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.37) – AUGUST 2016

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

Date	Reference No.	Prepared By	Certified By
12 September 2016	TCS00694/13/600/R0590v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 September 2016	First Submission
2	12 September 2016	Amended according to the IEC's comments on 10 September 2016

SMEC
Local People. Global Experience.

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

13 September 2016 Our ref: 7076192/L20959/AB/AW/MC/rw

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

By Email & Post

Attention: Mr Simon LEUNG

Dear Sirs

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. 37) – August 2016

With reference to the Monthly EM&A Report No. 37 for August 2016 (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/C.

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 Man CHEUNG on tel. 3995 8132 or by email to man.cheung@smec.com.

Yours faithfully
for and on behalf of
SMEC Asia Limited

Antony WONG
Independent Environmental Checker

cc	CEDD/BCP	-	Mr Desmond LAM	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
	SRJV	-	Mr Edwin AU	by email
	CW	-	Mr Daniel HO	by email
	DHK	-	Mr Daniel ALTIER	by email
	CCKJV	-	Mr Vincent CHAN	by email
	KRSJV	-	Mr TY LEUNG	by email
	Leighton	-	Mr Jon KITCHING	by email
	AUES	-	Mr TW TAM	by email

EXECUTIVE SUMMARY

ES01 This is the **37th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 31 August 2016** (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 (TCSS), 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 construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project currently included Contract 2, Contract 3, Contract 5, 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	147
	24-hour TSP	9	49
Construction Noise	$L_{eq(30min)}$ Daytime	10	45
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C,	14 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	14 Scheduled & 5 extra
		WM2B & WM2B-C	14 Scheduled & 4 extra
		WM3x &WM3-C	14 Scheduled & 0 extra
		WM4, WM4-CA &WM4-CB	14 Scheduled & 0 extra
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	4
		Contract 3	5
		Contract 5	5
		Contract 6	4
		Contract 7	5
		Contract SS C505	5

Note: Extra monitoring day was due to measurement results exceedance

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES04 In the Reporting Period, no air quality exceedance and construction noise exceedance was registered for the Project. For water quality monitoring, a total of thirty-two (32) Action/ Limit Level exceedances were recorded. 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	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--
	24-hour TSP	0	0	0	--	--
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	0	--	--
Water Quality	DO	0	0	0	--	--
	Turbidity	**2**	**10**	**12**	The exceedances on 2, 3, 4, 10, 11 and 12	It was reminded that the all the Contractor shall

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation Result	Corrective Actions
	SS	0	**20**	**20**	August 2016 were not project related. Exceedances on 18, 19, 22, 23, 24 and 31 August 2016 are under investigation.	implement water quality mitigation measures in accordance with ISEMM of the EM&A Manual requirements

ENVIRONMENTAL COMPLAINT

ES05 In this Reporting Period, one (1) documented environmental complaint was received in respect of the wastewater issue related to Contract 6. Upon receipt of the complaints, RE, IEC and ET with the relevant Contractors has immediately undertaken investigation. Follow up actions have been undertaking by the Contractor to resolve the deficiencies and investigation report conducted by ET had submitted to all relevant parties.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES06 No environmental summons or successful prosecutions were recorded in the Reporting Period.

REPORTING CHANGE

ES07 No reporting changes were made in the Reporting Period.

SITE INSPECTION

ES08 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 **5, 12, 19 and 26 August 2016**. No non-compliance was noted.

ES09 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 **1, 8, 15, 24 and 29 August 2016**. No non-compliance was noted.

ES10 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 5*** has been carried out by the RE, IEC, ET and the Contractor on **5, 9, 16, 23 and 30 August 2016.** No non-compliance was noted.

ES11 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 **4, 11, 18 and 25 August 2016.** No non-compliance was noted.

ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract SS C505*** has been carried out by the RE, IEC, ET and the Contractor on **3, 9, 17, 24 and 31 August 2016**. No non-compliance was noted.

ES13 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 7*** has been carried out by the RE, IEC, ET and the Contractor on **5, 9, 16, 23 and 30 August 2016**. No non-compliance was noted.

FUTURE KEY ISSUES

ES14 As wet season has come, 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 or public area would be the key issue. 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. Moreover, 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.

ES15 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.

ES16 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

1 INTRODUCTION 1
1.1 PROJECT BACKGROUND 1
1.2 REPORT STRUCTURE 1

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS 3
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

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS 14
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

4 AIR QUALITY MONITORING 23
4.1 GENERAL 23
4.2 AIR QUALITY MONITORING RESULTS IN REPORTING MONTH 23

5 CONSTRUCTION NOISE MONITORING 26
5.1 GENERAL 26
5.2 NOISE MONITORING RESULTS IN REPORTING MONTH 26

6 WATER QUALITY MONITORING 27
6.1 GENERAL 27
6.2 RESULTS OF WATER QUALITY MONITORING 27

7 WASTE MANAGEMENT 31
7.1 GENERAL WASTE MANAGEMENT 31
7.2 RECORDS OF WASTE QUANTITIES 31

8 SITE INSPECTION 32
8.1 REQUIREMENTS 32
8.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH 32

9 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE 37
9.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION 37

10 IMPLEMENTATION STATUS OF MITIGATION MEASURES 41
10.1 GENERAL REQUIREMENTS 41
10.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH 41
10.3 KEY ISSUES FOR THE COMING MONTH 42

11 CONCLUSIONS AND RECOMMENDATIONS 44
11.1 CONCLUSIONS 44
11.2 RECOMMENDATIONS 44

LIST OF TABLES

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 – AM1A
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 – AM7A
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 (CONTRACT 3 AND 5)
TABLE 5-2 SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS (CONTRACT 2 AND 6)
TABLE 6-1 SUMMARY OF WATER QUALITY MONITORING RESULTS FOR CONTRACT 2 AND 3
TABLE 6-2 SUMMARY OF WATER QUALITY MONITORING RESULTS FOR CONTRACT 5 AND SS C505
TABLE 6-3 SUMMARY OF WATER QUALITY MONITORING RESULTS FOR CONTRACT 6
TABLE 6-4 SUMMARY OF WATER QUALITY MONITORING RESULTS FOR CONTRACT 2 AND 6
TABLE 6-5 BREACHES OF WATER QUALITY MONITORING CRITERIA IN REPORTING PERIOD
TABLE 6-6 SUMMARY OF WATER QUALITY EXCEEDANCE IN THE REPORTING PERIOD
TABLE 6-7 SUMMARY OF WATER QUALITY EXCEEDANCE WHICH WERE UNDER REVIEW BY IEC IN APRIL 2016
TABLE 7-1 SUMMARY OF QUANTITIES OF INERT C&D MATERIALS
TABLE 7-2 SUMMARY OF QUANTITIES OF C&D WASTES
TABLE 8-1 SITE OBSERVATIONS FOR CONTRACT 2
TABLE 8-2 SITE OBSERVATIONS FOR CONTRACT 3
TABLE 8-3 SITE OBSERVATIONS FOR CONTRACT 5
TABLE 8-4 SITE OBSERVATIONS FOR CONTRACT 6
TABLE 8-5 SITE OBSERVATIONS FOR CONTRACT SS C505
TABLE 8-6 SITE OBSERVATIONS FOR CONTRACT 7
TABLE 9-1 STATISTICAL SUMMARY OF ENVIRONMENTAL COMPLAINTS
TABLE 9-2 STATISTICAL SUMMARY OF ENVIRONMENTAL SUMMONS
TABLE 9-3 STATISTICAL SUMMARY OF ENVIRONMENTAL PROSECUTION
TABLE 10-1 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

1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Civil Engineering and Development Department is the Project Proponent and the Permit Holder of *Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works*, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/C granted on 12 March 2015.

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 **37th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **31 August 2016**.

1.2 REPORT STRUCTURE

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

Section 1 *Introduction*
Section 2 *Project Organization and Construction Progress*
Section 3 *Summary of Impact Monitoring Requirements*
Section 4 *Air Quality Monitoring*
Section 5 *Construction Noise Monitoring*
Section 6 *Water Quality Monitoring*

Section 7 *Waste Management*
Section 8 *Site Inspections*
Section 9 *Environmental Complaints and Non-Compliance*
Section 10 *Implementation Status of Mitigation Measures*
Section 11 *Conclusions and Recommendations*

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

2.1.2 The details of each contracts is summarized below and the delineation of each contracts is shown in ***Appendix A***.

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

2.1.5 Contract 4 has awarded in mid-April 2016. However, the major construction work still is not yet commenced. 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 Regulaiton 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 lEC 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, lEC 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, lEC 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, 5, 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	• Tube excavation (NB + SB)
Portal	• Adit invert slab, waterproofing and lining, post-excavation grouting
	• Ventilation building superstructure and backfilling
North Portal	• Slope stabilization and retaining wall
	• Southbound Tunnel Boring Machine (TBM) excavation
	• Northbound bench excavation and tunnel enlargement
South Portal	• Southbound and Northbound Drill and Blast (D&B) excavation
	• South ventilation building superstructure
	• Blast curtain inside the tunnel
Admin Building	• Building superstructure

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
- Installation of Stone Cladding
- Noise barrier construction
- Pier / pier table construction
- Pile cap works
- Portal beam construction
- Piling Works for Viaduct
- Piling Works for Noise Barrier
- Retaining Wall construction
- Road works
- Sewer works
- Slope works
- Utilities Duct Laying
- Water Main Laying
- Viaduct segment erection

Contract 4 (Contract number to be assigned)

2.4.4 The Contract was awarded in mid-April 2016 and the major construction work has not yet commenced.

Contract 5 (CV/2013/03)

2.4.5 The Contract awarded in April 2013 and commenced on August 2013. As advised by the ER, the construction works under Contract 5 was substantially completed on 31 August 2016. In this Reporting Period, construction activities conducted are listed below:

- Bituminous laying at existing Lin Ma Hang (LMH) road
- Brick laying at footpath at LMH road
- Road works (kerb & bituminous laying) at existing LMH road
- Installation of Underground Utility (additional) at proposed and existing LMH road
- Irrigation system at existing LMH Road

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:

- Slope Works
- Bored Piling
- Pile Cap Construction
- Bridge Pier Construction

- Tunnel Excavation
- Sewage Treatment Plant 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:

- Piling Works at Bridges A, C and E
- Pile Caps Construction at Bridges B, C and D

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:

- General Site Set-up
- Building no.4, 5, 6, 9, 11 and 36 construction
- Excavation waterproofing works for Building no. 4, 6 & 11
- Pile cap construction for Building no.4,6&7
- Tower crane operation and erection
- Disassembly of crawler crane
- Grouting and full core to completed bored piles
- Bridge construction works including construction of bridge column, retaining wall, pile cap and pier
- Underground drainage works
- Prototype "A" construction works
- Mock up for south entrance double curve cladding
- Formwork and falsework for PTB's slab construction
- Construction PTB M/F flat slab
- Steel beam works for maintenance platform for PTB
- Pile cap construction for PTB, including excavation and backfilling works
- Bridge deck construction for Bridges 1, 2 & 3
- Footing construction

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, 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, 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

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	8 Oct 2014	30 Sep 2019
		No.: W5/1I389	28 Mar 2014	31 Mar 2019
		No. WT00023063-2015	18 Dec 2015	31 Mar 2019
		No.: W5/1I392	28 Mar 2014	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-RN0077-16	07 Feb 2016	06 Aug 2016
		GW-RN0199-16	24 Mar 2016	17 Sep 2016
		GW-RN0332-16	09 May 2016	08 Aug 2016
		GW-RN0359-16	20 May 2016	19 Aug 2016
		GW-RN0378-16	30 May 2016	29 Aug 2016
		GW-RN0451-16	24 Jun 2016	19 Sep 2016
		GW-RN0457-16	22 Jun 2016	14 Dec 2016
		GW-RN0435-16	27 Jun 2016	26 Dec 2016
		GW-RN0519-16	1 Aug 2016	30 Oct 2016
		GW-RN0543-16	18 Jul 2016	13 Jan 2017
		GW-RN0582-16	09 Aug 2016	08 Nov 2016
		GW-RN0590-16	09 Aug 2016	08 Nov 2016
		GW-RN0579-16	11 Aug 2016	07 Jan 2017
		GW-RN0604-16	11 Aug 2016	07 Jan 2017
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	No.:WT00016832 – 2013	28 Aug 13	31 Aug 2018

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Control Ordinance - Discharge License			
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-RN0064-16	16 Feb 2016	13 Aug 2016
		GW-RN0098-16	1 Mar 2016	4 Sep 2016
		GW-RN0113-16	25 Feb 2016	24 Aug 2016
		GW-RN0139-16	2 Mar 2016	24 Aug 2016
		GW-RN0140-16	2 Mar 2016	24 Aug 2016
		GW-RN0158-16	8 Mar 2016	31 Aug 2016
		GW-RN0170-16	11 Mar 2016	10 Sep 2016
		GW-RN0218-16	6 Apr 2016	30 Sep 2016
		GW-RN0233-16	11 Apr 2016	10 Oct 2016
		GW-RN0305-16	5 May 2016	4 Aug 2016
		GW-RN0307-16	10 May 2016	9 Sep 2016
		GW-RN0308-16	10 May 2016	9 Sep 2016
		GW-RN0309-16	30 Apr 2016	29 Oct 2016
		GW-RN0414-16	18 Jun 2016	17 Dec 2016
		GW-RN0419-16	21 Jun 2016	30 Sep 2016
		GW-RN0421-16	21 Jun 2016	30 Sep 2016
		GW-RN0434-16	22 Jun 2016	21 Dec 2016
		GW-RN0446-16	24 June 2016	31 Aug 2016
		GW-RN0509-16	16 Jul 2016	31 Aug 2016
		GW-RN0514-16	16 Jul 2016	15 Oct 2016
		GW-RN0525-16	20 Jul 2016	7 Jan 2017
		GW-RN0541-16	5 Aug 2016	4 Nov 2016
		GW-RN0549-16	30 Jul 2016	9 Jan 2017
		GW-RN0557-16	8 Aug 2016	30 Sep 2016
		GW-RN0561-16	16 Aug 2016	11 Feb 2017
		GW-RN0580-16	25 Aug 2016	24 Feb 2017
		GW-RN0581-16	25 Aug 2016	24 Feb 2017
		GW-RN0596-16	17 Aug 2016	15 Feb 2017
		GW-RN0606-16	27 Aug 2016	2 Oct 2016
		GW-RN0619-16	22 Aug 2016	14 Feb 2017
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 -	No.: W5/1G44/1	8 Jun 13	30 Jun 2018

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Discharge License			
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
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-RN0396-16	5 June 2016	4 Nov 2016
		PP-RN0020-16	16 Jul 2016	14 Jan 2017
		GW-RN0520-16	23 Jul 2016	22 Jan 2017
Contract 7				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal	Account No. 7024129	21 Jan 2016	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	of Construction Waste			
5	Construction Noise Permit	GW-RN0538-16	23 Jul 2016	4 Nov 2016
Contract 4				
1	Air pollution Control (Construction Dust) Regulation	Form of Notification of Construction work has submitted to EPD in July 2016.		
2	Chemical Waste Producer Registration	Application is under preparation		
3	Water Pollution Control Ordinance - Discharge License	Application is under preparation		
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Application is under preparation		

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	• 1-hour TSP by Real-Time Portable Dust Meter; and • 24-hour TSP by High Volume Air Sampler.
Noise	• $L_{eq(30min)}$ in normal working days (Monday to Saturday) 07:00-19:00 except public holiday; and • 3 sets of consecutive $L_{eq(5min)}$ on restricted hours i.e. 19:00 to 07:00 next day, and whole day of public holiday or Sunday • Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.
Water Quality	**In-situ Measurements** • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Water depth (m); and • Temperature (℃).
	Laboratory Analysis • Suspended Solids (mg/L)

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 proposed alternative monitoring locations has updated in the revised EM&A Programme which verified by IEC and certified by ET Leader prior submitted to EPD on 10 July 2013. ***Table 3-2***, ***Table 3-3*** and ***Table 3-4*** are respectively listed the air quality, construction noise and water quality monitoring locations for the Project and a map showing these monitoring stations is presented in ***Appendix 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 5 Contract 7
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 5 Contract 6

Station ID	Description	Works Area	Related to the Work Contract
AM3	Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village.	LMH to Frontier Closed Area	Contract 5 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 AM1to AM1a was submitted to EPD on 24 March 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (6) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).*
@ 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.

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 5 Contract 7
NM2a#	Village House near Lin Ma Hang Road	Lin Ma Hang to Frontier Closed Area	Contract 5, 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 5 Contract 6
WM1-Control	Upstream of Kong Yiu Channel	834 185	845 917	NA	SS C505 Contract 5 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 on 29th March 2016. If the measured water depth of the monitoring station is lower than 150 mm, alternative location (WM3x and WM2A-Controlx) based on the criteria were selected to perform water monitoring in accordance with the updated EM&A Programme (Rev. 05) (Section 4.1.4)
** 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)*

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"), 3 consecutive $L_{eq(5min)}$ measurement will depended CNP requirements to undertake. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

Water Quality Monitoring

3.4.3 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
24-Hr TSP	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170*
Calibration Kit	TISCH Model TE-5025A*
1-Hour TSP	
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* or Rion NL-31 or Rion NL-52*
Calibrator	B&K Type 4231* or Cesva CB-5 or Rion NC-74*
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 ºC 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; and also $Leq_{(15min)}$ in three consecutive $Leq_{(5min)}$ 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 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.

3.6.12 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.

3.6.13 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^{0}C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

In-situ Measurement

3.6.14 YSI PRO20 Handheld Dissolved Oxygen Instrument or YSI Professional DSS is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation.

3.6.15 A portable AZ Model 8685 pH pen-style meter or YSI Professional DSS 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.

3.6.16 A portable Hach 2100Q Turbidimeter or YSI Professional DSS is used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU.

3.6.17 All in-situ measurement equipment are calibrated by HOKLAS accredited laboratory of three month interval.

Laboratory Analysis

3.6.18 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 (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1b	265	143	500	260
AM2	268	149		
AM3	269	145		
AM4b	267	148		
AM5a	268	143		
AM6	269	148		
AM7b	275	156		
AM8	269	144		
AM9b	271	151		

Table 3-9 Action and Limit Levels for Construction Noise

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

Note 1: Acceptable Noise Levels for school should be reduced to 70 dB(A) and65 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
		AND 130% of upstream control station of the same day				
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, 5, 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 IN REPORTING MONTH

4.2.1 In the Reporting Period, a total of ***147*** events of 1-hour TSP and ***49*** 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 – AM1b

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
1-Aug-16	88	2-Aug-16	13:19	36	25	24
6-Aug-16	64	8-Aug-16	13:18	82	77	69
12-Aug-16	40	13-Aug-16	13:00	47	46	44
18-Aug-16	23	19-Aug-16	9:37	81	76	78
24-Aug-16	52	25-Aug-16	9:11	72	76	81
30-Aug-16	91	31-Aug-16	9:16	97	99	93
Average (Range)	**60 (23 – 91)**	Average (Range)		**67 (24 – 99)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
1-Aug-16	131	2-Aug-16	13:12	28	26	27
6-Aug-16	85	8-Aug-16	9:38	65	74	76
12-Aug-16	62	13-Aug-16	13:03	47	49	50
18-Aug-16	37	19-Aug-16	9:31	78	83	75
24-Aug-16	142	25-Aug-16	9:13	83	84	77
30-Aug-16	146	31-Aug-16	9:27	92	101	97
Average (Range)	**101 (37 – 146)**	Average (Range)		**67 (26 – 101)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
1-Aug-16	135	2-Aug-16	13:03	40	26	36
6-Aug-16	142	8-Aug-16	9:26	79	79	71
12-Aug-16	100	13-Aug-16	13:06	50	50	50
18-Aug-16	21	19-Aug-16	9:24	81	83	80
24-Aug-16	66	25-Aug-16	9:19	87	87	83
30-Aug-16	122	31-Aug-16	13:03	92	82	95
Average (Range)	**98 (21 – 142)**	Average (Range)		**70 (26 – 95)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
3-Aug-16	20	4-Aug-16	9:23	43	43	38
9-Aug-16	59	10-Aug-16	9:19	38	47	38
15-Aug-16	29	16-Aug-16	9:21	57	72	72
20-Aug-16	45	22-Aug-16	10:17	58	59	50
26-Aug-16	53	27-Aug-16	9:27	82	84	80
Average (Range)	**41 (20 – 59)**	Average (Range)		**57 (38 – 84)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
3-Aug-16	34	4-Aug-16	9:26	44	35	32
9-Aug-16	63	10-Aug-16	9:26	43	39	47
15-Aug-16	25	16-Aug-16	9:29	65	54	49
20-Aug-16	43	22-Aug-16	10:19	63	63	61
26-Aug-16	83	27-Aug-16	9:22	89	82	80
Average (Range)	**50 (25 – 83)**	Average (Range)		**56 (32 – 89)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
3-Aug-16	36	4-Aug-16	9:32	39	31	27
9-Aug-16	104	10-Aug-16	9:33	44	49	50
15-Aug-16	60	16-Aug-16	9:37	70	62	64
20-Aug-16	93	22-Aug-16	10:00	58	60	63
26-Aug-16	134	27-Aug-16	9:15	88	91	87
Average (Range)	**85 (36 – 134)**	Average (Range)		**59 (27 – 91)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
3-Aug-16	32	4-Aug-16	9:34	111	107	131
9-Aug-16	75	10-Aug-16	9:39	53	43	44
15-Aug-16	38	16-Aug-16	9:09	99	79	74
20-Aug-16	45	22-Aug-16	12:51	83	87	60
26-Aug-16	61	27-Aug-16	9:21	122	116	134
Average (Range)	**50 (32 – 75)**	Average (Range)		**90 (43 – 134)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
3-Aug-16	20	4-Aug-16	13:06	99	94	104
9-Aug-16	35	10-Aug-16	13:03	53	48	52
15-Aug-16	22	16-Aug-16	13:06	51	46	72
20-Aug-16	34	22-Aug-16	9:11	67	55	72
26-Aug-16	61	27-Aug-16	13:06	122	118	132
Average (Range)	**34 (20 – 61)**	Average (Range)		**79 (46 -132)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
1-Aug-16	72	2-Aug-16	13:15	39	39	39
6-Aug-16	95	8-Aug-16	13:08	47	44	40
12-Aug-16	47	13-Aug-16	13:33	52	51	48
18-Aug-16	25	19-Aug-16	12:51	50	47	45
24-Aug-16	45	25-Aug-16	9:26	100	63	57
30-Aug-16	37	31-Aug-16	12:53	214	180	156
Average (Range)	**54 (25 – 95)**	Average (Range)		**73 (39 – 214)**		

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, 5, 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 IN REPORTING MONTH

5.2.1 In the Reporting Period, a total of **45** event 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(*)**	**NM8**	**NM9**	**NM10(*)**
2-Aug-16	54	68	57	61	62
8-Aug-16	53	71	59	62	61
19-Aug-16	57	70	58	63	61
25-Aug-16	62	73	55	61	64
31-Aug-16	55	72	57	65	64
Limit Level	**75 dB(A)**				

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**
4-Aug-16	61	62	55	55	65
10-Aug-16	58	60	59	56	61
16-Aug-16	57	58	55	61	63
22-Aug-16	61	63	51	59	58
Limit Level	**75 dB(A)**				

5.2.2 As shown in ***Tables 5-1 and 5-2***, the noise level measured at all designated monitoring locations were below 75dB(A). Furthermore, there was no noise complaints (Action Level exceedance) received by the RE, CEDD, Architect/AR/ and the Contractors in the Reporting Period. Therefore, no Action or Limit Level exceedance was triggered and no corrective action was required.

6 WATER QUALITY MONITORING

6.1 GENERAL

6.1.1 In the Reporting Period, construction works under the project has been commenced in Contracts 2, 3, 5, 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 fourteen (14) sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances were recorded at WM2A(a) and WM2B, according to "*Event and Action Plan*" stipulation, five (5) and four (4) additional water quality monitoring days were conducted for WM2A(a) and WM2B respectively and its control stations in the reporting period.

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-Aug-16	7.4	7.4	6.8	35.0	20.0	29.0	29.5	16.5	22.0
4-Aug-16	7.0	7.4	6.2	119.0	100.9	99.7	114.5	98.0	80.5
6-Aug-16	7.2	7.2	6.7	27.0	28.4	11.3	20.5	24.5	8.0
8-Aug-16	7.3	7.3	7.2	15.8	9.4	10.6	13.5	6.0	7.0
10-Aug-16	6.9	7.7	7.4	37.4	30.9	34.6	25.5	18.5	30.0
12-Aug-16	7.2	7.5	6.7	35.1	10.6	19.3	32.0	10.0	13.5
16-Aug-16	7.0	7.4	6.1	35.0	8.1	18.6	32.0	3.0	15.0
18-Aug-16	7.2	7.4	6.7	35.7	24.2	37.5	37.0	20.0	29.0
20-Aug-16	7.2	7.7	7.1	34.0	13.9	10.6	35.0	3.0	10.0
22-Aug-16	7.1	7.0	7.0	15.3	18.7	29.1	15.0	5.5	20.5
24-Aug-16	7.5	7.7	7.0	23.5	5.9	11.4	28.5	6.0	12.5
26-Aug-16	7.4	7.4	7.2	18.1	8.1	12.0	19.5	9.0	12.0
29-Aug-16	7.8	7.9	7.2	29.4	8.6	26.0	22.5	8.0	14.5
31-Aug-16	11.2	9.9	9.0	11.2	9.9	9.0	10.0	8.5	8.5

Table 6-2 Water Quality Monitoring Results Associated of Contracts 5, 6 and SS C505

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
2-Aug-16	7.0	7.2	198.0	170.0	164.0	138.5
4-Aug-16	7.3	6.9	16.0	12.9	18.5	12.0
6-Aug-16	6.9	7.5	44.8	13.2	47.0	10.0
8-Aug-16	7.3	7.7	12.8	9.1	11.0	4.5
10-Aug-16	7.2	7.0	309.5	308.5	283.0	287.5
12-Aug-16	7.3	7.3	14.8	11.2	13.0	10.0
16-Aug-16	6.7	7.1	50.8	21.3	37.0	16.0
18-Aug-16	7.0	6.8	182.0	230.0	151.5	188.5
20-Aug-16	7.0	7.1	50.4	18.1	52.5	16.0
22-Aug-16	7.1	6.9	33.9	15.2	19.0	13.0
24-Aug-16	7.2	7.2	13.7	11.3	11.5	7.0
26-Aug-16	7.2	7.6	21.8	10.5	24.5	8.0
29-Aug-16	7.2	7.5	17.9	11.8	20.0	6.0
31-Aug-16	7.6	8.2	11.5	7.3	8.5	4.0

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-Aug-16	7.0	7.8	7.4	7.5	**48.4**	17.9	**26.8**	10.3	**55.0**	13.5	**22.0**	5.5
3-Aug-16#	--	--	--	--	**203.5**	4.0	10.4	3.8	**170.0**	<2	**15.0**	<2
4-Aug-16	7.1	7.6	7.9	6.8	24.7	4.1	11.1	3.3	**23.5**	2.5	21.5	<2
5-Aug-16#	--	--	--	--	24.6	5.3	--	--	14.0	4.0	--	--
6-Aug-16	6.6	7.4	7.6	6.5	24.4	7.0	11.1	3.7	13.5	2.0	10.0	<2
8-Aug-16	6.8	7.5	7.3	6.7	19.8	8.7	9.8	8.6	11.0	<2	5.0	<2
10-Aug-16	7.0	7.8	7.0	6.6	***42.8***	33.8	***51.3***	41.1	**41.0**	22.0	61.0	68.0
11-Aug-16#	--	--	--	--	21.1	8.6	11.3	3.1	**34.0**	12.0	11.0	2.0
12-Aug-16	7.2	7.4	7.1	6.6	22.5	10.3	11.4	7.6	**33.5**	13.5	9.5	8.0
16-Aug-16	7.4	7.4	7.5	6.6	24.5	6.8	10.3	3.8	14.0	3.0	9.0	2.0
18-Aug-16	7.2	7.4	7.4	6.0	**357.5**	26.7	**>999**	14.2	**244.0**	20.0	**1375.0**	2.0
19-Aug-16#	--	--	--	--	**265.5**	62.1	**23.7**	2.9	**336.0**	19.0	**15.0**	<2
20-Aug-16	6.8	7.5	7.0	6.5	**547.5**	6.6	10.4	3.5	**335.5**	4.5	11.0	<2
22-Aug-16	7.2	7.7	7.7	8.1	**374.5**	9.1	**>999**	3.7	**248.0**	8.0	**1720.0**	4.0
23-Aug-16#	--	--	--	--	24.7	5.0	8.1	3.6	**35.0**	9.0	**15.0**	<2
24-Aug-16	6.9	7.5	7.0	6.7	23.8	10.6	11.3	5.9	**22.5**	7.5	**16.0**	9.0
26-Aug-16	7.1	7.6	7.8	6.7	23.1	10.5	7.7	7.0	14.5	5.5	7.0	4.5
29-Aug-16	7.2	7.6	7.4	6.9	24.1	20.9	7.4	3.4	30.5	31.5	4.5	<2
31-Aug-16	7.4	7.9	8.1	6.7	24.7	15.8	6.9	2.1	**25.0**	9.5	7.0	<2

Remarks: *bold with 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 6-4 Water Quality Monitoring Results Associated Contracts 2 and 6

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-Control	WM3x	WM3-Control	WM3x	WM3-Control
2-Aug-16	7.1	7.7	243.0	260.0	229.5	339.0
4-Aug-16	7.2	6.8	>999	>999	1470.0	1270.0
6-Aug-16	6.6	6.6	21.2	18.8	23.5	23.0
8-Aug-16	7.0	6.6	20.7	19.1	23.0	32.5
10-Aug-16	6.9	6.6	51.7	75.5	44.5	100.5
12-Aug-16	7.0	6.5	8.1	9.3	9.0	17.0
16-Aug-16	6.8	6.4	17.3	21.1	13.5	21.5
18-Aug-16	6.8	6.7	148.0	153.0	130.5	309.5
20-Aug-16	7.0	6.8	93.8	87.7	103.5	118.0
22-Aug-16	6.7	6.5	107.0	>999	104.0	13100.0
24-Aug-16	7.8	6.3	12.3	18.4	16.0	64.0
26-Aug-16	7.6	6.6	6.7	12.1	8.0	20.0
29-Aug-16	7.1	7.1	12.9	11.9	15.0	20.5
31-Aug-16	6.3	6.8	7.9	7.8	15.0	14.5

Table 6-5 Breaches of Water Quality Monitoring Criteria in Reporting Period

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
WM1	0	0	0	0	0	0	0	0
WM2A(a)	0	0	**1**	**6**	0	**13**	**1**	**19**
WM2B	0	0	**1**	**4**	0	**7**	**1**	**11**
WM3x	0	0	0	0	0	0	0	0
WM4	0	0	0	0	0	0	0	0

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit
No of Exceedance	0	0	2	10	0	20	2	30

6.2.3 In this Reporting Period, a total of thirty (30) Limit Level (LL) exceedances and two (2) Action Level (AL) exceedances, namely twelve (12) AL/LL exceedance of turbidity and twenty (20) LL exceedances of Suspended Solids were recorded for the Project and they are summarized in ***Table 6-5***.

6.2.4 NOE was issued to relevant parties upon confirmation of the monitoring result. The cause of exceedance is summarized in ***Table 6-6*** accordance to investigation findings and the detailed 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
2, 3 and 4 August 2016	WM2A(a) (C6)	NTU &SS	Typhoon No.8 was hoisted on 2 August 2016 morning and heavy rain was recorded on 2 and 3 August 2016. In order to identify the source of turbid water, the monitoring team subsequently inspected the alignment of the river course of Bridge D. On 2 and 3 August 2016, it was observed that water releasing from the rubber dam after heavy rain and the rubber dam was not belong to C6. The water flow of the river became very vigorous and stirred up the loose sediment at the river bed. It is concluded that the exceedances on 2 and 3 August 2016 were related to vigorous flow disturbing the sediment at the river when water releasing from the rubber dam. For exceedances on 4 August 2016, it is considered the exceedances were related to the unknown source of turbid water seeping out from the river bed.
10, 11 and 12 August 2016	WM2A(a) (C6)	NTU &SS	According to the Hong Kong Observatory, there was heavy rainstorm on 10 August 2016 and occasionally shower on 11 and 12 August 2016. In order to identify the source of turbid water, the monitoring team subsequently inspected the alignment of the river course of Bridge D. On 10 August 2016, turbid water was observed throughout the stream course due to vigorous flow and stirred up of the sediment. On 11 and 12 August, unknown source of turbid water seeping out from the river bed was observed. In our investigation, it is considered that the exceedance was not likely caused by the Project.
2, 3 and 4 August 2016	WM2B (C6)	NTU &SS	Typhoon No.8 was hoisted on 2 August 2016 morning and heavy rain was recorded on 2 and 3 August 2016. According to the site observations from the monitoring team on 2, 3 and 4 August 2016, the water flow in the channel was very vigorous due to heavy rain and it stirred up some silt and sediment at the river bed. Moreover, there was trails of muddy water flowing from the adjacent road into the channel resulted from rain. In our investigation, it is considered that the exceedances were due to the disturbance of silt and sediment during sampling and runoff from road and not likely caused by the Project.
10 August 2016	WM2B (C6)	NTU &SS	According to the site observations from the monitoring team on 10 August 2016, the water flow in the channel as

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
			well as WM2B and WM2B-c was very vigorous due to heavy rain and turbid water was observed throughout the channel. Moreover, there was trails of turbid water flowing from the adjacent road into the channel resulted from rain. In our investigation, it is considered that the exceedance was due rainstorm and runoff from road and not likely caused by the Project.
18, 19 and 22 August 2016	WM2B (C6)	NTU &SS	To be reporting in next reporting month.
23 and 24 August 2016	WM2B (C6)	NTU &SS	According to the site observations from the monitoring team on 23 and 24 August 2016, the water at WM2B was visually clear though some obvious silt and sediment was found at the river bed. No abnormality was observed by the monitoring Team. Since the sampling was conducted at shallow water (water depth <0.03m), it is considered that the exceedances were due to the disturbance of silt and sediment during sampling and not likely caused by the Project.
18, 19, 20, 22 August 2016	WM2A(a) (C6)	NTU &SS	According to the HKO, there was rainstorm recorded on 18 to 22 August 2016. Due to continuous rainfall, large amount of surface muddy runoff generated from the surrounding environment has been flowing into existing stream. The muddy runoff resulted in slurry and mud accumulated in the river bed. According to the photo recorded and monitoring data, the water quality at control station WM2A-C was also affected by the rainfall, particularly on 18 and 19 August 2016. In our investigation, it is considered the exceedance was due to surface runoff and mud from the surrounding environmental under rainstorm and unlikely caused by the works under the project.
23, 24 and 31 August 2016	WM2A(a) (C6)	NTU &SS	In our investigation, the water mitigation measures implemented on site was in order and there were no rain recorded on 23, 24 and 31 August 2016 and therefore muddy runoff from the site was not likely to occur. It is considered the exceedances were due to natural variation and unlikely caused by the works under the project.

7 WASTE MANAGEMENT

7.1 GENERAL WASTE MANAGEMENT

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

7.2 RECORDS OF WASTE QUANTITIES

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

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

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

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

Type of Waste	Contract 2		Contract 3		Contract 5		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	
C&D Materials (Inert) (in '000m^3)	**88.4693**	--	**0.582**	--	0	--	**45.652**	--	**0.464**	--	**4.247**	--	**139.4143**
Reused in this Contract (Inert) (in '000 m^3)	**0.1268**	--	0	--	0	--	**6.653**	--	0	--	**4.182**	--	**10.9618**
Reused in other Contracts/ Projects (Inert) (in '000 m^3)	**27.0545**	C6/ NENT# & other projects approved by the ER	0	--	0	--	**5.933**	C5 & other projects approved by the ER	0	--	0	--	**32.9875**
Disposal as Public Fill (Inert) (in '000 m^3)	**61.2879**	Tuen Mun 38	**0.494**	Tuen Mun 38	0	--	**33.066**	Tuen Mun 38	**0.464**	Tuen Mun 38	**0.065**	TKO 137	**95.3769**

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

Table 7-2 Summary of Quantities of C&D Wastes for the Project

Type of Waste	Contract 2		Contract 3		Contract 5		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) #	**23.0**	-	0	-	0	--	0	--	0	--	**242.37**	Licensed collector	**265.37**
Recycled Paper / Cardboard Packing ('000kg) #	0	-	0	-	0	--	0	--	**0.03**	--	**0.36**	--	**0.39**
Recycled Plastic ('000kg) #	0	--	**0.001**	-	0	--	0	--	**0.001**	--	**0.025**	--	**0.001#+0.026**
Chemical Wastes ('000kg) #	**4.9280**	Licensed collector	0	-	0	--	0	--	0	--	0	--	**4.928**
General Refuses ('000m^3)	**0.1482**	NENT	**0.105**	NENT	**0.02**	NENT	**0.110**	NENT	0	--	**0.228**	NENT	**0.6112**

Remark #: Unit of recycled metal, recycled paper/ cardboard packing, recycled plastic and chemical waste for Contract 3 was in ('000m^3).

8 SITE INSPECTION

8.1 REQUIREMENTS

8.1.1 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.

8.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

Contract 2

8.2.1 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 **5, 12, 19 and 26 August 2016**. No non-compliance was noted.

8.2.2 The findings / deficiencies of ***Contract 2*** that observed during the weekly site inspection are listed in ***Table 8-1***.

Table 8-1 Site Observations for Contract 2

Date	Findings / Deficiencies	Follow-Up Status
5 August 2016	• No adverse environmental issue was observed.	• NA
12 August 2016	• It was reminded that proper maintenance or replacement should be provided for the broken water to prevent accumulation of stagnant water. Moreover, stagnant water should be removed after rainfall to prevent mosquito breeding.	• Not required for reminder.
19 August 2016	• It was reminded that stagnant water cumulated on site should be cleared to prevent mosquito breeding particularly after the rainstorm	• Not required for reminder.
26 August 2016	• No adverse environmental issue was observed.	• NA

Contract 3

8.2.3 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 **1, 8, 15, 24 and 29 August 2016**. No non-compliance was noted.

8.2.4 The findings / deficiencies of ***Contract 3*** that observed during the weekly site inspection are listed in ***Table 8-2***.

Table 8-2 Site Observations for Contract 3

Date	Findings / Deficiencies	Follow-Up Status
1 August 2016	• Stagnant water was observed at AC 1. The Contractor should remove the stagnant water to prevent mosquito breeding.	• Stagnant water was removed.
8 August 2016	• Broken water filled road barrier was observed at SA12A. The Contractor should replace the barrier to avoid accumulation of stagnant water. • Stagnant water was observed near SA12A. The Contractor should remove the stagnant water to prevent mosquito breeding.	• The water filled road barrier was repaired. • Water pump was provided to remove the stagnant water.

Date	Findings / Deficiencies	Follow-Up Status
15 August 2016	• No adverse environmental issue was observed.	• NA
24 August 2016	• Stagnant water was observed in two unused sedimentation tanks, the Contractor should remove the stagnant water to prevent mosquito breeding. (Tai Wo Service Road West) • Stagnant water was observed near the sheetpile area, the Contractor should remove the stagnant water and backfill the affected area to prevent mosquito breeding. (Tai Wo Service Road West) • Chemical container without drip tray was observed, the Contractor should put it in the chemical storage area with drip tray underneath. • The Contractor was reminded to dispose of the waste on regular basis. Moreover, on-site waste sorting should be implemented appropriately.	• Stagnant water was removed from the sedimentation tanks. • Stagnant water near sheet pile area was removed. • Chemical container was removed from site. • Not required for reminder.
29 August 2016	• The Contractor was reminded to remove stagnant water on site regularly especially after rainy days.	• Not required for reminder.

Contract 5

8.2.5 In the Reporting Period, joint site inspection for Contract 5 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **5, 9, 16, 23 and 30 August 2016**. No non-compliance was noted.

8.2.6 The findings / deficiencies of ***Contract 5*** that observed during the weekly site inspection are listed in ***Table 8-3***.

Table 8-3 Site Observations for Contract 5

Date	Findings / Deficiencies	Follow-Up Status
5 August 2016	• The Contractor was reminded that mosquito control measures should be provided to prevent mosquito breeding.	• Not required for reminder.
9 August 2016	• No adverse environmental issue was observed.	• NA
16 August 2016	• No adverse environmental issue was observed.	• NA
23 August 2016	• It was reminded that the housekeeping should be improved and maintained.	• Not required for reminder.
30 August 2016	• No adverse environmental issue was observed.	• NA

Contract 6

8.2.7 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 **4, 11, 18 and 25 August 2016**. No non-compliance was noted.

8.2.8 The findings / deficiencies of ***Contract 6*** that observed during the weekly site inspection are

listed in ***Table 8-4***.

Table 8-4 Site Observations for Contract 6

Date	Findings / Deficiencies	Follow-Up Status
4 August 2016	• Overflow of sedimentation tank in Ng Chow Road site exit was observed, the Contractor should further review the wastewater treatment facility.	• Desilting of sedimentation tank has been carried out to ensure the tank is functional. The footpath is cleaned up and sandbag bund is maintained.
11 August 2016	• Overflow of wheel washing bay was observed in Bridge Y, the Contractor should provide mitigation measures for the wheel washing bay and the system to avoid overflow and wheel washing water leakage. • Stagnant water was found in damaged water-filled barriers and drip tray of generator in Bridge Y; and construction ground in Bridge D, mitigation measures should be provided to prevent mosquito breeding. • Exposed slope was observed in Bridge D, the Construction should be cover the slope to minimise dust generation and water run-off. • It was reminded that proper vehicle washing facility should be provided in Bridge D site exit.	• Water overflowing from wheel washing bay has been diverted to wastewater treatment facility. • Damaged water-filled barrier has been removed; Stagnant water has been removed from drip tray; and uneven ground has been filled up to avoid ponding. • Exposed slope has been covered with impervious tarpaulin sheet. • Not required for reminder.
18 August 2016	• Vehicle without washing before leaving the site was observed in Ping Yuen Interchange. The Contractor should ensure all vehicles are washed off the mud from vehicle body and wheels before leaving site.	• Vehicles have been instructed to wash their wheels properly before leaving the site.
25 August 2016	• Dusty haul road was observed. Dust control measures or water spraying frequency should be increased for the haul road to reduce dust generation. (Bridge D)	• Watering on haul road was provided to reduce dust generation. (Bridge D)

Contract SS C505

8.2.9 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **3, 9, 17, 24 and 31 August 2016.** No non-compliance was noted.

8.2.10 The findings / deficiencies of ***Contract SS C505*** that observed during the weekly site inspection are listed in ***Table 8-5***.

Table 8-5 Site Observations for Contract SS C505

Date	Findings / Deficiencies	Follow-Up Status
3 August 2016	• Chemical container without drip tray was observed at PTB. The Contractor should place the container into drip tray to prevent	• Chemical container was placed into the drip at PTB

Date	Findings / Deficiencies	Follow-Up Status
	land contamination.	
9 August 2016	• Stagnant water cumulated inside the drip tray after rainstorm was observed. (Building 9 & PTB) • Freestanding chemical container without drip tray was observed at PTB. Drip tray should be provided for all chemical storage on site. • It was reminded that mosquito control measures should be provided for the stagnant water accumulated on site to prevent mosquito breeding.	• Stagnant water was removed. • The chemical container was removed. • Not required for reminder.
17 August 2016	• Water filled road barriers without cap was observed at Gate 1. The Contractor should provide cap for the barriers to prevent mosquito breeding.	• Cap for the water filled road barriers was provided.
24 August 2016	• Oil drums without drip tray were observed. Drip tray should be provided for all chemical storage on site. (Training Centre) • Stagnant water cumulated inside the drip tray was observed after rainstorm. The Contractor should remove the water cumulated inside. (PTB) • Stagnant water cumulated inside the lifting eyes of the concrete block was observed. The Contractor should filled the lifting eyes with sand to prevent stagnant water accumulation. (TC10)	• Oil drums were removed • Stagnant water was removed from the drip tray. • The lifting eyes of the concrete block were filled with sand to avoid stagnant water accumulation.
31 August 2016	• Stagnant water was observed near Bridge 2, Training Centre, Gate 2 and Building 9. The Contractor should remove the stagnant water to prevent mosquito breeding.	• The stagnant water was removed.

Contract 7

8.2.11 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 **5, 9, 16, 23 and 30 August 2016**. No non-compliance was noted.

8.2.12 The findings / deficiencies of ***Contract 7*** that observed during the weekly site inspection are listed in ***Table 8-6***.

Table 8-6 Site Observations for Contract 7

Date	Findings / Deficiencies	Follow-Up Status
5 August 2016	• Stagnant water cumulated inside the lifting eyes of the concrete block was observed. Mosquito control measures should be provided to prevent mosquito breeding. (Bridge C)	• The lifting eyes are filled up to prevent stagnant water.
9 August 2016	• Free standing chemical containers were observed on site, the Contractor should provide drip tray for the chemical container. (Pile Cap B01)	• The chemical containers are removed from site.

Date	Findings / Deficiencies	Follow-Up Status
16 August 2016	• No adverse environmental issue was observed.	• NA
23 August 2016	• Smoke emission from an excavator was observed in the site area along the river, the Contractor should provide plant maintenance to avoid smoke emission.	• Smoke emission from an excavator was observed in the site area along the river, the Contractor should provide plant maintenance to avoid smoke emission.
30 August 2016	• Free standing chemical containers were found on site, the Contractor should provide drip tray for the chemical containers. (location: Bridge C)	• The chemical containers were removed.

8.2.13 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.

Other Contracts

8.2.14 Since the construction work of Contract 4 has not commenced, no site inspection was performed.

9 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

9.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

9.1.1 In the Reporting Period, no summons and prosecution under the EM&A Programme was lodged for Contracts 2, 3, 5, 6, 7 and Contract SS C505. However, one (1) documented environmental complaint was received in respect of the wastewater issue related to Contract 6. The investigation reports were reviewed by IEC. The detail of the complaints and the investigation results are presented below.

Investigation Result for the Documented Complaints received by EPD on 22 July 2016 (Contract 2 & 6) (last Reporting Period)

9.1.2 A complaint was received from EPD on 22 July 2016 related to mud and slurry discharged out of the construction sites near Sha Tau Kok Road – Ma Mei Ha and Wo Keng Shan Road. In addition to the complaint details described above, the complainant also mentioned that:-

(a) he saw a worker washing a truck at the entrance of the construction site near Sha Tau Kok Road – Ma Mei Ha and Wo Keng Shan Road and some mud or slurry was being washed to the ground outside the construction site.

(b) he saw two trucks outside the construction site along Wo Keng Shan Road (which should be Contract 6's construction site) pouring water which carried mud from the trucks during rainy day.

(c) a staff from one of the construction sites told him that trucks working for Contract 2 and 6 shared the same entrance. However, he noted that some trucks working for the other Contractor did not pass the vehicle-washing basin before driving towards the entrance when leaving the site.

9.1.3 The mentioned entrance (site exit) of the construction site near Sha Tau Kok Road – Ma Mei Ha and Wo Keng Shan Road should be the North Portal of Contract 2 which maintained by DHK. This entrance is shared by Contracts 2 and 6 as the complainant said in IR#1(c). As advised by Contractor of C6 (CCKJV), there was an active works area (CR6) next to North Portal of C2 and main construction activities carried out were plants demobilization during 11-22 July 2016 and site clearance has been conducting after 23 July 2016 and throughout August 2016. Since there were very limited vehicles getting in and out CR6, all vehicles under C6 would be preliminary washed by water spraying at CR6 site exit and then pass through the wheel washing facilities at North Portal of C2 for proper cleaning. Upon this complaint, CCKJV has reminded the front line staffs to pay more attention on the wheel washing issue and ensure all vehicles were properly cleaned before leaving the site. As recently advised by CCKJV, they will construct a new exit in Sha Tau Kok Road for CR6 and a wheel washing facilities would be properly implemented and maintained. The construction for new exit is expected to be completed in end of September 2016.

9.1.4 Site inspection was carried out by ET on 23 July 2016 at the concerned area including the proposed Sha Tau Kok interchange and site exit for the complaint investigation. The observations during the site inspection are summarized below:

(a) Wheel washing facilities were provided within the construction site of North Portal of C2.

(b) After the vehicles were thoroughly washed, they will pass through a hard paved haul road and then reached the main site exit before leaving construction site.

(c) A cut-off drain was provided at the exit to Sha Tau Kok Road – Ma Mei Ha to divert possibly runoff and discharge from the construction area.

(d) The main site exit was paved with concrete and clear of mud. As advised by DHK, manual water spraying was provided at the entrance of North Portal, it is not a wheel washing facilities but to clean and tidy the site entrance as needed.

(e) No dusty materials were brought by vehicles from the site was observed. The cleanliness condition of the site exit of North Portal within the site area was satisfactory.

9.1.5 In our investigation, no mud or dusty materials would be brought by the vehicles out of the construction site. Therefore, it is considered that the suspected mud and slurry discharge from

the works area out to Sha Tau Kok Road road – Ma Mei Ha and Wo Keng Shan Road was unlikely due to the project. However, to address the complainant's concern, DHK have immediately stopped the cleaning work at the site exit as described in IR#3(d), thus no possibly mud/ slurry could be washed to the ground on the Sha Tau Kok Road road – Ma Mei Ha.

9.1.6 Secondly, the complainant also mentioned that he saw two truck outside the construction site along Wo Keng Shan Road (which should be Contract 6's construction site) pouring water which carried mud from the trucks during rainy day. In order to investigate this incident, inspection was carried out along Wo Keng Shan Road during rainy day on 4 August 2016. It was observed that all the dump trucks leaving the sites of C6 were properly covered and no muddy water leaking come from the dump trucks. Moreover, no trails of mud and muddy water were observed on the Wo Keng Shan Road as well as the site exits. It is considered that the incident was unlikely due to the Project. However, both contractors were reminded to pay special attention on this issue and ensure all dump trucks should be well covered and without water dripping before leaving the site.

9.1.7 Finally, EPD noted that the road along Sha Tau Kok Road – Ma Mei Ha and Wo Keng Shan Road was covered with mud during their recent inspection and the Contractors C2 and C6 were reminded to clean the concerned road as needed. As advised by both contractors, road washing/ cleaning by water bowsers was provided along Wo Keng Shan Road to Sha Tau Kok Road in every normal working day (Mon-Sat), except for rainy day. Moreover, road sweeping would be provided for the concerned roads twice a week. To address the EPD's concern, the ET will keep closely inspection on the cleanliness situation on both roads during weekly site inspection.

Investigation Result for the Documented Complaints received by DSD on 25 August 2016 (Contract 6)

9.1.8 An email was issued by DSD on 24 August 2016 to CEDD and copied to EPD attached with an inspection report stating that a lot of slurry was found from the stream besides Ping Yeung Village during their routine inspection on 19 August 2016. The slurry was flushed down from the upstream and part of slurry was trapped by the nylon dam. Another inspection was conducted on 23 August 2016 to search for the source. The concerned slurry was flushed away. The Nylon Dam was loosed by the responsible department. On the other hand, a farm owner at the upstream complained that the U-channel in his farm had always been choked with silt since the civil works started at the upstream. 200mm deep (approx.) silt/sediment was dipped at the U-channel. It was suspected that the slurry and silt/ sediment were come from the construction site under Contract No. CV/2013/08.

9.1.9 Upon receipt of the complaint on 25 August 2016, joint site inspection for the complaint investigation was conducted by RE, IEC, ET and the Contractor of Contract 6 (CCKJV) at concerned area on 25 August 2016. The observations during the site inspection are summarized below:

(f) No slurry and muddy water was observed in the concerned Nylon Dam.

(g) No muddy water and choked silt were observed at the U-channel of the concerned farm in Ping Yeung Village. Moreover, it was noted that the ground levels of the concerned farm as well as the said U-channel was higher than the adjacent construction site. It revealed that complaint choked silt at the U-channel of the farm was not likely come from the construction site.

(h) Wastewater treatment facilites (2 nos. of AquaSed) at upstream of the Nylon dam were provided by Contract 6. According to the daily record of wastewater treatment systems provided by the Contractor of Contract 6, the wastewater discharge from the site was compliance with the Discharge Licences requirements.

(i) To minimize the muddy runoff from the site, the Contractor has covered the exposed slopes as far as practicable. Moreover, the edges of the slope top were bund up to minimize surface runoff.

9.1.10 According to the Hong Kong Observatory, there were rainstorm recorded on 9, 10, 11, 14, 15, 16, 17 and 18 August 2016. Due to continuous rainfall, large amount of surface muddy runoff generated from the surrounding environment has been flowing into existing stream near Ping

Yeung Village. The muddy runoff resulted in slurry and mud accumulated in the river bed.

9.1.11 In our investigation, it is considered the slurry and mud observed within watercourse near Ping Yeung Village was due to surface runoff and mud from the surrounding environmental under rainstorm and unlikely caused by the works under the project. Besides, the sediment/silt accumulated in the U-channel carrying water to nearby farm was also unlikely due to the project. Nevertheless, CCKJV should continue fully implement the water pollution mitigation measures throughout the construction period.

Table 9-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 July 2016	Contract 2	**2**	**19**	• **(8)Water Quality** • **(8) Dust** • **(3) Noise**
06 Nov 2013 – 31 July 2016	Contract 3	0	**4**	• **(1) Dust** • **(2) Water quality** • **(1) Noise**
16 Aug 2013 – 31 July 2016	Contract 5	0	**4**	• **(3) Dust** • **(1) Noise**
16 Aug 2013 – 31 July 2016	Contract 6	**4**	**21**	• **(15) Water Quality** • **(5) Dust** • **(1) Noise**
15 Feb 2016 – 31 July 2016	Contract 7	0	**0**	**N/A**
16 Aug 2013 – 31 July 2016	SS C505	0	**1**	**(1) Noise**
1 – 31 August 2016	Contract 2	0	**19**	• **(8)Water Quality** • **(8) Dust** • **(3) Noise**
	Contract 3	0	**4**	• **(1) Dust** • **(2) Water quality** • **(1) Noise**
	Contract 5	0	**4**	• **(3) Dust** • **(1) Noise**
	Contract 6	**1**	**22**	• **(16) Water Quality** • **(5) Dust** • **(1) Noise**
	Contract 7	0	**0**	**N/A**
	SS C505	0	**0**	**N/A**

Table 9-2 Statistical Summary of Environmental Summons

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 July 2016	Contract 2	0	0	NA
06 Nov 2013 – 31 July 2016	Contract 3	0	0	NA
16 Aug 2013 – 31 July 2016	Contract 5	0	0	NA
16 Aug 2013 – 31 July 2016	Contract 6	0	0	NA
15 Feb 2016 – 31 July 2016	Contract 7	0	0	NA

16 Aug 2013 – 31 July 2016	SS C505	0	0	NA
1 – 31 August 2016	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 5	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

Table 9-3 Statistical Summary of Environmental Prosecution

Reporting Period	Contract No	Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 July 2016	Contract 2	0	0	NA
06 Nov 2013 – 31 July 2016	Contract 3	0	0	NA
16 Aug 2013 – 31 July 2016	Contract 5	0	0	NA
16 Aug 2013 – 31 July 2016	Contract 6	0	0	NA
15 Feb 2016 – 31 July 2016	Contract 7	0	0	NA
16 Aug 2013 – 31 July 2016	SS C505	0	0	NA
1 – 31 August 2016	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 5	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

The Other Contracts

9.1.12 Since the construction works at the Contract 4 has not yet commenced, no environmental complaint, summons and prosecution under the EM&A Programme are registered in the Reporting Period.

10 IMPLEMENTATION STATUS OF MITIGATION MEASURES

10.1 GENERAL REQUIREMENTS

10.1.1 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.***

10.1.2 All contracts under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by Contracts 2, 3, 5, 6, 7 and Contract SS C505 in this Reporting Period are summarized in ***Table 10-1***.

Table 10-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	• Wastewater to be treated by the wastewater treatment facilities i.e. sedimentation tank or similar facility before discharge.
Air Quality	• Maintain damp / wet surface on access road • Low vehicular speed within the works areas. • All vehicles must use wheel washing facility before off site • Sprayed water during breaking works • A cleaning truck was regularly performed on the public road to prevent fugitive dust emission
Noise	• Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants • Place noisy plants away from residence or school • Provide noise barriers or hoarding to enclose the noisy plants or works • Shut down the plants when not in used.
Waste and Chemical Management	• On-site sorting prior to disposal • Follow requirements and procedures of the "Trip-ticket System" • Predict required quantity of concrete accurately • Collect the unused fresh concrete at designated locations in the sites for subsequent disposal
General	• The site was generally kept tidy and clean.

10.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

10.2.1 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
- Tube excavation (NB+SB)
- Adit waterproofing, lining and post-excavation grouting
- Ventilation building superstructure and backfilling

North Portal
- Southbound TBM excavation
- Northbound bench excavation and tunnel enlargement
- Retaining walls and slope stabilization

South Portal
- Southbound and Northbound D&B excavation
- South ventilation building superstructure

Admin Building
- Building superstructure

Contract 3

- Cable detection and trial trenches
- Demolition of the Existing Vehicular Bridge between Tai Wo Service West and Tai Wo Service Road East
- Installation of Stone Cladding

- Cap pier construction of Kiu Tau Footbridge
- Noise barrier construction
- Pier / Pier Table construction
- Pile cap works
- Portal beam construction
- Piling works for viaduct
- Piling works for noise barrier
- Retaining Wall construction
- Road works
- Utilities duct laying
- Viaduct segment erection
- Water Main Laying

Contract 6

- Slope Works
- Bored Piling
- Pile Cap Construction
- Bridge Pier Construction
- Sewage Treatment Plant Construction
- Tunnel Works
- Segment Installation

Contract 7

- Piling Works at Bridge A,C and E
- Pile caps construction at Bridge B,C and D
- Column construction at Bridge C

Contract SS C505

- General Site Set-up
- Building no.4, 5, 6, 9, 11 and 36 construction
- Excavation waterproofing works for Building no. 4, 6 & 11
- Pile cap construction for Building no.4,6&7
- Tower crane operation and erection
- Disassembly of crawler crane
- Grouting and full core to completed bored piles
- Bridge construction works including construction of bridge column, retaining wall, pile cap and pier
- Underground drainage works
- Prototype “A” construction works
- Mock up for south entrance double curve cladding
- Formwork and falsework for PTB’s slab construction
- Construction PTB M/F flat slab
- Steel beam works for maintenance platform for PTB
- Pile cap construction for PTB, including excavation and backfilling works
- Bridge deck construction for Bridges 1, 2 & 3
- Footing construction

10.3 KEY ISSUES FOR THE COMING MONTH

10.3.1 Key issues to be considered in the coming month for Contracts 2, 3, 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

10.3.2 Since the construction work of Contract 4 has not commenced, no environmental issue is presented.

11 CONCLUSIONS AND RECOMMENDATIONS

11.1 CONCLUSIONS

11.1.1 This is the **37th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **31 August 2016**.

11.1.2 For air quality monitoring, no 1-hour and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.

11.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in the Reporting Period. No NOEs or the associated corrective actions were therefore issued.

11.1.4 For water quality monitoring, thirty (30) Limit Level (LL) exceedances and two (2) Action Level (AL) exceedances, namely twelve (12) AL/LL exceedance of turbidity and twenty (20) LL exceedances of Suspended Solids were recorded for the Project. Investigations for the cause of exceedances on 2, 3, 4, 10, 11 and 12 August have been conducted by ET and investigation results revealed that these exceedances were not project related. The IRs and the associated investigation reports were submitted to relevant parties. Exceedances on 18, 19, 22, 23, 24 and 31 August 2016 are under investigation by ET.

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

11.1.6 In this Reporting Period, one (1) documented environmental complaint was received in respect of the wastewater issue related to Contract 6. Upon receipt of the complaints, RE, IEC and ET with the relevant Contractors has immediately undertaken investigation. Follow up actions have been undertaking by the Contractor to resolve the deficiencies and investigation report conducted by ET had submitted to all relevant parties.

11.1.7 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, 5, 6, 7 and SS C505 in accordance with the EM&A Manual stipulation. No non-compliance observed during the site inspection.

11.2 RECOMMENDATIONS

11.2.1 As wet season has come, 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 or public area would be the key issue. 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. Moreover, 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.

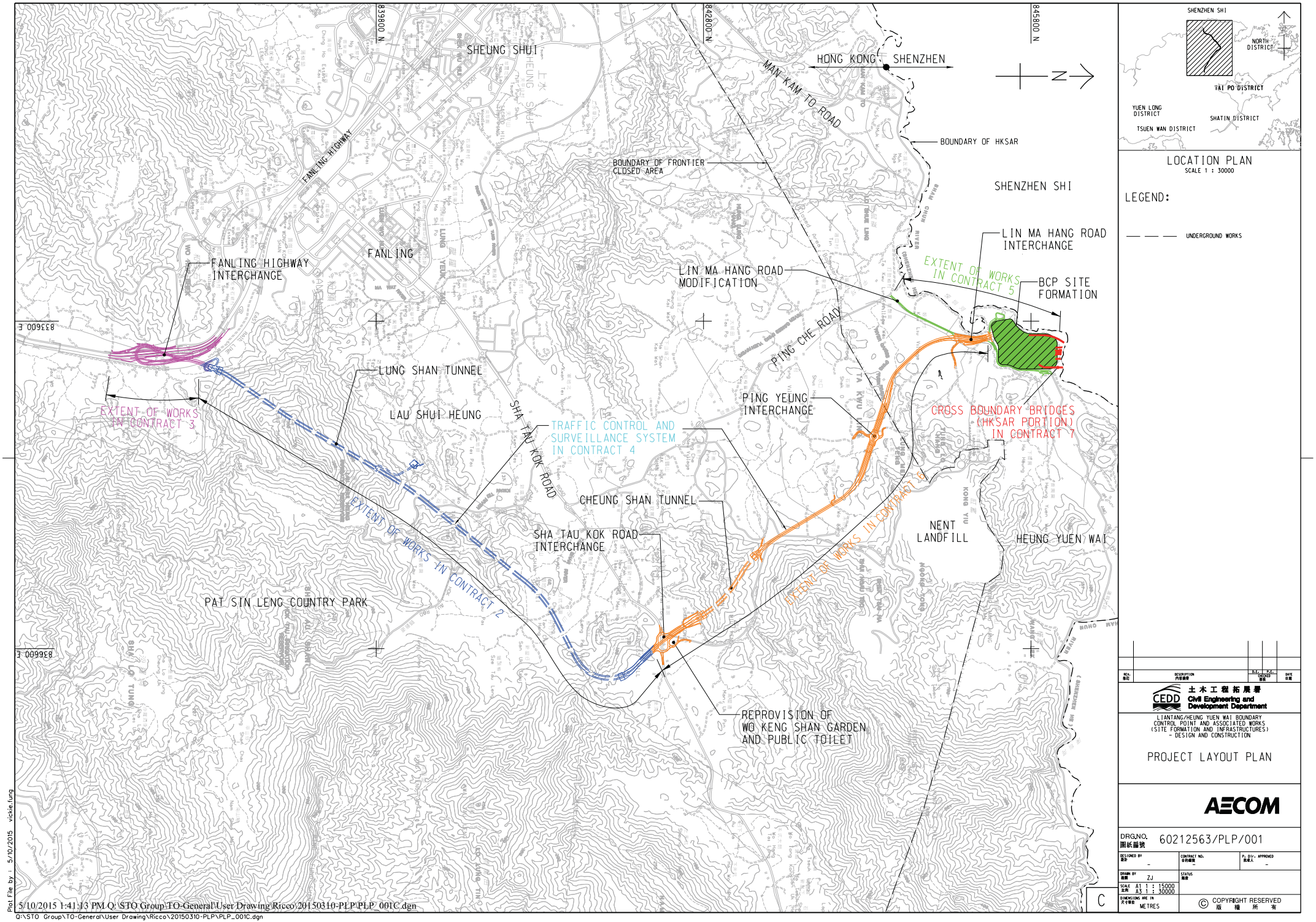
11.2.2 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

11.2.3 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.

11.2.4 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 : 30000

LEGEND:

UNDERGROUND WORKS

REV. 修訂	DESCRIPTION 內容摘要	D.E.	P.E. CHECKED 審核	DATE 日期
C				

CEDD 土木工程拓展署 Civil Engineering and Development Department

LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION

PROJECT LAYOUT PLAN

AECOM

DRG.NO. 圖紙編號 60212563/PLP/001

DESIGNED BY 設計	CONTRACT NO. 合約編號	P. DIV. APPROVED 批准人
–	–	–
DRAWN BY 繪圖	STATUS 階段	
ZJ		
SCALE 比例 A1 1 : 15000 A3 1 : 30000		
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版權所有	

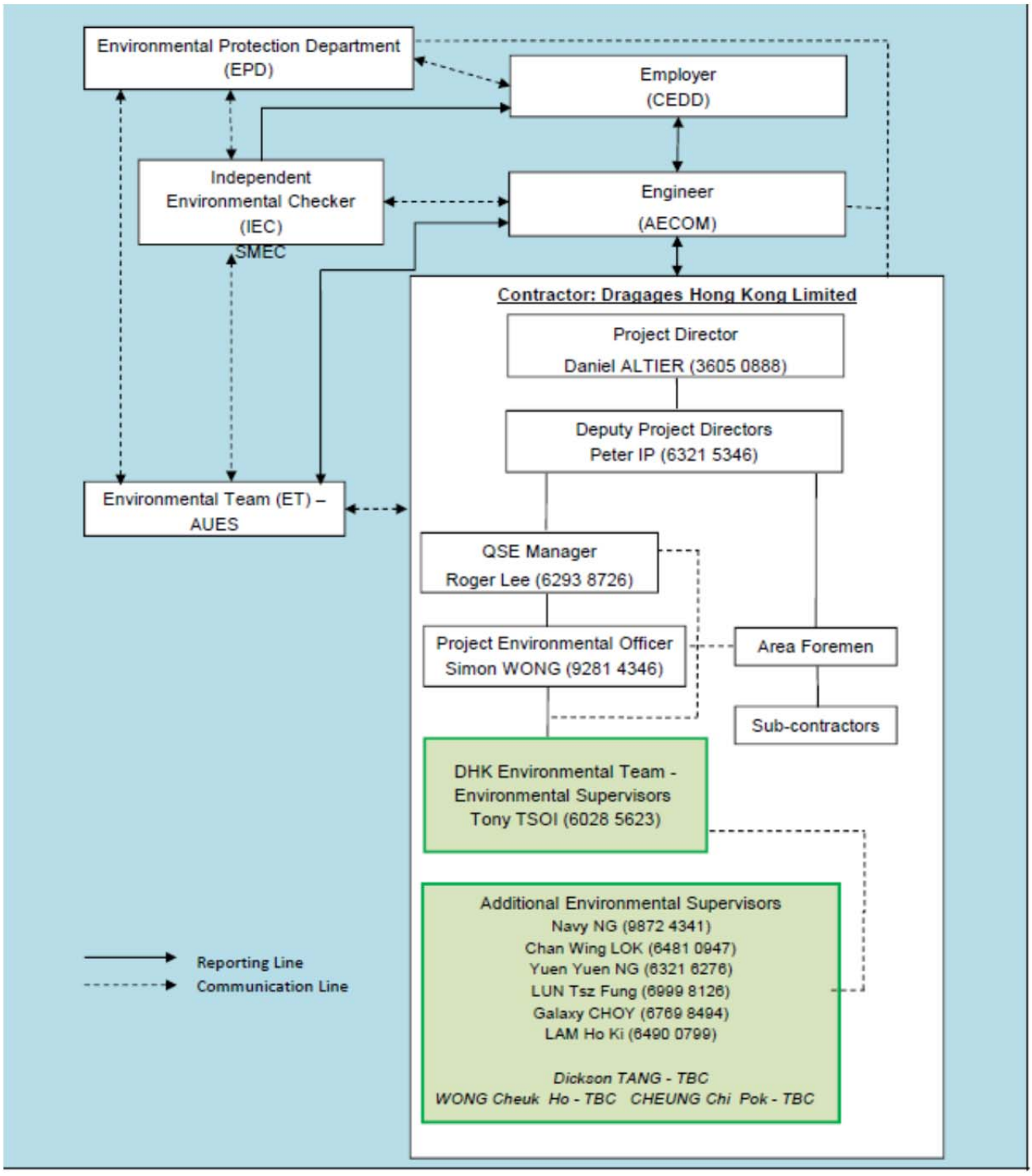
Plot File by : 5/10/2015 vickie.fung

5/10/2015 1:41:13 PM Q:\STO Group\TO-General\User Drawing\Ricco\20150310-PLP\PLP_001C.dgn

Q:\STO Group\TO-General\User Drawing\Ricco\20150310-PLP\PLP_001C.dgn

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	Gregory Lo	2171 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	2171 3004	2171 3299
DHK	Deputy Project Manager	Peter Ip	6321 5346	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3004	2171 3299
DHK	Environmental Supervisor	Tony Tsoi	6028 5623	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:

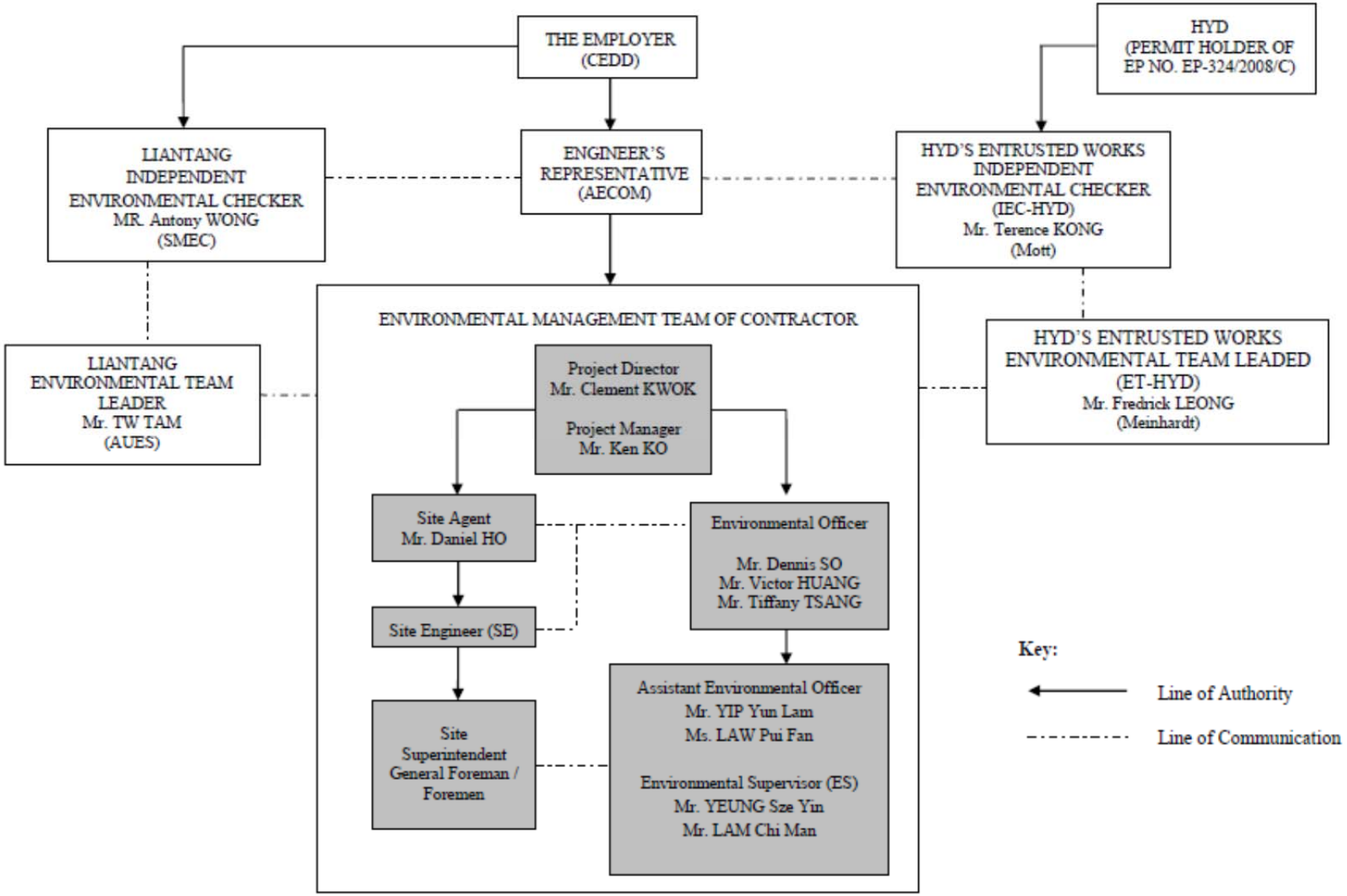
CEDD (Employer) – Civil Engineering and Development Department

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Bobby Hung	2171 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Chun Wo	Project Director	Clement Kwok	3758 8735	2638 7077
Chun Wo	Project Manager	Ken Ko	2638 6136	2638 7077
Chun Wo	Site Agent	Daniel Ho	2638 6144	2638 7077
Chun Wo	Environmental Officer	Victor Huang Tiffany Tsang Dennis So	2638 6115	2638 7077
Chun Wo	Assistant Environmental Officer	Yip Yun Lam Law Pui Fan	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

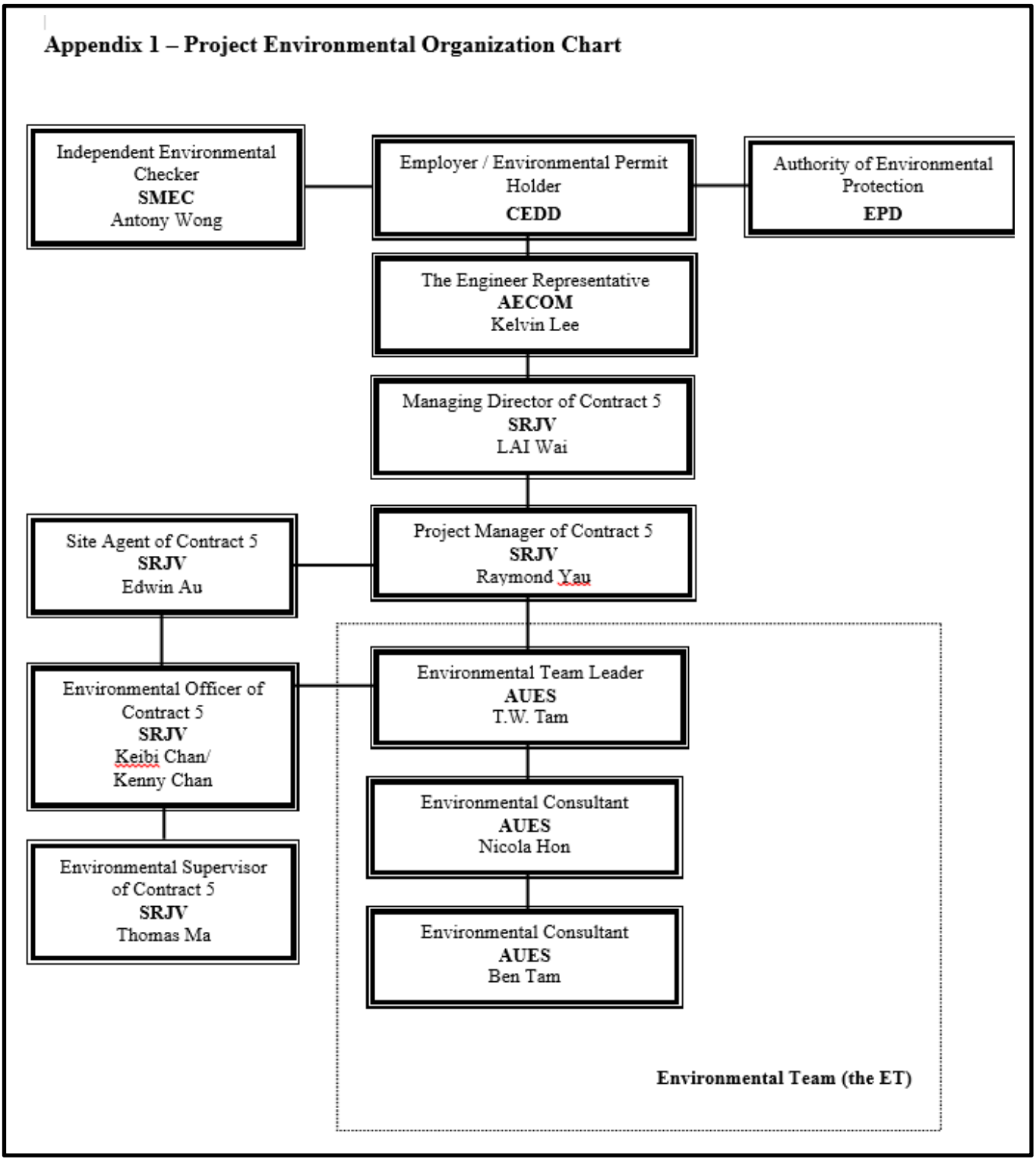
AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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

Appendix 1 – Project Environmental Organization Chart



Environmental Management Organization – CV/2013/03

Contact Details of Key Personnel for Contract 5 - CV/2013/03

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Kelvin Lee	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
SRJV	Project Director	LAI Wai	--	2403 1162
SRJV	Contract Manager	Raymond Yu	9041 1620	2403 1162
SRJV	Project Manager	Aaron Mak	9464 7095	2403 1162
SRJV	Site Agent	Edwin Au	9208 7329	2403 1162
SRJV	Environmental Officer	Chan Ng jhon-keibi / Kenny Chan	6090 0183	2403 1162
SRJV	Environmental Supervisor	Thomas Ma	-	2403 1162
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:

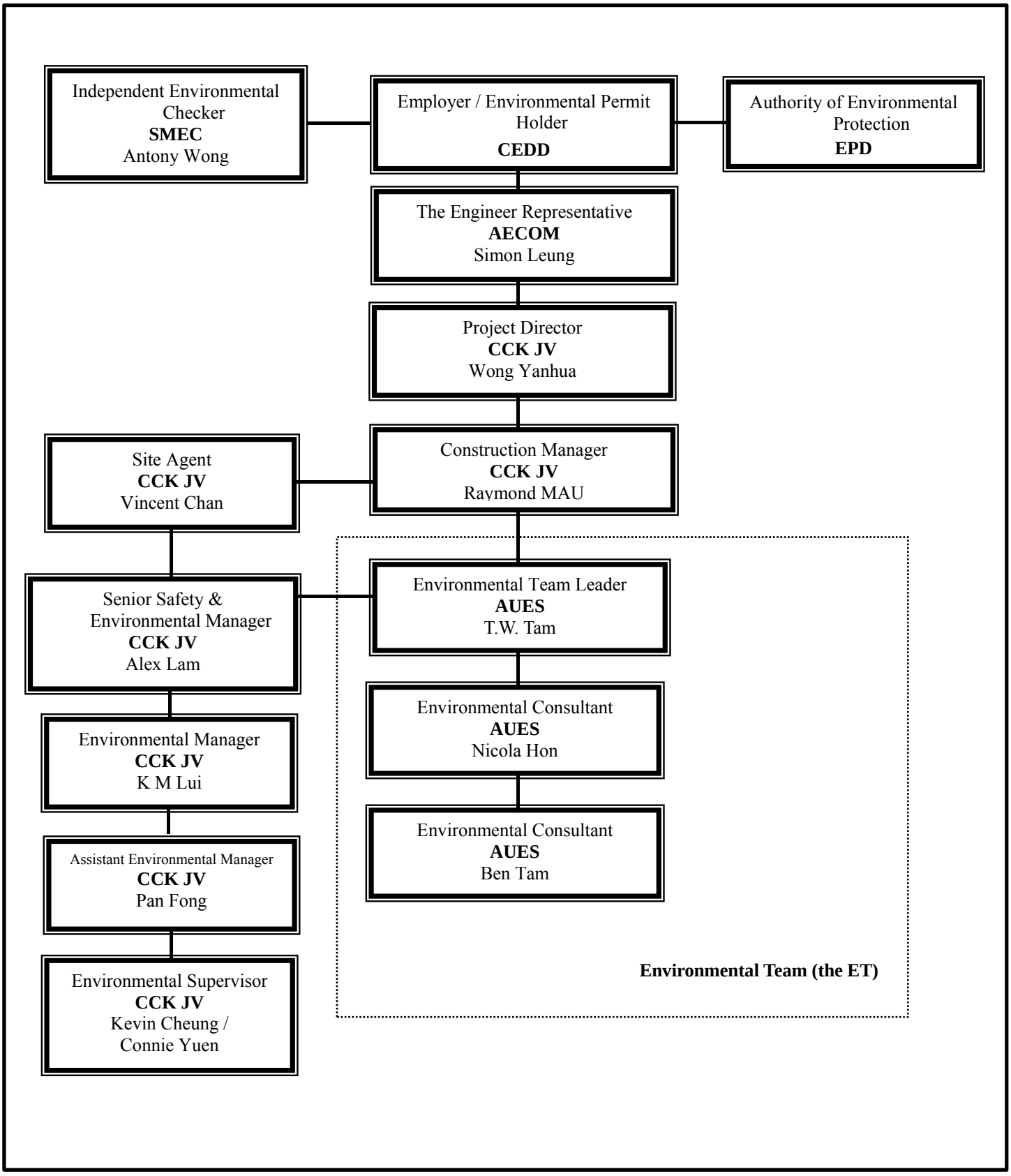
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

SRJV (Main Contractor) – Sang Hing Civil – Richwell Machinery JV

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/2013/03

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Simon Leung	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wang Yanhua	6190 4212	--
CCK JV	Construction Manager	Raymond Mau Sai-Wai	9011 5340	--
CCK JV	Site Agent	Vincent Chan	9655 9404	--
CCK JV	Senior Safety & Environmental Manager	Alex Lam	5547 0181	--
CCK JV	Environmental Manager	K M Lui	51138223	--
CCK JV	Assistant Environmental Officer	Pan Fong	9436 9432	--
CCK JV	Environmental Supervisor	Kevin Cheung/ Connie Yeun	6316 6931 6117 1344	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

Legend:

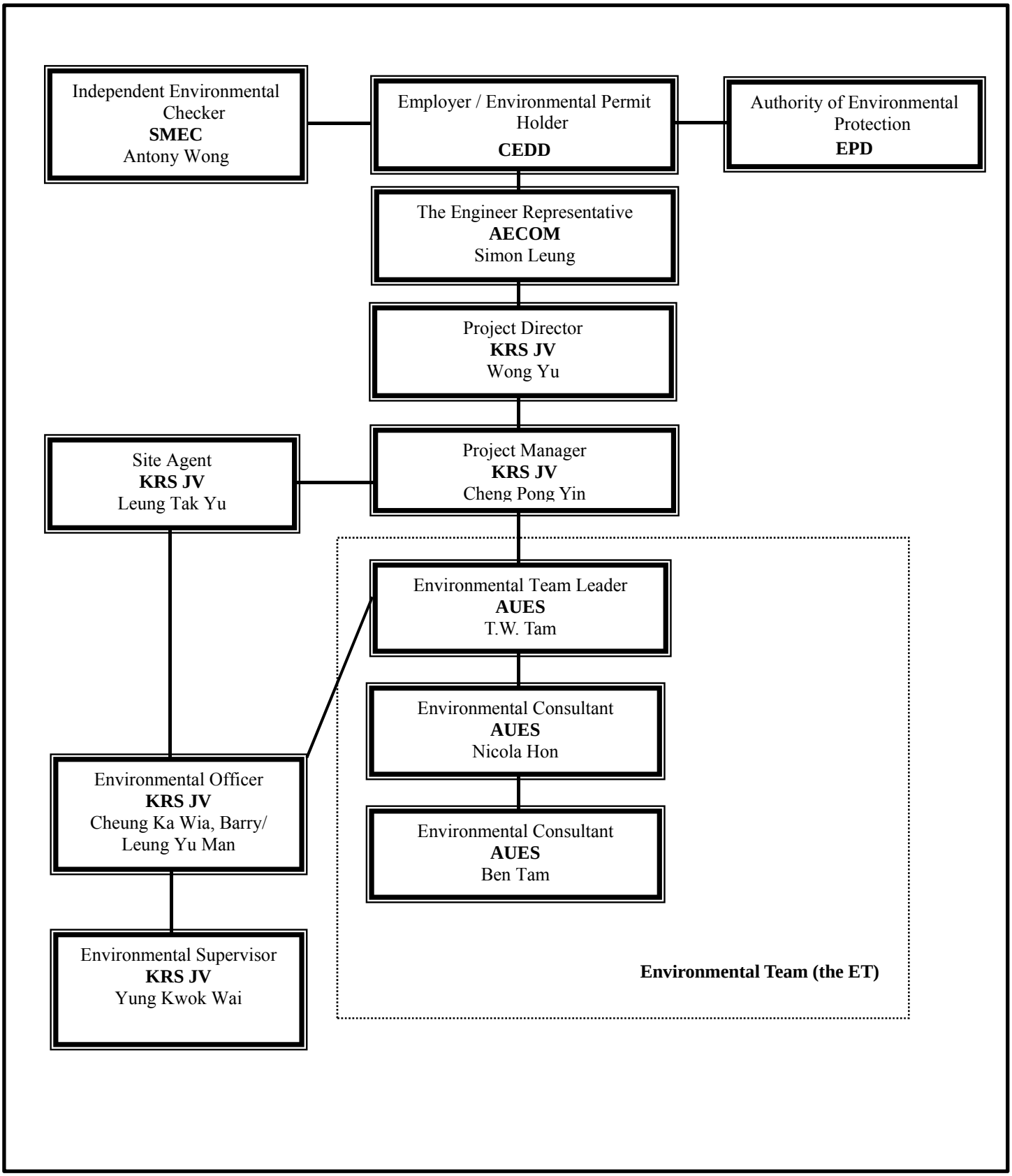
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization –NE/2014/03

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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Simon Leung	2674 2273	2674 7732
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	Leung Tak Yu	9705 7536	2682 2783
KRSJV	Environmental Officer	Cheung Ka Wia, Barry	6117 2339	2682 2783
KRSJV	Environmental Officer	Leung Yu Man	6592 3084	2682 2783
KRSJV	Environmental Supervisor	Yung Kwok Wai	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:

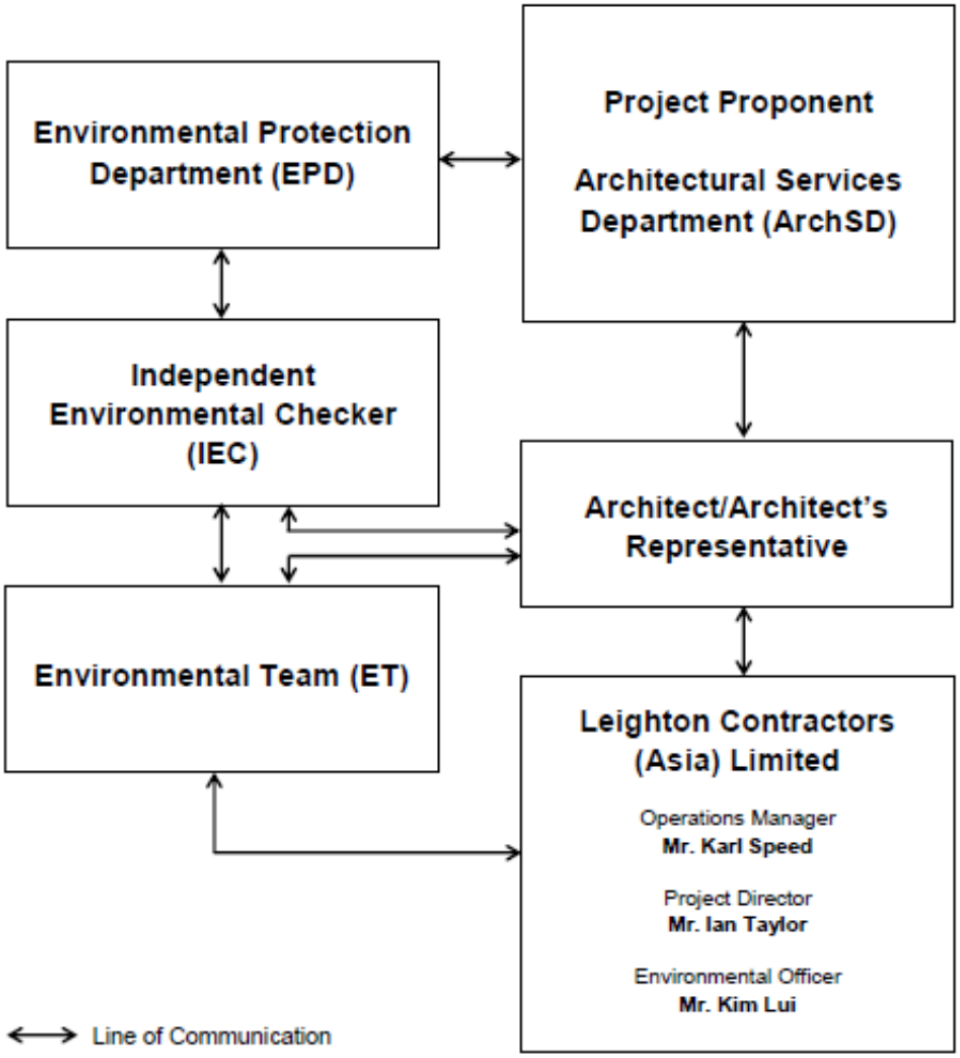
CEDD (Employer) – Civil Engineering and Development Department

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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
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. Karl Speed	2823 1433	25298784
Leighton	Project Director	Mr. Ian Taylor	2858 1519	2858 1899
Leighton	Environmental Officer	Mr. Kim Lui	3973 1069	-
Leighton	Assistant Environmental Officer	Ms. Penny Yiu	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 (September - November 2016) Construction Rolling Progam

Item	Major Construction Activites
1	Admin Bldg - Building foundation and superstructure works
2	Mid Vent Portal - Adit invert slab, waterproofing and lining
3	Mid Vent Portal - Adit Post-excavation grouting
4	Mid Vent Portal - Stud tunnel D&B excavation
5	Mid Vent Portal - Ventilation building superstructure works
6	North Portal - Northbound tunnel bench mechanical excavation
7	North Portal - Southbound tunnel excavation by TBM
8	North Portal - Southbound tunnel enlargement
9	North Portal - Retaining walls and slope stabilizations
10	North Portal - North ventilation building foundations
11	South Portal - Northbound and Southbound tunnel D&B excavation
12	South Portal - South ventilation building superstructure works

Contract 3

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
CEDD Contract No: CV/2012/09
Main Contractor: Chun Wo Construction Ltd

俊和建築工程有限公司
CHUN WO CONSTRUCTION & ENGINEERING CO., LTD.

Tentative Three Months (August, September and October 2016) Construction Rolling Progam

Item	Construction Activites
1	Cable Detection and Trial Trenches
2	Demolition of the Existing Vehicular Bridge between Tai Wo Service West and Tai Wo Service Road East
3	Installation of Stone Cladding
4	Cap Pier Construction of Kiu Tau Footbridge
5	Noise Barrier Construction
6	Pier / Pier Table Construction
7	Pile Cap Works
8	Portal Beam Construction
9	Piling Works for Viaduct
10	Piling Works for Noise Barrier
11	Road Works
12	Utilities Duct Laying
13	Viaduct Segment Erection
14	Water Main Laying

Contract 5

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
CEDD Contract No: CV/2013/08
Main Contractor: CRBE-CEC-Kaden Joint Venture

CRBC-CEC-KADEN Joint Venture

Tentative Three Months (August, September and October 2016) Construction Rolling Progam

Item	Construction Activites
1	Slope Works
2	Bored Piling
3	Pile Cap Construction
4	Bridge Pier Constrcution
5	Segment Erection
6	Tunnel Excavation
7	Sewage Treatment Plant Construction

Contract 6

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
CEDD Contract No: CV/2013/08
Main Contractor: CRBE-CEC-Kaden Joint Venture

CRBC-CEC-KADEN Joint Venture

Tentative Three Months (August, September and October 2016) Construction Rolling Progam

Item	Construction Activites
1	Slope Works
2	Bored Piling
3	Pile Cap Construction
4	Bridge Pier Constrcution
5	Segment Erection
6	Tunnel Excavation
7	Sewage Treatment Plant Construction

Contract 7

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
CEDD Contract No: NE/2014/03
Main Contractor: Kwan On-Richwell-SCG Joint Venture

均安 - 顯豐機械 - 上海建工 聯營
Kwan On - Richwell - SCG JV

Tentative Three Months(August, September and October 2016) Construction Rolling Progam

Item	Construction Activites
1	Bridge A - Piling Works
2	Bridge B - Pile Caps and Column
3	Bridge C - Piling Works
4	Bridge C - Pile Caps and Column
5	Bridge D - Pile Caps and Column
6	Bridge E - Piling Works

Contract SS C505

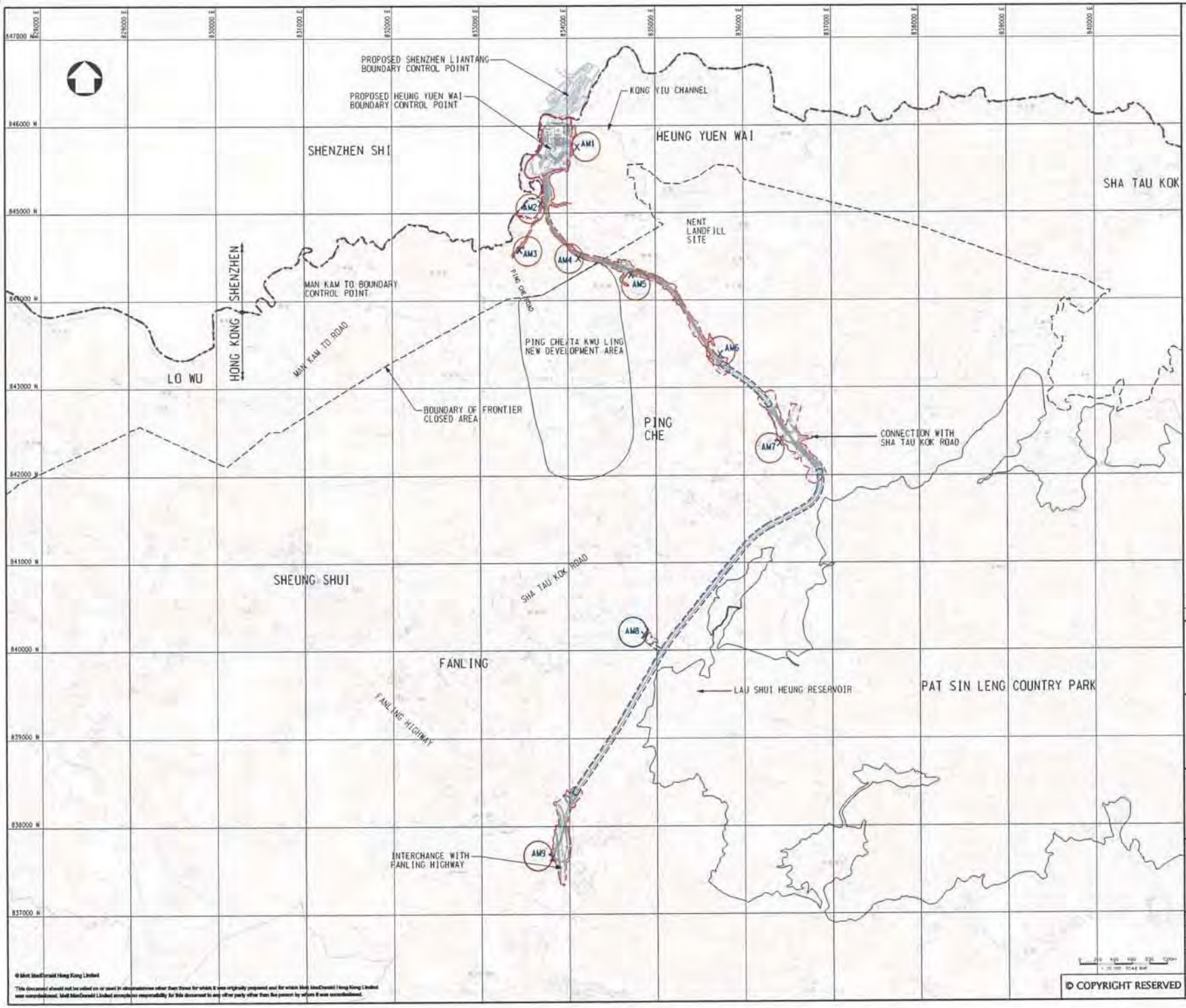
Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
ArchSD Contract No: SSC505
Main Contractor: Leighton

Tentative Three Months (August, September and October 2016) Construction Rolling Program

Item	Construction Activites
1	Establishment Mobilisation & Advance Works
2	Setup Tower Cranes
3	Passenger Terminal Building - Foundation Works
4	Passenger Terminal Building - Substructure Works
5	Passenger Terminal Building - RC Structures
6	HKPF Building - Construct pilecaps, RC structures, Integrated ABWF and MEP Works
7	Fire Station - Construct pilecaps, substructures and structures
8	Drill Tower - Construct pilecaps, substructures and Structures
9	Cargo Examination Building (Inbound) - Foundation, Pilecaps, RC Structure and ABWF & MEP
10	Cargo Examination Building (Outbound) - Pilecaps and RC Structure, ABWF & MEP
11	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) - Structural Works and ABWF & MEP
12	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) - Foundations, Structural Works and ABWF &
13	GV Kiosk (Inbound) - Foundations and RC structures
14	GV Kiosk (Outbound) - Foundations and RC structures
15	MXRVSS (Outbound) - Structures and ABWF works
16	Fire Hydrant Tank & Pump Room - Site Formation and Structural Works
17	Elevated Walkway - Foundation Works
18	Vehicular bridges - Foundation works, Pilecaps / Piers / abutment / retaining walls / portal
19	Vehicular bridges - B5 - Bridge Decks and Road & Finishes Works
20	External Works in Portion 1 - laying utilities & pile ducts & CLP cable ducts
21	External Works in Portion 2 - Site formation, laying utilities & pipe ducts & CLP cable ducts

Appendix D

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



Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	AUG 10	MENG	FIRST ISSUE	DC	HT

Mott MacDonald

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

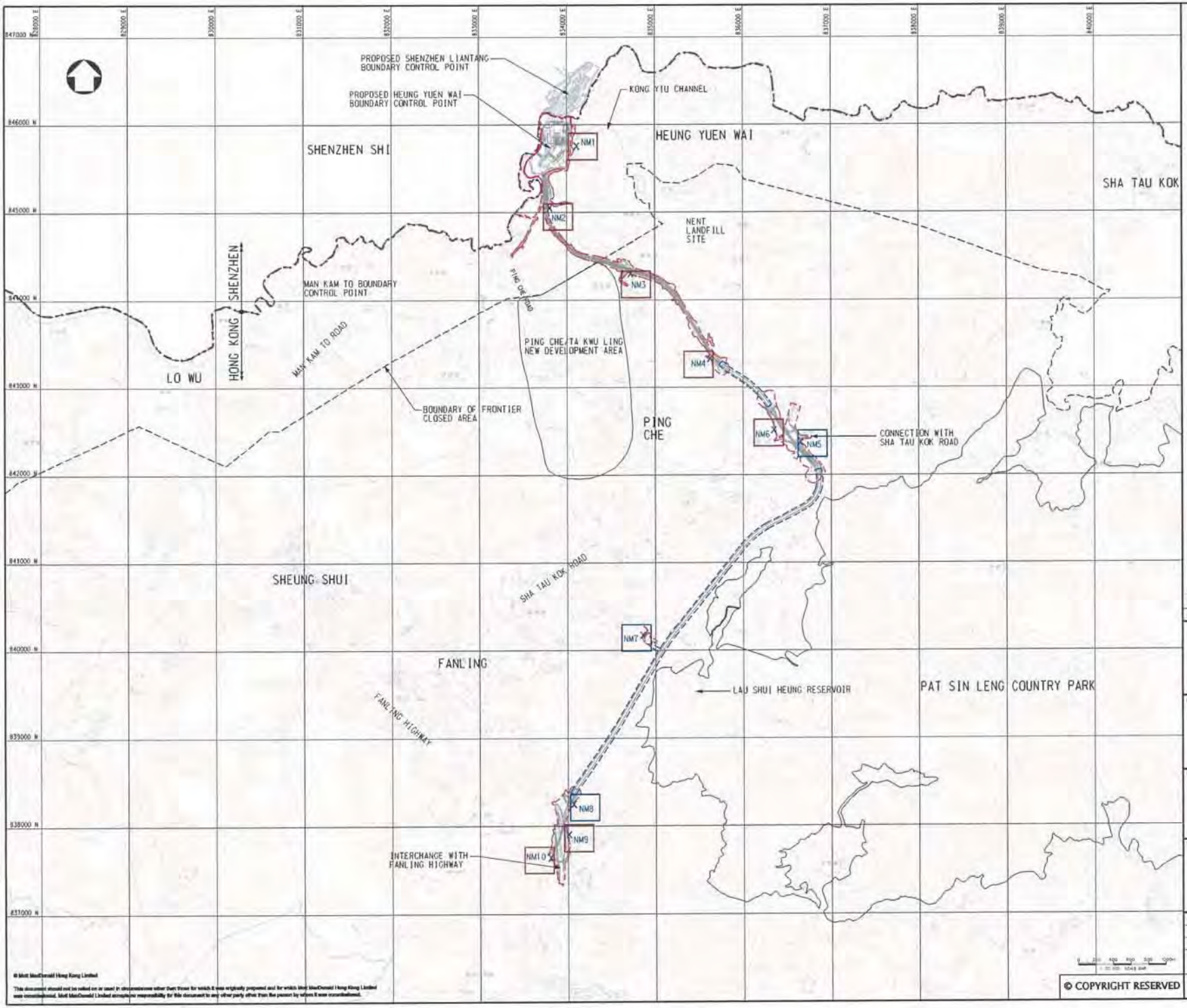
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Designed	DC		Eng.Chk.	EC	
Drawn	MENG		Coordination	EC	
Eng.Chk.	DC		Approved	HT	
Scale at A1	1:20000	Project	255228		Status PRE
Drawing No	FIGURE 2.1				Rev P1

© COPYRIGHT RESERVED
© 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 (TUNNEL)
- X CONSTRUCTION NOISE MONITORING STATIONS

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

Mott MacDonald

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

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

Title

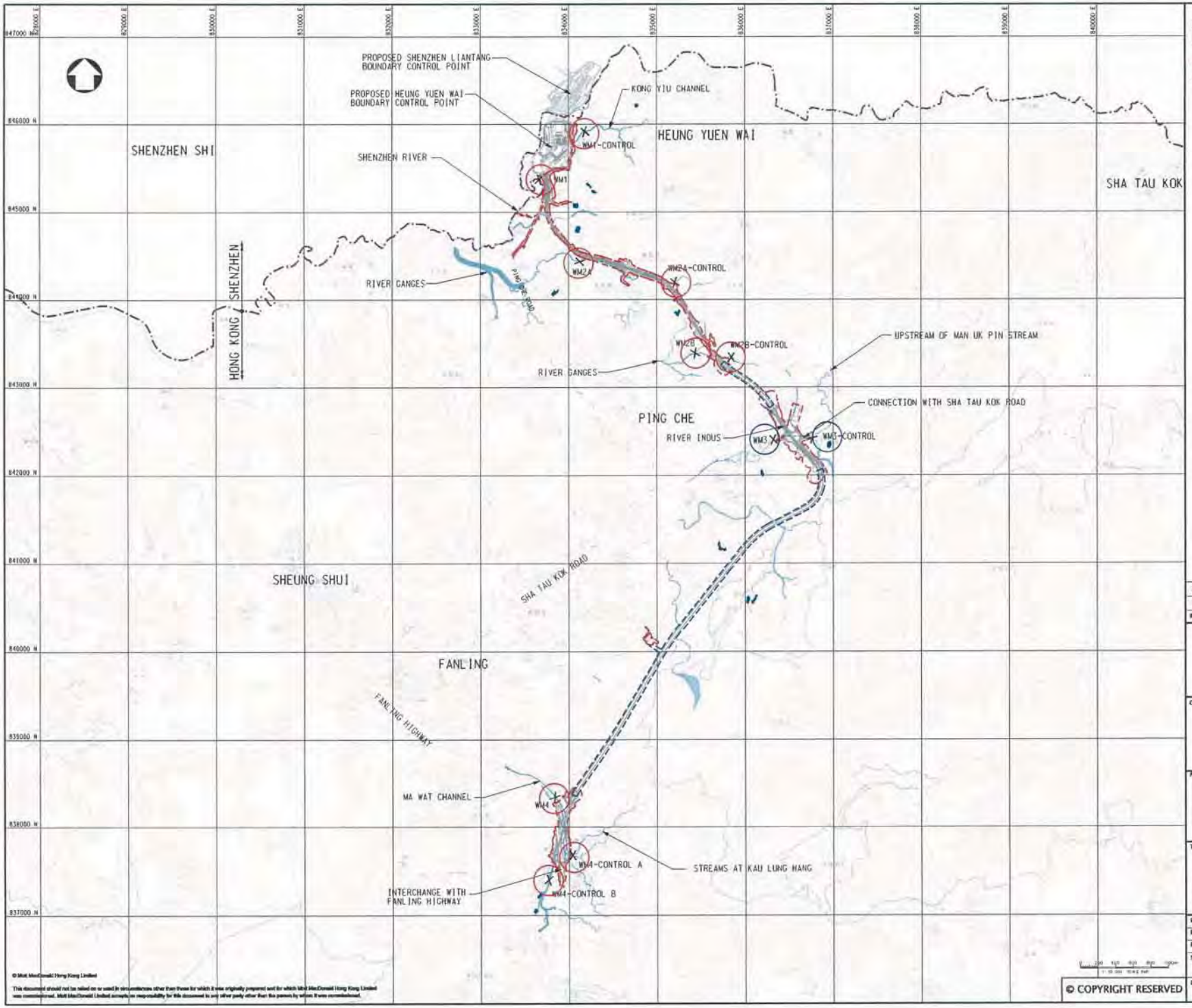
PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	DC	Approved	HT

Scale at A1: 1:20000 | Project: 255228 | Status: PRE

Drawing No: FIGURE 3.1 | Rev: P1

© COPYRIGHT RESERVED



LEGEND:

- BOUNDARY OF HKSAR
- LAND REQUIREMENT LIMIT (ABOVE GROUND)
- LAND REQUIREMENT LIMIT (TUNNEL)
- X PROPOSED WATER QUALITY MONITORING STATION

MONITORING STATION	CO-ORDINATES	
	EASTING(m)	NORTHING(m)
WM1	833668.635	845371.097
WM1-CONTROL	834185.480	845916.662
WM2A	834132.193	844432.910
WM2A-CONTROL	835205.329	844200.151
WM2B	835434.744	843394.606
WM2B-CONTROL	835845.878	843343.625
WM3	836323.622	842404.977
WM3-CONTROL	836763.419	842425.507
WM4	833840.783	838344.842
WM4-CONTROL A	834038.937	837688.995
WM4-CONTROL B	833769.123	837406.936

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	NOV 10	WING	GENERAL REVISION	HC	HT
P1	OCT 10	WING	FIRST ISSUE	HC	HT

Mott MacDonald

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.Chk.	EC	
Drawn	WING		Coordination	EC	
Eng.Chk.	HC		Approved	HT	
Scale at A1	1:20000	Project	255228		Status PRE
Drawing No	FIGURE 4.1				Rev P2

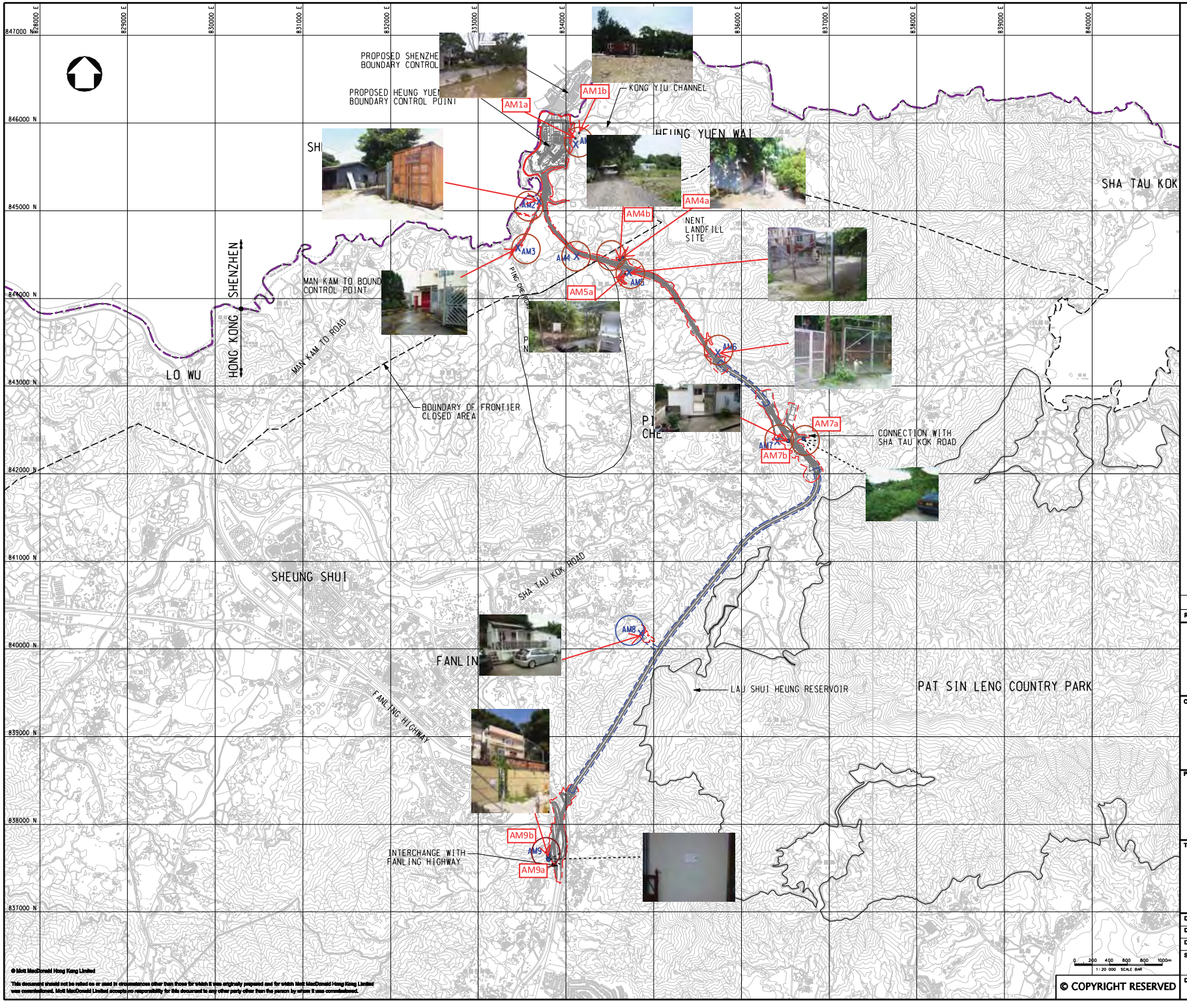
© COPYRIGHT RESERVED

© 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.

Appendix E

Monitoring Locations for Impact Monitoring



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

Mott MacDonald
20/F Two Landmark East
100 How Ming Street
Kwun Tong, Kowloon
Hong Kong
T +852 2828 5757
F +852 2827 1823
W www.mottmac.com.hk

Client

CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

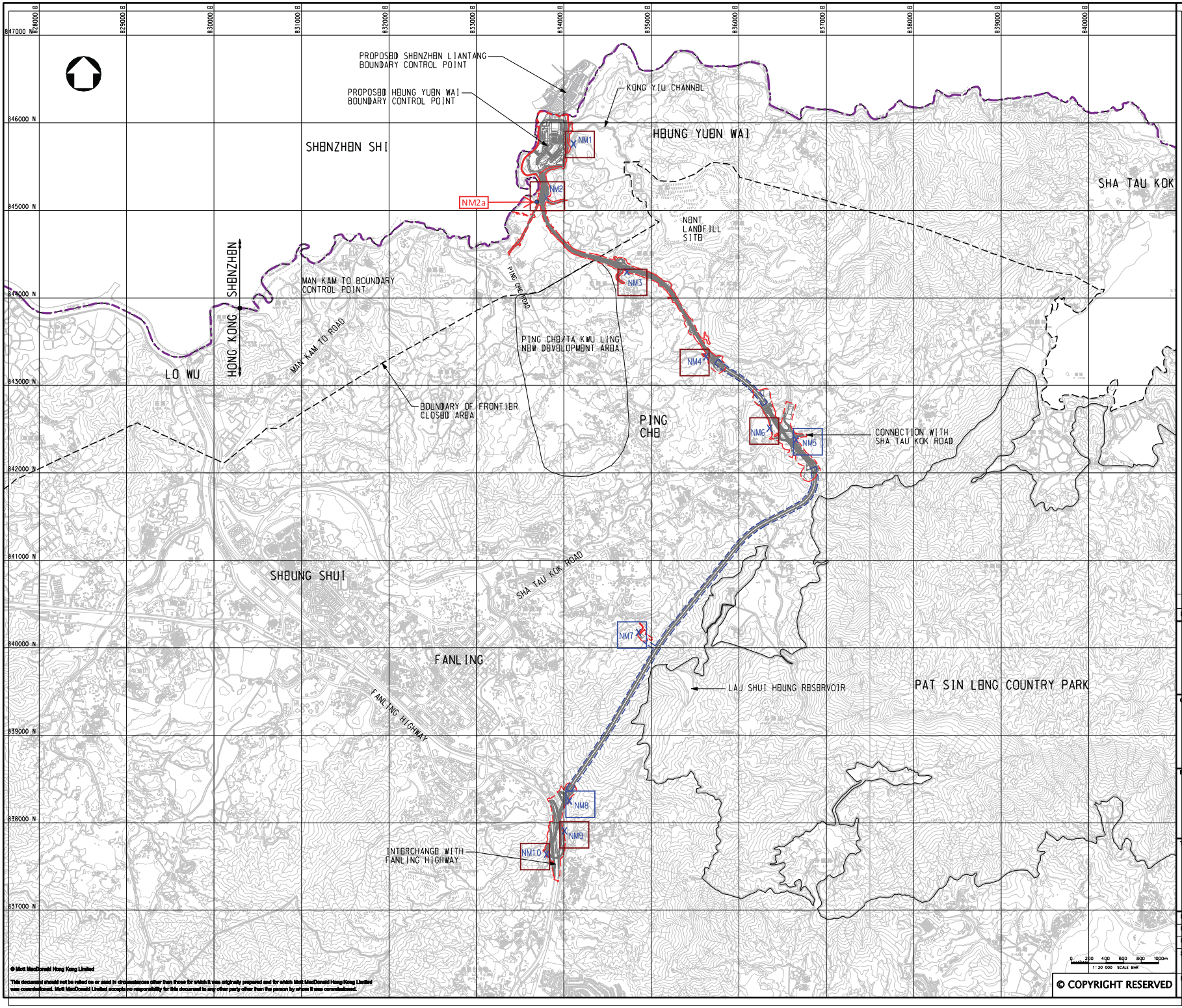
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Designed	DC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	DC		Approved	HT	
Scale at A1	1:20000	Project	255228	Status	PRE
		CAD file	j:\255228\report\env\em&a\00B3\FIG 2-1.dgn		
Drawing No	FIGURE 2.1			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.
© COPYRIGHT RESERVED



LEGEND:

- BOUNDARY OF HKSAR
- WORKS AREA (ABOVE GROUND)
- WORKS AREA (TUNNEL)
- X CONSTRUCTION NOISE MONITORING STATIONS
- Proposed Noise Monitoring Stations

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

Mott MacDonald
20/F Two Landmark East
100 How Ming Street
Kwun Tong, Kowloon
Hong Kong
T +852 2828 5757
F +852 2827 1823
W www.mottmac.com.hk

Client

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

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

Title

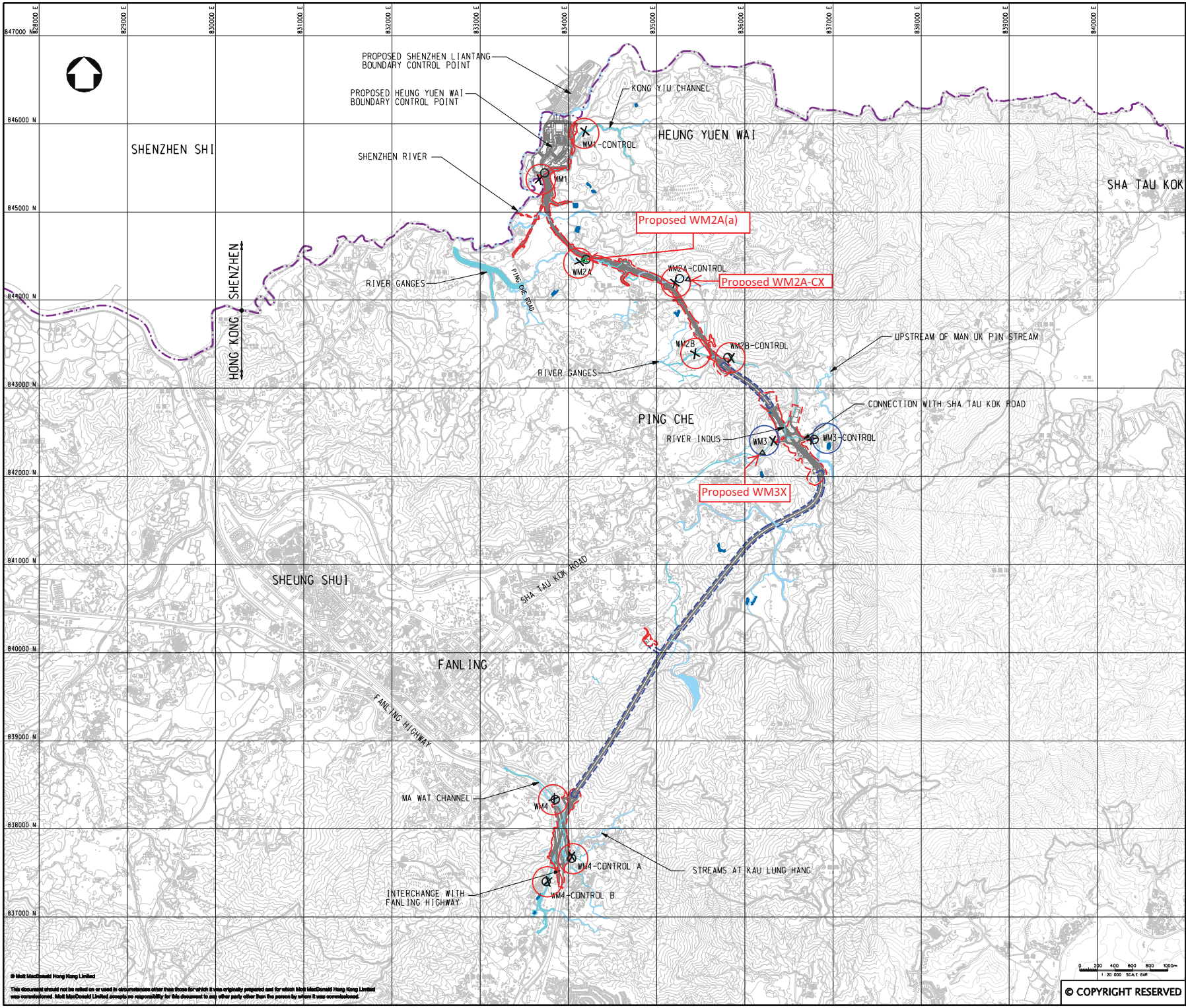
PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC		Eng.Chk.	BC	
Drawn	MING		Coordination	BC	
Dwg.Chk.	DC		Approved	HT	
Scale at A1	1:20000	Project	255228	Status	PRE
		CAD file	j:\255228\report\env\em&o\00B3\FIG 3-1.dgn		
Drawing No	FIGURE 3.1			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.

© COPYRIGHT RESERVED



LEGEND:

- BOUNDARY OF HKSAR
- LAND REQUIREMENT LIMIT (ABOVE GROUND)
- LAND REQUIREMENT LIMIT (TUNNEL)
- X Water Quality Monitoring Location Recommended in EM&A Manual
- O 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 Coordinates		Location found during site visit Coordinates	
	Easting	Northing	Easting	Northing
WM1	833668.835	845371.897	833679	845421
WM1 Control	834187.480	845916.662	834185	845917
WM2A	834182.193	844432.910	834204	844471
WM2A-Control	835205.329	844200.151	835270	844243
WM2B	835434.744	843304.606	835435	843397
WM2B-Control	835845.878	843343.625	835835	843351
WM3	836323.622	842404.377	836324	842407
WM3-Control	836763.419	842425.507	836763	842400
WM4	833840.784	838344.842	833850	838338
WM4-Control A	834588.937	837668.995	834028	837695
WM4-Control B	833769.123	837406.936	833760	837395

New Proposed Water Quality Monitoring Location in November 2015		
Location ID	Easting	Northing
WM2A-C (Original)	0835270	0844243
WM2A-Cx (Proposed)	0835377	0844188
WM3(Original)	0836324	0842407
WM3x(Proposed)	0836206	0842270

New Proposed Wate Quality Monitoring Location in May 2016		
Location ID	Easting	Northing
WM2A (Original)	834204	844471
WM2A(a) (Proposed	834191	844474

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

Mott MacDonald
20/F Two Landmark East
100 How Ming Street
Kwun Tong, Kowloon
Hong Kong
T +852 2828 5757
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.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	HC		Approved	HT	
Scale at A1	1:20000	Project	255228		Status PRE
		CAD file	u:\255228\REPORT\ENV\EM&A\DWS\FIG 4-1.dgn		
Drawing No	Appendix C				Rev P2

© 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.
© COPYRIGHT RESERVED

Appendix F

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Garden Farm, Tsung Yuen Ha Village		Date of Calibration:	25/6/2016
Location ID : AM1b		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	6.8	6.8	13.6	1.832	54	53.31
13	5.1	5.1	10.2	1.589	46	45.41
10	3.9	3.9	7.8	1.391	41	40.48
7	2.7	2.7	5.4	1.160	30	29.62
5	1.5	1.5	3.0	0.869	22	21.72

LINEAR REGRESSION

Slope = 33.5108
Intercept = -7.7352
Corr. coeff. = 0.9959

Calculations :

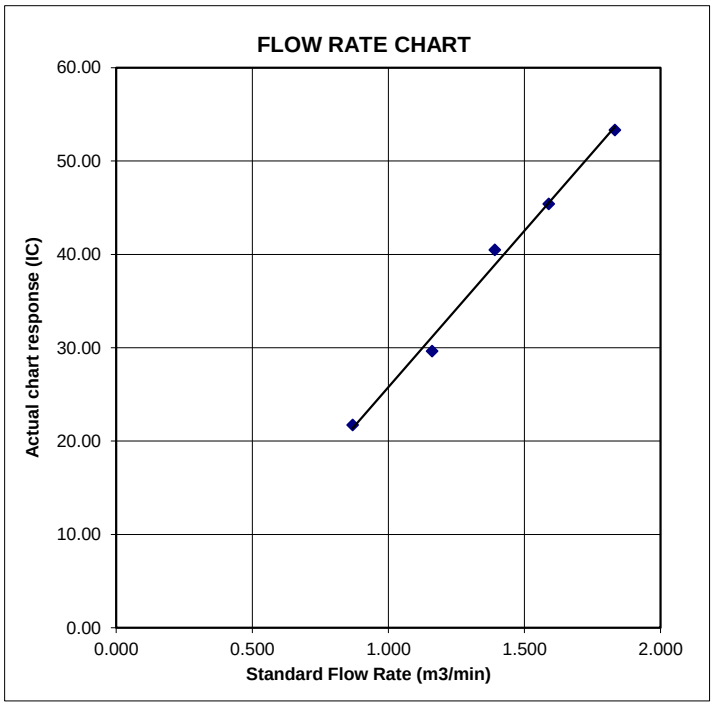
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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		Date of Calibration:	25/6/2016
Location ID : AM2		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.764	53	52.33	Slope = 30.6197
13	5.0	5.0	10.0	1.573	47	46.40	Intercept = -1.7753
10	3.9	3.9	7.8	1.391	42	41.47	Corr. coeff. = 0.9968
7	2.6	2.6	5.2	1.139	32	31.59	
5	1.4	1.4	2.8	0.840	25	24.68	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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/Tav)(Pav/760)]-b)

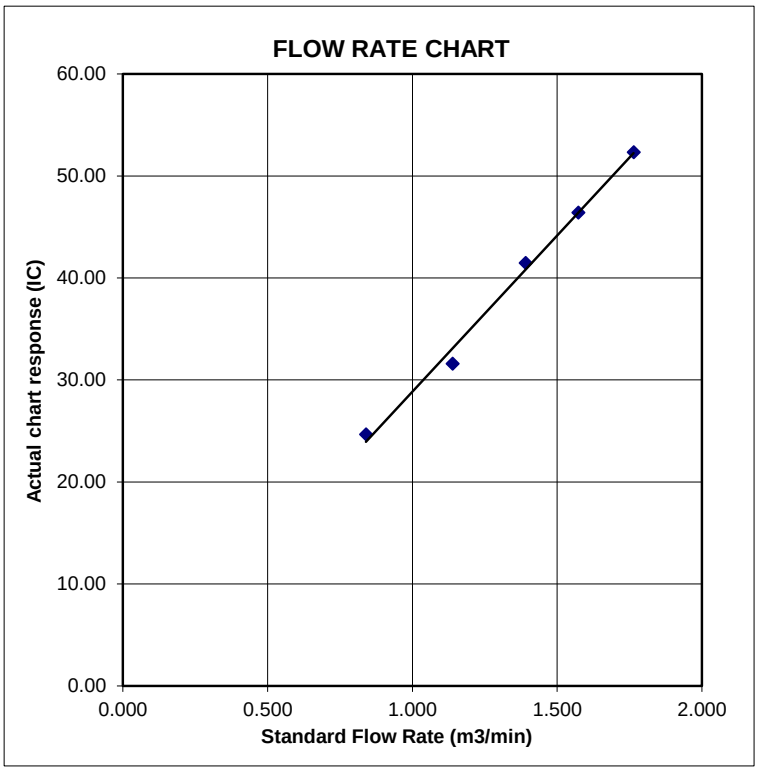
m = sampler slope

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		Date of Calibration:	25/6/2016
Location ID : AM3		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.736	57	56.27	Slope = 31.8284
13	4.9	4.9	9.8	1.557	51	50.35	Intercept = 0.5420
10	3.7	3.7	7.4	1.355	43	42.45	Corr. coeff. = 0.9982
7	2.4	2.4	4.8	1.095	36	35.54	
5	1.3	1.3	2.6	0.810	27	26.66	

Calculations :

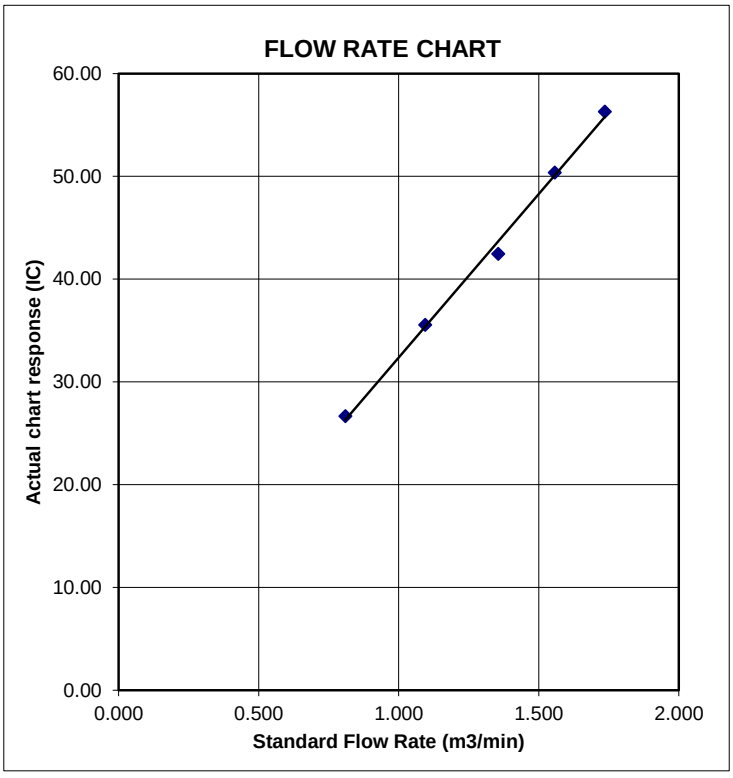
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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		Date of Calibration:	25/6/2016
Location ID : AM4a		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.764	56	55.29	Slope = 31.7024
13	5.2	5.2	10.4	1.604	52	51.34	Intercept = -0.4967
10	4	4	8.0	1.409	44	43.44	Corr. coeff. = 0.9976
7	2.7	2.7	5.4	1.160	36	35.54	
5	1.5	1.5	3.0	0.869	28	27.64	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

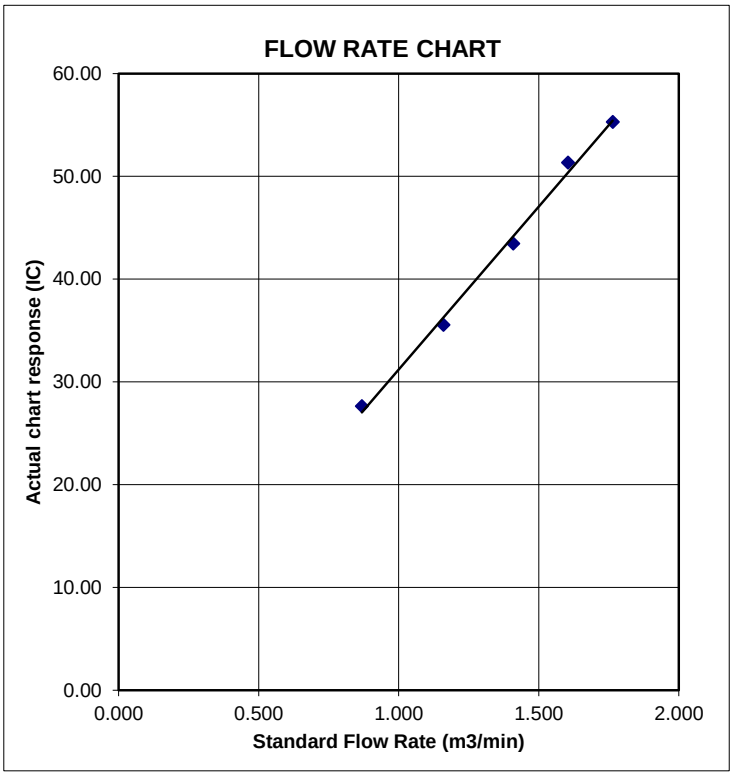
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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		Date of Calibration:	25/6/2016
Location ID : AM5		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.6	6.6	13.2	1.805	56	55.29	Slope = 31.4362
13	5.2	5.2	10.4	1.604	50	49.36	Intercept = -1.5367
10	3.8	3.8	7.6	1.373	41	40.48	Corr. coeff. = 0.9982
7	2.4	2.4	4.8	1.095	34	33.57	
5	1.5	1.5	3.0	0.869	26	25.67	

Calculations :

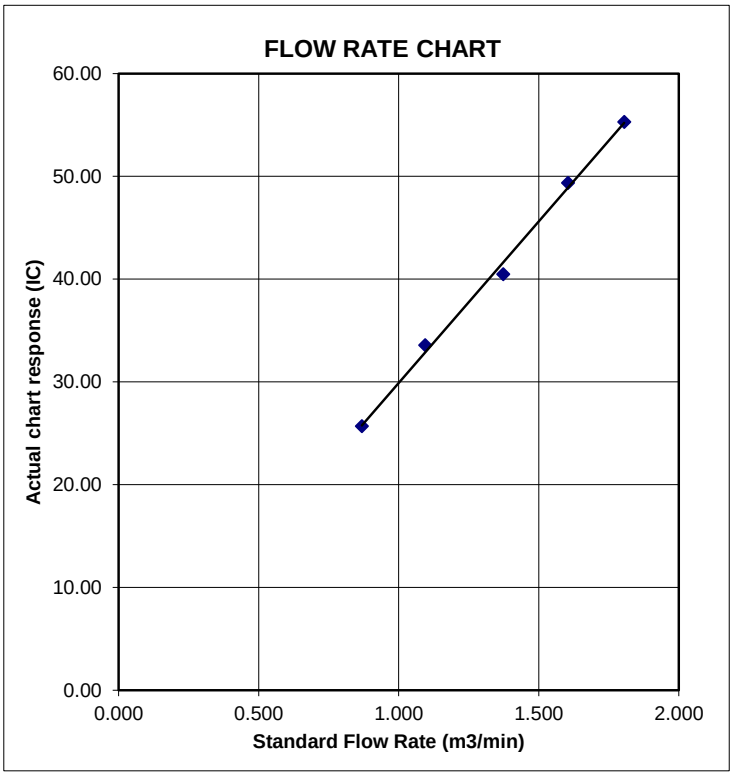
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Wo Keng Shan Village House		Date of Calibration:	25/6/2016
Location ID : AM6		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.5	6.5	13.0	1.791	55	54.30	Slope = 27.6107
13	5.4	5.4	10.8	1.634	52	51.34	Intercept = 5.7658
10	3.7	3.7	7.4	1.355	45	44.43	Corr. coeff. = 0.9969
7	2.4	2.4	4.8	1.095	36	35.54	
5	1.4	1.4	2.8	0.840	29	28.63	

Calculations :

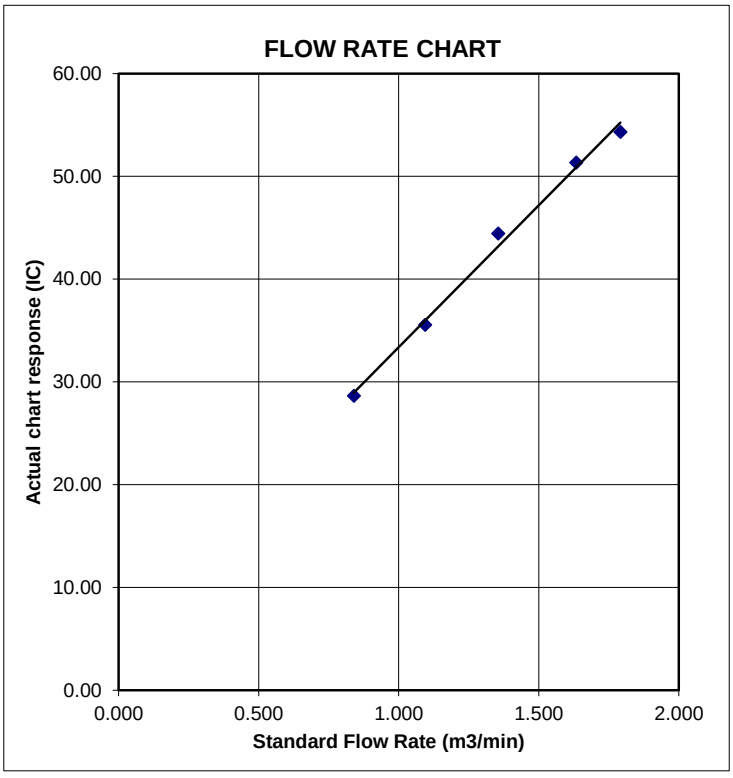
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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
Location ID : AM7b

Date of Calibration: 25/6/2016
Next Calibration Date: 25/8/2016
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.2	5.2	10.4	1.604	54	53.31	Slope = 32.4478
13	4.2	4.2	8.4	1.443	48	47.39	Intercept = 0.9688
10	3.2	3.2	6.4	1.262	42	41.47	Corr. coeff. = 0.9977
7	2	2	4.0	1.001	35	34.55	
5	1.3	1.3	2.6	0.810	27	26.66	

Calculations :

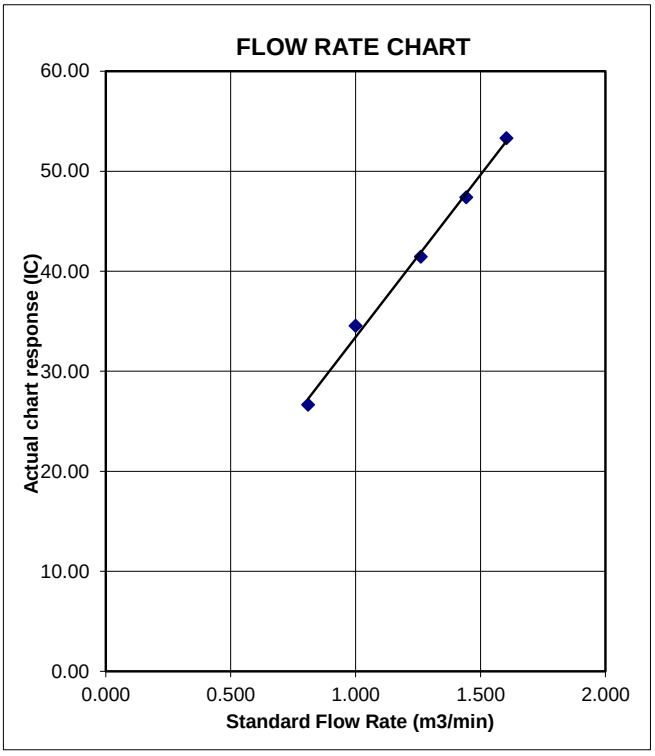
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Po Kat Tsai Village No. 4	Date of Calibration: 25/6/2016
Location ID : AM8	Next Calibration Date: 25/8/2016
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (°C)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.764	62	61.21	Slope = 30.3885
13	5.1	5.1	10.2	1.589	55	54.30	Intercept = 6.7184
10	3.9	3.9	7.8	1.391	49	48.38	Corr. coeff. = 0.9983
7	2.6	2.6	5.2	1.139	42	41.47	
5	1.3	1.3	2.6	0.810	32	31.59	

Calculations :

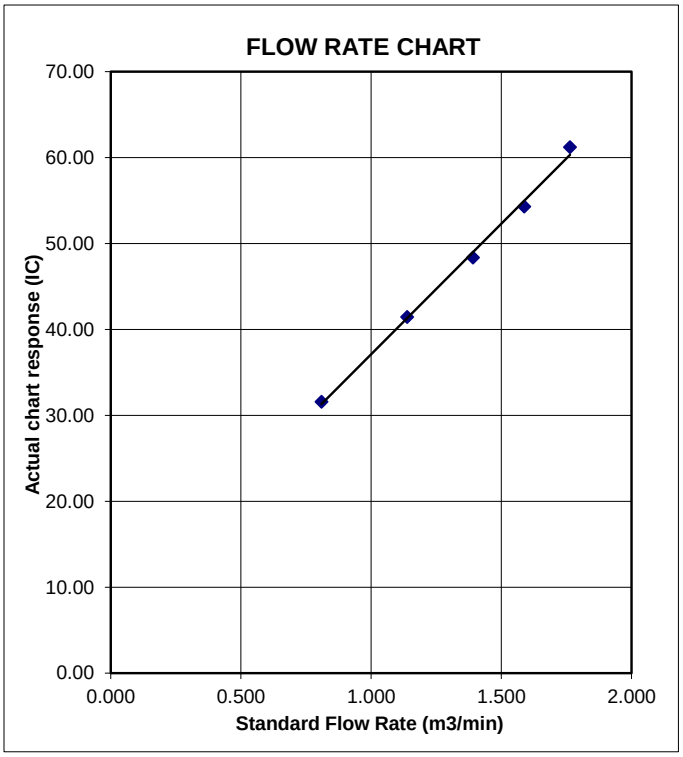
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Nam Wa Po Village House No. 80		Date of Calibration:	25/6/2016
Location ID : AM9b		Next Calibration Date:	25/8/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1008.9	Corrected Pressure (mm Hg)	756.675
Temperature (ºC)	31.4	Temperature (K)	304

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.778	54	53.31	Slope = 29.4733
13	4.9	4.9	9.8	1.557	49	48.38	Intercept = 1.1553
10	3.9	3.9	7.8	1.391	42	41.47	Corr. coeff. = 0.9955
7	2.6	2.6	5.2	1.139	34	33.57	
5	1.4	1.4	2.8	0.840	27	26.66	

Calculations :

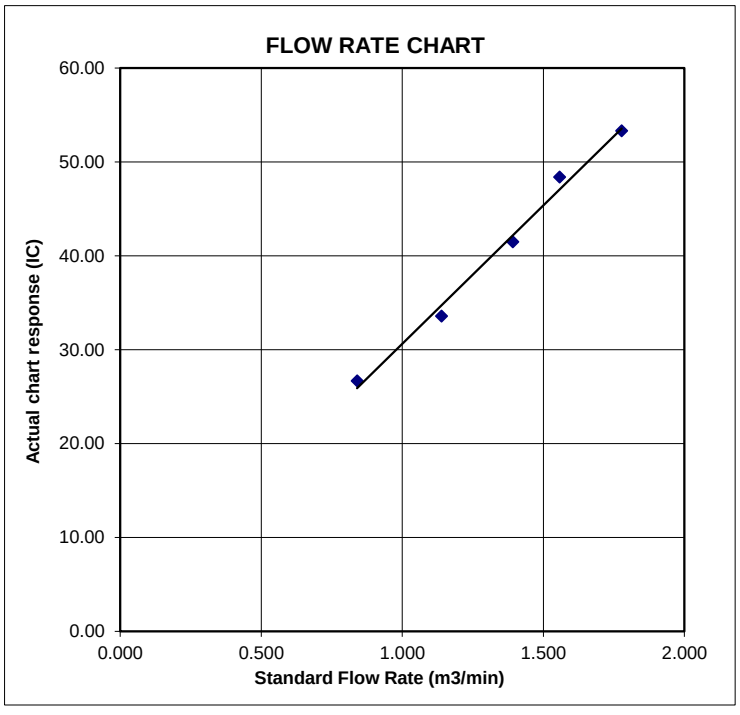
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Garden Farm, Tsung Yuen Ha Village		Date of Calibration:	25/8/2016
Location ID : AM1b		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.9	5.9	11.8	1.706	50	49.33	Slope = 30.5221
13	4.6	4.6	9.2	1.508	44	43.41	Intercept = -2.1180
10	3.4	3.4	6.8	1.299	40	39.46	Corr. coeff. = 0.9943
7	2.3	2.3	4.6	1.071	31	30.58	
5	1.4	1.4	2.8	0.839	23	22.69	

Calculations :

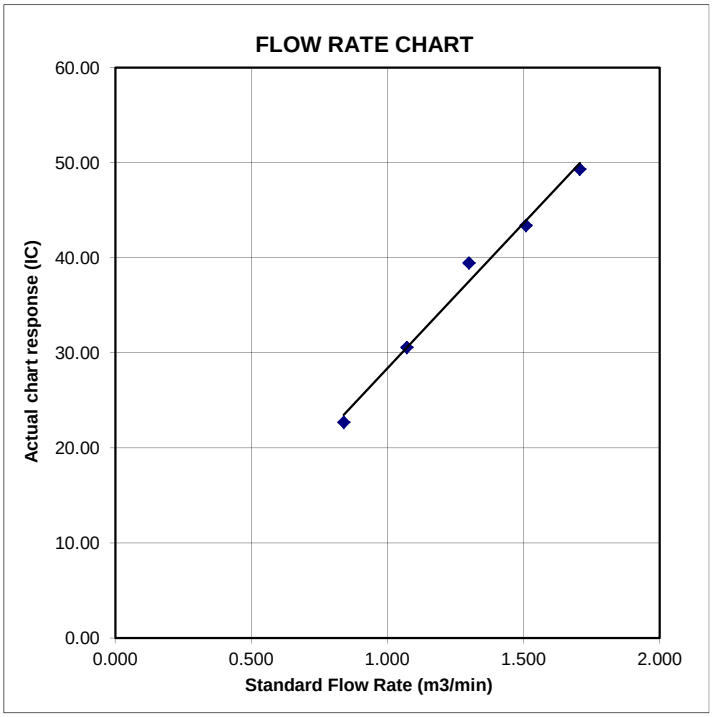
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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		Date of Calibration:	25/8/2016
Location ID : AM2		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.677	53	52.29	Slope = 36.3739
13	4.6	4.6	9.2	1.508	46	45.38	Intercept = -8.9604
10	3.6	3.6	7.2	1.336	40	39.46	Corr. coeff. = 0.9978
7	2.1	2.1	4.2	1.024	30	29.60	
5	1.4	1.4	2.8	0.839	21	20.72	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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/Tav)(Pav/760)]-b)

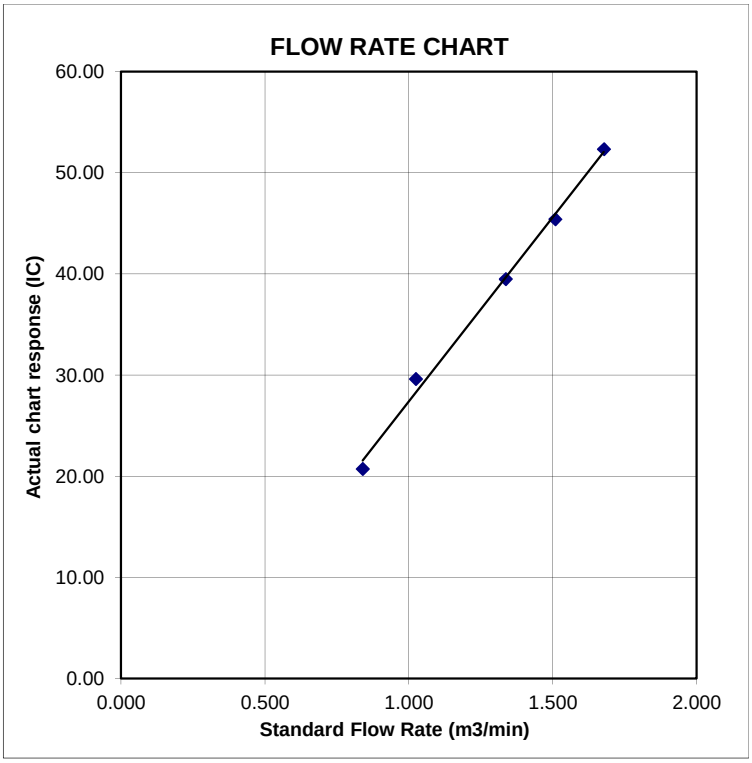
m = sampler slope

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		Date of Calibration:	25/8/2016
Location ID : AM3		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.6	5.6	11.2	1.663	54	53.28	Slope = 31.0492
13	4.3	4.3	8.6	1.459	48	47.36	Intercept = 2.0333
10	3.3	3.3	6.6	1.280	44	43.41	Corr. coeff. = 0.9929
7	2.3	2.3	4.6	1.071	34	33.54	
5	1.3	1.3	2.6	0.809	28	27.62	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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/Tav)(Pav/760)]-b)

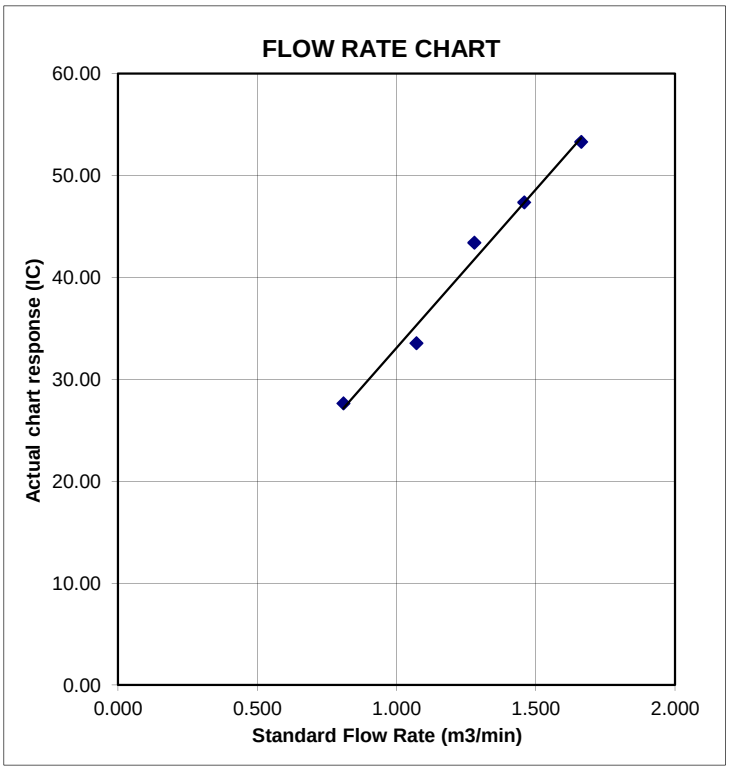
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House		Date of Calibration:	25/8/2016
Location ID : AM4b		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.6	5.6	11.2	1.663	54	53.28	Slope = 31.7450
13	4.6	4.6	9.2	1.508	48	47.36	Intercept = 0.5925
10	3.4	3.4	6.8	1.299	44	43.41	Corr. coeff. = 0.9917
7	2.3	2.3	4.6	1.071	36	35.52	
5	1.7	1.7	3.4	0.923	29	28.61	

Calculations :

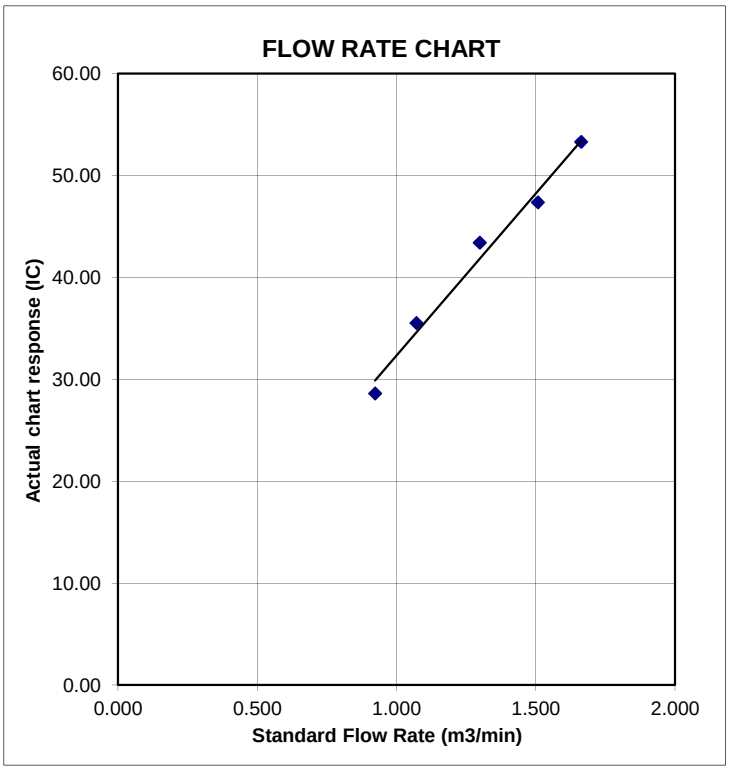
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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		Date of Calibration:	25/8/2016
Location ID : AM5a		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (ºC)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.2	5.2	10.4	1.603	52	51.30	Slope = 32.8135
13	4	4	8.0	1.408	46	45.38	Intercept = -0.4377
10	3.2	3.2	6.4	1.261	43	42.42	Corr. coeff. = 0.9925
7	2	2	4.0	1.000	34	33.54	
5	1.3	1.3	2.6	0.809	25	24.66	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

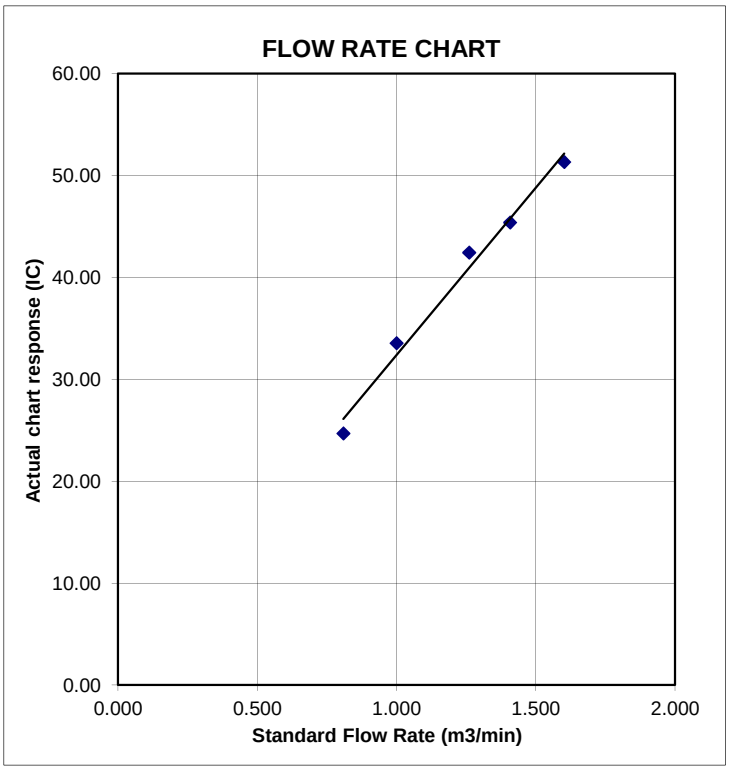
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Wo Keng Shan Village House		Date of Calibration:	25/8/2016
Location ID : AM6		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (ºC)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.777	48	47.36	Slope = 25.0376
13	4.8	4.8	9.6	1.541	50	49.33	Intercept = 7.1507
10	3.7	3.7	7.4	1.354	44	43.41	Corr. coeff. = 0.9321
7	2.3	2.3	4.6	1.071	36	35.52	
5	1.5	1.5	3.0	0.868	26	25.65	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

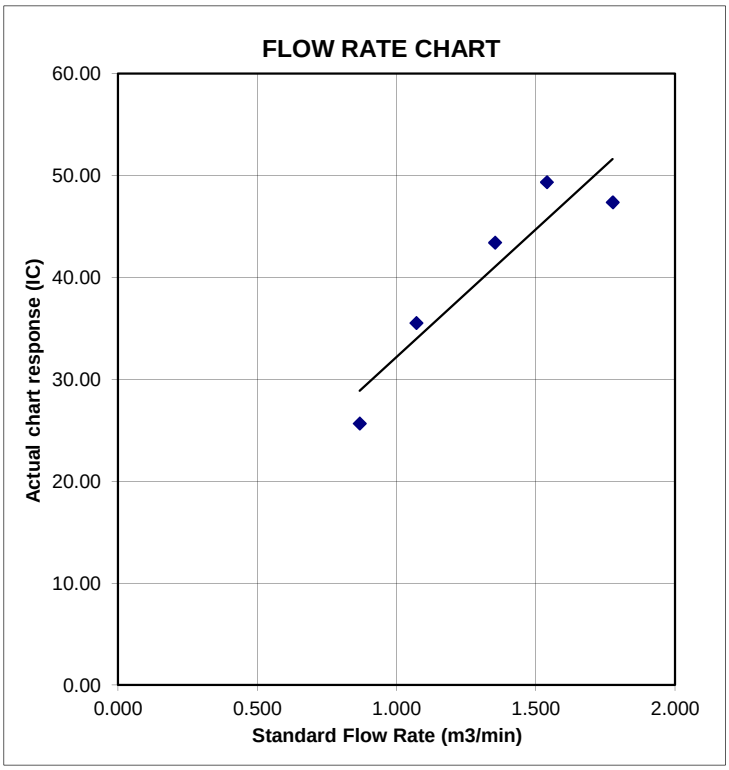
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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
Location ID : AM7b

Date of Calibration: 25/8/2016
Next Calibration Date: 25/10/2016
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.425	54	51.00	Slope = 30.8482
13	3.3	3.3	6.6	1.280	48	47.00	Intercept = 7.1979
10	2.6	2.6	5.2	1.138	42	42.00	Corr. coeff. = 0.9993
7	1.7	1.7	3.4	0.923	35	36.00	
5	1.2	1.2	2.4	0.778	27	31.00	

Calculations :

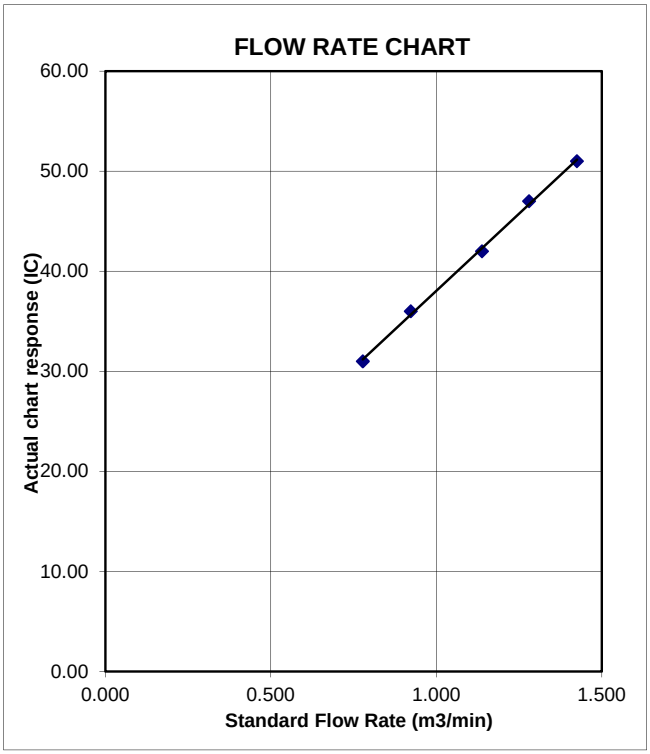
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Po Kat Tsai Village No. 4
Location ID : AM8

Date of Calibration: 25/8/2016
Next Calibration Date: 25/10/2016
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (°C)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.677	63	62.15	Slope = 37.2726
13	4.5	4.5	9.0	1.492	56	55.25	Intercept = -0.0759
10	3.6	3.6	7.2	1.336	51	50.32	Corr. coeff. = 0.9990
7	2.3	2.3	4.6	1.071	41	40.45	
5	1.4	1.4	2.8	0.839	31	30.58	

Calculations :

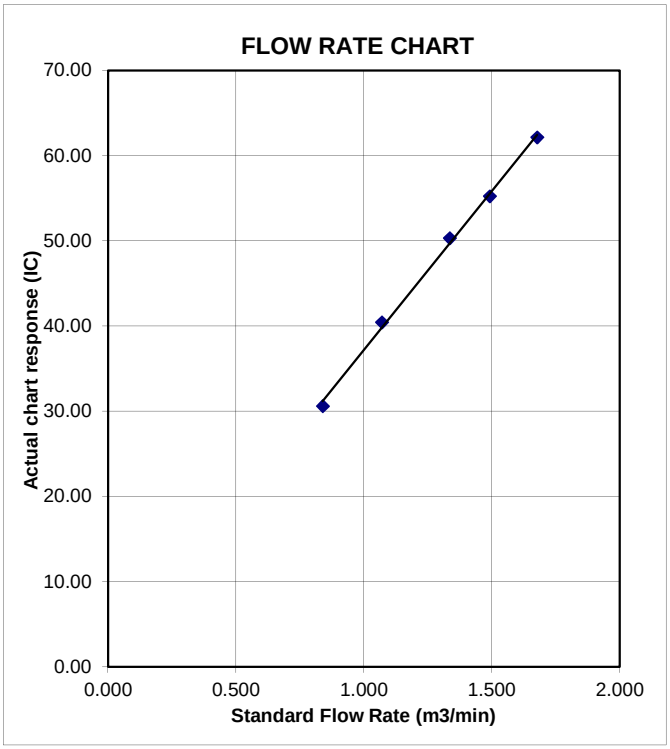
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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 : Nam Wa Po Village House No. 80		Date of Calibration:	25/8/2016
Location ID : AM9b		Next Calibration Date:	25/10/2016
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1004.2	Corrected Pressure (mm Hg)	753.15
Temperature (ºC)	30.4	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00411
Model->	5025A	Qstd Intercept ->	-0.03059
Serial # ->	1612		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.749	54	53.28	Slope = 31.9186
13	4.9	4.9	9.8	1.556	48	47.36	Intercept = -2.4102
10	3.7	3.7	7.4	1.354	41	40.45	Corr. coeff. = 0.9984
7	2.4	2.4	4.8	1.094	34	33.54	
5	1.5	1.5	3.0	0.868	25	24.66	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate

IC = corrected chart respones

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/Tav)(Pav/760)]-b)

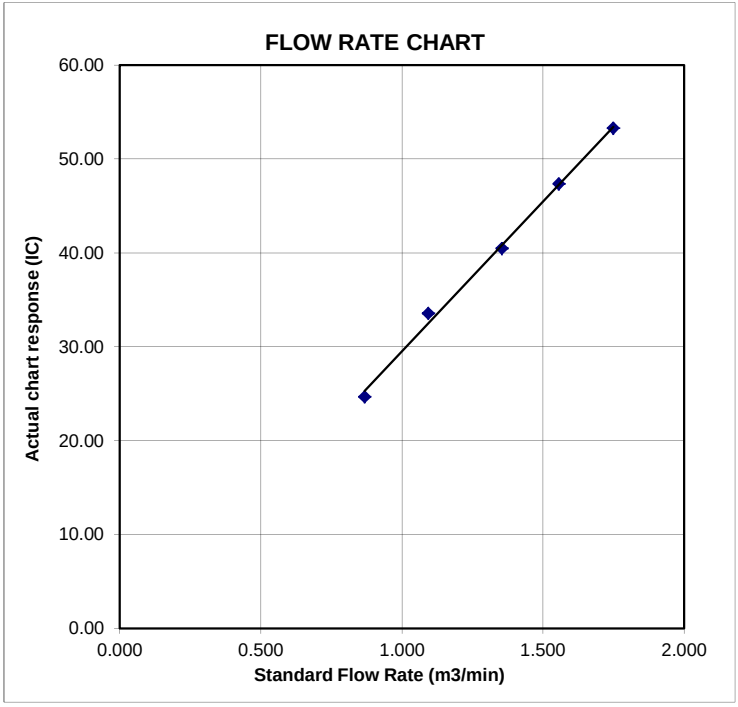
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVES, OH
45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 14, 2016 Rootsmeter S/N 0438320 Ta (K) - 295
Operator Tisch Orifice I.D. - 1612 Pa (mm) - 745.49

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3770	3.2	2.00
2	NA	NA	1.00	0.9710	6.4	4.00
3	NA	NA	1.00	0.8710	7.8	5.00
4	NA	NA	1.00	0.8310	8.7	5.50
5	NA	NA	1.00	0.6860	12.6	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)
0.9866	0.7165	1.4078
0.9824	1.0117	1.9909
0.9804	1.1256	2.2259
0.9793	1.1785	2.3345
0.9741	1.4200	2.8155

Qstd slope (m) = 2.00411
intercept (b) = -0.03059
coefficient (r) = 0.99995

y axis = SQRT[H2O(Pa/760)(298/Ta)]

Va	(x axis) Qa	(y axis)
0.9957	0.7231	0.8896
0.9914	1.0210	1.2581
0.9894	1.1360	1.4066
0.9883	1.1893	1.4753
0.9830	1.4330	1.7792

Qa slope (m) = 1.25494
intercept (b) = -0.01933
coefficient (r) = 0.99995

y axis = SQRT[H2O(Ta/Pa)]

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760)(298/Ta))]- b}
Qa = 1/m{[SQRT H2O(Ta/Pa)]- b}

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	2X6145
Equipment Ref:	EQ105
Job Order	HK1603558

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1602	11.7
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1522	9.3
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3347	23.6

Sensitivity Adjustment Scale Setting (Before Calibration) 593 (CPM)

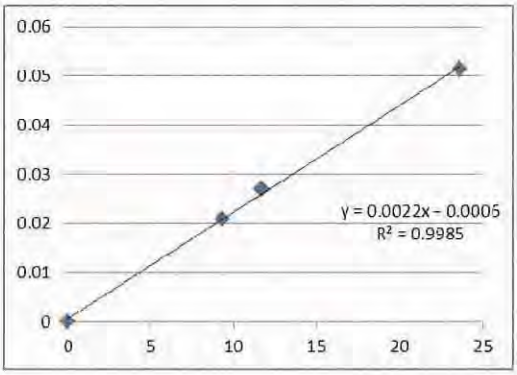
Sensitivity Adjustment Scale Setting (After Calibration) 596 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9985

Date of Issue 11 January 2016



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 : Donald Kwok Signature : Date : 12 January 2016

QC Reviewer : Ben Tam Signature : Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	2-Jan-16
Location ID :	Calibration Room	Next Calibration Date:	2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

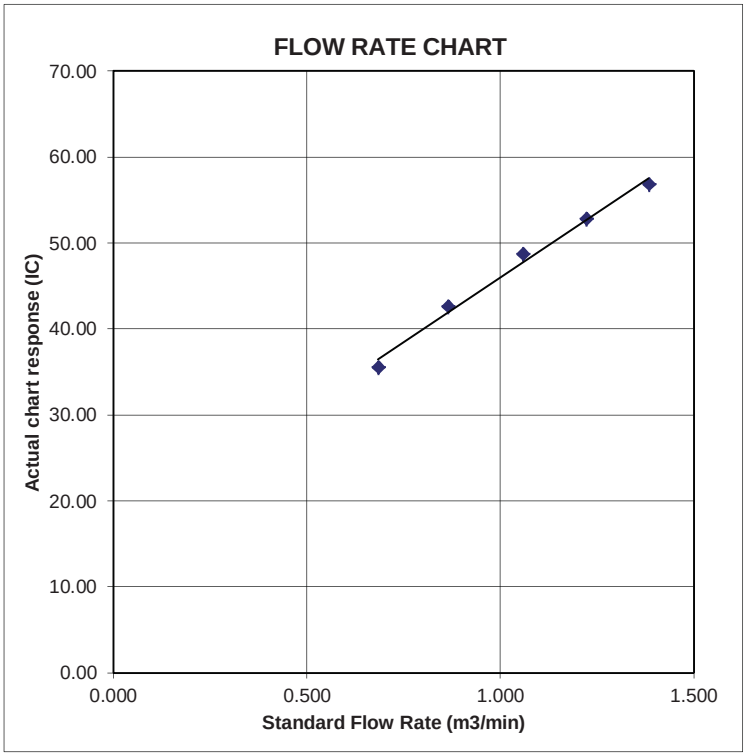
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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	HK1603560

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1577	11.5
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1433	8.8
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3328	23.5

Sensitivity Adjustment Scale Setting (Before Calibration) 540 (CPM)

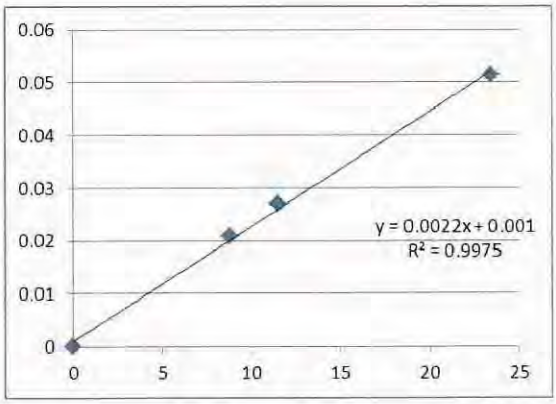
Sensitivity Adjustment Scale Setting (After Calibration) 540 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9975

Date of Issue 11 January 2016



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 : Donald Kwok Signature : Date : 12 January 2016

QC Reviewer : Ben Tam Signature : Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	2-Jan-16
Location ID :	Calibration Room	Next Calibration Date:	2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

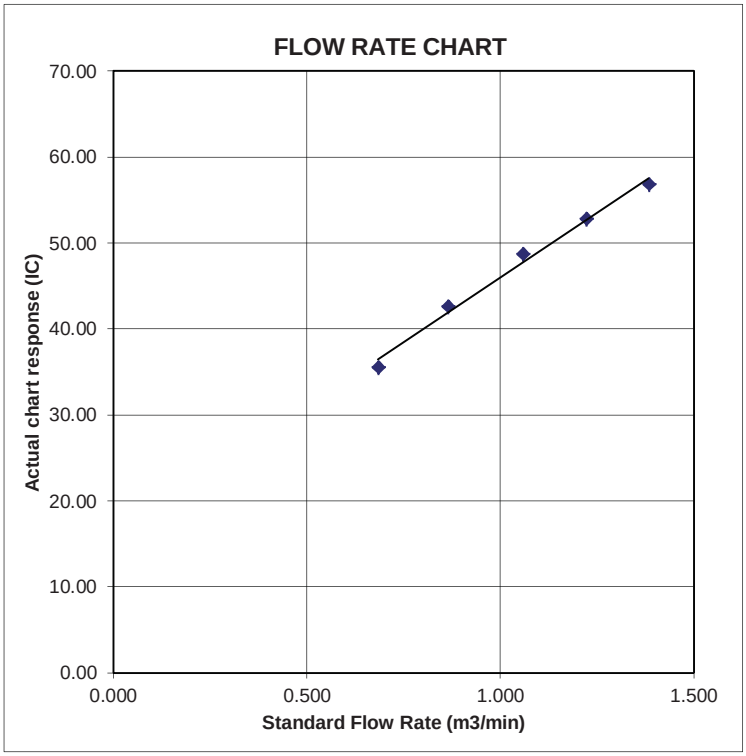
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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.	366410
Equipment Ref:	EQ110
Job Order	HK1603561

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1566	11.4
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1422	8.7
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3318	23.4

Sensitivity Adjustment Scale Setting (Before Calibration) 660 (CPM)

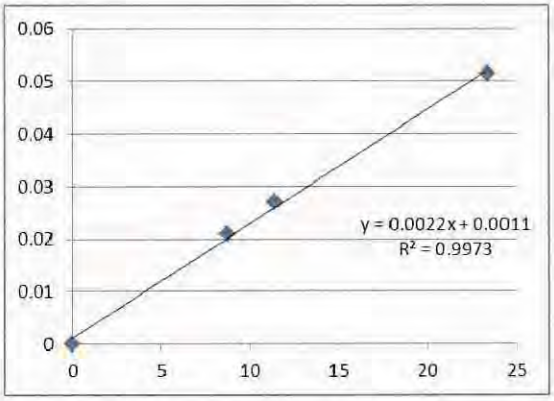
Sensitivity Adjustment Scale Setting (After Calibration) 661 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9973

Date of Issue 11 January 2016



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 : Donald Kwok Signature : Date : 12 January 2016

QC Reviewer : Ben Tam Signature : Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	2-Jan-16
Location ID :	Calibration Room	Next Calibration Date:	2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

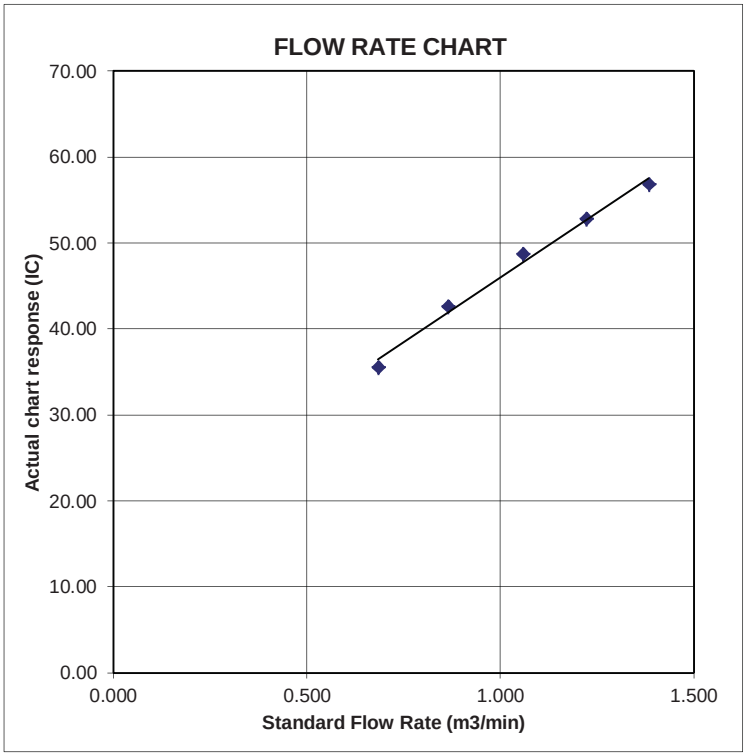
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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.	3Y6503
Equipment Ref:	EQ112
Job Order	HK1603553

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1633	11.9
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1502	9.2
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3365	23.8

Sensitivity Adjustment Scale Setting (Before Calibration) 642 (CPM)

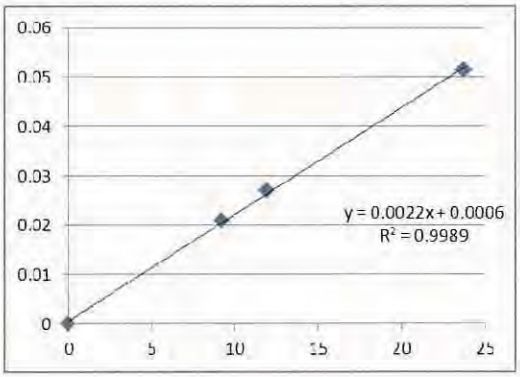
Sensitivity Adjustment Scale Setting (After Calibration) 648 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9989

Date of Issue 11 January 2016



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 : Donald Kwok Signature : Date : 12 January 2016

QC Reviewer : Ben Tam Signature : Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	2-Jan-16
Location ID :	Calibration Room	Next Calibration Date:	2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

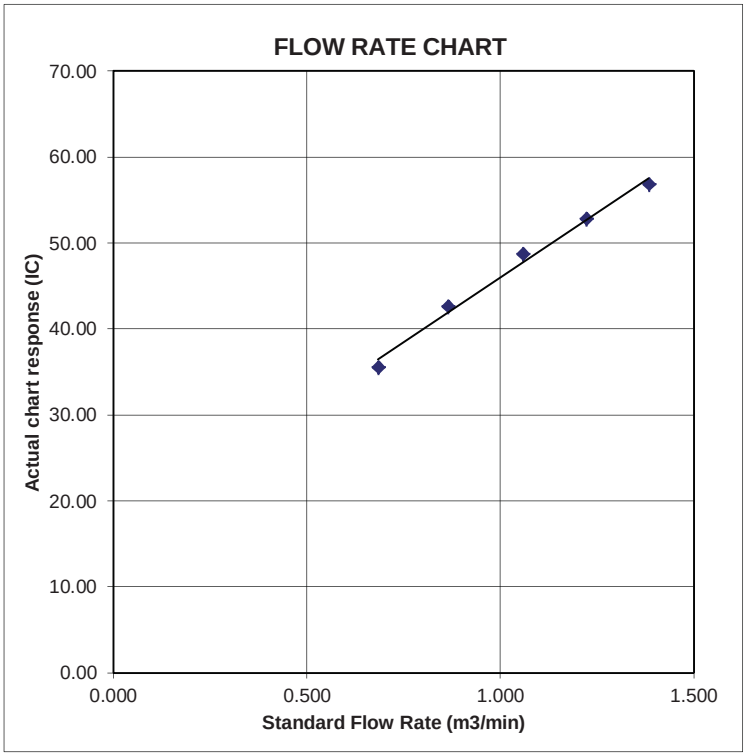
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/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.	3Y6505
Equipment Ref:	EQ114
Job Order	HK1603562

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	2 January 2016

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr17min	17:30 ~ 19:47	20.6	1018.9	0.027	1589	11.6
2hr42min	17:00 ~ 19:42	20.7	1015.9	0.021	1473	9.0
2hr21min	18:00 ~ 20:21	20.9	1018.8	0.051	3314	23.4

Sensitivity Adjustment Scale Setting (Before Calibration) 588 (CPM)

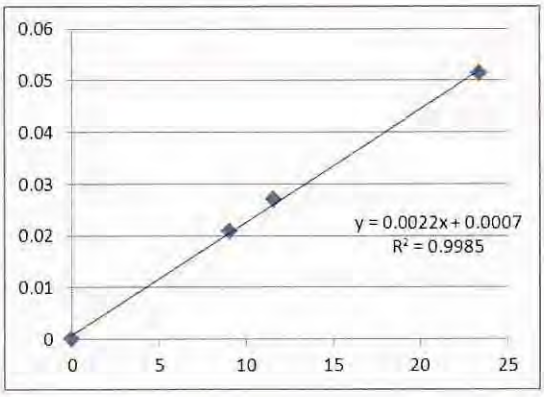
Sensitivity Adjustment Scale Setting (After Calibration) 585 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9985

Date of Issue 11 January 2016



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 : Donald Kwok Signature : Date : 12 January 2016

QC Reviewer : Ben Tam Signature : Date : 12 January 2016

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	2-Jan-16
Location ID :	Calibration Room	Next Calibration Date:	2-Apr-16

CONDITIONS

Sea Level Pressure (hPa)	1022	Corrected Pressure (mm Hg)	766.5
Temperature (°C)	18.9	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Calibration Date->	24-Mar-15	Expiry Date->	24-Mar-16

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.1	4.1	8.2	1.384	56	56.82	Slope = 30.1332
13	3.2	3.2	6.4	1.222	52	52.76	Intercept = 15.8637
10	2.4	2.4	4.8	1.059	48	48.71	Corr. coeff. = 0.9950
8	1.6	1.6	3.2	0.865	42	42.62	
5	1.0	1.0	2.0	0.684	35	35.51	

Calculations :

Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]

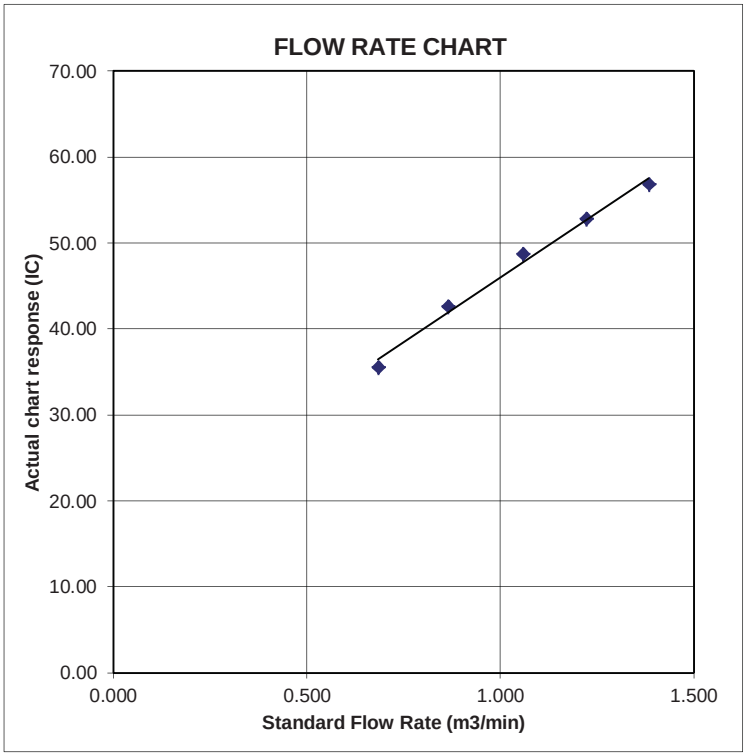
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

Qstd = standard flow rate
IC = corrected chart respones
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/Tav)(Pav/760)]-b)

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



輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162996
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Date of Receipt / 收件日期 : 26 May 2016

Description / 儀器名稱 : Integrating Sound Level Meter (EQ065)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2337676
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 ± 2)°C
Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016

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
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 6 June 2016

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

Certificate of Calibration
校正證書

Certificate No. : C162996
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_{AFP}	A	F	94.00	1	94.0	Ref.
	L_{ASP}		S			94.1	± 0.1
	L_{AIP}		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_{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L_{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L_{ASP}		S		Continuous	106.0	Ref.
	L_{ASMax}				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_{AFP}	A	F	94.00	31.5 Hz	54.9	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.4	-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所書面批准。

Certificate of Calibration
校正證書

Certificate No. : C162996
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_{CFP}	C	F	94.00	31.5 Hz	91.2	-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	87.9	-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_{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.2	± 0.5
						$1/10^2$		90	90.1	± 0.5
			60 sec.			$1/10^3$		80	79.8	± 1.0
			5 min.			$1/10^4$		70	69.8	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812708

- 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 :
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

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162991
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843)

Description / 儀器名稱 : Sound Calibrator (EQ083)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-74
Serial No. / 編號 : 34246492
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.

Date of Receipt / 收件日期 : 24 May 2016

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
Line Voltage / 電壓 : ---
Relative Humidity / 相對濕度 : (55 ± 20)%

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016

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, Project Engineer

Date of Issue 簽發日期 : 3 June 2016

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

Certificate of Calibration
校正證書

Certificate No. : C162991
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	C153519
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	94.0	± 0.3	± 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 ± 1 %	± 1

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

Note :
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

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C161797
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0662) Date of Receipt / 收件日期 : 22 March 2016

Description / 儀器名稱 : Sound Level Meter (EQ014)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142580
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 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 6 April 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification. (after adjustment)
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
Project Engineer

Date of Issue 簽發日期 : 7 April 2016

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

Certificate of Calibration
校正證書

Certificate No. : C161797
證書編號

1. 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.

2. Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	* 91.9	± 1.1

* Out of IEC 61672 Class 1 Spec.

6.1.1.2 After Adjustment

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L_A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 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所書面批准。

Certificate of Calibration
校正證書

Certificate No. : C161797
證書編號

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	94.0	Ref.
			Slow			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_A	A	Fast	94.00	63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.3	-8.6 ± 1.4
					500 Hz	90.7	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.6
					4 kHz	95.0	+1.0 ± 1.6
					8 kHz	92.9	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.5	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_C	C	Fast	94.00	63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	91.0	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.6	-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。

Certificate of Calibration
校正證書

Certificate No. : C161797
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 07725

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	63 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)

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

Note :
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

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162177
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 14 April 2016

Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285762
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 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 April 2016

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
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 27 April 2016

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

Certificate of Calibration
校正證書

Certificate No. : C162177
證書編號

1. 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.

2. Self-calibration using laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.4.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. 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_{AFP}	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_{AFP}	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_{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

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所書面批准。

Certificate of Calibration
校正證書

Certificate No. : C162177
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_{AFP}	A	F	94.00	1	94.0	Ref.
	L_{ASP}		S			94.0	± 0.1
	L_{AIP}		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_{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L_{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L_{ASP}		S		Continuous	106.0	Ref.
	L_{ASMax}				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_{AFP}	A	F	94.00	31.5 Hz	55.1	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-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	91.0	-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所書面批准。

Certificate of Calibration
校正證書

Certificate No. : C162177
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_{CFP}	C	F	94.00	31.5 Hz	91.5	-3.0 ± 1.5
					63 Hz	93.4	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	92.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-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_{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
						$1/10^2$		90	89.9	± 0.5
			60 sec.			$1/10^3$		80	79.2	± 1.0
			5 min.			$1/10^4$		70	69.2	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812705

- 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 :
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

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162438
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 5 May 2016

Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
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 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016

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
Project Engineer

Date of Issue 簽發日期 : 11 May 2016

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

Certificate of Calibration
校正證書

Certificate No. : C162438
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	C153519
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	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

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

Note :
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

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C162125
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 14 April 2016

Description / 儀器名稱 : Acoustical Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
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 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 April 2016

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, Project Engineer

Date of Issue 簽發日期 : 25 April 2016

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

Certificate of Calibration
校正證書

Certificate No. : C162125
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	C153519
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	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.000 0	1 kHz ± 0.1 %	± 0.1

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

Note :
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

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T: +852 2610 1044
F: +852 2610 2021
www.alsglobal.com

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1624924
CLIENT:	ACTION UNITED ENVIRO SERVICES	**SUB-BATCH:**	0
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG.	**LABORATORY:**	HONG KONG
		DATE RECEIVED:	22/06/2016
		DATE OF ISSUE:	27/06/2016

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 principals 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:	24 June, 2016

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.

Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

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

RIGHT SOLUTIONS | RIGHT PARTNER

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1624924
Sub-Batch: 0
Date of Issue: 27/06/2016
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: --
Date of Calibration: 24 June, 2016 Date of next Calibration: 24 September, 2016

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.88	3.76	-0.12
5.03	4.98	-0.05
6.97	6.94	-0.03
	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)
11.5	12.1	+0.6
20.5	20.3	-0.2
44.0	43.3	-0.7
	Tolerance Limit (°C)	±2.0

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

Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T: +852 2610 1044
F: +852 2610 2021
www.alsglobal.com

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1626910
CLIENT:	ACTION UNITED ENVIRO SERVICES	**SUB-BATCH:**	0
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG	**LABORATORY:**	HONG KONG
		DATE RECEIVED:	06/07/2016
		DATE OF ISSUE:	13/07/2016

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 principals 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.:	11030C008499
Equipment No.:	--
Date of Calibration:	13 July, 2016

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.

Mr. Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

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

RIGHT SOLUTIONS | RIGHT PARTNER

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1626910
Sub-batch: 0
Date of Issue: 13/07/2016
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 13 July, 2016 Date of next Calibration: 13 October, 2016

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.32	--
4	3.69	-7.8
40	39.0	-2.5
80	80.5	+0.6
400	378	-5.5
800	802	+0.3
	Tolerance Limit (%)	±10.0

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

Mr. Fung Lim Chee, Richard
General Manager
Greater China & Hong Kong

ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung, N.T., Hong Kong
T: +852 2610 1044
F: +852 2610 2021
www.alsglobal.com

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1624926
CLIENT:	ACTION UNITED ENVIRO SERVICES	**SUB-BATCH:**	0
ADDRESS:	RM A 20/F., GOLDEN KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG	**LABORATORY:**	HONG KONG
		DATE RECEIVED:	22/06/2016
		DATE OF ISSUE:	24/06/2016

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 principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	pH and Temperature
Description:	pH Meter
Brand Name:	AUES
Model No.:	AZ 8685
Serial No.:	1128165
Equipment No.:	--
Date of Calibration:	23 June, 2016

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.

Mr Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

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

RIGHT SOLUTIONS | RIGHT PARTNER

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1624926
Sub-batch: 0
Date of Issue: 24/06/2016
Client: ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: AUES
Model No.: AZ 8685
Serial No.: 1128165
Equipment No.: --
Date of Calibration: 23 June, 2016 Date of next Calibration: 23 September, 2016

Parameters:

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.1	+0.10
7.0	7.0	0.00
10.0	9.9	-0.10
	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)
11.5	11.0	-0.5
23.0	22.5	-0.5
45.5	45.0	-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.

Mr Fung Lim Chee, Richard
General Manager -
Greater China & Hong Kong

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

This certificate is issued subject to the terms and conditions laid down by HKAS
本證書按照香港認可處訂立的條款及條件發出

L 000552

Appendix G

Event and Action Plan

Event and Action Plan for Air Quality

Event	ET	IEC	ER	Action Contractor
Action Level				
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.
Limit Level				
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 theimplementation 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 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.	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 the ER accordingly; 5. Monitor the implementation of 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. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event and Action Plan for Construction Noise

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	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER; 6. Implement the agreed mitigation measures.
Action Level being exceeded by more than two consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC and Contractor; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC and Contractor; 6. Ensure mitigation measures are implemented; 7. Prepare to increase the monitoring frequency to daily; 8. Repeat measurement on next day of exceedance.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC on the proposed mitigation measures; 2. Make agreement on the mitigation measures to be implemented; 3. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit Level being exceeded by one sampling day	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	1. Repeat in-situ measurement to confirm findings; 2. Identify reasons for non-compliance and sources of impact; 3. Inform IEC, Contractor and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days.	1. Discuss with ET and Contractor on the mitigation measures; 2. Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; 3. Assess the effectiveness of the implemented mitigation measures.	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Assess the effectiveness of the implemented mitigation measures; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level.	1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; 6. Implement the agreed mitigation measures; 7. As directed by the ER, to slow down or to stop all or part of the construction activities.

Appendix H

Impact Monitoring Schedule

Impact Monitoring Schedule for Reporting Period – August 2016

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Mon	1-Augst-16		AM1b, AM2, AM3 & AM9b		
Tue	2-Augst-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Wed	3-Augst-16		AM4b, AM5, AM6, AM7b & AM8		
Thu	4-Augst-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Fri	5-Augst-16				
Sat	6-Augst-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sun	7-Augst-16				
Mon	8-Augst-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Tue	9-Augst-16		AM4b, AM5, AM6, AM7b & AM8		
Wed	10-Augst-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Thu	11-Augst-16				
Fri	12-Augst-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sat	13-Augst-16	AM1b, AM2, AM3 & AM9b			
Sun	14-Augst-16				
Mon	15-Augst-16		AM4b, AM5, AM6, AM7b & AM8		
Tue	16-Augst-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Wed	17-Augst-16				
Thu	18-Augst-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Fri	19-Augst-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Sat	20-Augst-16		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sun	21-Augst-16				
Mon	22-Augst-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Tue	23-Augst-16				
Wed	24-Augst-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Thu	25-Augst-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Fri	26-Augst-16		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sat	27-Augst-16	AM4b, AM5, AM6, AM7b & AM8			
Sun	28-Augst-16				
Mon	29-Augst-16				All Water Quality Monitoring Locations
Tue	30-Augst-16		AM1b, AM2, AM3 & AM9b		
Wed	31-Augst-16	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations

	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for next Reporting Period – September 2016

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

	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 ($\mu g/m^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
AM1b – Open Area, Tsung Yuen Ha Village															
1-Aug-16	29762	11853.74	11877.89	1449.00	48	50	49.0	28.8	1004.7	1.68	2431	2.7786	2.9926	0.2140	88
6-Aug-16	29785	11877.89	11902.14	1455.00	46	48	47.0	30	1005	1.62	2351	2.7835	2.9349	0.1514	64
12-Aug-16	29794	11902.14	11926.32	1450.80	46	48	47.0	28.1	1001.3	1.62	2347	2.8106	2.9053	0.0947	40
18-Aug-16	29829	11926.32	11950.47	1449.00	44	46	45.0	27	996.3	1.56	2257	2.8457	2.8983	0.0526	23
24-Aug-16	29840	11950.47	11974.66	1451.40	46	46	46.0	30.1	1003.8	1.59	2301	2.8467	2.9669	0.1202	52
30-Aug-16	29864	11974.66	11998.81	1449.00	46	46	46.0	28	1007.6	1.56	2267	2.7902	2.9959	0.2057	91
AM2 - Village House near Lin Ma Hang Road															
1-Aug-16	29763	7381.09	7404.90	1428.60	34	34	34.0	28.8	1004.1	1.16	1652	2.7982	3.0154	0.2172	131
6-Aug-16	29786	7404.90	7428.72	1429.20	34	34	34.0	30	1005	1.15	1650	2.8017	2.9419	0.1402	85
12-Aug-16	29792	7428.72	7452.51	1427.40	36	38	37.0	28.1	1001.3	1.25	1788	2.8106	2.9209	0.1103	62
18-Aug-16	29830	7452.51	7476.24	1423.80	36	38	37.0	27	996.3	1.25	1783	2.8228	2.8896	0.0668	37
24-Aug-16	29839	7476.24	7499.95	1422.60	38	40	39.0	30.1	1003.8	1.31	1871	2.8357	3.1020	0.2663	142
30-Aug-16	29866	7499.95	7523.77	1429.20	44	44	44.0	28	1007.6	1.45	2067	2.8126	3.1138	0.3012	146
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
1-Aug-16	29764	8498.99	8522.99	1440.00	44	44	44.0	28.8	1004.1	1.35	1945	2.7952	3.0578	0.2626	135
6-Aug-16	29787	8522.99	8546.99	1440.00	48	50	49.0	30	1005	1.50	2165	2.7983	3.1053	0.3070	142
12-Aug-16	29793	8546.99	8570.99	1440.00	48	48	48.0	28.1	1001.3	1.47	2123	2.8116	3.0237	0.2121	100
18-Aug-16	29831	8570.99	8595.95	1497.60	46	50	48.0	27	996.3	1.47	2206	2.8200	2.8663	0.0463	21
24-Aug-16	29838	8595.95	8619.95	1440.00	44	58	51.0	30.1	1003.8	1.56	2253	2.8300	2.9786	0.1486	66
30-Aug-16	29865	8619.95	8643.96	1440.60	50	56	53.0	28	1007.6	1.63	2346	2.7966	3.0817	0.2851	122
AM4 - House no. 10B1 Nga Yiu Ha Village															
3-Aug-16	29768	10506.49	10530.49	1440.00	40	40	40.0	28.7	1004.7	1.26	1821	2.8042	2.8408	0.0366	20
9-Aug-16	29784	10530.49	10554.48	1439.40	40	40	40.0	29.2	1001.8	1.26	1816	2.8020	2.9092	0.1072	59
15-Aug-16	29799	10554.48	10578.48	1440.00	40	40	40.0	26.6	997.4	1.26	1820	2.8181	2.8704	0.0523	29
20-Aug-16	29834	10578.48	10602.48	1440.00	40	40	40.0	29.2	1004.7	1.26	1819	2.8178	2.8990	0.0812	45
26-Aug-16	29843	10602.51	10626.51	1440.00	44	44	44.0	30.4	1004.6	1.35	1943	2.8406	2.9445	0.1039	53
AM5a - Ping Yeung Village House															
3-Aug-16	29767	8368.93	8392.93	1440.00	34	34	34.0	28.7	1004.7	1.12	1612	2.8008	2.8549	0.0541	34
9-Aug-16	29783	8392.93	8416.93	1440.00	40	40	40.0	29.2	1001.8	1.31	1880	2.8036	2.9217	0.1181	63
15-Aug-16	29798	8416.93	8440.94	1440.60	32	32	32.0	26.6	997.4	1.06	1521	2.8174	2.8555	0.0381	25
20-Aug-16	29833	8440.94	8464.95	1440.60	32	32	32.0	29.2	1004.7	1.06	1520	2.8305	2.8955	0.0650	43
26-Aug-16	29842	8464.95	8488.70	1425.00	40	40	40.0	30.4	1004.6	1.22	1733	2.8368	2.9805	0.1437	83

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 ($\mu g/m^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
AM6 - Wo Keng Shan Village House															
3-Aug-16	29766	6950.30	6974.30	1440.00	34	34	34.0	28.7	1004.7	1.01	1454	2.8092	2.8617	0.0525	36
9-Aug-16	29782	6974.30	6998.30	1440.00	34	34	34.0	29.2	1001.8	1.01	1450	2.7986	2.9499	0.1513	104
15-Aug-16	29797	6998.30	7022.30	1440.00	36	36	36.0	26.6	997.4	1.08	1557	2.8392	2.9332	0.0940	60
20-Aug-16	29832	7022.30	7046.30	1440.00	36	40	38.0	29.2	1004.7	1.15	1659	2.8342	2.9886	0.1544	93
26-Aug-16	29841	7046.34	7070.35	1440.60	38	40	39.0	30.4	1004.6	1.25	1803	2.8449	3.0871	0.2422	134
AM7b - Loi Tung Village House															
3-Aug-16	29770	15986.55	16010.55	1440.00	34	34	34.0	28.7	1004.7	1.01	1450	2.8026	2.8485	0.0459	32
9-Aug-16	29789	16010.55	16034.55	1440.00	32	32	32.0	29.2	1001.8	0.94	1359	2.8159	2.9184	0.1025	75
15-Aug-16	29826	16034.55	16058.55	1440.00	34	34	34.0	26.6	997.4	1.01	1450	2.8541	2.9093	0.0552	38
20-Aug-16	29835	16058.55	16082.55	1440.00	34	34	34.0	29.2	1004.7	1.01	1449	2.8116	2.8762	0.0646	45
26-Aug-16	29844	16082.55	16106.56	1440.60	54	54	54.0	30.4	1004.6	1.49	2152	2.8345	2.9658	0.1313	61
AM8 - Po Kat Tsai Village No. 4															
3-Aug-16	29769	9893.11	9917.11	1440.00	44	44	44.0	28.7	1004.7	1.21	1745	2.7996	2.8346	0.0350	20
9-Aug-16	29788	9917.11	9941.11	1440.00	43	43	43.0	29.2	1001.8	1.18	1693	2.8071	2.8658	0.0587	35
15-Aug-16	29827	9941.11	9965.11	1440.00	42	42	42.0	26.6	997.4	1.15	1651	2.8190	2.8545	0.0355	22
20-Aug-16	29836	9965.11	9989.12	1440.60	40	40	40.0	29.2	1004.7	1.08	1556	2.8233	2.8767	0.0534	34
26-Aug-16	29845	9989.12	10013.13	1440.60	43	43	43.0	30.4	1004.6	1.14	1643	2.8407	2.9405	0.0998	61
AM9b - Nam Wa Po Village House No. 80															
1-Aug-16	29765	17272.33	17296.33	1440.00	28	30	29.0	29.5	999.8	0.93	1340	2.7941	2.8901	0.0960	72
6-Aug-16	29773	17296.33	17320.33	1440.00	30	30	30.0	30	1005	0.97	1391	2.8156	2.9471	0.1315	95
12-Aug-16	29795	17320.33	17344.33	1440.00	26	26	26.0	28.1	1001.3	0.83	1200	2.8195	2.8754	0.0559	47
18-Aug-16	29828	17344.33	17368.33	1440.00	28	28	28.0	27	996.3	0.90	1295	2.8230	2.8550	0.0320	25
24-Aug-16	29837	17368.33	17392.34	1440.60	28	30	29.0	30.1	1003.8	0.93	1342	2.8228	2.8838	0.0610	45
30-Aug-16	29867	17392.34	17416.34	1440.00	25	25	25.0	28	1007.6	0.85	1228	2.8179	2.8628	0.0449	37

Construction Noise Monitoring Results, dB(A)

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
NM1 - Tsung Yuen Ha Village House No. 63																					
2-Aug-16	13:24	54.3	55.9	50.3	53.9	55.8	49.8	52.3	56.2	48.3	54.3	50.3	47.3	53.2	54.2	49.8	53.3	55.2	49.2	54	NA
8-Aug-16	10:37	51.1	54.2	48.9	53.2	56.3	50.1	51.3	54.6	51.1	56.2	59.4	51.1	52.0	54.6	50.1	52.6	54.3	51.6	53	NA
19-Aug-16	10:46	55.8	58.3	52.0	57.1	58.9	53.4	58.1	59.2	54.1	57.1	58.4	54.3	57.6	58.7	54.8	57.0	59.1	54.2	57	NA
25-Aug-16	9:11	61.3	64.7	51.5	62.8	66.3	57.1	62.8	67.1	56.9	60.7	62.6	56.1	61.1	63.1	56.7	60.5	62.1	56.6	62	NA
31-Aug-16	9:54	57.7	60.2	53.5	55.7	57.8	52.8	55.4	57.1	53.0	54.2	55.4	52.5	54.5	55.8	52.6	53.3	54.2	52.7	55	NA
NM2a - Village House near Lin Ma Hang Road																					
2-Aug-16	14:12	66.2	69.3	64.1	68.2	70.1	63.2	64.3	66.5	62.1	63.3	66.2	60.1	64.1	65.0	58.2	62.3	66.5	61.5	65	68
8-Aug-16	13:19	67.1	68.4	62.1	68.7	71.6	62.3	65.9	67.9	64.4	66.3	69.6	63.1	67.3	68.2	60.0	69.2	71.3	61.2	68	71
19-Aug-16	9:55	65.8	67.3	64.9	66.2	67.8	65.2	66.9	68.2	64.3	67.6	69.2	66.3	66.5	68.2	65.7	66.1	67.8	65.0	67	70
25-Aug-16	9:51	69.4	70.4	68.3	69.0	69.9	68.0	69.7	71.5	68.7	69.4	70.1	68.4	69.8	71.1	68.1	71.0	72.7	68.3	70	73
31-Aug-16	10:35	69.5	70.9	66.7	69.8	71.4	67.1	68.1	71.9	66.2	67.3	69.9	66.8	69.2	71.3	67.4	69.9	72.4	66.5	69	72
NM3 - Ping Yeung Village House																					
4-Aug-16	10:21	62.9	54.3	48.3	59.2	55.1	49.3	61.3	62.3	50.4	61.2	62.6	51.2	60.3	61.3	50.4	60.6	62.7	49.2	61	NA
10-Aug-16	9:52	56.7	57.9	54.1	57.1	60.0	55.1	57.6	58.7	53.2	58.1	59.9	56.1	57.9	58.8	54.1	58.1	60.2	56.6	58	NA
16-Aug-16	10:03	55.8	56.9	53.1	56.2	57.8	53.6	57.1	58.1	54.6	59.1	57.3	54.2	56.9	58.0	52.1	53.8	55.1	52.0	57	NA
22-Aug-16	11:01	62.9	65.7	55.0	58.1	60.2	53.6	60.7	63.5	53.8	57.3	59.4	54.3	62.5	63.1	54.0	58.4	60.1	54.2	61	NA
NM4 - Wo Keng Shan Village House																					
4-Aug-16	11:29	62.3	65.4	51.1	63.2	66.2	50.1	60.0	62.2	48.1	62.3	63.4	52.3	61.0	64.2	51.3	64.1	66.2	50.3	62	NA
10-Aug-16	10:23	58.1	59.9	56.1	58.6	61.2	56.3	61.9	63.2	57.1	60.0	61.9	56.8	59.2	61.3	55.9	58.7	61.1	54.8	60	NA
16-Aug-16	14:20	57.8	59.2	56.9	58.1	59.7	56.6	57.2	58.3	56.1	58.2	59.9	54.3	56.8	57.3	55.8	58.3	60.1	57.2	58	NA
22-Aug-16	10:16	65.4	62.2	63.7	61.9	63.2	53.6	62.4	60.0	53.7	63.0	62.2	53.6	59.9	62.3	53.7	62.7	65.4	53.8	63	NA
NM5– Ping Yeung Village House (façade facing northeast)																					
4-Aug-16	9:46	56.9	58.0	44.0	52.4	55.5	43.5	54.8	58.0	44.0	56.9	58.5	46.0	54.7	58.5	44.5	55.5	58.5	43.0	55	NA
10-Aug-16	9:51	55.6	57.5	53.0	61.1	64.0	55.5	59.1	61.5	55.5	61.1	62.5	58.5	57.7	59.0	56.0	58.9	60.0	55.5	59	NA
16-Aug-16	9:22	55.7	58.5	49.0	56.3	59.0	50.0	56.1	59.0	48.0	53.5	56.0	48.5	55.0	58.0	48.5	54.8	57.5	49.0	55	NA
22-Aug-16	13:45	50.9	53.5	46.5	50.1	52.5	46.5	51.1	53.5	47.0	51.0	53.5	46.5	49.4	51.5	46.5	51.2	53.5	46.0	51	NA
NM6 – Tai Tong Wu Village House 2																					
4-Aug-16	10:30	56.1	59.0	42.5	53.5	57.0	44.5	55.1	59.0	41.5	54.4	57.5	42.0	54.6	56.5	44.5	54.3	56.0	43.5	55	NA
10-Aug-16	10:34	56.3	57.0	54.5	58.5	63.5	54.0	55.8	56.5	52.0	54.2	55.5	52.0	56.3	57.0	52.0	54.5	55.5	52.5	56	NA
16-Aug-16	10:08	56.4	60.0	48.0	59.2	62.0	52.0	59.5	63.0	51.0	61.1	64.0	54.5	64.2	67.5	56.0	59.9	63.0	49.5	61	NA
22-Aug-16	13:02	58.1	61.0	51.5	57.7	61.0	50.0	61.0	62.0	52.0	58.9	61.0	52.0	58.3	60.5	50.5	58.1	61.0	48.0	59	NA

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
NM7 – Po Kat Tsai Village																					
4-Aug-16	13:10	71.2	71.5	44.0	52.0	54.5	45.0	53.2	55.0	45.5	56.8	58.5	47.5	62.1	66.0	50.5	63.2	65.5	51.0	65	NA
10-Aug-16	13:05	60.7	62.0	54.5	62.1	64.0	55.0	63.1	66.0	55.0	58.2	60.0	54.5	59.7	62.0	55.0	59.7	62.0	56.0	61	NA
16-Aug-16	13:10	60.8	64.0	50.0	64.4	68.0	48.5	61.3	64.5	53.5	63.0	66.5	49.5	64.2	67.0	56.0	64.4	68.0	53.0	63	NA
22-Aug-16	9:16	56.4	59.0	49.5	55.5	55.5	48.5	60.3	62.0	50.0	60.9	63.0	50.5	56.8	58.5	50.0	56.3	57.5	49.0	58	NA
NM8 - Village House, Tong Hang																					
2-Aug-16	13:21	56.5	58.3	54.5	57.4	59.4	55	57.7	59.5	55.3	56.6	58.7	54.1	56.5	58.5	54.5	57.3	59.2	55.4	57	NA
8-Aug-16	9:47	58.6	60.6	51.7	59.2	62.8	52.9	58.4	61.9	51	58.5	60	51.5	59.5	61.1	52	59.6	62.5	52.6	59	NA
19-Aug-16	9:40	59.7	63.5	50.1	57.4	61.4	50.7	58.7	64.7	49	57.5	63.4	48.5	58.9	64	49.6	57.3	63.2	49.6	58	NA
25-Aug-16	11:26	53.3	55	51	56.2	56.4	51.2	54.6	56.4	51.8	55.1	57	52.5	56.7	57.9	52.7	55.5	56.4	51	55	NA
NM9 - Village House, Kiu Tau Village																					
2-Aug-16	14:10	61.8	64.4	58.2	60.4	63.1	58.8	62.5	65.1	59.5	61.8	64.7	58.4	60.4	63.0	57.3	61.0	64.5	58.6	61	NA
8-Aug-16	10:32	61.8	64.0	58.3	60.8	63.2	58.7	61.5	64.5	59.5	62.4	65.8	60.0	63.7	65.8	60.1	61.2	64.3	59.7	62	NA
19-Aug-16	10:27	63.5	65.6	58.7	64.9	64.6	57.0	62.5	62.8	57.5	61.4	61.7	57.7	62.3	62.5	57.5	60.8	61.6	56.5	63	NA
25-Aug-16	10:41	61.3	63.3	57.8	61.1	62.7	58.5	61.6	65.3	57.3	60.0	61.6	57.4	59.9	61.1	57.9	61.5	64.2	57.4	61	NA
31-Aug-16	10:29	68.9	70.7	58.3	61.5	64.9	57.5	62.1	66.8	57.8	63.2	66.5	57.4	64.5	67.4	58.0	63.1	66.6	57.7	65	NA
NM10 - Nam Wa Po Village House No. 80																					
2-Aug-16	14:56	59.3	63.0	51.3	58.7	62.7	50.7	59.6	63.0	51.5	59.5	63.5	51.2	58.9	62.5	50.5	59.5	63.7	51.2	59	62
8-Aug-16	15:23	57.1	58.0	55.7	57.5	58.8	56.0	58.4	60.0	56.0	58.2	59.9	56.1	58.0	59.3	56.1	57.6	59.1	55.7	58	61
19-Aug-16	15:13	57.1	58.5	55.6	56.3	57.4	55.5	56.7	58.5	55.8	57.6	58.7	55.9	58.1	59.8	56.0	61.7	62.0	57.5	58	61
25-Aug-16	10:00	61.1	62.7	59.7	60.7	62.0	59.4	61.4	62.8	59.9	61.4	62.9	59.8	61.9	63.4	60.1	60.9	62.2	59.3	61	64
31-Aug-16	15:10	62.6	64.2	59.1	61.9	63.4	58.8	62.0	64.1	59.7	59.4	62.0	57.7	61.1	63.7	58.5	60.7	63.5	57.0	61	64

Water Quality Monitoring Data for Contract 5, 6 and SS C505

Date	2-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	15:21	0.36	26.4	26.4	7.21	7.2	89.1	88.8	171.0	170.0	9.9	9.9	137	138.5
			26.4		7.17		88.5		169.0		9.9		140	
WM1	15:31	0.41	27.3	27.3	7.02	7.0	88.6	88.8	195.0	198.0	9.3	9.3	162	164.0
			27.3		7.06		88.9		201.0		9.3		166	

Date	4-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:05	0.34	26.7	26.7	6.94	6.9	89.8	89.9	13.2	12.9	9.9	9.9	12	12.0
			26.7		6.95		90.0		12.5		9.9		12	
WM1	11:00	0.26	26.5	26.5	7.27	7.3	89.1	89.4	15.5	16.0	9.6	9.6	18	18.5
			26.5		7.28		89.6		16.4		9.6		19	

Date	6-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:40	0.34	26.8	26.8	7.5	7.5	92.2	92.3	13.4	13.2	10.7	10.7	10	10.0
			26.8		7.53		92.4		12.9		10.7		10	
WM1	9:30	0.26	28	28.0	6.85	6.9	90.1	90.4	46.6	44.8	10.3	10.3	47	47.0
			28		6.86		90.7		43.0		10.3		47	

Date	8-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	12:11	0.34	28.9	28.9	7.69	7.7	98.4	98.2	9.1	9.1	9.1	9.1	4	4.5
			28.9		7.74		97.9		9.0		9.1		5	
WM1	11:57	0.36	28.7	28.7	7.33	7.3	94.9	95.2	12.3	12.8	9.1	9.1	12	11.0
			28.7		7.35		95.4		13.3		9.1		10	

Date	10-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:00	0.36	25.9	25.9	7.02	7.0	86.7	86.8	302.0	308.5	9.3	9.3	288	287.5
			25.9		7.03		86.8		315.0		9.3		287	
WM1	10:50	0.29	25.9	25.9	7.14	7.2	87.7	87.8	312.0	309.5	9.2	9.3	282	283.0
			25.9		7.16		87.8		307.0		9.3		284	

Date	12-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:30	0.35	26.4	26.4	7.31	7.3	90.3	90.4	11.6	11.2	10.2	10.2	10	10.0
			26.4		7.33		90.4		10.7		10.1		10	
WM1	11:15	0.26	26.6	26.6	7.28	7.3	90.2	90.3	14.7	14.8	10.1	10.1	13	13.0
			26.6		7.28		90.4		14.8		10.1		13	

Date	16-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:55	0.34	26.9	26.9	7.08	7.1	88.5	88.4	20.9	21.3	10.8	10.5	16	16.0
			26.8		7.02		88.2		21.6		10.2		16	
WM1	11:10	0.26	26.8	26.8	6.64	6.7	82.8	82.9	50.9	50.8	9.4	9.5	55	37.0
			26.8		6.66		82.9		50.6		9.5		19	

Date	18-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:25	0.35	26.9	26.9	6.77	6.8	84.8	84.8	231.0	230.0	9	9.1	191	188.5
			26.9		6.78		84.8		229.0		9.1		186	
WM1	11:15	0.28	26.8	26.8	6.99	7.0	89.3	89.4	183.0	182.0	8.9	8.9	155	151.5
			26.8		7		89.4		181.0		8.9		148	

Date	20-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:53	0.27	28.4	28.4	7.07	7.1	90.8	91.3	17.8	18.1	9.1	9.1	15	16.0
			28.4		7.14		91.7		18.3		9.1		17	
WM1	12:07	0.33	30.2	30.2	6.94	7.0	92.1	92.4	49.7	50.4	8.8	8.8	52	52.5
			30.2		6.97		92.7		51.0		8.8		53	

Date	22-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:30	0.34	27.9	27.9	6.78	6.9	86.3	87.6	15.5	15.2	9.8	9.8	12	13.0
			27.9		6.94		88.8		14.9		9.8		14	
WM1	11:20	0.26	27.8	27.8	7.06	7.1	89.8	90.5	33.5	33.9	9.8	9.8	18	19.0
			27.8		7.12		91.1		34.3		9.8		20	

Date	24-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	12:31	0.23	28	28.0	7.25	7.2	92.9	92.7	11.2	11.3	8	8.0	7	7.0
			28		7.22		92.4		11.4		8		7	
WM1	12:16	0.30	28.1	28.1	7.2	7.2	91.8	91.5	13.7	13.7	8.2	8.2	12	11.5
			28.1		7.17		91.2		13.6		8.2		11	

Date	26-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:02	0.31	28.6	28.6	7.6	7.6	98.4	98.3	10.4	10.5	8.3	8.3	8	8.0
			28.6		7.58		98.1		10.6		8.3		8	
WM1	10:49	0.23	28.5	28.5	7.26	7.2	93.4	93.2	21.9	21.8	8.2	8.2	25	24.5
			28.5		7.23		93.0		21.6		8.2		24	

Date	29-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	12:21	0.37	25.7	25.7	7.49	7.5	91.7	92.3	11.5	11.8	8.9	8.9	6	6.0
			25.7		7.57		92.9		12.1		8.9		6	
WM1	12:37	0.29	25.6	25.7	7.13	7.2	87.4	87.8	17.7	17.9	8.6	8.6	20	20.0
			25.7		7.17		88.1		18.0		8.6		20	

Date	31-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:00	0.34	26.6	26.6	8.19	8.2	102.1	102.2	7.5	7.3	9.6	9.6	4	4.0
			26.6		8.17		102.3		7.2		9.6		4	
WM1	10:10	0.26	26.3	26.3	7.58	7.6	94.1	94.3	11.7	11.5	9.2	9.2	8	8.5
			26.3		7.65		94.5		11.2		9.2		9	

Water Quality Monitoring Data for Contract 2 and 3

Date	2-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	16:20	0.21	25.8	25.8	7.27	7.4	89.6	90.7	19.9	20.0	9.8	9.8	16	16.5
			25.8		7.47		91.7		20.1		9.8		17	
WM4-CB	16:37	0.47	26.5	26.5	6.79	6.8	84.5	84.8	28.7	29.0	8.9	8.9	22	22.0
			26.5		6.83		85.0		29.3		8.9		22	
WM4	16:04	0.39	26.3	26.3	7.35	7.4	91.2	91.6	34.7	35.0	9.4	9.4	29	29.5
			26.3		7.37		91.9		35.2		9.4		30	

Date	4-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:05	0.18	26.7	26.7	7.38	7.4	92.3	92.4	98.8	100.9	9.7	9.8	95	98.0
			26.7		7.39		92.5		103.0		9.8		101	
WM4-CB	13:35	0.31	27.2	27.2	6.19	6.2	77.8	77.9	99.5	99.7	9.4	9.4	81	80.5
			27.2		6.2		77.9		99.8		9.4		80	
WM4	13:45	0.15	26.6	26.6	6.96	7.0	87.3	87.4	118.0	119.0	8.9	8.9	113	114.5
			26.6		6.97		87.4		120.0		8.9		116	

Date	6-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:45	0.18	29.4	29.4	7.19	7.2	94.8	95.0	28.9	28.4	9.6	9.6	25	24.5
			29.4		7.21		95.1		27.8		9.6		24	
WM4-CB	12:00	0.31	29.6	29.6	6.72	6.7	87.9	88.1	10.8	11.3	8.9	8.9	8	8.0
			29.6		6.74		88.2		11.8		8.9		8	
WM4	11:35	0.14	29.5	29.5	7.21	7.2	94.0	94.3	27.3	27.0	9.2	9.2	20	20.5
			29.5		7.24		94.5		26.6		9.2		21	

Date	8-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	12:49	0.30	29.4	29.5	7.23	7.3	94.5	94.7	9.3	9.4	9.4	9.4	6	6.0
			29.5		7.31		94.9		9.4		9.4		6	
WM4-CB	13:08	0.33	31.4	31.5	7.16	7.2	97.1	97.5	10.2	10.6	8.8	8.8	7	7.0
			31.5		7.23		97.9		11.0		8.8		7	
WM4	12:37	0.37	30.4	30.4	7.3	7.3	97.6	98.2	15.4	15.8	9.1	9.1	13	13.5
			30.4		7.35		98.7		16.1		9.1		14	

Date	10-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:15	0.20	25.4	25.4	7.64	7.7	93.0	51.2	30.8	30.9	9.6	9.7	18	18.5
			25.4		7.66		9.3		31.0		9.7		19	
WM4-CB	13:25	0.33	27.2	27.2	7.39	7.4	93.3	93.2	35.1	34.6	9.1	9.2	29	30.0
			27.2		7.38		93.1		34.0		9.2		31	
WM4	13:00	0.16	26	26.0	6.91	6.9	85.8	85.9	36.8	37.4	9	9.0	25	25.5
			26		6.9		85.9		37.9		9		26	

Date	12-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:15	0.19	26.7	26.7	7.48	7.5	92.8	92.9	11.0	10.6	9.6	9.6	10	10.0
			26.7		7.49		92.9		10.2		9.6		10	
WM4-CB	13:30	0.31	27.4	27.4	6.75	6.7	86.1	86.1	19.2	19.3	9.3	9.3	13	13.5
			27.4		6.74		86.0		19.3		9.3		14	
WM4	13:00	0.14	27.2	27.2	7.18	7.2	92.2	92.2	35.0	35.1	9	9.0	31	32.0
			27.2		7.19		92.1		35.1		9		33	

Date	16-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	12:40	0.18	25.9	25.9	7.4	7.4	92.1	92.3	8.3	8.1	8.9	9.0	3	3.0
			25.9		7.45		92.4		7.9		9		3	
WM4-CB	12:55	0.31	26.8	26.8	6.14	6.1	76.6	76.7	19.0	18.6	8.5	8.6	16	15.0
			26.8		6.15		76.7		18.2		8.6		14	
WM4	12:35	0.15	26.7	26.7	7	7.0	87.3	87.3	35.0	35.0	8.5	8.6	32	32.0
			26.7		7.01		87.2		34.9		8.6		32	

Date	18-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:30	0.20	25.9	25.9	7.43	7.4	91.3	91.4	24.3	24.2	9.3	9.4	19	20.0
			25.9		7.45		91.4		24.0		9.4		21	
WM4-CB	13:15	0.35	26.8	26.8	6.65	6.7	83.6	83.7	38.3	37.5	8.8	8.8	29	29.0
			26.8		6.66		83.7		36.6		8.8		29	
WM4	13:00	0.15	26.8	26.8	7.21	7.2	90.6	90.7	35.8	35.7	8.9	9.0	36	37.0
			26.7		7.22		90.7		35.5		9		38	

Date	20-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	10:00	0.29	26.3	26.3	7.69	7.7	95.2	95.8	13.5	13.9	11.2	11.2	3	3.0
			26.3		7.74		96.4		14.3		11.2		3	
WM4-CB	9:21	0.37	27	27.0	7.08	7.1	88.7	89.1	10.1	10.6	10.3	10.3	10	10.0
			27		7.13		89.5		11.1		10.3		10	
WM4	9:45	0.36	27	27.0	7.15	7.2	90.3	90.8	34.3	34.0	10.7	10.7	32	35.0
			27		7.19		91.3		33.6		10.7		38	

Date	22-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	12:59	0.37	30.6	30.6	7.08	7.0	94.9	94.3	18.0	18.7	11.2	11.2	6	5.5
			30.6		7.01		93.6		19.3		11.2		5	
WM4-CB	12:45	0.37	30.4	30.4	6.93	7.0	92.3	92.8	28.8	29.1	11.3	11.3	21	20.5
			30.4		6.97		93.3		29.3		11.3		20	
WM4	13:27	0.33	31	31.1	7.09	7.1	95.4	96.1	14.9	15.3	11	11.0	15	15.0
			31.1		7.14		96.7		15.7		11		15	

Date	24-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	9:36	0.12	26.7	26.7	7.24	7.7	103.0	102.9	6.0	5.9	12.2	12.2	6	6.0
			26.7		8.21		102.8		5.8		12.2		6	
WM4-CB	9:44	0.27	27.8	27.8	7.01	7.0	90.4	90.2	11.1	11.4	8.4	8.4	13	12.5
			27.8		7.07		89.9		11.6		8.4		12	
WM4	10:01	0.16	27.4	27.4	7.49	7.5	95.0	95.2	23.2	23.5	8.3	8.3	28	28.5
			27.4		7.52		95.4		23.7		8.3		29	

Date	26-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:39	0.14	28.8	28.8	7.42	7.4	96.2	96.0	8.1	8.1	8.2	8.2	9	9.0
			28.8		7.39		95.8		8.1		8.2		9	
WM4-CB	11:50	0.28	30.5	30.5	7.19	7.2	95.9	96.2	12.0	12.0	8	8.0	12	12.0
			30.5		7.22		96.4		11.9		8		12	
WM4	11:31	0.17	29.6	29.6	7.38	7.4	96.7	96.3	17.9	18.1	8.1	8.1	20	19.5
			29.6		7.34		95.9		18.2		8.1		19	

Date	29-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:29	0.19	25.3	25.3	7.89	7.9	95.9	96.3	8.5	8.6	9.4	9.4	9	8.0
			25.3		7.91		96.7		8.7		9.4		7	
WM4-CB	11:43	0.33	26.4	26.4	7.16	7.2	88.9	89.3	25.2	26.0	8.6	8.6	15	14.5
			26.4		7.23		89.7		26.7		8.6		14	
WM4	11:15	0.29	26.4	26.5	7.73	7.8	96.1	96.8	29.0	29.4	9.5	9.5	22	22.5
			26.5		7.81		97.5		29.7		9.5		23	

Date	31-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	13:15	0.18	27.1	27.1	7.8	7.8	98.0	98.2	9.9	9.9	8.2	8.2	8	8.5
			27.1		7.81		98.3		10.0		8.2		9	
WM4-CB	13:30	0.31	28.2	28.2	7.02	7.0	90.1	90.4	9.1	9.0	7.6	7.6	9	8.5
			28.2		7.04		90.6		8.9		7.6		8	
WM4	13:00	0.14	28.3	28.3	7.49	7.5	96.0	96.3	11.5	11.2	7.7	7.7	10	10.0
			28.3		7.5		96.5		10.8		7.7		10	

Water Quality Monitoring Data for Contract 6

Date	2-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	15:07	0.36	25.7	25.7	7.74	7.8	94.7	95.1	17.6	17.9	10.70	10.7	14	13.5
			25.7		7.83		95.5		18.1		10.70		13	
WM2A	15:12	0.23	26.5	26.5	6.97	7.0	89.3	89.9	48.0	**48.4**	10.30	10.3	56	**55.0**
			26.5		7.05		90.5		48.7		10.30		54	

Date	3-Aug-16#													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:35	0.28							4.0	4.0			<2	<2
									3.9				<2	
WM2A	10:45	0.18							202.0	**203.5**			170	**170.0**
									205.0				170	

Date	4-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:20	0.28	25.6	25.6	7.61	7.6	93.1	93.2	4.2	4.1	9.8	9.8	3	2.5
			25.6		7.63		93.2		4.0		9.8		2	
WM2A	10:45	0.17	27	27.0	7.06	7.1	87.9	88.0	24.8	24.7	9.4	9.5	24	**23.5**
			27		7.04		88.0		24.6		9.5		23	

Date	5-Aug-16#													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:55	0.28							5.4	5.3			4	4.0
									5.2				4	
WM2A	11:45	0.17							24.5	24.6			14	14.0
									24.7				14	

Date	6-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:15	0.28	26.1	26.1	7.36	7.4	92.6	92.8	6.9	7.0	10.10	10.1	2	2.0
			26.1		7.39		92.9		7.1		10.10		2	
WM2A	10:00	0.17	30.1	30.1	6.6	6.6	86.2	86.5	24.7	24.4	10.30	10.3	13	13.5
			30.1		6.63		86.7		24.0		10.30		14	

Date	8-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:01	0.34	26.5	26.5	7.52	7.5	93.8	93.9	8.7	8.7	9.40	9.4	<2	<2
			26.5		7.54		93.9		8.7		9.40		<2	
WM2A	11:27	0.31	30.5	30.5	6.79	6.8	90.6	91.0	19.2	19.8	8.70	8.7	11	11.0
			30.5		6.83		91.3		20.3		8.70		11	

Date	10-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:25	0.30	25.4	25.4	7.77	7.8	94.5	94.6	34.4	33.8	10.30	10.4	21	22.0
			25.4		7.79		94.6		33.2		10.50		23	
WM2A	10:40	0.19	26.7	26.7	7.04	7.0	90.3	90.4	43.1	**42.8**	9.50	9.5	42	**41.0**
			26.7		7.03		90.5		42.5		9.50		40	

Date	11-Aug-16#													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	13:55								8.6	8.6			12	12.0
									8.5				12	
WM2A	14:05								21.6	21.1			34	**34.0**
									20.6				34	

Date	12-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:54	0.28	25.4	25.4	7.41	7.4	91.1	91.3	10.1	10.3	9.90	9.9	13	13.5
			25.4		7.43		91.4		10.4		9.90		14	
WM2A	11:13	0.18	27	27.0	7.19	7.2	90.3	90.6	22.6	22.5	10.00	10.0	33	**33.5**
			27		7.23		90.8		22.3		10.00		34	

Date	16-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:38	0.28	25.6	25.6	7.35	7.4	89.8	89.9	6.6	6.8	9.50	9.5	3	3.0
			25.6		7.37		89.9		7.0		9.50		3	
WM2A	11:25	0.17	25.8	25.8	7.42	7.4	91.4	91.5	24.4	24.5	9.70	9.8	13	14.0
			25.8		7.43		91.5		24.6		9.80		15	

Date	18-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:40	0.30	26.1	26.1	7.38	7.4	90.8	90.9	26.4	26.7	9.90	10.0	20	20.0
			26.1		7.4		90.9		26.9		10.00		20	
WM2A	11:00	0.20	27	27.0	7.2	7.2	90.6	90.7	347.0	**357.5**	9.30	9.3	243	**244.0**
			27		7.21		90.7		368.0		9.30		245	

Date	19-Aug-16#															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:05								61.7	62.1			19	19.0
									62.4					
WM2A	10:55								272.0	**265.5**			336	**336.0**
									259.0					

Date	20-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:20	0.37	26.2	26.2	7.47	7.5	92.2	92.3	6.6	6.6	9.00	9.0	5	4.5
			26.2		7.49		92.4		6.6		9.00		4	
WM2A	11:39	0.29	28.1	28.1	6.91	6.8	88.3	88.7	539.0	**547.5**	8.80	8.8	339	**335.5**
			28.1		6.74		89.1		556.0		8.80		332	

Date	22-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:46	0.36	25.6	25.6	7.65	7.7	93.7	94.0	9.0	9.1	10.70	10.7	8	8.0
			25.6		7.69		94.3		9.1		10.70		8	
WM2A	11:08	0.18	28.4	28.4	7.16	7.2	92.0	92.7	377.0	**374.5**	9.90	9.9	251	**248.0**
			28.4		7.24		93.3		372.0		9.90		245	

Date	23-Aug-16#															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:20	0.33							5.1	5.0			9	9.0
									4.9					
WM2A	11:30	0.37							24.5	24.7			35	**35.0**
									24.8					

Date	24-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	11:47	0.24	26.8	26.8	7.47	7.5	93.5	93.3	10.3	10.6	8.10	8.1	8	7.5
			26.8		7.46		93.1		10.8		8.10		7	
WM2A	12:06	0.18	27.9	27.9	6.9	6.9	88.6	88.7	23.6	23.8	8.30	8.3	23	**22.5**
			27.9		6.91		88.8		23.9		8.30		22	

Date	26-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:22	0.22	26	26.0	7.58	7.6	93.2	93.1	10.6	10.5	8.10	8.1	6	5.5
			26		7.56		92.9		10.3		8.10		5	
WM2A	10:39	0.16	28	28.0	7.11	7.1	90.8	90.4	23.3	23.1	8.10	8.1	14	14.5
			28		7.07		89.9		22.9		8.10		15	

Date	29-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	13:14	0.33	24.8	24.9	7.67	7.6	92.6	93.0	20.7	20.9	8.60	8.6	32	31.5
			24.9		7.61		93.3		21.1		8.60		31	
WM2A	12:54	0.27	26.3	26.3	7.27	7.2	92.3	92.1	23.7	24.1	8.60	8.6	31	30.5
			26.3		7.22		91.9		24.5		8.60		30	

Date	31-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2A-C	10:40	0.28	25.4	25.4	7.93	7.9	96.8	96.7	15.5	15.8	8.30	8.3	10	9.5
			25.4		7.91		96.6		16.0		8.30		9	
WM2A	10:25	0.18	26.3	26.3	7.41	7.4	91.8	92.0	24.9	24.7	8.50	8.5	26	**25.0**
			26.3		7.42		92.1		24.5		8.50		24	

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

Date	2-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	14:42	0.02	25.3	25.3	7.54	7.5	91.5	91.6	10.4	10.3	11.30	11.3	6	5.5
			25.3		7.55		91.6		10.1		11.30		5	
WM2B	14:53	0.05	27.1	27.1	7.39	7.4	93.1	93.4	27.1	**26.8**	10.70	10.7	22	**22.0**
			27.1		7.45		93.7		26.4		10.70		22	

Date	3-Aug-16#															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:15	0.03							3.9	3.8			<2	<2
									3.6				<2	
WM2B	10:25	0.03							9.9	10.4			15	**15.0**
									10.8				15	

Date	4-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:10	0.03	24.7	24.7	6.82	6.8	82.6	82.7	3.4	3.3	10.80	10.9	<2	<2
			24.7		6.83		82.8		3.2		10.90		<2	
WM2B	10:00	0.03	27.6	27.6	7.85	7.9	99.6	99.7	10.9	11.1	10.5	10.6	22	**21.5**
			27.6		7.86		99.7		11.2		10.6		21	

Date	6-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:33	0.02	25	25.0	6.48	6.5	79.6	79.8	3.7	3.7	10.50	10.5	<2	<2
			25		6.5		79.9		3.6		10.50		<2	
WM2B	10:23	0.03	27.5	27.5	7.61	7.6	94.7	94.9	10.7	11.1	9.70	9.7	10	10.0
			27.5		7.63		95.0		11.4		9.70		10	

Date	8-Aug-16															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:34	0.02	25	25.0	6.71	6.7	81.2	81.0	8.3	8.6	10.90	10.9	<2	<2
			25		6.68		80.7		8.9		10.90		<2	
WM2B	10:47	0.02	29.1	29.1	7.27	7.3	96.3	97.2	9.5	9.8	9.80	9.8	5	5.0
			29.1		7.33		98.0		10.1		9.80		5	

Date	10-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:00	0.04	25.5	25.5	6.64	6.6	80.0	80.1	41.5	41.1	11.20	11.3	69	68.0
			25.5		6.64		80.1		40.7		11.30		67	
WM2B	10:15	0.04	26	26.0	6.98	7.0	90.2	90.3	51.0	**51.3**	10.60	10.6	61	61.0
			26		6.99		90.3		51.5		10.60		61	

Date	11-Aug-16#													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	13:40								3.2	3.1			2	2.0
									3.1				2	
WM2B	13:30								11.4	11.3			11	11.0
									11.1				11	

Date	12-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:28	0.06	24.7	24.7	6.6	6.6	79.2	79.1	7.4	7.6	11.80	11.8	8	8.0
			24.7		6.59		79.0		7.8		11.80		8	
WM2B	10:35	0.04	26.1	26.1	7.12	7.1	90.3	90.4	11.3	11.4	10.30	10.4	9	9.5
			26.1		7.13		90.4		11.4		10.40		10	

Date	16-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	12:00	0.04	24.5	24.5	6.6	6.6	78.6	78.6	3.8	3.8	9.80	10.0	2	2.0
			24.5		6.57		78.5		3.7		10.10		2	
WM2B	11:50	0.04	26.2	26.2	7.49	7.5	92.4	92.5	10.4	10.3	9.70	9.7	9	9.0
			26.2		7.52		92.5		10.2		9.70		9	

Date	18-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:20	0.04	24.8	24.8	6.02	6.0	72.5	72.5	14.3	14.2	10.90	11.0	<2	2.0
			24.8		6.02		72.5		14.1		11.10		2	
WM2B	10:30	0.04	26.9	26.9	7.36	7.4	92.0	92.1	>999	**>999**	8.90	8.9	1360	**1375.0**
			26.9		7.35		92.1		>999		8.90		1390	

Date	19-Aug-16#															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	11:20								2.8	2.9			<2	<2
									2.9					
WM2B	11:13								23.7	**23.7**			15	**15.0**
									23.6					

Date	20-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:47	0.02	25	25.1	6.45	6.5	78.2	78.6	3.5	3.5	9.90	9.9	<2	<2
			25.1		6.47		78.9		3.6		9.90		<2	
WM2B	10:59	0.04	28.7	28.7	6.97	7.0	91.3	91.6	10.1	10.4	8.90	8.9	10	11.0
			28.6		6.99		91.8		10.7		8.90		12	

Date	22-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:30	0.03	26	26.0	8.12	8.1	100.1	99.5	3.6	3.7	11.40	11.4	4	4.0
			26		8.02		98.9		3.8		11.40		4	
WM2B	10:20	0.04	28.5	28.5	7.65	7.7	98.3	98.8	>999	**>999**	9.90	9.9	1720	**1720.0**
			28.4		7.69		99.3		>999		9.90		1720	

Date	23-Aug-16#													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	11:00	0.02							3.8	3.6			<2	<2
									3.4					
WM2B	11:10	0.03							9.0	8.1			15	**15.0**
									7.2					

Date	24-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	11:27	0.02	25.2	25.2	6.72	6.7	81.6	81.4	5.9	5.9	8.40	8.4	8	9.0
			25.2		6.69		81.2		6.0		8.40		10	
WM2B	11:22	0.01	30	30.0	7.03	7.0	94.2	94.0	11.1	11.3	8.00	8.0	16	**16.0**
			30		7.01		93.8		11.5		8.00		16	

Date	26-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:09	0.02	25	25.0	6.7	6.7	81.1	81.3	6.9	7.0	8.60	8.6	4	4.5
			25		6.72		81.4		7.0		8.60		5	
WM2B	10:16	0.02	27.9	27.9	7.82	7.8	99.9	99.7	7.7	7.7	8.30	8.3	8	7.0
			27.9		7.79		99.4		7.8		8.30		6	

Date	29-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	13:49	0.02	24.4	24.5	6.82	6.9	81.5	81.9	3.4	3.4	8.50	8.5	<2	<2
			24.5		6.91		82.3		3.5		8.50		<2	
WM2B	13:37	0.03	25.1	25.1	7.33	7.4	89.0	89.3	7.4	7.4	8.40	8.4	4	4.5
			25.1		7.37		89.5		7.5		8.40		5	

Date	31-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM2B-C	10:55	0.02	24.8	24.8	6.73	6.7	81.2	80.9	2.1	2.1	8.60	8.6	<2	<2
			24.8		6.7		80.5		2.1		8.60		<2	
WM2B	10:45	0.02	27.3	27.3	8.07	8.1	101.7	101.9	7.0	6.9	8.30	8.3	6	7.0
			27.3		8.08		102.1		6.8		8.30		8	

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

Water Quality Monitoring Data for Contract 2 and 6

Date	2-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	13:47	0.37	26.5	26.5	7.76	7.7	97.1	96.7	253.0	260.0	9.10	9.1	338	339.0
			26.5		7.7		96.2		267.0		9.10		340	
WM3	13:59	0.29	27.3	27.3	7.1	7.1	89.5	89.7	237.0	243.0	9.50	9.5	224	229.5
			27.3		7.11		89.8		249.0		9.50		235	

Date	4-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	14:45	0.05	26.7	26.7	6.84	6.8	85.8	85.8	>999	>999	8.80	8.8	1280	1270.0
			26.7		6.85		85.7		>999		8.80		1260	
WM3	14:55	0.20	27.1	27.1	7.21	7.2	90.5	90.6	>999	>999	9.30	9.3	1500	1470.0
			27.1		7.23		90.6		>999		9.30		1440	

Date	6-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:50	0.30	28.7	28.7	6.6	6.6	84.2	84.4	19.4	18.8	7.70	7.7	23	23.0
			28.7		6.64		84.5		18.1		7.70		23	
WM3	11:00	0.15	28.7	28.7	6.61	6.6	87.1	87.3	22.0	21.2	8.90	8.9	22	23.5
			28.7		6.63		87.5		20.4		8.90		25	

Date	8-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:01	0.31	29	29.0	6.66	6.6	86.9	86.6	18.8	19.1	9.90	9.9	32	32.5
			29		6.63		86.3		19.3		9.90		33	
WM3	9:47	0.19	29.8	29.8	6.95	7.0	91.6	91.8	20.3	20.7	10.10	10.1	22	23.0
			29.8		6.98		91.9		21.0		10.10		24	

Date	10-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:30	0.05	26.1	26.1	6.58	6.6	80.8	80.9	74.0	75.5	9.20	9.2	101	100.5
			26.1		6.6		80.9		76.9		9.20		100	
WM3	11:38	0.15	25.7	25.7	6.93	6.9	85.1	85.2	51.5	51.7	9.60	9.6	45	44.5
			25.7		6.94		85.3		51.8		9.60		44	

Date	12-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:20	0.20	27.2	27.2	6.51	6.5	81.6	81.6	9.5	9.3	10.70	10.7	17	17.0
			27.2		6.53		81.5		9.2		10.70		17	
WM3	10:10	0.16	26.4	26.4	7.03	7.0	87.4	87.5	8.0	8.1	10.30	10.4	9	9.0
			26.4		7.01		87.5		8.2		10.40		9	

Date	16-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	12:10	0.05	27.1	27.1	6.39	6.4	80.5	80.6	20.8	21.1	7.50	7.6	22	21.5
			27.1		6.41		80.6		21.3		7.60		21	
WM3	12:20	0.16	26.7	26.7	6.75	6.8	84.1	84.2	17.5	17.3	8.30	8.4	14	13.5
			26.7		6.75		84.2		17.1		8.50		13	

Date	18-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:10	0.05	27	27.0	6.74	6.7	84.9	85.1	155.0	153.0	9.90	10.0	300	309.5
			27		6.75		85.2		151.0		10.10		319	
WM3	10:00	0.18	26.6	26.6	6.79	6.8	84.3	84.4	144.0	148.0	11.30	11.3	132	130.5
			26.6		6.8		84.5		152.0		11.20		129	

Date	20-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:25	0.27	28.5	28.5	6.74	6.8	87.1	87.5	87.1	87.7	9.00	9.0	116	118.0
			28.5		6.77		87.9		88.3		9.00		120	
WM3	10:33	0.19	28.9	28.9	6.96	7.0	91.2	91.5	94.3	93.8	9.40	9.4	100	103.5
			28.9		6.98		91.8		93.3		9.40		107	

Date	22-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:47	0.27	30.8	30.8	6.47	6.5	86.8	87.1	>999	>999	13.30	13.3	13400	13100.0
			30.8		6.51		87.4		>999		13.30		12800	
WM3	12:01	0.33	29.2	29.2	6.64	6.7	86.5	87.2	104.0	107.0	12.10	12.1	101	104.0
			29.1		6.71		87.9		110.0		12.10		107	

Date	24-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:14	0.02	29.2	29.2	6.35	6.3	83.1	83.1	18.2	18.4	7.80	7.8	65	64.0
			29.2		6.34		83.0		18.5		7.80		63	
WM3	10:51	0.11	28	28.0	6.85	7.8	87.1	87.0	12.4	12.3	9.30	9.3	16	16.0
			28		8.82		86.8		12.1		9.30		16	

Date	26-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	9:55	0.02	28.8	28.8	6.66	6.6	86.4	86.3	12.3	12.1	7.90	7.9	20	20.0
			28.8		6.61		86.1		11.8		7.90		20	
WM3	9:50	0.12	27.5	27.5	7.58	7.6	96.1	95.9	6.7	6.7	9.30	9.3	8	8.0
			27.5		7.54		95.6		6.6		9.30		8	

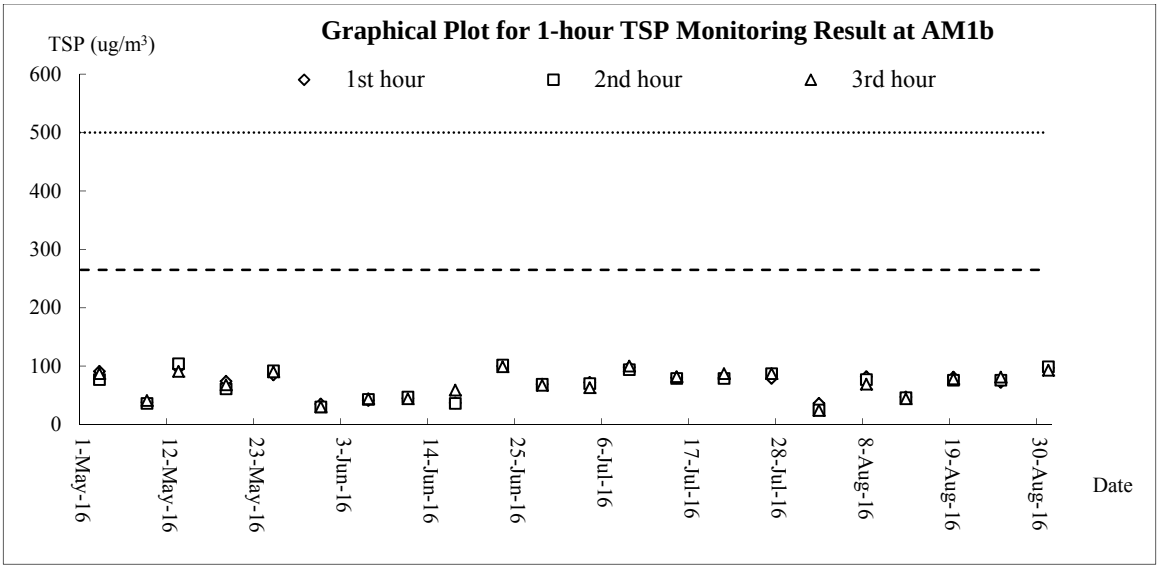
Date	29-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	14:07	0.31	26.9	26.9	7.06	7.1	88.5	88.8	11.3	11.9	8.60	8.6	20	20.5
			26.9		7.11		89.1		12.4		8.60		21	
WM3	14:19	0.19	27.1	27.2	7.04	7.1	90.1	91.0	12.7	12.9	8.90	8.9	15	15.0
			27.3		7.11		91.9		13.1		8.90		15	

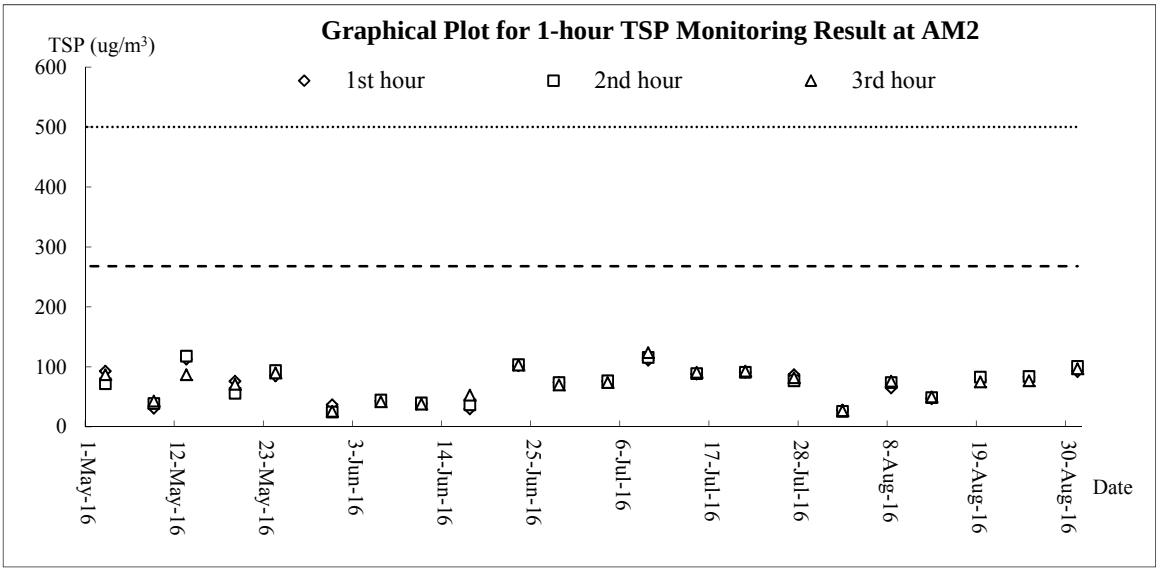
Date	31-Aug-16													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:00	0.03	28.8	28.8	6.87	6.8	89.1	88.6	7.7	7.8	7.30	7.3	15	14.5
			28.8		6.66		88.1		8.0		7.30		14	
WM3	11:15	0.15	28.6	28.6	6.27	6.3	83.4	83.3	13.4	7.9	7.90	7.9	14	15.0
			28.6		6.26		83.2		13.1		7.90		16	

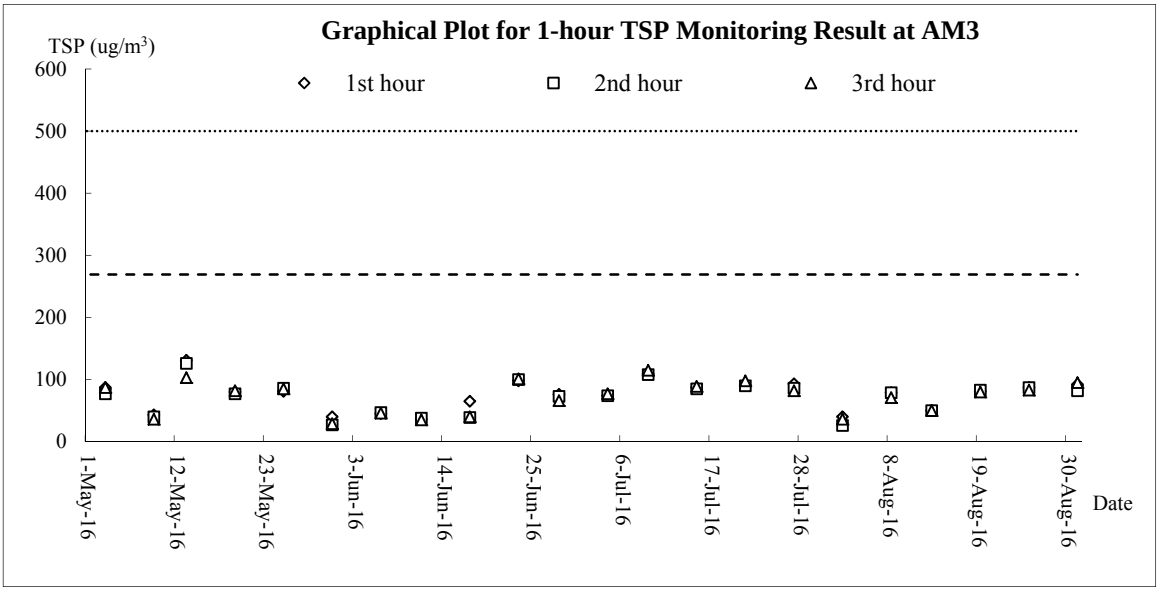
Appendix J

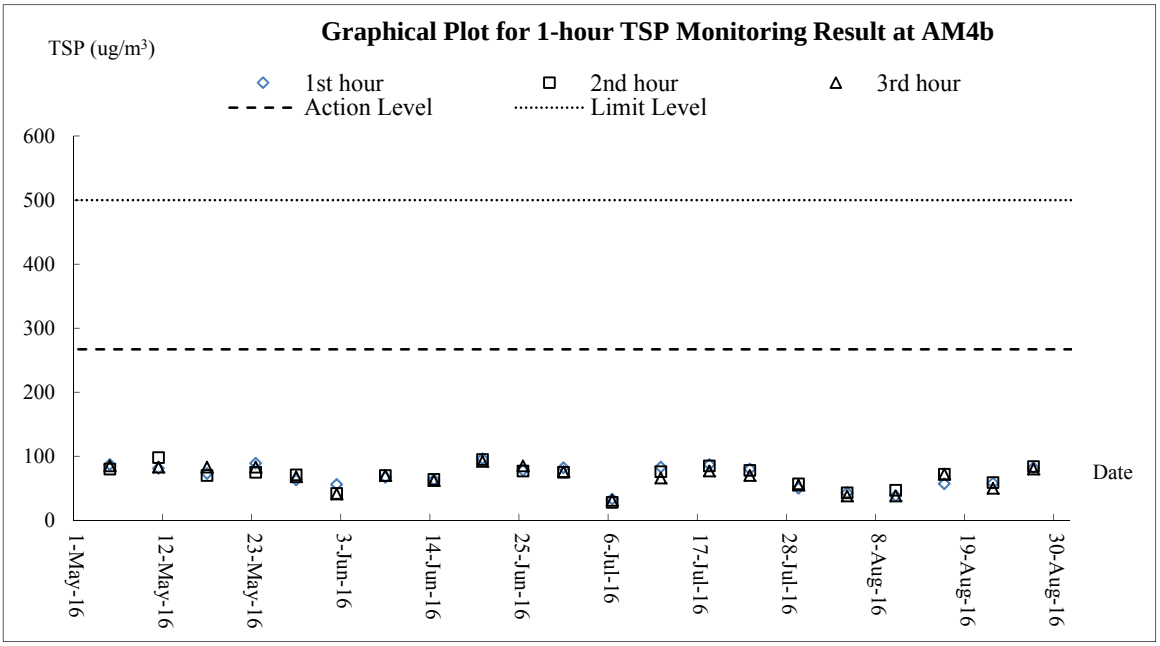
Graphical Plots for Monitoring Result

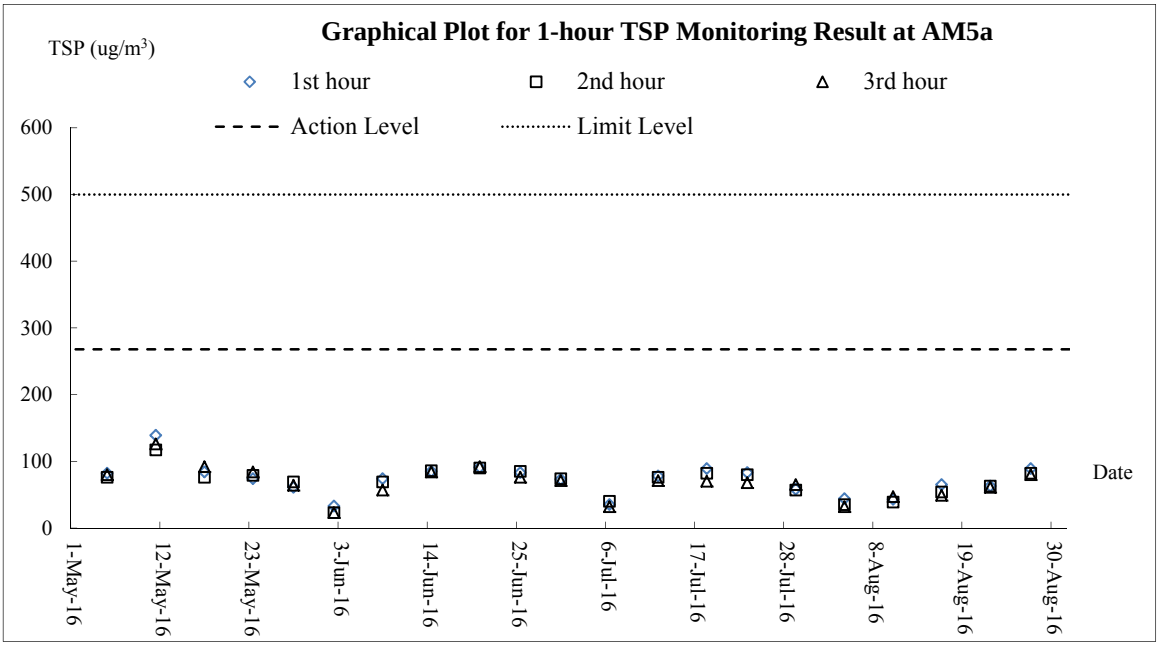
Air Quality – 1-hour TSP

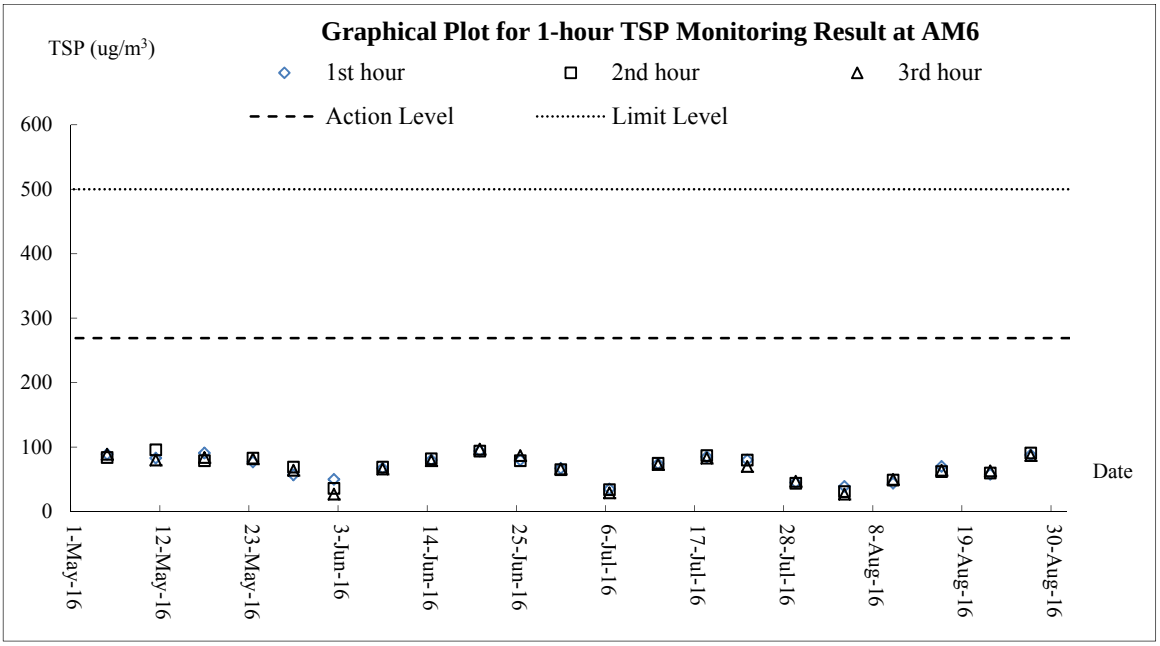


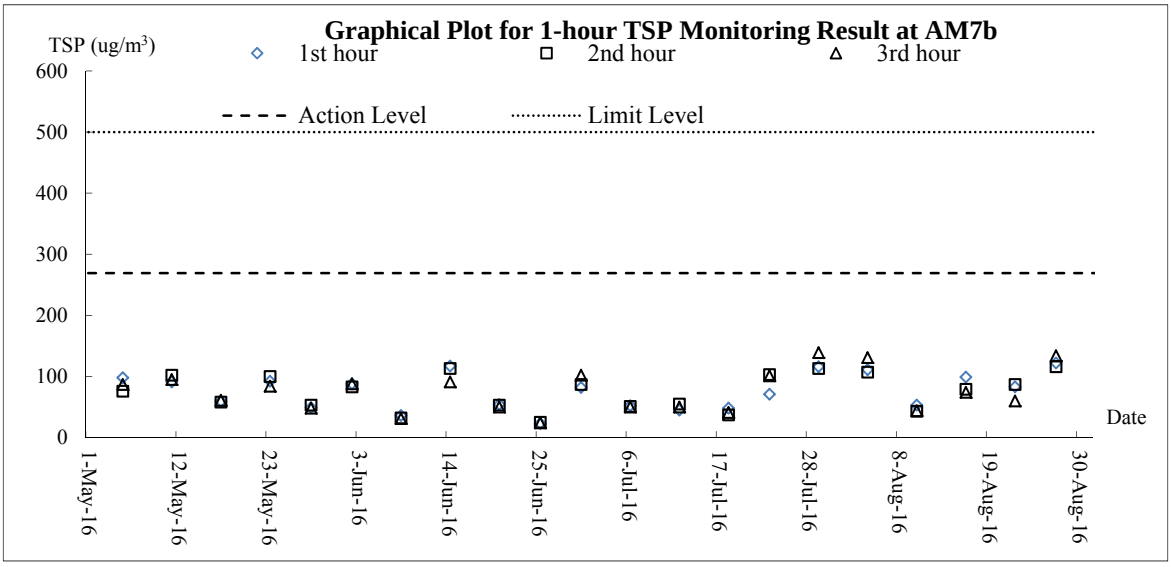


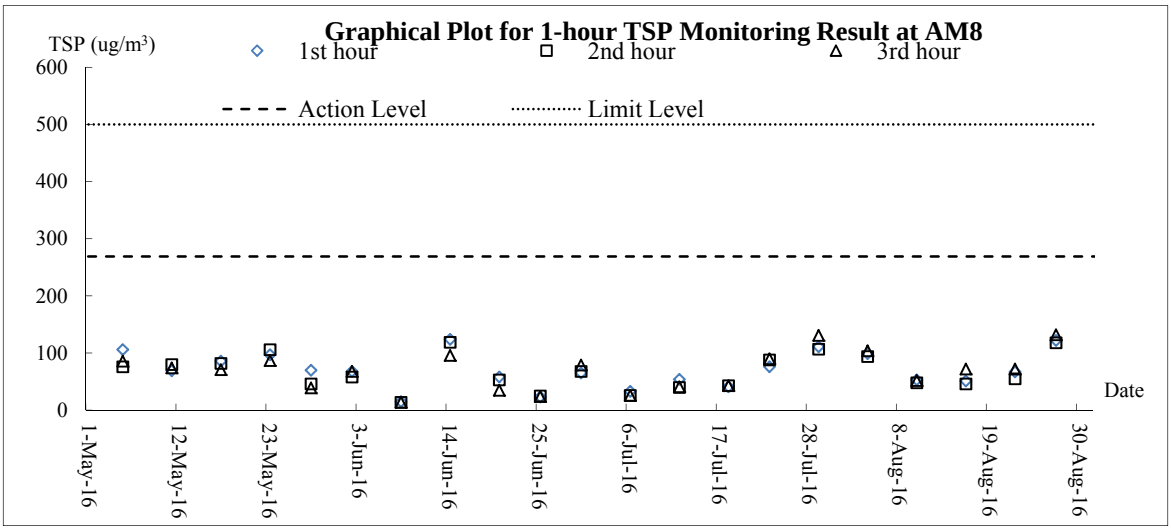


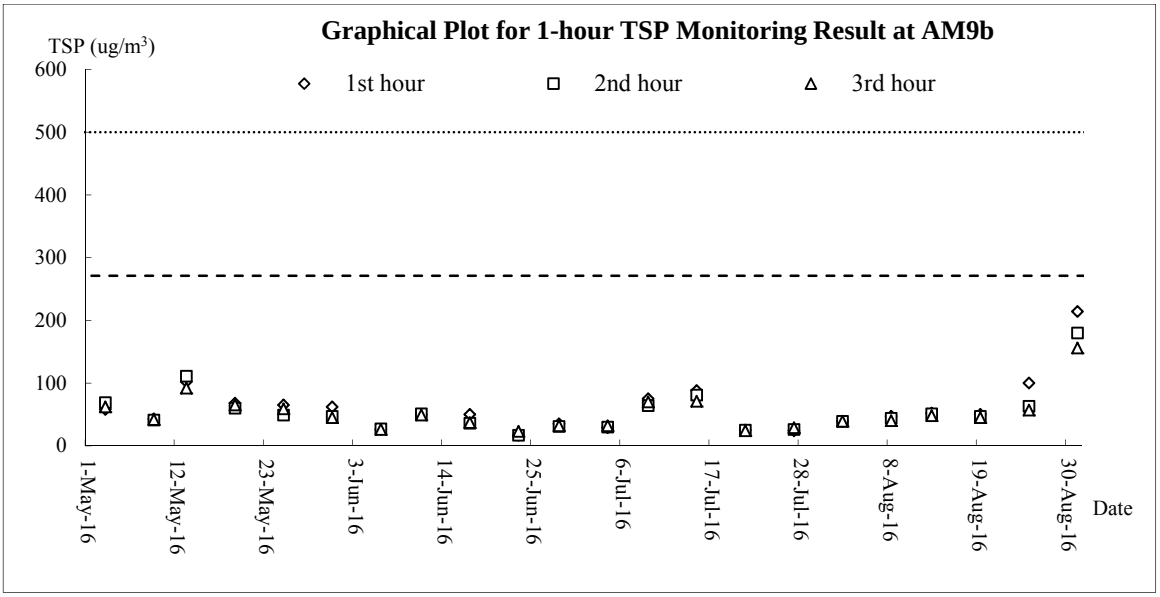

Graphical Plot for 1-hour TSP Monitoring Result at AM4b
TSP (ug/m³)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for 1-hour TSP Monitoring Result at AM5a
TSP (ug/m³)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

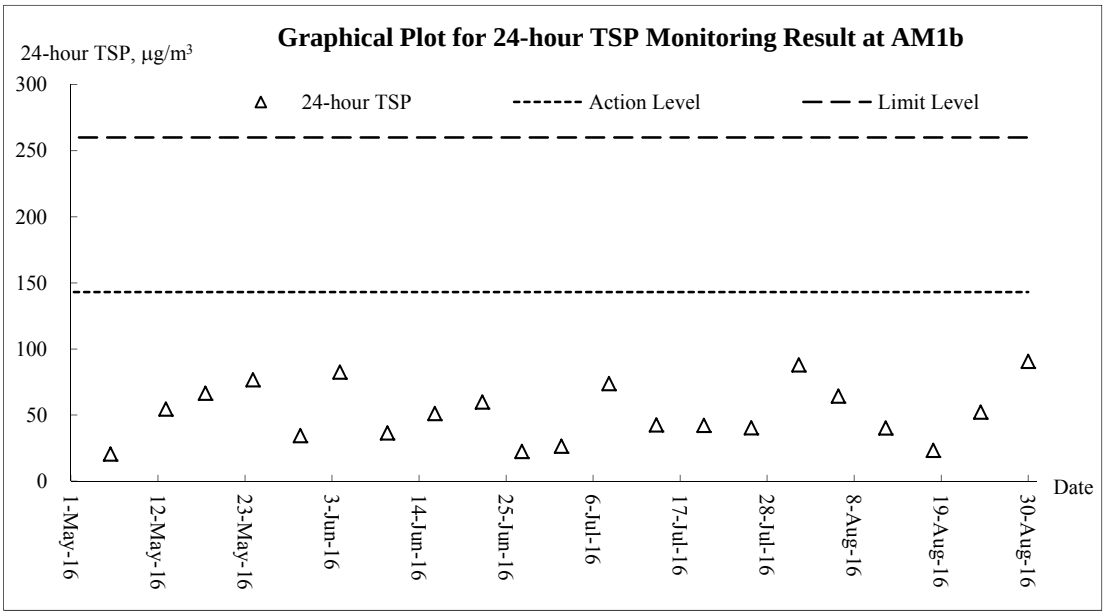

Graphical Plot for 1-hour TSP Monitoring Result at AM6
TSP (ug/m³)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

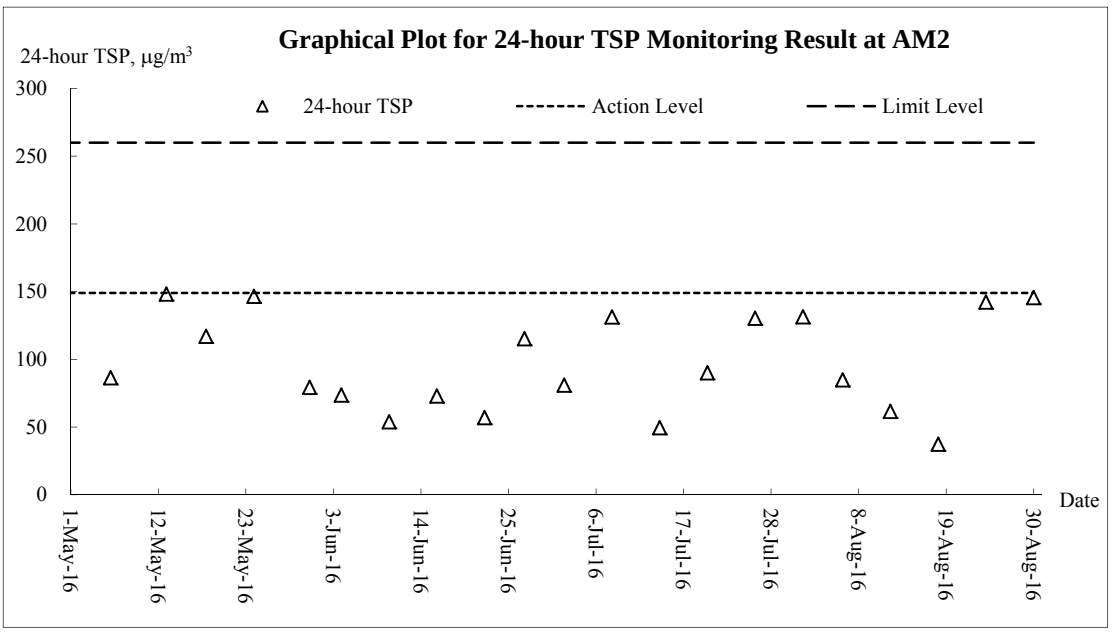

Graphical Plot for 1-hour TSP Monitoring Result at AM7b
TSP (ug/m³)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

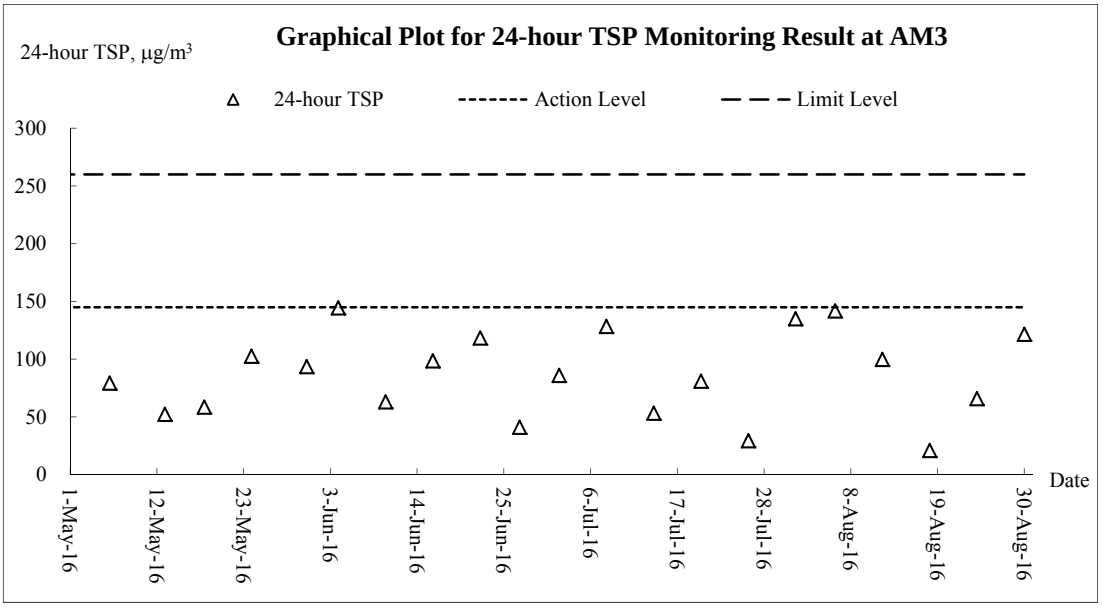

Graphical Plot for 1-hour TSP Monitoring Result at AM8
TSP (ug/m³)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

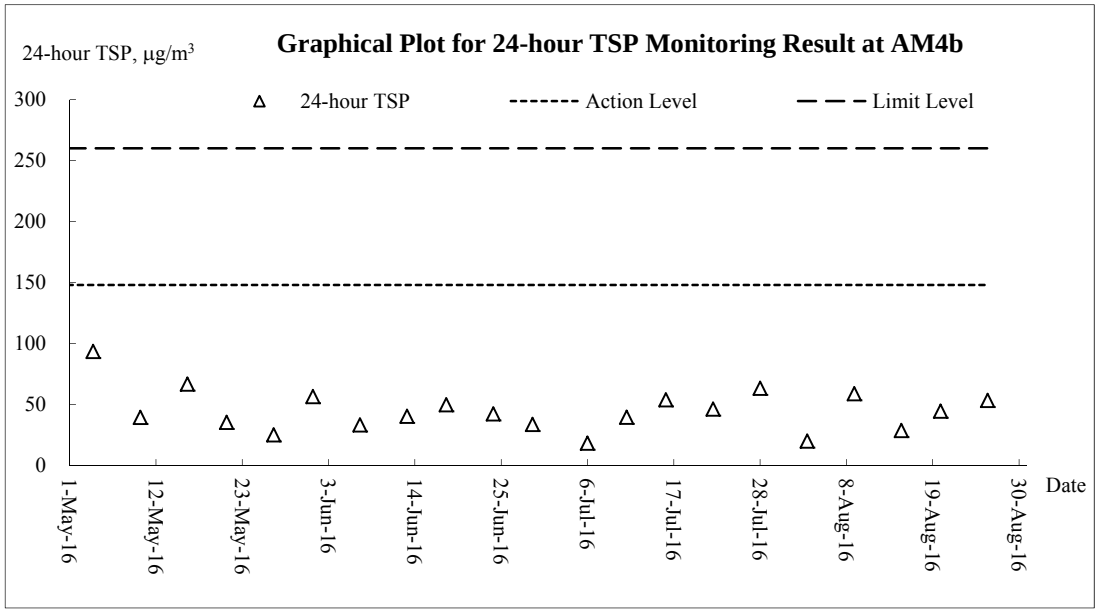

Graphical Plot for 1-hour TSP Monitoring Result at AM9b
TSP (ug/m³)
1st hour
2nd hour
3rd hour
600
500
400
300
200
100
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

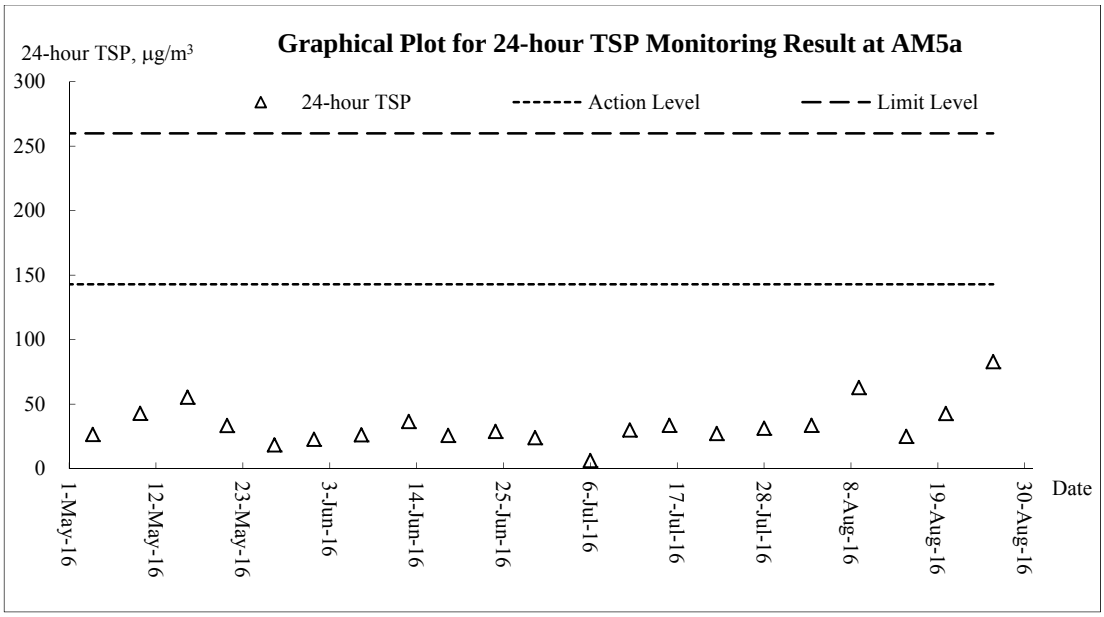
Air Quality – 24-hour TSP

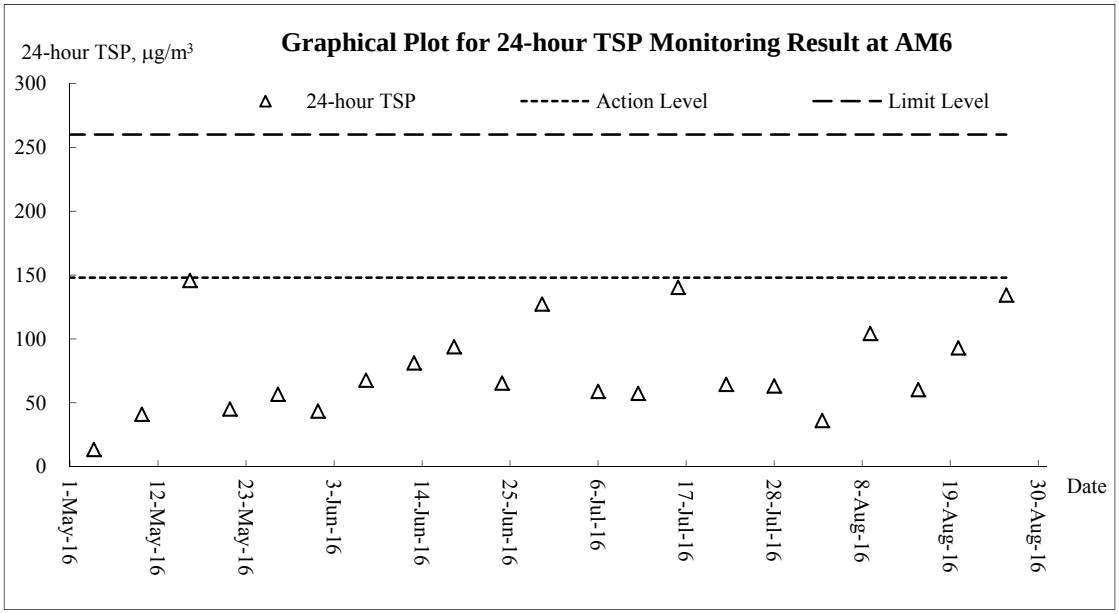


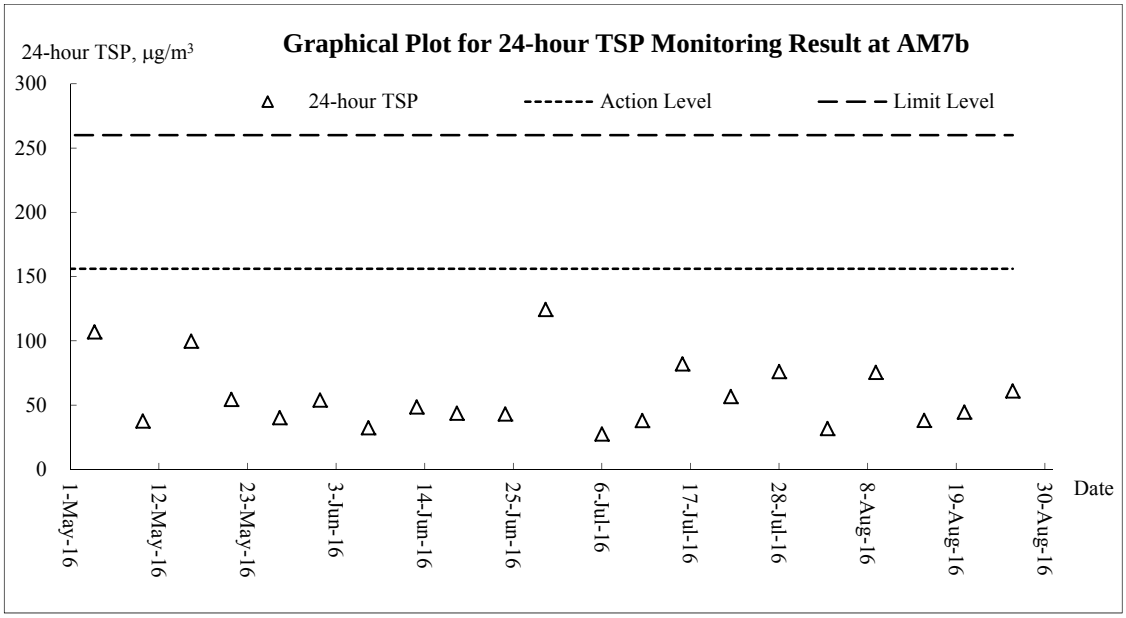


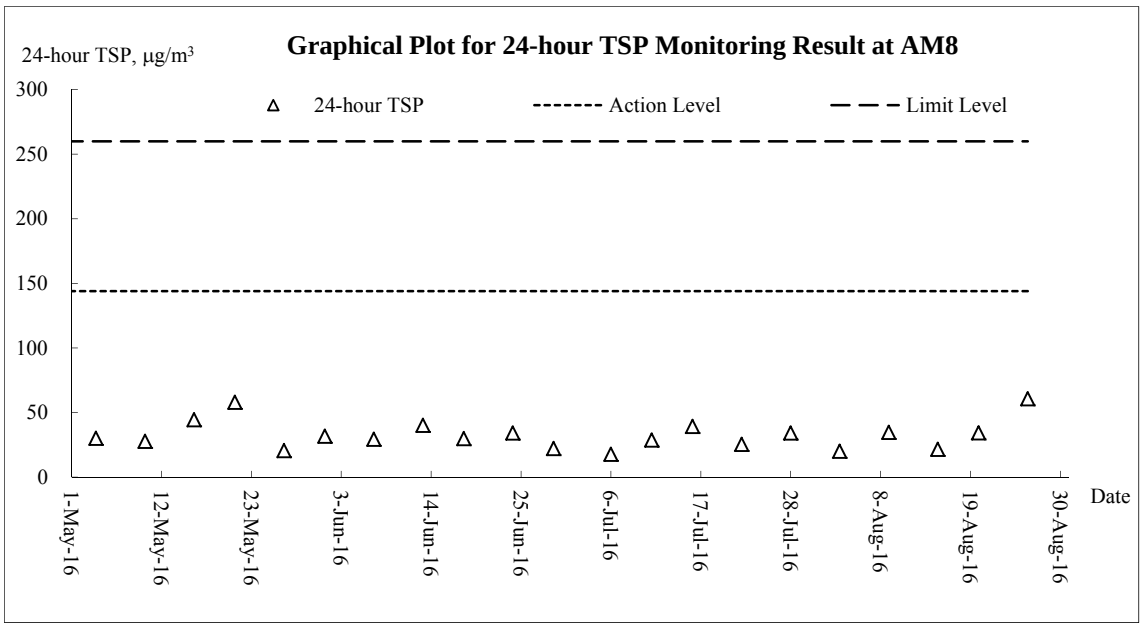


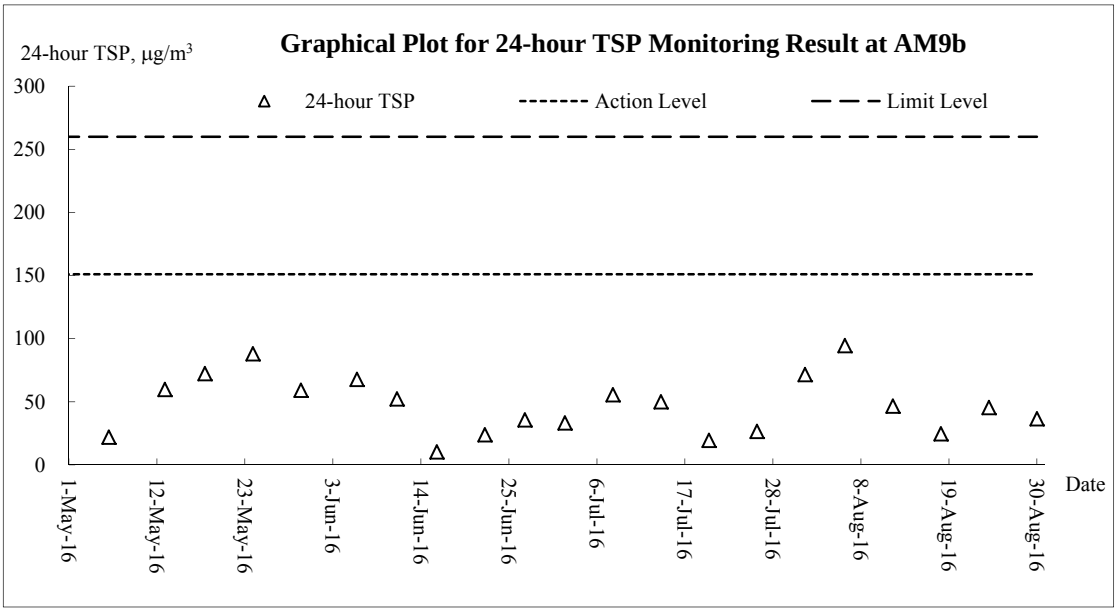

Graphical Plot for 24-hour TSP Monitoring Result at AM4b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16
Date


Graphical Plot for 24-hour TSP Monitoring Result at AM5a
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16
Date

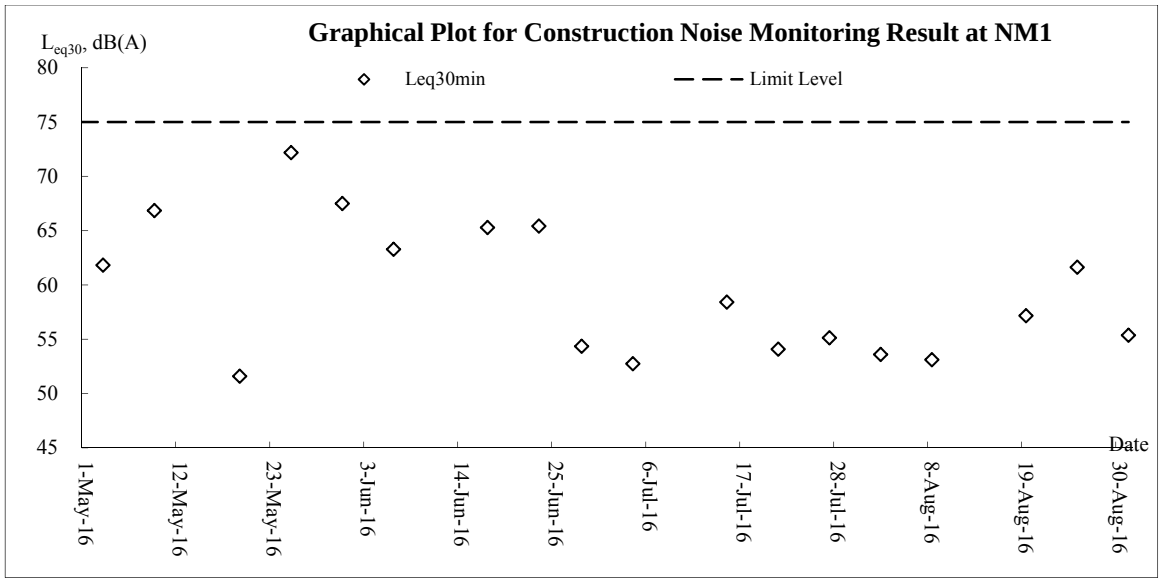

Graphical Plot for 24-hour TSP Monitoring Result at AM6
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16
Date

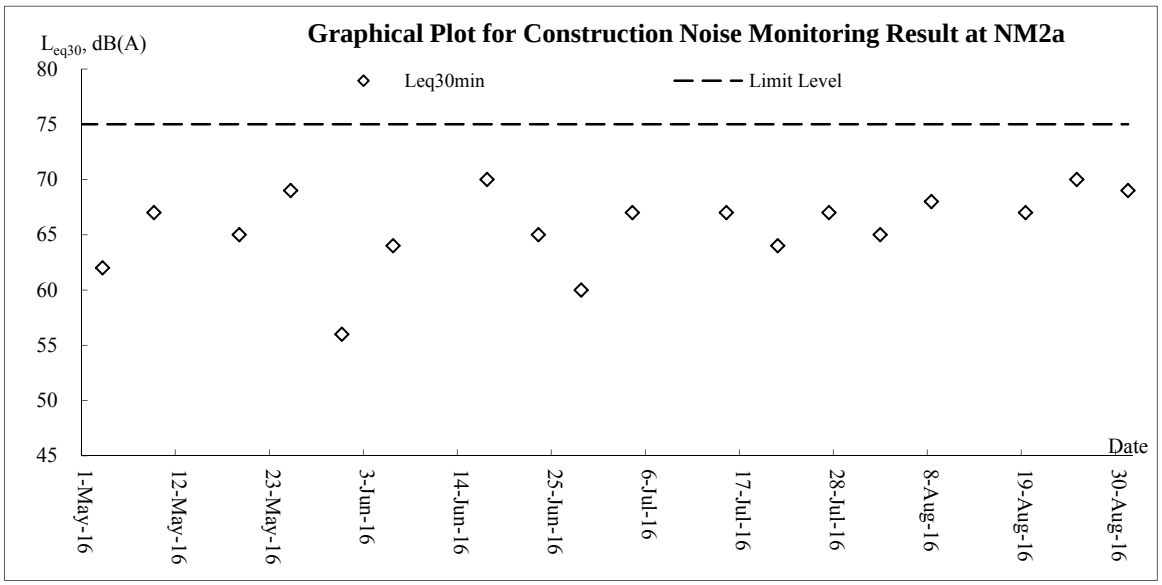

Graphical Plot for 24-hour TSP Monitoring Result at AM7b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16
Date

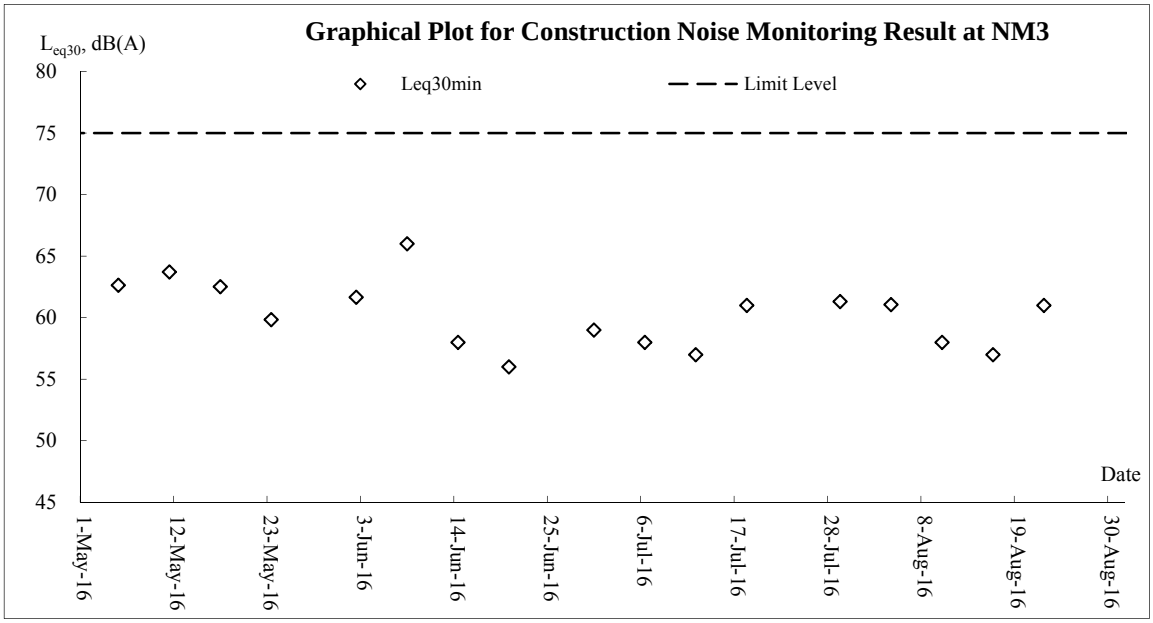

Graphical Plot for 24-hour TSP Monitoring Result at AM8
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16
Date

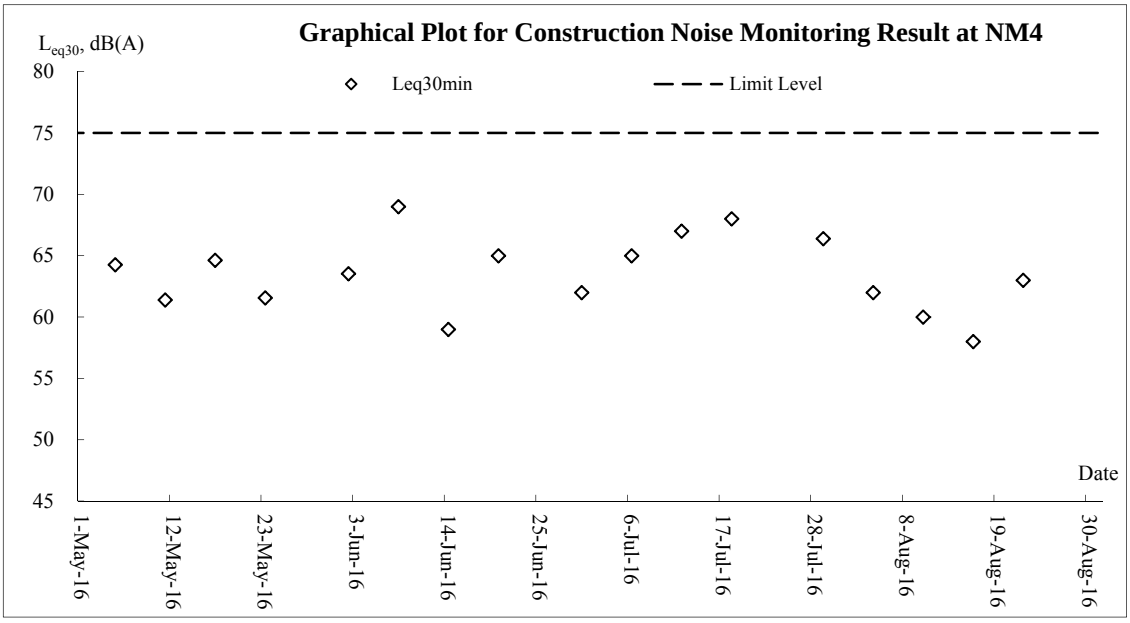

Graphical Plot for 24-hour TSP Monitoring Result at AM9b
24-hour TSP, μg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16
Date

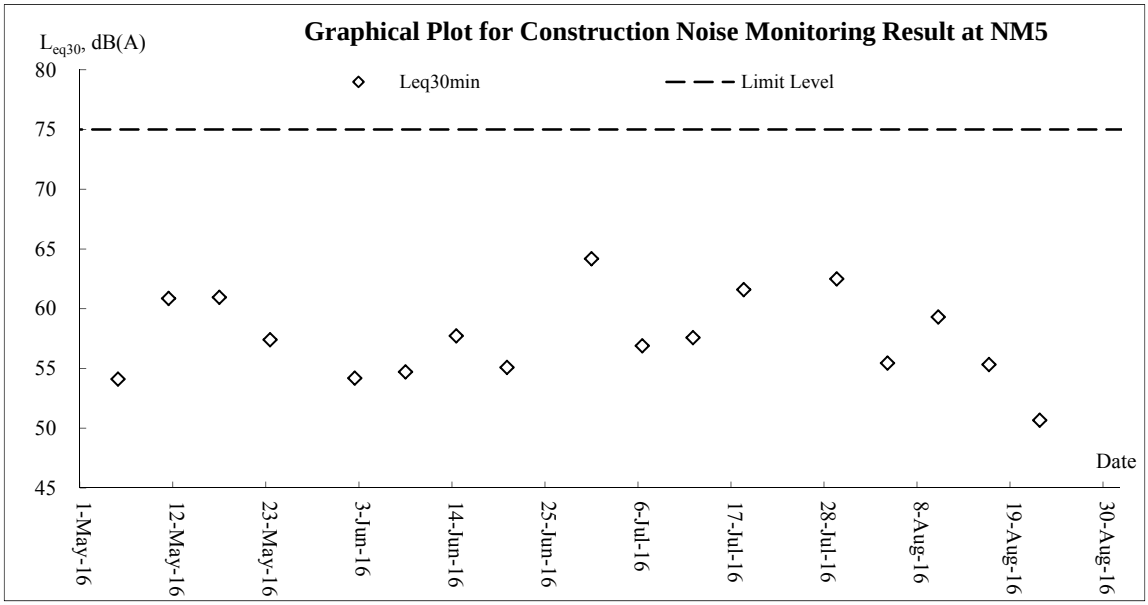
Noise

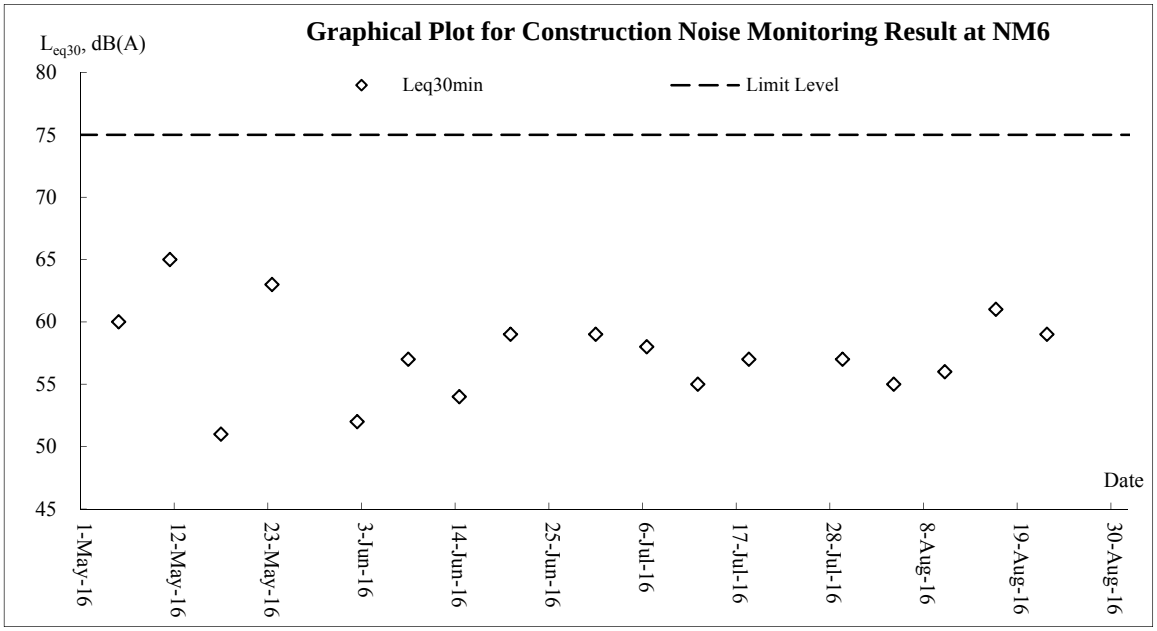

Graphical Plot for Construction Noise Monitoring Result at NM1
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

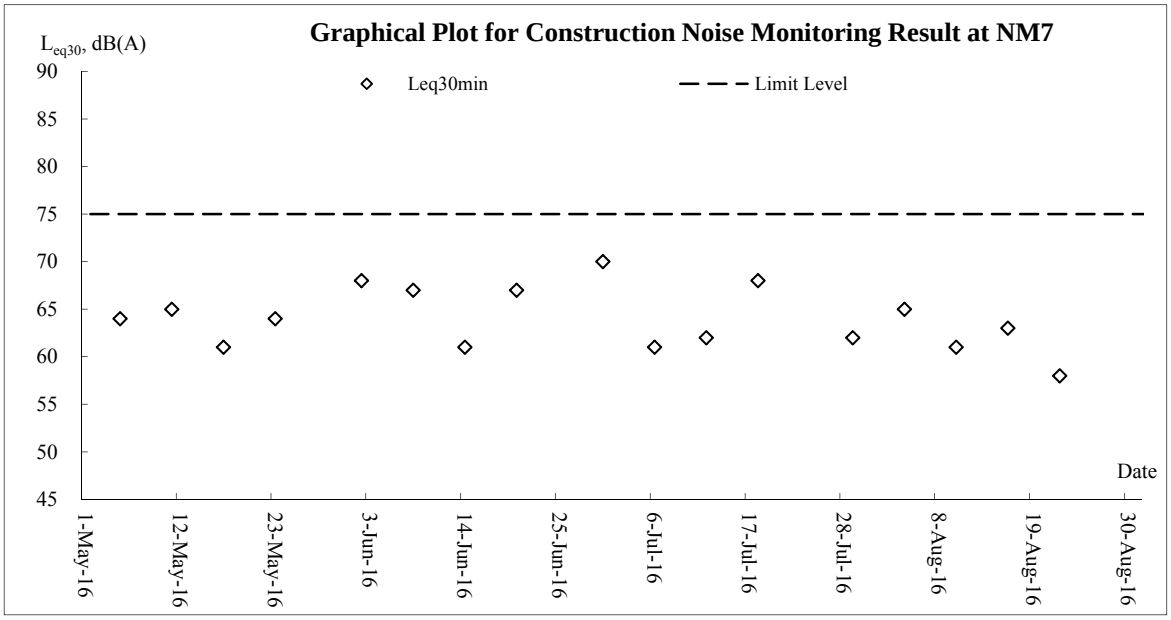

Graphical Plot for Construction Noise Monitoring Result at NM2a
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

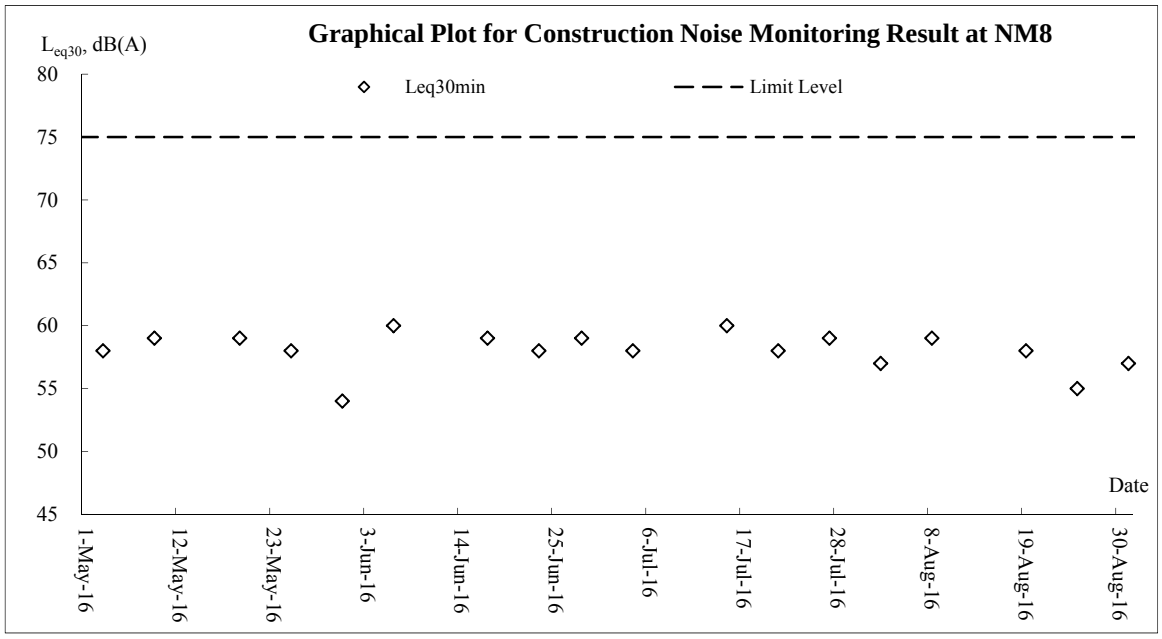

Graphical Plot for Construction Noise Monitoring Result at NM3
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

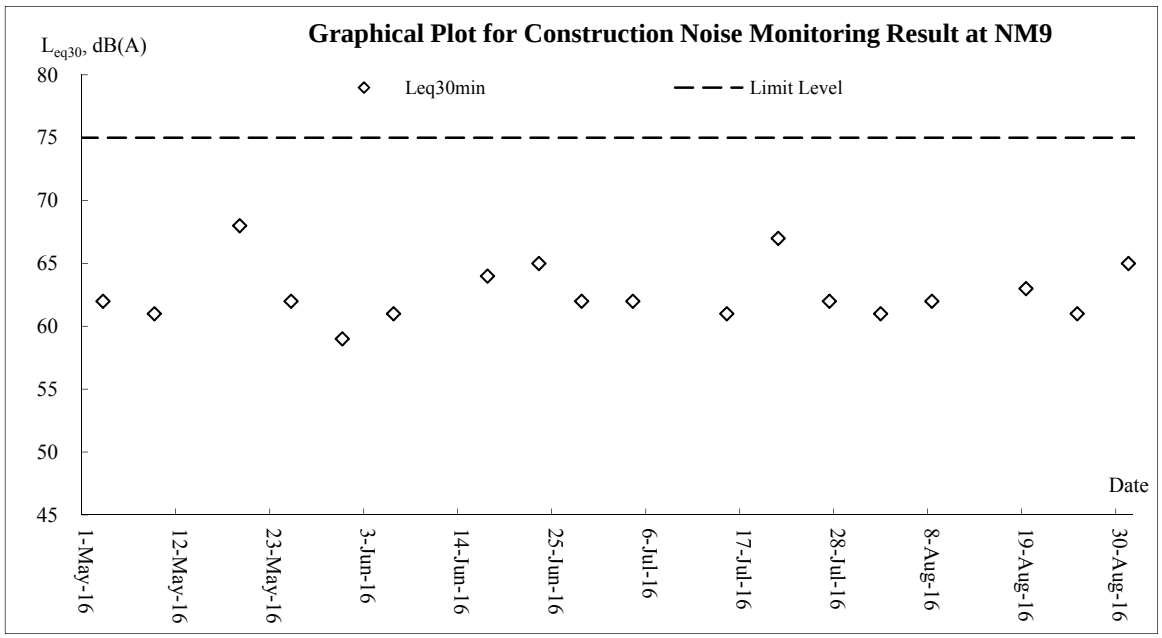

Graphical Plot for Construction Noise Monitoring Result at NM4
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

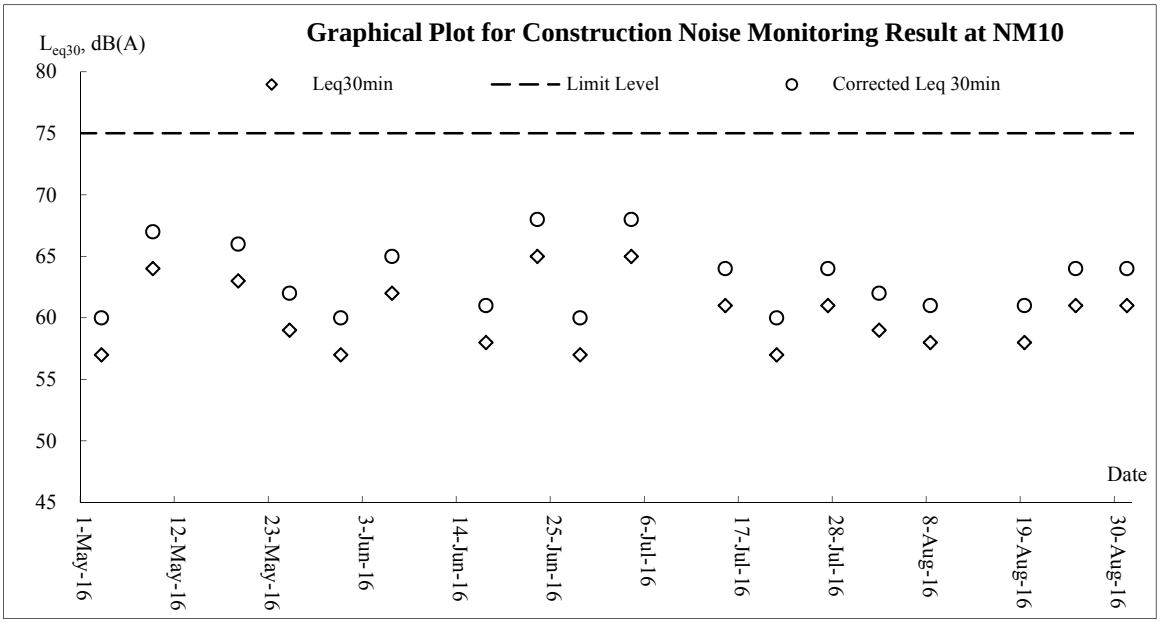

Graphical Plot for Construction Noise Monitoring Result at NM5
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for Construction Noise Monitoring Result at NM6
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

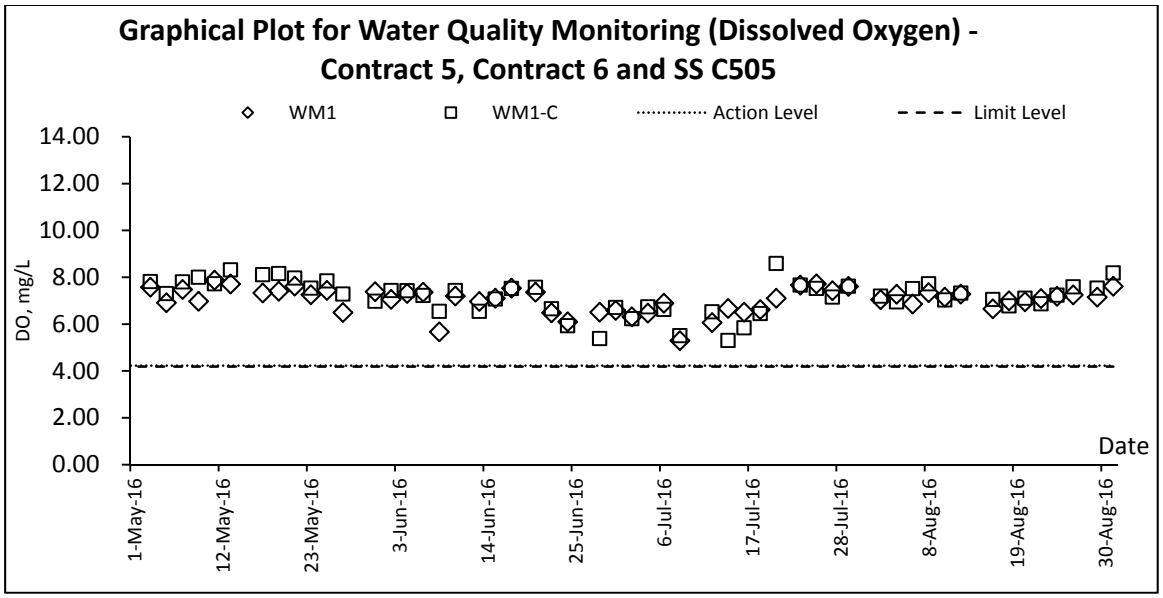

Graphical Plot for Construction Noise Monitoring Result at NM7
L_{eq30}, dB(A)
Leq30min
Limit Level
90
85
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

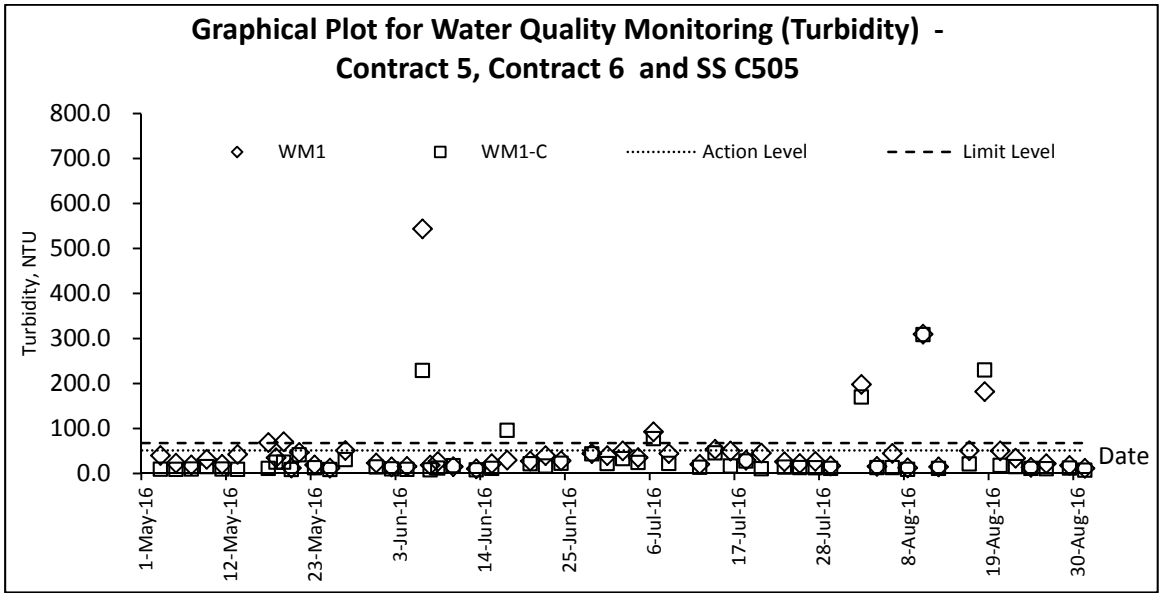

Graphical Plot for Construction Noise Monitoring Result at NM8
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

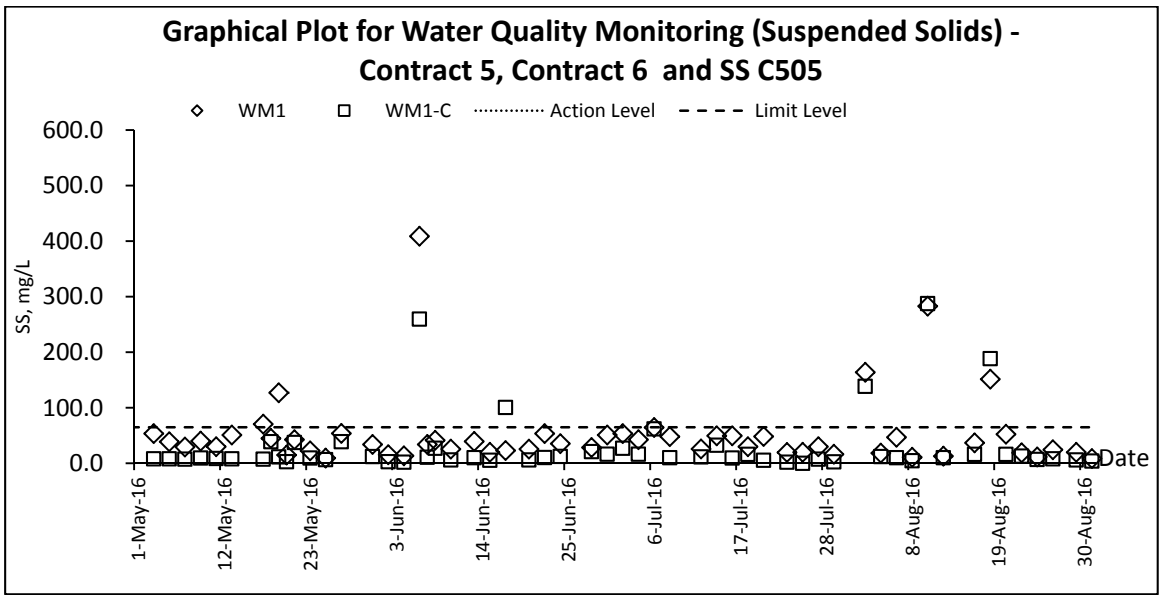

Graphical Plot for Construction Noise Monitoring Result at NM9
L_{eq30}, dB(A)
Leq30min
Limit Level
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

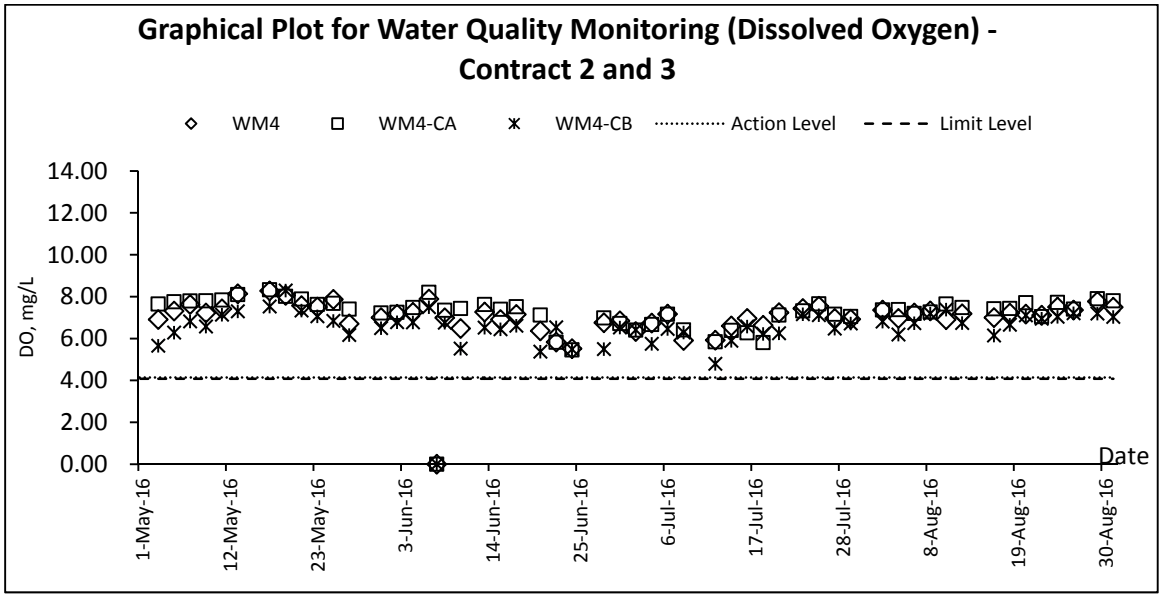

Graphical Plot for Construction Noise Monitoring Result at NM10
L_{eq30}, dB(A)
Leq30min
Limit Level
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

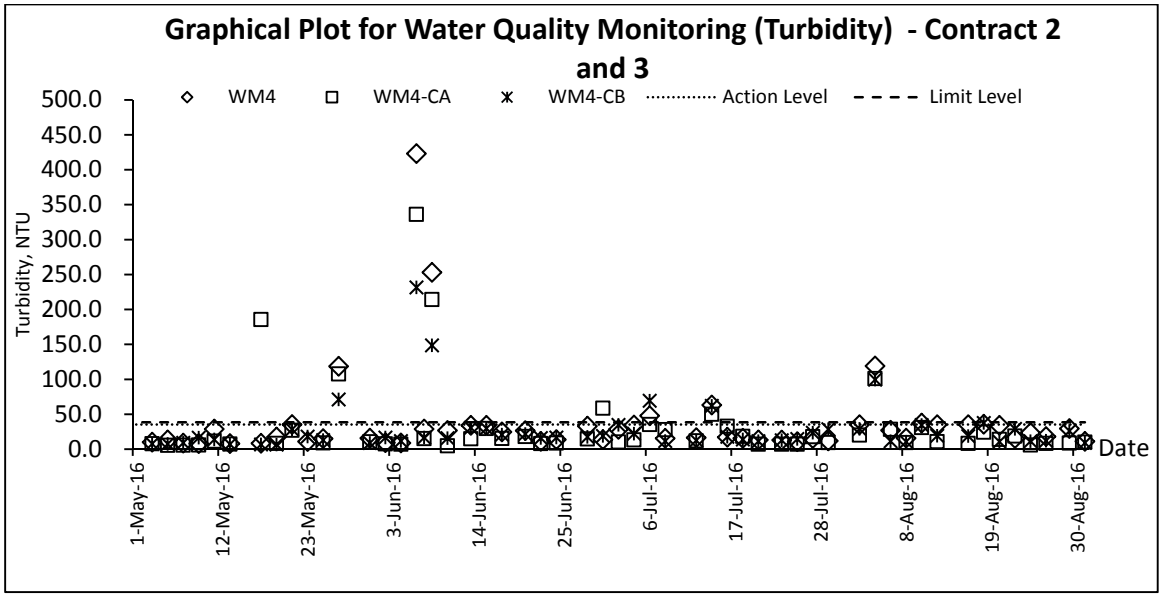
Water Quality

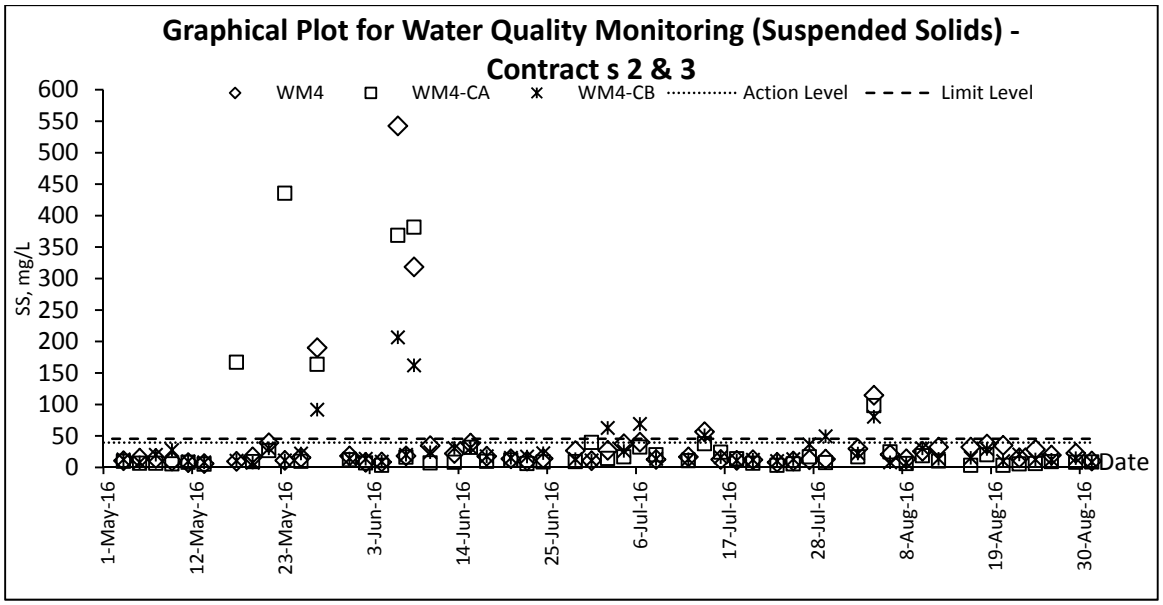


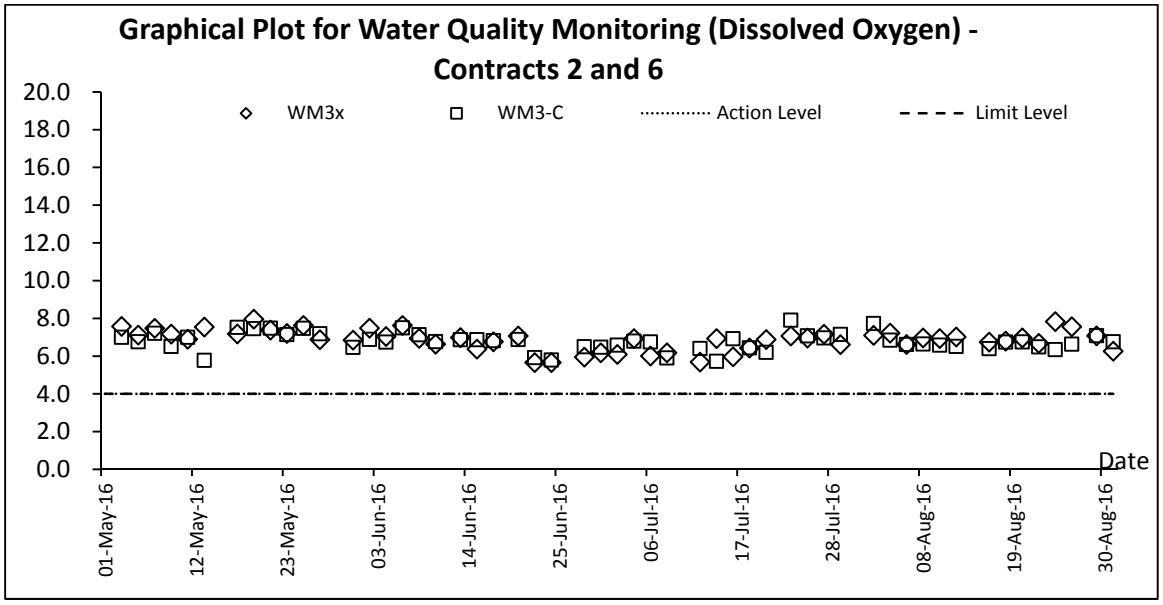


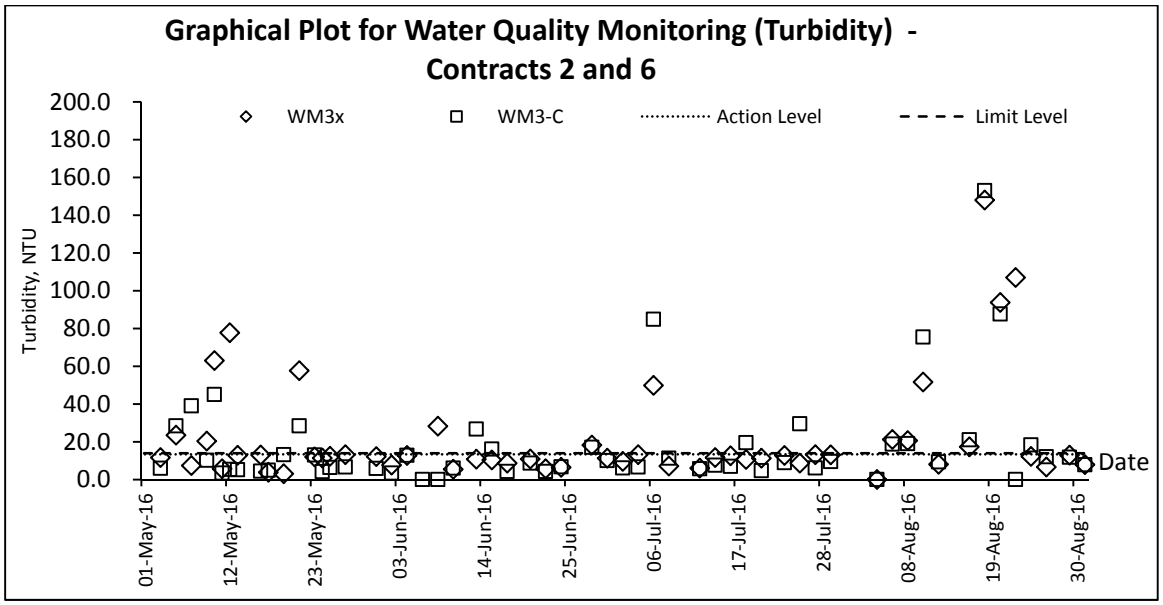


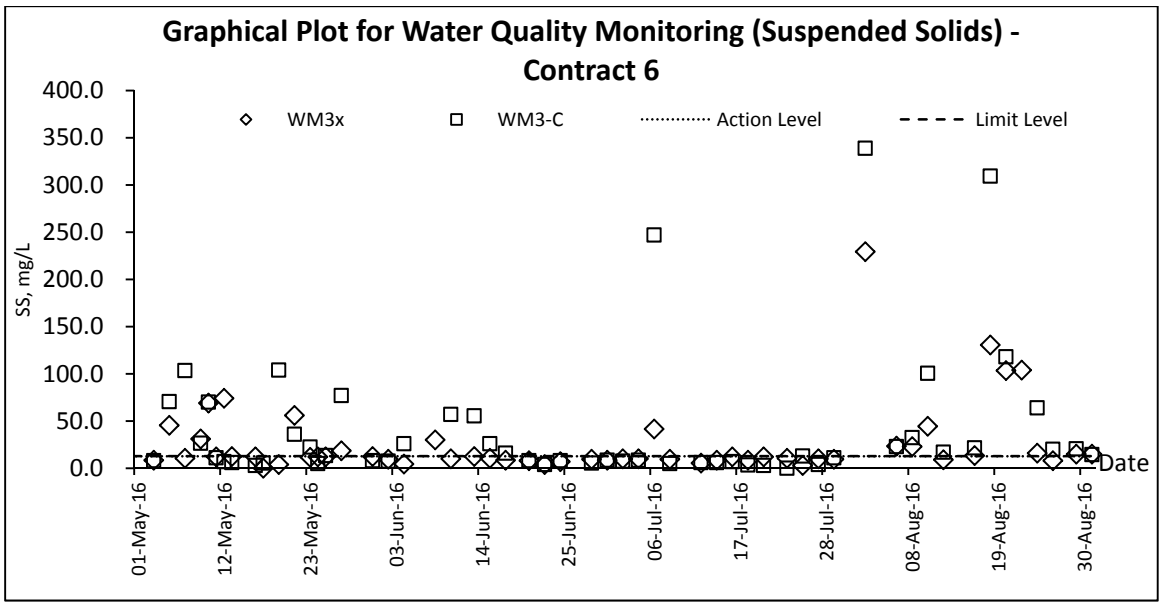

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contract 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
DO, mg/L
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

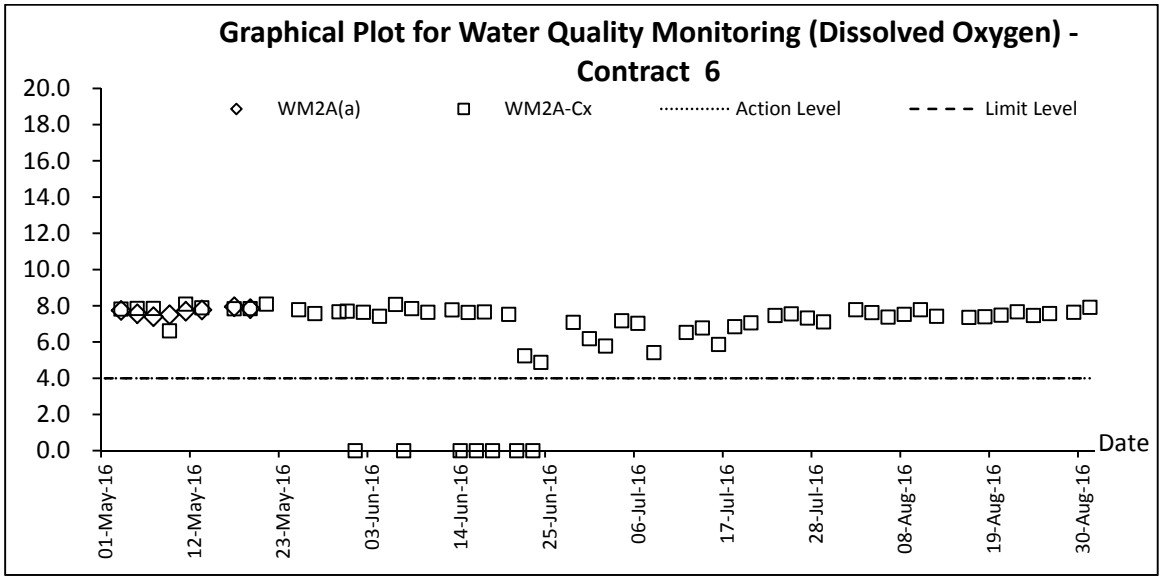

Graphical Plot for Water Quality Monitoring (Turbidity) - Contract 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
Turbidity, NTU
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

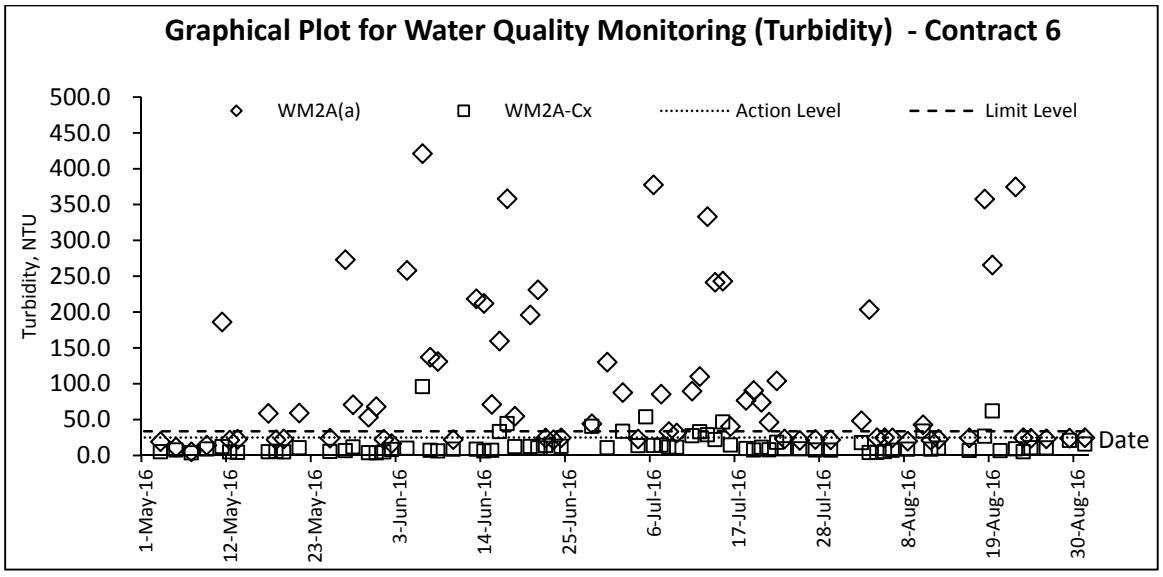

Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract s 2 & 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
SS, mg/L
600
550
500
450
400
350
300
250
200
150
100
50
0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

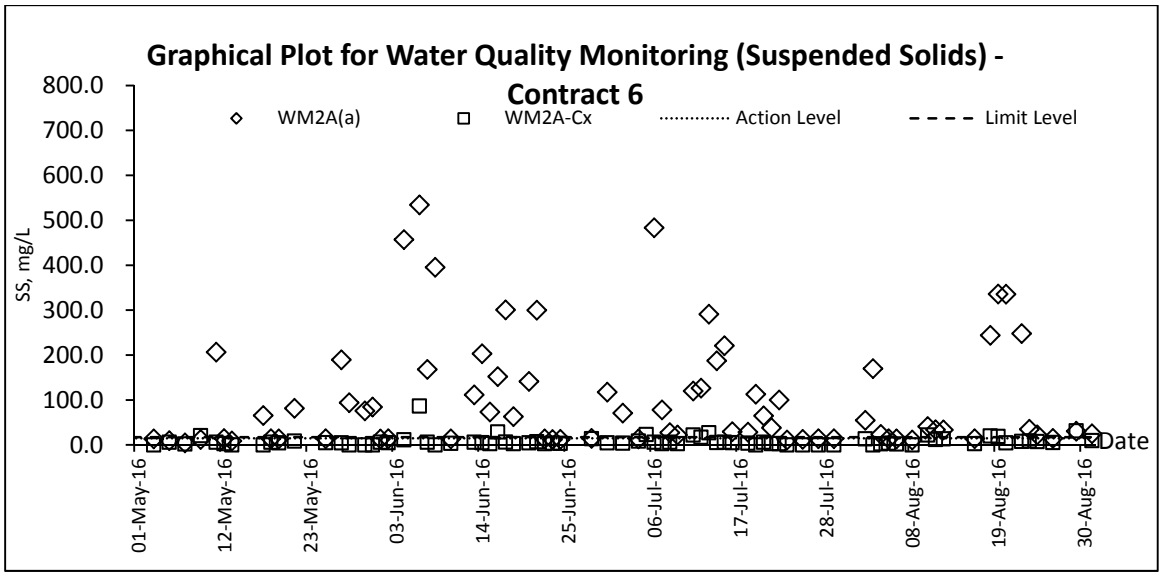

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-May-16
12-May-16
23-May-16
03-Jun-16
14-Jun-16
25-Jun-16
06-Jul-16
17-Jul-16
28-Jul-16
08-Aug-16
19-Aug-16
30-Aug-16

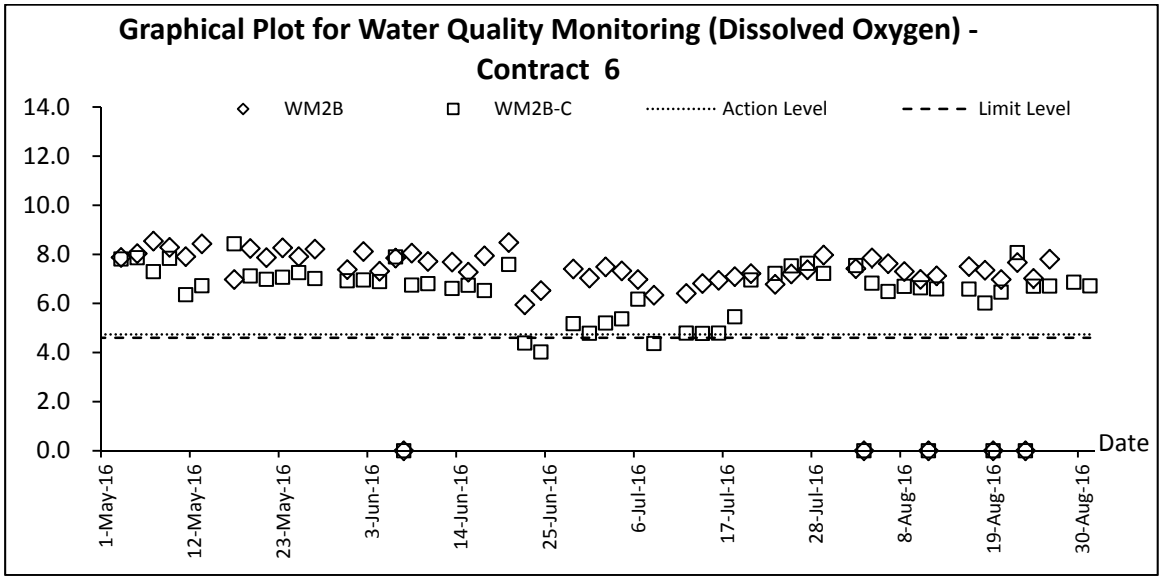

Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
Turbidity, NTU
200.0
180.0
160.0
140.0
120.0
100.0
80.0
60.0
40.0
20.0
0.0
Date
01-May-16
12-May-16
23-May-16
03-Jun-16
14-Jun-16
25-Jun-16
06-Jul-16
17-Jul-16
28-Jul-16
08-Aug-16
19-Aug-16
30-Aug-16

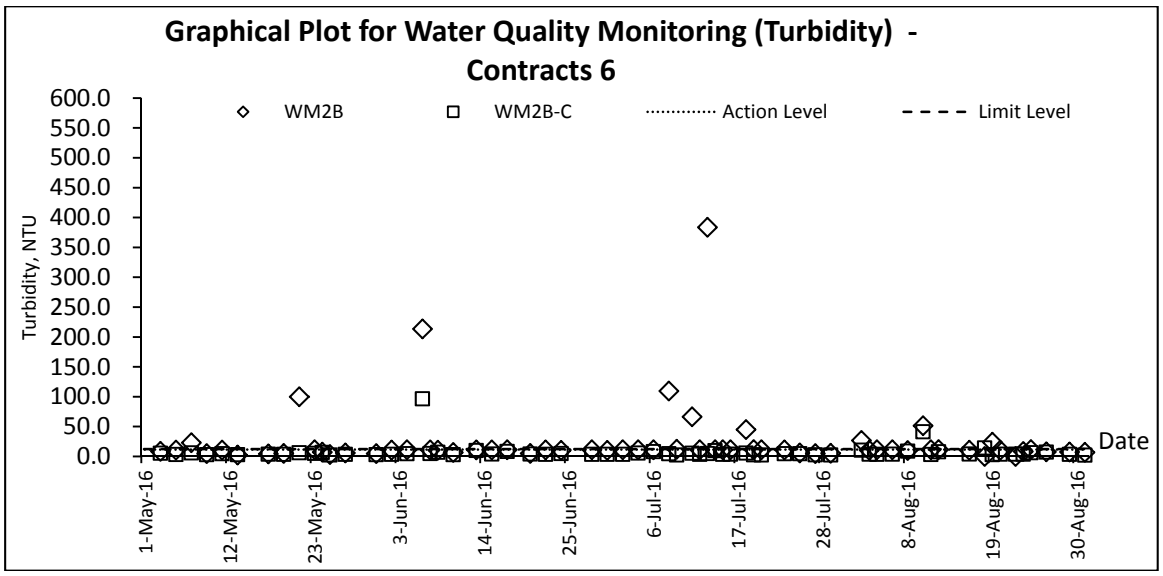

Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract 6
WM3x
WM3-C
Action Level
Limit Level
SS, mg/L
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Date
01-May-16
12-May-16
23-May-16
03-Jun-16
14-Jun-16
25-Jun-16
06-Jul-16
17-Jul-16
28-Jul-16
08-Aug-16
19-Aug-16
30-Aug-16

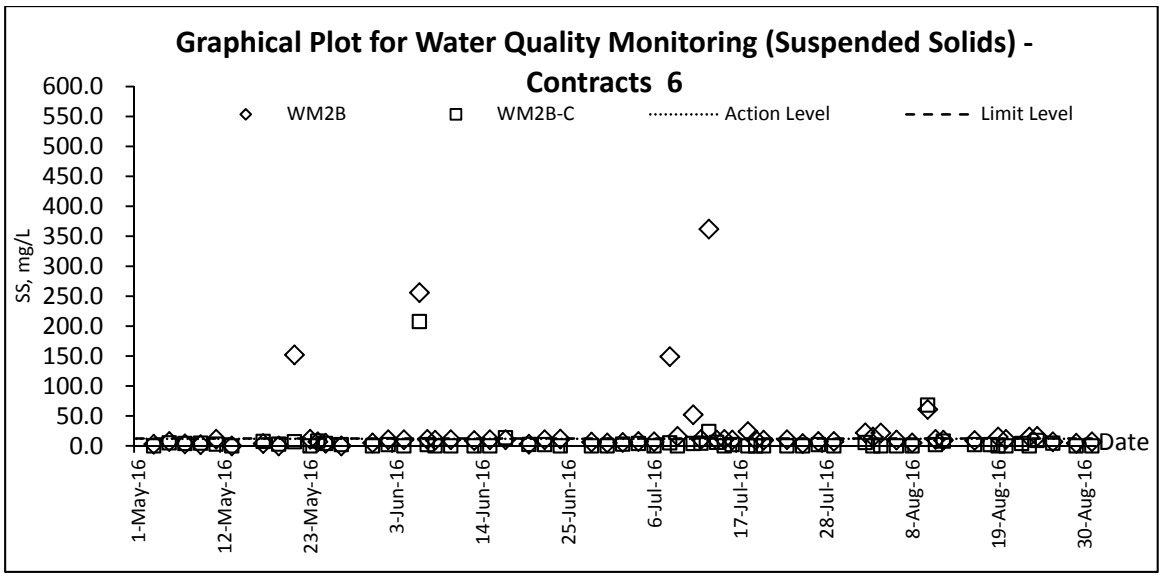

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-May-16
12-May-16
23-May-16
03-Jun-16
14-Jun-16
25-Jun-16
06-Jul-16
17-Jul-16
28-Jul-16
08-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for Water Quality Monitoring (Turbidity) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
Turbidity, NTU
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
SS, mg/L
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-May-16
12-May-16
23-May-16
03-Jun-16
14-Jun-16
25-Jun-16
06-Jul-16
17-Jul-16
28-Jul-16
08-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contract 6
WM2B
WM2B-C
Action Level
Limit Level
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 6
WM2B
WM2B-C
Action Level
Limit Level
Turbidity, NTU
600.0
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 6
WM2B
WM2B-C
Action Level
Limit Level
SS, mg/L
600.0
550.0
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Date
1-May-16
12-May-16
23-May-16
3-Jun-16
14-Jun-16
25-Jun-16
6-Jul-16
17-Jul-16
28-Jul-16
8-Aug-16
19-Aug-16
30-Aug-16

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-Aug-16	Mon	Very hot during the day	4.6	29	7.6	79.2	S/SW
2-Aug-16	Tue	Mainly fine apart from isolated showers.	12.1	26.6	19.5	86	S/SE
3-Aug-16	Wed	Light to moderate southwesterly winds.	17.3	27.1	6	89.7	E/NE
4-Aug-16	Thu	Very hot during the day	20.9	27.9	7.7	87.2	E/NE
5-Aug-16	Fri	Mainly fine apart from isolated showers.	Trace	29.2	4.9	80	E/NE
6-Aug-16	Sat	Very hot with sunny periods.	0	29.8			
7-Aug-16	Sun	Very hot with sunny periods.	0	30.7	9.5	83	E/SE
8-Aug-16	Mon	Very hot with sunny periods.	0	31	7.5	73.5	S/SW
9-Aug-16	Tue	Very hot with sunny periods.	33.5	29.4	11.9	81.7	W/NW
10-Aug-16	Wed	Mainly cloudy with a few showers. Light winds.	39.8	26.1	4.5	90.7	E/SE
11-Aug-16	Thu	Mainly cloudy with a few showers. Light winds.	42.1	28.5	4.9	83.2	S/SE
12-Aug-16	Fri	Very hot with sunny periods.	0.4	27.5	4.1	83.5	S/SW
13-Aug-16	Sat	Sunny intervals in the afternoon. Mainly cloudy tonight	Trace	29.3			
14-Aug-16	Sun	Moderate east to southeasterly winds.	25.7	27.3	7.5	87.5	E/NE
15-Aug-16	Mon	Sunny intervals in the afternoon. Mainly cloudy tonight	19.1	27.8	4.5	83.7	N/NW
16-Aug-16	Tue	Sunny intervals in the afternoon. Mainly cloudy tonight	49.9	27	4.5	89	S/SE
17-Aug-16	Wed	Sunny intervals in the afternoon. Mainly cloudy tonight	40.9	27.3	12.5	89	E/NE
18-Aug-16	Thu	Moderate east to southeasterly winds.	50.9	27.8	12.6	87.5	E/NE
19-Aug-16	Fri	Sunny intervals in the afternoon. Mainly cloudy tonight	10.5	29	7.9	83.5	E/NE
20-Aug-16	Sat	Very hot with sunny periods.	3.8	30			
21-Aug-16	Sun	Sunny intervals in the afternoon. Mainly cloudy tonight	39.9	27.7	4.1	81	S/SW
22-Aug-16	Mon	Sunny intervals in the afternoon. Mainly cloudy tonight	0	29.4	6.1	76.2	E/NE
23-Aug-16	Tue	Sunny intervals in the afternoon. Mainly cloudy tonight	0	29.9	5.3	72.7	S/SE
24-Aug-16	Wed	Moderate east to southeasterly winds.	0	30.5			
25-Aug-16	Thu	Sunny intervals in the afternoon. Mainly cloudy tonight	0	30.1			
26-Aug-16	Fri	Very hot with sunny periods.	0	30.5	4.6	74.5	S/SW
27-Aug-16	Sat	Sunny intervals in the afternoon. Mainly cloudy tonight	3.5	29.4			
28-Aug-16	Sun	Mainly cloudy with isolated showers.	8.7	27.9	7	74.2	N
29-Aug-16	Mon	Mainly cloudy with isolated showers.	Trace	26	7	70	E/NE
30-Aug-16	Tue	Dry with sunny periods in the afternoon.	0	27.5	4.5	74.5	N/NW
31-Aug-16	Wed	Mainly cloudy with showers and a few squally thunderstorms.	0.2	27.9	3.5	75.5	S/SW

Appendix L

Waste Flow Table

Name of Department : CEDD **Contract No./ Work Order No. :** CV/2012/08

Appendix I - Monthly Summary Waste Flow Table for 2016

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

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated [a+b+c+d]	Broken Concrete (including rock for recycling into aggregates) (a)	Reused in the Contract (b)	Reused in Other Projects (c)	Disposed as Public Fill (d)	Imported C&D Material	Metal (in '000kg)	Paper/ Cardboard Packaging (in '000kg)	Plastic (bottles/containers, plastic sheets/ foams from package material) (in '000kg)	Chemical Waste (in '000kg)	Others (e.g. General Refuse etc.) (in '000m3)
January	72.2029	0.0000	0.6482	31.8061	39.7486	0.9345	26.2000	0.0000	0.0000	1.2320	0.1247
February	55.6715	0.0000	1.0145	38.3484	16.3085	1.3108	8.3800	0.9800	0.0000	1.4080	0.1089
March	34.1757	0.0000	0.3241	29.3514	4.5003	1.0325	44.1700	0.0000	0.0000	11.9680	0.0732
April	86.9048	0.0000	0.7045	32.8811	53.3191	1.3786	31.8220	0.4000	0.0000	1.6456	0.1306
May	77.5386	0.0000	0.1268	38.9050	38.5068	6.3690	44.8000	0.3500	0.0000	2.7280	0.1246
June	62.4192	0.0000	0.5848	45.2952	16.5392	2.4119	35.7300	0.3700	0.0000	1.7600	0.0916
Half-year total	388.9127	0.0000	3.4030	216.5873	168.9224	13.4373	191.1020	2.1000	0.0000	20.7416	0.6536
July	65.3701	0.0000	0.4227	25.0255	39.9219	2.4087	11.3820	0.3500	0.0010	2.9920	0.1794
August	88.4693	0.0000	0.1268	27.0545	61.2879	0	23.0000	0	0	4.9280	0.1482
September	0.0000										
October	0.0000										
November	0.0000										
December	0.0000										
Yearly Total	542.7520	0.0000	3.9525	268.6673	270.1323	15.8460	225.4840	2.4500	0.0010	28.6616	0.9812

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

Year	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated [a+b+c+d]	Broken Concrete (including rock for recycling into aggregates) (a)	Reused in the Contract (b)	Reused in Other Projects (c)	Disposed as Public Fill (d)	Imported C&D Material	Metal (in '000kg)	Paper/ Cardboard Packaging (in '000kg)	Plastic (bottles/containers, plastic sheets/ foams from package material) (in '000kg)	Chemical Waste (in '000kg)	Others (e.g. General Refuse etc.) (in '000m3)
2013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2014	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609
2015	570.9459	0.0000	20.8159	543.2162	6.9138	4.5492	14.1300	3.9220	1.5000	16.1920	1.1696
2016	542.7520	0.0000	3.9525	268.6673	270.1323	15.8460	225.4840	2.4500	0.0010	28.6616	0.9812
2017											
2018											
Total	1539.1385	0.0000	27.5046	1188.2780	323.3559	26.0197	242.8240	6.8110	1.5080	55.7336	4.4117

Remark:

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

Name of Department: CEDD

Contract No.: CV/2012/09

Monthly Summary Waste Flow Table for 2016 (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^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in m^3)	(in '000m^3)
Jan	2.683	0.253	0.030	0.000	2.400	0.799	0.001	0.000	0.000	0.000	0.115
Feb	1.877	0.651	0.020	0.000	1.205	1.141	0.000	0.000	0.000	0.000	0.110
Mar	1.501	0.417	0.000	0.000	1.084	0.831	0.000	0.000	0.001	0.000	0.090
Apr	0.472	0.046	0.018	0.000	0.408	0.647	0.000	0.000	0.000	0.000	0.135
May	0.488	0.013	0.000	0.000	0.475	2.479	0.000	0.000	0.000	0.000	0.105
Jun	0.523	0.103	0.000	0.000	0.420	0.716	0.000	0.000	0.001	0.000	0.135
Sub-total	7.544	1.483	0.068	0.000	5.993	6.613	0.001	0.000	0.002	0.000	0.690
Jul	0.565	0.019	0.000	0.000	0.546	1.407	0.000	0.001	0.004	1.000	0.085
Aug	0.582	0.088	0.000	0.000	0.494	0.715	0.000	0.000	0.001	0.000	0.105
Sep											
Oct											
Nov											
Dec											
Total	8.690	1.590	0.068	0.000	7.032	8.736	0.001	0.001	0.007	1.000	0.880

Note:

1. Assume the density of soil fill is 2 ton/m^3.
2. Assume the density of rock and broken concrete is 2.5 ton/m^3.
3. Assume each truck of C&D wastes is 5m^3.
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^3.
8. Assume the density of plastic is 941 kg/m^3.

Name of Department: CEDD

Monthly Summary Waste Flow Table for 2016

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^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
JAN	0	0	0	0	0	0.235	0	0	0	0	0.06
FEB	0	0	0	0	0	0.141	0	0	0	0	0.045
MAR	0	0	0	0	0	0.1785	0	0	0	0	0.055
APRIL	0	0	0	0	0	0	0	0	0	0	0.03
MAY	0	0	0	0	0	0	0	0	0	0	0.015
JUN	0	0	0	0	0	0	0	0.062	0	0	0.01
Sub Total	0	0	0	0	0	0.5545	0	0.062	0	0	0.215
JUL	0	0	0	0	0	0	0	0	0	0	0.005
AUG	0	0	0	0	0	0	0	0	0	0	0.02
SEP											
OCT											
NOV											
DEC											
Total	0	0	0	0	0	0.55	0	0.062	0	0	0.24

Notes:

Name of Department: CEDD

Forecast of Total Quantities of C&D Materials to be Generated from the Contract (see Note 4)										
Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported Fill	Metal	Paper / cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
0	0	0	0	0	350	30	4	2	1	4

Notes:

(1) The performance targets are given in PS clause 6(14) above.

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

(3) Plastic 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

- Hard Rocks and Large Broken Concrete = Cannot be defined at this stage
- Imported Fill = Estimated by the Contractor = 1 loading = 8m 3
- Metal = Estimated by the Contractor
- Paper/cardboard packaging = Estimated by the Contractor
- Plastics = Estimated by the Contractor
- Chemical Waste = Estimated by the Contractor (Spent lubricating oil, assume density 0.9kg/L)
- Other, e.g. general refuse = Estimated by the Contractor

Monthly Summary Waste Flow Table for 2016 (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^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan	58.943	0	3.811	12.131	43.001	31.248	0	0	0	0	0.695
Feb	74.418	0	8.785	39.85	25.783	6.552	0	0.097	0	0	0.339
Mar	43.764	0	6.438	12.034	25.292	3.288	0	0.206	0.007	0	0.042
Apr	33.767	0	1.933	5.759	26.075	0	0	0.221	0	0	0.070
May	51.115	0	3.229	17.469	30.417	0.928	0	0.211	0	0	0.079
Jun	61.126	0	6.921	23.286	30.919	3.693	0	0.166	0	0	0.043
Sub-total	323.133	0	31.117	110.529	181.487	45.709	0	0.901	0.007	0	1.268
Jul	73.407	0	0.951	32.858	39.598	0.827	0	0.271	0	0	0.094
Aug	45.652	0	6.653	5.933	33.066	0	0	0	0	0	0.110
Sep											
Oct											
Nov											
Dec											
Total	611.415	0	57.255	166.104	388.056	53.785	0	1.466	0.007	32.28	4.548

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.

Appendix I

MONTHLY SUMMARY WASTE FLOW TABLE

Name of Department: CEDD

Contract Title: Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 7

Contract No.: NE/2014/03

Monthly Summary Waste Flow Table for 2016 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of 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^3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
Jan	0	0	0	0	0	0	0	0	0	0	0
Feb	0.16	0	0	0	0.16	0	0	0	0	0	0
Mar	0.135	0	0	0	0.135	0	0	0	0	0	0.005
Apr	0.313	0	0	0	0.313	0	0	0	0	0	0.005
May	0.505	0	0	0	0.505	0	0	0	0	0	0
June	0.613	0	0	0	0.613	0	0	0.005	0.001	0	0
Sub-total	1.726	0	0	0	1.726	0	0	0.005	0.001	0	0.01
July	0.207	0	0	0	0.207	0	0	0.047	0.001	0	0
Aug	0.464	0	0	0	0.464	0	0	0.03	0.001	0	0
Sept											
Oct											
Nov											
Dec											
Total	2.397	0	0	0	2.397	0	0	0.082	0.003	0	0.01

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.

Architectural Services Department	Form No. D/OI.03/09.002

Contract No. / Works Order No.: - SSC505

Monthly Summary Waste Flow Table for 2016 [year] [to be submitted not later than the 15th 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^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)
Jan	0.800	0	0	0	0.800
Feb	0.858	0	0	0	0.858
Mar	0.793	0	0	0	0.793
Apr	0.111	0	0	0	0.111
May	1.087	0	1.074	0	0.013
Jun	8.645	0	8.541	0	0.104
Sub-total	12.293	0	9.615	0	2.678
Jul	2.942	0	2.884	0	0.059
Aug	4.247	0	4.182	0	0.065
Sep					
Oct					
Nov					
Dec					
Total	19.482	0	16.681	0	2.802

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^3)
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	4.73	4.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072
Feb	0.000	0.000	0.0004	0.0004	0.0186	0.0186	0.000	0.000	0.000	0.000	0.021	0.021	0.065
Mar	0	0	52.752	52.752	0.044	0.044	0	0	0	0	0.05	0.05	0.059
Apr	0	0	1465.5906	1465.5906	0.09	0.09	0	0	0	0	0.084	0.084	0.091
May	0	0	1587.5818	1587.5818	0	0	0.004	0.004	0	0	0.153	0.153	0.156
Jun	0	0	725.0582	725.0582	0.33	0.33	0.0045	0.0045	0	0	0.067	0.067	0.117
Sub-total	0	0	3818.7330	3818.7330	0.4826	0.4826	0.0085	0.0085	0	0	0.375	0.375	0.559
Jul	0	0	277.230	277.230	0.430	0.430	0.020	0.020	0.000	0.000	0.194	0.194	0.189
Aug	0	0	242.370	242.370	0.360	0.360	0.025	0.025	0.000	0.000	0.069	0.069	0.228
Sep													
Oct													
Nov													
Dec													
Total	0	0	4338.333	4338.333	1.273	1.273	0.053	0.053	0.000	0.000	0.637	0.637	0.982

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					
8.5kg of cans were sent to Kong Han for recycling.	360kg of papers were sent to Kong Han for recycling.	24.5kg of plastic bottles and 60kg of glass bottles were sent to Action Health for recycling.	172.07 tons of scrap metals from LCAL were sent for recycling.	70.30 tons of scrap metals from subcontractors were sent 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^3 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?
Air Quality Impact (Construction)							
3.6.1.1	2.1	**General Dust Control Measures** The following dust suppression measures should be implemented: ■ 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 ■ 80% of stockpile areas should be covered by impervious sheets ■ Speed of trucks within the site should be controlled to about 10 km/hr ■ All haul roads within the site should be paved to avoid dust emission due to vehicular movement	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	**Best Practice for Dust Control** 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: *Good site management* ■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. ■ 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. ■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly. ■ 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. ■ The material should be handled properly to prevent fugitive dust emission before cleaning. *Disturbed Parts of the Roads* ■ Each and every main temporary access should be paved with	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?
		concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or ■ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. *Exposed Earth* ■ Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating 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. *Loading, Unloading or Transfer of Dusty Materials* ■ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. *Debris Handling* ■ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides. ■ Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped. *Transport of Dusty Materials* ■ 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. *Wheel washing* ■ 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. *Use of vehicles* ■ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. ■ 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.				

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?
		Site hoarding ■ 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. *Blasting* ■ The areas within 30m from the blasting area should be wetted with water prior to blasting.					
Air Quality Impact (Operation)							
3.5.2.2	2.2	The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site: ■ 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. ■ Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission. ■ Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity. ■ 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.	To minimize potential odour impact from operation of the proposed sewage treatment work at BCP	DSD	BCP	Operation Phase	EIA recommendation
Noise Impact (Construction)							
4.4.1.4	3.1	**Adoption of Quieter PME** Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in **Table 4.14**, which can be found in Hong Kong.	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	**Use of Movable Noise Barrier** 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^2 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	**Use of Noise Enclosure/ Acoustic Shed** 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	**Use of Noise Insulating Fabric** 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	**Good Site Practice** The good site practices listed below should be followed during each phase of construction: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; • Mobile plant, if any, should be sited as far from NSRs as possible; • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
Noise Impact (Operation)							
		Road Traffic Noise					
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
		Fixed Plant Noise					
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	The following noise reduction measures shall be considered as far as practicable during operation: • Choose quieter plant such as those which have been effectively silenced; • Include noise levels specification when ordering new plant (including chillier and E/M equipment); • Locate fixed plant/louver away from any NSRs as far as practicable; • Locate fixed plant in walled plant rooms or in specially designed enclosures; • Locate noisy machines in a basement or a completely separate building; • Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and • 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.	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
Water Quality Impact (Construction)							
5.6.1.1	4.1	**Construction site runoff and drainage** 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: ▪ 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. ▪ The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas.	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?
		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. ▪ 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. ▪ 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. ▪ 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. ▪ 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. ▪ The overall slope of the site should be kept to a minimum to reduce					

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?
		the erosive potential of surface water flows. ▪ 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. ▪ 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. ▪ 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. ▪ 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. ▪ 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.					
5.6.1.1	4.1	**Good site practices for works within water gathering grounds** The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:	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?
		▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments. ▪ 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. ▪ All surplus spoil should be removed from water gathering grounds as soon as possible. ▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks. ▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time. ▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion. ▪ Facilities for washing the wheels of vehicles before leaving the site should be provided. ▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately. ▪ 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. ▪ 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. ▪ 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. ▪ Drainage plans should be submitted for approval by the Director of			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?
		Water Supplies. ▪ An unimpeded access through the waterworks access road should always be maintained. ▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March, ▪ Advance notice must be given before the commencement of works on site quoting WSD's approval letter reference.					
5.6.1.2	4.1	**Good site practices of general construction activities** 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. 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.	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	**Sewage effluent from construction workforce** 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.	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	**Hydrogeological Impact** 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.	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
Water Quality Impact (Operation)							
		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?
Sewage and Sewerage Treatment Impact (Construction)							
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
Sewage and Sewerage Treatment Impact (Operation)							
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
Waste Management Implication (Construction)							
7.6.1.1	6	**Good Site Practices** 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: ▪ 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 ▪ Training of site personnel in proper waste management and chemical handling procedures ▪ Provision of sufficient waste disposal points and regular collection of waste ▪ 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 ▪ General refuse shall be removed away immediately for disposal. As	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?
		such odour is not anticipated to be an issue to distant sensitive receivers ▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road ▪ Covers and water spraying system should be provided for the stockpiled C&D material to prevent dust impact or being washed away ▪ Designate different locations for storage of C&D material to enhance reuse ▪ Well planned programme for transportation of C&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&D material is not anticipated ▪ 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 ▪ Provision of cover for the stockpile material, sand bag or earth bund as barrier to prevent material from washing away and entering the drains					
7.6.1.2	6	**Waste Reduction Measures** 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: ▪ 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 ▪ 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 ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials ▪ Plan and stock construction materials carefully to minimise amount	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?
		of waste generated and avoid unnecessary generation of waste ▪ 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.					
7.6.1.3	6	**C&D Materials** In order to minimise impacts resulting from collection and transportation of C&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&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&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: ▪ A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and ▪ In order to monitor the disposal of C&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.	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	**General refuse** General refuse should be stored in enclosed bins or compaction units separated from other C&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.	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	**Chemical waste** 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 *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. 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	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

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**29 August 2016**
Our Ref	TCS00694/13/300/**F0557a**	**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 2, 3 and 4 August 2016**		

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/F0541 dated 4 August 2016
TCS00694/13/300/F0555 dated 12 August 2016

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.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

安順聯合環境服務及顧問
Action-United Environmental Services & Consulting
Flat A, 20/F, Gold King Industrial Building,
35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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		2 Aug	3 Aug	2 Aug	3 Aug	4 Aug
Location		WM2A(a)				
Time		15:12	10:45	15:12	10:45	10:45
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**	17.9	4.0	13.5	<2	2.5
	WM2A(a)	**48.4**	**203.5**	**55.0**	**170.0**	**23.5**
Exceedance		Limit level	Limit level	Limit level	Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided from the CCKJV, construction activities carried out on 2, 3 and 4 August 2016 at Bridge D (upstream of WM2A) were mainly bored piling and pile cap works. The monitoring locations and works area are shown in Figure 1. 2. Typhoon No.8 was hoisted on 2 August 2016 morning and heavy rain was recorded on 2 and 3 August 2016. According to the site record from the monitoring team, the water quality observed at WM2A(a) was turbid on 2, 3 and 4 August 2016. There was discharge from the AquaSed into the river course on 4 August 2016 and the effluent quality was clear. The water quality at WM2A-C was found cloudy on 2 and 3 August 2016 and water flow was fairly vigorous compared to non-rainy day. The water quality at WM2A-C was clean on 4 August 2016 (Photo 1 to 6) 3. In order to identify the source of turbid water, the monitoring team subsequently inspected the alignment of the river course of Bridge D. On 2 and 3 August 2016, it was observed that water releasing from the rubber dam after heavy rain and the rubber dam was not belong to C6. The water flow of the river became very vigorous and stirred up the loose sediment at the river bed. (Photo 7 and 8) 4. During weekly joint site inspection in 11 August 2016, unknown source of turbid water seeping out from the river bed was observed. (Photo 9) As observed on site, the source of turbid water was unknown and there is no evident that the turbid water come from site and related to the works of Contract 6. As water mitigation measures, concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site. (Photo 11) Moreover, wastewater treatment facilities including one AquaSed and three series of sedimentation tank have been installed for piling work and most of the time the wastewater was recirculated. (Photo 12) 5. It is considered that the exceedances on 2 and 3 August 2016 were					

	related to vigorous flow disturbing the sediment at the river when water releasing from the rubber dam. For exceedances on 4 August 2016, it is considered the exceedances were related to the unknown source of turbid water seeping out from the river bed. 6. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were no exceedances of SS and NTU 4 August 2016. However, the Contractor is reminded to continue 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 August 2016

Photo Record

Photo 1

On 2 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 2

On 2 Aug 2016, cloudy water was observed at WM2A-C and the water flow was vigorous compared to non-rainy day

Photo 3

On 3 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 4

On 3 Aug 2016, cloudy water was observed at WM2A-C and the water flow was vigorous compared to non-rainy day

Photo 5

On 4 Aug 2016, discharge water from the AquaSed was visually clear but turbid water was observed in the existing river course and WM2A(a).

Photo 6

On 4 Aug 2016, visually clear water was observed at WM2A-C.

Photo 7

On 2 Aug 2016, water releasing from the rubber dam was observed after heavy rain. The water flow of the river became vigorous and stirred up the loose sediment at the river bed.

Photo 8

On 3 Aug 2016, water releasing from the rubber dam was observed after heavy rain. The water flow of the river became vigorous and stirred up the loose sediment at the river bed.

Photo 9

On 4 Aug 2016, it was observed that the stream water was trapped at rubber dam.

Photo 10

During site inspection on 11 August, unknown source of turbid water seeping out from the river bed was observed.

Photo 11

At Bridge, concrete block as temporary bund was provided align the river course to minimize runoff into the river.

Photo 12

At Bridge D, wastewater treatment facilities were implemented for piling work and most of the time the wastewater was recirculated.

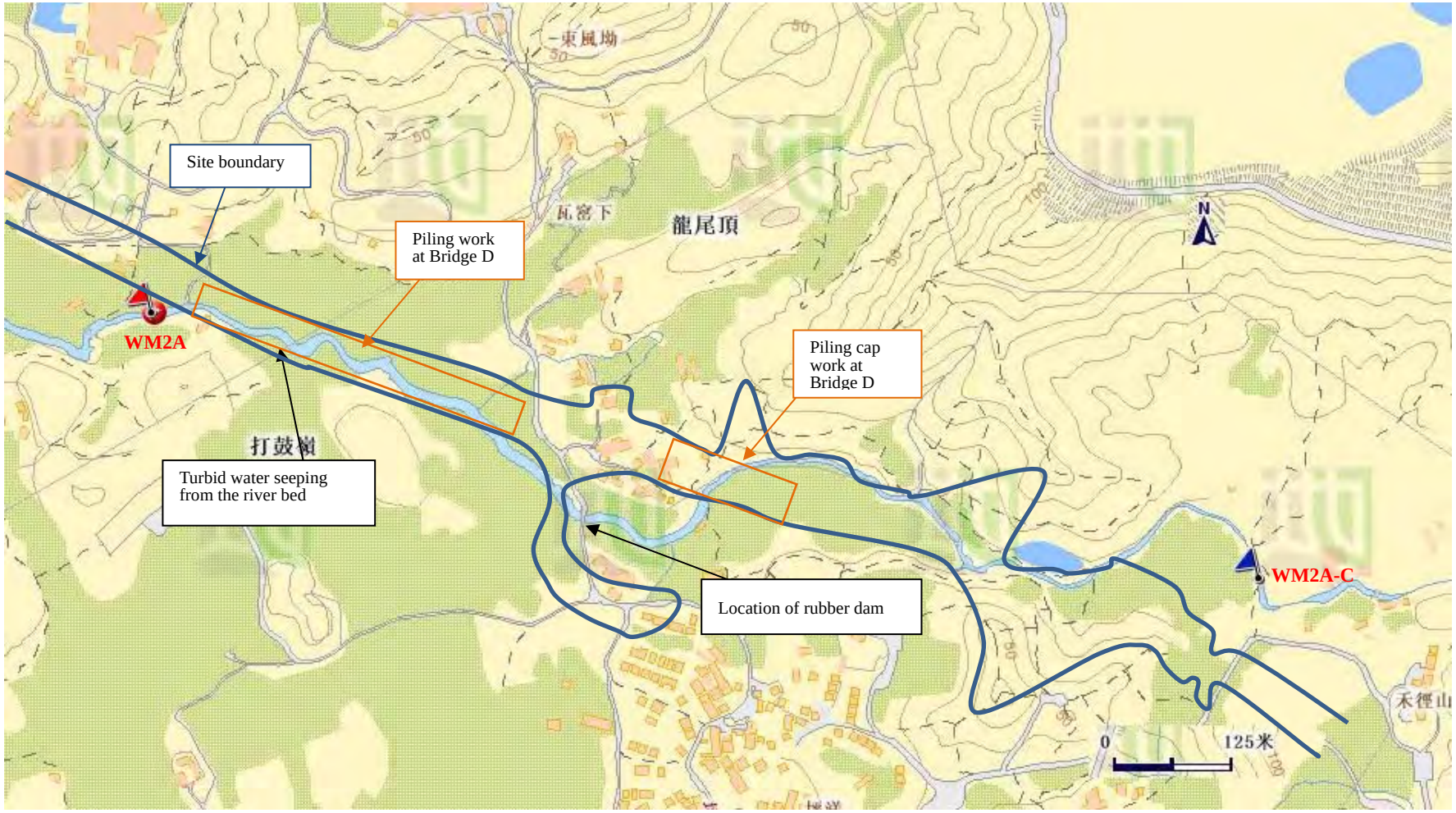


Figure 1 Location Map for Water Quality Monitoring Locations WM2A, WM2A-Control and work area under Contract 6

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**16 August 2016**
Our Ref	TCS00694/13/300/**F0558**	**No of Pages**	4 **(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 WM2B on 2, 3 and 4 August 2016**		

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. of following:

TCS00694/13/300/F0542 dated 4 August 2016
TCS00694/13/300/F0532 dated 12 August 2016

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.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

安順聯合環境服務及顧問
Action-United Environmental Services & Consulting
Flat A, 20/F, Gold King Industrial Building,
35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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		2 Aug 2016	3 Aug 2016	4 Aug 2016	2 Aug 2016	3 Aug 2016	4 Aug 2016
Location		WM2B					
Time		14:53	10:25	10:00	14:53	10:25	10:00
Parameter		Turbidity (NTU)			Suspended Solids (mg/L)		
Action Level		11.4 AND 120% of upstream control station of the same day			11.8 AND 120% of upstream control station of the same day		
Limit Level		12.3 AND 130% of upstream control station of the same day			12.4 AND 130% of upstream control station of the same day		
Measured Levels	**WM2B-C**	10.3	3.8	3.3	5.5	<2	<2
	WM2B	**26.8**	**10.4**	**11.1**	**22.0**	**15.0**	**21.5**
Exceedance		**Limit Level**	**NA**	**NA**	**Limit Level**	**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided from CCKJV, construction activities carried out from 2 to 4 August 2016 at North Portal (upstream of WM2B) were bored piling and slope work. The monitoring locations and works area are shown in Figure 1. 2. According to the site record and photograph taken from the monitoring team, the water quality at WM2B and WM2B-C were visually clear but some silt and sediment was cumulated at the river bed near WM2B. (Photo 1 to 6) 3. According to the site observations from the monitoring team on 2, 3 and 4 August 2016, the water flow in the channel was very vigorous due to heavy rain and it stirred up some silt and sediment at the river bed. Moreover, there was trails of muddy water flowing from the adjacent road into the channel resulted from rain. (Photo 1, 3 and 5 and Figure 1) In our investigation, it is considered that the exceedances were due to the disturbance of silt and sediment during sampling and runoff from road and not likely caused by the Project. 4. There was no exceedance recorded in the subsequent monitoring day on 5 August 2016. Nevertheless, CCKJV should 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 : 16 August 2016

Photo Record

Photo 1

On 2 August 2016, the water quality at WM2B was clear but some silt and sediment was cumulated at the river bed near WM2B.

Photo 2

On 2 August 2016, the water quality at WM2B-C was clear.

Photo 3

On 3 August 2016, the water quality at WM2B was clear but some silt and sediment was cumulated at the river bed near WM2B.

Photo 4

On 3 August 2016, the water quality at WM2B-C was clear.

Photo 5

On 4 August 2016, the water quality at WM2B was clear but some silt and sediment was cumulated at the river bed near WM2B.

Photo 6

On 4 August 2016, the water quality at WM2B-C was clear.

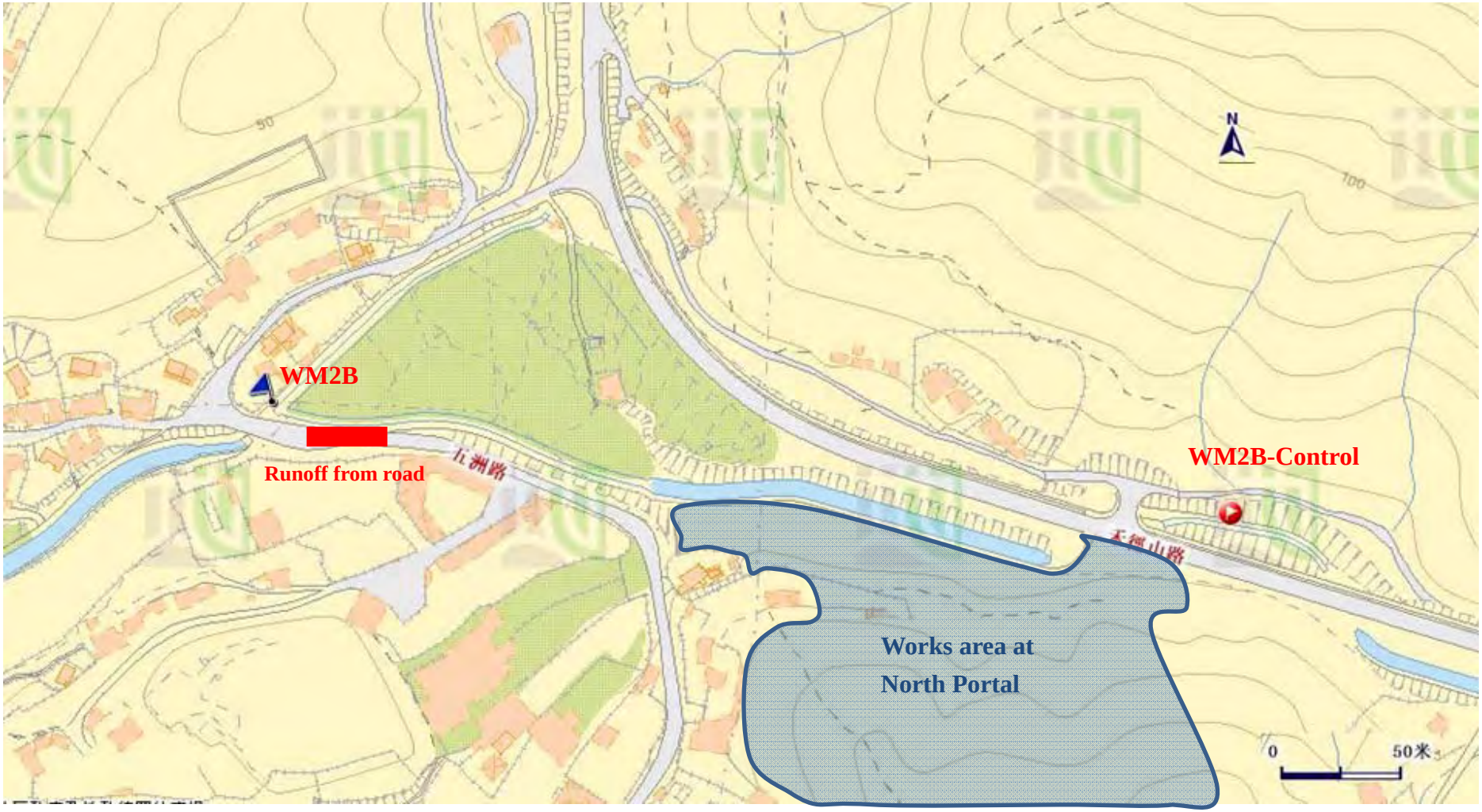


Figure 1 Location Map for Water Quality Monitoring Locations WM2B and WM2B-Control

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**29 August 2016**
Our Ref	TCS00694/13/300/**F0574a**	**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 10, 11 and 12 August 2016**		

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/F0548 dated 10 August 2016
TCS00694/13/300/F0572 dated 24 August 2016

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.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

安順聯合環境服務及顧問
Action-United Environmental Services & Consulting
Flat A, 20/F, Gold King Industrial Building,
35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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		10 Aug	10 Aug	11 Aug	12 Aug
Location		WM2A(a)			
Time		10:40	10:40	14:05	11:13
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**	33.8	22.0	12.0	13.5
	WM2A(a)	**42.8**	**41.5**	**34.0**	**33.5**
Exceedance		Action level	Limit level	Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided from CCKJV, construction activities carried out on 10, 11 and 12 August 2016 at Bridge D (upstream of WM2A) were mainly bored piling and pile cap works. The monitoring locations and works area are shown in Figure 1. 2. According to the Hong Kong Observatory, there was heavy rainstorm on 10 August 2016 and occasionally shower on 11 and 12 August 2016. According to the site record from the monitoring team, the water quality observed at WM2A(a) was turbid on 10, 11 and 12 August 2016. The water quality at WM2A-C was also found turbid on 10 August 2016 and water flow in the stream course was vigorous due to heavy rain. The water quality at WM2A-C on 11 and 12 August 2016 was slightly cloudy. (Photo 1 to 6) 3. In order to identify the source of turbid water, the monitoring team subsequently inspected the alignment of the river course of Bridge D. On 10 August 2016, turbid water was observed throughout the stream course due to vigorous flow and stirred up of the sediment. On 11 and 12 August, unknown source of turbid water seeping out from the river bed was observed (Photo 7 and 8) 4. During weekly joint site inspection in 11 August 2016, unknown source of turbid water seeping out from the river bed was observed. (Photo 9) Moreover, it was checked that the wastewater treatment facilities was in proper function and the effluent of the AquaSed was clear. (Photo 10) As checked on site, the source of turbid water was unknown and there was no evident that the turbid water come from site and related to the works of Contract 6. 5. As water mitigation measures, concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site. (Photo 11) Moreover, wastewater treatment facilities including one AquaSed and three series of			

	sedimentation tank have been installed for piling work and most of the time the wastewater was recirculated. (Photo 12) 6. In our investigation, it is considered that the exceedance was due rainstorm and turbid water seeping out from the river bed and not likely caused by the Project. 7. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were no exceedances of SS and NTU on 13 August 2016. However, the Contractor is reminded to continue 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 August 2016

Photo Record

Photo 1

On 10 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 2

On 10 Aug 2016, turbid water was observed at WM2A-C and the water flow was vigorous compared to non-rainy day

Photo 3

On 11 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 4

On 11 Aug 2016, the water quality observed at WM2A-C was slightly cloudy.

Photo 5

On 12 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 6

On 12 Aug 2016, the water quality observed at WM2A-C was slightly cloudy.

Photo 7

On 11 August, unknown source of turbid water seeping out from the river bed was observed.

Photo 8

On 12 August, unknown source of turbid water seeping out from the river bed was observed.

Photo 9

During site inspection on 11 August, unknown source of turbid water seeping out from the river bed was observed.

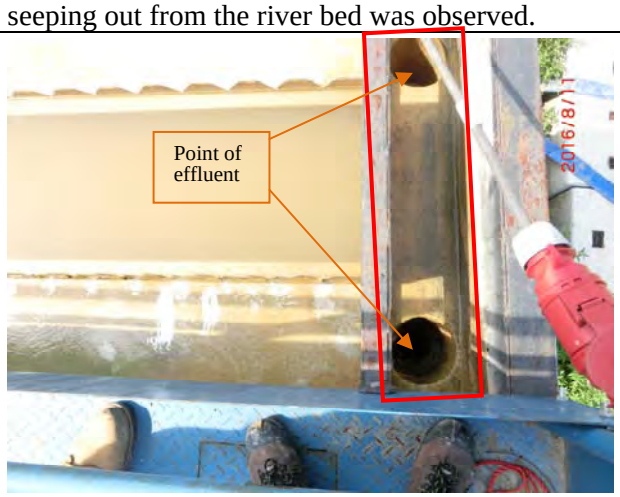


Photo 10

During site inspection on 11 August, it was checked that the wastewater treatment facilities was in proper function and the effluent of the AquaSed was clear.

Photo 11 At Bridge D, concrete block as temporary bund was provided align the river course to minimize runoff into the river.	**Photo 12** At Bridge D, wastewater treatment facilities were implemented for piling work and most of the time the wastewater was recirculated.

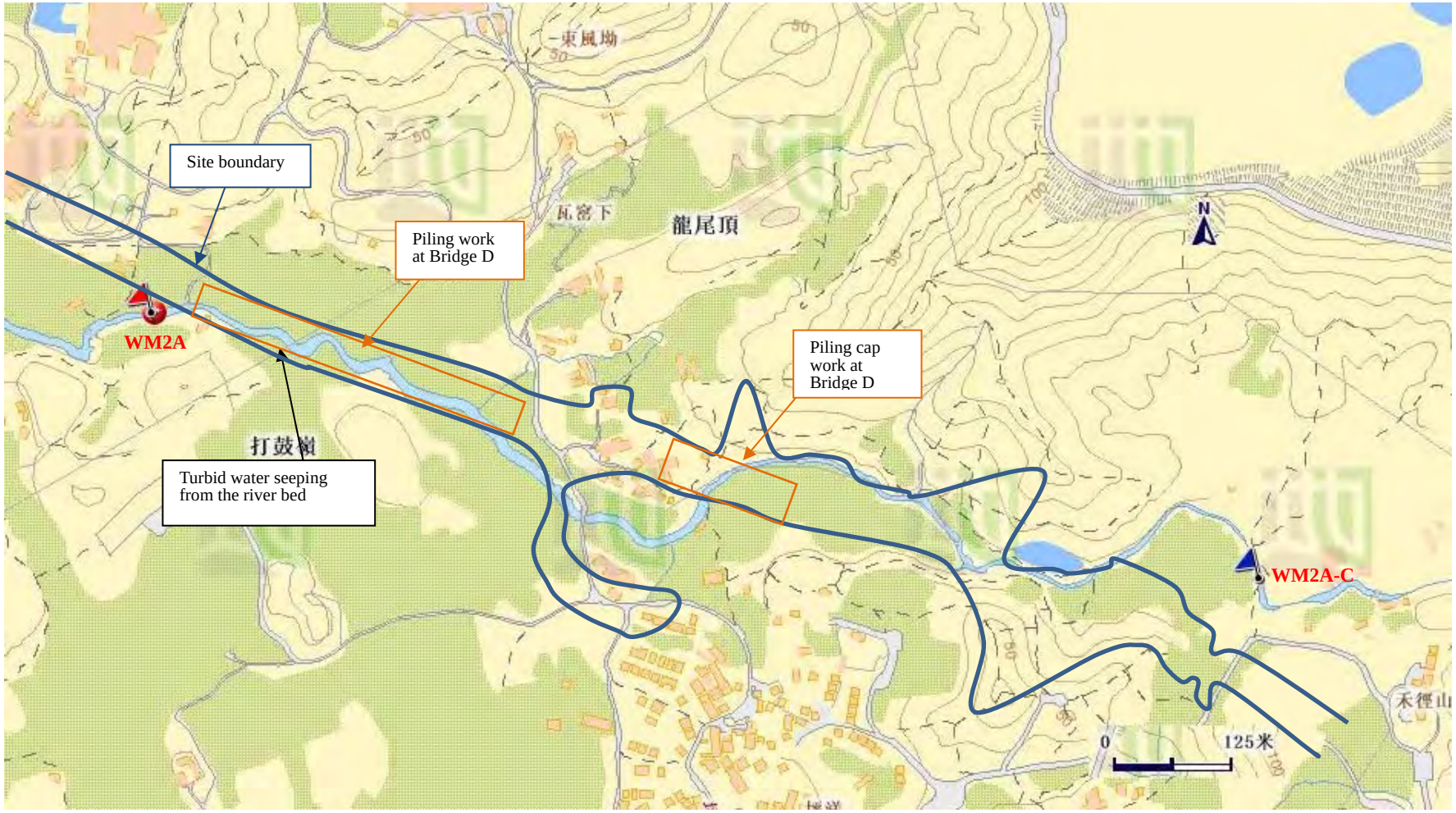


Figure 1 Location Map for Water Quality Monitoring Locations WM2A, WM2A-Control and work area under Contract 6

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**25 August 2016**
Our Ref	TCS00694/13/300/**F0575**	**No of Pages**	4 **(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 WM2B on 10 August 2016**		

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. of following:

TCS00694/13/300/F0549 dated 10 August 2016

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.

Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
Mr. Antony Wong (IEC, SMEC)		By email

安順聯合環境服務及顧問
Action-United Environmental Services & Consulting
Flat A, 20/F, Gold King Industrial Building,
35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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		10 Aug 2016
Location		WM2B
Time		10:15
Parameter		Turbidity (NTU)
Action Level		11.4 AND 120% of upstream control station of the same day
Limit Level		12.3 AND 130% of upstream control station of the same day
Measured Levels	**WM2B-C**	41.1
	WM2B	**51.3**
Exceedance		**Action Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided from CCKJV, construction activities carried out from 10 August 2016 at North Portal (upstream of WM2B) were bored piling and slope work. The monitoring locations and works area are shown in Figure 1. 2. According to the site record and photograph taken from the monitoring team, the water quality at WM2B and WM2B-C were slightly turbid and the water flow in the channel was fairly vigorous due to heavy rain. (Photo 1 and 2) 3. According to the site observations from the monitoring team on 10 August 2016, the water flow in the channel as well as WM2B and WM2B-c was very vigorous due to heavy rain and turbid water was observed throughout the channel. Moreover, there was trails of turbid water flowing from the adjacent road into the channel resulted from rain. (Photo 1 and Figure 1) In our investigation, it is considered that the exceedance was due rainstorm and runoff from road and not likely caused by the Project. 4. There was no exceedance recorded in the subsequent monitoring day on 11 August 2016. Nevertheless, CCKJV should 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 : 25 August 2016

Photo Record

Photo 1

On 10 August 2016, turbid water was observed at WM2B and there was turbid water flowing from the adjacent road into the channel that resulted from rain.

Photo 2

On 10 August 2016, turbid water was observed at WM2B-C.

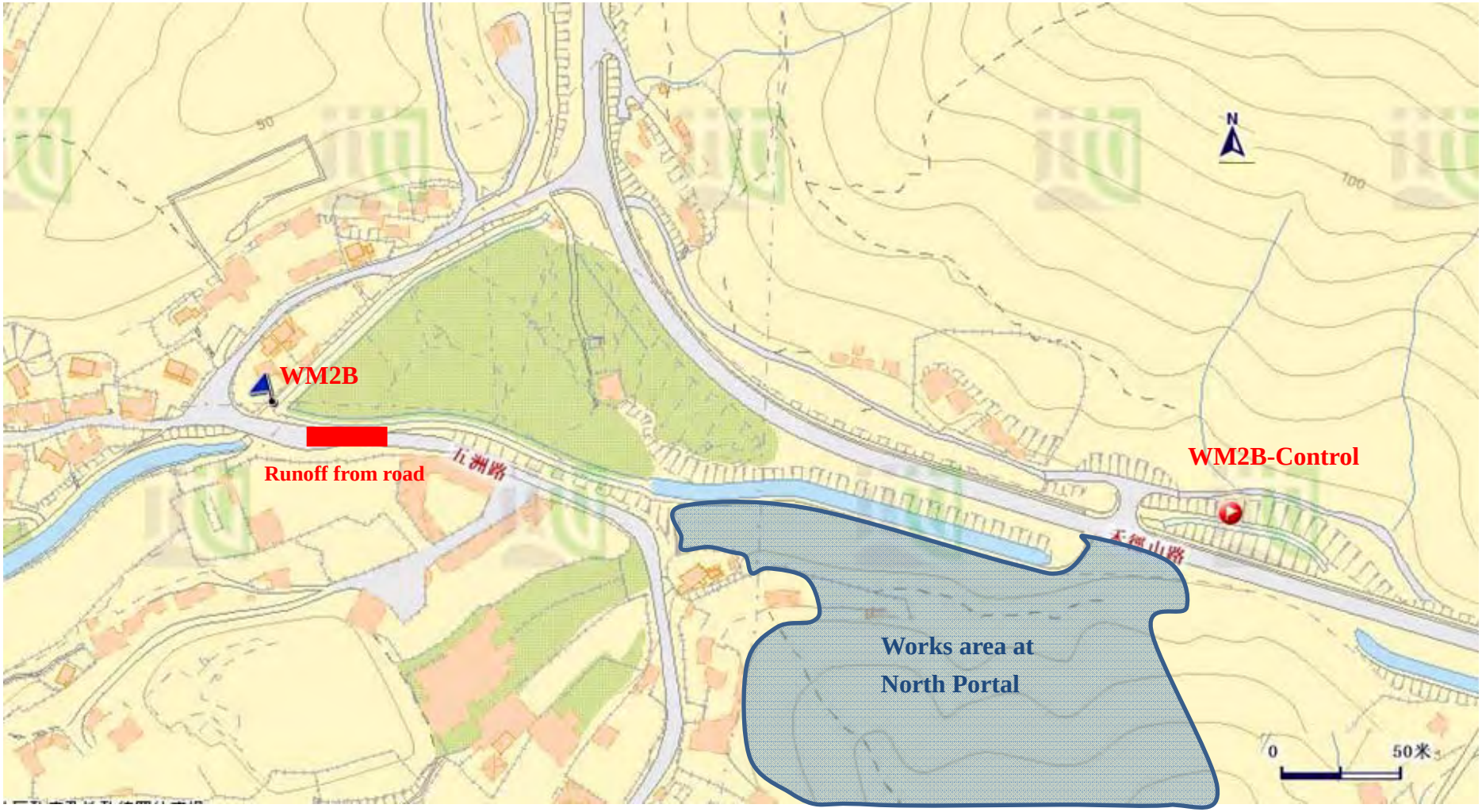


Figure 1 Location Map for Water Quality Monitoring Locations WM2B and WM2B-Control

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**13 September 2016**
Our Ref	TCS00694/13/300/**F0602a**	**No of Pages**	12 **(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 18, 19, 20, 22, 23, 24 and 31 August 2016**		

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/F0565 dated 18 August 2016
TCS00694/13/300/F0568 dated 23 August 2016
TCS00694/13/300/F0585 dated 1 September 2016
TCS00694/13/300/F0601 dated 8 September 2016

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.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

安順聯合環境服務及顧問
Action-United Environmental Services & Consulting
Flat A, 20/F, Gold King Industrial Building,
35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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		18 Aug	19 Aug	20 Aug	22 Aug	18 Aug	19 Aug	20 Aug	22 Aug
Location		WM2A(a)							
Time		11:00	10:55	11:39	11:08	11:00	10:55	11:39	11:08
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**	26.7	62.1	6.6	9.1	20.0	19.0	4.5	8.0
	WM2A(a)	**357.5**	**265.5**	**547.5**	**374.5**	**244.0**	**336.0**	**335.5**	**248.0**
Exceedance		Limit level	Limit level	Limit level	Limit level	Limit level	Limit level	Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided from the CCKJV, construction activities carried out on 18 to 22 August 2016 at Bridge D (upstream of WM2A) were mainly bored piling and pile cap works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team, the water observed at WM2A(a) was turbid on 18, 19, 20 and 22 August 2016. There was discharge from the AquaSed into the river course on 18 and 22 August 2016 and the effluent quality was clear. The water quality at WM2A-C was found cloudy on 18 and 19 August 2016 and water flow was fairly vigorous compared to non-rainy day. The water quality at WM2A-C was clean on 20 and 22 August 2016 (Photo 1 to 8) 3. In order to identify the source of turbid water, the monitoring team subsequently inspected the alignment of the river course of Bridge D. It was observed that water released from the Nylon Dam after heavy rain on 19 and 22 August 2016. The water flow of the river became very vigorous and stirred up the loose sediment at the river bed. Moreover, muddy water was observed in the Nylon Dam on 18, 19, 20 and 22 August 2016. (Photo 9 to 12) 4. Weekly joint site inspection at Bridge D was carried out on 18 and 25 August 2016. The observation during the site inspection is summarized below. (a) Wastewater treatment facilites (3 nos. of AquaSed) were provided for Bridge D (***Figures 1 and 2***) According to the daily record of wastewater treatment systems provided by the Contractor of Contract 6, the wastewater discharge from the site was compliance with the Discharge Licences requirements. (b) To minimize the muddy runoff from the site, the Contractor has covered the exposed slopes as far as practicable.								

	Moreover, the edges of the slope top were bund up to minimize surface runoff (Photo 13 and 14) (c) Concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site. (Photo 15) 5. According to the Hong Kong Observatory, there was rainstorm recorded on 18 to 22 August 2016. Due to continuous rainfall, large amount of surface muddy runoff generated from the surrounding environment has been flowing into existing stream. The muddy runoff resulted in slurry and mud accumulated in the river bed. According to the photo recorded and monitoring data, the water quality at control station WM2A-C was also affected by the rainfall, particularly on 18 and 19 August 2016. 6. In our investigation, it is considered the exceedance was due to surface runoff and mud from the surrounding environmental under rainstorm and unlikely caused by the works under the project. 7. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were exceedances of SS and NTU 23 and 24 August 2016. The Contractor should continually implement the water mitigation measures in full gear as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature :

Date : 13 September 2016

Photo Record

Photo 1

On 18 Aug 2016, turbid water was observed in the existing river course and WM2A(a). There was discharge from the AquaSed into the river course and the effluent quality was clear.

Photo 2

On 18 Aug 2016, cloudy water was observed at WM2A-C and the water flow was vigorous compared to non-rainy day

Photo 3

On 19 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 4

On 19 Aug 2016, cloudy water was observed at WM2A-C and the water flow was vigorous compared to non-rainy day

Photo 5

On 20 Aug 2016, turbid water was observed in the existing river course and WM2A(a).

Photo 6

On 20 Aug 2016, visually clear water was observed at WM2A-C.

Photo 7

On 22 Aug 2016, turbid water was observed in the existing river course and WM2A(a). There was discharge from the AquaSed into the river course and the effluent quality was clear.

Photo 8

On 22 Aug 2016, visually clear water was observed at WM2A-C.

Photo 9

On 18 Aug 2016, muddy water was observed at the Nylon Dam.

Photo 10

On 19 Aug 2016, water releasing from Nylon Dam was observed after heavy rain. The sediment cumulated at the river bed was stirred up.

Photo 11

On 20 Aug 2016, muddy water was observed at the Nylon Dam.

Photo 12

On 22 Aug 2016, water releasing from the rubber dam was observed after heavy rain. The sediment cumulated at the river bed was stirred up.

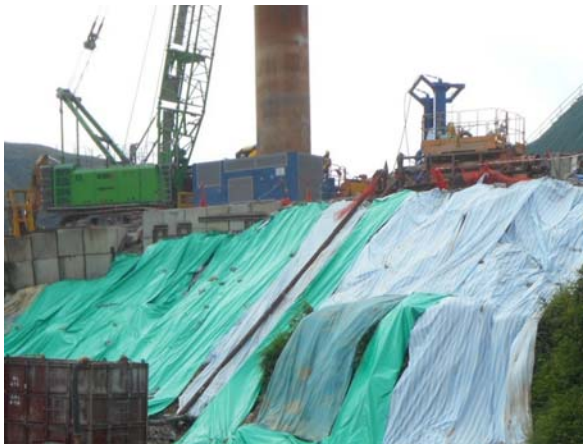


Photo 13

The exposed slopes have been covered with tarpaulin as far as practicable.

Photo 14

The edges of slope top have been bund up to minimize muddy runoff.

Photo 15

Concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site.

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		23 Aug	24 Aug	31 Aug
Location		WM2A(a)		
Time		11:30	12:06	10:40
Parameter		Suspended Solids (mg/L)		
Action Level		14.6 AND 120% of upstream control station of the same day		
Limit Level		17.3 AND 130% of upstream control station of the same day		
Measured Levels	**WM2A-C**	9.0	7.5	9.5
	WM2A(a)	**35.0**	**30.5**	**25.0**
Exceedance		Limit level	Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided from the CCKJV, construction activities carried out on 23, 24 and 31 August 2016 at Bridge D (upstream of WM2A) were mainly bored piling and pile cap works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team, the water observed at WM2A(a) was slightly cloudy on 23 August 2016 and the water at WM2A(a) was clean on 24 and 31 August 2016. The water quality at WM2A-C was clean on all days (Photo 1 to 6) 3. Weekly joint site inspection at Bridge D was carried out on 25 August 2016. The observation during the site inspection is summarized below. (a) Wastewater treatment facilites (3 nos. of AquaSed) were provided for Bridge D (***Figures 1 and 2***) According to the daily record of wastewater treatment systems provided by the Contractor of Contract 6, the wastewater discharge from the site was compliance with the Discharge Licences requirements. (b) Concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site. (Photo 7) (c) To minimize the muddy runoff from the site, the Contractor has covered the exposed slopes as far as practicable. Moreover, the edges of the slope top were bund up to minimize surface runoff (Photo 8 and 9) 4. In our investigation, the water mitigation measures implemented on site was in order and there were no rain recorded on 23, 24 and 31 August 2016 and therefore muddy runoff from the site was not likely to occur. It is considered the exceedances were due to natural variation and unlikely caused by the works under the project. 5. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were no exceedances of SS		

	and NTU 25 August 2016 and 1 September 2016. Nevertheless, the Contractor should continually implement the water mitigation measures in full gear as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature :

Date : 13 September 2016

Photo Record

 Photo 1 On 23 Aug 2016, the water observed in the existing river course and WM2A(a) was slightly cloudy.	 **Photo 2** On 23 Aug 2016, visually clear water was observed at WM2A-C.
 Photo 3 On 24 Aug 2016, the water observed in the existing river course and WM2A(a) was clean.	 **Photo 4** On 24 Aug 2016, visually clear water was observed at WM2A-C.
 Photo 5 On 31 Aug 2016, the water observed in the existing river course and WM2A(a) was clean.	 **Photo 6** On 31 Aug 2016, visually clear water was observed at WM2A-C.

Photo 7

Concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site.

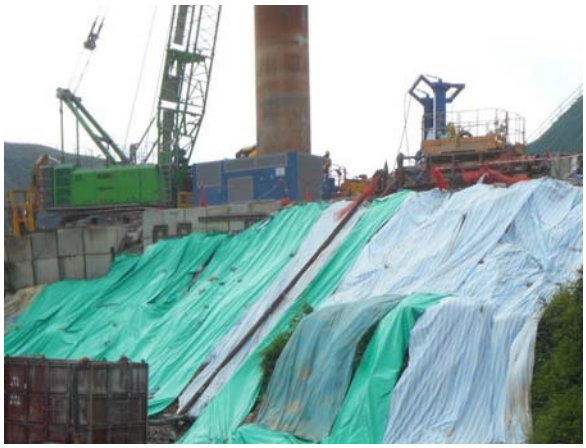


Photo 8

The exposed slopes have been covered with tarpaulin as far as practicable.

Photo 9

The edges of slope top have been bund up to minimize muddy runoff.

Figure 1 Location Map for Water Quality Monitoring Locations WM2A, WM2A-Control and work area under Contract 6

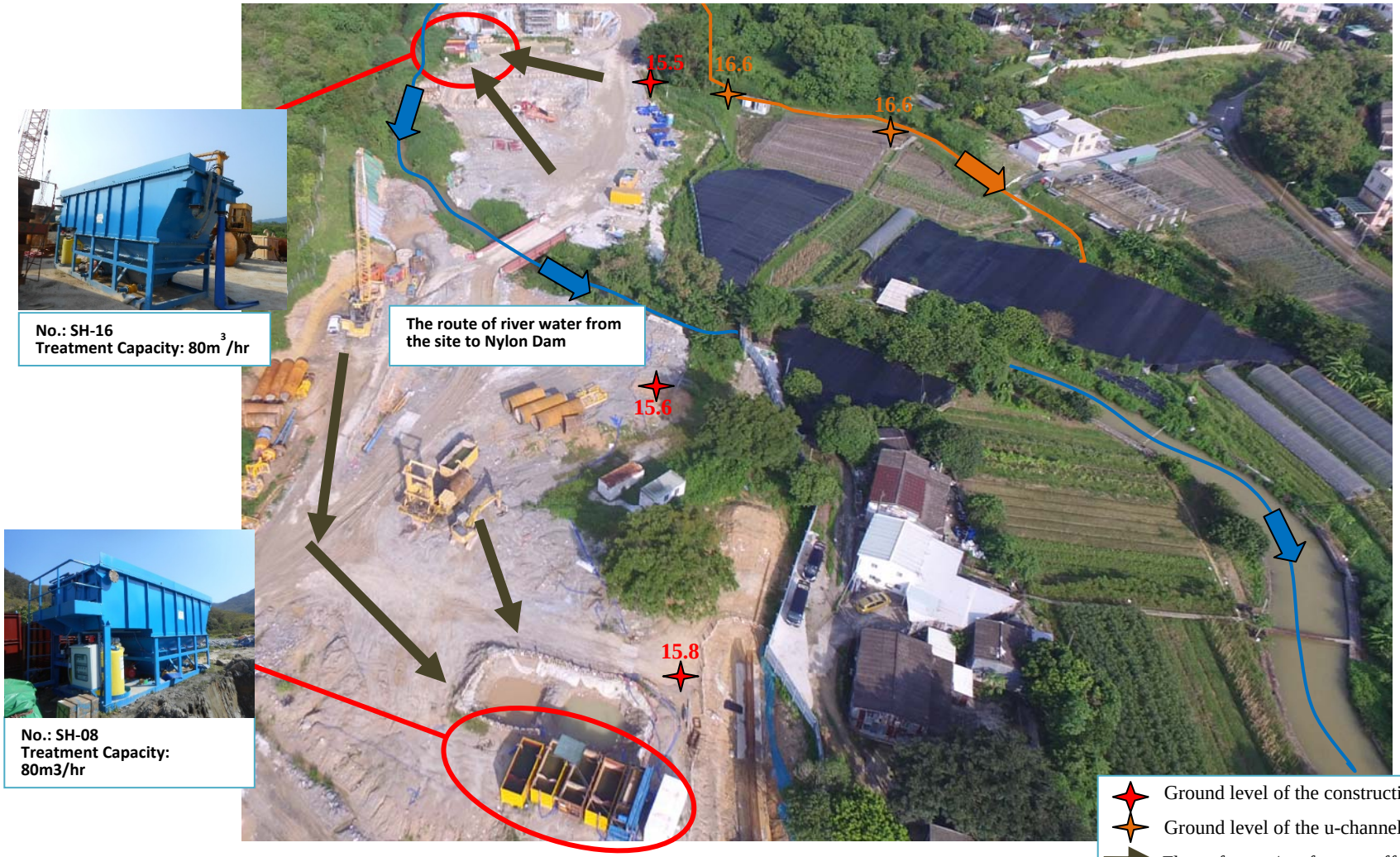


Figure 2 Layout of Bridge D