	167.0	170.5	6.7	6.7	97	93.5
			26.8		5.51		68.9		174.0		6.7		90	

Date	25-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:30	0.35	27.1	27.1	5.96	6.0	74.8	75.2	29.6	30.0	6.8	6.8	15	15.0
			27.1		6.02		75.6		30.3		6.8		15	
WM1	10:20	0.25	26.8	26.8	4.9	4.9	61.2	61.4	33.1	32.8	6.8	6.8	20	19.5
			26.8		4.93		61.5		32.4		6.8		19	

Date	28-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:05	0.35	28.2	28.2	7.18	7.2	92.3	92.3	17.5	17.0	7.1	7.1	9	9.0
			28.2		7.2		92.2		16.5		7.1		9	
WM1	11:00	0.25	27.4	27.4	6.4	6.4	80.6	80.5	26.8	26.4	7.5	7.5	23	23.5
			27.4		6.38		80.3		25.9		7.5		24	

Date	30-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:37	0.27	28.6	28.6	7.6	7.6	97.9	98.0	14.9	14.9	7.1	7.1	7	7.5
			28.6		7.65		98.1		14.9		7.1		8	
WM1	11:20	0.19	27.4	27.4	6.7	6.7	85.4	85.8	43.9	44.2	6.9	6.9	29	29.0
			27.4		6.75		86.1		44.5		6.9		29	



**Water Quality Monitoring Data for Contract 2 and 3**

Date	2-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:05	0.12	30	30.0	5.32	5.2	70.4	67.6	4.8	4.9	7.01	7.0	11	10.5
			30		4.99		64.8		5.1		7.01		10	
WM4-CB	11:15	0.28	30.5	30.5	4.05	4.0	54.0	52.8	11.2	11.7	6.97	7.0	18	19.0
			30.5		3.86		51.6		12.1		6.97		20	
WM4	10:55	0.15	28.8	28.8	4.32	4.3	56.0	54.8	14.9	14.2	6.73	6.7	11	11.5
			28.8		4.18		53.6		13.4		6.73		12	

Date	4-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:41	0.18	29.2	29.2	4.01	4.1	52.1	52.9	6.1	6.1	7.8	7.8	6	6.5
			29.2		4.09		53.7		6.1		7.8		7	
WM4-CB	12:17	0.30	29.7	29.7	5.1	5.1	65.8	66.3	10.6	10.8	7.5	7.5	8	8.5
			29.7		5.12		66.7		10.9		7.5		9	
WM4	11:27	0.27	28.9	28.9	5.32	5.4	71.1	71.8	11.8	12.0	7.7	7.7	8	9.0
			28.9		5.41		72.4		12.1		7.7		10	

Date	6-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:20	0.20	26.2	26.2	4.59	4.5	56.9	55.8	41.3	40.5	7.52	7.5	22	23.0
			26.2		4.42		54.7		39.7		7.52		24	
WM4-CB	12:30	0.35	26.7	26.7	3.6	3.6	44.9	44.7	64.7	64.3	7.32	7.3	36	35.0
			26.7		3.56		44.4		63.9		7.32		34	
WM4	12:10	0.25	26.7	26.7	5.45	5.3	67.9	66.5	70.3	69.3	7.86	7.9	40	41.0
			26.7		5.22		65.1		68.2		7.86		42	

Date	8-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:30	0.40	24.7	24.7	7.21	7.2	86.7	86.5	36.5	36.4	7.39	7.4	17	16.5
			24.7		7.17		86.3		36.3		7.39		16	
WM4-CB	11:45	0.46	25.5	25.5	5.88	5.8	71.2	70.8	56.9	56.7	7.36	7.4	33	34.5
			25.5		5.76		70.3		56.5		7.36		36	
WM4	11:20	1.20	25.4	25.4	8.5	8.4	103.6	102.1	67.3	67.4	7.47	7.5	40	38.5
			25.4		8.25		100.6		67.5		7.47		37	

Date	11-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:40	0.15	29.1	29.1	6.57	6.6	85.8	86.5	2.9	3.0	7.67	7.7	3	3.5
			29.1		6.67		87.1		3.1		7.67		4	
WM4-CB	13:50	0.31	30.9	30.9	6.94	7.0	93.6	94.3	142.0	144.5	7.55	7.6	100	97.0
			30.9		7.04		94.9		147.0		7.55		94	
WM4	13:30	0.17	29.1	29.1	6.55	6.6	85.6	85.6	102.0	102.5	7.96	8.0	60	62.0
			29.1		6.56		85.6		103.0		7.96		64	

Date	13-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	14:08	0.27	25.7	25.7	5.72	5.8	69.3	70.2	15.0	15.2	7.4	7.4	6	7.0
			25.7		5.86		71.1		15.3		7.4		8	
WM4-CB	14:39	0.39	26.7	26.7	4.22	4.3	52.6	53.7	19.1	19.5	7.1	7.1	17	16.5
			26.7		4.3		54.7		19.9		7.1		16	
WM4	13:30	0.18	26.8	26.8	5.93	5.9	74.1	73.2	22.8	22.1	7.6	7.6	17	17.0
			26.8		5.81		72.2		21.4		7.6		17	

Date	15-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:45	0.15	26.8	26.8	10.12	9.9	125.7	122.7	13.3	13.1	8.13	8.1	<2	<2
			26.8		9.63		119.6		12.9		8.13		<2	
WM4-CB	11:55	0.25	27.8	27.8	5.17	5.1	65.1	63.4	10.0	10.4	7.48	7.5	6	7.0
			27.8		4.94		61.7		10.9		7.48		8	
WM4	11:35	0.20	27.3	27.3	6.85	6.9	86.4	87.1	26.7	27.7	8.71	8.7	13	12.0
			27.3		6.95		87.7		28.6		8.71		11	

Date	19-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:25	0.14	29.8	29.8	8.14	8.2	107.2	107.6	6.9	6.4	7.34	7.3	3	3.0
			29.8		8.17		107.9		6.0		7.34		3	
WM4-CB	12:35	0.20	30.5	30.5	5.45	5.4	72.9	72.9	8.1	8.0	6.7	6.7	<2	<2
			30.5		5.44		72.8		7.9		6.7		<2	
WM4	12:15	0.15	29.9	29.9	6.83	6.9	90.6	90.9	14.2	13.8	6.64	6.6	4	4.0
			29.9		6.88		91.1		13.4		6.64		4	

Date	21-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:35	0.13	30.3	30.3	8.02	7.6	106.4	101.2	6.7	6.6	8	8.0	<2	2.0
			30.3		7.23		95.9		6.6		8		2	
WM4-CB	12:45	0.25	30.6	30.6	4.08	4.0	54.6	53.9	9.6	9.9	7.22	7.2	8	7.5
			30.6		3.96		53.1		10.2		7.22		7	
WM4	12:25	0.15	30.8	30.8	5.5	5.5	73.7	73.3	46.1	48.2	7.87	7.9	27	27.5
			30.8		5.44		72.8		50.3		7.87		28	

Date	22-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:20	0.13							3.4	3.8			5	5.0
									4.2				5	
WM4-CB	11:30	0.20							5.3	6.1			10	10.0
									6.8				10	
WM4	11:15	0.15							57.9	58.0			23	23.0
									58.1				23	

Date	23-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:40	0.50	25.1	25.1	8.15	8.2	98.7	98.8	169.0	166.5	7.7	7.7	113	111.0
			25.1		8.16		98.8		164.0		7.7		109	
WM4-CB	13:00	0.40	26.1	26.1	7.46	7.5	92.1	92.2	191.0	194.0	7.3	7.3	183	181.5
			26.1		7.47		92.3		197.0		7.3		180	
WM4	12:30	0.70	26.2	26.2	7.64	7.7	94.4	94.5	224.0	225.5	7.6	7.6	193	193.5
			26.2		7.66		94.5		227.0		7.6		194	

Date	25-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:30	0.20	25.6	25.6	8.23	8.2	100.6	100.7	8.7	8.7	7.4	7.4	<2	<2
			25.6		8.25		100.7		8.6		7.4		<2	
WM4-CB	12:40	0.30	27.3	27.3	4.92	4.9	61.9	62.0	19.6	19.6	6.7	6.7	9	8.0
			27.3		4.94		62.1		19.5		6.7		7	
WM4	12:20	0.20	26.7	26.7	7.6	7.6	94.9	95.0	34.8	34.7	7.3	7.3	16	17.0
			26.7		7.61		95.0		34.5		7.3		18	

Date	28-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:10	0.15	28.3	28.3	7.89	7.9	101.2	101.3	5.0	4.9	8.1	8.1	2	2.5
			28.3		7.9		101.3		4.9		8.1		3	
WM4-CB	13:20	0.31	30.2	30.2	6.4	6.4	85.5	85.6	16.0	15.6	7.7	7.7	11	10.0
			30.2		6.42		85.7		15.2		7.7		9	
WM4	13:00	0.20	29.3	29.3	7.77	7.8	100.5	100.9	20.3	19.9	7.9	7.9	11	10.5
			29.3		7.73		101.2		19.5		7.9		10	

Date	30-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	9:36	0.13	27.3	27.3	8.33	8.3	104.8	105.0	11.5	11.8	7.4	7.4	3	3.0
			27.3		8.36		105.1		12.0		7.4		3	
WM4-CB	8:57	0.37	28.5	28.5	5.62	5.7	71.0	71.6	9.9	10.0	6.7	6.7	6	6.0
			28.5		5.7		72.1		10.1		6.7		6	
WM4	9:11	0.33	27.3	27.3	7.43	7.5	93.2	94.0	32.2	32.8	7.1	7.1	36	36.5
			27.3		7.49		94.7		33.4		7.1		37	

**Remarks:** # Additional water quality monitoring for the parameters with Action/Limit Level exceedance triggered only.

	Action Level
	Limit Level

**Water Quality Monitoring Data for Contract 6**

Date	2-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:05	0.22	26.7	26.7	4.43	4.4	55.4	54.5	14.4	14.0	7.52	7.5	4	5.0
			26.7		4.3		53.5		13.6		7.52		6	
WM2A	9:50	0.15	26.9	26.9	5.38	5.3	67.3	66.5	24.0	24.1	7.71	7.7	14	13.0
			26.9		5.26		65.6		24.2		7.71		12	

Date	4-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:17	0.27	27.2	27.2	5.71	5.8	71.7	72.4	13.0	13.3	7.60	7.6	2	2.0
			27.2		5.8		73.0		13.5		7.60		2	
WM2A	10:01	0.17	27.7	27.7	5.84	5.9	71.1	72.1	20.2	20.5	7.80	7.8	10	10.0
			27.7		5.89		73.0		20.7		7.80		10	

Date	6-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:15	0.30	25.8	25.8	6.42	6.3	78.9	77.6	240.0	243.0	8.06	8.1	123	126.5
			25.8		6.23		76.2		246.0		8.06		130	
WM2A	11:00	0.25	26.2	26.2	5.71	5.6	70.7	69.1	944.0	967.5	7.90	7.9	428	444.5
			26.2		5.48		67.4		991.0		7.90		461	

Date	7-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:25	0.38							28.3	27.8			27	27.0
									27.3				27	
WM2A	10:40	0.30							354.0	345.5			266	266.0
									337.0				266	

Date	8-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:30	0.38	25.1	25.1	8.64	8.6	104.8	103.9	259.0	263.5	7.40	7.4	67	70.0
			25.1		8.49		103.0		268.0		7.40		73	
WM2A	10:20	0.40	25.6	25.6	6.45	6.4	78.9	78.0	over	over range	7.60	7.6	800	785.0
			25.6		6.33		77.0		range		7.60		770	

Date	9-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:05	0.30							5.1	5.1			2	2.0
									5.2				2	
WM2A	10:35	0.20							185.0	183.0			80	80.0
									181.0				80	



Date	11-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:10	0.20	24.8	24.8	6.37	6.6	76.8	79.6	6.1	6.0	7.36	7.4	3	3.0
			24.8		6.82		82.4		5.8		7.36		3	
WM2A	10:50	0.20	25.6	25.6	5.96	6.1	73.1	74.5	64.6	64.1	7.17	7.2	52	54.5
			25.6		6.18		75.9		63.6		7.17		57	

Date	12-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:45	0.20							4.2	4.2			2	2.0
									4.1				2	
WM2A	11:30	0.15							86.0	84.7			38	38.0
									83.4				38	

Date	13-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:50	0.20	25.2	25.2	7.44	7.6	90.4	92.8	25.0	24.8	7.58	7.6	6	6.5
			25.2		7.84		95.1		24.6		7.58		7	
WM2A	10:20	0.20	25.9	25.9	5.45	5.4	67.1	66.6	242.0	242.0	8.29	8.3	146	150.0
			25.9		5.38		66.1		242.0		8.29		154	

Date	14-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:15	0.25							10.0	10.8			6	6.0
									11.5				6	
WM2A	11:00	0.20							91.1	90.5			54	54.0
									89.9				54	

Date	15-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:25	0.20	24.5	24.5	7.44	7.4	89.3	88.3	14.3	14.3	7.10	7.1	<2	2.0
			24.5		7.28		87.3		14.2		7.10		2	
WM2A	10:00	0.15	25.3	25.3	6.35	6.4	77.6	77.9	60.9	65.1	7.18	7.2	39	40.5
			25.3		6.4		78.2		69.2		7.18		42	

Date	16-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:55	0.22							6.5	6.1			<2	<2
									5.7				<2	
WM2A	10:05	0.20							24.2	24.1			15	15.0
									23.9				15	

Date	19-Jun-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)
WM2A-C	10:55	0.23	25.8	25.8	6.83	6.8	84.1	84.3	11.7	11.3	7.45	7.5	<2
			25.8		6.84		84.4		10.9		7.45		<2
WM2A	10:35	0.20	27.3	27.3	6.2	6.2	78.3	78.4	267.0	265.5	7.37	7.4	132
			27.3		6.21		78.4		264.0		7.37		140
													136.0

Date	20-Jun-18 #												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)
WM2A-C	10:40	0.22							7.7	7.8			2
									7.9				2
WM2A	10:30	0.20							24.1	24.0			11
									23.8				11
													11.0

Date	21-Jun-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)
WM2A-C	11:20	0.25	26.5	26.5	7.56	7.4	94.0	91.4	10.8	11.5	7.62	7.6	6
			26.5		7.14		88.8		12.1		7.62		5
WM2A	11:10	0.20	29.7	29.7	4.92	4.9	64.7	64.6	22.4	21.5	7.45	7.5	14
			29.7		4.9		64.5		20.6		7.45		14
													14.0

Date	23-Jun-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)
WM2A-C	11:10	0.28	25.5	25.5	7.96	8.0	97.4	97.6	97.9	101.5	7.80	7.8	20
			25.5		7.99		97.7		105.0		7.80		22
WM2A	10:55	0.20	26.3	26.3	7.46	7.5	92.5	92.7	561.0	586.0	7.00	7.0	207
			26.3		7.47		92.8		611.0		7.00		195
													201.0

Date	25-Jun-18												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)
WM2A-C	11:00	0.28	25.4	25.4	7.43	7.5	90.6	90.8	19.0	18.7	7.10	7.1	5
			25.4		7.47		90.9		18.4		7.10		6
WM2A	10:45	0.20	26.7	26.7	7.24	7.3	90.2	90.4	107.0	106.5	6.90	6.9	63
			26.7		7.34		90.5		106.0		6.90		58
													60.5

Date	26-Jun-18 #												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)
WM2A-C	12:00	0.31							7.1	7.1			6
									7.1				6
WM2A	11:45	0.20							47.1	46.6			28
									46.0				28
													28.0

Date	27-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:00	0.25							7.3	6.9			6	6.0
							6.6				6			
WM2A	10:45	0.20							21.2	21.8			14	14.5
							22.3				15			

Date	28-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:45	0.25	25.7	25.7	7.73	7.7	94.7	94.6	21.5	22.1	7.30	7.3	17	18.0
			25.7		7.72		94.4		22.7		7.30		19	
WM2A	11:20	0.20	27.8	27.8	6.78	6.8	86.3	86.4	24.8	24.9	7.50	7.5	15	16.0
			27.8		6.79		86.5		24.9		7.50		17	

Date	30-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:47	0.31	26	26.0	7.76	7.8	95.6	96.3	8.3	8.3	6.20	6.2	4	4.0
			26		7.8		96.9		8.4		6.20		4	
WM2A	10:59	0.17	27.6	27.6	7.24	7.2	91.0	91.3	12.0	12.5	6.60	6.6	14	14.5
			27.6		7.25		91.5		13.0		6.60		15	

**Remarks:** # Additional water quality monitoring for the parameters with Action/Limit Level exceedance triggered only.

	Action Level
	Limit Level

**Water Quality Monitoring Data for Contract 2 and 6**

Date	2-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:18	0.15	29.2	29.2	5.26	5.2	68.5	67.8	3.3	3.2	2.85	2.8	2	<2
			29.2		5.12		67.0		3.2		2.83		2	
WM3	10:30	0.15	29.1	29.1	6.64	6.4	86.7	83.9	13.0	13.1	5.99	6.0	10	9.0
			29.1		6.2		81.0		13.2		5.99		8	

Date	4-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:39	0.16	29.3	29.3	6.21	6.3	81.0	81.9	12.6	12.8	7.4	7.4	17	16.5
			29.3		6.3		82.7		12.9		7.4		16	
WM3	10:53	0.12	28.5	28.5	6.83	6.9	87.5	87.8	11.5	11.6	7.5	7.5	12	11.0
			28.5		6.87		88.0		11.7		7.5		10	

Date	6-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:35	0.20	26.1	26.1	5.33	5.3	65.6	65.2	71.5	70.8	9.07	9.1	56	57.0
			26.1		5.26		64.7		70.0		9.07		58	
WM3	11:45	0.25	26.3	26.3	5.25	5.2	65.0	64.0	609.0	624.0	8.26	8.3	486	472.5
			26.3		5.09		62.9		639.0		8.26		459	

Date	7-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:15	0.30							72.1	70.0			58	58.0
									67.8				58	
WM3	10:00	1.50							69.8	69.1			54	54.0
									68.4				54	

Date	8-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:50	0.20	25.5	25.5	6.22	6.2	75.9	75.8	238.0	240.0	8.99	9.0	121	122.5
			25.5		6.18		75.6		242.0		8.99		124	
WM3	11:00	1.20	25.4	25.4	6.08	6.1	74.2	74.1	89.3	89.5	8.09	8.1	42	40.0
			25.4		6.06		73.9		89.7		8.09		38	

Date	11-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:30	0.15	28.1	28.1	7.09	7.1	91.1	91.5	7.1	6.7	11.09	11.1	12	13.0
			28.1		7.15		91.8		6.3		11.09		14	
WM3	11:42	0.15	28.8	28.8	6.19	6.2	80.3	80.5	13.1	13.0	9.22	9.2	13	13.5
			28.8		6.21		80.6		12.8		9.22		14	

Date	13-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:10	0.15	26.9	26.9	5.82	5.9	74.7	75.3	15.5	16.1	6.86	6.9	15	16.0
			26.9		6.04		75.9		16.6		6.86		17	
WM3	11:20	0.17	27	27.0	6.78	6.8	85.1	85.2	73.5	73.6	6.91	6.9	49	51.0
			27		6.79		85.2		73.6		6.91		53	

Date	14-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:00	0.15							4.2	3.6			17	17.0
									3.1				17	
WM3	10:10	0.15							33.6	33.2			30	30.0
									32.7				30	

Date	15-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:45	0.15	28.2	28.2	7.77	7.6	99.8	97.5	7.7	7.3	11.43	11.4	7	6.5
			28.2		7.46		95.1		7.0		11.43		6	
WM3	10:55	0.16	27.6	27.6	5.44	5.5	69.3	69.5	23.9	24.0	10.51	10.5	21	22.0
			27.6		5.46		69.6		24.0		10.51		23	

Date	16-Jun-18 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	9:40	0.15							4.2	4.0			4	4.0
									3.9				4	
WM3	9:30	0.15							8.5	7.9			4	4.0
									7.3				4	

Date	19-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:45	0.15	29.8	29.8	6.93	6.9	91.1	91.6	4.4	3.8	2.98	3.0	<2	<2
			29.8		6.95		92.0		3.2		2.98		<2	
WM3	11:55	0.15	29	29.0	6.43	6.4	83.6	83.4	5.3	5.5	5.81	5.8	3	3.0
			29		6.38		83.1		5.8		5.81		3	

Date	21-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:50	0.15	29.9	29.9	4.96	4.9	65.4	64.8	15.6	14.9	8.8	8.8	28	29.0
			29.9		4.84		64.1		14.1		8.8		30	
WM3	12:00	0.15	29.8	29.8	5.33	5.3	69.5	68.7	12.7	12.8	8.07	8.1	7	7.0
			29.8		5.18		67.9		12.9		8.07		7	



Date	23-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:30	0.20	26.5	26.5	7.35	7.4	91.3	91.4	222.0	223.5	7.3	7.3	195	189.5
			26.5		7.37		91.5		225.0		7.3		184	
WM3	12:00	0.50	26.4	26.4	7.49	7.4	93.1	92.6	266.0	263.0	7.3	7.3	213	204.5
			26.4		7.27		92.0		260.0		7.3		196	

Date	25-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:50	0.15	27.9	27.9	7.54	7.5	96.2	96.3	11.0	10.4	10.1	10.1	<2	<2
			27.9		7.55		96.4		9.8		10.1		<2	
WM3	12:00	0.15	26.7	26.7	6.4	6.5	79.2	80.4	10.5	10.7	7.7	7.7	5	4.0
			26.7		6.54		81.6		10.8		7.7		3	

Date	28-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:05	0.15	29.4	29.4	7.2	7.2	94.6	94.9	3.8	3.4	10.5	10.5	10	9.0
			29.4		7.26		95.1		3.0		10.5		8	
WM3	12:20	0.15	30.3	30.3	6.68	6.7	89.1	89.4	12.9	13.1	8.7	8.7	13	12.5
			30.3		6.75		89.7		13.2		8.7		12	

Date	30-Jun-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:27	0.20	29.1	29.1	7.51	7.5	97.7	97.9	5.6	5.6	7.1	7.1	4	4.5
			29.1		7.55		98.0		5.6		7.1		5	
WM3	10:13	0.15	28.3	28.3	6.71	6.8	86.4	87.0	12.8	13.0	6.9	6.9	12	11.5
			28.3		6.79		87.5		13.1		6.9		11	

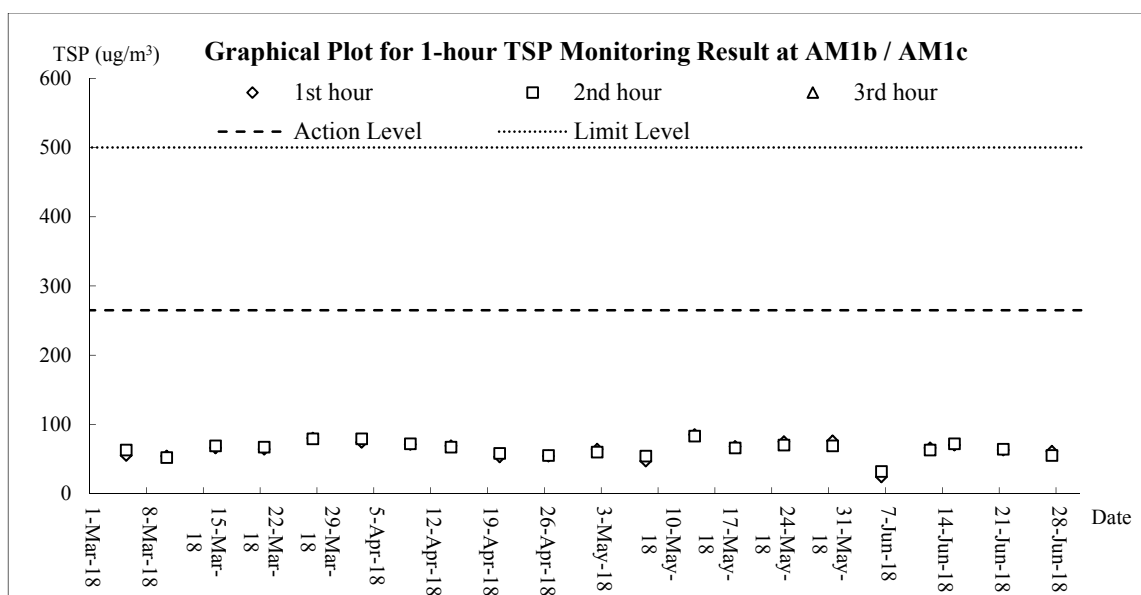
**Remarks:** # Additional water quality monitoring for the parameters with Action/Limit Level exceedance triggered only.

	Action Level
	Limit Level

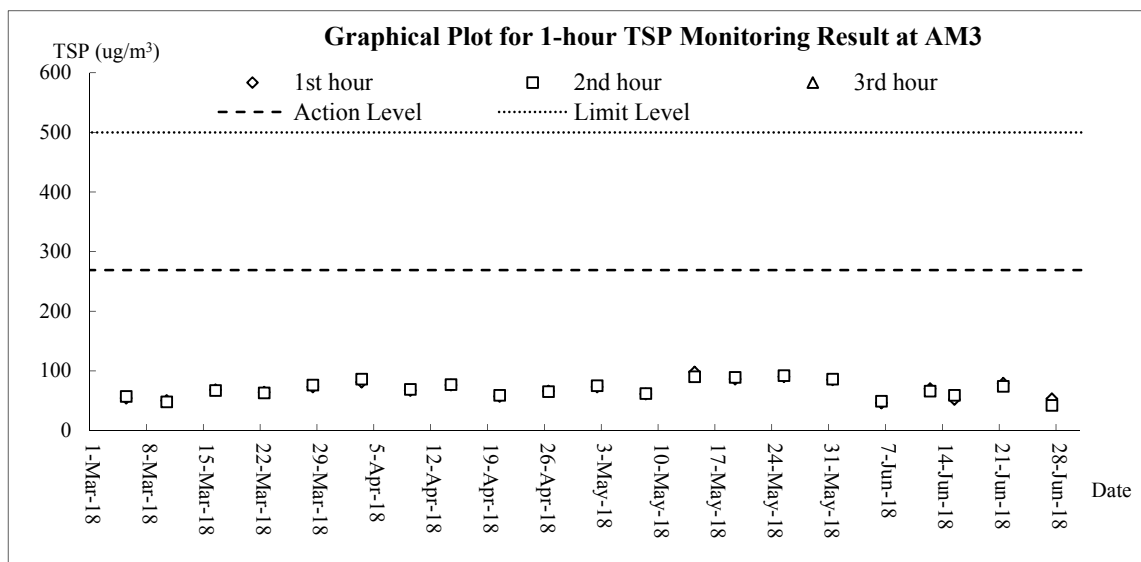
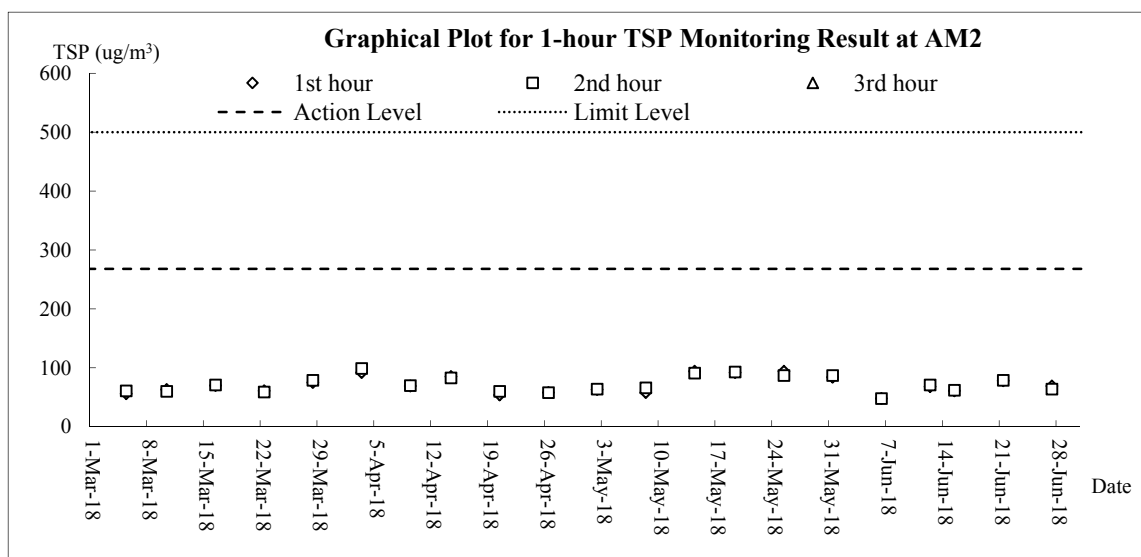
## **Appendix J**

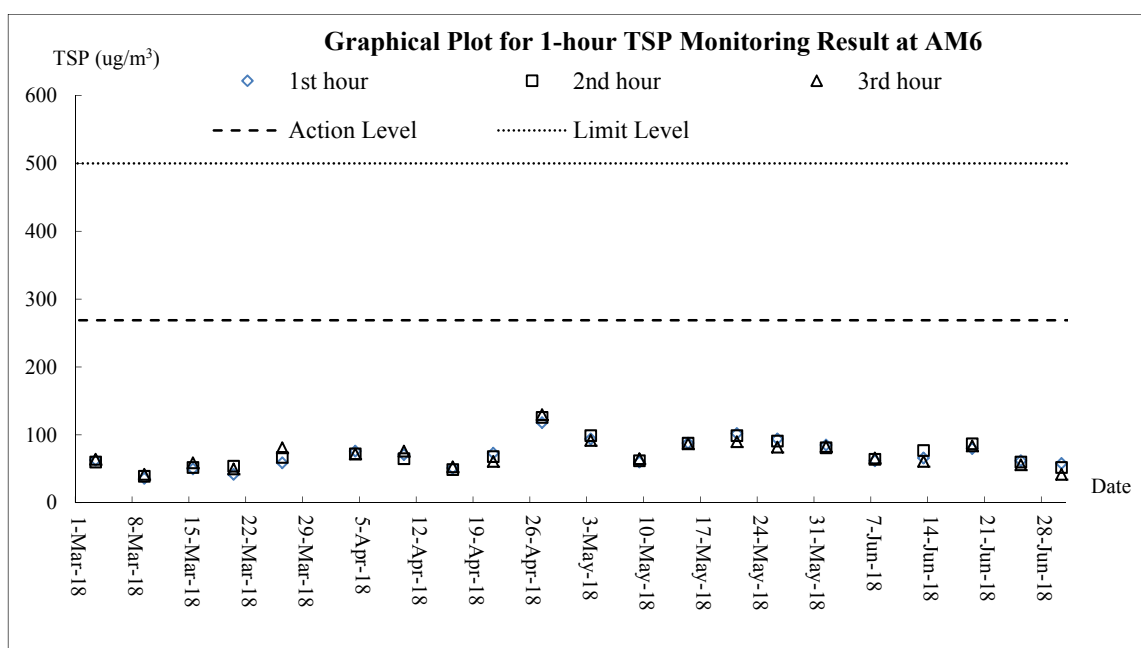
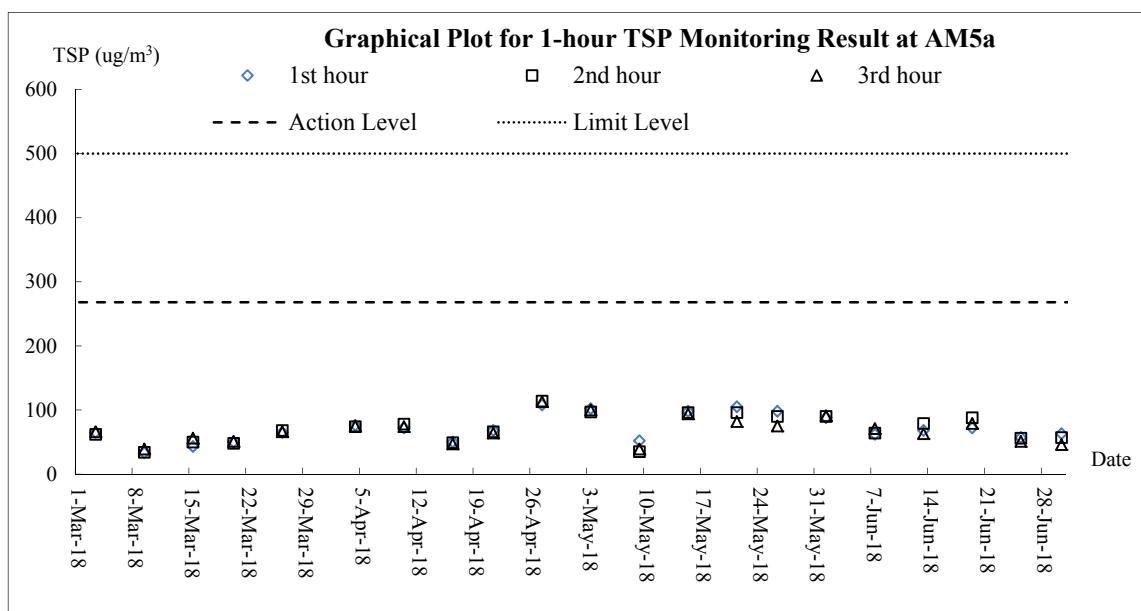
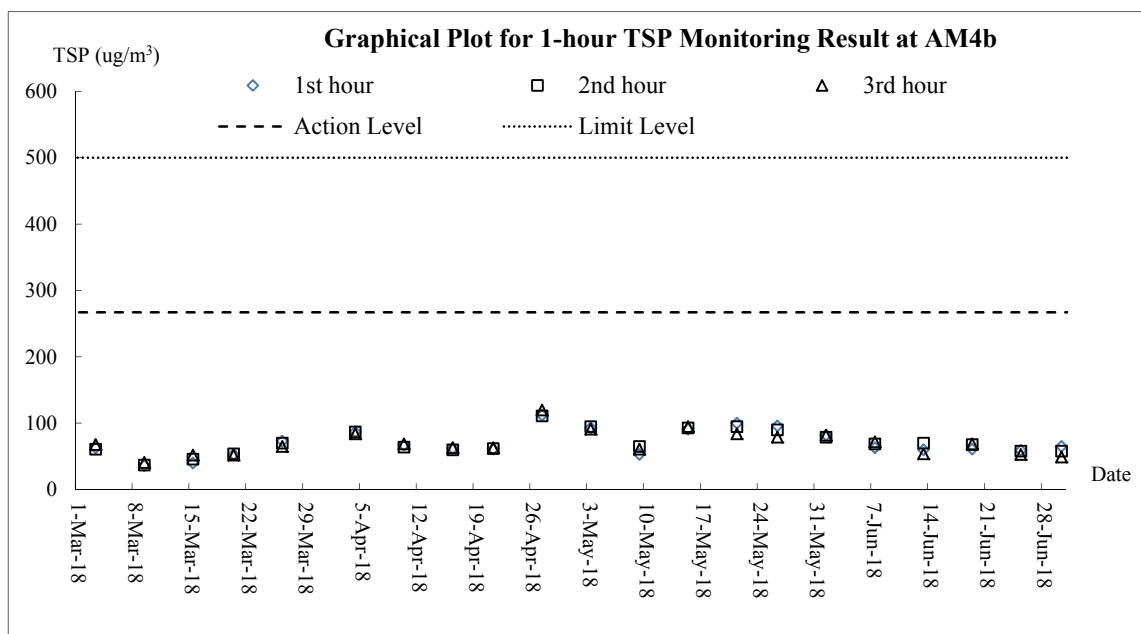
### **Graphical Plots for Monitoring Result**

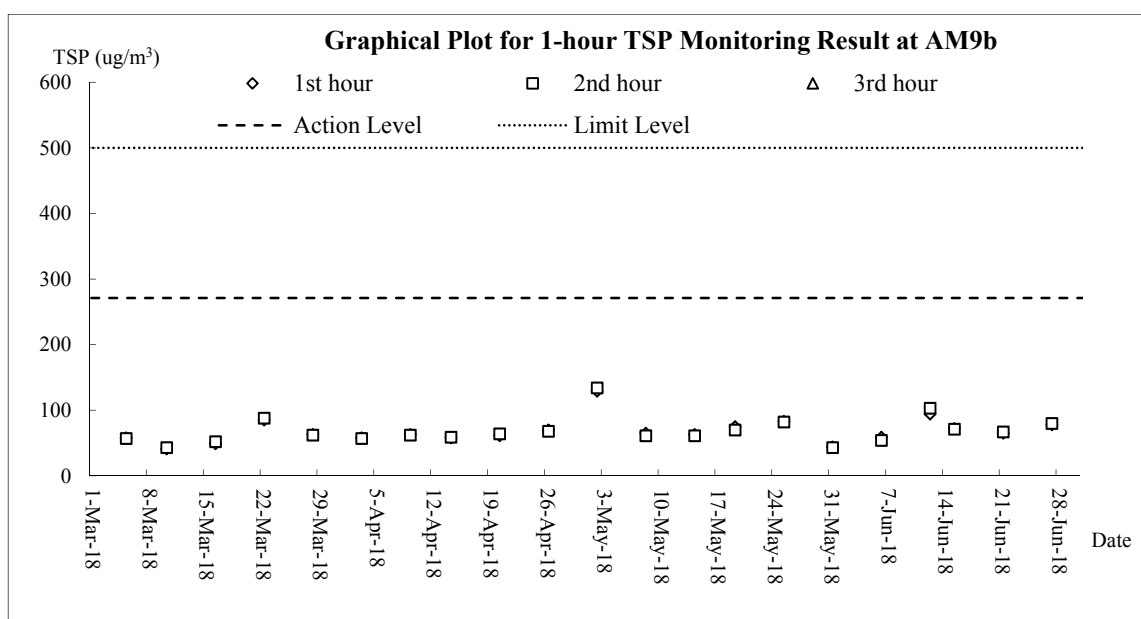
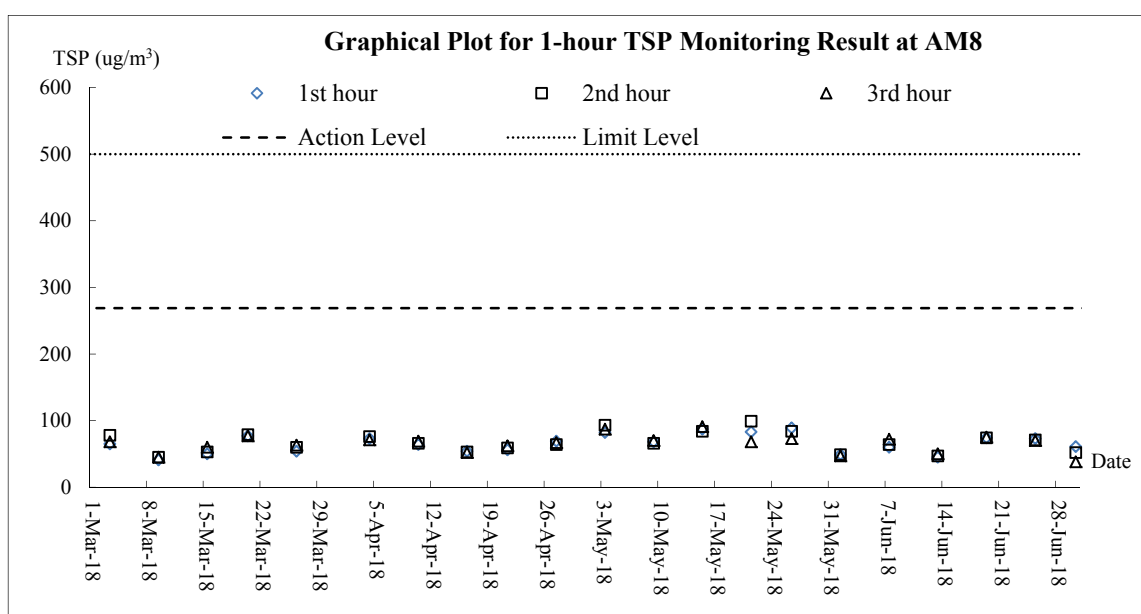
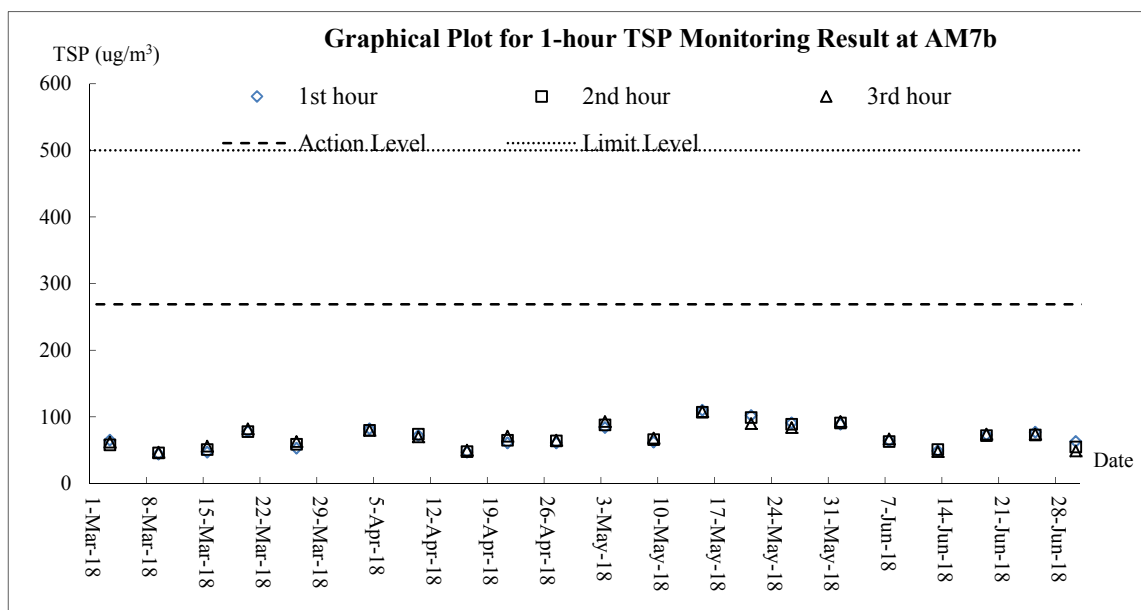
## Air Quality – 1-hour TSP



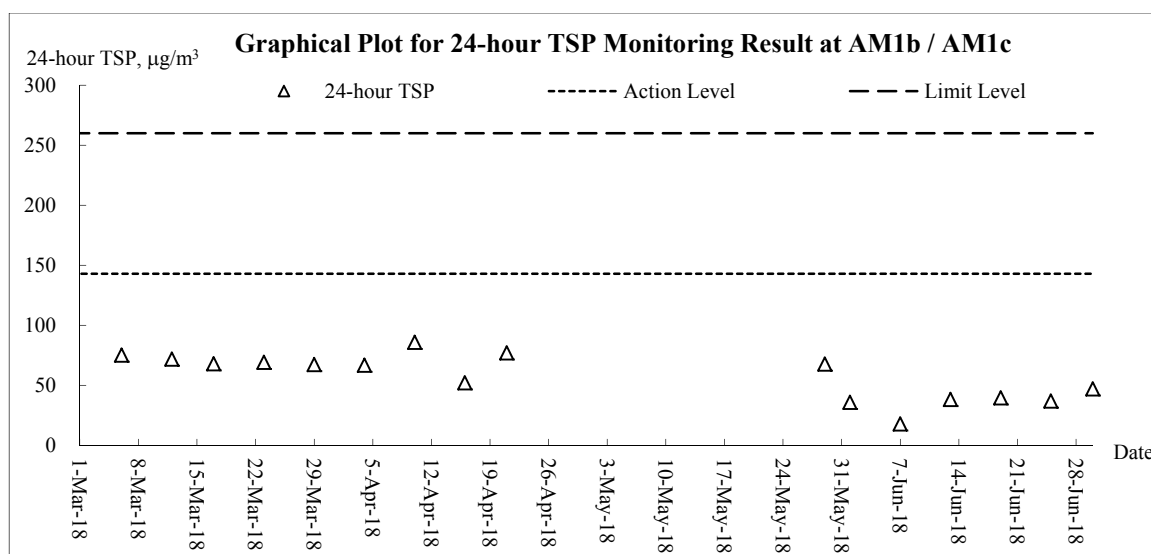
*Note: Air Quality Monitoring Location AM1b was suspended on 28 April 2018 due to the land issues and it was relocated to AM1c since 29 May 2018.*



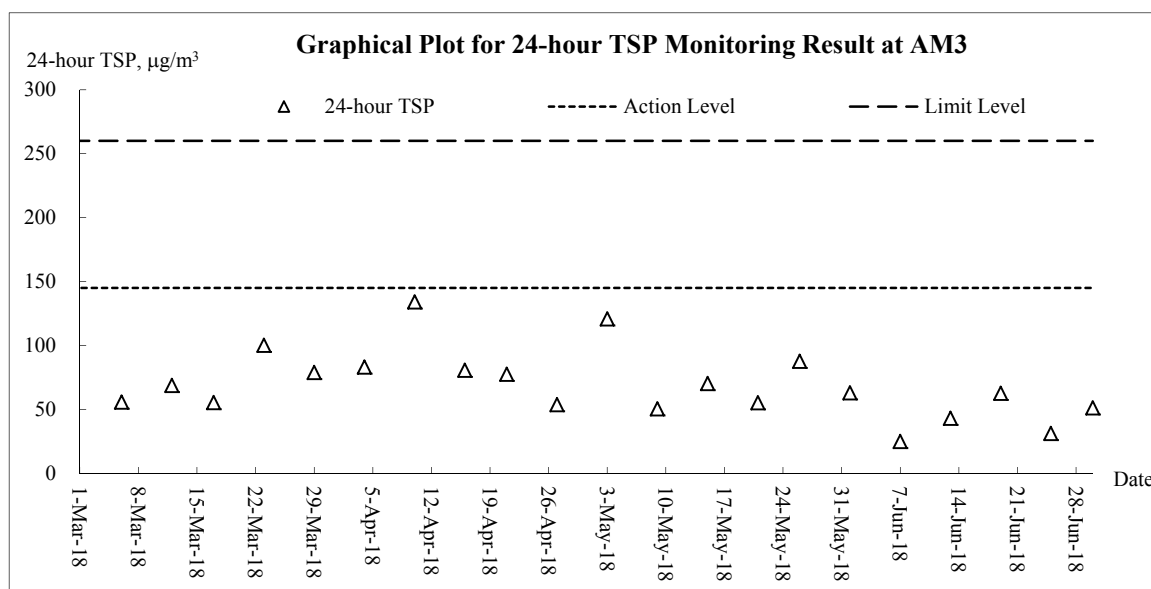
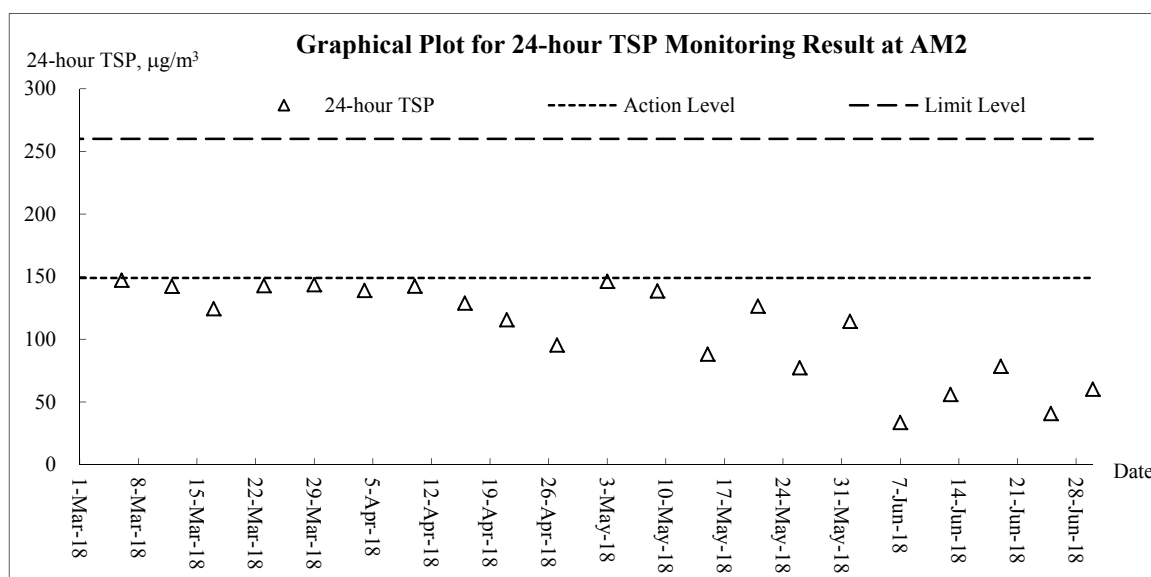




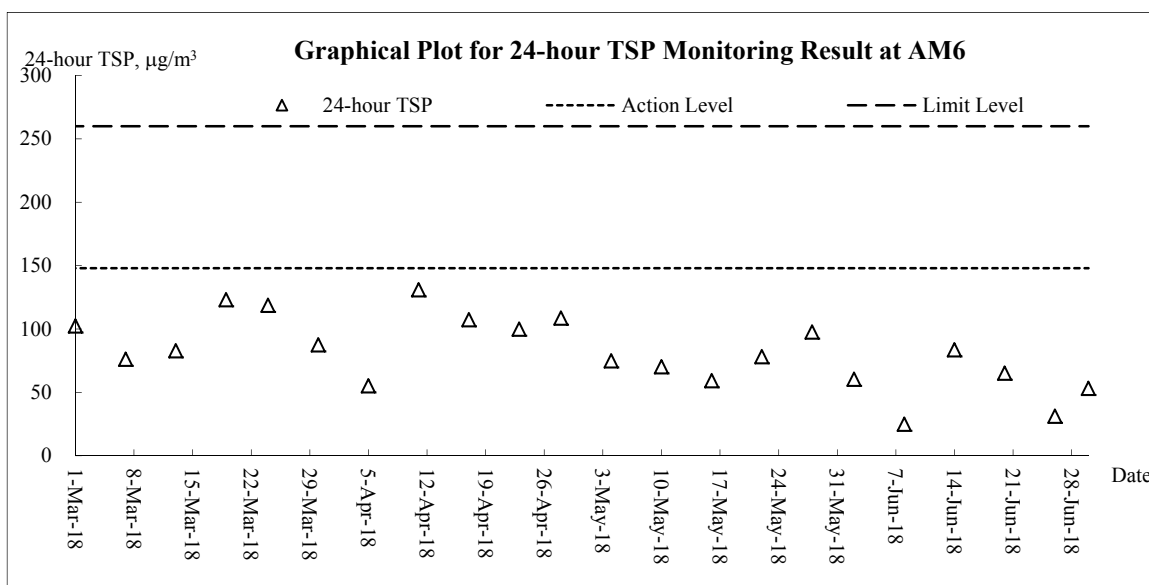
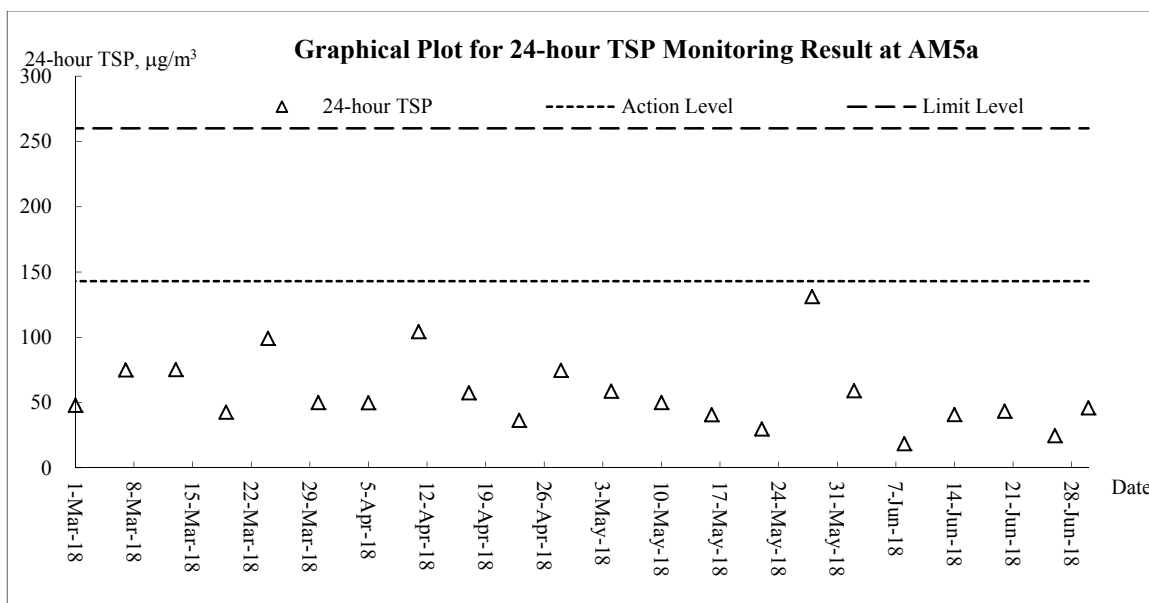
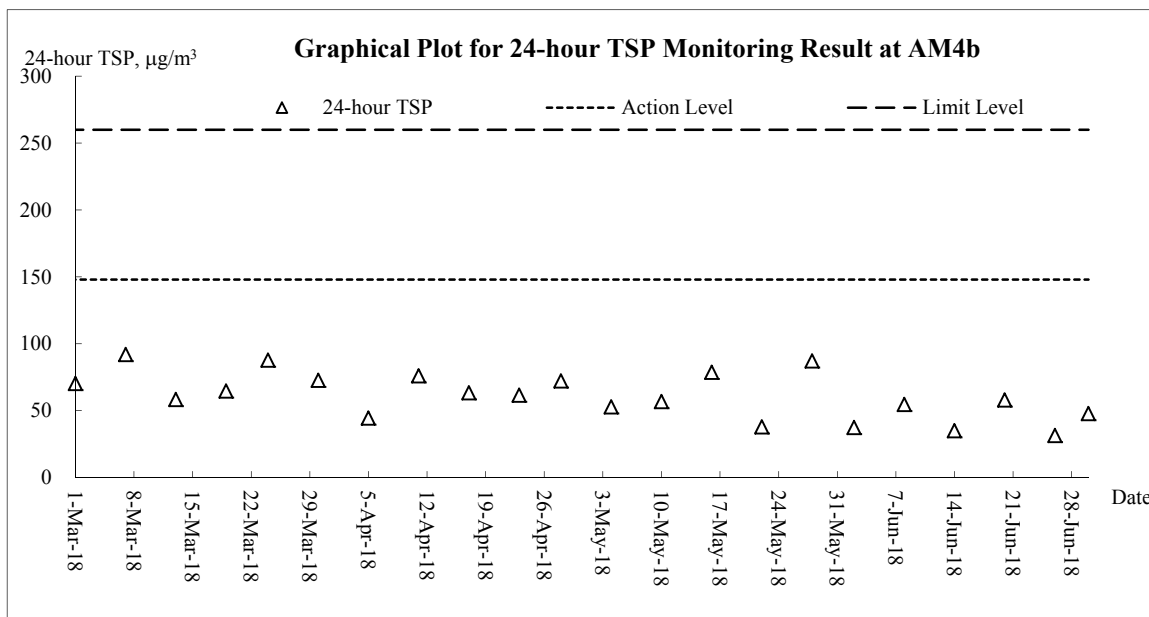
### Air Quality – 24-hour TSP

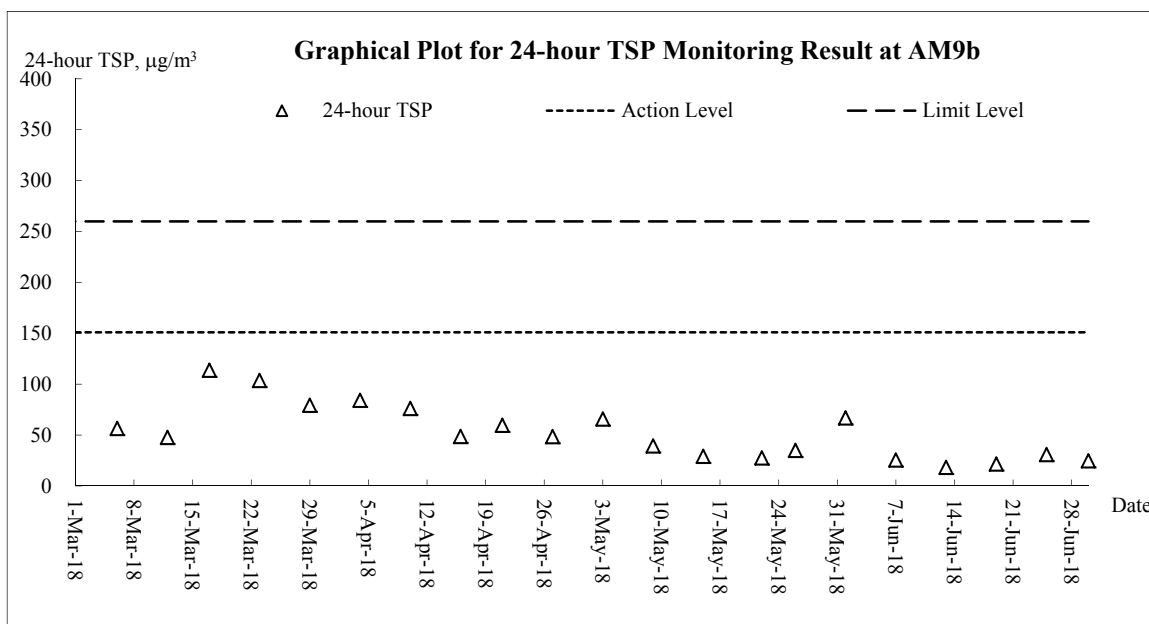
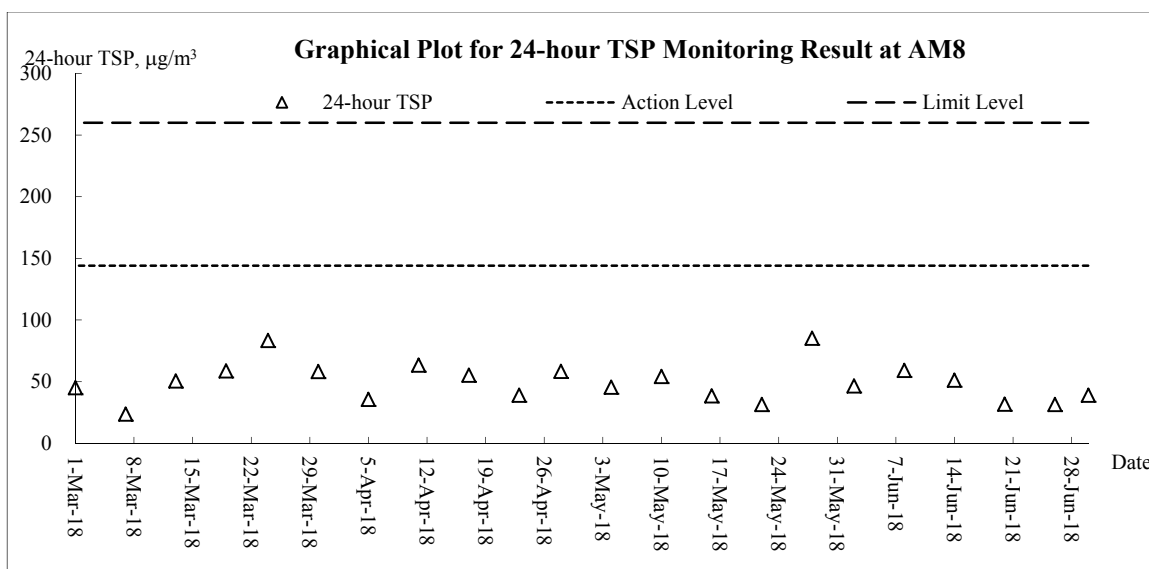
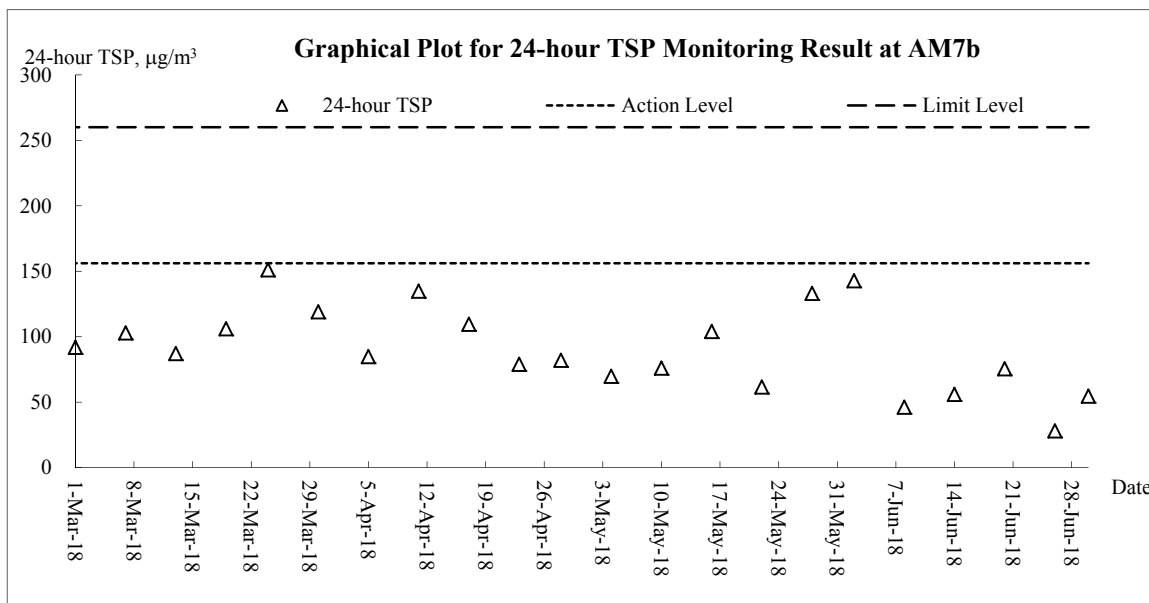


*Note: Air Quality Monitoring Location AM1b was suspended on 28 April 2018 due to the land issues and it was relocated to AM1c since 29 May 2018.*

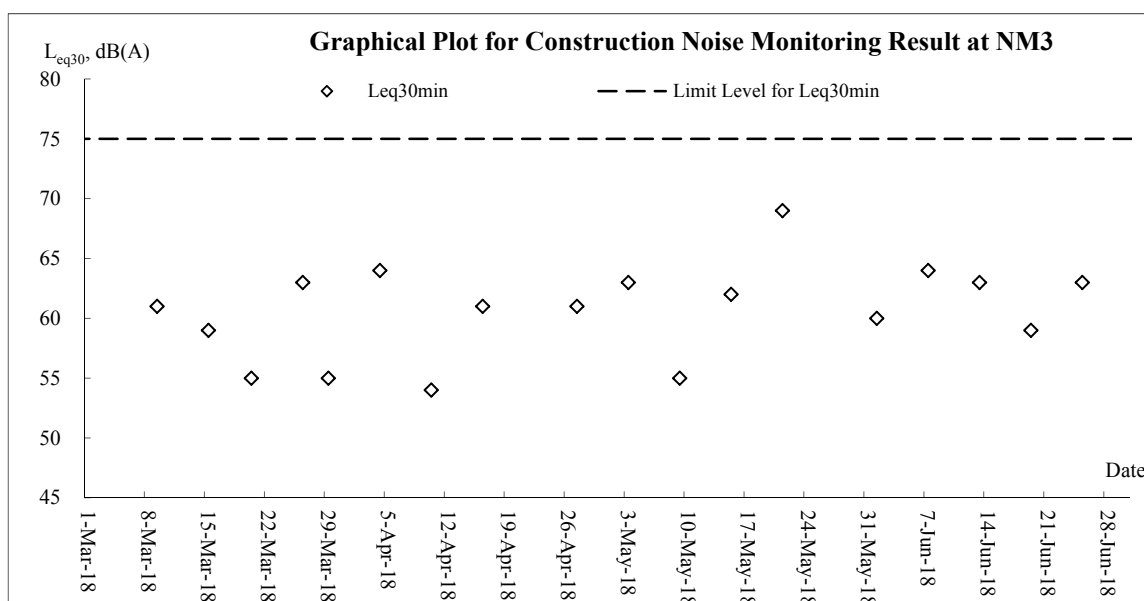
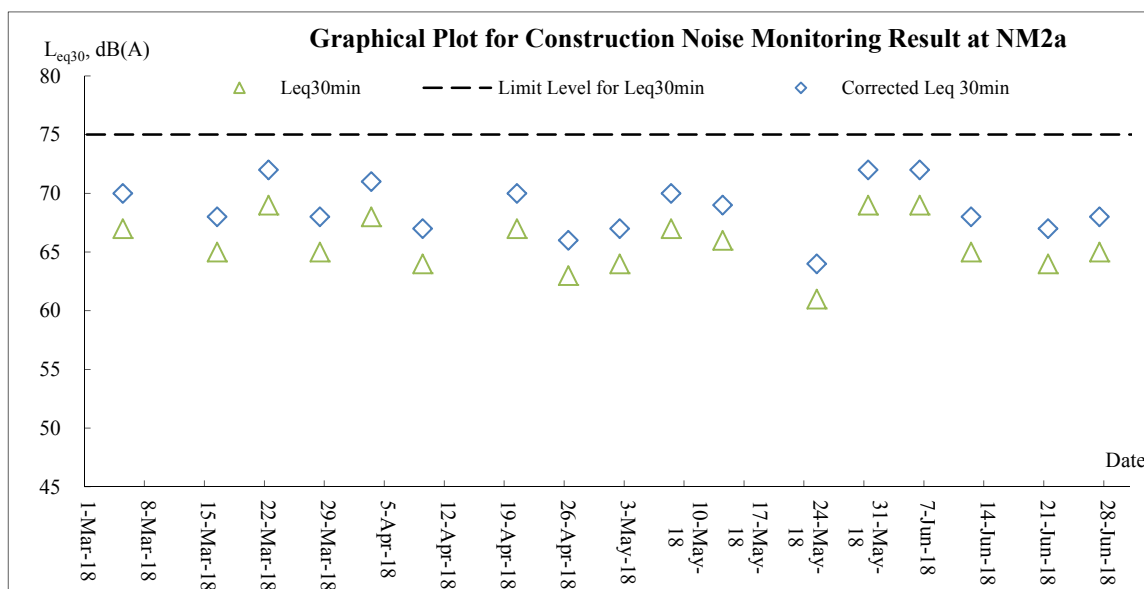
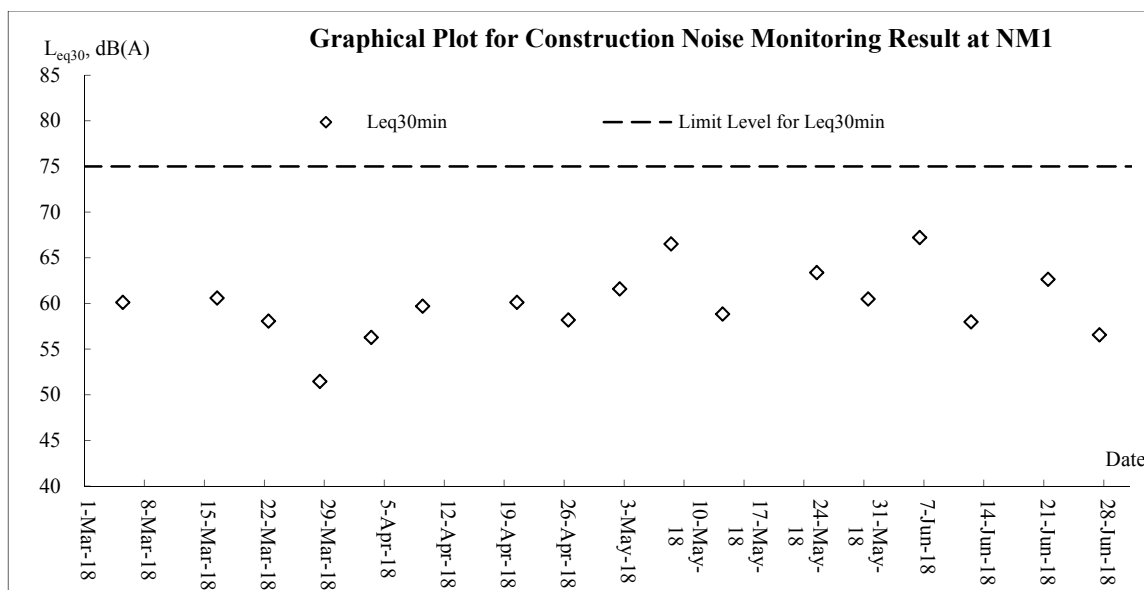


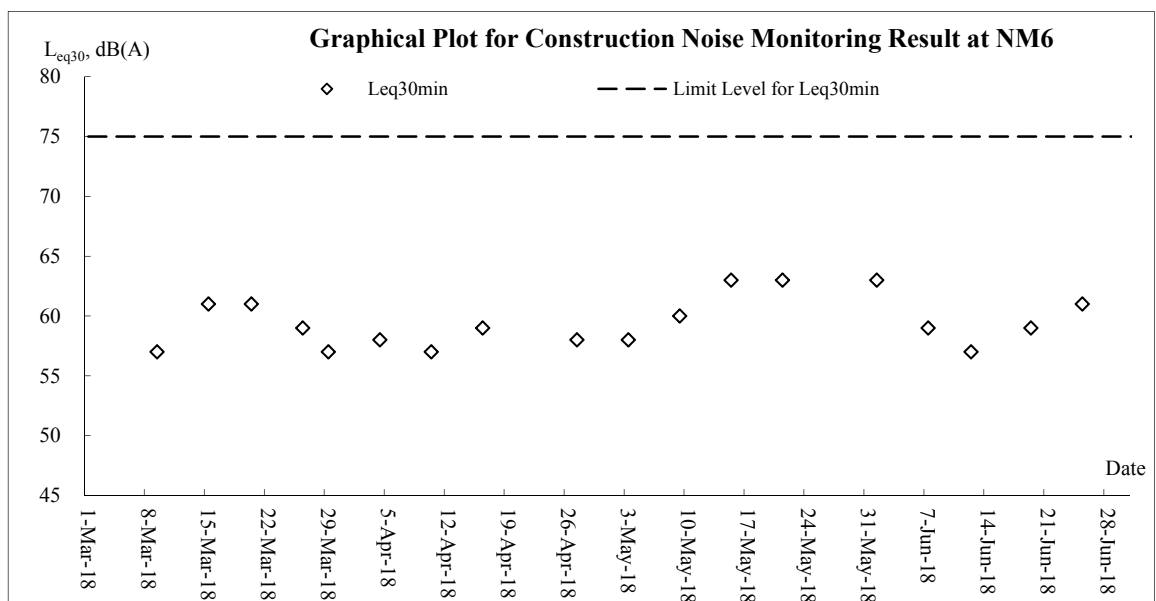
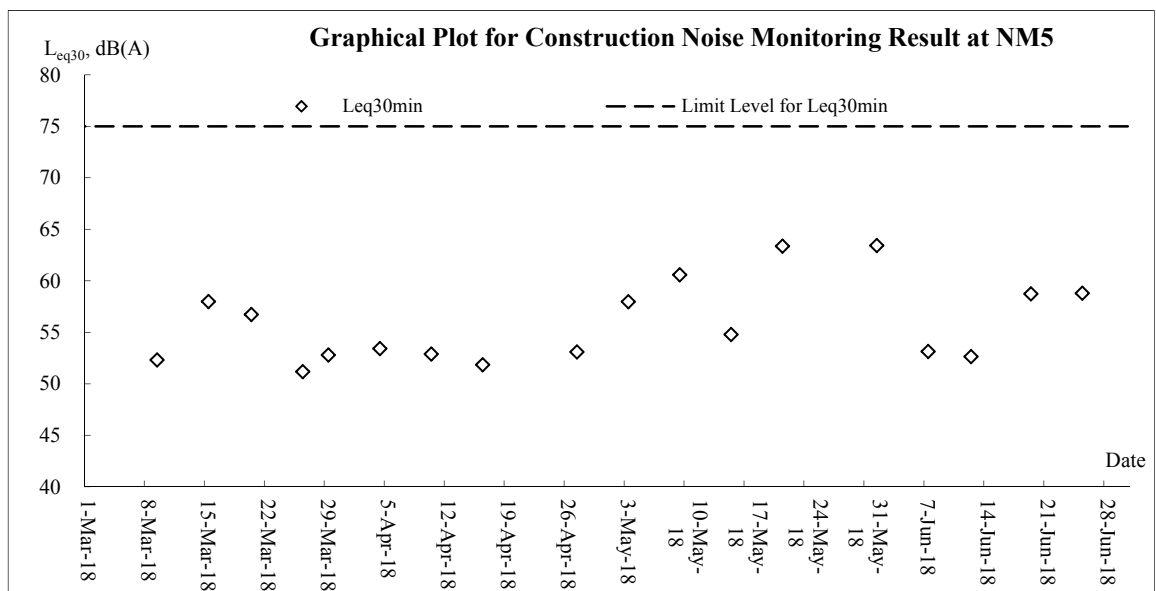
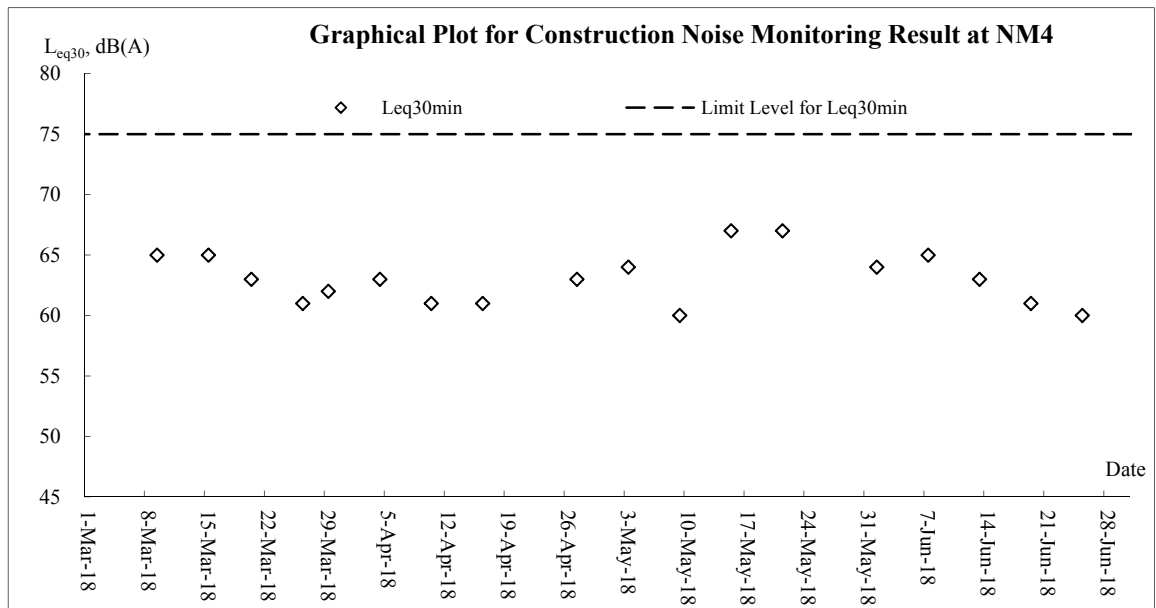


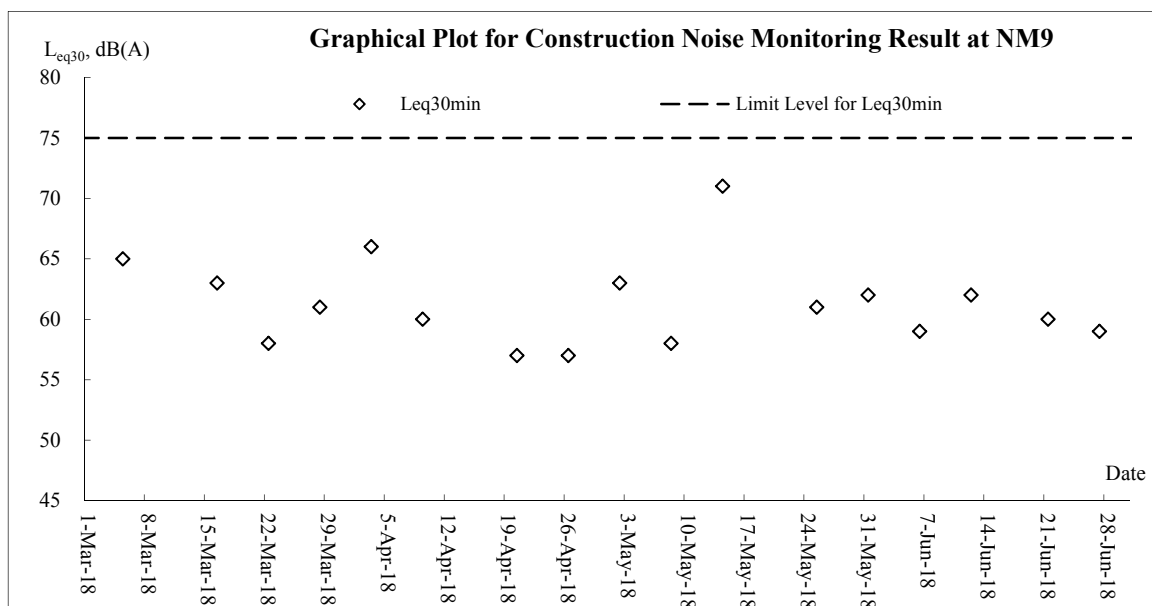
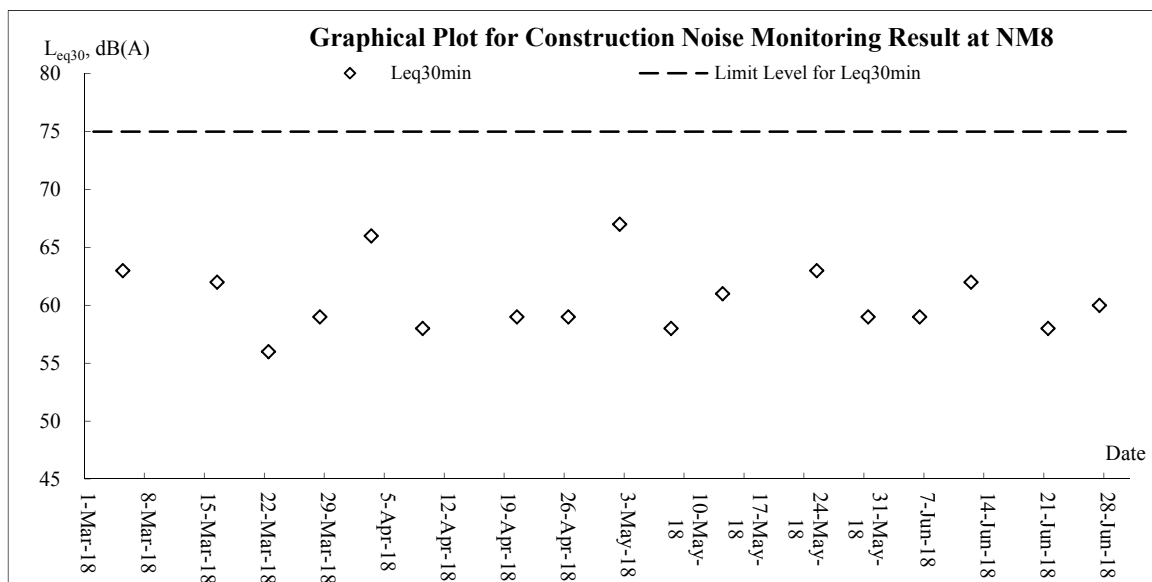
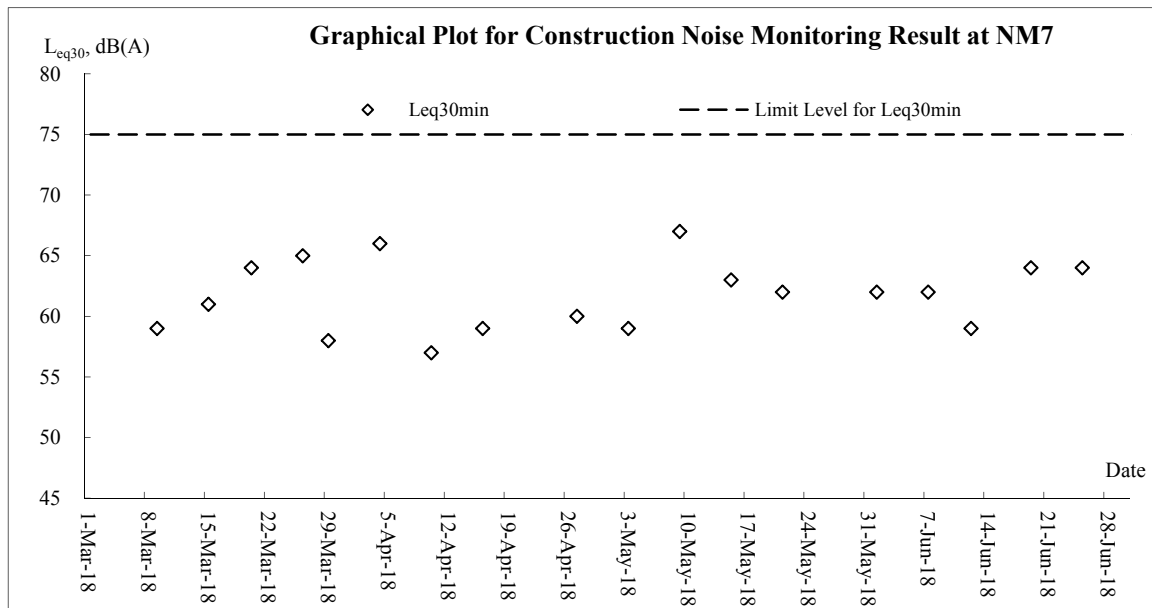


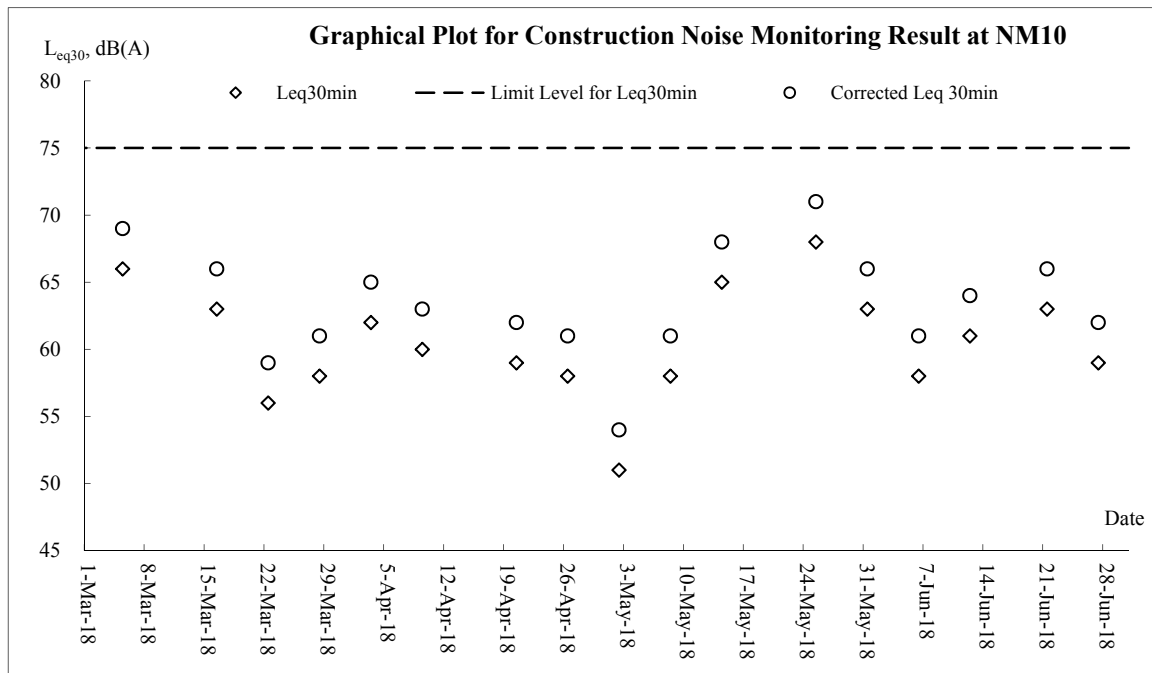


### Noise



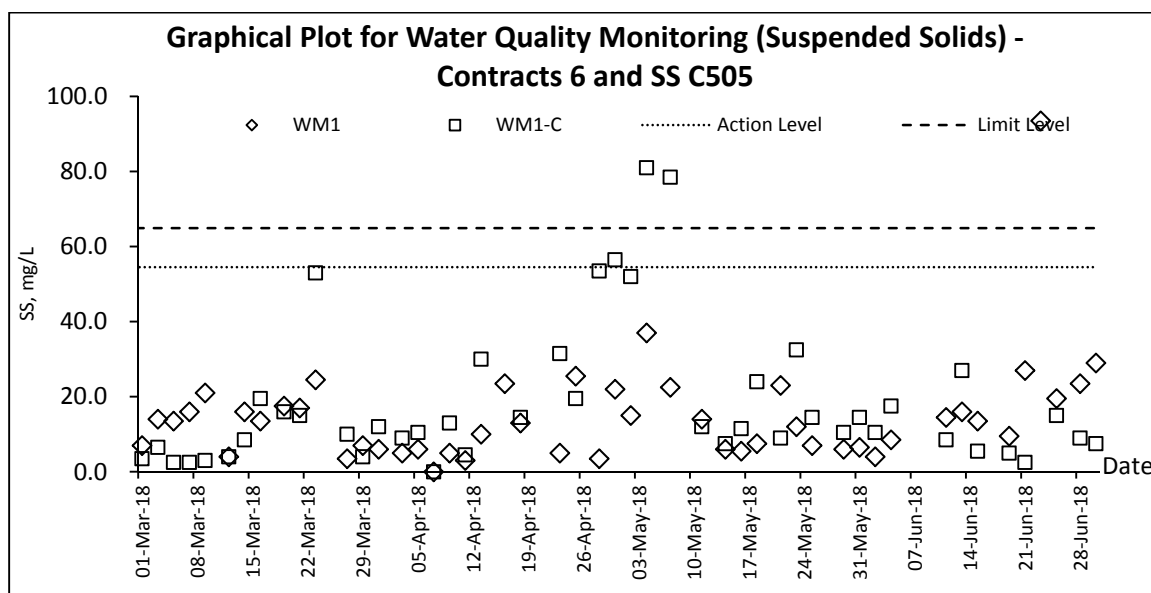
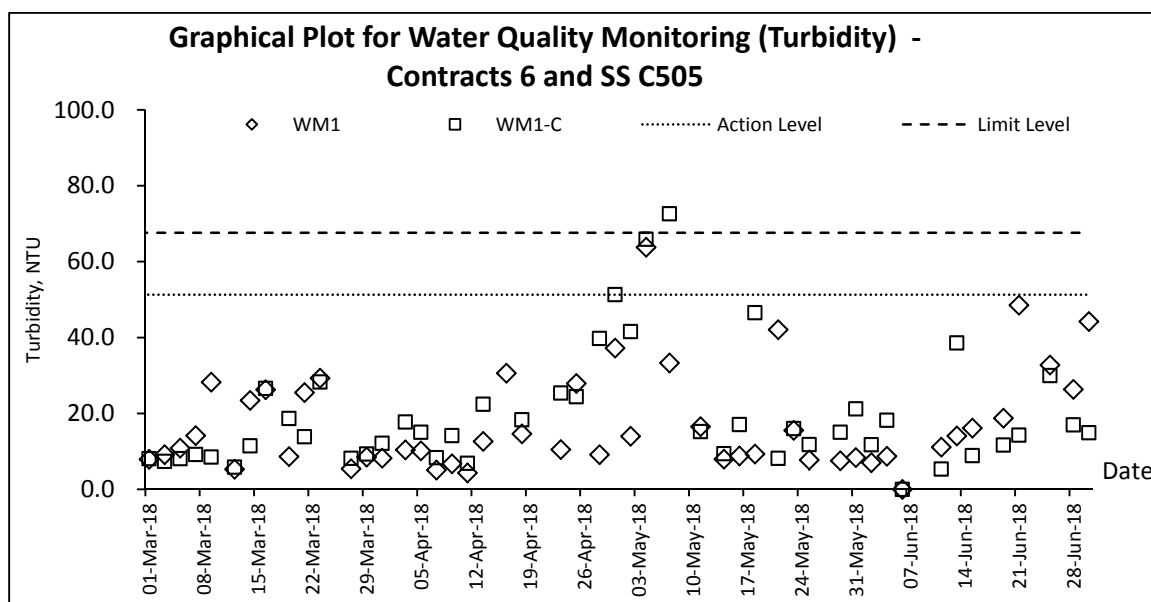
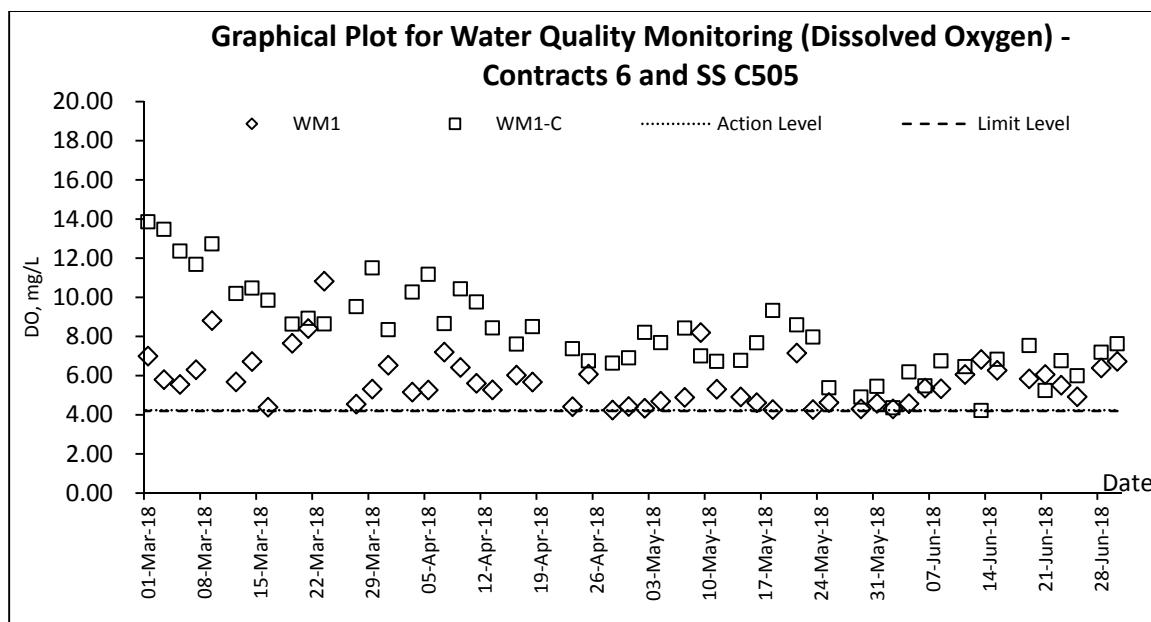


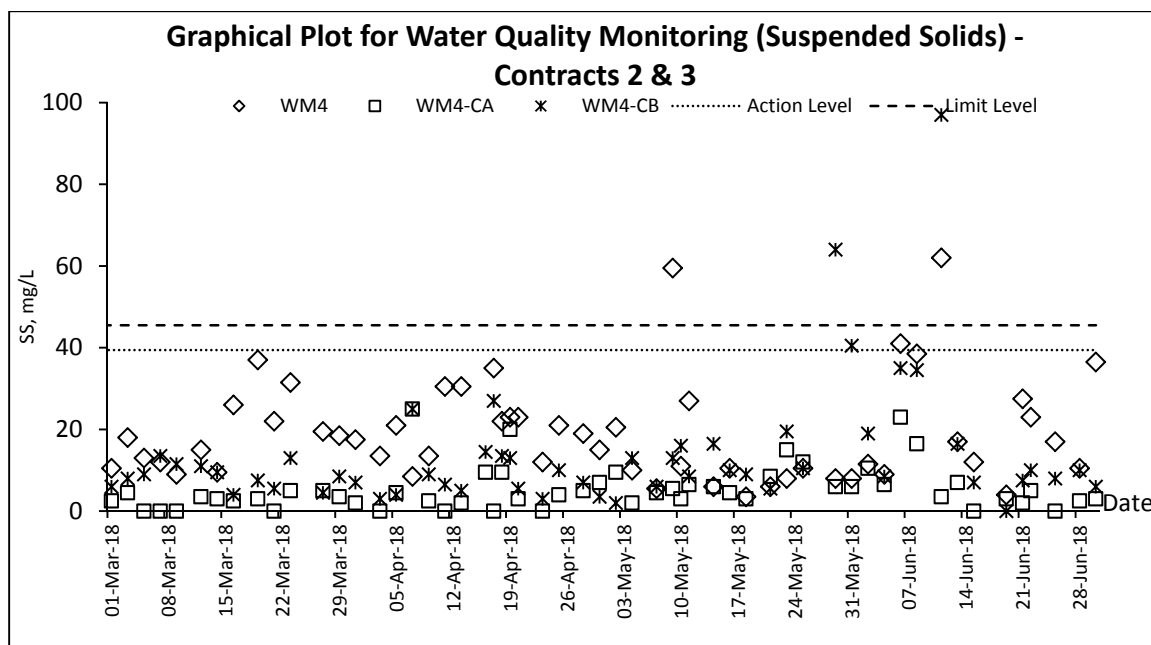
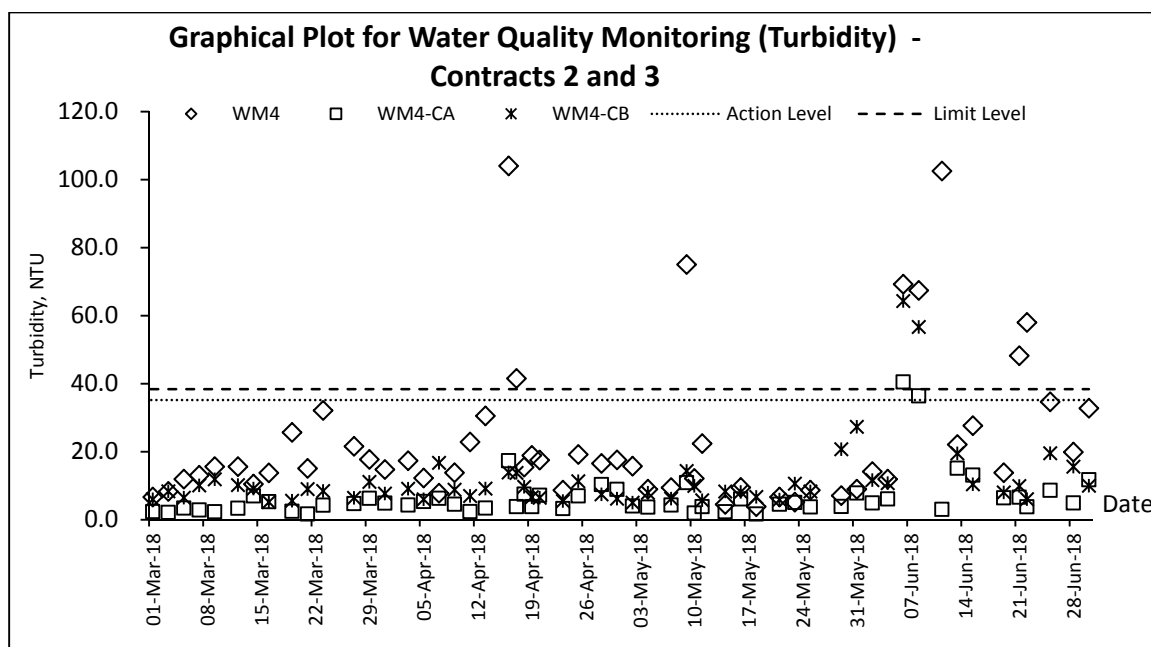
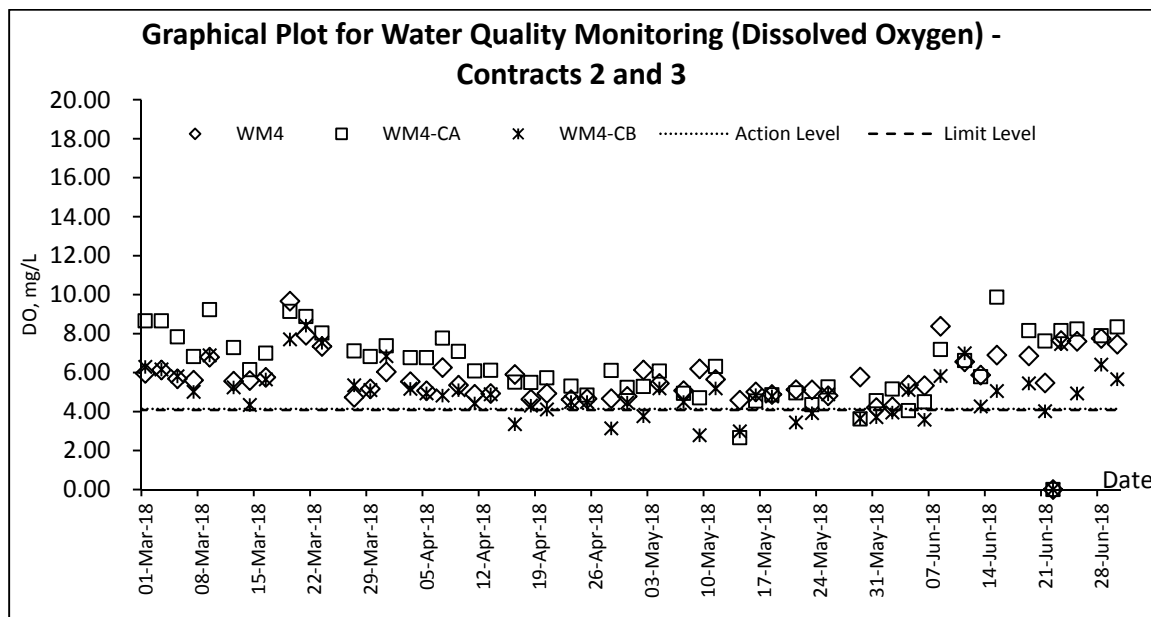


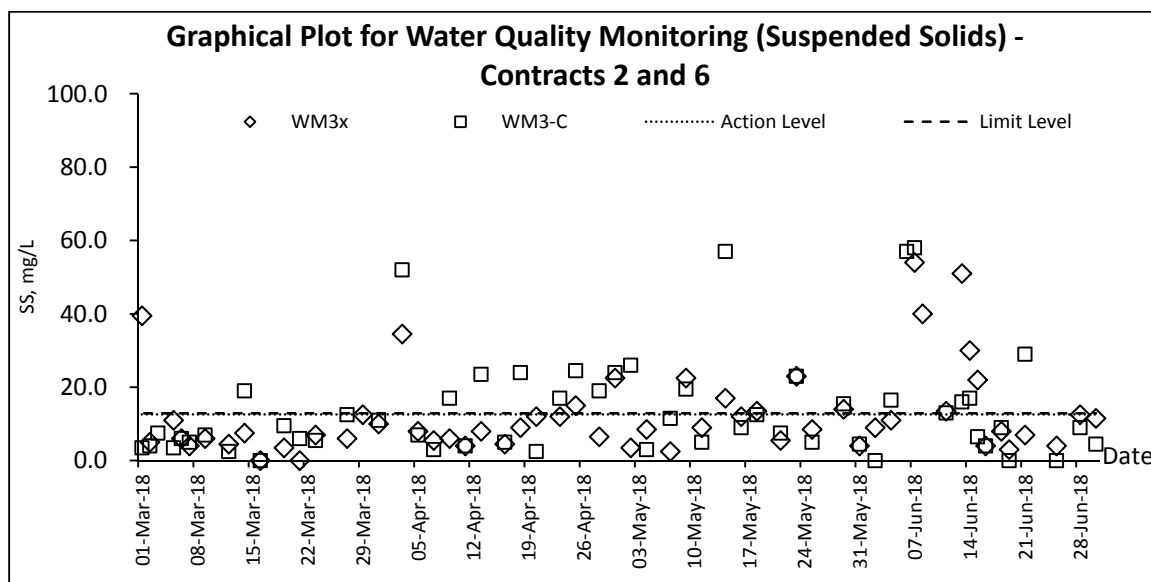
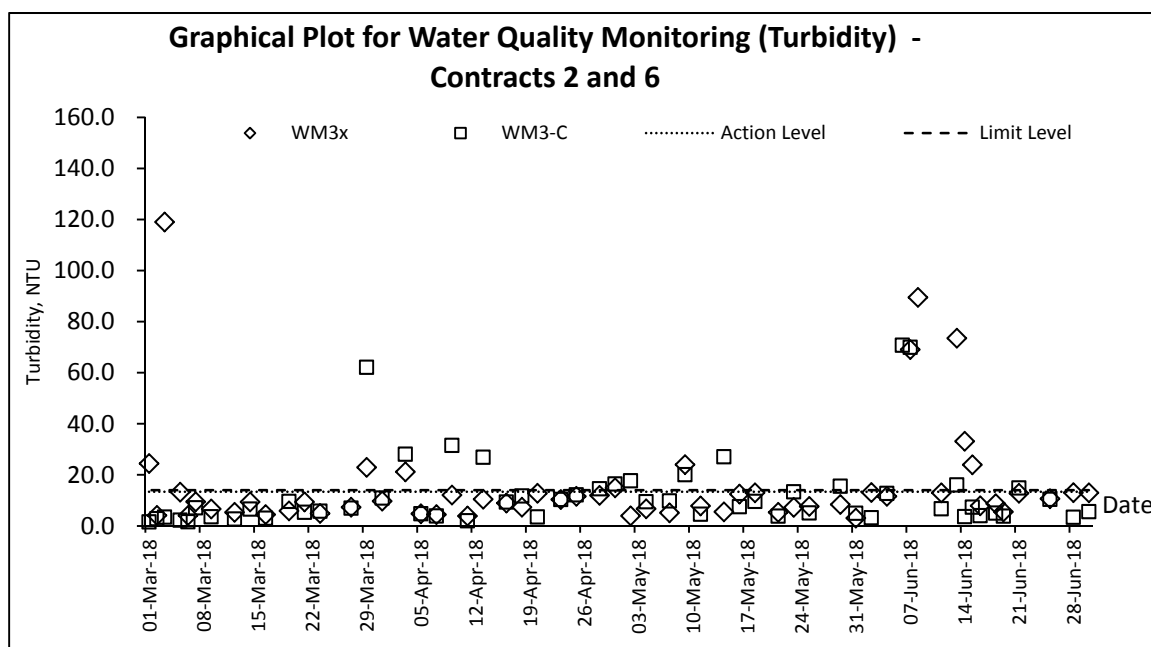
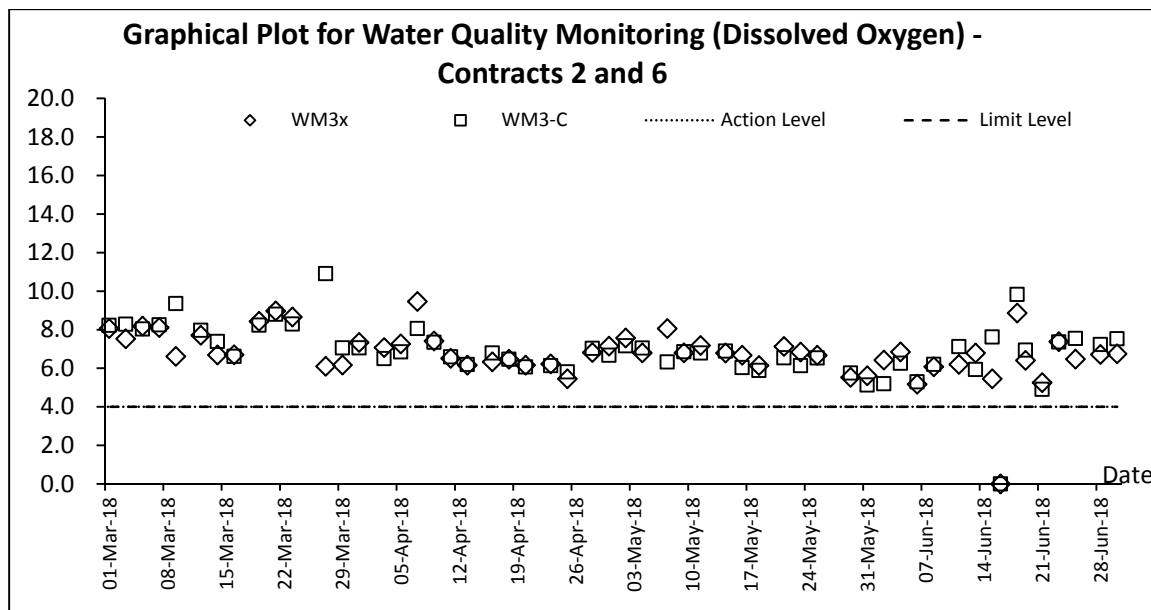


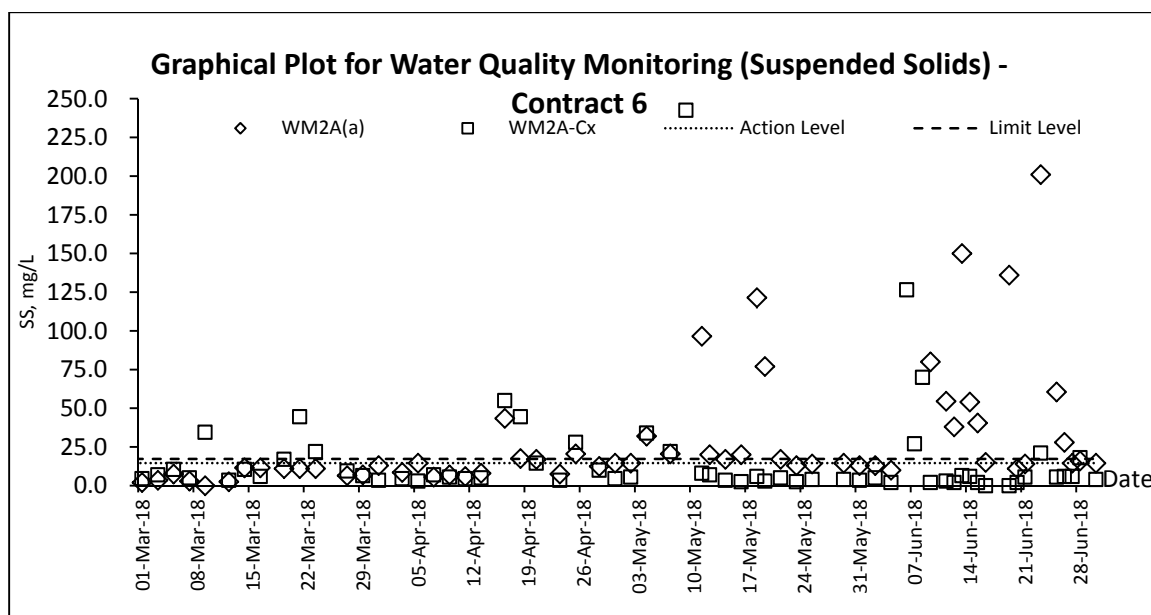
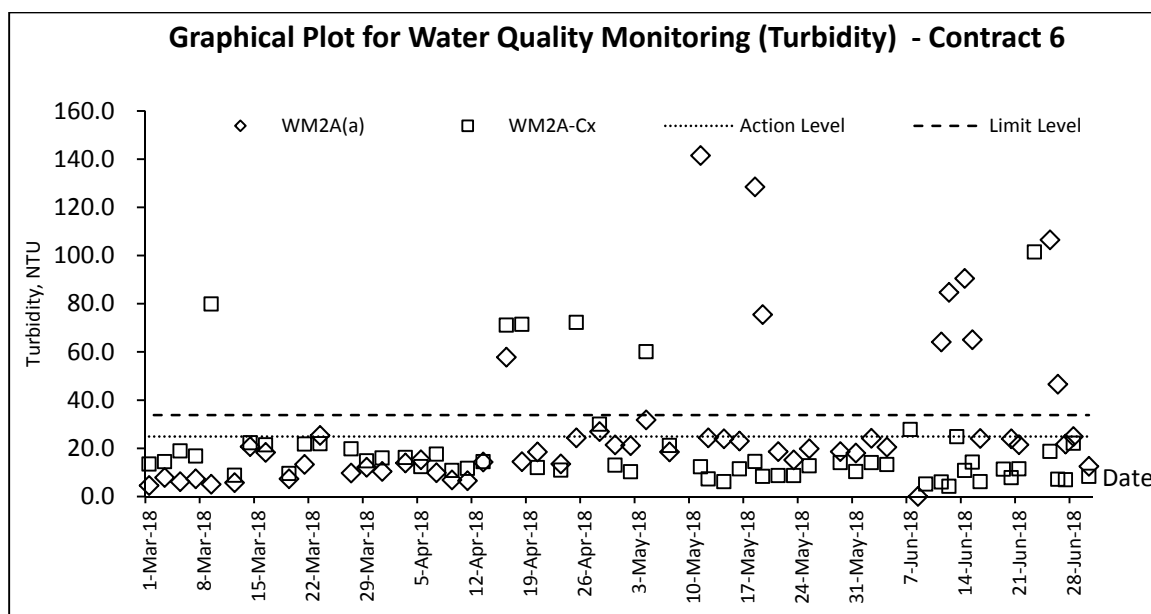
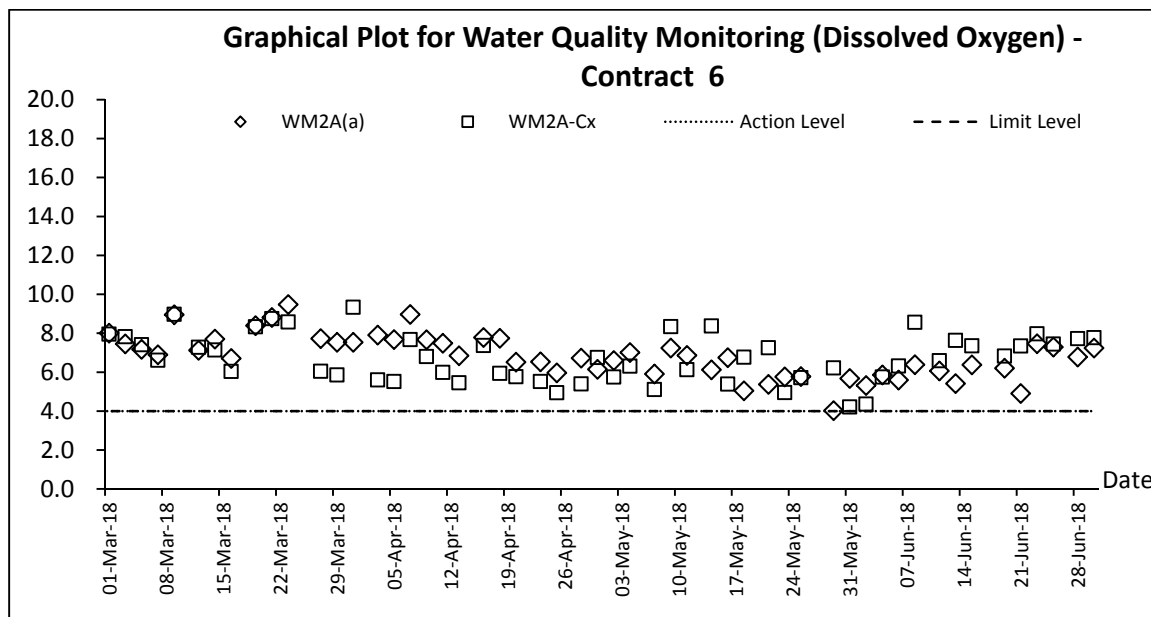


## Water Quality









## **Appendix K**

### **Meteorological Data**

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jun-18	Fri	Fine and very hot. Light to moderate southwesterly winds.	0	31	8.2	70	E/SE
2-Jun-18	Sat	Fine and very hot. Light to moderate southwesterly winds.	Trace	30	7.9	69	E
3-Jun-18	Sun	Mainly cloudy with a few showers and thunderstorms.	Trace	30.2	10.5	66	E
4-Jun-18	Mon	Mainly cloudy with a few showers and thunderstorms.	12.4	30	10.8	72.2	E/NE
5-Jun-18	Tue	Cloudy with squally showers and thunderstorms.	28.2	28.5	9.3	83	E/NE
6-Jun-18	Wed	occasionally strong offshore and on high ground	58.3	27.1	7	92.5	E/NE
7-Jun-18	Thu	Mainly cloudy with a few squally showers and thunderstorms	47.4	27.5	8	85	E/NE
8-Jun-18	Fri	Mainly cloudy with a few squally showers and thunderstorms	70.2	27.2	10.1	86.2	E/SE
9-Jun-18	Sat	Mainly fine. Very hot and dry in the afternoon. Light winds.	4.8	28.4	8.2	73	N/NW
10-Jun-18	Sun	Mainly fine. Very hot and dry in the afternoon. Light winds.	0	29.6	7.3	68.5	N/NW
11-Jun-18	Mon	Mainly fine. Very hot and dry in the afternoon. Light winds.	0	29.3	6	66.2	N/NW
12-Jun-18	Tue	Mainly cloudy with showers and a few thunderstorms.	39.6	27.6	8.3	81.5	E/NE
13-Jun-18	Wed	Cloudy. Heavy showers at first.	109.3	27	7	85.7	E/NE
14-Jun-18	Thu	Mainly cloudy with sunny intervals.	1.3	26.7	5.6	82	N/NW
15-Jun-18	Fri	Mainly cloudy with isolated showers. Sunny periods	0.2	26.8	6.5	77	N/NW
16-Jun-18	Sat	Mainly cloudy with sunny intervals.	0	28.5	7.8	75	N/NW
17-Jun-18	Sun	Mainly cloudy with isolated showers. Sunny periods	Trace	28.7	8.1	72	S/SW
18-Jun-18	Mon	Mainly cloudy with sunny intervals.	Trace	29.2	8	73.7	S/SW
19-Jun-18	Tue	Hot with sunny periods.	Trace	29.5	8.2	79.2	S/SW
20-Jun-18	Wed	Hot with sunny periods.	Trace	29.5	6.5	82	SW
21-Jun-18	Thu	Mainly cloudy with a few showers.	2.6	29.6	6.5	80	S/SW
22-Jun-18	Fri	Mainly cloudy with a few showers.	32.9	27.8	7.5	85	S/SE
23-Jun-18	Sat	Mainly cloudy with a few showers.	25.6	28.4	7.5	84	S/SE
24-Jun-18	Sun	Hot with sunny periods.	18.1	28.8	7.6	81.5	E/SE
25-Jun-18	Mon	Mainly cloudy with occasional showers	6.2	28	10	85.5	E/SE
26-Jun-18	Tue	Sunny periods. It will be hot.	1.7	28.3	6	84	E/SE
27-Jun-18	Wed	Mainly cloudy with a few showers	Trace	28.1	9.7	81.5	E/NE
28-Jun-18	Thu	Mainly fine. Very hot	0	28.6	6.1	74.5	SW
29-Jun-18	Fri	Mainly fine apart from isolated showers	Trace	29.5	7	75.7	W/SW
30-Jun-18	Sat	Mainly fine. Very hot with isolated showers	Trace	29.7	6.8	74.5	W/SW



## **Appendix L**

### **Waste Flow Table**

# **APPENDIX G: MONTHLY SUMMARY WASTE FLOW TABLE**

FOR: **2018**

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 '000 kg)	(in '000 kg)	(in '000 kg)	(in '000m <sup>3</sup> )
Jan	86.6400	0.0000	0.0000	5.2900	81.3500	1.6570	45.0000	0.3100	2.8000	4.5760	0.6575
Feb	33.2700	0.0000	0.0000	3.6700	29.6000	1.3470	32.0000	0.2500	2.4000	1.9500	0.2850
Mar	39.7600	0.0000	0.0000	3.4600	36.3000	1.3380	36.0000	0.3050	2.7000	9.8560	0.6290
Apr	55.5979	0.0000	0.0000	3.3680	52.2299	1.2470	33.7800	0.3240	2.5000	0.0000	0.5748
May	12.9815	0.0000	0.0000	4.6780	8.3035	1.1470	30.1400	0.3040	2.6000	44.9600	0.7056
June	8.5257	0.0000	0.0000	3.1916	5.3341	1.2200	31.7800	0.2870	2.3000	0.1760	0.7534
Sub-total	236.7751	0.0000	0.0000	23.6576	213.1175	7.9560	208.7000	1.7800	15.3000	61.5180	3.6053
July	0.0000										
Aug	0.0000										
Sep	0.0000										
Oct	0.0000										
Nov	0.0000										
Dec	0.0000										
Sub-total	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	236.7751	0.0000	0.0000	23.6576	213.1175	7.9560	208.7000	1.7800	15.3000	61.5180	3.6053

Notes:

- (1) The performance targets are given in PS 1.100(14)(a)
- (2) The waste flow table shall also include C&D materials 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) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials.
- (5) Assumption: 1m<sup>3</sup> of inert material weight 2.2 tonne    1m<sup>3</sup> of non-inert material weight 1.6 tonne    1m<sup>3</sup> of chemical waste weight 0.88 tonne

Forecast of Total Quantities of C&D Materials to be Generated from the Project											
Forecast Made at the End of the Project	Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemicals Waste	Others, e.g. general refuse
									(see Note 3)		
Month- Year	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000m3)
Dec-13	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	220.6270	0.0000	0.0000	0.0000	0.0000
Dec-14	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609
Dec-15	570.9459	0.0000	20.8159	543.2162	6.9138	4.5492	37.6310	3.9220	11.9700	16.1920	1.1696
Dec-16	905.0989	0.0000	7.4372	427.7834	469.8783	24.8350	430.5200	3.8500	18.7262	34.2936	1.9720
Dec-17	741.9482	0.0000	8.0385	175.6792	558.2305	78.3865	1681.8000	4.0700	30.5175	48.7906	5.9610
Dec-18	236.7751	0.0000	0.0000	23.6576	213.1175	7.9560	208.7000	1.7800	15.3000	61.5180	3.6053
Total	2880.2087	0.0000	39.0278	1546.7310	1294.4500	121.3512	2582.4880	14.0610	76.5207	171.6742	14.9688

**Monthly Summary Waste Flow Table for 2018 (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	3.089	0.304	0.060	0.000	2.725	0.923	0.000	0.000	0.000	0.000	0.150
Feb	2.697	0.256	0.150	0.000	2.292	1.144	0.000	0.000	0.000	0.000	0.095
Mar	1.524	0.141	0.120	0.000	1.263	0.211	0.000	0.000	0.000	0.000	0.085
Apr	2.880	0.786	0.360	0.000	1.734	0.788	0.000	0.000	0.000	0.000	0.125
May	1.164	0.290	0.101	0.000	0.773	0.185	0.000	0.000	0.000	0.000	0.150
Jun	0.862	0.082	0.515	0.000	0.265	0.000	0.000	0.000	0.000	0.000	0.110
Sub-total	12.216	1.859	1.306	0.000	9.051	3.251	0.000	0.000	0.000	0.000	0.715
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	12.216	1.859	1.306	0.000	9.051	3.251	0.000	0.000	0.000	0.000	0.715

- 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>.

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	Diposal as Public Fill	Imported Fill	Metals	Paper/card board 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 '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )
52.5	5.2	12.3	0.0	35.0	41.8	5.0	1.0	1.0	0.5	44.8

Notes:

- (1) The performance targets are given in PS Clause 6(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 Site.
- (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works if equal to or exceed 50,000 m<sup>3</sup>.

**SUMMARY TABLE FOR WORK PROCESSES OR ACTIVITIES REQUIRING TIMBER FOR TEMPORARY WORKS**

Contract No.: CV/2012/09

Contract Title: Liantang /Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works - Contract 3

Item No.	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m <sup>3</sup> )	Actual Quantities Used (m <sup>3</sup> )	Remarks
1	Formwork for Construction of Retaining Wall NB67	Easy handling by manpower	182.33	182.33	
3	Formwork for Construction of Retaining Wall NB69	Easy handling by manpower	81.94	81.94	
4	Formwork for Construction of Retaining Wall NB72	Easy handling by manpower	227.59	227.59	
5	Formwork for Construction of Retaining Wall NB73	Easy handling by manpower	24.03	24.03	
6	Formwork for Construction of Retaining Wall NB71	Easy handling by manpower	33.00	33.00	
7	Formwork for Construction of Retaining Wall FR32	Easy handling by manpower	98.40	98.40	
8	Formwork for Construction of Drainage	Easy handling by manpower	150.00	150.00	
Total Estimated Quantity of Timber Used			797.29		

- Notes:
- (a) The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.
  - (b) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.24(11)..



Name of Department: CEDD

Contract No.: NE/2014/02

Monthly Summary Waste Flow Table for 2018

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
Jan-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mar-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Apr-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
May-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul-18											
Aug-18											
Sep-18											
Oct-18											
Nov-18											
Dec-18											
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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 6m3 capacity per dump truck

## Monthly Summary Waste Flow Table for 2018 (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	4.152	0	0.629	1.947	1.576	0	0	0.240	0	0	0.892
Feb	2.740	0	0.867	0.544	1.329	0	0	0.402	0	0	0.578
Mar	3.269	0	1.581	0.969	0.719	0	0	0.380	0	0	0.725
Apr	2.901	0	0.255	1.955	0.691	0	0	0.360	0	0	0.921
May	3.194	0	0.068	1.964	1.162	0	0	0.384	0	0	1.340
Jun	2.206	0	0	0.9775	1.228	0	0	0.270	0	0	0.714
Sub-total	18.462	0.000	3.400	8.357	6.705	0.000	0.000	2.036	0.000	0.000	5.170
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	1016.856	0.000	166.627	279.000	571.230	53.939	0.000	8.415	0.007	34.045	13.921

- 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: CEDDContract 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 2018 (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	0.015	0	0	0	0.015	0	14.5	0.5	0.001	0	0.15
Feb	0	0	0	0	0	0	9	0.18	0.001	0	0.13
Mar	0.005	0	0	0	0.005	0	6	0.15	0.001	0	0.2
Apr	1.1	0	0	0	1.1	0	6.6	0.22	0.001	0	0.3
May	0.077	0	0	0	0.077	0	1.3	0.15	0.001	0	0.1
June	0	0	0	0	0	0	6	0.4	0.001	0	0.05
Sub-total	1.197	0	0	0	1.197	0	43.4	1.6	0.006	0	0.93
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	1.197	0	0	0	1.197	0	43.4	1.6	0.006	0	0.930

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 2018** [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	5.298	0.646	0.160	0.000	4.492
Feb	7.243	0.572	0.320	0.000	6.351
Mar	11.241	0.831	0.225	0.000	10.186
Apr	3.717	1.458	0.257	0.000	2.002
May	5.346	0.788	0.300	0.000	4.258
Jun	6.828	0.661	0.376	0.000	5.792
Sub-total	39.672	4.956	1.638	0.000	33.079
Jul					
Aug					
Sep					
Oct					
Nov					
Dec					
Total	39.672	4.956	1.638	0.000	33.079

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	375.870	375.870	0.220	0.220	0.032	0.032	0.000	0.000	0.000	0.000	1.918
Feb	0.000	0.000	720.120	720.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.223
Mar	0.000	0.000	220.860	220.860	0.830	0.830	0.005	0.005	0.000	0.000	0.005	0.005	2.711
Apr	0.000	0.000	202.130	202.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.470
May	0.000	0.000	294.330	294.330	0.000	0.000	0.042	0.042	0.000	0.000	0.000	0.000	2.490
Jun	0.000	0.000	138.850	138.850	0.990	0.990	0.000	0.000	1.200	0.000	0.000	0.000	2.997
Sub-total	0.000	0.000	1,952.160	1,952.160	2.040	2.040	0.079	0.079	1.200	0.000	0.005	0.005	14.809
Jul													
Aug													
Sep													
Oct													
Nov													
Dec													
Total	0.000	0.000	1,952.160	1,952.160	2.040	2.040	0.079	0.079	1.200	0.000	0.005	0.005	14.809

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					
138.85 tons of scrap metals were sent to Wai Hung Metal Ltd. for recycling	1,321.10 tons of broken concrete were sent to Tailor Recycled Aggregates Ltd. for recycling.	990.0 kg of paper were sent to Lau Choi Kee Papers Co. 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.



## **Appendix M**

### **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><u>Air Quality Impact (Construction)</u></b>							
3.6.1.1	2.1	<b>General Dust Control Measures</b> The following dust suppression measures should be implemented: <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	<b>Best Practice for Dust Control</b> 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: <i>Good site management</i> <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> <i>Disturbed Parts of the Roads</i> <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	<b>Use of Movable Noise Barrier</b> 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.	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	<b>Use of Noise Enclosure/ Acoustic Shed</b> 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.	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	<b>Use of Noise Insulating Fabric</b> 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.	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	<b>Good Site Practice</b> The good site practices listed below should be followed during each phase of construction: <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 from 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	<b>Good Site Practices</b> 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: <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 N**

### **Investigation Report for Exceedance**

**To**                      **Mr. Vincent Chan**

**Fax No**                      **By e-mail**

**Company** CRBC-CEC-Kaden JV

cc

**From** Nicola Hon

**Date**                    **21 June 2018**

**Our Ref**    TCS00694/13/300/**F1615a**

**No of Pages**      7      (**Incl. cover sheet**)

**RE Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
**Investigation Report of Exceedance of Water Quality at Location WM2A(a) on 6, 7,**  
**8, 9 and 11 June 2018**

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

Dear Sir,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F1593 dated 6 June 2018

TCS00694/13/300/F1596 dated 7 June 2018

TCS00694/13/300/F1601 dated 11 June 2018

TCS00694/13/300/F1605 dated 13 June 2018

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,

For and on Behalf of

**Action-United Environmental Services & Consulting**

Luigi

Nicola Hon  
Environmental Consultant

Encl.

c.c. Ms. Clara U (EPD)  
Mr. Simon Leung (ER of C6/ AECOM)  
Mr. Antony Wong (IEC, SMEC)

Fax: 2685 1133  
Fax: 2251 0698  
By email

**Agreement No. CE 45/2008**
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**
**Investigation Report on Action or Limit Level Non-compliance**

Project		CE 45/2008				
Date		6 Jun 2018	7 Jun 2018	8 Jun 2018	9 Jun 2018	11 Jun 2018
Location		WM2A(a)				
Time		11:00	10:40	10:20	10:35	10:50
Parameter		Turbidity (NTU) / Suspended solids (mg/L)				
Action Level		24.9 AND 120% of upstream control station of the same day / 14.6 AND 120% of upstream control station of the same day				
Limit Level		33.8 AND 130% of upstream control station of the same day / 17.3 AND 130% of upstream control station of the same day				
Measured Levels	WM2A-C	243.0 / 126.5	27.8 / 27.0	263.5 / 70.0	5.1 / 2.0	6.0 / 3.0
	WM2A(a)	<b>967.5 / 444.5</b>	<b>345.5 / 266.0</b>	<b>&gt;999 / 785.0</b>	<b>183.0 / 80.0</b>	<b>64.1 / 54.5</b>
Exceedance		Limit Level	Limit Level	Limit Level	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> <li>1. According to the site information provided from the Contractor of Contract 6 (CCKJV), construction activities carried out on 6 to 11 June 2018 at Bridge D (upstream of WM2A(a)) were mainly bridge construction. The monitoring locations and work boundary are shown in <b>Figure 1</b>.</li> <li>2. According to the site photos taken by the monitoring team during water sampling on 6 to 8 June 2018, muddy water was observed throughout the river course including control station WM2A-C and impact station WM2A(a). (<b>Photos 1 to 6</b>) On 9 and 11 June 2018, the water quality at control station was clear while muddy water was observed at impact station. (<b>Photos 7 to 10</b>)</li> <li>3. According to the weather information from the Observatory, heavy rainstorm was recorded during 5 to 8 June 2018, in which Amber Rainstorm Warning Signal was in force on 6 and 8 June 2018 and Red Rainstorm Warning Signal was in force on 8 June 2018. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. On 9 June 2018, it was observed that muddy water from upstream after rainstorm was being trapped at the Nylon Dam which located at intermediate of the construction site. On 11 June 2018, deflate of Nylon Dam was observed and muddy water was generated by the stirred up sediment accumulated at the river bed. (<b>Photos 11 &amp; 12</b>)</li> <li>4. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 7 June 2018 to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below.</li> </ol>				

	<p>(a) Bridge construction work was carried out at Bridge D and there was no discharge due to nature of works.</p> <p>(b) Wastewater treatment facilities were properly provided for Bridge D (<i>Figure 1</i>)</p> <p>(c) No muddy discharge and runoff from the construction site was observed. However, muddy water was observed throughout the river course resulted from the impact of heavy rain. (<i>Photo 13</i>)</p> <p>(d) There was no adverse water quality impact observed during the site inspection and the site condition was general in order after the rainstorm. (<i>Photo 14</i>)</p> <p>(e) As water quality mitigation measures, open slopes were covered with tarpaulin sheet or hard paved as far as practicable to minimize muddy runoff. (<i>Photos 15 and 16</i>)</p> <p>5. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection and the site condition was general in order after the rainstorm. Since muddy water was observed from upstream during rainstorm and got trapped at Nylon Dam in the following days, it is considered that the exceedances on 6 to 8 June 2018 were due to rainstorm while on 9 and 11 June 2018 were related to the residual impact of rainstorm.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were exceedances recorded on 12 and 13 June 2018 and another investigation will be conducted. Nevertheless, the Contractor should continually implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
--	--

**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :** 

**Date :** 21 June 2018



## Photo Record



**Photo 1**

On 6 June 2018, muddy water was observed at WM2A(a).



**Photo 2**

On 6 June 2018, muddy water was observed at WM2A-C.



**Photo 3**

On 7 June 2018, muddy water was observed at WM2A(a).



**Photo 4**

On 7 June 2018, muddy water was observed at WM2A-C.



**Photo 5**

On 8 June 2018, muddy water was observed at WM2A(a).



**Photo 6**

On 8 June 2018, muddy water was observed at WM2A-C.





**Photo 7**

On 9 June 2018, muddy water was observed at WM2A(a).



**Photo 8**

On 9 June 2018, the water quality observed at WM2A-C was clear.



**Photo 9**

On 11 June 2018, muddy water was observed at WM2A(a).



**Photo 10**

On 11 June 2018, the water quality observed at WM2A-C was clear.



**Photo 11**

On 9 June 2018, it was observed that muddy water from upstream after rainstorm was being trapped at the Nylon Dam which located at intermediate of the construction site.



**Photo 12**

On 11 June 2018, deflate of Nylon Dam was observed and muddy water was generated by the stirred up sediment accumulated at the river bed.





**Photo 13**

During site inspection on 7 June 2018, no muddy discharge and runoff from the construction site was observed. However, muddy water was observed throughout the river course resulted from the impact of heavy rain.



**Photo 14**

During site inspection on 7 June 2018, there was no adverse water quality impact observed during the site inspection and the site condition was general in order after the rainstorm.



**Photo 15**

As water quality mitigation measures, open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Photo 16**

As water quality mitigation measures, open slopes were hard paved as far as practicable to minimize muddy runoff.





**Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract**

**To**                      **Mr. Vincent Chan**

**Fax No** **By e-mail**

**Company** CRBC-CEC-Kaden JV

cc

**From** Nicola Hon

**Date**                    **26.June 2018**

**Our Ref**    TCS00694/13/300/**F1621**

**No of Pages**      7      (Incl. cover sheet)

**RE Agreement No. CE 45/2008  
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works  
Investigation Report of Exceedance of Water Quality at Location WM2A(a) on 12,  
13, 14 and 15 June 2018**

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

Dear Sir,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F1602 dated 13 June 2018

TCS00694/13/300/F1608 dated 15 June 2018

TCS00694/13/300/F1620 dated 21 June 2018

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059** or **Fax: 2959-6079**.

Yours Faithfully,

For and on Behalf of

**Action-United Environmental Services & Consulting**

Anders

Nicola Hon  
Environmental Consultant

Encl.

c.c. Ms. Clara U (EPD)  
Mr. Simon Leung (ER of C6/ AECOM)  
Mr. Antony Wong (IEC, SMEC)

Fax: 2685 1133  
Fax: 2251 0698  
By email

**Agreement No. CE 45/2008**
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**
**Investigation Report on Action or Limit Level Non-compliance**

<b>Project</b>		CE 45/2008			
<b>Date</b>		12 Jun 2018	13 Jun 2018	14 Jun 2018	15 Jun 2018
<b>Location</b>		WM2A(a)			
<b>Time</b>		11:30	10:20	11:00	10:00
<b>Parameter</b>		Turbidity (NTU) / Suspended solids (mg/L)			
<b>Action Level</b>		24.9 AND 120% of upstream control station of the same day / 14.6 AND 120% of upstream control station of the same day			
<b>Limit Level</b>		33.8 AND 130% of upstream control station of the same day / 17.3 AND 130% of upstream control station of the same day			
<b>Measured Levels</b>	<b>WM2A-C</b>	4.2 / 2.0	24.8 / 6.5	10.8 / 6.0	14.3 / 2.0
	<b>WM2A(a)</b>	<b>84.7 / 38.0</b>	<b>242.0 / 150.0</b>	<b>90.5 / 54.0</b>	<b>65.1 / 40.5</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>1. According to the site information provided from the Contractor of Contract 6 (CCKJV), construction activities carried out on 12 to 15 June 2018 at Bridge D (upstream of WM2A(a)) were mainly bridge construction. The monitoring locations and work boundary are shown in <i>Figure 1</i>.</li> <li>2. According to the site photos taken by the monitoring team during water sampling on 12 to 15 June 2018, the water quality at control station was clear while muddy water was observed at impact station. (<i>Photos 1 to 8</i>)</li> <li>3. According to the weather information from the Observatory, heavy rainstorm was recorded during 12 to 14 June 2018 in which Amber Rainstorm Warning Signal was in force on 13 June 2018. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. Moreover, it was observed that muddy water generated under rainstorm was being trapped at the Nylon Dam which located at intermediate of the construction site. Deflation of Nylon Dam was observed during the monitoring and muddy water was generated by the stirred up sediment accumulated at the river bed. (<i>Photos 9 to 12</i>)</li> <li>4. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 14 June 2018 to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below. <ol style="list-style-type: none"> <li>(a) Bridge construction work was carried out at Bridge D and there was no discharge due to nature of works.</li> <li>(b) Wastewater treatment facilities were properly provided for Bridge D (<i>Figure 1</i>)</li> </ol> </li> </ol>			



	<p>(c) It was observed that water quality at the diversion channel within the construction site was clear. No adverse water quality impact was observed and the site condition was general in order after the rainstorm. (<i>Photo 13</i>)</p> <p>(d) As water quality mitigation measures, open slopes were covered with tarpaulin sheet or hard paved as far as practicable to minimize muddy runoff. (<i>Photos 14 &amp; 15</i>)</p> <p>5. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection and the site condition was general in order. It is considered that the exceedances on 12 to 15 June 2018 were due to stirred up sediment during deflation of Nylon Dam and not related to the works under the Project.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were exceedances recorded on 16 and 17 June 2018 and another investigation will be conducted. Nevertheless, the Contractor should continually implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
--	---

**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :**



**Date :** 26 June 2018

## Photo Record



**Photo 1**

On 12 June 2018, muddy water was observed at WM2A(a).



**Photo 2**

On 12 June 2018, the water quality observed at WM2A-C was clear.



**Photo 3**

On 13 June 2018, muddy water was observed at WM2A(a).



**Photo 4**

On 13 June 2018, the water quality observed at WM2A-C was clear.



**Photo 5**

On 14 June 2018, muddy water was observed at WM2A(a).



**Photo 6**

On 14 June 2018, the water quality observed at WM2A-C was clear.





**Photo 7**

On 15 June 2018, muddy water was observed at WM2A(a).



**Photo 8**

On 15 June 2018, the water quality observed at WM2A-C was clear.



**Photo 9**

On 12 June 2018, it was observed that muddy water from upstream after rainstorm was being trapped at the Nylon Dam which located at intermediate of the construction site.



**Photo 10**

On 13 June 2018, deflation of Nylon Dam was observed during the monitoring and muddy water was generated by the stirred up sediment accumulated at the river bed.



**Photo 11**

On 14 June 2018, deflation of Nylon Dam was observed during the monitoring and muddy water was generated by the stirred up sediment accumulated at the river bed.



**Photo 12**

On 15 June 2018, deflation of Nylon Dam was observed during the monitoring and muddy water was generated by the stirred up sediment accumulated at the river bed.





**Photo 13**

During site inspection on 14 June 2018, it was observed that water quality at the diversion channel within the construction site was clear. No adverse water quality impact was observed.



**Photo 14**

As water quality mitigation measures, open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Photo 15**

As water quality mitigation measures, open slopes were hard paved as far as practicable to minimize muddy runoff.





**Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract**

---

To	Mr. Vincent Chan	Fax No	By e-mail
Company	CRBC-CEC-Kaden JV		
cc			
From	Nicola Hon	Date	29 June 2018
Our Ref	TCS00694/13/300/F1622a	No of Pages	7 (Incl. cover sheet)
RE	Agreement No. CE 45/2008 Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works Investigation Report of Exceedance of Water Quality at Location WM3x on 6, 13, 14 and 15 June 2018 (Contract 6)		

---

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

---

Dear Sir,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F1594 dated 6 June 2018  
TCS00694/13/300/F1603 dated 13 June 2018  
TCS00694/13/300/F1609 dated 15 June 2018  
TCS00694/13/300/F1618 dated 21 June 2018

Please find attached the "Investigation Report on Action or Limit Level Non-compliance" referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,  
For and on Behalf of  
**Action-United Environmental Services & Consulting**



Nicola Hon  
Environmental Consultant  
Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email



## Agreement No. CE 45/2008

### Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

#### Investigation Report on Action or Limit Level Non-compliance

<b>Project</b>		CE 45/2008			
<b>Date</b>		6 June 2018	13 June 2018	14 June 2018	15 June 2018
<b>Location</b>		WM3x			
<b>Time</b>		11:45	11:20	10:10	10:55
<b>Parameter</b>		Turbidity (NTU) / Suspended Solids (mg/L)			
<b>Action Level</b>		13.4 AND 120% of upstream control station of the same day / 12.6 AND 120% of upstream control station of the same day			
<b>Limit Level</b>		14.0 AND 130% of upstream control station of the same day / 12.9 AND 130% of upstream control station of the same day			
<b>Measured Level</b>	<b>WM3-C</b>	70.8 / 57.0	16.1 / 16.0	3.6 / 17.0	7.3 / 6.5
	<b>WM3x</b>	<b>624.0 / 472.5</b>	<b>73.6 / 51.0</b>	<b>33.2 / 30.0</b>	<b>24.0 / 22.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>According to the site information provided by the Contractor of C6 (CCKJV), the construction activities carried out at South Portal Site (upstream of WM3x) on 6, 13, 14 and 15 June 2018 included construction of Sha Tau Kok Interchange and road diversion. The monitoring locations and works areas are illustrated in <i>Figure 1</i>.</li> <li>According to the site photo taken on 6 June 2018, muddy water was observed throughout the Ng Tung River as well as WM3 and WM3-C under heavy rainstorm. On 13 to 15 June 2018, the water quality at WM3-C was appeared clear while turbid water was observed at WM3. It was noted that the channel of WM3x also received the storm water from Sha Tau Kok Road and the adjacent villages. (<i>Photos 1 to 8 and Figure 1</i>)</li> <li>According to the weather information from the Observatory, heavy rainstorm was recorded on 6 and 13 June 2018 and Amber Rainstorm Warning Signal were in force in both days. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. On 6 June 2018, muddy water was observed throughout the Ng Tung River including upstream of the project due to heavy rainstorm. (<i>Photo 9</i>) Moreover, as reported by the Contractor of Contract 2, large amount of silts were washed downstream from a villager's backfilled site situated at upper section of Loi Tung Stream. (<i>Photos 10 &amp; 11</i>)</li> <li>Weekly joint site inspection by RE, Contractor, IEC and ET was conducted on 7 and 14 June 2018 to audit the site environmental performance. The findings of the inspection are summarized below:- <ol style="list-style-type: none"> <li>Wastewater treatment facilities at South Portal were function properly and the effluent was clear. (<i>Photos 12, 14 &amp; 15</i>)</li> <li>The site area adjacent to the stream was completely sealed to minimize the risk of site runoff flowing into the exiting stream. (<i>Photo 13</i>)</li> <li>The expose slope next to the river channel was covered with impervious sheet to minimize generation of muddy runoff flowing into the channel.</li> </ol> </li> </ol>			

	<p><b>(Photo 16)</b></p> <p>(d) The construction site was general in order and no adverse water quality impact was observed.</p> <p>5. In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. Since inflow of muddy water was observed from upstream of construction site and the channel of WM3x also received the storm water from Sha Tau Kok Road and the adjacent villages during rainy days, it is considered that the exceedances were likely related to the rainstorm and not caused by the works under Contract 6.</p> <p>6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered in the monitoring result on 16 and 19 June 2018. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
<b>Action to be taken</b>	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :**



**Date :** 29 June 2018

## Photo Record



**Photo 1**

During water sampling on 6 June 2018, muddy water was observed at WM3x.



**Photo 2**

During water sampling on 6 June 2018, muddy water was observed at WM3x.



**Photo 3**

During water sampling on 13 June 2018, muddy water was observed at WM3x.



**Photo 4**

During water sampling on 13 June 2018, the water quality flowing at WM3-C was clear.



**Photo 5**

During water sampling on 14 June 2018, the water quality observed at WM3x was slightly turbid.



**Photo 6**

During water sampling on 14 June 2018, the water quality flowing at WM3-C was clear.





**Photo 7**

During water sampling on 15 June 2018, the water quality observed at WM3x was slightly turbid.



**Photo 8**

During water sampling on 15 June 2018, the water quality flowing at WM3-C was clear.



**Photo 9**

Muddy water was observed throughout the Ng Tung River on 6 June 2018 due to heavy rainstorm.



**Photo 10**

As reported by the Contractor of Contract 2 on 6 June 2018, large amount of silts were washed downstream from a villager's backfilled site situated at upper section of Loi Tung Stream.



**Photo 11**

Large amount of silts were washed downstream from the bare ground of the villager's backfilled site after the downpour.



**Photo 12**

Joint site inspection was conducted on 7 June 2018. It was observed that wastewater treatment facilities at South Portal were function properly and the effluent was clear.





**Photo 13**

The site area adjacent to the stream was completely sealed to minimize the risk of site runoff flowing into the exiting stream.



**Photo 14**

Joint site inspection was conducted on 14 June 2018. It was observed that wastewater treatment facilities at South Portal were function properly and the effluent was clear.



**Photo 15**

Joint site inspection was conducted on 14 June 2018. It was observed that wastewater treatment facilities at South Portal were function properly and the effluent was clear.



**Photo 16**

The expose slope next to the river channel was covered with impervious sheet to minimize generation of muddy runoff flowing into the channel.

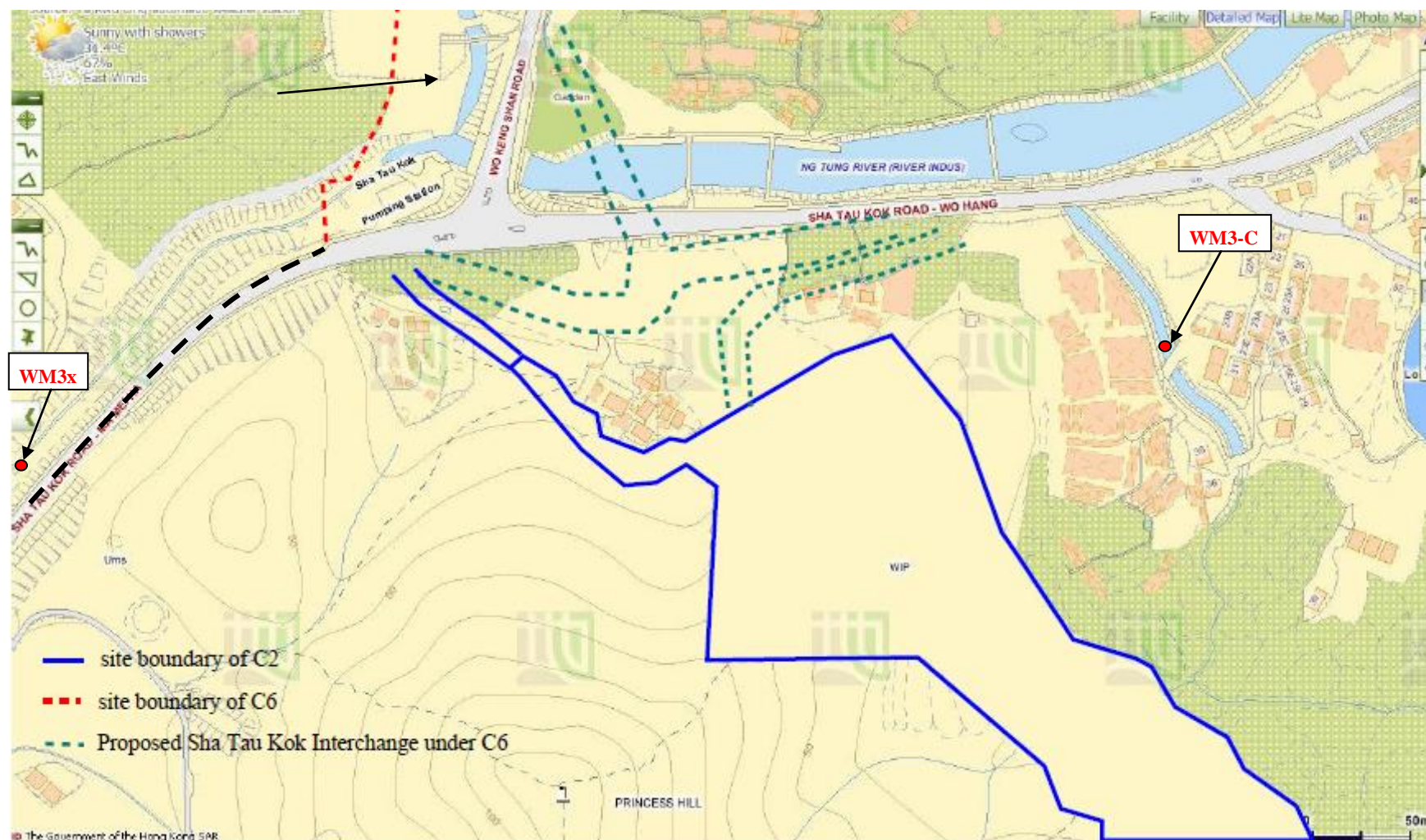


Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location



**To**                      **Mr. Roger Lee**

**Fax No**                    **2717 3299**

**Company** Dragages Hong Kong Limited

cc

**From** Nicola Hon

**Date**                    **27 June 2018**

**Our Ref**    TCS00697/13/300/**F1623**

No of Pages 7 (Incl. cover sheet)

**RE Agreement No. CE 45/2008  
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works  
Investigation Report of Exceedance of Water Quality at Location WM3x on 6, 13, 14  
and 15 June 2018 (Contract 2)**

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

Dear Mr. Lee,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F1595 dated 6 June 2018

TCS00694/13/300/F1604 dated 13 June 2018

TCS00694/13/300/F1610 dated 15 June 2018

TCS00694/13/300/F1619 dated 21 June 2018

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059** or **Fax: 2959-6079**.

Yours Faithfully,

For and on Behalf of

**Action-United Environmental Services & Consulting**

And

Nicola Hon  
Environmental Consultant

Encl.

c.c. Ms. Clara U (EPD)  
Mr. Edwin Ching (CRE, AECOM)  
Mr. Antony Wong (IEC, SMEC)

Fax: 2685 1133  
Fax: 2171 3498  
By e-mail

**Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
**Investigation Report on Action or Limit Level Non-compliance**

<b>Project</b>		CE 45/2008			
<b>Date</b>		6 June 2018	13 June 2018	14 June 2018	15 June 2018
<b>Location</b>		WM3x			
<b>Time</b>		11:45	11:20	10:10	9:44
<b>Parameter</b>		Turbidity (NTU) / Suspended Solids (mg/L)			
<b>Action Level</b>		13.4 AND 120% of upstream control station of the same day / 12.6 AND 120% of upstream control station of the same day			
<b>Limit Level</b>		14.0 AND 130% of upstream control station of the same day / 12.9 AND 130% of upstream control station of the same day			
<b>Measured Level</b>	<b>WM3-C</b>	70.8 / 57.0	16.1 / 16.0	3.6 / 17.0	7.3 / 6.5
	<b>WM3x</b>	<b>624.0 / 472.5</b>	<b>73.6 / 51.0</b>	<b>33.2 / 30.0</b>	<b>24.0 / 22.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 6, 13, 14 and 15 June 2018 at North Portal Site included tunnel internal work and construction of slip road, temporary utility bridge, permanent drainage and ventilation building while construction of permanent drainage and fitting out were conducted at Admin Building Site. The relevant works area under C2 and the water monitoring locations are illustrated in <i>Figure 1</i>.</li> <li>2. According to the site photo taken on 6 June 2018, muddy water was observed throughout the Ng Tung River as well as WM3 and WM3-C under heavy rainstorm. On 13 to 15 June 2018, the water quality at WM3-C was appeared clear while turbid water was observed at WM3. It was noted that the channel of WM3x also received the storm water from Sha Tau Kok Road and the adjacent villages. (<i>Photos 1 to 8 and Figure 1</i>)</li> <li>3. According to the weather information from the Observatory, heavy rainstorm was recorded on 6 and 13 June 2018 and Amber Rainstorm Warning Signal were in force in both days. The water quality throughout the river course was highly affected by the stirred up sediment and muddy runoff from the surrounding environment even outside the construction site. On 6 June 2018, muddy water was observed throughout the Ng Tung River including upstream of the project due to heavy rainstorm. (<i>Photo 9</i>) Moreover, as reported by DHK, large amount of silts were washed downstream from a villager's backfilled site situated at upper section of Loi Tung Stream. (<i>Photos 10 &amp; 11</i>)</li> <li>4. Joint site inspections with AECOM, IEC, DHK and ET were carried out on 15 June 2018. It was observed wastewater treatment facilities were in place properly, and the water quality outside the discharge point at downstream Loi Tung Stream was visually clear. (<i>Photos 12 &amp; 13</i>) At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited. The water quality at the adjacent channel was clear. (<i>Photos 14 &amp; 15</i>)</li> <li>5. In our investigation, the Contractor had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified during site inspection. In view of the external source of muddy water observed due to rainstorm, it is considered that the exceedances were related to other source of turbid water and not caused by the works under Contract 2.</li> <li>6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered in the monitoring result on 16 and 19 June 2018. Nevertheless, the</li> </ol>			

	Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
--	---

**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :**



**Date :** 27 June 2018

## Photo Record



**Photo 1**

During water sampling on 6 June 2018, muddy water was observed at WM3x.



**Photo 2**

During water sampling on 6 June 2018, muddy water was observed at WM3x.



**Photo 3**

During water sampling on 13 June 2018, muddy water was observed at WM3x.



**Photo 4**

During water sampling on 13 June 2018, the water quality flowing at WM3-C was clear.



**Photo 5**

During water sampling on 14 June 2018, the water quality observed at WM3x was slightly turbid.



**Photo 6**

During water sampling on 14 June 2018, the water quality flowing at WM3-C was clear.





**Photo 7**

During water sampling on 15 June 2018, the water quality observed at WM3x was slightly turbid.



**Photo 8**

During water sampling on 15 June 2018, the water quality flowing at WM3-C was clear.



**Photo 9**

Muddy water was observed throughout the Ng Tung River on 6 June 2018 due to heavy rainstorm.



**Photo 10**

As reported by DHK on 6 June 2018, large amount of silts were washed downstream from a villager's backfilled site situated at upper section of Loi Tung Stream.



**Photo 11**

Large amount of silts were washed downstream from the bare ground of the villager's backfilled site after the downpour.



**Photo 12**

During site inspection on 15 June 2018, it was observed wastewater treatment facilities were in place properly.



**Photo 13**

During site inspection on 15 June 2018, it was observed the water quality outside the discharge point at downstream Loi Tung Stream was visually clear.



**Photo 14**

At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited.



**Photo 15**

At Admin Building Site, the water quality at the adjacent channel was clear on 15 June 2018.



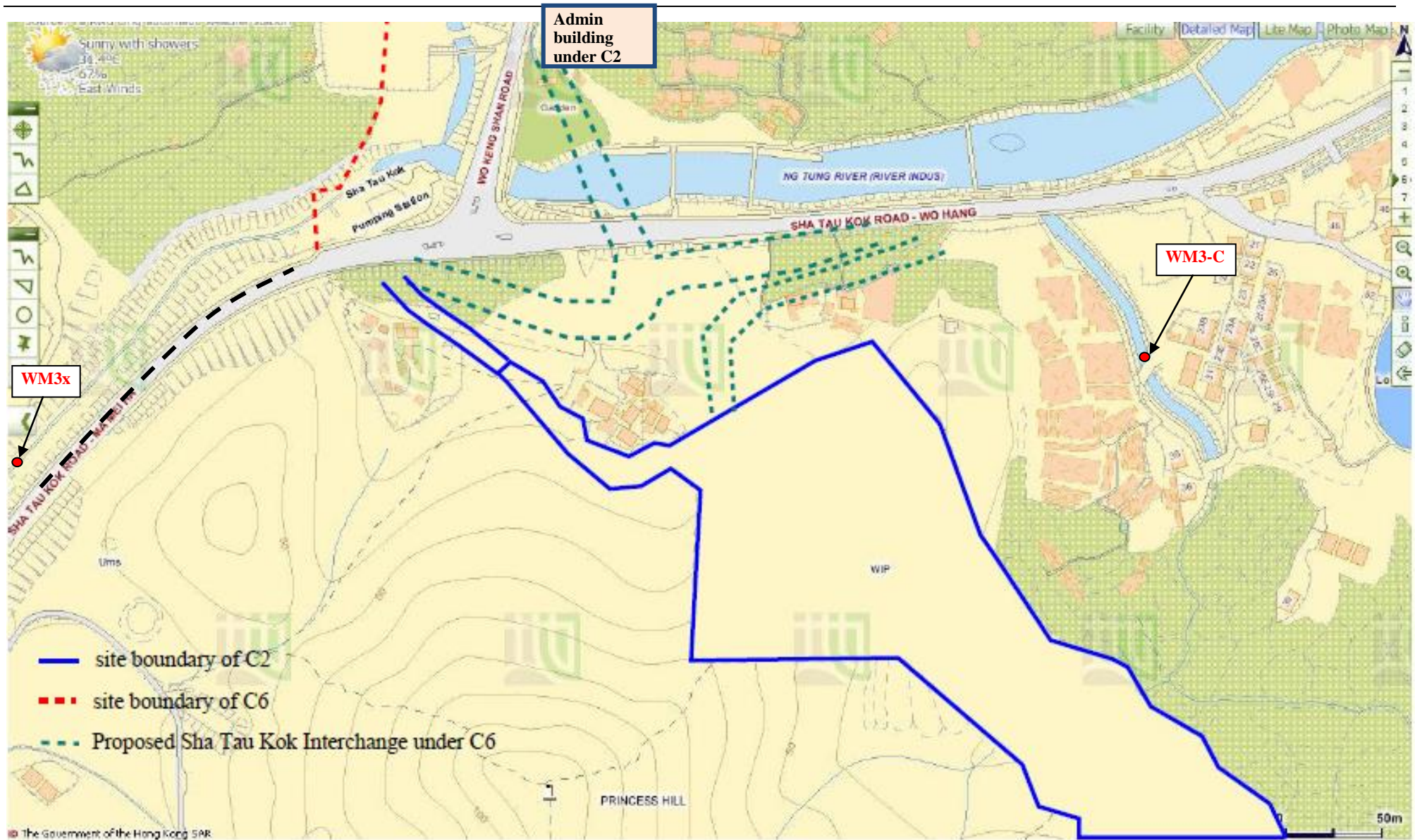


Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

To	Mr. Roger Lee	Fax No	by e-mail
Company	Dragages Hong Kong Limited		
cc			
From	Nicola Hon	Date	29 June 2018
Our Ref	TCS00670/13/300/ F1639a	No of Pages	6 (Incl. cover sheet)
RE	Agreement No. CE 45/2008 Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works Investigation Report of Exceedance of Water Quality at Location WM4 on 21 and 22 June 2018 (Contract 2)		

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

Dear Mr. Ho.

Further to the Notification of Exceedance (NOE) reference of the following.

TCS00670/13/300/F1630 dated 22 June 2018

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,  
For and on Behalf of  
**Action-United Environmental Services & Consulting**

Lu Lu

Nicola Hon  
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Edwin Ching (RE, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail


**Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
**Investigation Report on Action or Limit Level Non-compliance**

<b>Project</b>		CE 45/2008	
<b>Date</b>		21 Jun 2018	22 Jun 2018
<b>Location</b>		<b>WM4</b>	
<b>Time</b>		12:25	11:15
<b>Parameter</b>		Turbidity (NTU)	
<b>Action Level</b>		35.2 AND 120% of upstream control station of the same day	
<b>Limit Level</b>		38.4 AND 130% of upstream control station of the same day	
<b>Measured Level</b>	<b>WM4-CA</b>	6.6	3.8
	<b>WM4-CB</b>	9.9	6.1
	<b>WM4</b>	<b>48.2</b>	<b>58.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<p>1. According to the site information provided by the Contractor of Contract 2 (DHK), construction activities carried out at South Portal Site (SP) on 21 and 22 June 2018 included tunnel internal work, construction of retaining wall and backfilling and south ventilation building external wall finishing and E&amp;M installation. <b>(Figure 1)</b> The construction site was generally hard paved to minimize muddy runoff.</p> <p>2. According to the site photos taken by ET on 21 and 22 June 2018, turbid water was observed at impact station WM4 whereas the water quality at control stations WM4-CA and WM4-CB were clear. <b>(Photos 1 to 6 &amp; Figure 1)</b></p> <p>3. On 21 and 22 June 2018, the Contractor of Contract 3 reported that there was unknown source of muddy water attributed to site area via an underground pipe from box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3). <b>(Photos 7 &amp; 8 &amp; Figure 1)</b></p> <p>4. Weekly joint site inspection by the RE, DHK, IEC and ET was conducted on 22 June 2018. It was observed that wastewater treatment facilities implemented in South Portal Site was functioned properly and the discharge was clear. <b>(Photo 9)</b> The site was mostly hard paved and site hoarding with sealed foots was erected along the site boundary to minimize muddy surface runoff and prevent it from flowing outside the site. <b>(Photo 10)</b> No major water quality impact was observed adjacent to the river course.</p> <p>5. In our investigation, DHK has properly implemented water mitigation measures such as well maintain the wastewater treatment facilities and hard paved most of the site surface. In general, the condition of the South Portal Site under Contract 2 was in order and no adverse water quality impact was identified. It was considered that the exceedances were not related to the works under Contract 2.</p> <p>6. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM4 on 23 and 25 June 2018. However, the Contractor should</p>	

	continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual.
--	--

**Prepared By :** \_\_\_\_\_ Nicola Hon

**Designation :** \_\_\_\_\_ Environmental Consultant

**Signature :** \_\_\_\_\_ 

**Date :** \_\_\_\_\_ 29 June 2018



## Photo Record



**Photo 1**

During water quality monitoring on 21 June 2018, turbid water was observed at WM4.



**Photo 2**

During water quality monitoring on 21 June 2018, the water quality at WM4-CA was clear.



**Photo 3**

During water quality monitoring on 21 June 2018, the water quality at WM4-CB was clear.



**Photo 4**

During water quality monitoring on 22 June 2018, turbid water was observed at WM4.



**Photo 5**

During water quality monitoring on 22 June 2018, the water quality at WM4-CA was clear.



**Photo 6**

During water quality monitoring on 22 June 2018, the water quality at WM4-CB was clear.





**Photo 7**

On 21 June 2018, the Contractor of Contract 3 reported that there was unknown source of muddy water attributed to site area via an underground pipe from box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3).



**Photo 8**

On 22 June 2018, the Contractor of Contract 3 reported that there was unknown source of muddy water attributed to site area via an underground pipe from box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3).



**Photo 9**

During site inspection on 22 June 2018, it was observed that wastewater treatment facilities implemented in South Portal Site was functioned properly and the discharge was clear.



**Photo 10**

The site was mostly hard paved and site hoarding with sealed foots was erected along the site boundary to minimize muddy surface runoff and prevent it from flowing outside the site.



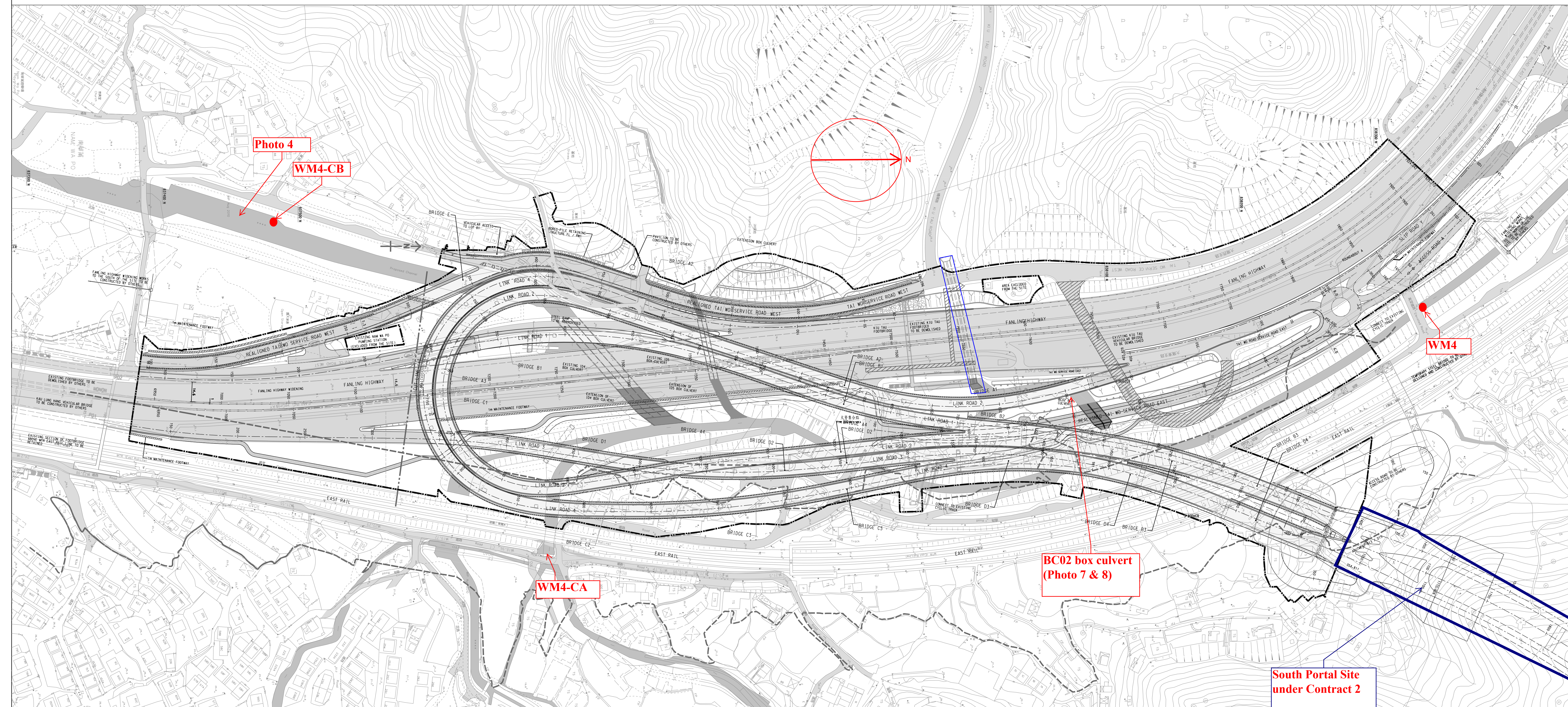


Figure 1. Location of Water Quality Monitoring Location



---

**To** Mr. Daniel Ho **Fax No** 2638 7077

**Company** Chun Wo Construction Ltd

**cc**

**From** Nicola Hon **Date** 28 June 2018

**Our Ref** TCS00670/13/300/F1640 **No of Pages** 6 (Incl. cover sheet)

**RE** Agreement No. CE 45/2008  
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works  
Investigation Report of Exceedance of Water Quality at Location WM4 on 21 and 22  
June 2018 (Contract 3)

---

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

---

Dear Mr. Ho,

Further to the Notification of Exceedance (NOE) reference of the following.

TCS00670/13/300/F1629 dated 22 June 2018

Please find attached the "Investigation Report on Action or Limit Level Non-compliance" referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079.**

Yours Faithfully,  
For and on Behalf of  
**Action-United Environmental Services & Consulting**



Nicola Hon  
Environmental Consultant


Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Alan Lee (ER of C3, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

**Agreement No. CE 45/2008**  
**Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works**  
**Investigation Report on Action or Limit Level Non-compliance**

<b>Project</b>		CE 45/2008	
<b>Date</b>		21 Jun 2018	22 Jun 2018
<b>Location</b>		<b>WM4</b>	
<b>Time</b>		12:25	11:15
<b>Parameter</b>		Turbidity (NTU)	
<b>Action Level</b>		35.2 AND 120% of upstream control station of the same day	
<b>Limit Level</b>		38.4 AND 130% of upstream control station of the same day	
<b>Measured Level</b>	<b>WM4-CA</b>	6.6	3.8
	<b>WM4-CB</b>	9.9	6.1
	<b>WM4</b>	<b>48.2</b>	<b>58.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		1. According to the site information provided by the Contractor of C3 (Chun Wo), the construction activities carried out on 21 and 22 June 2018 were general site works such as excavation, construction of Retaining Wall and road works. Water quality mitigation measures were implemented to minimize the impact by the construction works.	
		2. According to the site photos taken by ET on 21 and 22 June 2018, turbid water was observed at impact station WM4 whereas the water quality at control stations WM4-CA and WM4-CB were clear. <b>(Photos 1 to 6 &amp; Figure 1)</b> Moreover, it was observed that the water flowing from ID4 and ID5 (at intermediate of site) were appeared clear. <b>(Photos 7 &amp; 8 &amp; Figure 1)</b>	
		3. On 21 and 22 June 2018, Chun Wo reported that there was unknown source of muddy water attributed to site area via an underground pipe from box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3). <b>(Photos 9 &amp; 10 &amp; Figure 1)</b>	
		4. Joint site inspection by the RE, IEC, Chun Wo and ET was carried out on 20 June 2018 for site investigation. The findings of the inspection are summarized below.	
		(a) It was observed that the inflow of muddy water was observed through Box Culvert BC02 to site area under Contract 3. <b>(Photo 11)</b>	
		(b) Wastewater treatment facilities implemented on-site were functioned properly and no adverse water quality impact was observed.	
		(c) As water quality mitigation measures, the exposed surface was covered by tarpaulin sheet as far as practicable to minimize muddy runoff. <b>(Photo 12)</b>	
		5. In our investigation, the Contractor had implemented water quality mitigation measures. In viewing of inflow of muddy water from outside the site boundary was observed on 21 and 22 June 2018, it is considered that the exceedances were unlikely caused by the works under Contract 3.	
		6. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in	

	consecutive days. There were no exceedances triggered at WM4 on 23 and 25 June 2018. However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual.
--	--

**Prepared By :** Nicola Hon  
**Designation :** Environmental Consultant  
**Signature :**   
**Date :** 28 June 2018



## Photo Record



**Photo 1**

During water quality monitoring on 21 June 2018, turbid water was observed at WM4.



**Photo 2**

During water quality monitoring on 21 June 2018, the water quality at WM4-CA was clear.



**Photo 3**

During water quality monitoring on 21 June 2018, the water quality at WM4-CB was clear.



**Photo 4**

During water quality monitoring on 22 June 2018, turbid water was observed at WM4.



**Photo 5**

During water quality monitoring on 22 June 2018, the water quality at WM4-CA was clear.



**Photo 6**

During water quality monitoring on 22 June 2018, the water quality at WM4-CB was clear.





**Photo 7**

During water quality monitoring on 21 June 2018, it was observed that the water flowing from ID4 and ID5 (at intermediate of site) were appeared clear.



**Photo 8**

During water quality monitoring on 22 June 2018, it was observed that the water flowing from ID4 and ID5 (at intermediate of site) were appeared clear.



**Photo 9**

On 21 June 2018, Chun Wo reported that there was unknown source of muddy water attributed to site area via an underground pipe from box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3).



**Photo 10**

On 22 June 2018, Chun Wo reported that there was unknown source of muddy water attributed to site area via an underground pipe from box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3).



**Photo 11**

During site inspection on 20 June, it was observed that the inflow of muddy water was observed through Box Culvert BC02 to site area under Contract 3.



**Photo 12**

As water quality mitigation measures, the exposed surface was covered by tarpaulin sheet as far as practicable to minimize muddy runoff.



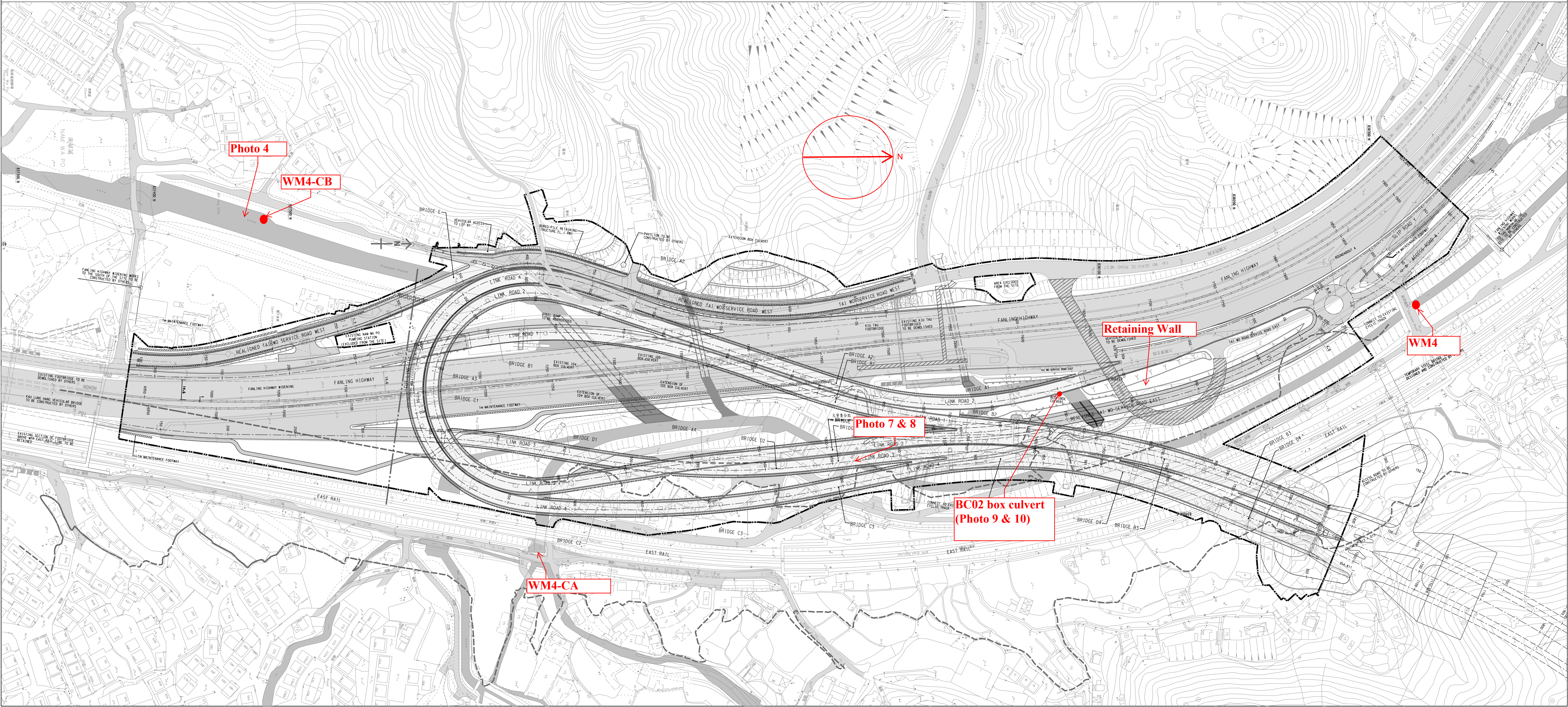


Figure 1. Location of Water Quality Monitoring Location



**To**                      **Mr. Vincent Chan**

**Fax No**                      **By e-mail**

**Company** CRBC-CEC-Kaden JV

cc

**From** **Nicola Hon**

**Date**                    **11 July 2018**

**Our Ref**      TCS00694/13/300/**F1638a**

No of Pages 6 (Incl. cover sheet)

**RE Agreement No. CE 45/2008  
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works  
Investigation Report of Exceedance of Water Quality at Location WM2A(a) on 16  
and 19 June 2018**

*If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.*

Dear Sir,

Further to the Notification of Exceedance (NOE) ref.:

TCS00694/13/300/F1617 dated 21 June 2018

TCS00694/13/300/F1635 dated 25 June 2018

Please find attached the “Investigation Report on Action or Limit Level Non-compliance” referenced above for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,  
For and on Behalf of  
**Action-United Environmental Services & Consulting**

And

Nicola Hon  
Environmental Consultant

Encl.

c.c. Ms. Clara U (EPD)  
Mr. Simon Leung (ER of C6/ AECOM)  
Mr. Antony Wong (IEC, SMEC)

Fax: 2685 1133  
Fax: 2251 0698  
By email

## Agreement No. CE 45/2008

### Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

#### Investigation Report on Action or Limit Level Non-compliance

<b>Project</b>		CE 45/2008		
<b>Date</b>		19 June 2018	16 June 2018	19 June 2018
<b>Location</b>		WM2A(a)		
<b>Time</b>		10:35	10:05	10:35
<b>Parameter</b>		Turbidity (NTU)	Suspended solids (mg/L)	
<b>Action Level</b>		24.9 AND 120% of upstream control station of the same day	14.6 AND 120% of upstream control station of the same day	
<b>Limit Level</b>		33.8 AND 130% of upstream control station of the same day	17.3 AND 130% of upstream control station of the same day	
<b>Measured Levels</b>	WM2A-C	11.3	2.0	2.0
	WM2A(a)	<b>265.5</b>	<b>15.0</b>	<b>136.0</b>
<b>Exceedance</b>		<b>Limit Level</b>	<b>Action Level</b>	<b>Limit Level</b>
<b>Investigation Results, Recommendations &amp; Mitigation Measures</b>		<ol style="list-style-type: none"> <li>1. According to the site information provided from the Contractor of Contract 6 (CCKJV), construction activities carried out on 16 and 19 June 2018 at Bridge D (upstream of WM2A(a)) were mainly bridge construction. The monitoring locations and work boundary are shown in <i>Figure 1</i>.</li> <li>2. According to the site photos taken by the monitoring team during water sampling on 16 June 2018, the water quality at control station was clear while at impact station was slightly turbid. On 19 June 2018, muddy water was observed at WM2A(a) while the water quality at control station WM2A-C appeared clear. (<i>Photos 1 to 4</i>)</li> <li>3. As reported by CCKJV on 19 June 2018, inflow of muddy water was observed at WM2A-C from upstream of the construction site in the morning time before the water monitoring. (<i>Photo 5</i>) Besides, there was no rainfall recorded on 16 June 2018 while trace amount of rainfall was recorded on 19 June 2018.</li> <li>4. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 14 June 2018 to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below. <ol style="list-style-type: none"> <li>(a) Bridge construction work was carried out at Bridge D and there was no discharge due to nature of works.</li> <li>(b) Wastewater treatment facilities were properly provided for Bridge D (<i>Figure 1</i>)</li> <li>(c) It was observed that water quality at the diversion channel within the construction site was clear. No adverse water quality impact was observed and the site condition was general in order after the rainstorm. (<i>Photo 6</i>)</li> <li>(d) As water quality mitigation measures, open slopes were covered with</li> </ol> </li> </ol>		



	<p>tarpaulin sheet or hard paved as far as practicable to minimize muddy runoff. (<i>Photos 7 and 8</i>)</p> <p>5. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. There was no adverse water quality impact observed during the site inspection and the site condition was general in order. It is considered that the exceedance on 16 June 2018 was unlikely due to the contract work while the exceedances on 19 June 2018 were likely related to the external source of muddy water from upstream of the Project and not caused by the works under the Project.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were no exceedances recorded on 20 and 21 June 2018. Nevertheless, the Contractor should continually implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&amp;A Manual.</p>
--	--

**Prepared By :** Nicola Hon

**Designation :** Environmental Consultant

**Signature :**



**Date :** 11 July 2018

## Photo Record



**Photo 1**

On 16 June 2018, the water quality observed at WM2A(a) was slightly turbid.



**Photo 2**

On 16 June 2018, the water quality observed at WM2A-C was clear.



**Photo 3**

On 19 June 2018, muddy water was observed at WM2A(a).



**Photo 4**

On 19 June 2018, the water quality observed at WM2A-C was clear.



**Photo 5**

In the morning on 19 June 2018, inflow of muddy water was observed at WM2A-C from upstream of the construction site before the water monitoring.



**Photo 6**

During site inspection on 14 June 2018, it was observed that water quality at the diversion channel within the construction site was clear. No adverse water quality impact was observed





**Photo 7**

As water quality mitigation measures, open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.



**Photo 8**

As water quality mitigation measures, open slopes were hard paved as far as practicable to minimize muddy runoff.



**Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract**

**Appendix O**

**Investigation Report for Complaint**

**(not used)**