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.57) – APRIL 2018

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

Date	Reference No.	Prepared By	Certified By
14 May 2018	TCS00694/13/600/R1546v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	10 May 2018	First Submission
2	14 May 2018	Amended according to the IEC's comments on 10 May 2018

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15 May 2018

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

By Email & Post

Attention: Mr Simon LEUNG

Dear Sir

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Monthly EM&A Report (No. 57) – April 2018

With reference to the Monthly EM&A Report No. 57 for April 2018 (Version 2) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/D.

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

Yours faithfully

Antony WONG
Independent Environmental Checker

cc	CEDD/BCP	-	Mr LU Pei Yu / Mr William CHEUNG	by fax: 3547 1659
	ArchSD	-	Mr William WL CHENG	by fax: 2804 6805
	AECOM	-	Mr Pat LAM / Mr Perry YAM	by email
	Ronald Lu	-	Mr Peter YAM / Mr Justin CHEUNG	by email
	CW	-	Mr Daniel HO	by email
	DHK	-	Mr Daniel ALTIER	by email
	CCKJV	-	Mr Vincent CHAN	by email
	KRSJV	-	Mr Matthew TSANG	by email
	Leighton	-	Mr Ray HO	by email
	Siemens	-	Mr Patrick LEUNG	by email
	AUES	-	Mr TW TAM	by email

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

EXECUTIVE SUMMARY

ES01 This is the **57th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 30 April 2018** (hereinafter 'the Reporting Period').

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 To facilitate the project management and implementation, Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project is divided to seven CEDD contracts including Contract 2 (CV/2012/08), Contract 3 (CV/2012/09), Contract 4 (NE/2014/02), Contract 5 (CV/2013/03), Contract 6 (CV/2013/08) and Contract 7 (NE/2014/03) and an ArshSD contract (Contract SS C505).

ES03 In the Reporting Period, the major construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project included Contract 2, Contract 3, Contract 4, Contract 6, Contract 7 and Contract SS C505. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	135
	24-hour TSP	9	44 (^)
Construction Noise	$L_{eq(30min)}$ Daytime	10	40
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C	13 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	13 Scheduled & 0 extra
		WM2B & WM2B-C	13 Scheduled & 0 extra (*)
		WM3x &WM3-C	13 Scheduled & 0 extra
		WM4, WM4-CA &WM4-CB	13 Scheduled & 2 extra
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats and transect	0
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	4
		Contract 3	4
		Contract 4	4
		Contract 6	4
		Contract 7	4
		Contract SS C505 (#)	4

Remark:
(#) IEC only joined one (1) event of site inspection for Contract SS C505.
(*) In the whole Reporting Period, water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)
(^) 24-hour TSP monitoring at AM1b has been temporary suspended since 27 April 2018 as rented land was demolished and returned to the landlord. Alterative location to replaced AM1b is being seeking by ET for IEC and EPD approval.

ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

ES04 In the Reporting Period, no air quality and construction noise exceedance and valid noise complaint was recorded. For water quality monitoring, a total of three (3) Action/Limit Level exceedances were recorded under the Project. The summary of exceedance in the Reporting Period is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--	--
	24-hour TSP	0	0	0	--	--	--
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	0	--	--	--
Water Quality	DO	0	0	0	-	--	--
	Turbidity	0	**2**	**2**	- All exceedances were not project related.	0	The Contractor should fully implement water quality mitigation measure.
	SS	0	**1**	**1**		0	

ES05 Investigation Report for all water quality exceedances was completed by ET. Investigation results revealed that the Contractor had properly implemented water quality mitigation measures such as well-maintained the wastewater treatment facility and covered the expose area with impervious sheet. It was concluded that the exceedances were related to the unknown source of muddy water contributed from outside the project area and not caused by the works under the Project. Nevertheless, the Contractor was reminded to fully implement the water quality mitigation measure throughout the constriction phase as far as practicable.

ENVIRONMENTAL COMPLAINT

ES06 In this Reporting Period, two (2) documented environmental complaints were received under the EM&A programme regarding to the water quality issue. The investigation report for the complaint for Contract 2 regarding the foamy discharge was under reviewed by IEC while the other complaint for Contract SS C505 is underway by ET.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

REPORTING CHANGE

ES08 No reporting changes were made in the Reporting Period.

SITE INSPECTION

ES09 In this Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 2*** has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 20 and 27 April 2018**. No non-compliance was noted during the site inspection.

ES10 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 3*** has been carried out by the RE, IEC, ET and the Contractor on **4, 12, 18 and 26 April 2018**. No non-compliance was noted during the site inspection.

ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 4** has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 16 and 27 April 2018**. No non-compliance was noted.

ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 6*** has been carried out by the RE, IEC, ET and the Contractor on **4, 12, 19 and 26 April 2018**. No non-compliance was noted during the site inspection.

ES13 In the Reporting Period, joint site inspection for **Contract 7** to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 17 and 27 April 2018**. No non-compliance was noted during the site inspection.

ES14 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract SS C505*** has been carried out by the RE, ET and the Contractor on **4, 11, 18 and 25 April 2018** in which IEC joined the site inspection on **25 April 2018**. No non-compliance was noted during the site inspection.

FUTURE KEY ISSUES

ES15 During rainy season, preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River, Kwan Tei River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River.

ES16 In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.

ES17 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

ES18 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Civil Engineering and Development Department is the Project Proponent and the Permit Holder of *Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works*, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/D granted on 20 January 2017.

1.1.2 The Project consists of two main components: Construction of a Boundary Control Point (hereinafter referred as "BCP"); and Construction of a connecting road alignment. Layout plan of the Project is shown in ***Appendix A***.

1.1.3 The proposed BCP is located at the boundary with Shenzhen near the existing Chuk Yuen Village, comprising a main passenger building with passenger and cargo processing facilities and the associated customs, transport and ancillary facilities. The connecting road alignment consists of six main sections:

1) Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;
2) Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Cheung Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;
3) North Tunnel – this section comprises the tunnel segment at Cheung Shan and includes a ventilation building at the portals on either end of the tunnel;
4) Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;
5) South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung;
6) Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.

1.1.4 Action-United Environmental Services & Consulting has been commissioned as an Independent ET to implement the relevant EM&A program in accordance with the approved EM&A Manual, as well as the associated duties. As part of the EM&A program, the baseline monitoring has carried out between **13 June 2013** and **12 July 2013** for all parameters including air quality, noise and water quality before construction work commencement. The Baseline Monitoring Report summarized the key findings and the rationale behind determining a set of Action and Limit Levels (A/L Levels) from the baseline data. Also, the Project baseline monitoring report which verified by the IEC has been submitted to EPD on **16 July 2013** for endorsement. The major construction works of the Project was commenced on **16 August 2013** in accordance with the EP Section 5.3 stipulation.

1.1.5 This is **57th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **30 April 2018**.

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*

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

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

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

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

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

Contract 5 (CV/2013/03)

2.1.6 Contract 5 has awarded in April 2013 and construction work was commenced in August 2013. Major Scope of Work of the Contract 5 is listed below:

- site formation of about 23 hectares of land for the development of the BCP;
- construction of an approximately 1.6 km long perimeter road at the BCP including a 175m long depressed road;
- associated diversion/modification works at existing local roads and junctions including Lin Ma Hang Road;
- construction of pedestrian subway linking the BCP to Lin Ma Hang Road;
- provision of resite area with supporting infrastructure for reprovisioning of the affected village houses; and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

Contract 6 (CV/2013/08)

2.1.7 Contract 6 has awarded in June 2015 and construction work was commenced on 23 October 2015. Major Scope of Work of the Contract 6 would be included below:

- construction of an approximately 4.6km long dual two-lane connecting road (with about 0.6km of at-grade road, 3.3km of viaduct and 0.7km of tunnel) connecting the BCP with the proposed Sha Tau Kok Road Interchange and the associated ventilation buildings;
- associated diversion/modification works at access roads to the resite of Chuk Yuen Village;
- provision of sewage collection, treatment and disposal facilities for the BCP and the resite of Chuk Yuen Village;
- construction of a pedestrian subway linking the BCP to Lin Ma Hang Road;
- provisioning of the affected facilities including Wo Keng Shan Road garden; and
- construction of associated footpath, slopes, retaining structures, drainage, sewerage, waterworks, landscaping works and other ancillary works.

Contract 7 (NE/2014/03)

2.1.8 Contract 7 has awarded in December 2015 and the construction works of Contract 7 was commenced on 15 February 2016. Major Scope of Work of the Contract 7 would be included below:

- construction of the Hong Kong Special Administrative Region (HKSAR) portion of four vehicular bridge
- construction of one pedestrian bridge crossing Shenzhen (SZ) River (cross boundary bridges)

ArchSD Contract No. SS C505

2.1.9 SS C505 has awarded in July 2015 and construction work was commenced on 1 September 2015. Major Scope of Work of the SS C505 would be included below:

- passenger-related facilities including processing kiosks and examination facilities for private cars and coaches, passenger clearance building and halls, the interior fitting works for the pedestrian bridge crossing Shenzhen River, etc.;
- cargo processing facilities including kiosks for clearance of goods vehicles, customs inspection platforms, X-ray building, etc.;
- accommodation for the facilities inside of the Government departments providing services in connection with the BCP;
- transport-related facilities inside the BCP including road networks, public transport interchange, transport drop-off and pick-up areas, vehicle holding areas and associated road furniture etc;
- a public carpark; and

- other ancillary facilities such as sewerage and drainage, building services provisions and electronic systems, associated environmental mitigation measure and landscape works.

2.2 PROJECT ORGANIZATION

2.2.1 The project organization is shown in ***Appendix B***. The responsibilities of respective parties are:

Civil Engineering and Development Department (CEDD)

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

Architectural Services Department (ArchSD)

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

Environmental Protection Department (EPD)

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

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

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

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

Engineer or Engineers Representative (ER)

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

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

- Adhere to the procedures for carrying out complaint investigation
- Liaison with DSD, Engineer/Engineer's Representative, ET, IEC and the Contractor of the "Construction of the DSD's 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, 6, 7 and SS C505 and they are summarized in below. Moreover, 3-month rolling construction program for all the current contracts is enclosed in ***Appendix C***.

Contract 2 (CV/2012/08)

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

Mid-Vent Portal	• Cavern internal structure and tunnel E&M activities • Construction of C&C structure and permanent drainage • Structure connecting adit and ventilation building • Ventilation building superstructure and backfilling activities • Ventilation building fitting out and E&M installation
North Portal	• Southbound and Northbound tunnel waterproofing and lining • Construction of cross passage and internal structure • Tunnel backfilling and E&M installation • North ventilation building structure and internal structure • Construction of retaining wall and permanent drainage • Site formation and construction of slip road • Construction of temporary drainage to prepare for rainy season Construction of temporary utility bridge across the mid-platform
South Portal	• Tunnel waterproofing, lining and backfilling. • Tunnel internal structure and cross passage • Construction of retaining wall and backfilling activities • South ventilation building external wall finishing, fitting out and E&M installations
Admin Building	• Construction of permanent drainage and outdoor platform • Internal fit out and E&M installation. • Soft landscaping work.

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

2.4.4 The Contract was awarded in mid-April 2016 and the construction work was commenced on 2 May 2017. In this Reporting Period, construction activities conducted are listed below:

- System design and testing
- E&M installation at Admin Building
- E&M installation at Ventilation Building
- High mast erection
- E&M installation at OHVD in tunnel

Contract 5 (CV/2013/03)

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

Contract 6 (CV/2013/08)

2.4.6 Contract 6 has awarded in June 2015 and construction work was commenced on 23 October 2015. In this Reporting Period, construction activities conducted are listed below:

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

Contract 7 (NE/2014/03)

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

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

Contract SS C505

2.4.8 Contract SS C505 has awarded in July 2015 and construction work was commenced on 1 September 2015. In this Reporting Period, construction activities conducted are listed below:

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

2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

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

- Woodland Compensation Plan
- Habitat Creation Management Plan
- Wetland Compensation Plan

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

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

Item	Description	License/Permit Status			
		Ref. no.		Effective Date	Expiry Date
Contract 2					
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864		31 Dec 2013	Till Contract ends
2	Chemical Waste Producer Registration	***North Portal*** Waste Producers Number: No.5213-652-D2523-01		25 Mar 2014	Till Contract ends
		Mid-Vent Portal Waste Producers Number: No.5213-634-D2524-01		25 Mar 2014	Till Contract ends
		South Portal Waste Producers Number: No.5213-634-D2526-01		9 Apr 2014	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014 (South Portal)		3 Mar 2014	28 Feb 2019
		No. WT00023063-2015 (North Portal)		18 Dec 2015	31 Mar 2019
		No.: W5/1I392 (Admin Building)		28 Mar 2014	31 Mar 2019
		No.: WT00025594-2016 (Mid-Vent Portal)		7 Oct 2016	31 Mar 2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105		8 Jan 2014	Till Contract ends
5	Construction Noise Permit	GW-RN0744-17	North Portal	15-Nov-2017	09-May-2018
		GW-RN0747-17		15-Nov-2017	09-May-2018
		GW-RN0839-17		25-Dec-2017	17-Jun-2018
		GW-RN0047-18	Mid Vent	05-Feb-2018	01-Aug-2018
		GW-RN0049-18		05-Feb-2017	31-Jul-2018
		GW-RN0765-17	South Portal	01-Dec-2017	31-May-2018
		GW-RN0110-18		22-Mar-2018	21-Sep-2018
		GW-RN0673-17		28-Oct-2017	27-Apr-2018
		GW-RN0788-17		06-Dec-2017	05-Jun-2018
		GW-RN0176-18		30-Apr-2018	27-Oct-2018
		GW-RN0142-18	Admin Bldg	5-Apr-2018	27-Sep-2018

Item	Description	License/Permit Status			
		Ref. no.		Effective Date	Expiry Date
		GW-RN0140-18	Cheung Shan Tunnel	3-Apr-2018	22-Sep-2018
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)		12 Apr 2016	11 Apr 2021
Contract 3					
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101		17 Jul 2013	Till Contract ends
2	Chemical Waste Producer Registration	Waste Producers Number: No.:5113-634-C3817-01		7 Oct 2013	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.:WT00016832 – 2013		28 Aug 13	31 Aug 2018
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914		2 Aug 13	Till Contract ends
5	Construction Noise Permit	GW-RN0669-17		25 Oct 2017	7 Apr 2018
		GW-RN0721-17		26 Nov 2017	20 May 2018
		GW-RN0782-17		8 Dec 2017	26 May 2018
		GW-RN0785-17		19 Dec 2017	16 Jun 2018
		GW-RN0786-17		24 Dec 2017	18 Jun 2018
		GW-RN0801-17		22 Dec 2017	21 Jun 2018
		GW-RN0863-17		17 Jan 2018	5 Jul 2018
		GW-RN0043-18		25 Feb 2018	24 Aug 2018
		GW-RN0044-18		22 Feb 2018	21 Aug 2018
		GW-RN0102-18		14 Mar 2018	31 Aug 2018
		GW-RN0123-18		28 Mar 2018	5 Sep 2018
Contract 5					
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 359338		13 May 2013	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-642-S3735-01		8 Jun 2013	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: W5/1G44/1		8 Jun 13	30 Jun 2018
4	Waste Disposal Regulation - Billing Account for Disposal of	Account No. 7017351		29 Apr 13	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Construction Waste			
Contract 6				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390614	29 Jun 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-652-C3969-01	31 Aug 2015	Till the end of Contract
3	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022707	9 Jul 2015	Till the end of Contract
4	Water Pollution Control Ordinance - Discharge License	No.:WT00024574-2016	31 May 2016	31 May 2021
		No.:WT00024576-2016	31 May 2016	31 May 2021
		No.:WT00024742-2016	14 June 2016	30 June 2021
		No.:WT00024746-2016	14 June 2016	30 June 2021
5	Construction Noise Permit	GW-RW0684-17	30 Oct 2017	29 Apr 2018
		GW-RW0668-17	16 Jan 2018	15 Jul 2018
		GW-RW0086-18	1 Mar 2018	31 Aug 2018
		GW-RW0127-18	25 Mar 2018	27 May 2018
		GW-RW0188-18	27 Apr 2018	27 May 2018
		GW-RW0121-18	30 Apr 2018	29 Oct 2018
Contract SS C505				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	13 Jul 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5213-642-L1048-07	16 Sep 2015	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024865-2016	8 Jul 2016	30 Nov 2020
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022831	23 Jul 2015	Till the end of Contract
5	Construction Noise Permit	GW-RN0624-17	6 Oct 2017	5 Apr 2018
		GW-RN0720-17	26 Nov 2017	25 May 2018
		GW-RN0114-18	5 Apr 2018	4 Oct 2018
Contract 7				

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024129	21 Jan 2016	Till the end of Contract
5	Construction Noise Permit	GW-RN0705-17	5 Nov 2017	4 May 2018
Contract 4				
1	Air pollution Control (Construction Dust) Regulation	Ref. No. 405353	22 July 2016	Till the end of Contract
2	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024973	13 May 2016	Till the end of Contract

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

3.1.1 The Environmental Monitoring and Audit requirements are set out in the Approved EM&A manual. Environmental issues such as air quality, construction noise and water quality were identified as the key issues during the construction phase of the Project.

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

3.2 MONITORING PARAMETERS

3.2.1 The EM&A program of construction phase monitoring shall cover the following environmental issues:

- Air quality;
- Construction noise; and
- Water quality

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

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	• 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 latest alternative monitoring locations has been updated in the revised EM&A Programme (Rev.7) which approved by EPD on 7 April 2017. Besides, Location AM1b was temporary suspended (24-hour TSP monitoring) since 27 April 2018 as the rented land was demolished and returned to the landlord. Alterative location to replaced AM1b is being seeking by ET for IEC and EPD approval. ***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 7
AM2	Village House near Lin Ma Hang Road	LMH to Frontier	Contract 6

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

 # Proposal for the change of air quality monitoring location from AM9a to AM9b was submitted to EPD on 4 Nov 2013 after verified by the IEC and it was approved by EPD (EPD's ref.: (15) in EP 2/N7/A/52 Pt.10 dated 8 Nov 2013).
** Proposal for the change of air quality monitoring location from 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. Besides, Location AM1b was temporary suspended (24-hour TSP monitoring) since 27 April 2018 as the rented land was demolished and returned to the landlord. Alterative location to replaced AM1b is being seeking by ET for IEC and EPD approval.

Table 3-3 Impact Monitoring Stations - Construction Noise

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

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

Table 3-4 Impact Monitoring Stations - Water Quality

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

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

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

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

3.4 MONITORING FREQUENCY AND PERIOD

The requirements of impact monitoring are stipulated in *Sections 2.1.6, 3.1.5* and *4.1.6* of the

approved *EM&A Manual* and presented as follows.

Air Quality Monitoring

3.4.1 Frequency of impact air quality monitoring is as follows:

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

Noise Monitoring

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

Water Quality Monitoring

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

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to approve.

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

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

Table 3-5 Air Quality Monitoring Equipment

Equipment	Model
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 Quest QC-20* 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^{o} light scattering. The 1-hour TSP monitor consists of the following:

(a.) A pump to draw sample aerosol through the optic chamber where TSP is measured;

(b.) A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and

(c.) A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

3.6.2 The 1-hour TSP meter is used within the valid period as follow manufacturer's Operation and Service Manual.

24-hour TSP Monitoring

3.6.3 The equipment used for 24-hour TSP measurement is Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The High Volume Air Sampler (HVS) consists of the following:

(a.) An anodized aluminum shelter;
(b.) A 8"x10" stainless steel filter holder;
(c.) A blower motor assembly;
(d.) A continuous flow/pressure recorder;
(e.) A motor speed-voltage control/elapsed time indicator;
(f.) A 7-day mechanical timer, and
(g.) A power supply of 220v/50 Hz

3.6.4 The HVS is operated and calibrated on a regular basis in accordance with the manufacturer's instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out in two month interval.

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

Noise Monitoring

3.6.6 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels dB(A). Supplementary statistical results (L_{10} and L_{90}) were also obtained for reference.

3.6.7 During the monitoring, all noise measurements would be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $Leq_{(30min)}$ in six consecutive $Leq_{(5min)}$ measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays; $Leq_{(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.

3.6.8 Prior of noise measurement, the accuracy of the sound level meter is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking is performed before and after the noise measurement.

Water Quality

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

Sampling Procedure

3.6.10 A Digital Global Positioning System (GPS) is used to identify the designated monitoring stations prior to water sampling. A portable, battery-operated echo sounder or tape measurement is used for the determination of water depth at each station. At each station, water sample would be collected from 0.1m below water surface or the water surface to prevent the river bed sediment for stirring.

3.6.11 If the water level of a monitoring station is too shallow when sampling, sediment would be disturbed which affecting the accuracy of water quality monitoring. In order to avoid disturbing sediment, depth limits should be set up for the water sampling for the ease of reference. When the measured water depth of the monitoring station (both control and impact stations) is lower than 150mm, water monitoring would not be to perform at that monitoring location. Instead, the monitoring location will be moved to a temporary alternative location monitoring location based on the criteria below:-

(a) the alternative location should be either upstream or downstream of the original location and at the same the river/drain channel
(b) the alternative location should be within 15m far from the original location
(c) if no suitable alternative location could be found within 15m far from the original location, the sampling at that location will be cancelled since sampling at too far from the designated

location could not make a representative sample.

3.6.12 The sample container will be rinsed with a portion of the water sample. The water sample then will be transferred to the high-density polythene bottles as provided by the laboratory, labeled with a unique sample number and sealed with a screw cap.

3.6.13 Before sampling, general information such as the date and time of sampling, weather condition as well as the personnel responsible for the monitoring would be recorded on the field data sheet.

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

In-situ Measurement

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

3.6.16 A portable AZ Model 8685 is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1.

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

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

Laboratory Analysis

3.6.19 All water samples analyzed Suspended Solids (SS) will be carried out by a local HOKLAS-accredited testing laboratory (ALS Technichem (HK) Pty Ltd HOKLAS registration no. 66). SS determination using *APHA Standard Methods 2540D* as specified in the *EM&A Manual* will start within 48 hours of water sample receipt.

3.7 EQUIPMENT CALIBRATION

3.7.1 Calibration of the HVS is performed upon installation and thereafter at bimonthly intervals in accordance with the manufacturer's instruction using the certified standard calibrator (TISCH Model TE-5025A). Moreover, the Calibration Kit would be calibrated annually. The calibration data are properly documented and the records are maintained by ET for future reference.

3.7.2 The 1-hour TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment would be checked before and after each monitoring event. Annually calibration with the High Volume Sampler (HVS) in same condition would be undertaken by the Laboratory.

3.7.3 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.

3.7.4 All water quality monitoring equipment would be calibrated by HOKLAS accredited laboratory of three month intervals.

3.7.5 The calibration certificates of all monitoring equipment used for the impact monitoring program in the Reporting Period and the HOKLAS accredited certificate of laboratory are attached in ***Appendix F***.

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

3.8.1 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. According to the approved Environmental Monitoring and Audit Manual, the air quality, construction noise and water quality criteria were set up, namely Action and Limit levels are listed in ***Tables 3-8, 3-9*** and ***3-10***.

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

Monitoring Station	Action Level (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, 4, 6, 7 and Contract SS C505. Hence, air quality monitoring was performed at all designated locations.

4.1.2 The air quality monitoring schedule is presented in ***Appendix H*** and the monitoring results are summarized in the following sub-sections.

4.2 AIR QUALITY MONITORING RESULTS

4.2.1 In the Reporting Period, 24-hour TSP monitoring at AM1b has been temporary suspended since 27 April 2018 as the area for AM1b was demolished and returned to the landlord. Alterative location is being seeking by ET for IEC and EPD approval. A total of ***135*** events of 1-hour TSP and ***44*** 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
4-Apr-18	67	3-Apr-18	9:27	74	79	71
10-Apr-18	86	9-Apr-18	9:22	71	72	69
16-Apr-18	52	14-Apr-18	8:59	69	67	60
21-Apr-18	77	20-Apr-18	9:38	53	58	64
27-Apr-18	#	26-Apr-18	9:04	54	55	58
Average (Range)	**71 (52 – 86)**	Average (Range)		**65 (53 – 79)**		

Remark: (#) 24-hour TSP monitoring at AM1b has been temporary suspended since 27 April 2018 as the area for AM1b was demolished and returned to the landlord. Alterative location is being seeking by ET for IEC and EPD approval.

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
4-Apr-18	139	3-Apr-18	9:33	92	99	90
10-Apr-18	143	9-Apr-18	9:16	69	70	71
16-Apr-18	129	14-Apr-18	9:02	85	83	82
21-Apr-18	116	20-Apr-18	9:33	54	60	64
27-Apr-18	95	26-Apr-18	9:24	58	58	64
Average (Range)	**124 (95 – 143)**	Average (Range)		**73 (54 – 99)**		

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
4-Apr-18	83	3-Apr-18	9:27	81	86	89
10-Apr-18	134	9-Apr-18	9:07	67	69	72
16-Apr-18	81	14-Apr-18	9:05	76	77	84
21-Apr-18	77	20-Apr-18	9:28	57	59	65
27-Apr-18	54	26-Apr-18	13:12	66	65	66

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
Average (Range)	**86 (54 – 134)**	Average (Range)		**72 (57 – 89)**		

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
5-Apr-18	48	4-Apr-18	9:12	87	87	84
11-Apr-18	77	10-Apr-18	9:27	67	64	69
17-Apr-18	59	16-Apr-18	9:24	62	60	63
23-Apr-18	56	21-Apr-18	9:21	61	62	63
28-Apr-18	66	27-Apr-18	9:51	112	111	120
Average (Range)	**61 (48 – 77)**	Average (Range)		**78 (60 – 120)**		

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
5-Apr-18	50	4-Apr-18	9:14	76	74	75
11-Apr-18	104	10-Apr-18	9:18	72	78	74
17-Apr-18	57	16-Apr-18	9:36	50	49	47
23-Apr-18	36	21-Apr-18	9:28	68	66	64
28-Apr-18	75	27-Apr-18	9:41	108	114	113
Average (Range)	**64 (36 – 104)**	Average (Range)		**75 (47 – 114)**		

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
5-Apr-18	55	4-Apr-18	9:09	76	72	72
11-Apr-18	131	10-Apr-18	9:13	71	65	76
17-Apr-18	107	16-Apr-18	9:43	51	49	53
23-Apr-18	100	21-Apr-18	9:37	73	68	61
28-Apr-18	109	27-Apr-18	13:31	118	126	130
Average (Range)	**100 (55 – 131)**	Average (Range)		**77 (49 – 130)**		

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
5-Apr-18	85	4-Apr-18	9:04	82	80	80
11-Apr-18	135	10-Apr-18	9:07	72	74	70
17-Apr-18	110	16-Apr-18	9:52	47	48	50
23-Apr-18	79	21-Apr-18	9:21	61	65	71
28-Apr-18	82	27-Apr-18	9:31	61	64	65
Average	**98**	Average		**66**		

(Range)	**(79 – 135)**	(Range)	**(47 – 82)**

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
5-Apr-18	36	4-Apr-18	13:00	73	76	71
11-Apr-18	63	10-Apr-18	9:03	64	66	69
17-Apr-18	55	16-Apr-18	10:01	54	53	52
23-Apr-18	39	21-Apr-18	13:07	56	59	62
28-Apr-18	58	27-Apr-18	13:37	69	64	67
Average (Range)	**50 (36 – 63)**	Average (Range)		**64 (52 – 76)**		

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
4-Apr-18	84	3-Apr-18	9:31	58	57	64
10-Apr-18	76	9-Apr-18	9:21	63	62	68
16-Apr-18	49	14-Apr-18	9:37	58	59	62
21-Apr-18	60	20-Apr-18	13:01	61	64	65
27-Apr-18	49	26-Apr-18	13:19	70	68	69
Average (Range)	**64 (49 – 84)**	Average (Range)		**63 (57 – 70)**		

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

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

5 CONSTRUCTION NOISE MONITORING

5.1 GENERAL

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

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

5.2 NOISE MONITORING RESULTS

5.2.1 In the Reporting Period, a total of **40** events noise measurements were carried out at the designated locations. The sound level meter was set in 1m from the exterior of the building façade including noise monitoring locations NM1, NM3, NM4, NM5, NM6, NM7, NM8 and NM9. Therefore, no façade correction (+3 dB(A)) is added according to acoustical principles and EPD guidelines. However, free-field status were performed at NM2a and NM10 and façade correction (+3 dB(A)) has added according to the requirement in this month. The noise monitoring results at the designated locations are summarized in ***Tables 5-1 and 5-2.*** The detailed noise monitoring data are presented in ***Appendix I*** and the relevant graphical plots are shown in ***Appendix J***.

Table 5-1 Summary of Construction Noise Monitoring Results

Construction Noise Level ($L_{eq30min}$), dB(A)					
Date	**NM1**	**NM2a(*)**	**NM8**	**NM9**	**NM10(*)**
3-Apr-18	56	71	66	66	65
9-Apr-18	60	67	58	60	63
20-Apr-18	60	70	59	57	62
26-Apr-18	58	66	59	57	61
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-Apr-18	64	63	53	58	66
10-Apr-18	54	61	53	57	57
16-Apr-18	61	61	52	59	59
27-Apr-18	61	63	53	58	60
Limit Level	**75 dB(A)**				

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

6 WATER QUALITY MONITORING

6.1 GENERAL

6.1.1 In the Reporting Period, construction works under the project has been commenced in Contracts 2, 3, 4, 6, 7 and Contract SS C505 and water quality monitoring was performed at all designated locations. The water quality monitoring schedule is presented in ***Appendix H***. The monitoring results are summarized in the following sub-sections.

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of **thirteen (13)** sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances were recorded at WM4, according to "*Event and Action Plan*" stipulation, 2 additional water quality monitoring day were conducted for WM4x and its control stations.

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

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

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
3-Apr-18	5.5	6.8	5.2	17.4	4.3	9.1	13.5	<2	13.5
5-Apr-18	5.1	6.8	4.9	12.3	5.3	6.0	21.0	4.5	21.0
7-Apr-18	6.3	7.8	4.8	7.8	6.3	16.8	8.5	25.0	8.5
9-Apr-18	5.4	7.1	5.1	13.8	4.5	8.8	13.5	2.5	13.5
11-Apr-18	4.9	6.1	4.4	22.9	2.4	7.0	30.5	<2	30.5
13-Apr-18	4.9	6.1	4.9	30.5	3.4	9.1	30.5	2.0	30.5
16-Apr-18	5.9	5.5	3.4	**104.0**	17.4	13.9	**103.5**	9.5	103.5
17-Apr-18	#	#	#	**41.6**	3.8	13.8	35.0	<2	35.0
18-Apr-18	4.6	5.5	4.3	15.5	7.5	9.7	22.0	9.5	22.0
19-Apr-18	#	#	#	18.9	3.8	6.6	23.0	20.0	23.0
20-Apr-18	4.9	5.7	4.1	17.6	7.2	6.5	23.0	3.0	23.0
23-Apr-18	4.6	5.3	4.5	8.7	3.3	5.5	12.0	<2	12.0
25-Apr-18	4.7	4.8	4.5	19.2	7.0	11.3	21.0	4.0	21.0
28-Apr-18	4.7	6.1	3.1	16.6	10.4	7.5	19.0	5.0	19.0
30-Apr-18	4.8	5.2	4.5	17.6	8.9	6.2	15.0	7.0	15.0

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
3-Apr-18	5.2	10.3	10.4	17.8	5.0	9.0
5-Apr-18	5.3	11.2	10.1	15.1	6.0	10.5
7-Apr-18	7.2	8.7	5.1	8.4	<2	<2
9-Apr-18	6.4	10.4	6.7	14.2	5.0	13.0
11-Apr-18	5.6	9.8	4.3	6.9	3.0	4.5
13-Apr-18	5.3	8.4	12.7	22.4	10.0	30.0
16-Apr-18	6.0	7.6	30.6	297.5	23.5	181.0
18-Apr-18	5.7	8.5	14.6	18.4	13.0	14.5
20-Apr-18	4.4	7.4	10.5	25.4	5.0	31.5
23-Apr-18	6.1	6.7	27.9	24.4	25.5	19.5
25-Apr-18	4.2	6.6	9.2	39.8	3.5	53.5
28-Apr-18	4.4	6.9	37.2	51.3	22.0	56.5

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
30-Apr-18	5.2	10.3	10.4	17.8	5.0	9.0

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
3-Apr-18	7.9	5.6	*	*	13.9	16.2	*	*	8.5	4.5	*	*
5-Apr-18	7.7	5.5	*	*	15.3	12.4	*	*	14.5	3.0	*	*
7-Apr-18	9.0	7.7	*	*	9.9	17.6	*	*	5.5	7.0	*	*
9-Apr-18	7.7	6.8	*	*	6.8	10.8	*	*	7.0	5.5	*	*
11-Apr-18	7.5	6.0	*	*	6.5	11.7	*	*	6.0	4.5	*	*
13-Apr-18	6.8	5.5	*	*	14.3	14.5	*	*	8.0	5.0	*	*
16-Apr-18	7.8	7.4	*	*	57.8	71.1	*	*	43.5	55.0	*	*
18-Apr-18	7.7	5.9	*	*	14.5	71.4	*	*	17.5	44.5	*	*
20-Apr-18	6.5	5.8	*	*	18.5	12.0	*	*	17.0	14.5	*	*
23-Apr-18	6.5	5.5	*	*	13.5	10.9	*	*	7.5	3.5	*	*
25-Apr-18	6.0	5.0	*	*	24.4	72.3	*	*	20.5	28.0	*	*
28-Apr-18	6.7	5.4	*	*	27.0	30.0	*	*	12.5	10.0	*	*
30-Apr-18	6.2	6.8	*	*	21.4	13.0	*	*	14.5	4.5	*	*

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

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-C	WM3x	WM3-C	WM3x	WM3-C
3-Apr-18	7.1	6.5	21.2	28.1	34.5	52.0
5-Apr-18	7.3	6.9	4.8	4.8	8.0	7.0
7-Apr-18	9.5	8.1	4.5	3.9	5.5	3.0
9-Apr-18	7.4	7.3	12.1	31.5	6.0	17.0
11-Apr-18	6.5	6.6	3.9	2.0	4.0	4.0
13-Apr-18	6.2	6.2	10.5	26.9	8.0	23.5
16-Apr-18	6.3	6.8	9.0	9.4	4.5	5.0
18-Apr-18	6.5	6.5	7.3	11.7	9.0	24.0
20-Apr-18	6.2	6.1	12.8	3.5	12.0	2.5
23-Apr-18	6.2	6.1	10.3	10.4	12.0	17.0
25-Apr-18	5.5	5.8	11.6	12.2	15.0	24.5
28-Apr-18	6.8	7.0	12.0	14.6	6.5	19.0
30-Apr-18	7.1	6.7	14.9	16.4	22.5	24.0

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

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance		Project Related exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
WM1	0	0	0	0	0	0	0	0	0	0
WM2A	0	0	0	0	0	0	0	0	0	0
WM2B	0	0	0	0	0	0	0	0	0	0
WM3x	0	0	0	0	0	0	0	0	0	0
WM4	0	0	0	**2**	0	**1**	0	**3**	0	0
No of Exceedance	0	0	0	**2**	0	**1**	0	**3**	0	0

6.2.3 In this Reporting Period, a total of three (3) Limit Level exceedances, namely two (2) Limit Level

exceedance of turbidity and one (1) Limit Level exceedances of Suspended Solids were recorded for the Project and they are summarized in ***Table 6-5***. Investigation Reports for all water quality exceedances were completed by ET. Investigation results revealed that the Contractor had properly implemented water quality mitigation measures such as well-maintained the wastewater treatment facility and covered the expose area with impervious sheet. It was concluded that the exceedances recorded at WM4 were not caused by the works under the Project.

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

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

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
16 and 17 April 2018	WM4	NTU & SS	On 16 April 2018, the Contractor reported that unknown source of muddy water attributed to site area and the muddy water was finally entered Ma Wat River. On 17 April 2018, inflow of turbid water to Ma Wat River was observed and the source of unknown turbid water was out of the site boundary. In our investigation, no adverse water quality impact was observed during the site inspection for both sites of Contracts 2 and 3. It was considered that the exceedances on 16 and 17 April 2018 were related to unknown source of muddy water outside the site boundary and unlikely caused by the works under the project.

7 ECOLOGY MONITORING

7.1 GENERAL

7.1.1 Ecology monitoring for woodland compensation was shall be conducted at bi-monthly interval for the first year and the monitoring frequency would be reduced to quarterly from the second year.

7.1.2 The last Quarterly Ecological Monitoring Report (Dec 2017 - Feb 2018) was submitted to EPD in March 2018 as standalone as supplementary of the EM&A Report. In the Reporting, no Ecological Monitoring Report was carried out and no report will be submitted.

8 WASTE MANAGEMENT

8.1 GENERAL WASTE MANAGEMENT

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

8.2 RECORDS OF WASTE QUANTITIES

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

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

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

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Qty.
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m^3)	**55.5979**	--	**2.880**	--	0	--	**2.901**	--	**1.1**	--	**3.717**	--	**66.1959**
Reused in this Contract (Inert) (in '000 m^3)	0	--	**0.360**	--	0	--	**1.955**	--	0	--	**0.257**	--	**2.572**
Reused in other Contracts/ Projects (Inert) (in '000 m^3)	**3.3680**	Recycling facility as approved alternative site	0	--	0	--	**0.255**	NENT	0	--	0	--	**3.623**
Disposal as Public Fill (Inert) (in '000 m^3)	**52.2299**	Tuen Mun 38	**1.734**	Tuen Mun 38	0	--	**0.691**	Tuen Mun 38	**1.1**	Tuen Mun 38	**2.002**	TKO 137	**57.7569**

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
Recycled Metal ('000kg) #	**33.7800**	Licensed collector	0	-	0	--	0	--	**6.6**	Licensed collector	**202.130**	Licensed collector	**242.51**
Recycled Paper / Cardboard Packing ('000kg) #	**0.3240**	Licensed collector	0	-	0	-	**0.360**	Licensed collector	**0.22**	Licensed collector	0	--	**0.904**
Recycled Plastic ('000kg) #	**2.5000**	Licensed collector	0	-	0	--	0	--	**0.001**	Licensed collector	0	--	**2.501**
Chemical Wastes ('000kg) #	0	-	0	-	0	--	0	--	0	--	0	--	**0**
General Refuses ('000m^3)	**0.5748**	NENT	**0.125**	NENT	0	--	**0.921**	NENT	**0.3**	NENT	**2.470**	NENT	**4.3908**

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

9 SITE INSPECTION

9.1 REQUIREMENTS

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

9.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

Contract 2

9.2.1 In the Reporting Period, joint site inspection for Contract 2 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 20 and 27 April 2018**. No non-compliance was noted.

9.2.2 The findings / deficiencies of ***Contract 2*** that observed during the weekly site inspection are listed in ***Table 9-1***.

Table 9-1 Site Observations for Contract 2

Date	Findings / Deficiencies	Follow-Up Status
06 April 2018	• No wheel washing facility at site entrance was observed. The Contractor was advised to provide wheel washing facility to avoid dust material out of site and ensure all vehicles was washed before leaving site.(Admin Building) • The Contractor was reminded to cover stockpiles of cement bags at Mid-vent near main building.	• Wheel washing was provided at site entrance. Last observation closed. • Not required for reminder.
13 April 2018	• No adverse environmental issue was observed.	• Nil.
20 April 2018	• No adverse environmental issue was observed.	• Nil.
27 April 2018	• No adverse environmental issue was observed.	• Nil.

Contract 3

9.2.3 In the Reporting Period, joint site inspection for Contract 3 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **4, 12, 18 and 26 April 2018**. No non-compliance was noted.

9.2.4 The findings / deficiencies of ***Contract 3*** that observed during the weekly site inspection are listed in ***Table 9-2***.

Table 9-2 Site Observations for Contract 3

Date	Findings / Deficiencies	Follow-Up Status
4 April 2018	• No adverse environmental issue was observed.	• NA.
12 April 2018	• The Contractor should check and carry out maintenance work for the AquaSed WWPS7 to ensure the wastewater is properly treated prior discharge.	• AquaSed WWPS7 has been checked by the trained operator.
18 April 2018	• The Contractor reminded to cover the exposed slopes to minimize generation of muddy runoff during rainy day.	• Not required for reminder.
26 April 2018	• No adverse environmental issue was observed.	• NA.

Contract 4

9.2.5 In the Reporting Period, joint site inspection for Contract 4 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 16 and 27 April 2018**. No non-compliance was noted.

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

Table 9-3 Site Observations for Contract 4

Date	Findings / Deficiencies	Follow-Up Status
6 April 2018	• No adverse environmental issue was observed.	• NA
13 April 2018	• No adverse environmental issue was observed.	• NA
16 April 2018	• No adverse environmental issue was observed.	• NA
27 April 2018	• No adverse environmental issue was observed.	• NA

Contract 6

9.2.7 In the Reporting Period, joint site inspection for Contract 6 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **4, 12, 19 and 26 April 2018**. No non-compliance was noted.

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

Table 9-4 Site Observations for Contract 6

Date	Findings / Deficiencies	Follow-Up Status
4 April 2018	• Open stockpiles was observed at the roadside of LMH road. The Contractor was advised to cover it with tarpaulin sheets to avoid dust emission.	• The stockpile was covered properly to reduce dust emission.
12 April 2018	• No adverse environmental issue was observed.	• NA
19 April 2018	• No adverse environmental issue was observed.	• NA
26 April 2018	• Part of open slope was observed without proper covering near river at work area of D01. The Contractor was avised to provide proper covering for open slope of work area D01.	• The open slop was covered properly.

Contract SS C505

9.2.9 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, ET and the Contractor on **4, 11, 18 and 25 April 2018** in which IEC joined the site inspection on **25 April 2018**. No non-compliance was noted.

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

Table 9-5 Site Observations for Contract SS C505

Date	Findings / Deficiencies	Follow-Up Status
28 Mar 2018	• Oil leakage was observed on the ground of 1/F in front of PTB. The Contractor should clean the oil leakage and dispose of as chemical wastes. Besides, the Contractor should also provide proper label for chemical container and place chemical containers inside drip tray.	• Oil leakage was cleaned and disposed as chemical waste and chemical containers were placed inside drip tray.
4 April 2018	• No adverse environmental issue was observed.	• NA
11 April 2018	• Cement grouting activity was observed without proper mitigation at R/F of building 7. The Contractor was advised to provide proper sheltered area with three sides and top for cement grouting activity to avoid dust emission.	• No cement grouting was carried out and the equipment was covered. Last observation closed.

Date	Findings / Deficiencies	Follow-Up Status
18 April 2018	• The Contractor was reminded to clean stagnant water within site area after raining.	• Not required for reminder.
25 April 2018	• The Contractor was reminded to clean stagnant water within site area after raining. • The Contractor was reminded to perform house-keeping within site area (especially food waste).	• Not required for reminder. • Not required for reminder.

Contract 7

9.2.11 In the Reporting Period, joint site inspection for Contract 7 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 17 and 27 April 2018**. No non-compliance was noted.

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

Table 9-6 Site Observations for Contract 7

Date	Findings / Deficiencies	Follow-Up Status
6 April 2018	• Exposed dust materials along site boundary was observed. The Contractor should provide proper mitigation measure along site boundary to avoid potential runoff out of site. • The Contractor was reminded to spray water regularly for unpaved haul road.	• Proper mitigation measure was provided. Last observation closed. • Not required for reminder.
13 April 2018	• No adverse environmental issue was observed.	• NA
17 April 2018	• No adverse environmental issue was observed.	• NA
27 April 2018	• Silt sedimentation tanks was observed near site entrance. The Contractor was advised to maintain sedimentation tank regularly. The Contractor was reminded to provide proper mitigation measure along site boundary to avoid potential runoff out of site. • Muddy surface runoff near site boundary of bridge E was observed. The Contractor was advised to provide proper mitigation measure to avoid runoff out of site area. entrance.	• Proper maintenance was carried out for sedimentation tank. Last observation closed. • Proper mitigation was provided for site boundary to aviod surface runoff out of site. Last observation closed.

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

10 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTIONS

10.1.1 In the Reporting Period, two (2) documented environmental complaints were received under the EM&A program of the Project which related to water quality issue. No summons and prosecution under the EM&A Programme was lodged for all Contracts. The status of the outstanding investigation report in previous months is summarized below.

Date of complaint	Complaint Detail	Investigation Status
13 April 2018 (received by ET on 20 April 2018)	EPD had received a complaint regarding foams in water discharged from the North Portal Site of Contract 2.	The ET's draft IR was provided for IEC on 8 May 2018 and IEC issued comments on same day. The 2nd version of the IR was provided for IEC's further review on 10 May 2018 and IEC commented on 14 May 2018. Further information is being collected from the Contractor of Contract 2 (DHK) to incorporate into the IR. The finalized IR will be provided in next reporting month.
29 April 2018 (received by ET on 2 May 2018)	A public complaint was received from ASD regarding the muddy water flowing from the construction site of Contact SS 505.	Investigation was in progress and it will be provided in next reporting month.

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

Table 10-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
19 May 2014 – 31 Mar 2018	Contract 2	0	**34**	• **(18)Water Quality** • **(8) Dust** • **(5) Noise** • **(1) dust & noise** • **(1) waste management** • **(1) Water quality and dust**	**(6) water quality** **(2) dust** **(1) noise**
06 Nov 2013 – 31 Mar 2018	Contract 3	0	**6**	• **(2) Dust** • **(3) Water quality** • **(1) Noise**	**0**
16 Aug 2013 – 31 Mar 2018	Contract 5	0	**4**	• **(3) Dust** • **(1) Noise**	**0**
16 Aug 2013 – 31 Mar 2018	Contract 6	0	**38**	• **(23) Water Quality** • **(8) Dust** • **(3) Noise** • **(1) Nuisance** • **(1) Noise and dust** • **(2) Water quality and dust**	**(7) water quality** **(3) dust** **(1) Nuisance** **(1) Water quality and dust**
15 Feb 2016 – 28 Feb 2018	Contract 7	0	**3**	• **(1) Noise** • **(2) Water quality and dust**	**(1) Water quality and dust**
16 Aug 2013 – 31 Mar 2018	SS C505	0	**4**	• **(1) Noise** • **(1) dust** • **(2) Water quality and dust**	**(1) Water quality and dust**

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
1 – 30 Apr 2018	Contract 2	**1**	**35**	• **(19)Water Quality** • **(8) Dust** • **(5) Noise** • **(1) dust & noise** • **(1) waste management** • **(1) Water quality and dust**	NA
	Contract 3	0	**6**	• **(2) Dust** • **(3) Water quality** • **(1) Noise**	NA
	Contract 4	0	0	NA	NA
	Contract 6	0	**38**	• **(23) Water Quality** • **(8) Dust** • **(3) Noise** • **(1) Nuisance** • **(1) Noise and dust** • **(2) Water quality and dust**	NA
	Contract 7	0	**3**	• **(1) Noise** • **(2) Water quality and dust**	NA
	SS C505	**1**	**5**	• **(1) Noise** • **(1) dust** • **(2) Water quality and dust** • **(1) Water quality**	NA

Table 10-2 Statistical Summary of Environmental Summons

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 Mar 2018	Contract 2	0	**1**	contravening the Water Pollution Control (General) Regulations
06 Nov 2013 – 31 Mar 2018	Contract 3	0	0	NA
16 Aug 2013 – 31 Mar 2018	Contract 5	0	0	NA
16 Aug 2013 – 31 Mar 2018	Contract 6	0	0	NA
15 Feb 2016 – 28 Feb 2018	Contract 7	0	0	NA
16 Aug 2013 – 31 Mar 2018	SS C505	0	0	NA
1 – 30 Apr 2018	Contract 2	0	**1**	NA
	Contract 3	0	0	NA
	Contract 4	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

Table 10-3 Statistical Summary of Environmental Prosecutions

Reporting Period	Contract No	Environmental Prosecutions Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 31 Mar 2018	Contract 2	0	**1**	contravening the Water Pollution Control (General) Regulations

Reporting Period	Contract No	Environmental Prosecutions Statistics		
		Frequency	Cumulative	Complaint Nature
06 Nov 2013 – 31 Mar 2018	Contract 3	0	0	NA
16 Aug 2013 – 31 Mar 2018	Contract 5	0	0	NA
16 Aug 2013 – 31 Mar 2018	Contract 6	0	0	NA
15 Feb 2016 – 28 Feb 2018	Contract 7	0	0	NA
16 Aug 2013 – 31 Mar 2018	SS C505	0	0	NA
1 – 30 Apr 2018	Contract 2	0	**1**	NA
	Contract 3	0	0	NA
	Contract 4	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

11 IMPLEMENTATION STATUS OF MITIGATION MEASURES

11.1 GENERAL REQUIREMENTS

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

11.1.2 All contracts under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by Contracts 2, 3, 4, 5, 6, 7 and Contract SS C505 in this Reporting Period are summarized in ***Table 11-1***.

Table 11-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	• 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.

11.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

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

Contract 2

Mid-Vent Portal	• Construction of Cut and Cover structure and backfilling • Construction of adit enlargement internal structure • Stud tunnel internal structure and E&M installation • Ventilation building superstructure, fence wall, internal fitting out and E&M installation • Structure connecting adit tunnel and ventilation building • Permanent drainage and underground utilities
North Portal	• Construction of retaining wall, permanent drainage, site formation and slip road • Tunnel waterproofing, lining, backfilling and E&M installation • Construction of cross passage and internal structure • North ventilation building superstructure, internal structure and backfilling • Drainage cleansing and construction of temporary utility bridge across the mid-platform
South Portal	• Waterproofing and lining activities inside the tunnel • Construction of tunnel cross passage, tunnel backfilling and E&M

	installation • South ventilation building fitting out and E&M installation • Construction of retaining walls and backfilling activities
Admin Building	• Construction of outdoor platform and vehicle access road. • Building fit out, E&M installation and soft landscaping works.

Contract 3

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

Contract 4

- System design and testing
- E&M installation at Admin Building
- E&M installation at Ventilation Building
- High mast erection
- E&A installation at OHVD in tunnel

Contract 6

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

Contract 7

- Deck construction at Bridge E
- Profile barrier construction at Bridge B, D and E
- Construction of Façade and BMU at Bridge C
- Drainage and watermains at perimeter road
- Bitumen pavement at perimeter road

Contract SS C505

- Building no. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31 and 41 constructions
- Constructions of Steel Canopies (Building no. 32, 33, 34 and 35)
- Constructions of Master Water Meter Room 1, 2 and 3 (Building no. 42, 43, 44)
- Tower crane operation
- Bridge 1 - 5 construction works including retaining wall, road and finishes works
- Steel Canopies construction
- Underground drainage works, Road Works, CLP Cable laying and Landscaping
- Formwork and falsework for PTB's slab and internal wall construction

- Construction PTB M/F, 1/F, 2/F and Roof flat slab
- Construction PTB non-structural wall, Underground Drainage and Utilities, Fence Wall, On Grade Ground Slab and Paving
- PTB Southern Entrance Construction & Curtain Wall Installation
- Backfilling works
- PTB Major Plant Rooms ABWF & MEP Installation, Lift and Escalator Installation by NSC
- Integrated ABWF & MEP Works in PTB, Building no. 1, 2, 3, 4, 5, 6, 7, 10, 11, 14, 18, 36 and 41
- Elevated Walkway E1, E2, E3 and E4 construction
- Tower Crane Dismantling Works

11.3 KEY ISSUES FOR THE COMING MONTH

11.3.1 Key issues to be considered in the coming month for Contracts 2, 3, 4, 6, 7 and SS C505 include:

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

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 CONCLUSIONS

12.1.1 This is the **57th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **30 April 2018**.

12.1.2 For air quality monitoring, no 1-hour TSP and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded.

12.1.3 In the Reporting Period, no construction noise measurement results that exceeded the Limit Level were recorded. Moreover, no valid noise complaint which triggered an Action Level exceedance was recorded.

12.1.4 For water quality monitoring, a total of 3 LL exceedances, namely 2 LL exceedance of turbidity and 1 LL exceedances of SS were recorded. Investigation reports revealed that the Contractor had properly implemented water quality mitigation measures such as well-maintained the wastewater treatment facility and covered the expose area with impervious sheet. It was concluded that all the exceedances were not related to the unknown source of muddy water contributed from outside the project area and not caused by the works under the Project.

12.1.5 In this Reporting Period, two (2) documented environmental complaints were received under the EM&A programme regarding to the water quality issue. The investigation report for the complaint for Contract 2 regarding the foamy discharge is under reviewed by IEC while the other complaint for Contract SS C505 is underway by ET.

12.1.6 In the Reporting Period, no environmental summons and prosecution under the EM&A Programme was lodged for all Contracts.

12.1.7 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, 4, 6 and 7 in accordance with the EM&A Manual stipulation. For Contract SS C505, weekly joint site inspection was carried out by the RE, IEC, ET and main-contractor whereas IEC performed monthly site inspection. No non-compliance observed during the site inspection.

12.2 RECOMMENDATIONS

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

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

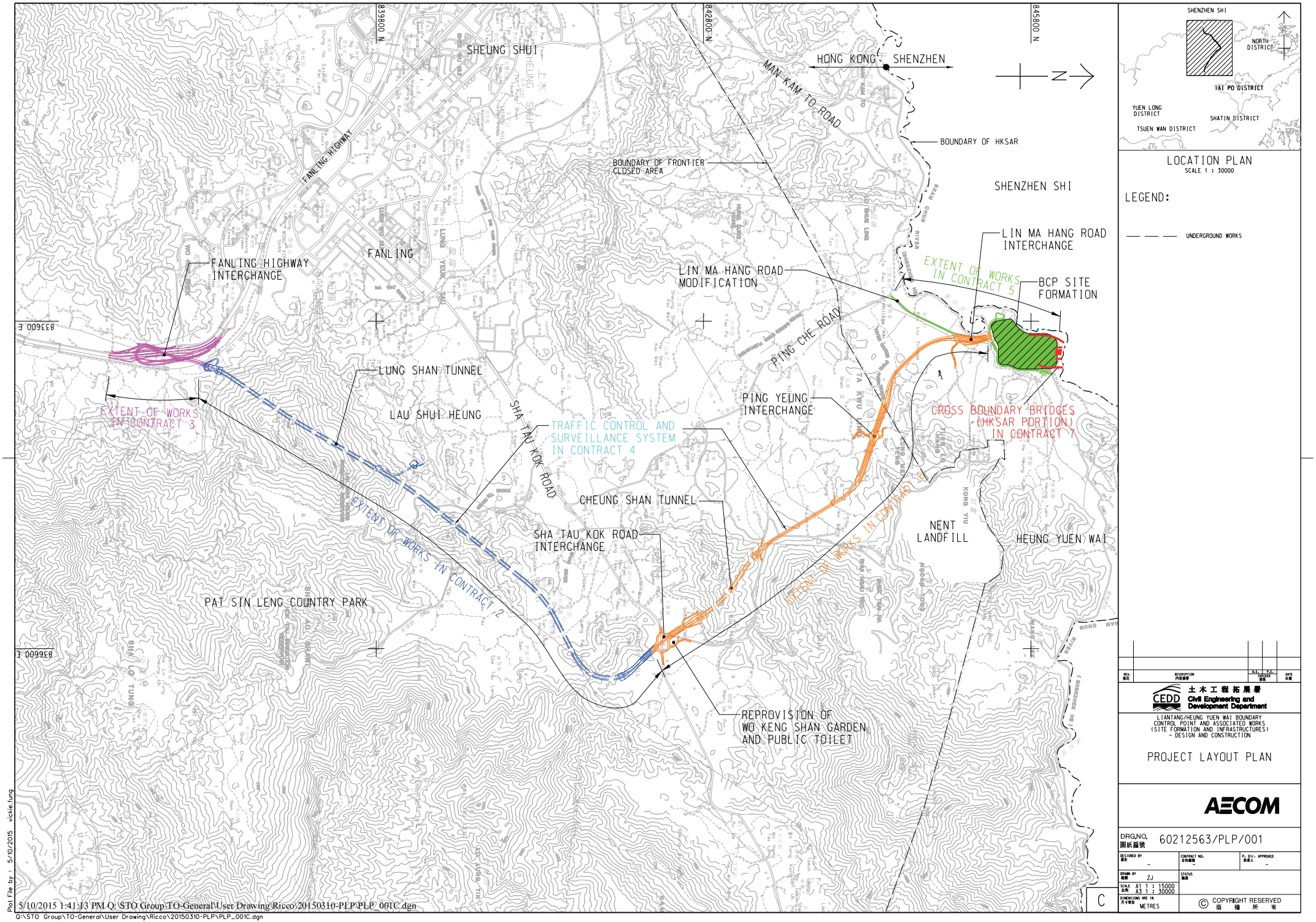
12.2.3 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

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

12.2.5 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be kept to prevent mosquito breeding on site.

Appendix A

Layout plan of the Project



LOCATION PLAN
SCALE 1 : 30000

LEGEND:

UNDERGROUND WORKS

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

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 ZJ	STATUS 階段	
SCALE 比例 A1 1 : 15000 A3 1 : 30000		
DIMENSIONS ARE IN 尺寸單位 METRES	© COPYRIGHT RESERVED 版權所有	

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

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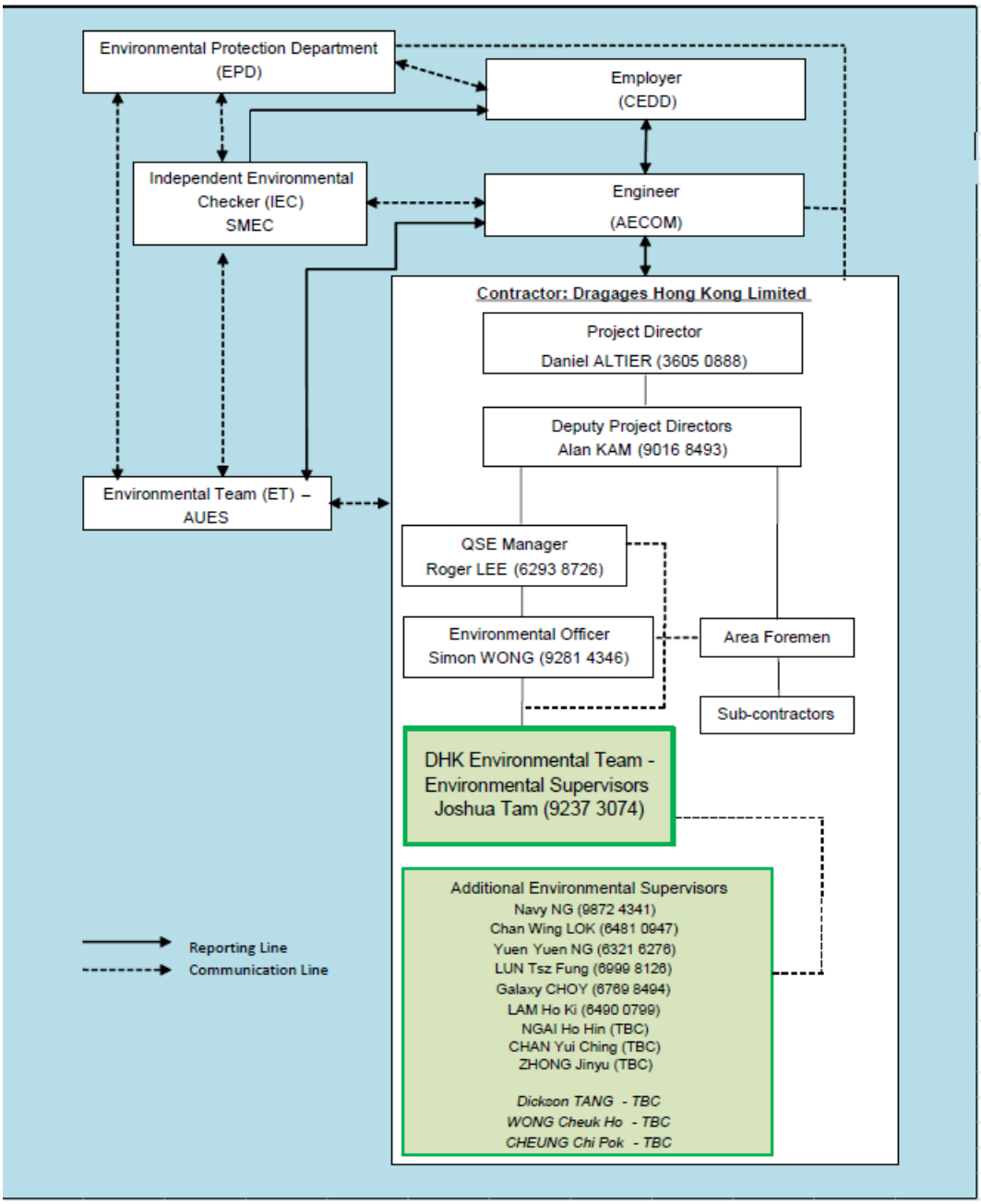
Appendix B

Organization Chart



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

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Edwin Ching	2171 3301	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	3605 0888	2171 3299
DHK	Deputy Project Manager	Alan Kam	9016 8493	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3017	2171 3299
DHK	Environmental Supervisor	Joshua Tam	9237 3074	2171 3299
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

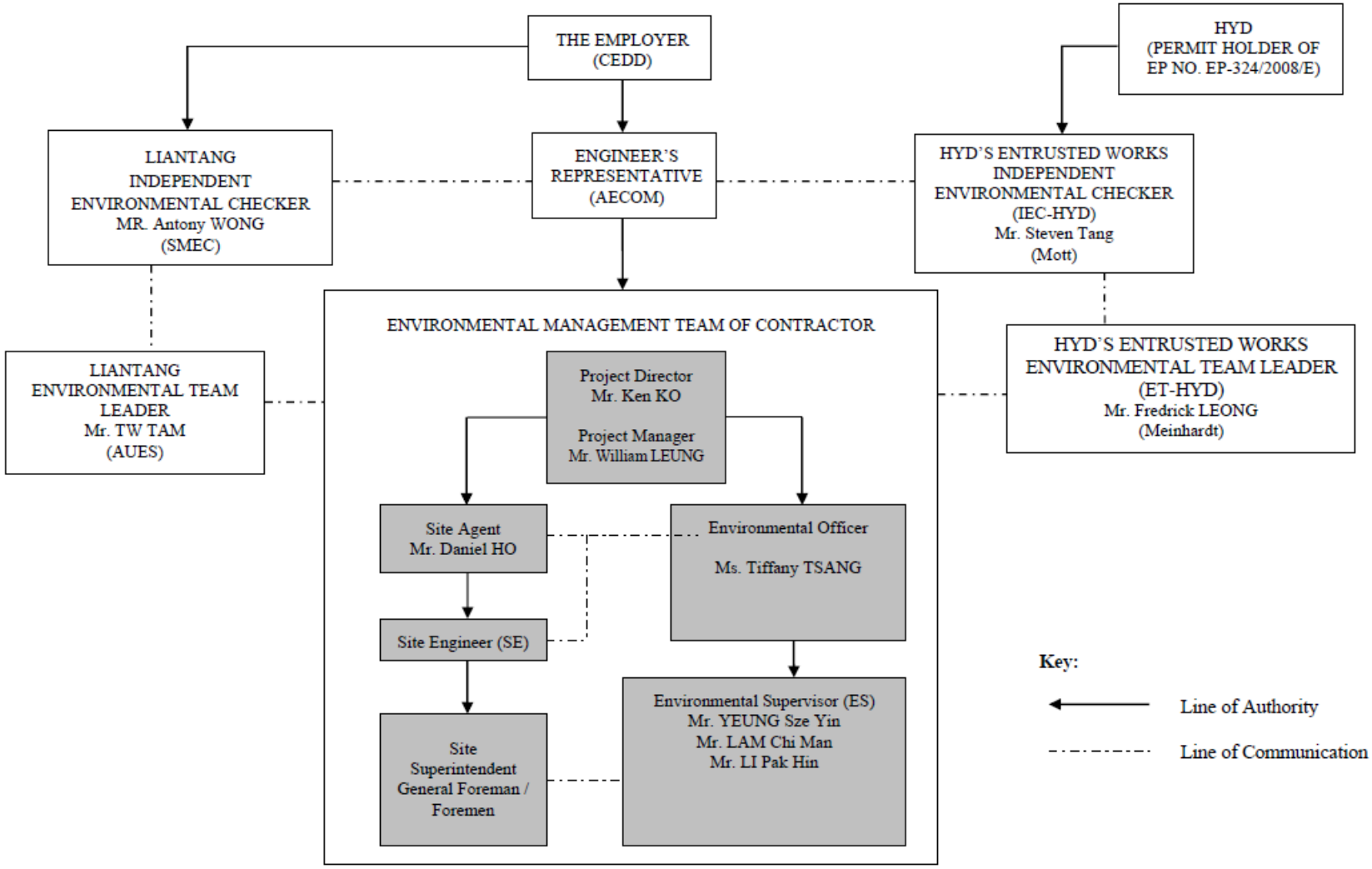
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

DHK(Main Contractor) –Dragages Hong Kong Ltd.

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization for Contract 3 - CV/2012/09

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Alan Lee	2171 3303	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Chun Wo	Project Director	Ken Ko	3758 8735	2638 7077
Chun Wo	Project Manager	William Leung	2638 6136	2638 7077
Chun Wo	Site Agent	Daniel Ho	2638 6144	2638 7077
Chun Wo	Environmental Officer	Tiffany Tsang	2638 6151	2638 7077
Chun Wo	Environmental supervisor	Li Pak Hin	2638 6125	2638 7077
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

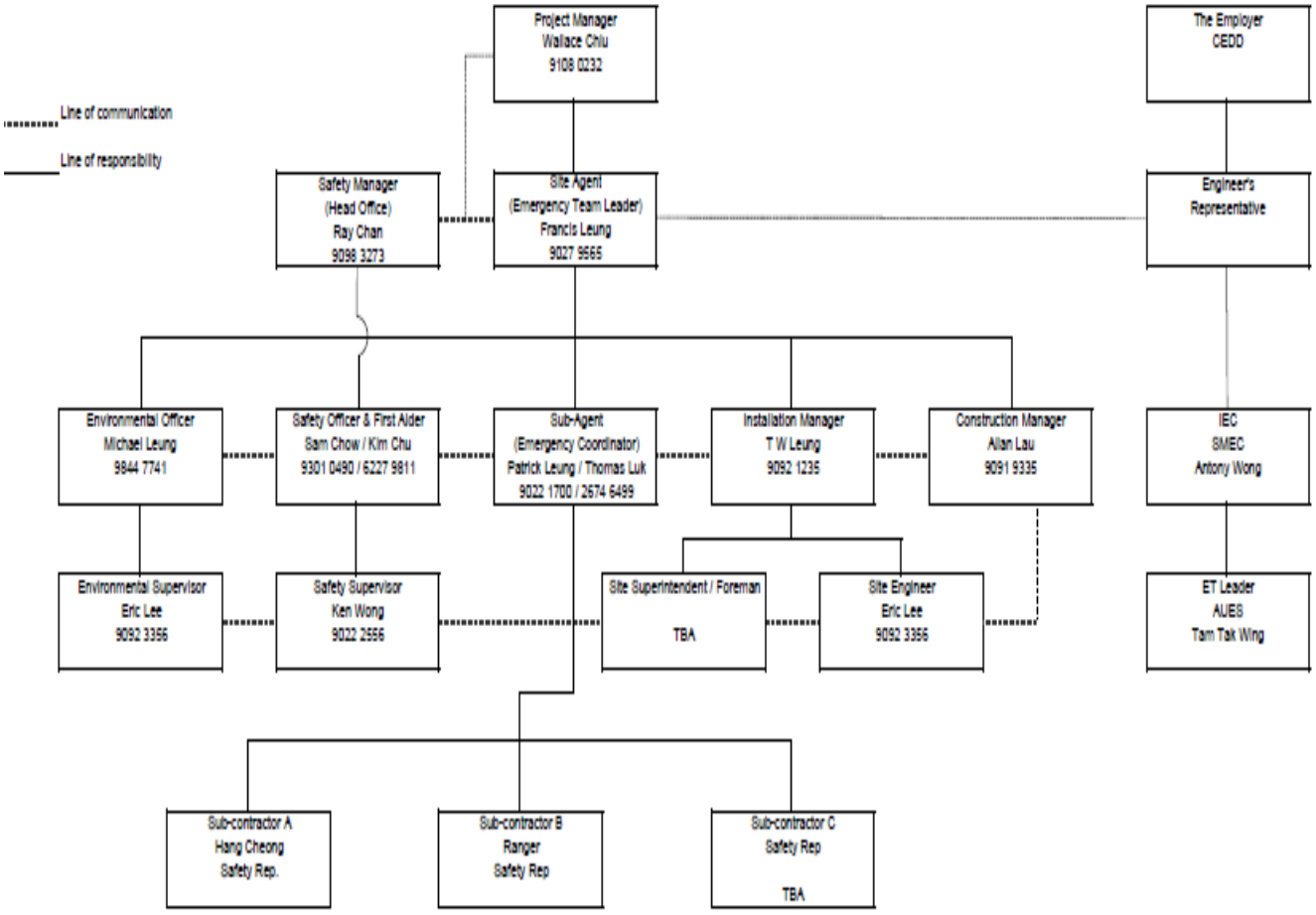
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



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

Contact Details of Key Personnel for Contract 4 - NE/2014/02

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Leo Lai	2171 3310	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Siemens	Project Manager	Wallace Chiu	9108 0232	--
Siemens	Site Agent	Francis Leung	9027 9565	--
Siemens	Environmental Officer	Michael Leung	9844 7741	--
Siemens	Environmental Supervisors	Eric Lee	9092 3356	--
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

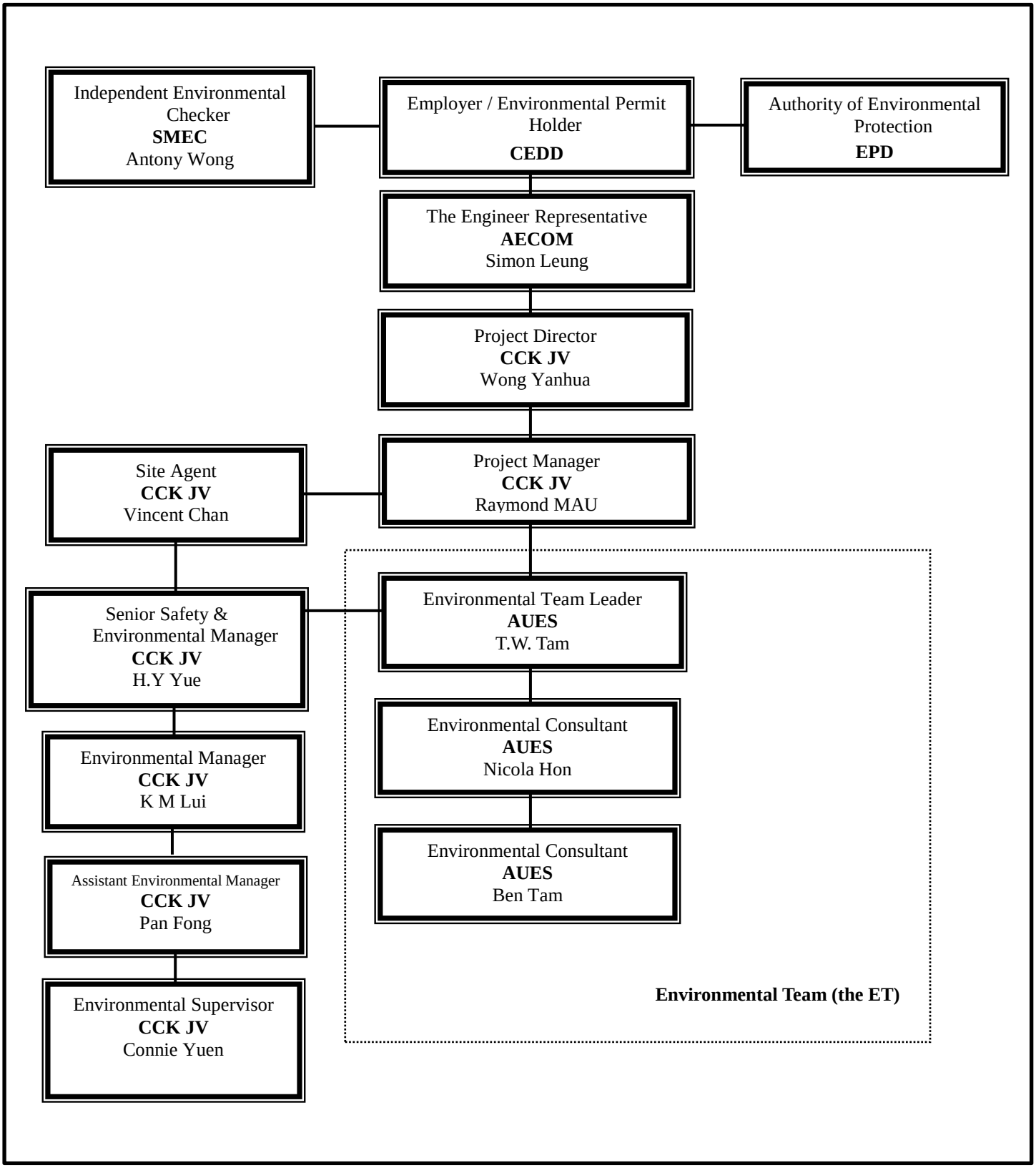
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

Siemens (Main Contractor) – Siemens Ltd.

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization – CV/2013/08

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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Simon Leung	2251 0688	2251 0698
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wang Yanhua	6190 4212	--
CCK JV	Project Manager	Raymond Mau Sai-Wai	9011 5340	--
CCK JV	Site Agent	Vincent Chan	9655 9404	--
CCK JV	Senior Safety & Environmental Manager	H.Y. Yue	9185 8186	--
CCK JV	Environmental Manager	K M Lui	51138223	--
CCK JV	Assistant Environmental Manager	Pan Fong	9436 9432	--
CCK JV	Environmental Supervisor	Connie Yuen	6316 6931	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

Legend:

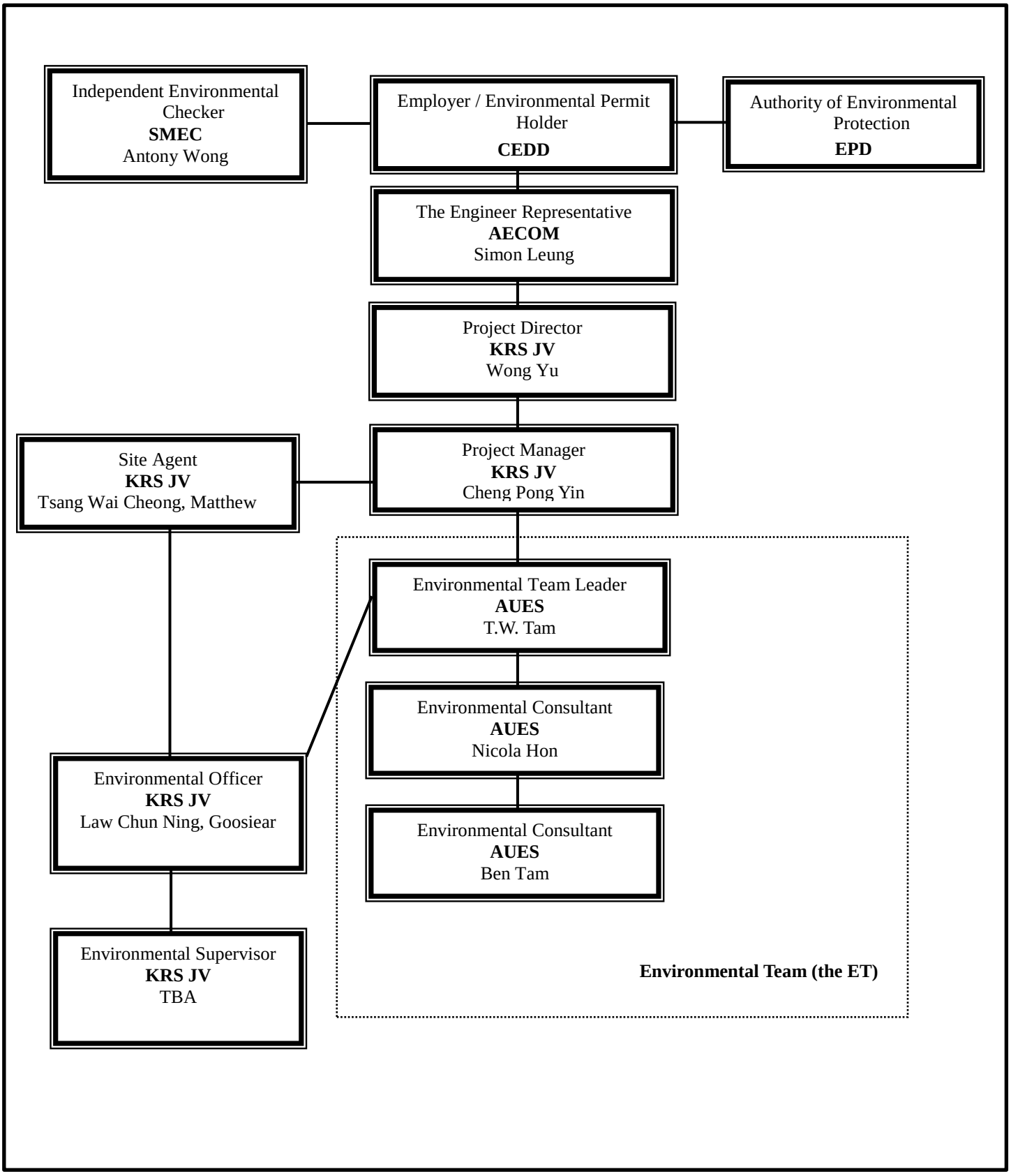
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



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	Kelvin lee	2251 0609	2251 0698
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
KRSJV	Project Director	Wong Yu	2682 6691	2682 2783
KRSJV	Project Manager	Cheng Pong Yin	9023 4821	2682 2783
KRSJV	Site Agent	Tsang Wai Cheong, Matthew	9705 7536	2682 2783
KRSJV	Environmental Officer	Law Chun Ning, Goosiear	9625 2381	2682 2783
KRSJV	Environmental Supervisor	TBA	6592 3084	2682 2783
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

Legend:

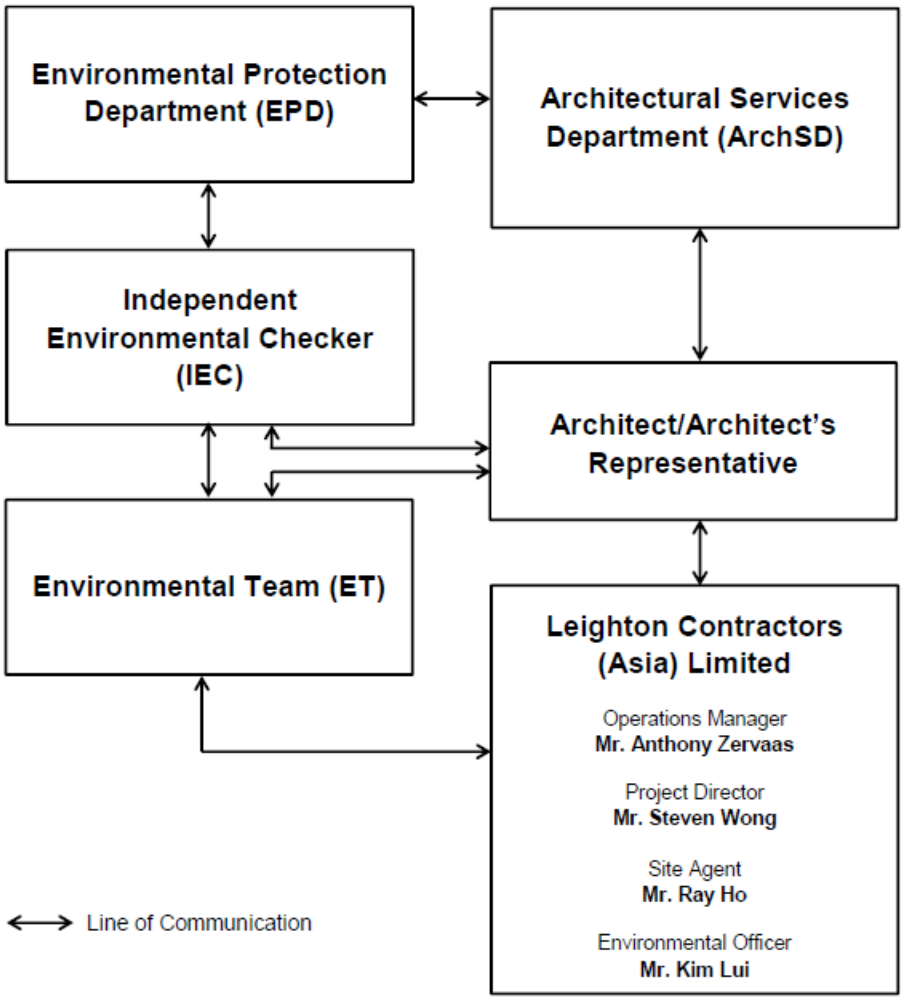
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organigram

Environmental Management Organization for Contract SS C505

Contact Details of Key Personnel for Contract SS C505

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. Antony Zervaas	2823 1433	2529 8784
Leighton	Project Director	Mr. Steven Wong	2858 1519	2858 1899
Leighton	Site Agent	Mr. Ray Ho	2858 1519	2858 1899
Leighton	Environmental Officer	Mr. Kim Lui	3973 1003	-
Leighton	Assistant Environmental Officer	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 (April, May and June 2018) Construction Rolling Progam

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

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 (April, May and June 2018) Construction Rolling Progam

Item	Construction Activites
1	Cable detection and trial trenches
2	Remaining works on new Kiu Tau Footbridge
3	Noise barrier construction
4	Road pavement works
5	Water main laying works (on Grade and on bridge deck)
6	Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
7	Parapet Installation on bridge deck
8	Road Drainage Works
9	Construction of profile barrier & Planter wall on Bridge deck
10	Stressing of external tendon
11	Bitumen paving on bridge deck
12	Installation of deck cell light inside the bridge deck
13	Installation of movement joint on the bridge
14	Construction of retaining wall
15	Landscaping works

Contract 4

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
CEDD Contract No: NE/2014/02
Main Contractor: Siemens Ltd.

SIEMENS
Ingenuity for life

Tentative Three Months (April, May and June 2018) Construction Rolling Progam

Item	Construction Activites
1	System design and testing
2	E&M installation at admin building
3	E&M installation at Ventilation Building
4	E&A installation at OHVD in tunnel
5	High mast erection

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 (April, May and June 2018) Construction Rolling Progam

Item	Construction Activites
1	Bridge Construction
2	Tunneling Works
3	Sewage Treatment Plant Construction
4	Tunnel Ventilation Building Construction
5	Slip Road/At-grade Road/Periphery Road 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 (April, May and June 2018) Construction Rolling Progam

Item	Construction Activites
1	Deck construction at Bridge E
2	Profile barrier construction at Bridge B, D and E
3	Construction of Façade and BMU at Bridge C
4	Drainage and watermains at perimeter road
5	Bitumen pavement at perimeter road

Contract SS C505

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

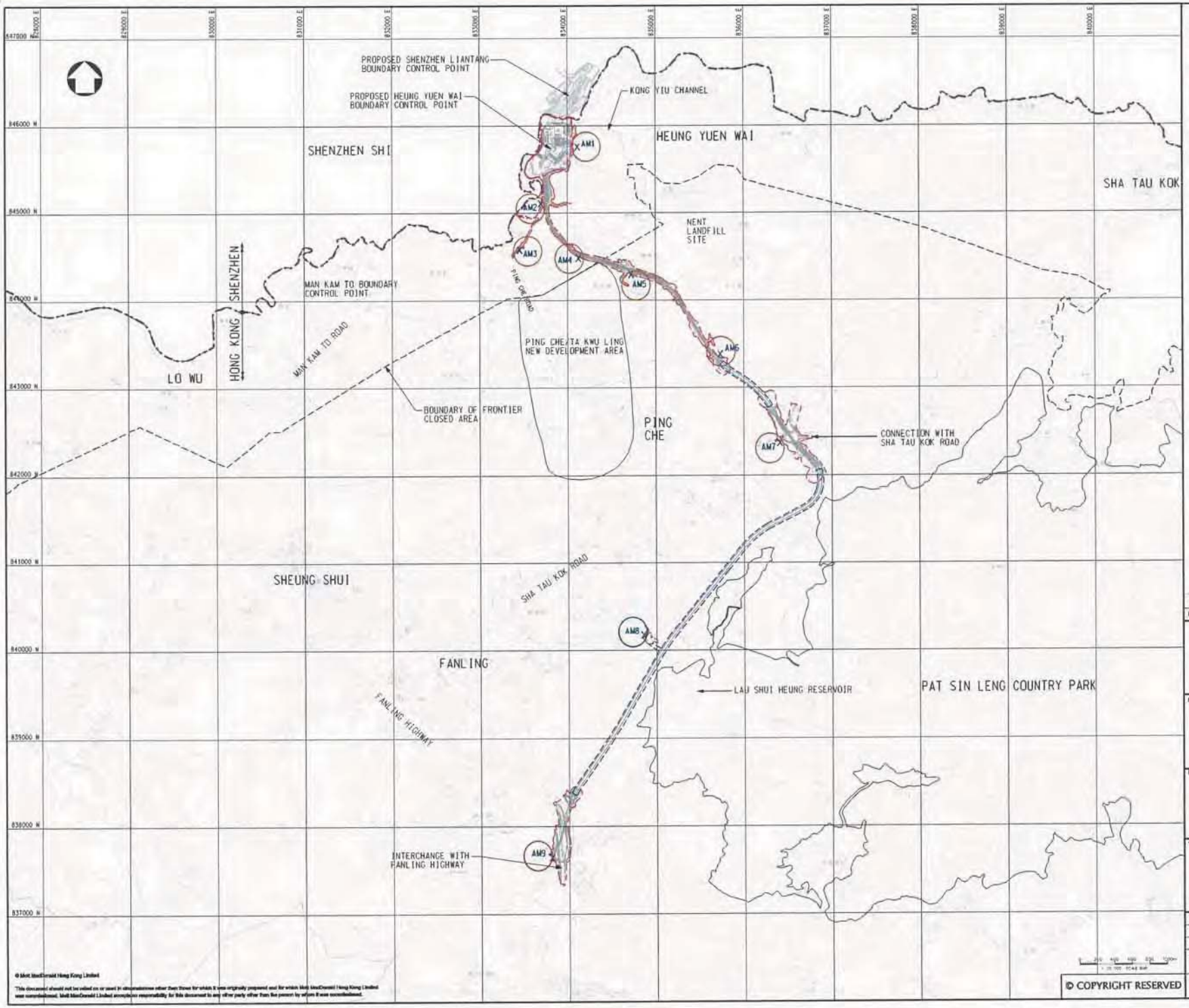
LEIGHTON 禮頓

Tentative Three Months (April, May and June 2018) Construction Rolling Progam

Item	Construction Activites
1	Passenger Terminal Building - Structure Works, Backfiling & Drainage, Under Ground Utilities, Fence Wall and Slab Construction
2	Passenger Terminal Building - ABWF Works & Integrated MEP Installation, Nonstructure Wall Erection and Southern Entrance Construction
3	Passenger Terminal Building - Major Plant Rooms ABWF Works & MEP Installation, and Lift & Escalator Installation by NSC
4	PTB Roof & Upper Roof Roofting Works - Outstanding Structure Works, Concrete Repairing & Waterproofing
5	PTB Podium Coach Canopy - Coach Canopy Construction & MEP Installation
6	PTB - Coach & Private Car Kiosks (Inbound) - Structures Works
7	PTB - Private Car Examination Buildings and MXRVSS (Inbound) - Superstructure Works, ABWF & MEP Installation
8	C&ED Detector Dog Base - External Structure Works and Integrated ABWF & MEP Works
9	HKPF Building and Observation Tower - Structures, External Works, Integrated ABWF & MEP Works
10	Fire Station and Drill Tower - Structures, External Works, Integradted ABWF & MEP Works
11	Cargo Examination Building (Inbound) - Structure, External Works and Integrated ABWF & MEP Works
12	Cargo Examination Building (Outbound) - External Works and Integrated ABWF & MEP Works
13	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) - Structures, External Works and Integrated ABWF & MEP Works
14	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) - Structures, External Works and Integrated ABWF & MEP Works
15	MXRVSS (Inbound) - Structure Works
16	MXRVSS (Outbound) - Structure Works
17	GV Kiosk (Inbound) - Structures Works, On-Grade Slab Construction, Steel Structure Works, Integrated ABWF and MEP Works
18	GV Kiosk (Outbound) - Structures Works, On-Grade Slab Construction, Steel Structure Works, Integrated ABWF & MEP Works
19	Public Toilets (Inbound) - Structure Works
20	Public Toilets (Outbound) - Structures Works
21	Disinsection Facilities (Inbound) - Substructure and Structure Works, Integrated ABWF & MEP Works
22	Disinsection Facilities (Outbound) - Substructure and Structure Works
23	Weigh Station - Structure Works, Integrated ABWF and MEP Works
24	EUVSS & Monitoring Room - Substructure and Structure Works, Steel Structure Works, Integrated ABWF & MEP Works
25	Refuse Collection Point - Structures, Integrated ABWF and MEP Works
26	Traffic Control Office (Inbound) - Structure Works, Integrated ABWF and MEP Works
27	Traffic Control Office (Outbound) - Structure Works
28	Inspection Post - Structure Works
29	Guard Booth (Inbound/Outbound/Vehicle Detention Area) - Structure Works, Integrated ABWF and MEP Works
30	Steel Canopies - Structure Works, Integrated ABWF and MEP Works
31	Fire Hydrant Tank & Pump Room - Integrated ABWF and MEP Works
32	Irrigation Pump Room - Structures works and Integrated ABWF & MEP Works
33	Master Water Meter Room 1,2,3 - Structures Works and Integrated ABWF and MEP Works
34	Elevated Walkway (E1, E2, E3 & E4) - Structures Works, ABWF and BS Works
35	Vehicular bridges 1-5 - Retaining walls, Road and Finishes Works
36	External Works - CLP Cable & Power ON Transfer room
37	External Works - Water Meter Room Connection (Inbound)
38	External Works - Underground Utilities, Structures and Inspection (Inbound & Outbound Areas)
39	External Works - Road Works
40	Bridge C (C7 Portion) - Integrated ABWF & MEP Works
41	Tower Crane Dismantling Works

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	WENG	FIRST ISSUE	DC	HT

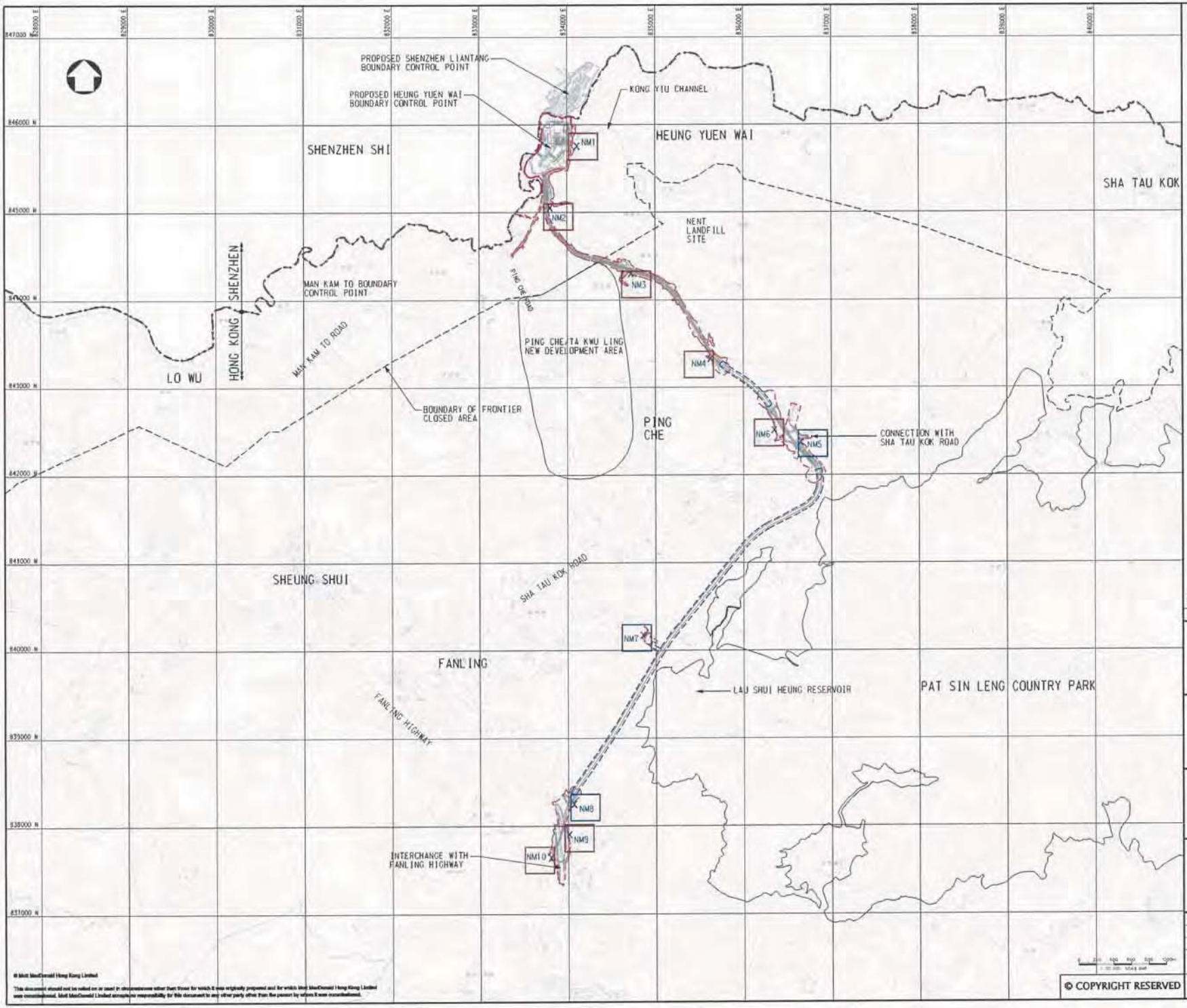
Mott MacDonald

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



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

Mott MacDonald

Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

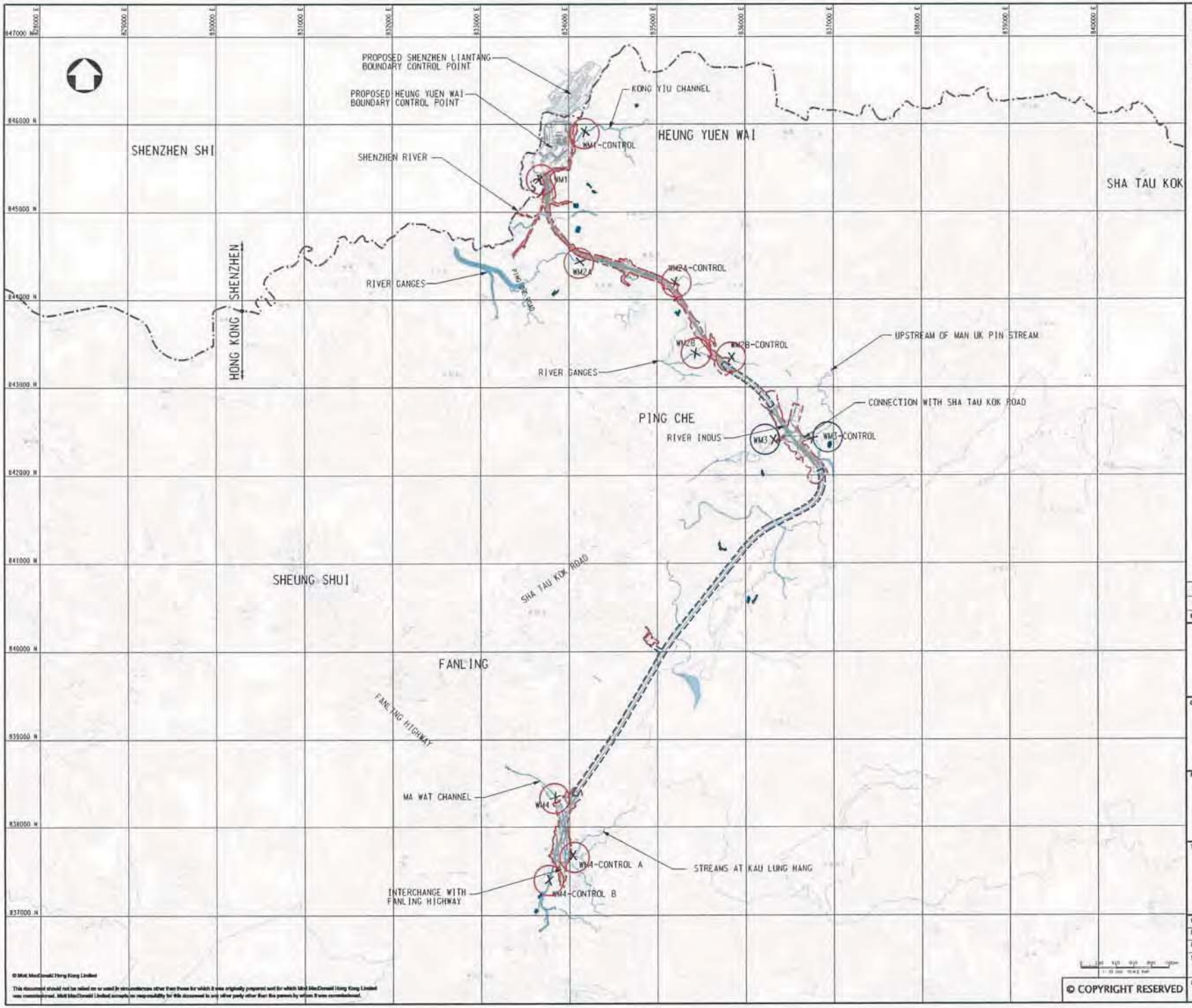
AGREEMENT NO. CE45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title

PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

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

Scale at A1: 1:20000
Project: 255228
CAD file: J:\255228\Document\env\cad\c\0083\FIG 3.1.dgn
Status: PRE
Drawing No: FIGURE 3.1
Rev: P1



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

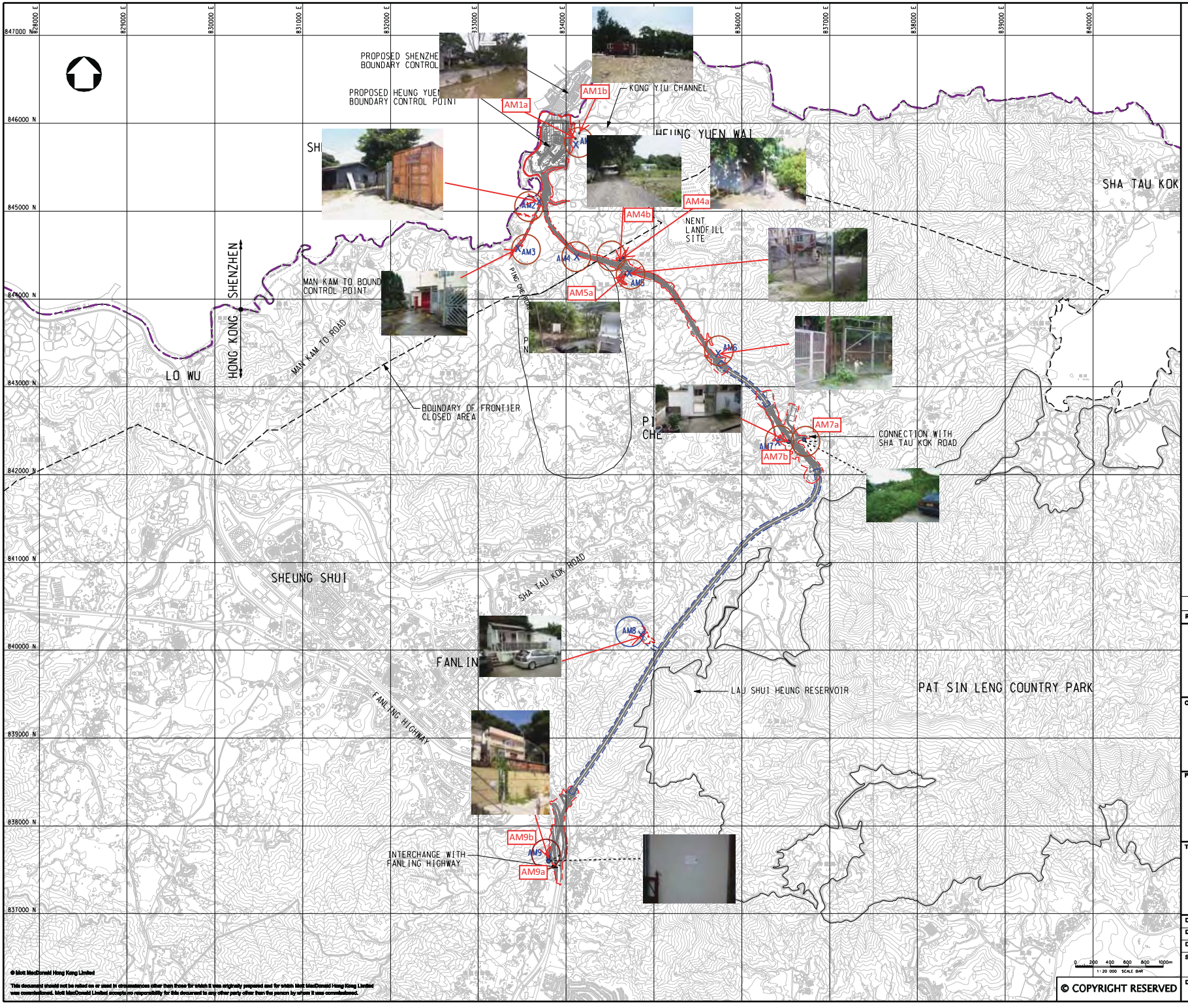
Project: AGREEMENT NO. CE45/2008(CE) LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title: LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

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

Appendix E

Monitoring Locations for Impact Monitoring



LEGEND:

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

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	
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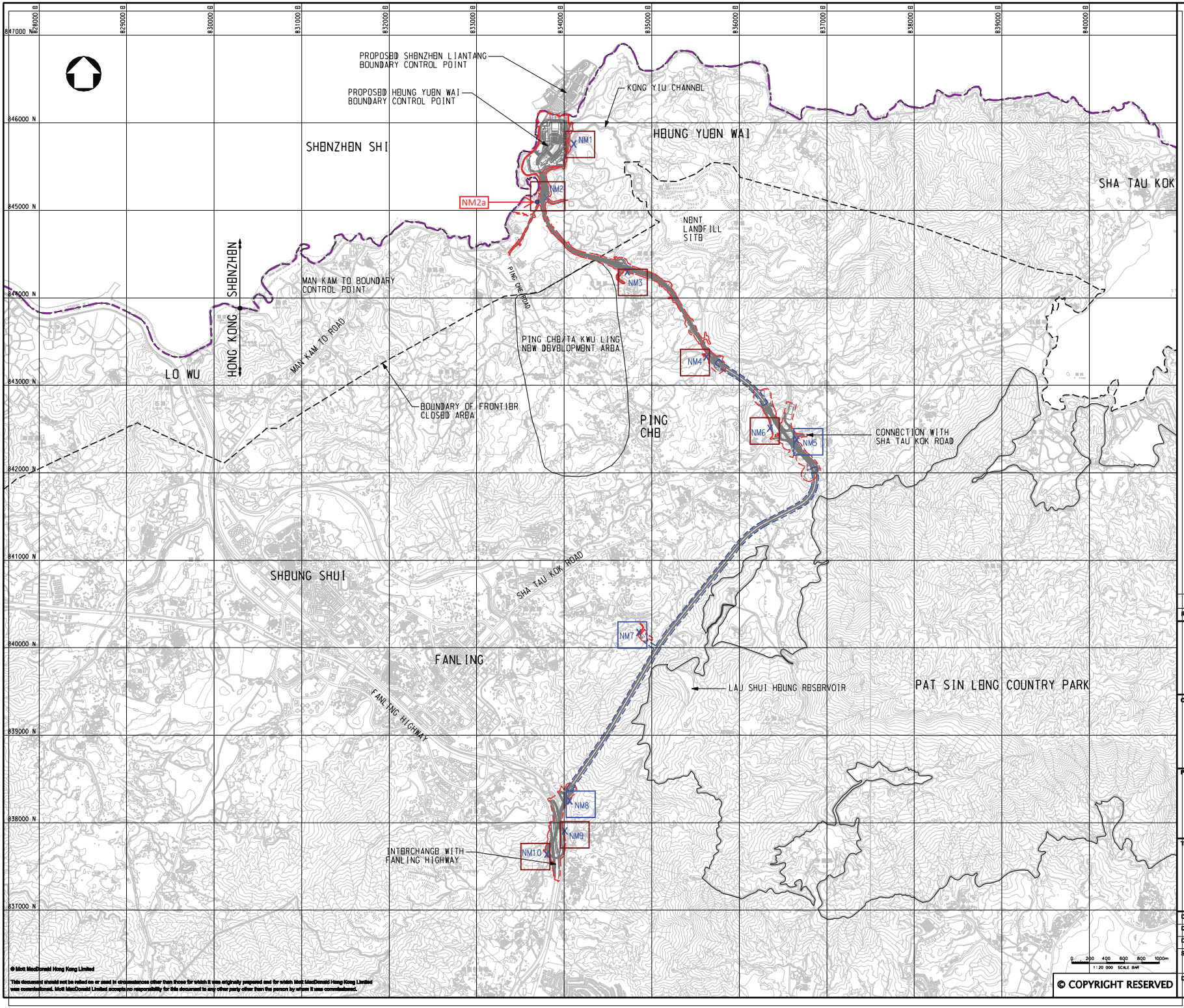
		CAD file	j:\255228\report\env\em&a\00B3\FIG 2-1.dgn		
Drawing No	FIGURE 2.1			Rev	P1

0 200 400 600 800 1000m
1:20 000 SCALE BAR



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

CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

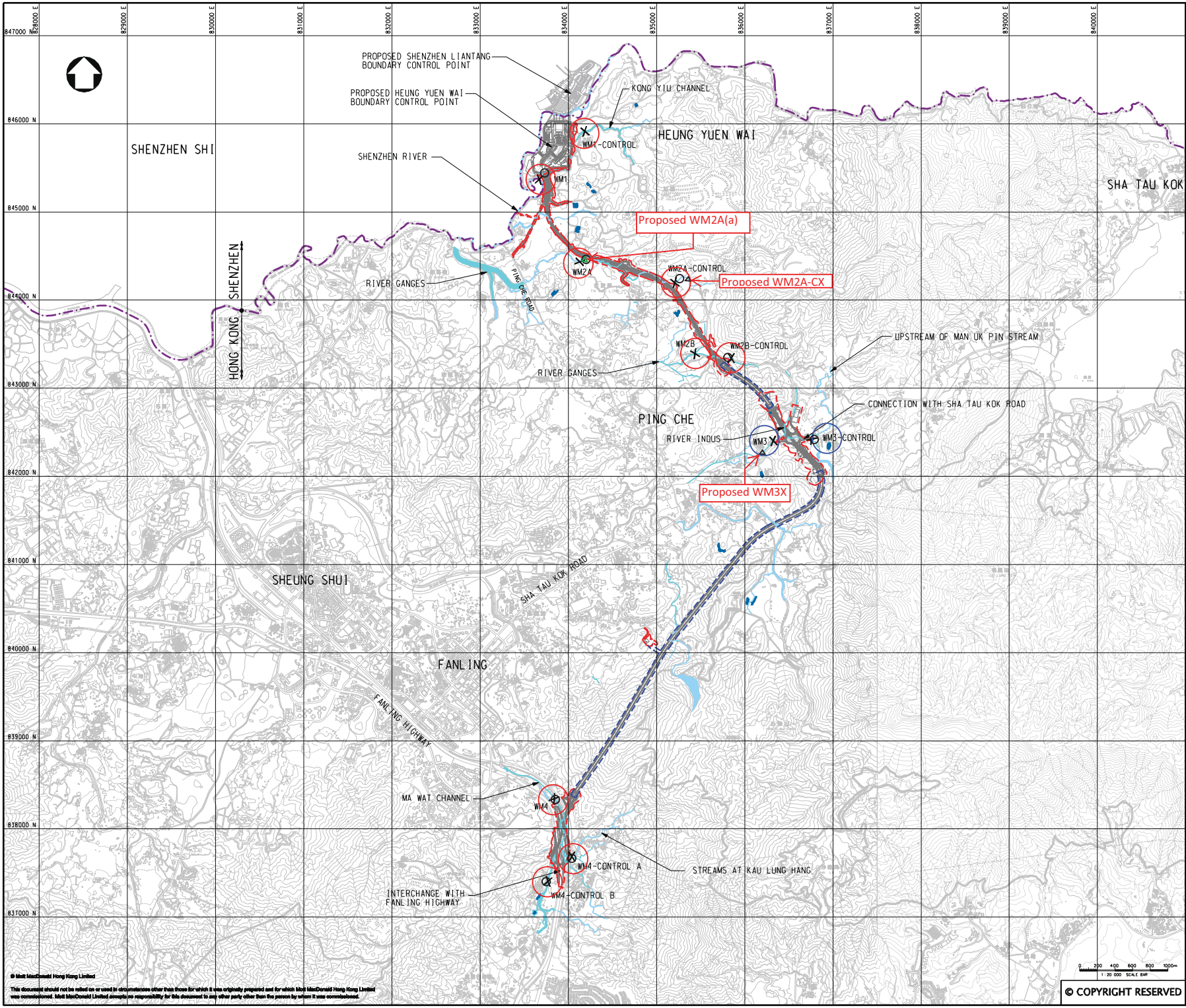
Project

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



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	833668.655	845371.897	833679	845421
WM1 Control	834187.480	845916.662	834185	845917
WM2A	834132.193	844432.910	834204	844471
WM2A-Control	835205.329	844200.151	835270	844243
WM2B	835414.744	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	833840.783	838344.842	833850	838338
WM4-Control A	834038.937	837668.985	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	\\hk1255228\REPORT\ENV\EM&A\DWS\FIG 4-1.dgn		
Drawing No	Appendix C				Rev P2

Appendix F

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village		Date of Calibration:	12/2/2018
Location ID : AM1b		Next Calibration Date:	12/4/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1026.4	Corrected Pressure (mm Hg)	769.8
Temperature (°C)	14.9	Temperature (K)	288

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

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	1.727	51	52.22	Slope = 30.7831
13	4.9	4.9	9.8	1.525	44	45.05	Intercept = -1.3066
10	3.8	3.8	7.6	1.344	40	40.96	Corr. coeff. = 0.9967
7	2.6	2.6	5.2	1.114	31	31.74	
5	1.4	1.4	2.8	0.821	24	24.57	

Calculations :

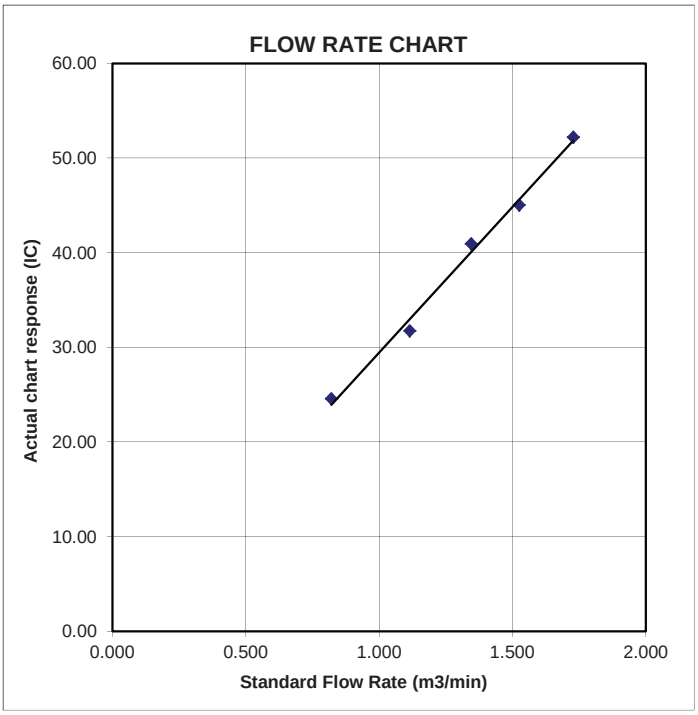
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	12/2/2018
Location ID : AM2		Next Calibration Date:	12/4/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1026.4	Corrected Pressure (mm Hg)	769.8
Temperature (ºC)	14.9	Temperature (K)	288

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.686	54	55.29	Slope = 30.6026
13	4.9	4.9	9.8	1.525	48	49.15	Intercept = 2.3931
10	3.7	3.7	7.4	1.327	40	40.96	Corr. coeff. = 0.9904
7	2.6	2.6	5.2	1.114	35	35.84	
5	1.5	1.5	3.0	0.849	29	29.69	

Calculations :

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

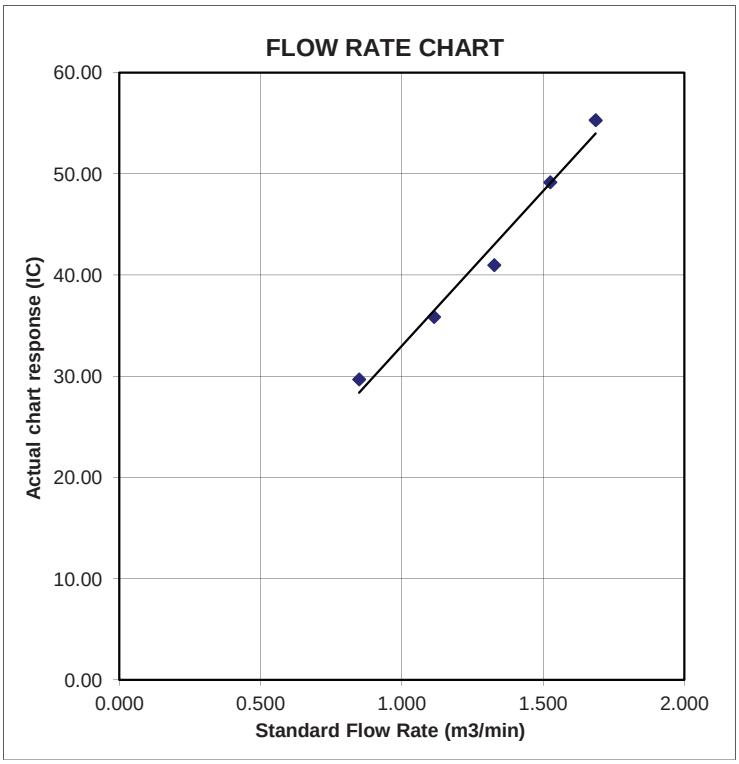
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 : Ta Kwu Ling Fire Service Station		Date of Calibration:	12/2/2018
Location ID : AM3		Next Calibration Date:	12/4/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1026.4	Corrected Pressure (mm Hg)	769.8
Temperature (°C)	14.9	Temperature (K)	288

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

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	1.727	54	55.29	Slope = 28.9393
13	4.7	4.7	9.4	1.494	47	48.12	Intercept = 4.9539
10	3.9	3.9	7.8	1.362	42	43.00	Corr. coeff. = 0.9920
7	2.4	2.4	4.8	1.071	37	37.89	
5	1.5	1.5	3.0	0.849	28	28.67	

Calculations :

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

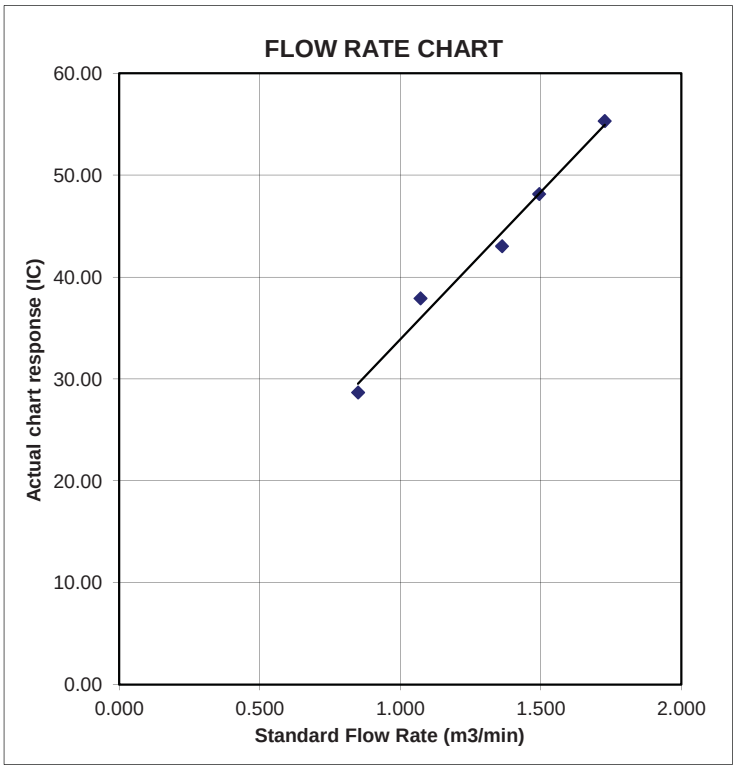
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 : Nga Yiu Ha Village
Location ID : AM4b

Date of Calibration: 10/2/2018
Next Calibration Date: 10/4/2018
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (°C)	18.0	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.670	61	61.85	Slope = 35.3270
13	4.7	4.7	9.4	1.479	54	54.76	Intercept = 3.2919
10	3.7	3.7	7.4	1.314	50	50.70	Corr. coeff. = 0.9930
7	2.4	2.4	4.8	1.061	42	42.59	
5	1.5	1.5	3.0	0.841	31	31.43	

Calculations :

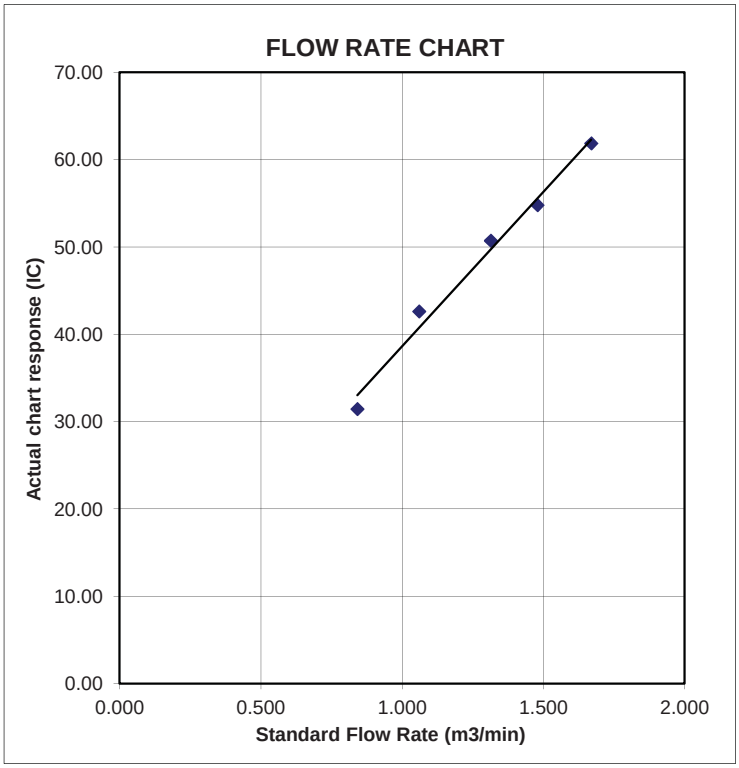
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	10/2/2018
Location ID : AM5a		Next Calibration Date:	10/4/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (°C)	18.0	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

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	1.738	50	50.70	Slope = 30.3411
13	5	5	10.0	1.525	42	42.59	Intercept = -2.8525
10	4	4	8.0	1.366	38	38.53	Corr. coeff. = 0.9977
7	2.5	2.5	5.0	1.082	29	29.41	
5	1.5	1.5	3.0	0.841	23	23.32	

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)

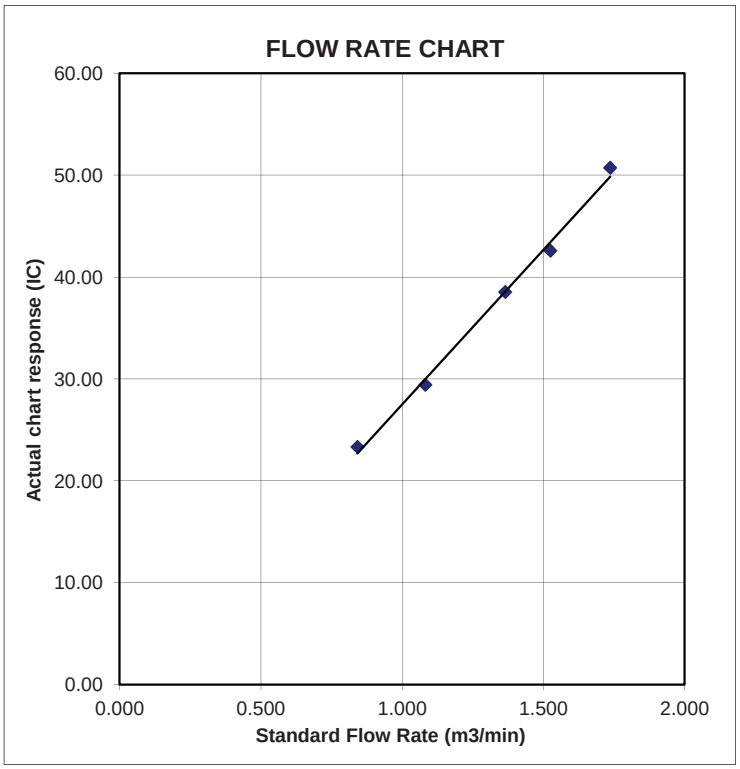
m = sampler slope

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:	10/2/2018
Location ID : AM6		Next Calibration Date:	10/4/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (ºC)	18.0	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.670	57	57.80	Slope = 40.8144
13	4.8	4.8	9.6	1.495	50	50.70	Intercept = -10.6594
10	3.7	3.7	7.4	1.314	43	43.60	Corr. coeff. = 0.9915
7	2.6	2.6	5.2	1.104	31	31.43	
5	1.5	1.5	3.0	0.841	25	25.35	

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)

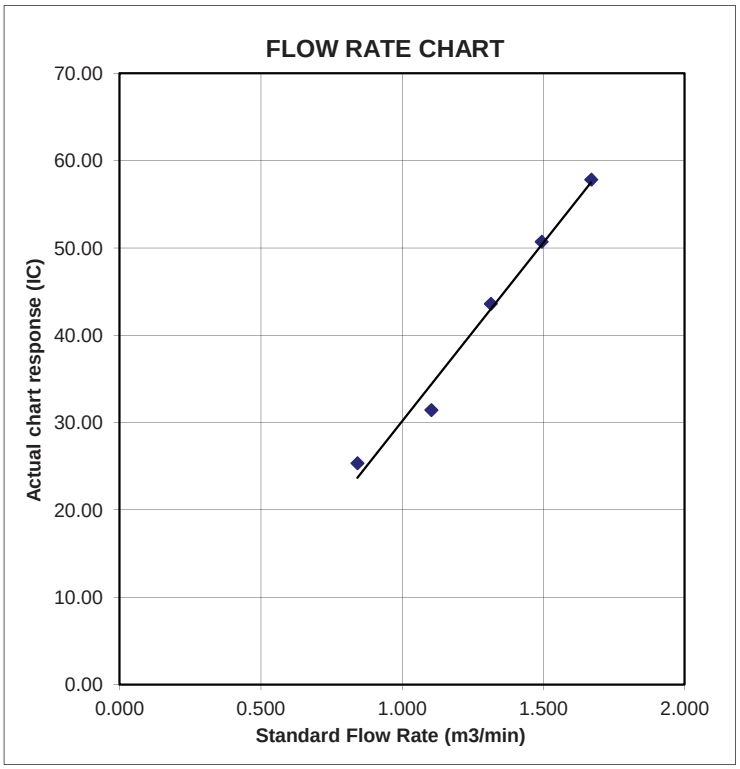
m = sampler slope

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: 10/2/2018
Next Calibration Date: 10/4/2018
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (°C)	18.0	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

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	1.724	59	59.83	Slope = 30.2259
13	4.9	4.9	9.8	1.510	54	54.76	Intercept = 8.3833
10	3.9	3.9	7.8	1.349	48	48.67	Corr. coeff. = 0.9933
7	2.3	2.3	4.6	1.039	41	41.57	
5	1.5	1.5	3.0	0.841	32	32.45	

Calculations :

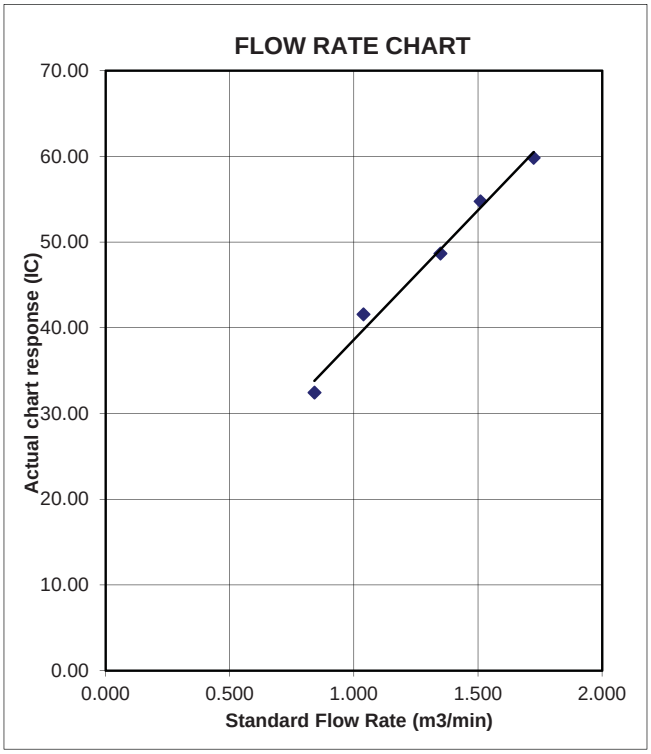
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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: 10/2/2018
Next Calibration Date: 10/4/2018
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1017.4	Corrected Pressure (mm Hg)	763.05
Temperature (°C)	18.0	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

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	1.656	60	60.84	Slope = 48.3070
13	5	5	10.0	1.525	51	51.71	Intercept = -20.6674
10	3.8	3.8	7.6	1.332	42	42.59	Corr. coeff. = 0.9970
7	2.4	2.4	4.8	1.061	31	31.43	
5	1.6	1.6	3.2	0.868	21	21.29	

Calculations :

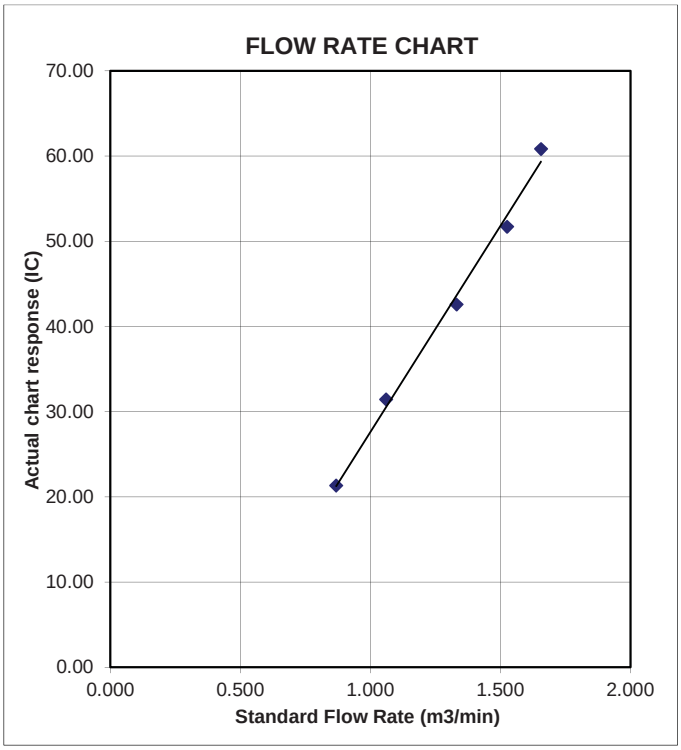
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	12/2/2018
Location ID : AM9b		Next Calibration Date:	12/4/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1026.4	Corrected Pressure (mm Hg)	769.8
Temperature (°C)	14.9	Temperature (K)	288

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11965
Model->	5025A	Qstd Intercept ->	-0.02696
Serial # ->	1941		

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	1.727	55	56.32	Slope = 32.0888
13	5.1	5.1	10.2	1.556	49	50.17	Intercept = 0.3969
10	3.8	3.8	7.6	1.344	41	41.98	Corr. coeff. = 0.9921
7	2.4	2.4	4.8	1.071	36	36.86	
5	1.6	1.6	3.2	0.877	27	27.65	

Calculations :

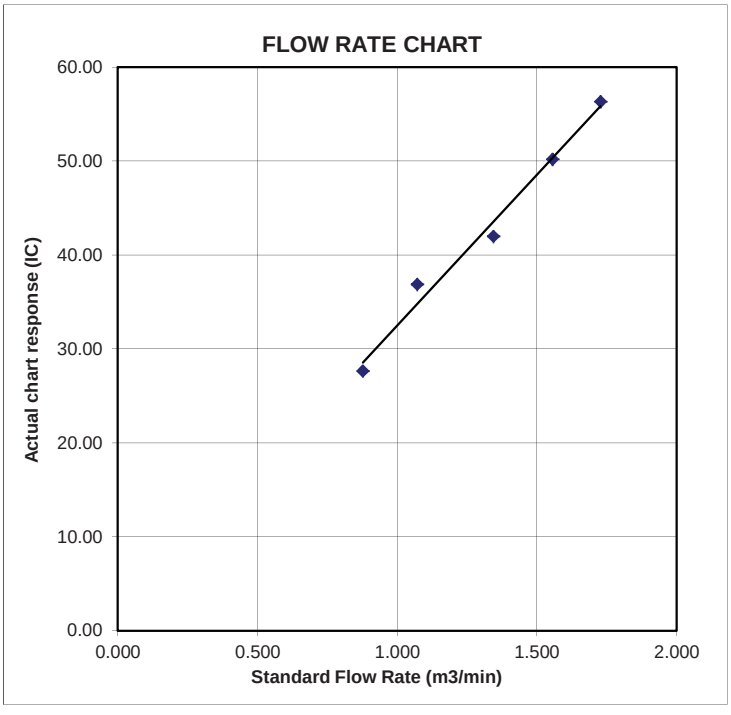
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 : Open area at Tsung Yuen Ha Village		Date of Calibration:	10/4/2018
Location ID : AM1b		Next Calibration Date:	10/6/2018
		Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.780	51	51.14	Slope = 29.5629
13	4.8	4.8	9.6	1.556	44	44.12	Intercept = -1.7557
10	3.7	3.7	7.4	1.368	39	39.11	Corr. coeff. = 0.9979
7	2.6	2.6	5.2	1.150	31	31.08	
5	1.3	1.3	2.6	0.819	23	23.06	

Calculations :

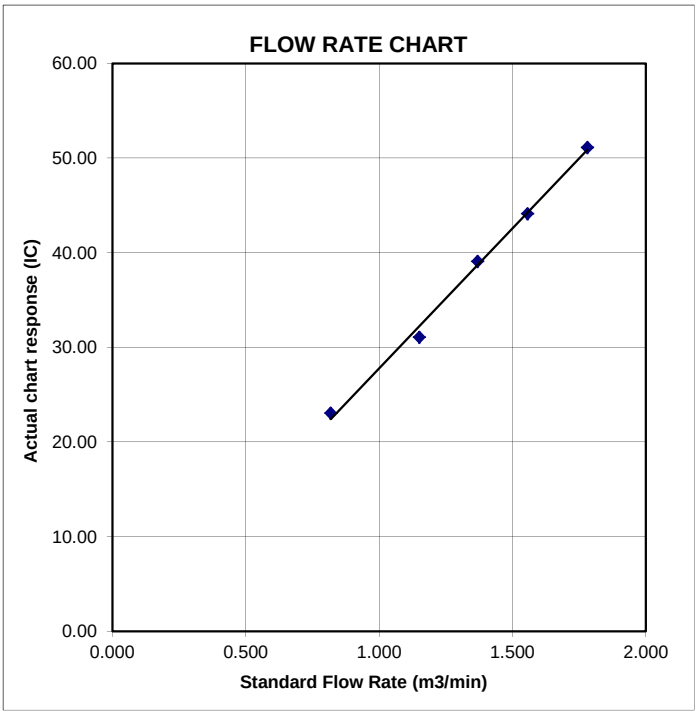
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	10/4/2018
Location ID : AM2		Next Calibration Date:	10/6/2018
		Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
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	1.752	53	53.14	Slope = 27.8827
13	4.9	4.9	9.8	1.572	47	47.13	Intercept = 3.8583
10	3.6	3.6	7.2	1.350	41	41.11	Corr. coeff. = 0.9982
7	2.5	2.5	5.0	1.128	36	36.10	
5	1.5	1.5	3.0	0.878	28	28.08	

Calculations :

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

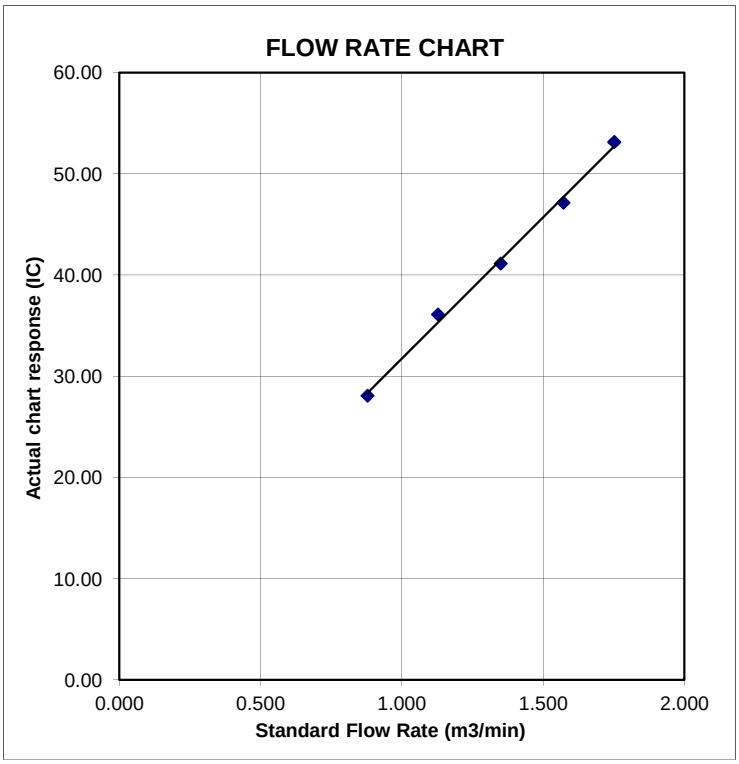
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	10/4/2018
Location ID : AM3		Next Calibration Date:	10/6/2018
		Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
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	1.766	54	54.15	Slope = 26.7795
13	4.8	4.8	9.6	1.556	48	48.13	Intercept = 6.1535
10	3.8	3.8	7.6	1.387	42	42.11	Corr. coeff. = 0.9963
7	2.4	2.4	4.8	1.106	35	35.09	
5	1.2	1.2	2.4	0.787	28	28.08	

Calculations :

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

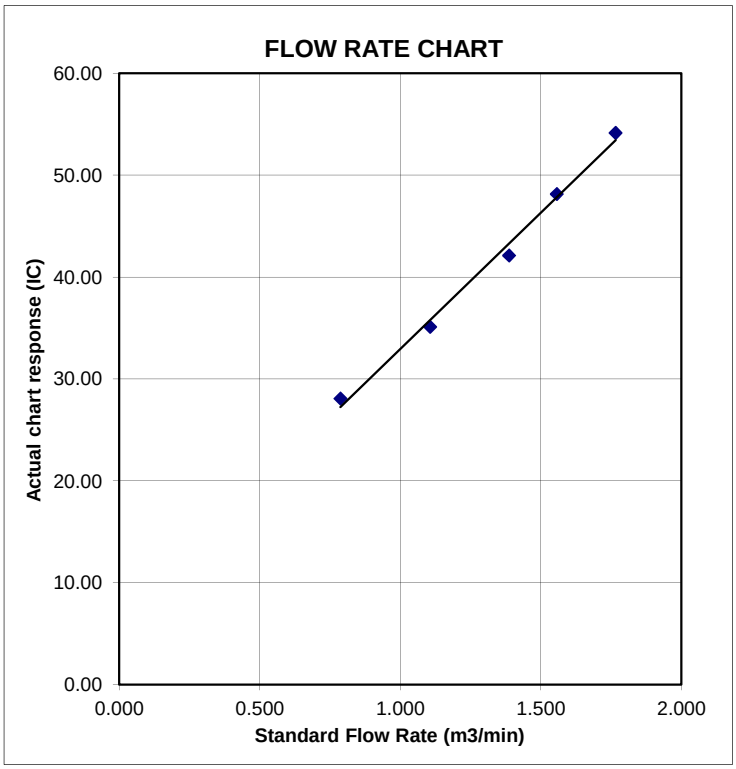
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 : Nga Yiu Ha Village
Location ID : AM4b

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.738	62	62.17	Slope = 34.1193
13	4.7	4.7	9.4	1.540	55	55.15	Intercept = 3.0874
10	3.7	3.7	7.4	1.368	50	50.13	Corr. coeff. = 0.9974
7	2.4	2.4	4.8	1.106	42	42.11	
5	1.4	1.4	2.8	0.849	31	31.08	

Calculations :

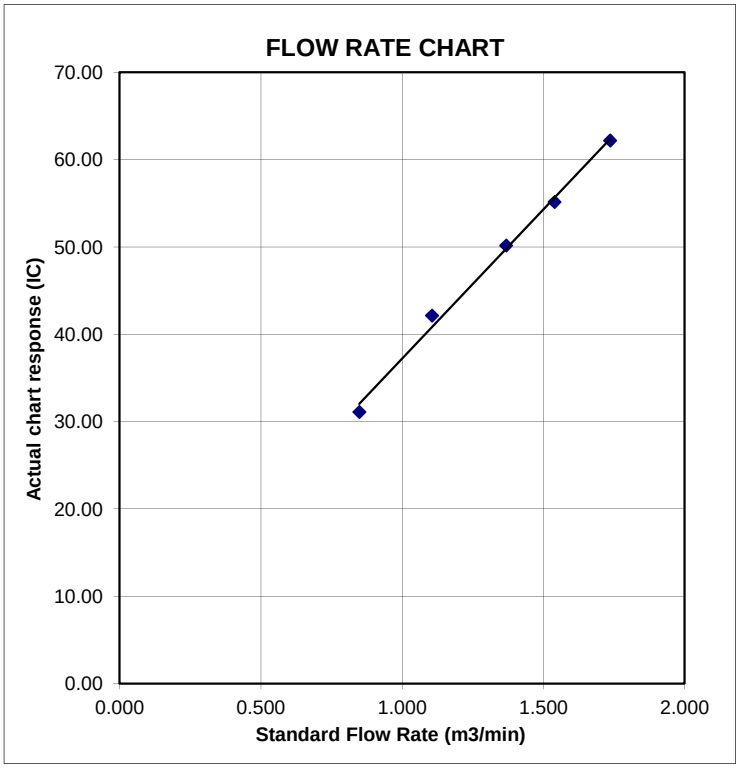
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	10/4/2018
Location ID : AM5a		Next Calibration Date:	10/6/2018
		Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
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	1.808	50	50.13	Slope = 29.2106
13	5.1	5.1	10.2	1.603	43	43.12	Intercept = -3.5289
10	4	4	8.0	1.422	37	37.10	Corr. coeff. = 0.9969
7	2.4	2.4	4.8	1.106	28	28.08	
5	1.5	1.5	3.0	0.878	23	23.06	

Calculations :

Qstd = 1/m[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)

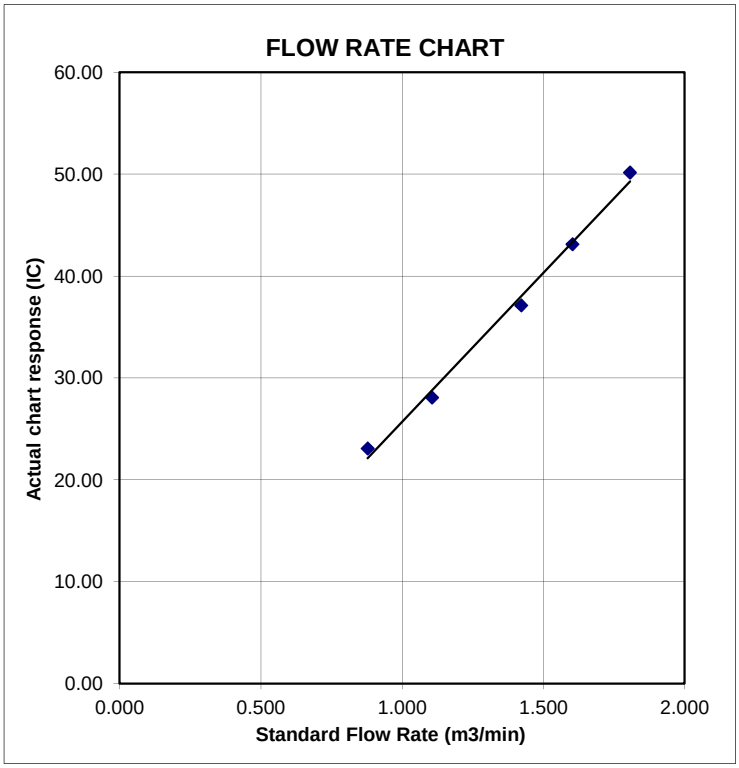
m = sampler slope

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:	10/4/2018
Location ID : AM6		Next Calibration Date:	10/6/2018
		Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.738	57	57.15	Slope = 39.4850
13	4.7	4.7	9.4	1.540	50	50.13	Intercept = -11.2216
10	3.7	3.7	7.4	1.368	43	43.12	Corr. coeff. = 0.9983
7	2.5	2.5	5.0	1.128	32	32.09	
5	1.5	1.5	3.0	0.878	24	24.06	

Calculations :

Qstd = 1/m[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)

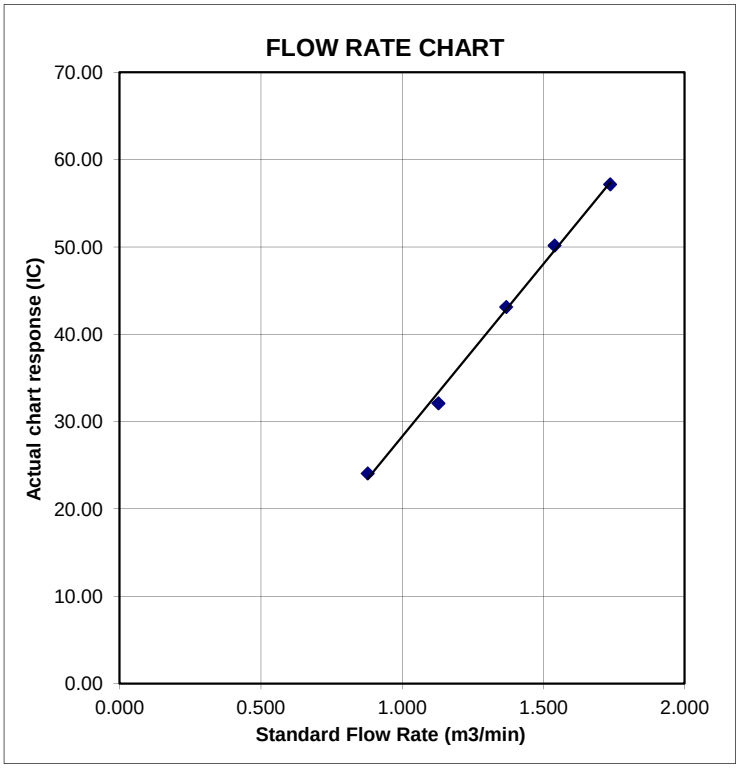
m = sampler slope

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.794	62	62.17	Slope = 31.8679
13	4.8	4.8	9.6	1.556	54	54.15	Intercept = 4.3254
10	3.9	3.9	7.8	1.404	47	47.13	Corr. coeff. = 0.9945
7	2.3	2.3	4.6	1.083	40	40.11	
5	1.5	1.5	3.0	0.878	32	32.09	

Calculations :

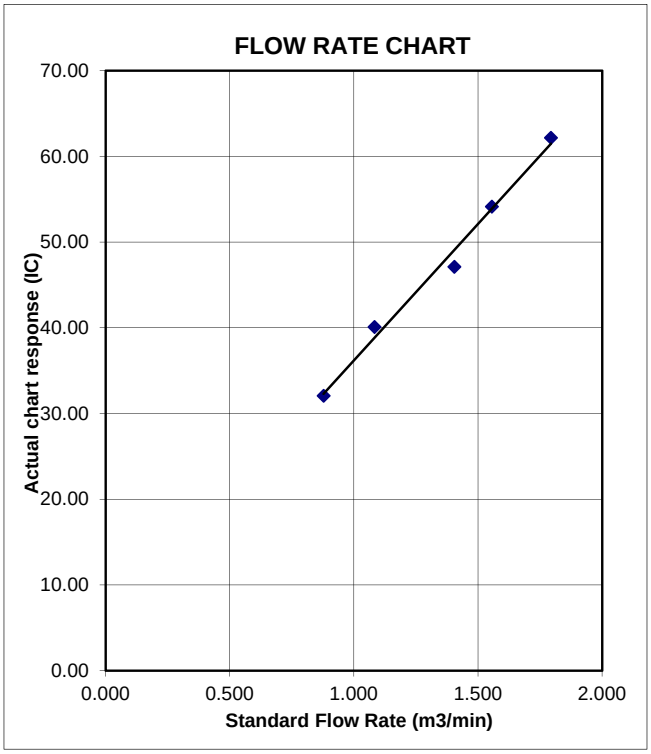
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.9	5.9	11.8	1.723	57	57.15	Slope = 41.7043
13	4.9	4.9	9.8	1.572	50	50.13	Intercept = -15.3326
10	3.8	3.8	7.6	1.387	41	41.11	Corr. coeff. = 0.9975
7	2.3	2.3	4.6	1.083	31	31.08	
5	1.6	1.6	3.2	0.906	22	22.06	

Calculations :

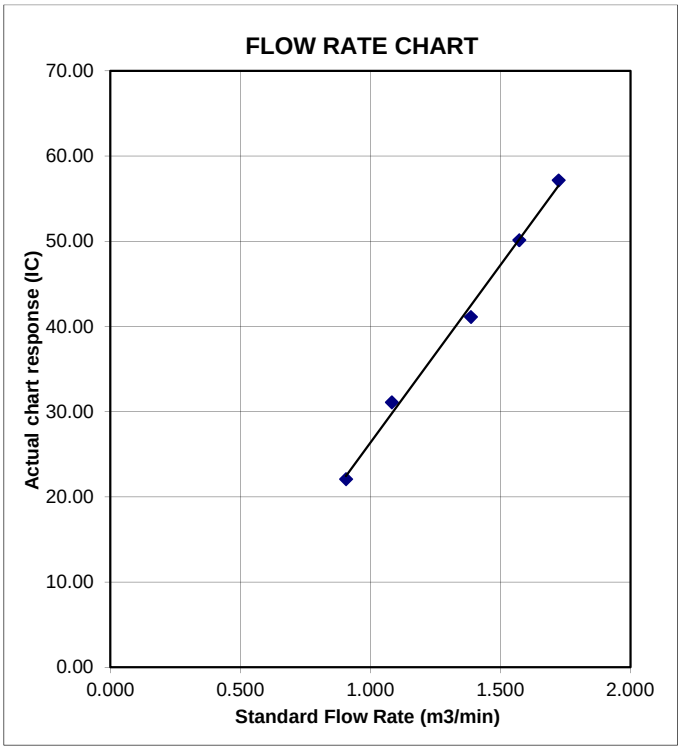
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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:	10/4/2018
Location ID : AM9b		Next Calibration Date:	10/6/2018
		Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	6.3	6.3	12.6	1.780	55	55.15
13	5.1	5.1	10.2	1.603	48	48.13
10	3.8	3.8	7.6	1.387	41	41.11
7	2.3	2.3	4.6	1.083	35	35.09
5	1.5	1.5	3.0	0.878	27	27.07

LINEAR REGRESSION

Slope =	29.4730
Intercept =	1.6349
Corr. coeff. =	0.9935

Calculations :

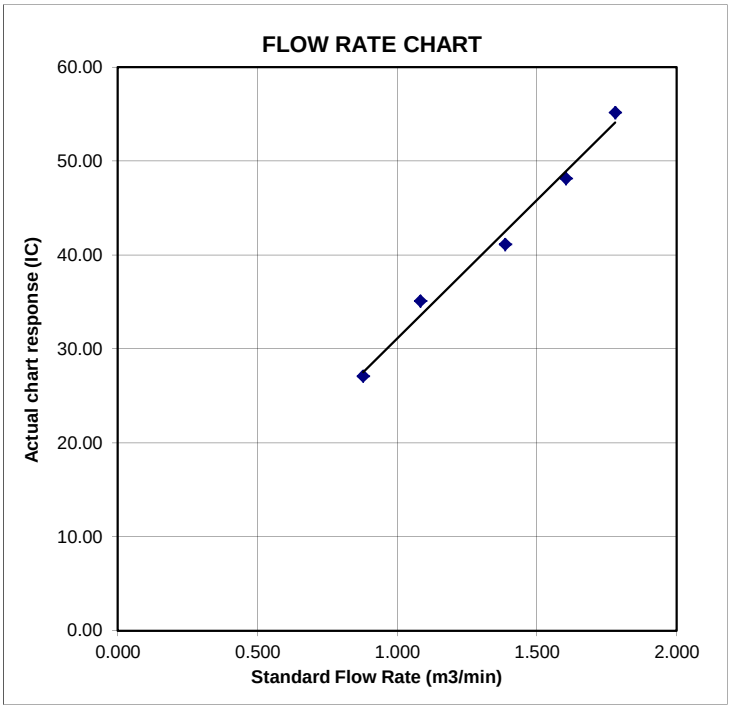
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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 - Feb 28, 2017 Rootsmeter S/N 0438320 Ta (K) - 294
Operator Tisch Orifice I.D. - 1941 Pa (mm) - 750.57

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	1.4600	3.2	2.00
2	NA	NA	1.00	1.0410	6.4	4.00
3	NA	NA	1.00	0.9280	7.9	5.00
4	NA	NA	1.00	0.8840	8.7	5.50
5	NA	NA	1.00	0.7290	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9967	0.6827	1.4149		0.9957	0.6820	0.8851
0.9925	0.9534	2.0010		0.9915	0.9524	1.2517
0.9904	1.0672	2.2372		0.9894	1.0661	1.3995
0.9894	1.1192	2.3464		0.9884	1.1181	1.4678
0.9840	1.3499	2.8299		0.9830	1.3485	1.7702
Qstd slope (m) =		2.11965		Qa slope (m) =		1.32729
intercept (b) =		-0.02696		intercept (b) =		-0.01686
coefficient (r) =		0.99991		coefficient (r) =		0.99991
y axis = SQRT[H2O(Pa/760)(298/Ta)]				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}

TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	February 13, 2018	**Rootsmeter S/N:** 438320	**Ta:** 293	°K
Operator:	Jim Tisch		**Pa:** 763.3	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **1612**		

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

Data Tabulation

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

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

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

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

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

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

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

www.tisch-env.cor
TOLL FREE: (877)263-761(
FAX: (513)467-900

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	511	4.0
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	598	4.9
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2111	16.5

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

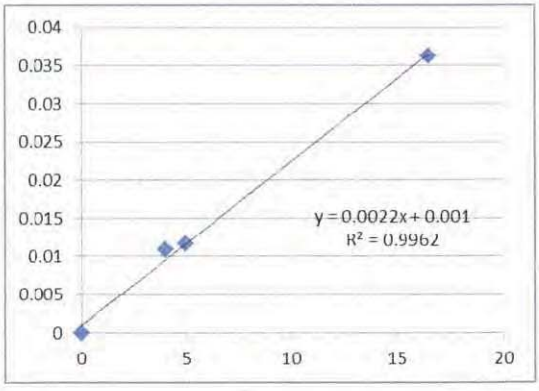
Sensitivity Adjustment Scale Setting (After Calibration) 583 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9981

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

Calculations :

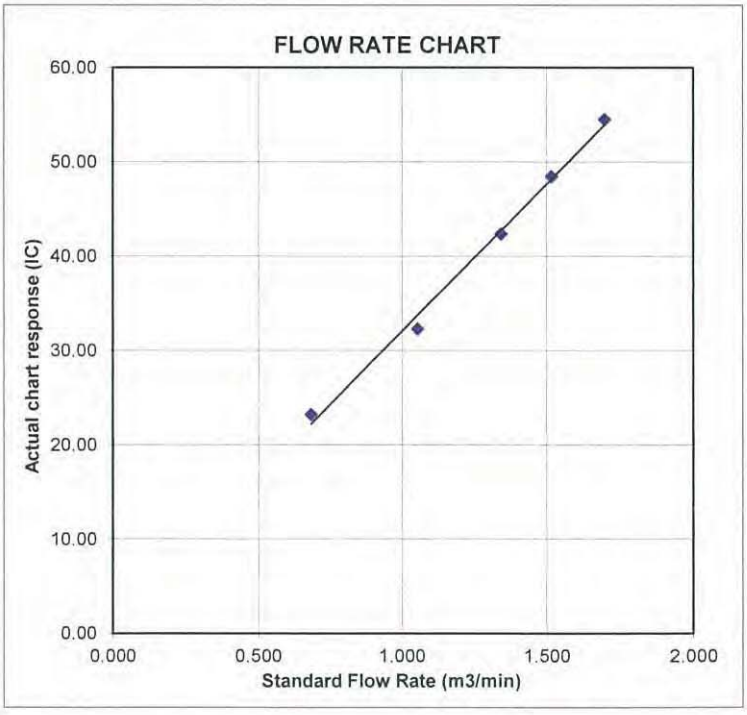
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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	HK1815078

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

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

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

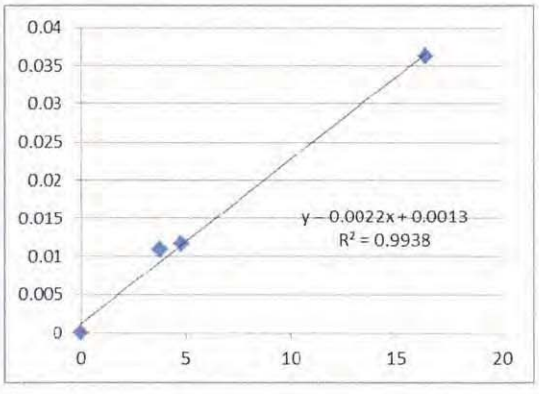
Sensitivity Adjustment Scale Setting (After Calibration) 521 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9967

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	498	3.9
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	571	4.7
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2095	16.4

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

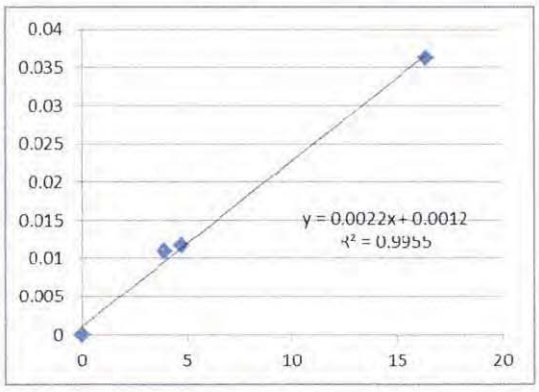
Sensitivity Adjustment Scale Setting (After Calibration) 669 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9977

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

Calculations :

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

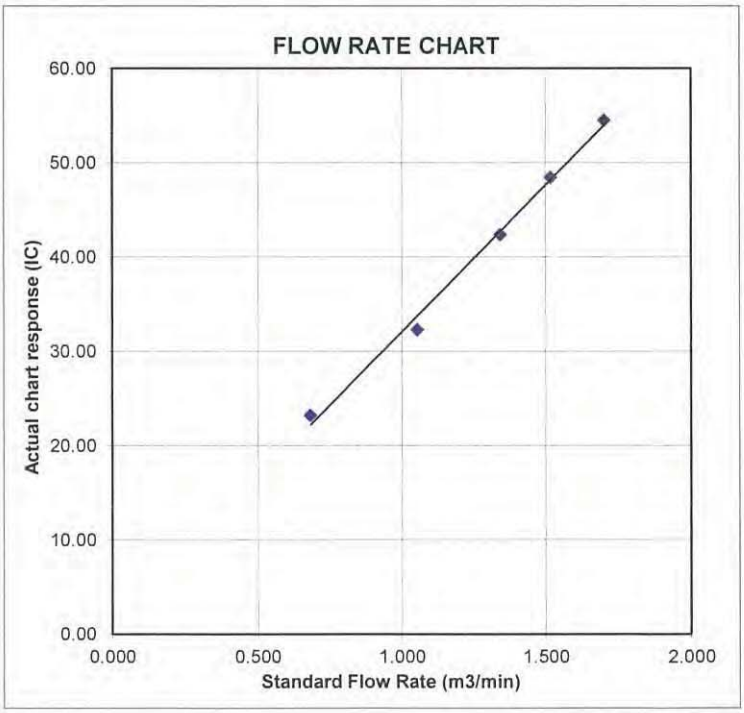
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

Calculations :

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

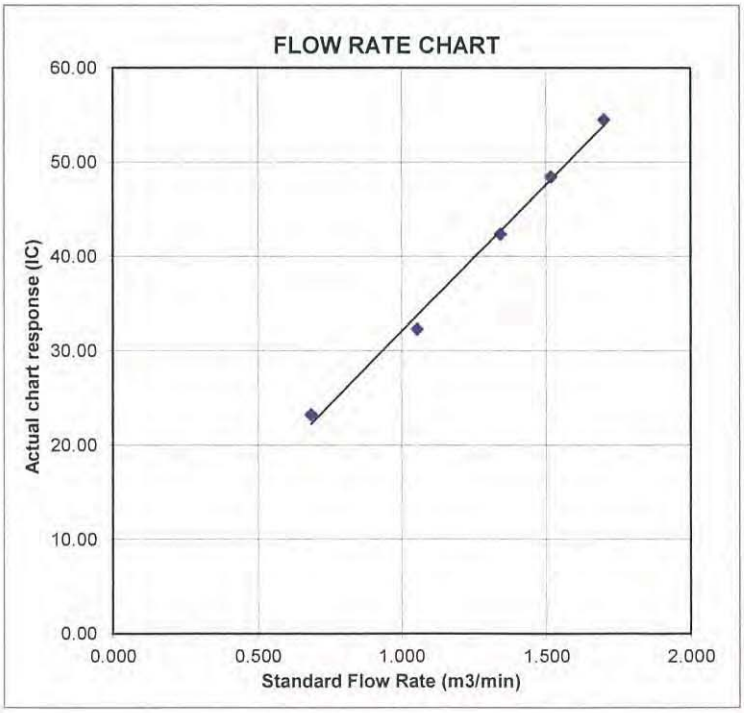
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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	HK1815077

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	521	4.1
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	674	5.6
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2077	16.3

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

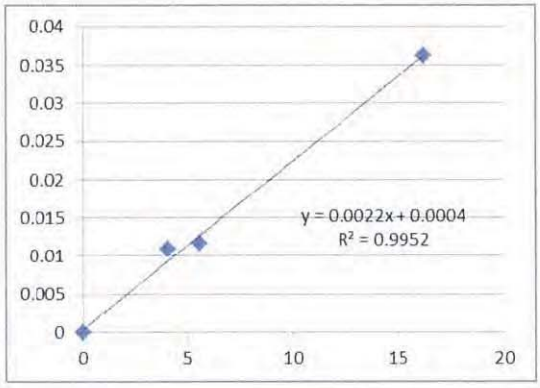
Sensitivity Adjustment Scale Setting (After Calibration) 661 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9976

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

Calculations :

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

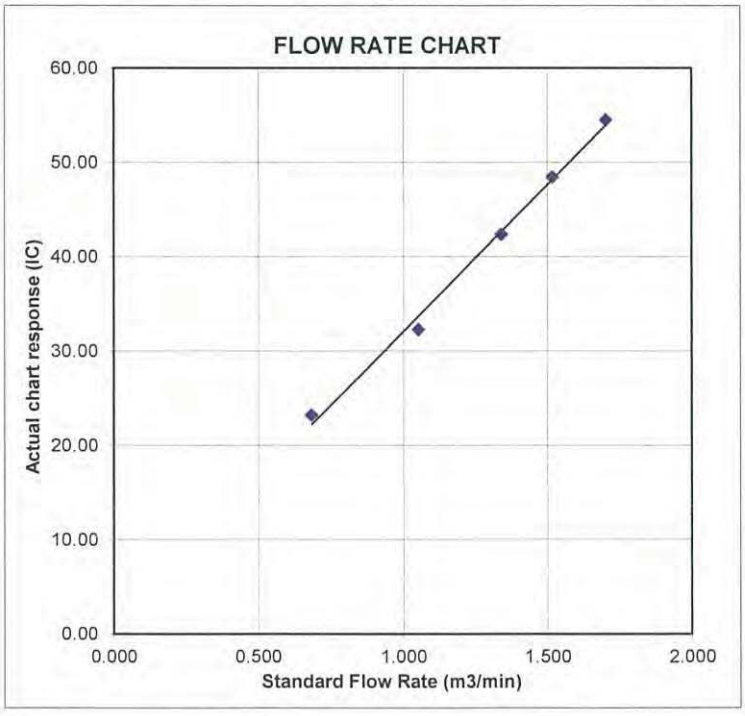
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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	HK1815074

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	10:27 ~ 12:34	19.3	1015.3	0.011	677	5.3
2hr01min	12:38 ~ 14:39	19.3	1015.3	0.012	601	5.0
2hr08min	14:42 ~ 16:50	19.3	1015.3	0.036	2064	16.2

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

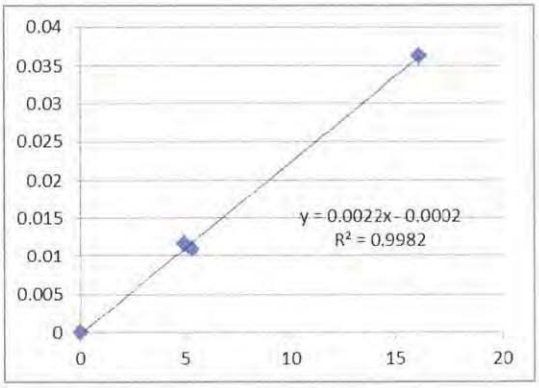
Sensitivity Adjustment Scale Setting (After Calibration) 590 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9991

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.3	6.3	12.6	1.703	54	54.49	Slope = 31.2239
13	5	5	10.0	1.518	48	48.44	Intercept = 0.7901
10	3.9	3.9	7.8	1.342	42	42.38	Corr. coeff. = 0.9971
8	2.4	2.4	4.8	1.056	32	32.29	
5	1.0	1.0	2.0	0.686	23	23.21	

Calculations :

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

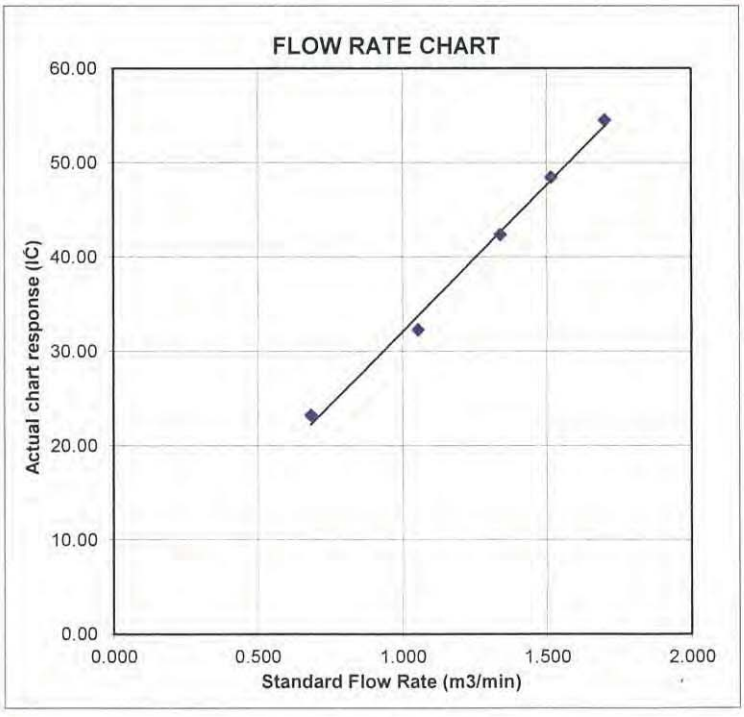
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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. : C174097
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 14 July 2017

Description / 儀器名稱 : Sound Level Meter
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00464681
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 July 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 25 July 2017

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. : C174097
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 was performed before the test.

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	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

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	93.7	± 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	93.7 (Ref.)
				104.00		103.7
				114.00		113.7

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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	93.7	Ref.
			Slow			93.7	± 0.3

Sun Creation Engineering Limited - Calibration & Testing Laboratory
c/o 4/F, Tung Shun 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百順灣貿易廣場4樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: calibration@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C174097
證書編號

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	67.4	-26.2 ± 1.5
					125 Hz	77.5	-16.1 ± 1.5
					250 Hz	85.0	-8.6 ± 1.4
					500 Hz	90.4	-3.2 ± 1.4
					1 kHz	93.7	Ref.
					2 kHz	94.9	+1.2 ± 1.6
					4 kHz	94.7	+1.0 ± 1.6
					8 kHz	92.6	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.2	-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	92.8	-0.8 ± 1.5
					125 Hz	93.5	-0.2 ± 1.5
					250 Hz	93.7	0.0 ± 1.4
					500 Hz	93.7	0.0 ± 1.4
					1 kHz	93.7	Ref.
					2 kHz	93.5	-0.2 ± 1.6
					4 kHz	92.9	-0.8 ± 1.6
					8 kHz	90.7	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.3	-6.2 (+3.0 ; -6.0)

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換樓四樓
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 E-mail 電郵: callab@sunecreation.com Website 網址: www.sunecreation.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. : C174097
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 07619

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

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

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. : C172288
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 24 April 2017

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 : 28 April 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 2 May 2017

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. : C172288
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	C170048
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	94.1

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		114.0

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

Certificate of Calibration
校正證書

Certificate No. : C172288
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	55.1	-39.4 ± 1.5
					63 Hz	68.0	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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

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Certificate No. : C172288
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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	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	100.0	± 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 :
Only the original copy or the laboratory's certified true copy is valid.

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

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. : C172287
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 24 April 2017

Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
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 : 28 April 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 2 May 2017

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. : C172287
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 was performed before the test.

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	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

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	94.3	± 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	94.3 (Ref.)
				104.00		104.3
				114.00		114.3

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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	94.3	Ref.
			Slow			94.3	± 0.3

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Certificate No. : C172287
證書編號

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	68.1	-26.2 ± 1.5
					125 Hz	78.1	-16.1 ± 1.5
					250 Hz	85.6	-8.6 ± 1.4
					500 Hz	91.0	-3.2 ± 1.4
					1 kHz	94.3	Ref.
					2 kHz	95.5	+1.2 ± 1.6
					4 kHz	95.3	+1.0 ± 1.6
					8 kHz	93.3	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.9	-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	93.4	-0.8 ± 1.5
					125 Hz	94.1	-0.2 ± 1.5
					250 Hz	94.3	0.0 ± 1.4
					500 Hz	94.3	0.0 ± 1.4
					1 kHz	94.3	Ref.
					2 kHz	94.1	-0.2 ± 1.6
					4 kHz	93.5	-0.8 ± 1.6
					8 kHz	91.4	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

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Certificate No. : C172287
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 06015

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

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

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

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Certificate of Calibration
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Certificate No. : C172286
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ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 24 April 2017

Description / 儀器名稱 : Sound Level Meter (EQ067)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-31
Serial No. / 編號 : 00410221
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 : 28 April 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 2 May 2017

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. : C172286
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 was performed before the test.

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	C170048
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	93.1	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 120	L_A	A	Fast	94.00	1	93.1 (Ref.)
				104.00		103.1
				114.00		113.2

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L_A	A	Fast	94.00	1	93.1	Ref.
			Slow			93.1	± 0.3

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Certificate No. : C172286
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6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_A	A	Fast	94.00	63 Hz	66.8	-26.2 ± 1.5
					125 Hz	76.9	-16.1 ± 1.5
					250 Hz	84.4	-8.6 ± 1.4
					500 Hz	89.8	-3.2 ± 1.4
					1 kHz	93.1	Ref.
					2 kHz	94.4	+1.2 ± 1.6
					4 kHz	94.2	+1.0 ± 1.6
					8 kHz	92.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.2	-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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L_C	C	Fast	94.00	63 Hz	92.2	-0.8 ± 1.5
					125 Hz	92.9	-0.2 ± 1.5
					250 Hz	93.1	0.0 ± 1.4
					500 Hz	93.1	0.0 ± 1.4
					1 kHz	93.1	Ref.
					2 kHz	93.0	-0.2 ± 1.6
					4 kHz	92.4	-0.8 ± 1.6
					8 kHz	90.2	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.3	-6.2 (+3.0 ; -6.0)

Certificate of Calibration
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Certificate No. : C172286
證書編號

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 319734

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

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

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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

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Certificate of Calibration
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Certificate No. : C172284
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 24 April 2017

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 : 28 April 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 2 May 2017

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

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Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C172284
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

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

3. Test equipment :

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

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 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 :
Only the original copy or the laboratory's certified true copy is valid.

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

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

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Certificate of Calibration
校正證書

Certificate No. : C172285
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 24 April 2017

Description / 儀器名稱 : Sound Level Calibrator (EQ088)
Manufacturer / 製造商 : Quest
Model No. / 型號 : QC-20
Serial No. / 編號 : QO9090006
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 : 28 April 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 2 May 2017

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. : C172285
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

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

3. Test equipment :

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

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.2	± 0.3	± 0.2
114 dB, 1 kHz	114.2		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.991	± 2 %	± 1

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

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

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

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. : C174095
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-0924) Date of Receipt / 收件日期 : 14 July 2017

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

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 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 July 2017

TEST RESULTS / 測試結果

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

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 25 July 2017

Sun Creation Engineering Limited - Calibration & Testing Laboratory
Unit A, 1/F, Tung Shun Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 E-mail 電郵: calibration@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. : C174095
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

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

3. Test equipment :

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

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 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 :
Only the original copy or the laboratory's certified true copy is valid.

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

Sun Creation Engineering Limited - Calibration & Testing Laboratory
Unit A, 12/F, Cheung Shun Wan Exchange Building, 1 Hing On Lane, Tsuen Wan, New Territories, Hong Kong
新創工程有限公司 - 校正及測試實驗所
荃灣興安里1號祥順源交易廣場12樓A室
Tel 電話: 2927 2606 Fax 傳真: 2744 8986 Email 電郵: suncal@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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1818150
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING	**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:** **DATE RECEIVED:** **DATE OF ISSUE:**	HONG KONG 23- Feb- 2018 02- Mar- 2018

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice 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:	27 February, 2018

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1818150
Sub- Batch: 0
Date of Issue: 02- Mar- 2018
Client: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: - -
Date of Calibration: 27 February, 2018 Date of next Calibration: 27 May, 2018

Parameters:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.42	2.37	- 0.05
5.55	5.47	- 0.08
8.58	8.41	- 0.17
	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 (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
10.5	10.8	+ 0.3
21.5	21.3	- 0.2
39.0	38.8	- 0.2
	Tolerance Limit (^{o}C)	± 2.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganics

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1818146
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING	**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:	23- Feb- 2018
		DATE OF ISSUE:	02- Mar- 2018

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice 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.:	12060C018266
Equipment No.:	- -
Date of Calibration:	27 February, 2018

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1818146
Sub- batch: 0
Date of Issue: 02- Mar- 2018
Client: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: - -
Date of Calibration: 27 February, 2018 Date of next Calibration: 27 May, 2018

Parameters:

Turbidity **Method Ref: APHA 21st Ed. 2130B**

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.32	- -
4	4.28	+ 7.0
40	38	- 5.0
80	84	+ 5.0
400	377	- 5.8
800	751	- 6.1
	Tolerance Limit (%)	± 10.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganics

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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	**WORK ORDER:**	HK1818147
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING	**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:	23- Feb- 2018
		DATE OF ISSUE:	02- Mar- 2018

COMMENTS

The performance of the equipment stated in this report is checked with independent reference material and results compared against a calibrated secondary source.
The "Tolerance Limit" quoted is the acceptance criteria applicable for similar equipment used by the ALS Hong Kong laboratory or quoted from relevant international standards.
The "Next Calibration Date" is recommended according to best practice principals as practised by the ALS Hong Kong laboratory or quoted from relevant international standards.

Scope of Test:	pH
Description:	pH Meter
Brand Name:	AZ
Model No.:	8685
Serial No.:	1141943
Equipment No.:	- -
Date of Calibration:	27 February, 2018

NOTES

This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

Mr Chan Siu Ming, Vico
Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1818147
Sub- batch: 0
Date of Issue: 02- Mar- 2018
Client: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Description: pH Meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1141943
Equipment No.: - -
Date of Calibration: 27 February, 2018 Date of next Calibration: 27 May, 2018

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.1	+0.10
7.0	6.9	- 0.10
10.0	9.8	- 0.20
	Tolerance Limit (pH Unit)	±0.20

Temperature

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

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
11.0	11.5	+0.5
21.0	21.0	+0.0
39.0	38.0	- 1.0
	Tolerance Limit (^{o}C)	±2.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganics

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 of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as listed in the HOKLAS Directory of Accredited Laboratories within the test category of
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，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 quality management system (see joint IAF-ILAC-ISO Communiqué).
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(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 2 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 – April 2018

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

	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for next Reporting Period – May 2018

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Tue	1-May-18				
Wed	2-May-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Thu	3-May-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Fri	4-May-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sat	5-May-18				
Sun	6-May-18				
Mon	7-May-18				All Water Quality Monitoring Locations
Tue	8-May-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	
Wed	9-May-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Thu	10-May-18		AM4b, AM5, AM6, AM7b & AM8		
Fri	11-May-18				All Water Quality Monitoring Locations
Sat	12-May-18				
Sun	13-May-18				
Mon	14-May-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Tue	15-May-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	
Wed	16-May-18		AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Thu	17-May-18				
Fri	18-May-18				All Water Quality Monitoring Locations
Sat	19-May-18	AM1b, AM2, AM3 & AM9b			
Sun	20-May-18				
Mon	21-May-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b	NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Tue	22-May-18		AM4b, AM5, AM6, AM7b & AM8		
Wed	23-May-18				All Water Quality Monitoring Locations
Thu	24-May-18				
Fri	25-May-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Sat	26-May-18	AM4b, AM5, AM6, AM7b & AM8	AM1b, AM2, AM3 & AM9b		
Sun	27-May-18				
Mon	28-May-18		AM4b, AM5, AM6, AM7b & AM8		
Tue	29-May-18				All Water Quality Monitoring Locations
Wed	30-May-18				
Thu	31-May-18	AM1b, AM2, AM3 & AM9b		NM1, NM2a, NM8, NM9 & NM10	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															
4-Apr-18	22405	14440.28	14464.45	1450.20	30	30	30.0	24.7	1012.7	1.02	1475	2.6582	2.7567	0.0985	67
10-Apr-18	22441	14464.45	14488.61	1449.60	38	38	38.0	23.8	1014.7	1.35	1954	2.6666	2.8342	0.1676	86
16-Apr-18	22469	14488.61	14512.70	1445.40	35	35	35.0	18.5	1016.5	1.26	1819	2.6866	2.7812	0.0946	52
21-Apr-18	22439	14512.70	14536.96	1455.60	38	38	38.0	24.5	1013.1	1.35	1959	2.6759	2.7984	0.1225	77
27-Apr-18															#
AM2 - Village House near Lin Ma Hang Road															
4-Apr-18	22404	9925.18	9949.26	1444.80	48	48	48.0	24.7	1012.7	1.49	2154	2.6510	2.9504	0.2994	139
10-Apr-18	22443	9949.26	9973.06	1428.00	48	48	48.0	23.8	1014.7	1.59	2267	2.6790	3.0021	0.3231	143
16-Apr-18	22468	9973.06	9996.98	1435.20	38	38	38.0	18.5	1016.5	1.24	1782	2.6799	2.9098	0.2299	129
21-Apr-18	22476	9996.98	10020.89	1434.60	38	38	38.0	24.5	1013.1	1.23	1758	2.6744	2.8778	0.2034	116
27-Apr-18	22517	10020.89	10044.99	1446.00	38	38	38.0	24.9	1015	1.23	1773	2.6755	2.8447	0.1692	95
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
4-Apr-18	22403	11061.36	11085.36	1440.00	36	36	36.0	24.7	1012.7	1.07	1545	2.6579	2.7864	0.1285	83
10-Apr-18	22440	11085.36	11109.36	1440.00	44	44	44.0	23.8	1014.7	1.42	2041	2.6710	2.9447	0.2737	134
16-Apr-18	22467	11109.36	11133.36	1440.00	34	34	34.0	18.5	1016.4	1.06	1520	2.6443	2.7670	0.1227	81
21-Apr-18	22475	11133.36	11157.37	1440.60	36	36	36.0	24.5	1013.1	1.12	1607	2.6660	2.7905	0.1245	77
27-Apr-18	22516	11157.37	11181.37	1440.00	36	36	36.0	24.9	1015	1.12	1607	2.6741	2.7604	0.0863	54
AM4b - House no. 10B1 Nga Yiu Ha Village															
5-Apr-18	22399	13063.16	13087.16	1440.00	43	43	43.0	24.6	1011.6	1.12	1504	2.6590	2.7311	0.0721	48
11-Apr-18	22444	13087.16	13111.16	1440.00	48	48	48.0	24.6	1012.3	1.32	1882	2.6605	2.8048	0.1443	77
17-Apr-18	22471	13109.09	13133.09	1440.00	44	44	44.0	19.9	1017.1	1.21	1882	2.6534	2.7643	0.1109	59
23-Apr-18	22493	13133.09	13156.96	1432.20	44	44	44.0	26.3	1009.2	1.19	1882	2.6890	2.7945	0.1055	56
28-Apr-18	22519	13156.96	13180.96	1440.00	44	44	44.0	24.5	1015	1.20	1882	2.7044	2.8295	0.1251	66
AM5a - Ping Yeung Village House															
5-Apr-18	22398	11888.11	11912.55	1466.40	40	40	40.0	24.6	1011.6	1.41	2071	2.6576	2.7610	0.1034	50
11-Apr-18	22445	11912.55	11936.88	1459.80	36	36	36.0	24.6	1012.3	1.35	1976	2.6770	2.8831	0.2061	104
17-Apr-18	22474	11936.88	11961.27	1463.40	36	36	36.0	19.9	1017.1	1.37	1999	2.6657	2.7805	0.1148	57
23-Apr-18	22492	11961.27	11985.73	1467.60	36	36	36.0	26.3	1009.2	1.35	1978	2.6644	2.7363	0.0719	36
28-Apr-18	22518	11985.73	12010.24	1470.60	40	40	40.0	24.5	1015	1.49	2195	2.6895	2.8534	0.1639	75
AM6 - Wo Keng Shan Village House															
5-Apr-18	22397	9493.52	9517.52	1440.00	36	36	36.0	24.6	1011.6	1.14	1646	2.6736	2.7645	0.0909	55
11-Apr-18	22446	9517.52	9541.52	1440.00	36	36	36.0	24.6	1012.3	1.20	1722	2.6618	2.8874	0.2256	131
17-Apr-18	22472	9541.52	9565.53	1440.60	36	36	36.0	19.9	1017.1	1.21	1737	2.6729	2.8593	0.1864	107

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)	
23-Apr-18	22494	9565.53	9589.53	1440.00	36	36	36.0	26.3	1009.2	1.19	1717	2.6604	2.8320	0.1716	100
28-Apr-18	22520	9589.53	9613.54	1440.60	30	30	30.0	24.5	1015.0	1.05	1506	2.7005	2.8640	0.1635	109
AM7b - Loi Tung Village House															
5-Apr-18	22401	18540.46	18564.47	1440.60	38	38	38.0	24.6	1011.6	0.98	1411	2.6745	2.7942	0.1197	85
11-Apr-18	22447	18564.47	18588.23	1425.60	42	42	42.0	24.6	1012.3	1.18	1686	2.6656	2.8930	0.2274	135
17-Apr-18	22382	18588.23	18612.23	1440.00	38	38	38.0	19.9	1017.1	1.07	1540	2.6750	2.8437	0.1687	110
23-Apr-18	22495	18612.23	18636.24	1440.60	46	46	46.0	26.3	1009.2	1.30	1875	2.6619	2.8099	0.1480	79
28-Apr-18	22521	18636.24	18660.23	1439.40	48	48	48.0	24.5	1015	1.37	1976	2.6722	2.8343	0.1621	82
AM8 - Po Kat Tsai Village No. 4															
5-Apr-18	22400	12437.77	12461.77	1440.00	34	34	34.0	24.6	1011.6	1.13	1629	2.6566	2.7145	0.0579	36
11-Apr-18	22448	12461.77	12485.77	1440.00	34	34	34.0	24.6	1012.3	1.18	1704	2.6726	2.7805	0.1079	63
17-Apr-18	22473	12485.77	12509.78	1440.60	32	32	32.0	19.9	1017.1	1.14	1647	2.6657	2.7566	0.0909	55
23-Apr-18	22496	12509.78	12533.78	1440.00	36	36	36.0	26.3	1009.2	1.23	1767	2.6600	2.7288	0.0688	39
28-Apr-18	22522	12533.78	12557.79	1440.60	32	32	32.0	24.5	1015	1.14	1637	2.6660	2.7614	0.0954	58
AM9b - Nam Wa Po Village House No. 80															
4-Apr-18	22402	19816.54	19840.54	1440.00	34	34	34.0	24.7	1012.7	1.05	1508	2.6660	2.7930	0.1270	84
10-Apr-18	22442	19840.54	19864.55	1440.60	36	36	36.0	23.8	1014.7	1.17	1684	2.6682	2.7965	0.1283	76
16-Apr-18	22470	19864.55	19888.55	1440.00	36	36	36.0	18.5	1016.5	1.18	1701	2.6700	2.7527	0.0827	49
21-Apr-18	22491	19888.55	19912.56	1440.60	34	34	34.0	24.5	1013.1	1.10	1583	2.6751	2.7695	0.0944	60
27-Apr-18	22514	19912.56	19936.56	1440.00	32	32	32.0	24.9	1015	1.03	1485	2.6952	2.7673	0.0721	49

Remark: (#) 24-hour TSP monitoring at AM1b has been temporary suspended since 27 April 2018 as the area for AM1b was demolished and returned to the landlord.

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																					
3-Apr-18	9:27	54.8	56.8	52.8	58.8	63.7	53.9	54.9	57.2	51.0	55.9	58.8	51.3	56.3	58.9	51.4	55.6	57.7	51.7	56	NA
9-Apr-18	9:43	59.7	62.6	54.2	61.0	62.5	55.9	57.6	59.7	54.4	61.0	63.9	56.3	58.1	61.5	53.0	59.6	60.2	53.7	60	NA
20-Apr-18	9:42	59.9	61.0	54.0	60.5	62.5	55.6	59.2	61.6	54.0	60.2	63.9	55.8	59.3	62.5	55.9	61.2	64.2	51.9	60	NA
26-Apr-18	9:09	57.8	59.5	55.0	58.3	60.5	55.5	57.8	59.0	55.5	57.6	59.0	55.0	59.5	62.0	56.0	57.8	59.0	55.0	58	NA
NM2a - Village House near Lin Ma Hang Road																					
3-Apr-18	9:23	72.1	69.5	53.2	68.4	70.5	54.5	62.1	66.6	53.6	64.5	67.3	55.1	68.4	70.5	54.9	65.9	68.2	56.2	68	71
9-Apr-18	9:39	65.5	68.1	56.6	63.5	66.3	57.4	61.9	66.1	54.6	63.9	67.8	56.1	63.3	66.8	55.3	62.5	66.3	54.8	64	67
20-Apr-18	10:16	72.6	68.6	53.6	64.5	69.6	55.9	65.9	69.8	54.5	62.8	66.4	55.1	62.4	67.8	55.7	63.5	68.8	55.1	67	70
26-Apr-18	10:07	62.5	64.5	56.5	59.5	62.0	56.0	60.0	62.5	56.0	63.6	66.5	58.5	63.8	66.0	61.0	63.7	66.0	59.5	63	66
NM3 - Ping Yeung Village House																					
4-Apr-18	9:19	62.4	63.1	61.2	63.0	64.6	61.0	64.2	66.0	61.9	64.5	65.8	62.0	64.9	65.5	61.0	62.6	63.7	59.9	64	NA
10-Apr-18	13:02	53.1	59.8	48.6	54.5	58.2	48.7	53.3	57.6	49.1	55.8	60.3	51.6	53.9	59.7	49.2	54.6	60.8	51.4	54	NA
16-Apr-18	9:16	61.2	63.1	54.9	58.4	59.4	55.4	60.7	62.4	56.4	60.5	62.4	56.4	60.9	62.4	56.9	61.0	62.9	57.9	61	NA
27-Apr-18	10:04	60.8	63.3	54.6	59.4	63.6	52.9	61.6	60.8	50.4	63.5	63.6	49.8	60.7	58.6	48.9	61.2	62.5	48.9	61	NA
NM4 - Wo Keng Shan Village House																					
4-Apr-18	9:55	62.3	64.6	57.8	61.0	63.8	54.4	61.9	64.6	56.3	65.2	68.4	57.3	63.0	65.2	57.2	64.6	67.1	58.3	63	NA
10-Apr-18	11:23	60.8	65.6	55.2	61.7	64.6	54.8	62.2	66.9	53.4	60.7	65.3	54.7	59.8	62.6	53.1	60.7	63.3	54.2	61	NA
16-Apr-18	9:58	59.3	60.4	48.2	59.6	57.0	44.7	54.0	56.0	43.2	65.5	66.5	43.7	59.1	63.0	56.1	56.0	55.7	44.9	61	NA
27-Apr-18	13:36	62.8	64.1	56.4	65.6	70.7	52.8	64.4	61.5	52.9	61.7	60.6	53.8	63.0	63.5	54.9	62.2	61.6	52.9	63	NA
NM5– Ping Yeung Village House																					
4-Apr-18	10:32	53.4	56.6	45.4	52.3	55.4	47.1	54.8	59.2	47.5	55.0	58.5	47.4	52.8	55.5	47.5	50.9	53.1	47.3	53	NA
10-Apr-18	10:38	52.8	57.9	50.3	53.6	58.4	51.2	52.2	56.7	50.1	52.2	56.9	49.6	53.3	56.2	49.8	53.1	55.9	50.1	53	NA
16-Apr-18	10:37	53.9	56.7	48.2	49.2	51.2	46.2	51.8	54.7	46.7	50.8	53.2	46.7	51.9	55.2	46.7	52.1	54.2	46.7	52	NA
27-Apr-18	10:32	54.1	58.2	51.3	52.2	56.3	47.1	53.1	56.3	48.5	52.3	56.3	50.2	53.1	56.1	49.1	53.5	54.6	48.3	53	NA
NM6 – Tai Tong Wu Village House 2																					
4-Apr-18	11:07	58.0	60.7	52.6	58.1	60.6	53.4	57.8	60.5	52.5	58.5	61.1	53.4	58.7	61.2	54.0	59.3	61.5	53.1	58	NA
10-Apr-18	10:03	56.1	60.4	52.1	57.8	60.3	52.4	58.9	62.5	53.6	56.4	60.1	50.3	55.9	61.7	50.1	56.8	60.4	51.4	57	NA
16-Apr-18	11:09	60.6	63.2	52.3	63.7	68.3	50.8	55.9	59.3	49.8	56.4	57.3	49.3	55.0	57.8	48.8	57.5	60.3	52.3	59	NA
27-Apr-18	11:23	61.3	64.2	51.1	62.4	65.3	52.1	54.3	56.3	51.2	54.3	55.2	52.3	53.1	62.3	49.3	56.2	59.3	51.3	58	NA
NM7 – Po Kat Tsai Village																					
4-Apr-18	13:04	68.2	70.7	61.8	64.8	67.7	58.2	65.9	69.1	59.6	66.6	69.4	60.1	66.0	69.2	59.7	63.7	66.6	57.4	66	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
10-Apr-18	9:04	56.8	61.7	53.4	57.9	60.2	54.4	56.2	58.6	54.3	55.2	59.7	53.6	58.1	62.4	54.1	57.6	61.2	55.3	57	NA
16-Apr-18	13:06	59.5	60.2	57.2	59.9	60.7	58.2	60.1	62.2	58.2	58.3	59.2	57.2	57.9	59.2	55.7	58.5	59.7	56.7	59	NA
27-Apr-18	13:23	61.2	64.3	58.2	58.1	61.3	59.2	61.2	63.2	59.1	56.1	58.3	56.1	59.3	61.2	57.3	59.2	61.2	57.3	60	NA
NM8 - Village House, Tong Hang																					
3-Apr-18	9:43	66.2	68	63	65.8	67	62.5	66	68.5	62	65.9	68	61.5	65.8	67.5	63.5	66	68	63	66	NA
9-Apr-18	11:11	51.8	53.5	41	58.6	63	42	59.6	63.5	46	56.5	60	41	60.1	64.3	41.5	59.8	64	44	58	NA
20-Apr-18	10:12	58.3	62.2	52.4	61.7	64.6	53.2	58.6	62.4	51.9	56.3	59.7	50.3	57.9	59.6	51.7	58.3	61.2	52.4	59	NA
26-Apr-18	9:33	59.2	62.8	53.6	60.7	63.6	54.2	59.8	62.1	55.3	57.1	59.6	55.3	58.2	59.7	55.3	59.4	62.8	56.7	59	NA
NM9 - Village House, Kiu Tau Village																					
3-Apr-18	10:31	65.8	68.5	60.5	68.3	69.5	63.0	65.9	68.0	62.0	64.5	67.5	60.0	64.1	66.0	58.5	61.7	64.5	57.0	66	NA
9-Apr-18	10:16	61.7	64.0	55.5	61.1	64.0	55.0	60.5	63.0	55.5	60.8	63.0	56.0	59.0	62.5	45.5	53.6	57.5	42.5	60	NA
20-Apr-18	9:21	57.4	60.1	52.3	56.9	59.4	53.4	57.8	59.9	53.1	55.3	58.6	53.7	56.9	60.4	54.3	57.8	61.7	53.2	57	NA
26-Apr-18	11:25	58.3	61.7	53.6	57.9	60.4	54.2	57.1	59.3	53.6	56.8	58.4	53.1	56.2	60.3	52.4	57.9	60.1	53.8	57	NA
NM10 - Nam Wa Po Village House No. 80																					
3-Apr-18	11:23	62.3	64.5	57.0	63.6	67.5	57.0	62.2	65.0	56.0	60.9	63.5	56.0	61.5	64.5	55.0	62.0	65.5	55.5	62	65
9-Apr-18	9:28	59.6	64.5	47.0	59.8	63.0	48.0	60.5	63.5	54.0	59.6	63.5	46.0	61.5	63.5	57.5	60.8	64.0	53.0	60	63
20-Apr-18	13:18	58.2	62.6	53.9	60.4	62.6	54.1	59.7	61.7	55.3	58.9	60.2	53.1	57.3	59.4	54.2	58.9	61.7	54.3	59	62
26-Apr-18	13:34	56.4	60.7	54.8	60.2	63.4	55.9	60.1	61.8	56.4	57.6	60.1	54.7	56.8	60.3	54.3	57.9	59.2	54.8	58	61

Water Quality Monitoring Data for Contract 6 and SS C505

Date	3-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:33	0.15	22.7	22.7	10.27	10.3	119.4	119.5	18.0	17.8	7.9	7.9	11	9.0
			22.7		10.25		119.5		17.5		7.9		7	
WM1	9:45	0.17	21.7	21.7	5.17	5.2	58.4	58.3	10.6	10.4	7.3	7.3	7	5.0
			21.7		5.14		58.1		10.2		7.3		3	

Date	5-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:20	0.15	22.6	22.6	11.23	11.2	129.7	129.2	15.7	15.1	7.9	7.9	11	10.5
			22.6		11.12		128.7		14.4		7.9		10	
WM1	9:30	0.18	21.9	21.9	5.28	5.3	60.1	59.9	9.6	10.1	7.5	7.5	7	6.0
			21.9		5.24		59.6		10.7		7.5		5	

Date	7-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:04	0.18	16	16.0	8.61	8.7	86.2	86.6	8.3	8.4	7.6	7.6	<2	<2
			16		8.7		87.0		8.4		7.6		<2	
WM1	8:51	0.19	17	17.0	7.18	7.2	73.2	73.7	5.1	5.1	7.7	7.7	<2	<2
			17		7.21		74.1		5.1		7.7		<2	

Date	9-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:50	0.16	20.4	20.4	10.51	10.4	116.8	115.9	14.6	14.2	7.9	7.9	14	13.0
			20.4		10.35		114.9		13.7		7.9		12	
WM1	10:00	0.20	19.4	19.4	6.4	6.4	68.8	68.9	6.2	6.7	7.4	7.4	6	5.0
			19.4		6.42		69.0		7.3		7.4		4	

Date	11-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:30	0.15	22.5	22.5	9.81	9.8	113.0	112.7	6.8	6.9	7.1	7.1	5	4.5
			22.5		9.71		112.3		6.9		7.1		4	
WM1	9:40	0.20	22.2	22.2	5.61	5.6	64.0	64.0	4.1	4.3	7	7.0	3	3.0
			22.2		5.6		64.0		4.6		7		3	

Date	13-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:30	0.16	25.6	25.6	8.44	8.4	103.6	103.5	23.5	22.4	7.3	7.3	30	30.0
			25.6		8.43		103.3		21.3		7.3		30	
WM1	9:40	0.20	24.5	24.5	5.27	5.3	63.1	63.0	12.2	12.7	7.3	7.3	9	10.0
			24.5		5.26		62.9		13.1		7.3		11	

Date	16-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:45	0.30	22.3	22.3	7.63	7.6	87.1	86.8	294.0	297.5	7.3	7.3	185	181.0
			22.3		7.58		86.4		301.0		7.3		177	
WM1	9:55	0.26	20.1	20.1	6.05	6.0	66.4	66.1	31.9	30.6	7	7.0	24	23.5
			20.1		5.99		65.8		29.3		7		23	

Date	18-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:45	0.15	21.9	21.9	8.59	8.5	97.4	96.3	18.5	18.4	7	7.0	14	14.5
			21.9		8.41		95.1		18.2		7		15	
WM1	9:55	0.20	21.1	21.1	5.66	5.7	63.2	63.3	14.3	14.6	6.9	6.9	13	13.0
			21.1		5.68		63.4		14.9		6.9		13	

Date	20-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:45	0.14	22.7	22.7	9.93	9.9	114.8	114.9	13.1	13.2	6.4	6.4	4	4.5
			22.7		9.96		115.0		13.2		6.4		5	
WM1	9:58	0.20	22.5	22.5	4.46	4.5	51.3	51.4	5.3	5.1	6.5	6.5	2	3.0
			22.5		4.48		51.4		5.0		6.5		4	

Date	23-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:25	0.15	25.8	25.8	7.33	7.4	90.1	90.6	25.5	25.4	7.3	7.3	30	31.5
			25.8		7.41		91.1		25.2		7.3		33	
WM1	9:40	0.20	24.9	24.9	4.47	4.4	53.8	53.2	10.6	10.5	6.9	6.9	4	5.0
			24.9		4.35		52.5		10.4		6.9		6	

Date	25-Apr-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:50	0.26	22.9	22.9	6.76	6.7	78.5	78.3	25.1	24.4	7.8	7.8	19	19.5
			22.9		6.73		78.1		23.7		7.8		20	
WM1	10:00	0.25	23.1	23.1	6.09	6.1	70.9	70.7	29.0	27.9	7.5	7.5	25	25.5
			23.1		6.05		70.5		26.8		7.5		26	

Date	28-Apr-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:59	0.15	23.9	23.9	6.61	6.6	77.1	77.7	41.6	39.8	9.1	9.2	56	53.5
			23.9		6.65		78.2		37.9		9.2		51	
WM1	9:50	0.17	23.7	23.7	4.2	4.2	48.0	48.5	9.2	9.2	7.3	7.3	3	3.5
			23.7		4.27		48.9		9.1		7.3		4	

Date	30-Apr-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	13:35	0.13	28.7	28.7	6.88	6.9	88.1	88.4	52.6	51.3	7.92	7.9	56	56.5
			28.7		6.93		88.7		50.0		7.92		57	
WM1	13:25	0.20	25.8	25.8	4.46	4.4	54.8	54.4	36.6	37.2	7.85	7.9	21	22.0
			25.8		4.37		53.9		37.8		7.85		23	

Water Quality Monitoring Data for Contract 2 and 3

Date	3-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:50	0.14	25.7	25.7	6.76	6.8	82.8	83.0	4.2	4.3	7.4	7.4	<2	<2
			25.7		6.77		83.1		4.4		7.4		<2	
WM4-CB	12:00	0.30	26.6	26.6	5.16	5.2	64.1	64.2	9.0	9.1	7.4	7.4	3	3.0
			26.6		5.18		64.3		9.3		7.4		3	
WM4	11:40	0.15	25.2	25.2	5.57	5.5	67.2	66.8	18.8	17.4	7.2	7.2	16	13.5
			25.2		5.51		66.3		15.9		7.2		11	

Date	5-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:15	0.13	25.8	25.8	6.84	6.8	83.0	82.5	5.3	5.3	7.4	7.4	5	4.5
			25.8		6.69		81.9		5.4		7.4		4	
WM4-CB	11:25	0.30	26.3	26.3	4.93	4.9	60.9	61.0	6.0	6.0	7	7.0	4	4.0
			26.3		4.95		61.1		6.0		7		4	
WM4	11:08	0.15	24.8	24.8	5.05	5.1	60.7	60.9	13.0	12.3	7.3	7.3	22	21.0
			24.8		5.08		61.1		11.5		7.3		20	

Date	7-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:10	0.19	18.4	18.5	7.71	7.8	80.7	81.4	6.3	6.3	7.2	7.2	38	25.0
			18.5		7.83		82.0		6.3		7.2		12	
WM4-CB	11:27	0.38	19.4	19.4	4.79	4.8	51.2	51.9	16.5	16.8	7.3	7.3	24	25.0
			19.4		4.85		52.5		17.0		7.3		26	
WM4	10:47	0.37	18	18.0	6.22	6.3	64.7	65.2	7.7	7.8	7.1	7.1	8	8.5
			18		6.3		65.7		7.9		7.1		9	

Date	9-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:30	0.13	23.9	23.9	7.08	7.1	83.6	83.7	4.6	4.5	7.3	7.3	3	2.5
			23.9		7.09		83.7		4.5		7.3		2	
WM4-CB	11:40	0.30	24.8	24.8	5.11	5.1	61.3	61.1	8.7	8.8	7	7.0	9	9.0
			24.8		5.09		60.8		8.9		7		9	
WM4	11:20	0.15	22.9	22.9	5.39	5.4	62.5	62.2	14.0	13.8	7.2	7.2	13	13.5
			22.9		5.32		61.8		13.6		7.2		14	

Date	11-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	10:55	0.14	23.4	23.4	6.12	6.1	71.4	71.2	2.6	2.4	7.4	7.4	<2	<2
			23.4		6.05		70.9		2.2		7.4		<2	
WM4-CB	11:00	0.30	24.3	24.3	4.41	4.4	52.5	52.6	6.9	7.0	7.1	7.1	6	6.5
			24.3		4.43		52.6		7.1		7.1		7	
WM4	10:50	0.15	23.9	23.9	4.91	4.9	58.3	58.1	23.8	22.9	7.1	7.1	30	30.5
			23.9		4.87		57.9		21.9		7.1		31	

Date	13-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	12:00	0.13	25.5	25.5	6.12	6.1	74.7	74.8	3.5	3.4	7.3	7.3	2	2.0
			25.5		6.12		74.8		3.3		7.3		2	
WM4-CB	12:10	0.30	26.8	26.8	4.89	4.9	61.1	61.1	10.1	9.1	7.3	7.3	5	5.0
			26.8		4.88		61.0		8.2		7.3		5	
WM4	11:50	0.15	25.8	25.8	4.94	4.9	60.8	60.6	31.0	30.5	7.2	7.2	29	30.5
			25.8		4.91		60.3		30.0		7.2		32	

Date	16-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:15	0.14	20.2	20.2	5.53	5.5	60.5	60.3	17.0	17.4	7.7	7.7	9	9.5
			20.2		5.49		60.0		17.7		7.7		10	
WM4-CB	11:25	0.31	21.1	21.1	3.35	3.4	33.7	33.9	13.9	13.9	7.5	7.5	14	14.5
			21.1		3.36		34.1		13.9		7.5		15	
WM4	11:05	0.16	20.1	20.1	5.92	5.9	64.5	64.3	106.0	**104.0**	7.6	7.6	106	**103.5**
			20.1		5.89		64.0		102.0		7.6		101	

Date	17-Apr-18#															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	10:30	0.14							4.1	3.8			<2	<2
									3.6				<2	
WM4-CB	10:47	0.30							14.5	13.8			27	27.0
									13.0				27	
WM4	10:25	0.15							42.2	**41.6**			35	35.0
									40.9				35	

Date	18-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:50	0.14	22.5	22.5	5.51	5.5	63.3	63.2	7.3	7.5	7.3	7.3	9	9.5
			22.5		5.48		63.0		7.7		7.3		10	
WM4-CB	12:00	0.30	23.6	23.6	4.32	4.3	50.7	50.6	9.4	9.7	6.9	6.9	14	13.5
			23.6		4.29		50.4		10.0		6.9		13	
WM4	11:38	0.15	24.1	24.1	4.65	4.6	55.0	54.8	15.2	15.5	7.1	7.1	22	22.0
			24.1		4.62		54.6		15.7		7.1		22	

Date	19-Apr-18#													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:05	0.13							3.7	3.8			20	20.0
									4.0				20	
WM4-CB	11:15	0.31							6.8	6.6			13	13.0
									6.5				13	
WM4	10:55	0.15							19.1	18.9			23	23.0
									18.7				23	

Date	20-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:40	0.13	24	24.0	5.73	5.7	67.9	68.0	8.2	7.2	7	7.0	3	3.0
			24		5.74		68.0		6.2		7		3	
WM4-CB	11:50	0.30	25.4	25.4	4.1	4.1	49.8	49.9	6.9	6.5	6.6	6.6	5	5.5
			25.4		4.11		49.9		6.1		6.6		6	
WM4	11:30	0.15	23.9	23.9	4.92	4.9	58.2	58.3	18.6	17.6	7.1	7.1	24	23.0
			23.9		4.93		58.3		16.5		7.1		22	

Date	23-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:10	0.13	26.7	26.7	5.31	5.3	66.3	66.3	3.2	3.3	7.4	7.4	<2	<2
			26.7		5.3		66.2		3.3		7.4		<2	
WM4-CB	11:20	0.30	27.6	27.6	4.52	4.5	57.3	57.0	5.4	5.5	7.1	7.1	3	3.0
			27.6		4.46		56.6		5.5		7.1		3	
WM4	11:00	0.15	26.2	26.2	4.66	4.6	57.8	57.3	8.9	8.7	7.3	7.3	13	12.0
			26.2		4.57		56.7		8.5		7.3		11	

Date	25-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	12:10	0.13	23.2	23.2	4.88	4.8	56.9	56.5	6.3	7.0	7.6	7.6	4	4.0
			23.2		4.81		56.1		7.7		7.6		4	
WM4-CB	12:20	0.31	23.8	23.8	4.61	4.5	36.3	35.4	11.6	11.3	6.8	6.8	9	10.0
			23.8		4.38		34.5		11.0		6.8		11	
WM4	12:00	0.15	23.5	23.5	4.64	4.7	54.6	54.8	20.2	19.2	7.5	7.5	21	21.0
			23.5		4.67		54.9		18.2		7.5		21	

Date	28-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:49	0.19	23.8	23.8	6.1	6.1	72.4	72.7	10.0	10.4	7.3	7.3	4	5.0
			23.8		6.13		72.9		10.7		7.3		6	
WM4-CB	12:07	0.31	24.6	24.6	3.04	3.1	39.8	38.9	7.4	7.5	6.91	6.9	7	7.0
			24.6		3.23		37.9		7.5		6.91		7	
WM4	11:31	0.27	23.8	23.8	4.64	4.7	55.6	56.2	16.1	16.6	7.2	7.2	19	19.0
			23.8		4.7		56.7		17.0		7.2		19	

Date	30-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	15:20	0.13	25.4	25.4	5.19	5.2	63.3	63.9	8.4	8.9	7.15	7.2	6	7.0
			25.4		5.29		64.5		9.4		7.15		8	
WM4-CB	15:30	0.30	27.1	27.1	4.5	4.5	56.6	56.0	6.2	6.2	6.97	7.0	3	3.5
			27.1		4.42		55.3		6.2		6.97		4	
WM4	15:15	0.15	27	27.0	4.82	4.8	60.6	60.0	17.7	17.6	6.75	6.8	14	15.0
			27		4.74		59.4		17.5		6.75		16	

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

	Action Level
	Limit Level

Water Quality Monitoring Data for Contract 6

Date	**3-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:35	0.28	21.6	21.6	5.81	5.6	66.0	64.1	15.8	16.2	7.70	7.7	5	4.5
			21.6		5.4		62.2		16.5		7.70		4	
WM2A	10:15	0.15	22	22.0	7.9	7.9	89.8	89.8	14.8	13.9	7.80	7.8	8	8.5
			22		7.91		89.8		13.0		7.80		9	

Date	**5-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:00	0.28	21.5	21.5	5.52	5.5	62.5	62.6	12.8	12.4	7.50	7.5	4	3.0
			21.5		5.53		62.7		12.0		7.50		2	
WM2A	9:40	0.15	21.9	21.9	7.67	7.7	87.2	87.3	16.3	15.3	7.60	7.6	14	14.5
			21.9		7.68		87.3		14.2		7.60		15	

Date	**7-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:41	0.27	17.4	17.4	7.66	7.7	79.0	80.1	17.4	17.6	7.30	7.3	7	7.0
			17.4		7.7		81.1		17.7		7.30		7	
WM2A	9:27	0.15	17.2	17.2	8.96	9.0	91.0	91.6	9.8	9.9	7.40	7.4	6	5.5
			17.2		8.98		92.1		9.9		7.40		5	

Date	**9-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:35	0.25	19.1	19.1	6.8	6.8	73.0	73.1	11.2	10.8	7.40	7.4	6	5.5
			19.1		6.81		73.1		10.3		7.40		5	
WM2A	10:25	0.15	19.5	19.5	7.64	7.7	82.9	83.1	6.5	6.8	7.40	7.4	6	7.0
			19.5		7.7		83.3		7.1		7.40		8	

Date	**11-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:05	0.28	21.6	21.6	6.01	6.0	68.2	68.1	11.5	11.7	7.20	7.2	5	4.5
			21.6		5.98		68.0		11.8		7.20		4	
WM2A	9:50	0.15	21.6	21.6	7.52	7.5	85.3	85.0	6.0	6.5	7.30	7.3	6	6.0
			21.6		7.45		84.6		7.1		7.30		6	

Date	**13-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:00	0.28	23.3	23.3	5.5	5.5	64.3	63.9	14.6	14.5	7.60	7.6	5	5.0
			23.3		5.42		63.4		14.3		7.60		5	
WM2A	9:50	0.15	24	24.0	6.96	6.8	82.3	81.3	14.0	14.3	7.60	7.6	7	8.0
			24		6.73		80.3		14.6		7.60		9	

Date	**16-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:15	0.30	19.5	19.5	7.42	7.4	80.2	79.6	69.9	71.1	7.50	7.5	55	55.0
			19.5		7.33		79.0		72.3		7.50		55	
WM2A	10:05	0.18	19.7	19.7	7.8	7.8	85.2	85.1	57.7	57.8	7.40	7.4	45	43.5
			19.7		7.77		84.9		57.9		7.40		42	

Date	**18-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:25	0.28	21	21.0	5.95	5.9	66.6	66.6	73.8	71.4	7.30	7.3	45	44.5
			21		5.94		66.5		69.0		7.30		44	
WM2A	10:05	0.16	20.9	20.9	7.73	7.7	86.2	86.3	15.1	14.5	7.20	7.2	18	17.5
			20.9		7.75		86.4		13.8		7.20		17	

Date	**20-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:24	0.26	21.6	21.6	5.76	5.8	65.3	65.4	11.3	12.0	6.90	6.9	15	14.5
			21.6		5.78		65.5		12.7		6.90		14	
WM2A	10:10	0.18	21.9	21.9	6.49	6.5	73.8	74.1	18.6	18.5	7.00	7.0	17	17.0
			21.9		6.54		74.3		18.3		7.00		17	

Date	**23-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:05	0.25	23.7	23.7	5.53	5.5	65.4	65.3	10.5	10.9	7.20	7.2	4	3.5
			23.7		5.51		65.1		11.3		7.20		3	
WM2A	9:50	0.15	24.5	24.5	6.54	6.5	78.3	78.2	12.9	13.5	7.10	7.1	8	7.5
			24.5		6.53		78.1		14.1		7.10		7	

Date	**25-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.30	22.5	22.5	4.99	5.0	57.4	57.0	72.1	72.3	7.60	7.6	28	28.0
			22.5		4.91		56.6		72.4		7.60		28	
WM2A	10:10	0.18	22.9	22.9	5.96	6.0	69.1	69.2	24.7	24.4	7.70	7.7	21	20.5
			22.9		5.97		69.3		24.0		7.70		20	

Date	**28-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:25	0.27	22.8	22.8	5.39	5.4	62.6	63.2	29.9	30.0	7.30	7.3	11	10.0
			22.8		5.41		63.7		30.1		7.30		9	
WM2A	10:11	0.19	24.4	24.4	6.7	6.7	80.1	80.5	26.8	27.0	7.60	7.7	13	12.5
			24.4		6.75		80.9		27.1		7.70		12	

Date	**30-Apr-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	14:00	0.25	24.6	24.6	6.79	6.8	81.7	81.2	12.5	13.0	7.26	7.3	4	4.5
			24.6		6.72		80.6		13.4		7.24		5	
WM2A	13:45	0.20	25.6	25.6	6.08	6.2	74.0	75.0	22.0	21.4	7.61	7.6	14	14.5
			25.6		6.22		76.0		20.8		7.61		15	

Water Quality Monitoring Data for Contract 2 and 6

Date	3-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:55	0.15	26	26.0	6.46	6.5	79.6	80.0	28.1	28.1	7.4	7.4	55	52.0
			26		6.53		80.3		28.1		7.4		49	
WM3	11:10	0.15	24.6	24.6	7.06	7.1	84.5	84.7	21.0	21.2	7.5	7.5	33	34.5
			24.6		7.08		84.8		21.4		7.5		36	

Date	5-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:20	0.15	25.2	25.2	6.79	6.9	82.3	83.0	4.9	4.8	9.9	9.9	6	7.0
			25.2		6.91		83.7		4.7		9.9		8	
WM3	10:30	0.15	24.1	24.1	7.25	7.3	86.1	86.3	5.1	4.8	8.1	8.1	7	8.0
			24.1		7.27		86.4		4.4		8.1		9	

Date	7-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:10	0.20	21	21.0	8.03	8.1	89.3	90.0	3.8	3.9	7.2	7.2	3	3.0
			21		8.09		90.7		3.9		7.2		3	
WM3	9:57	0.11	17.5	17.5	9.42	9.5	95.1	96.1	4.4	4.5	7.1	7.1	6	5.5
			17.5		9.5		97.0		4.5		7.1		5	

Date	9-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:50	0.15	23.9	23.9	7.11	7.3	83.3	85.4	30.8	31.5	8.2	8.2	25	17.0
			23.9		7.58		87.5		32.2		8.2		9	
WM3	11:00	0.15	22.6	22.6	7.4	7.4	84.9	85.1	12.2	12.1	7.6	7.6	7	6.0
			22.6		7.43		85.2		12.0		7.6		5	

Date	11-Apr-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:20	0.15	26	26.0	6.59	6.6	80.8	80.9	1.9	2.0	7.1	7.1	4	4.0
			26		6.58		80.9		2.2		7.1		4	
WM3	10:30	0.14	25.3	25.3	6.49	6.5	78.5	78.8	3.9	3.9	7.4	7.4	4	4.0
			25.3		6.54		79.0		4.0		7.4		4	

Date	13-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:45	0.15	27.2	27.2	6.2	6.2	78.0	77.9	27.0	26.9	7.1	7.1	24	23.5
			27.2		6.18		77.8		26.8		7.1		23	
WM3	10:55	0.15	26.2	26.2	6.16	6.2	76.5	76.6	10.4	10.5	7.2	7.2	8	8.0
			26.2		6.16		76.6		10.5		7.2		8	

Date	16-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:30	0.15	23.3	23.3	6.79	6.8	79.2	79.2	9.3	9.4	10.4	10.5	6	5.0
			23.3		6.78		79.1		9.4		10.5		4	
WM3	10:40	0.15	20.9	20.9	6.35	6.3	70.6	70.5	8.8	9.0	8.5	8.6	4	4.5
			20.9		6.32		70.3		9.1		8.6		5	

Date	18-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:50	0.15	25.2	25.2	6.46	6.5	78.2	78.3	13.7	11.7	7.9	7.9	23	24.0
			25.2		6.47		78.3		9.7		7.9		25	
WM3	11:05	0.15	22.9	22.9	6.46	6.5	74.8	74.9	6.5	7.3	7.4	7.4	9	9.0
			22.9		6.47		74.9		8.2		7.4		9	

Date	20-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:55	0.15	25.8	25.8	6.04	6.1	73.9	74.2	3.5	3.5	10.6	10.6	2	2.5
			25.8		6.09		74.4		3.6		10.6		3	
WM3	11:05	0.15	23.9	23.9	6.15	6.2	72.7	72.8	13.2	12.8	8.4	8.4	12	12.0
			23.9		6.16		72.8		12.4		8.4		12	

Date	23-Apr-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:20	0.15	27.6	27.6	6.16	6.1	77.6	77.4	9.8	10.4	7.3	7.3	17	17.0
			27.6		6.11		77.2		10.9		7.3		17	
WM3	10:30	0.15	26.1	26.1	6.2	6.2	76.5	76.9	9.5	10.3	7.6	7.6	13	12.0
			26.1		6.25		77.2		11.2		7.6		11	

Date	25-Apr-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:10	0.15	26	26.0	5.74	5.8	70.4	71.1	12.1	12.2	11.5	11.5	25	24.5
			26		5.87		71.8		12.2		11.5		24	
WM3	11:25	0.15	23.8	23.8	5.47	5.5	64.5	64.3	11.8	11.6	10.1	10.1	14	15.0
			23.8		5.43		64.0		11.4		10.1		16	

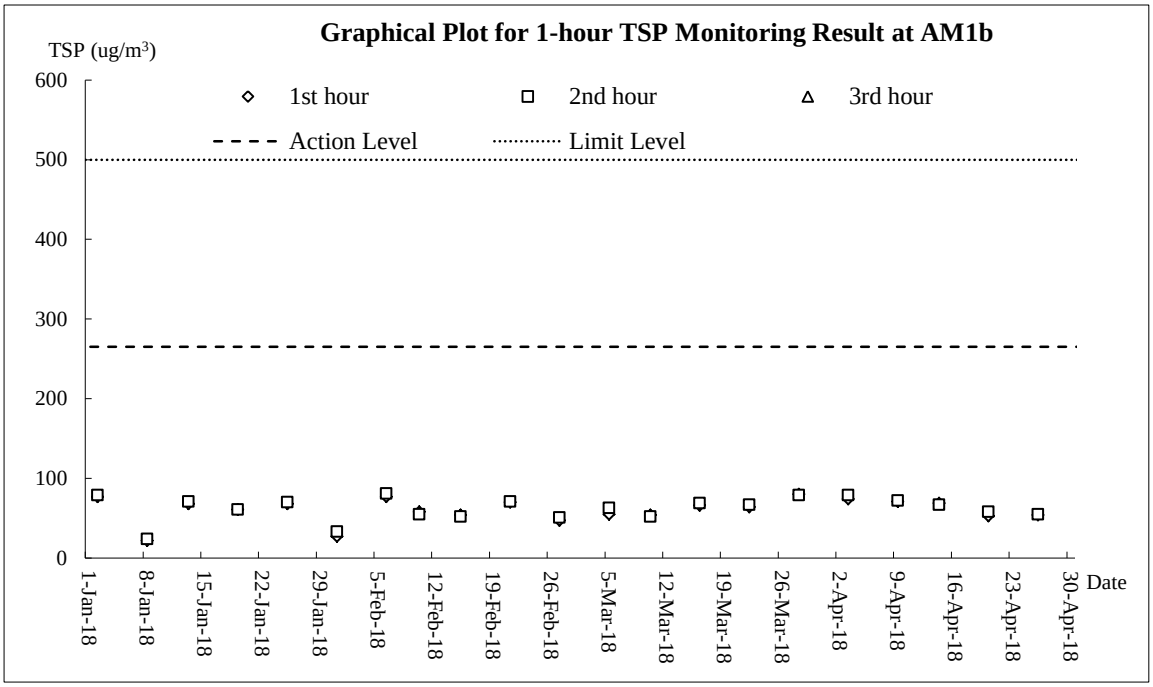
Date	28-Apr-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:47	0.18	26.2	26.2	6.99	7.0	86.7	87.3	14.4	14.6	6.8	6.8	19	19.0
			26.2		7.07		87.9		14.7		6.8		19	
WM3	10:59	0.16	24.4	24.4	6.8	6.8	85.4	85.4	11.8	12.0	7.4	7.4	7	6.5
			24.4		6.82		85.3		12.1		7.4		6	

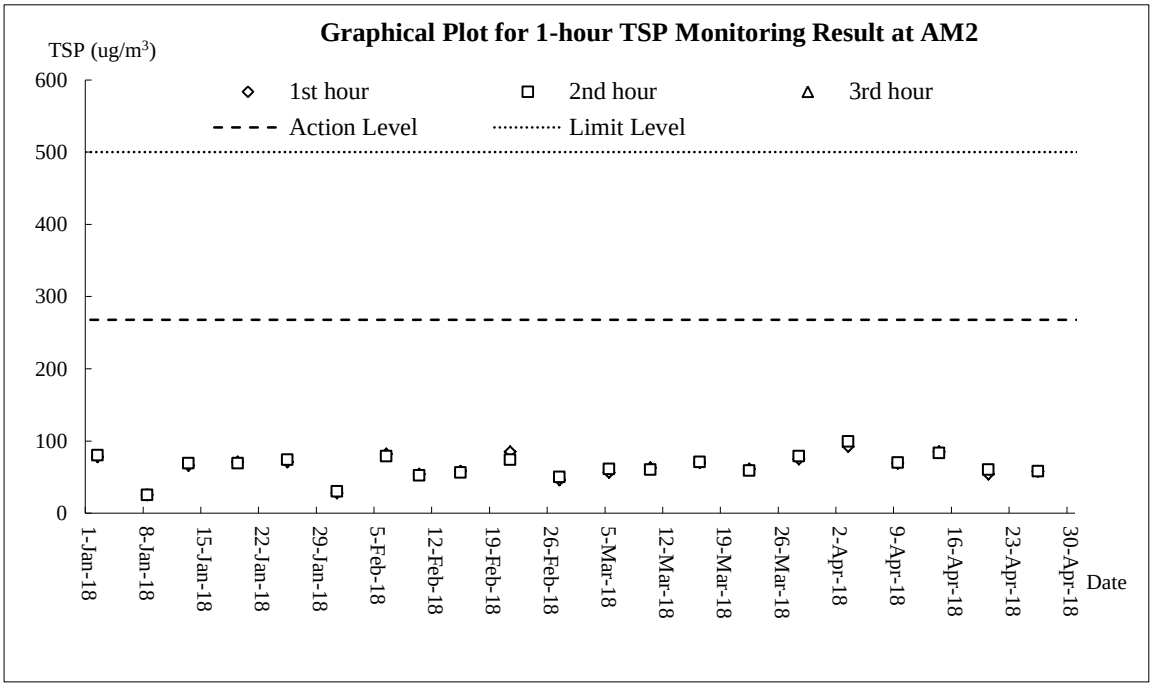
Date	30-Apr-18													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	14:20	0.15	27.7	27.7	6.63	6.7	84.9	85.4	16.8	16.4	2.63	2.6	24	24.0
			27.7		6.72		85.9		16.0		2.61		24	
WM3	14:30	0.15	26.4	26.4	7.08	7.1	88.4	89.2	14.5	14.9	6.42	6.4	22	22.5
			26.4		7.21		89.9		15.3		6.42		23	

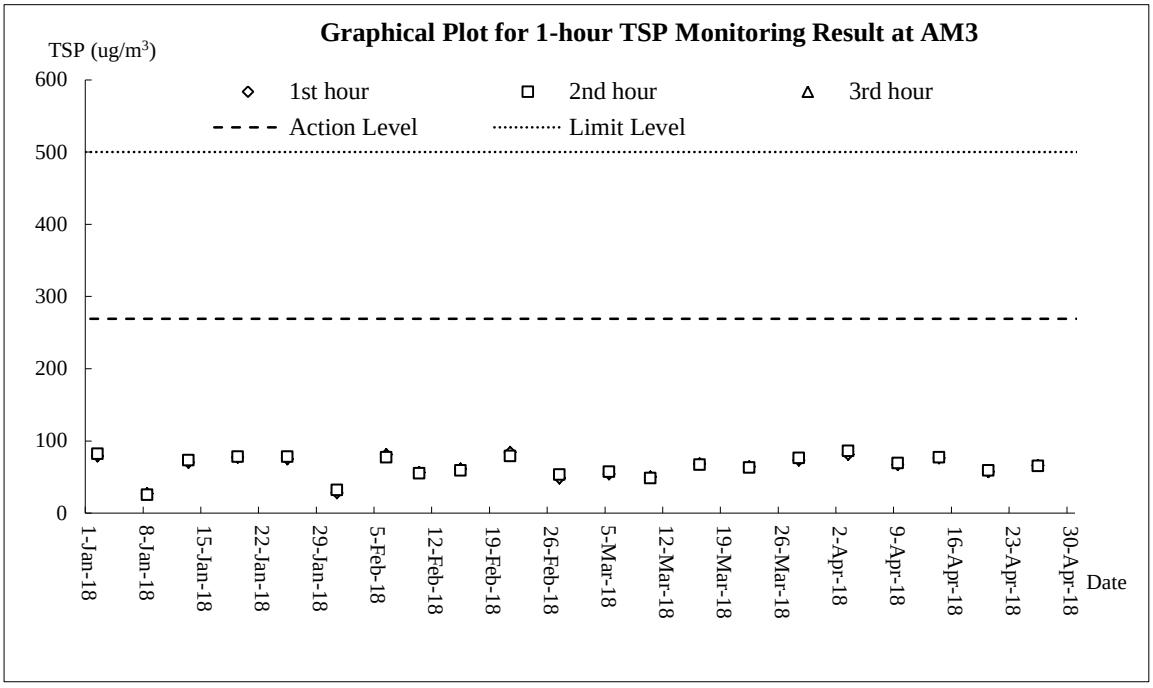
Appendix J

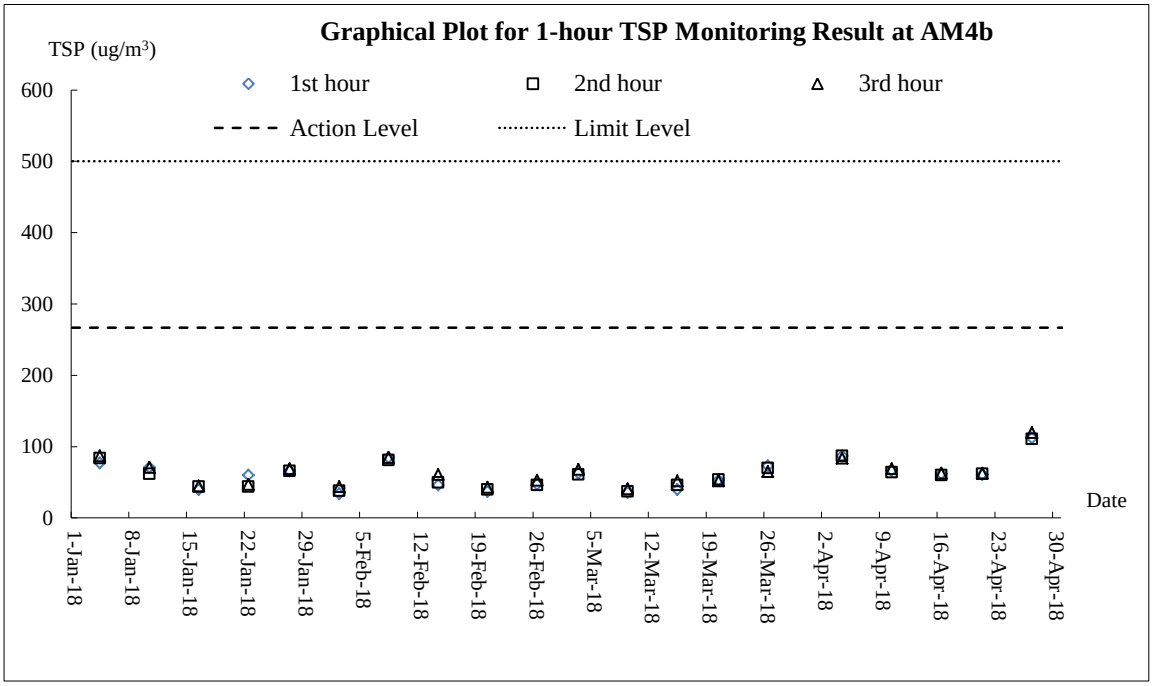
Graphical Plots for Monitoring Result

Air Quality – 1-hour TSP






Graphical Plot for 1-hour TSP Monitoring Result at AM3
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date


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
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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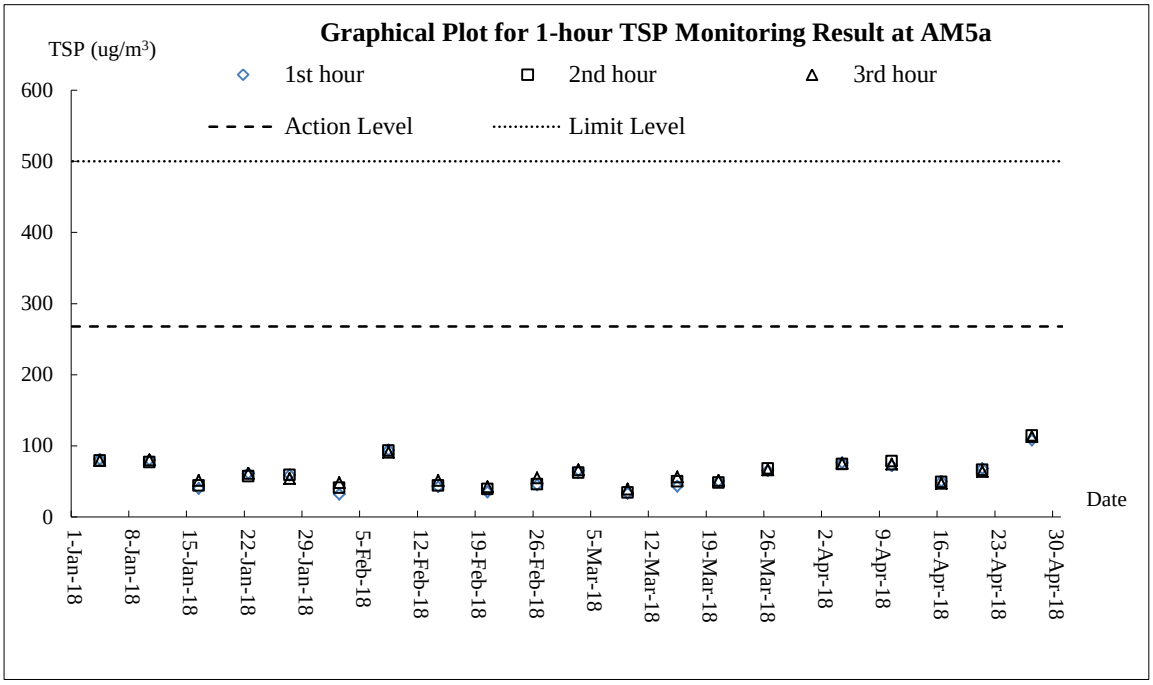
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date


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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
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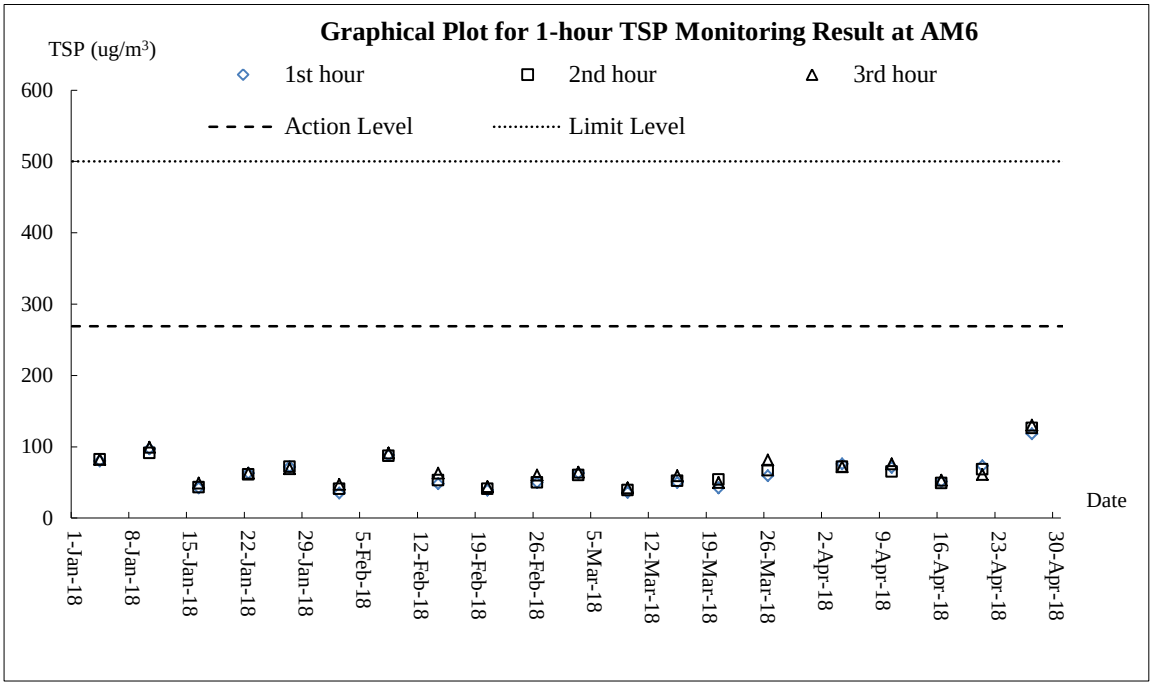
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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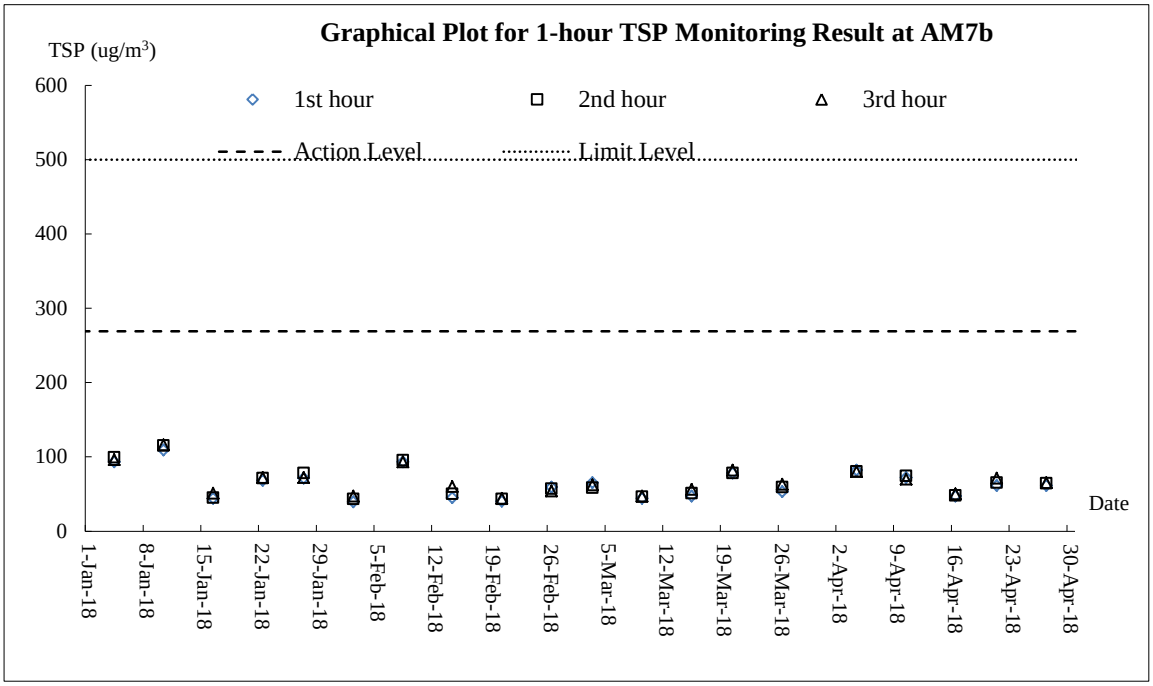
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
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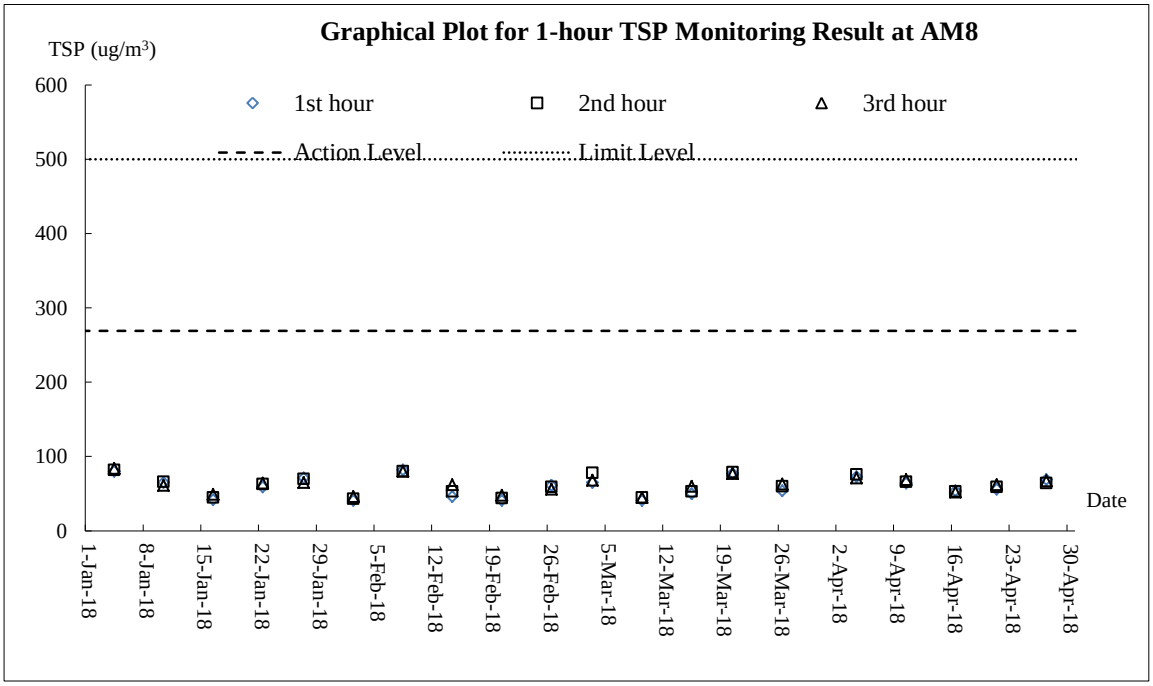
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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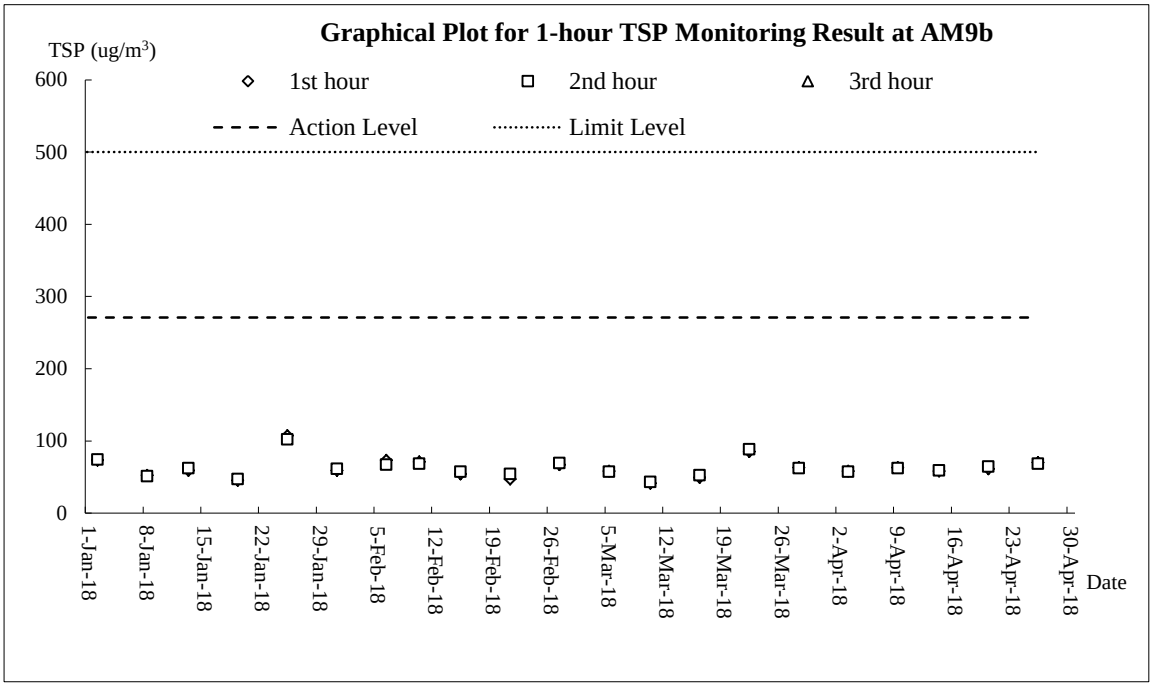
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for 1-hour TSP Monitoring Result at AM9b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
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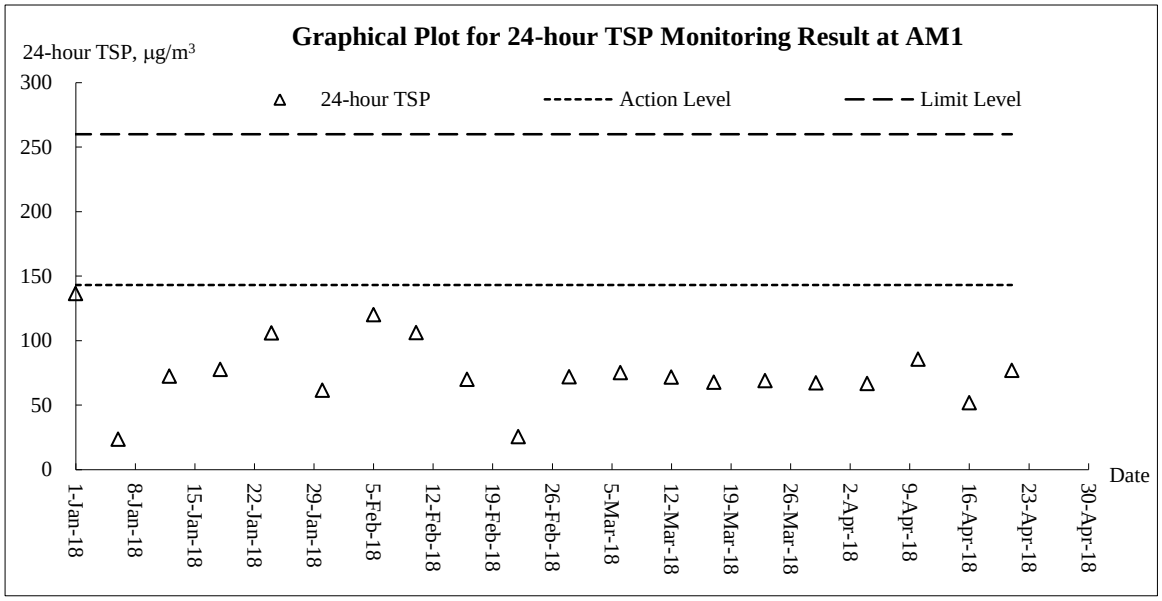
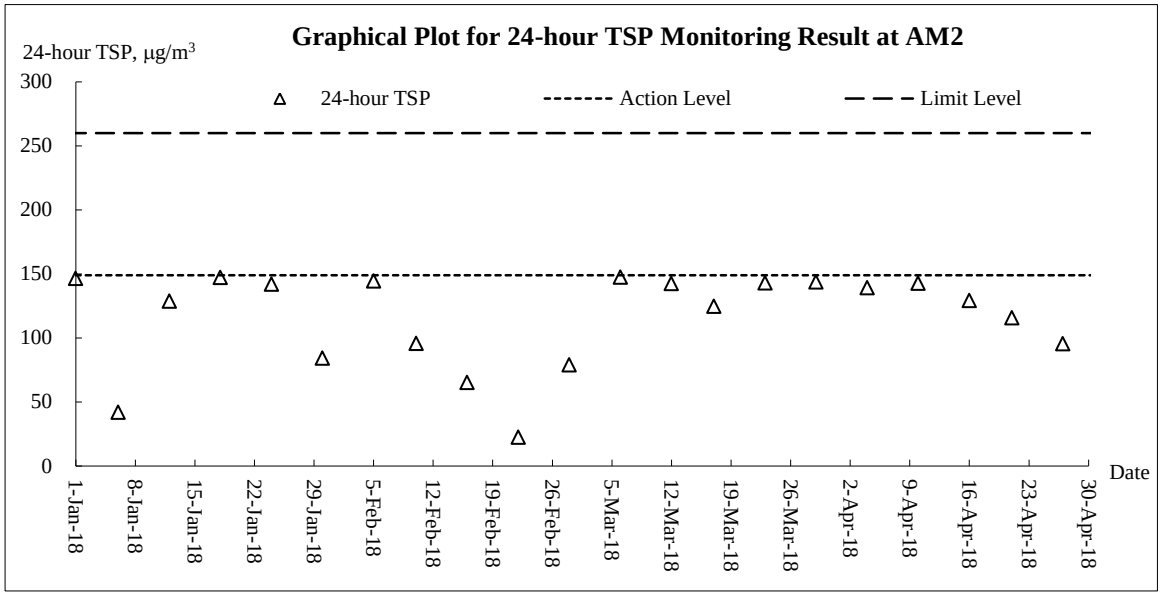
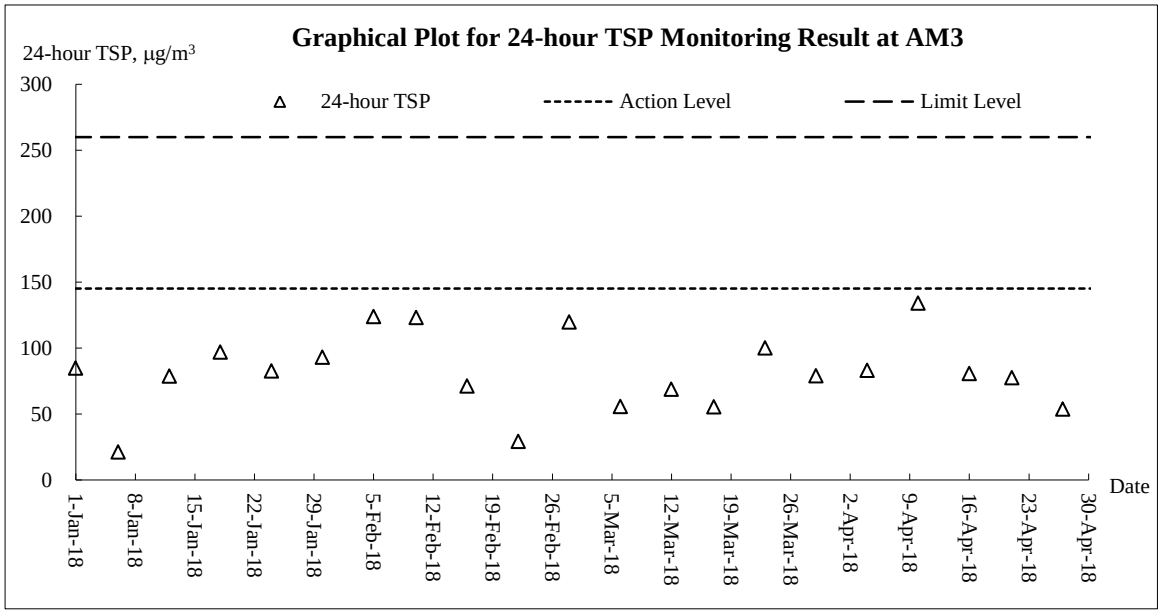
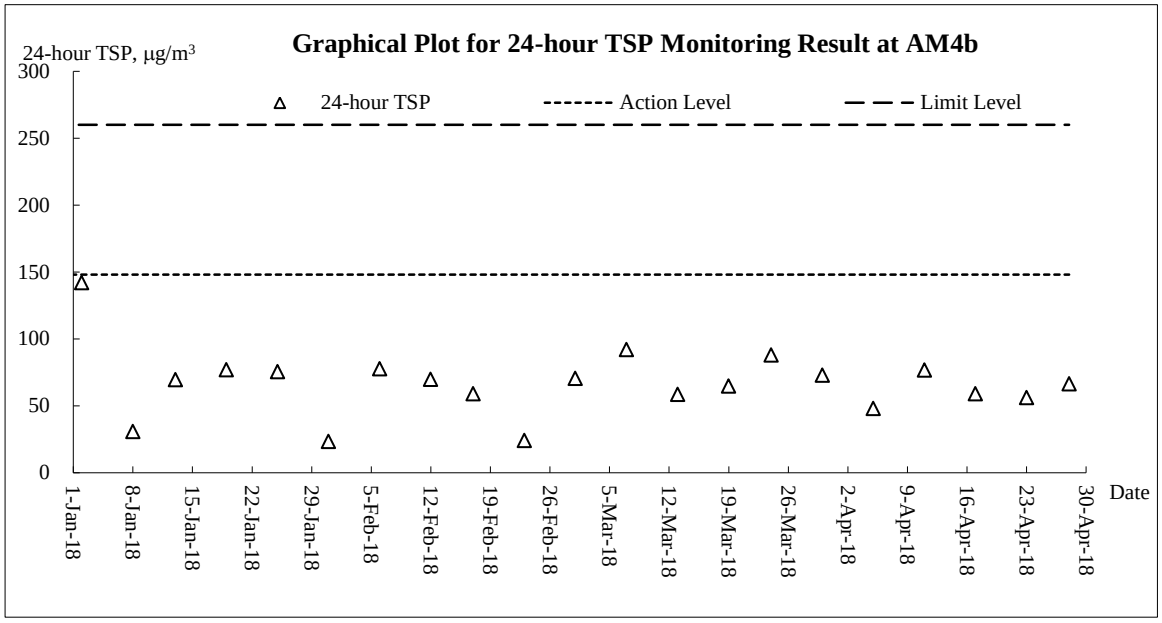
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date

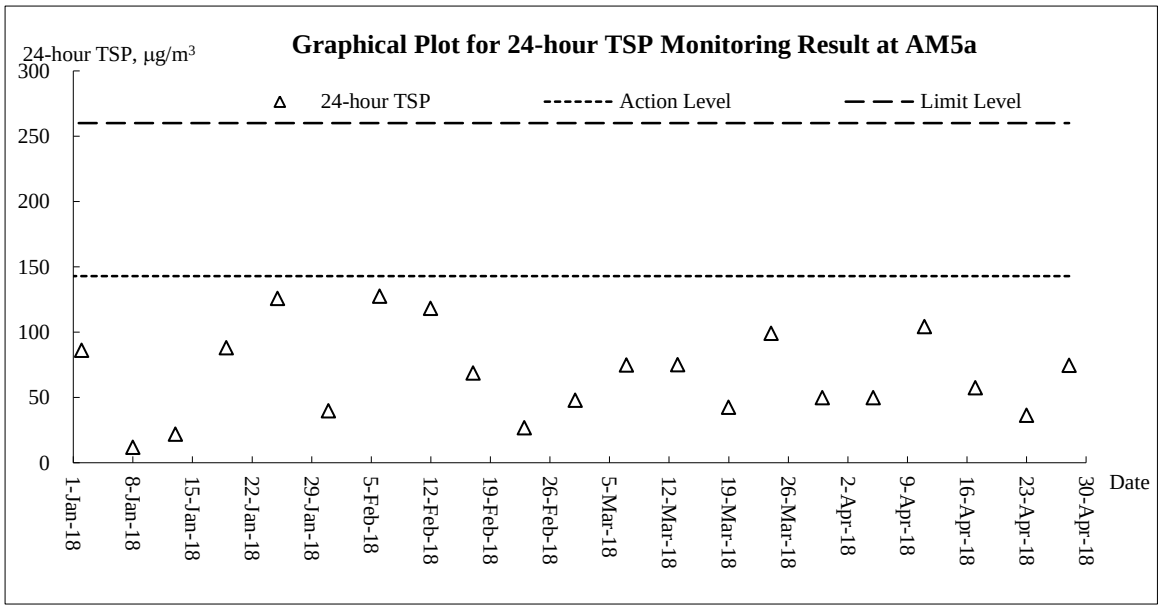
Air Quality – 24-hour TSP








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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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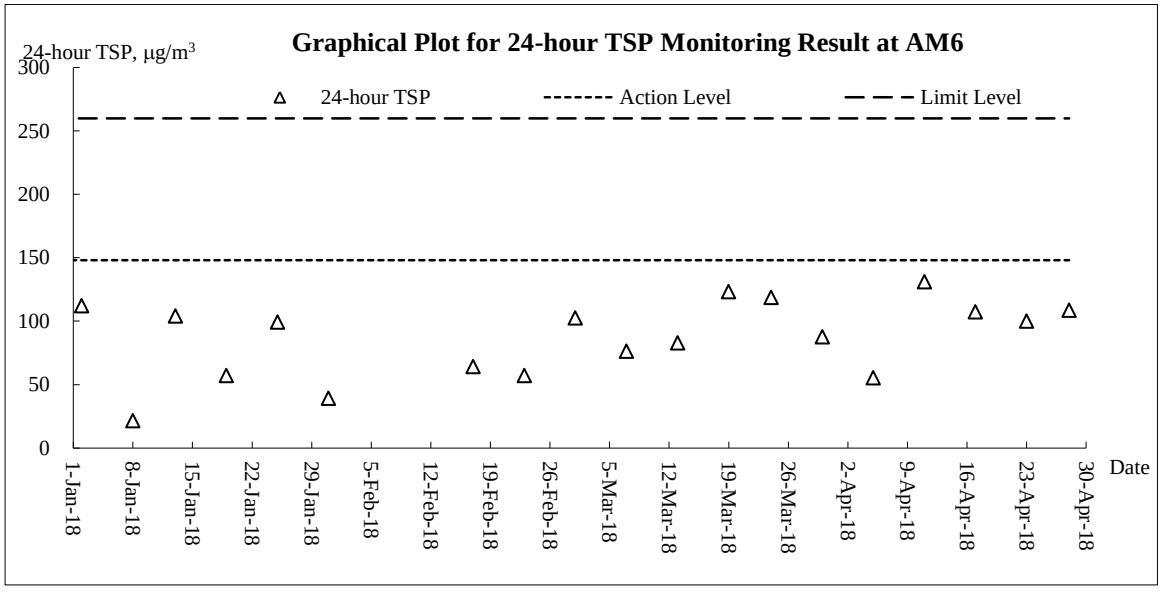
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date


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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
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26-Mar-18
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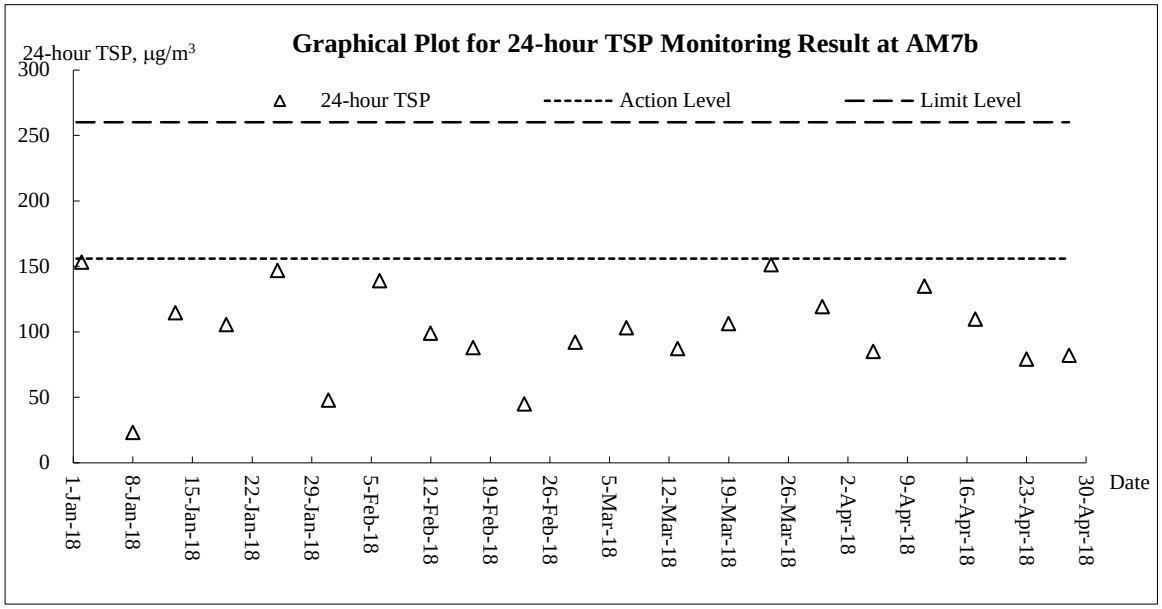
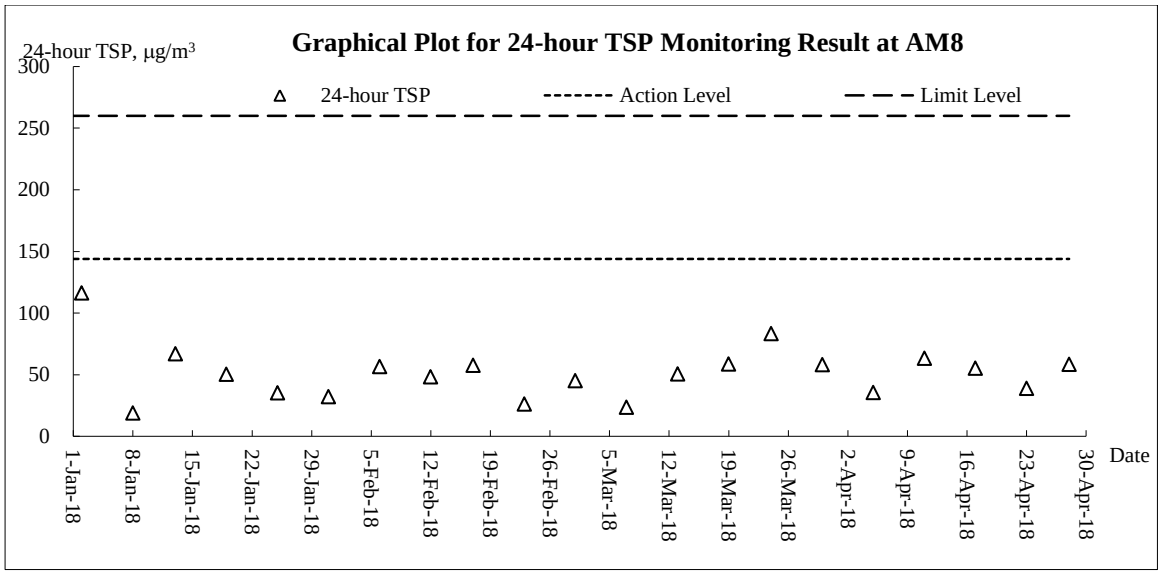
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date


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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
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-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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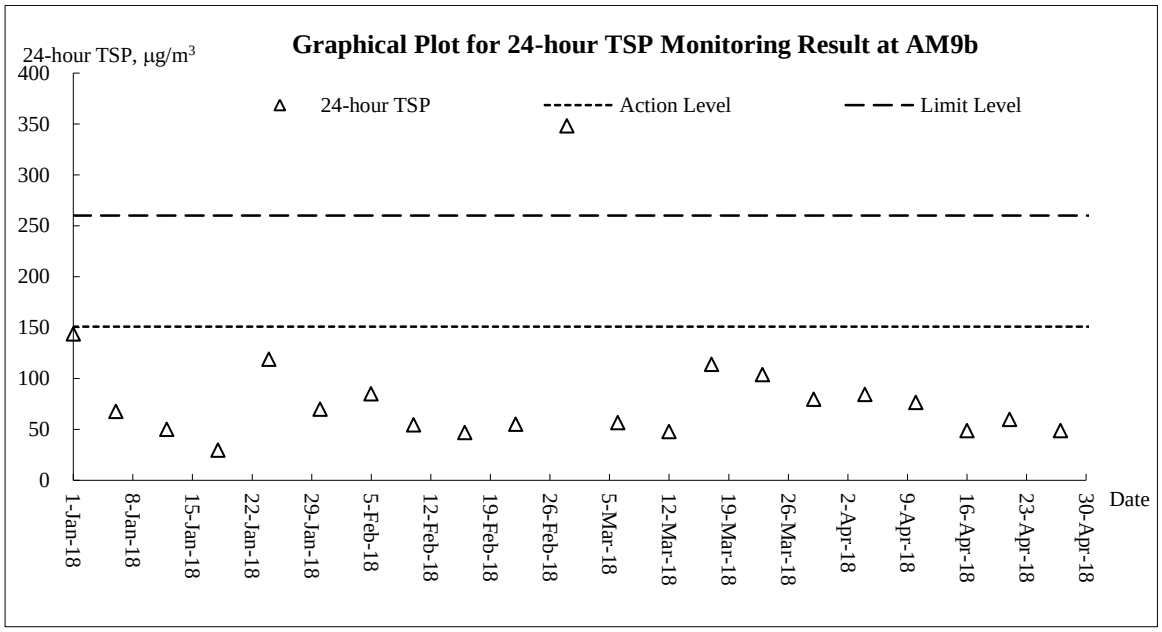
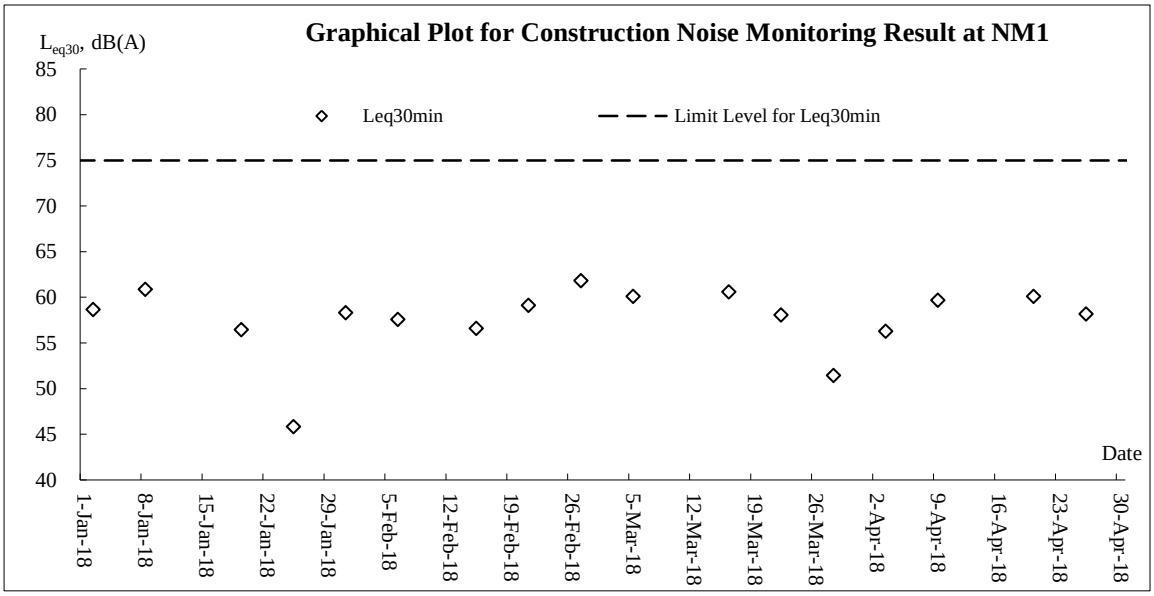
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date


Graphical Plot for 24-hour TSP Monitoring Result at AM9b
24-hour TSP, μg/m3
24-hour TSP
Action Level
Limit Level
400
350
300
250
200
150
100
50
0
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18
Date

Noise


Graphical Plot for Construction Noise Monitoring Result at NM1
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
85
80
75
70
65
60
55
50
45
40
Date
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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2-Apr-18
9-Apr-18
16-Apr-18
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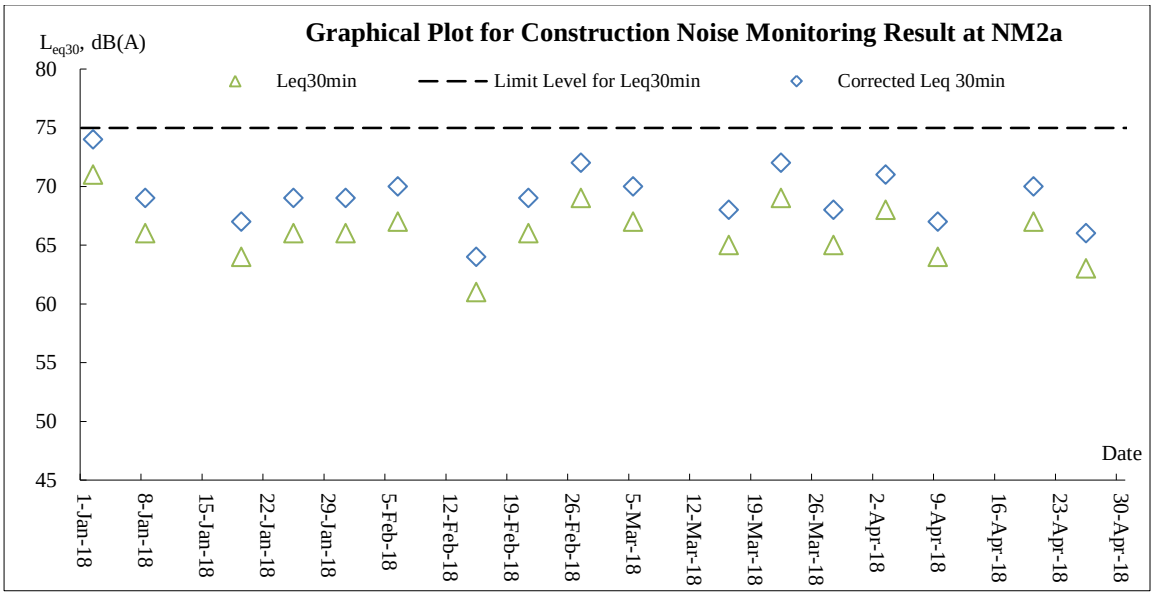
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM2a
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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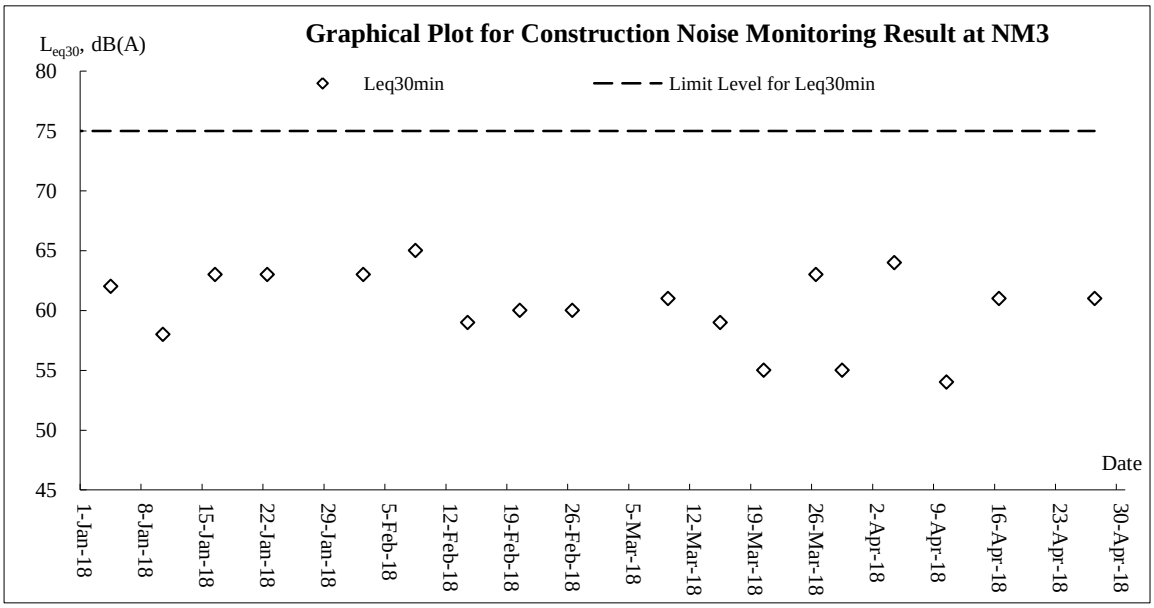
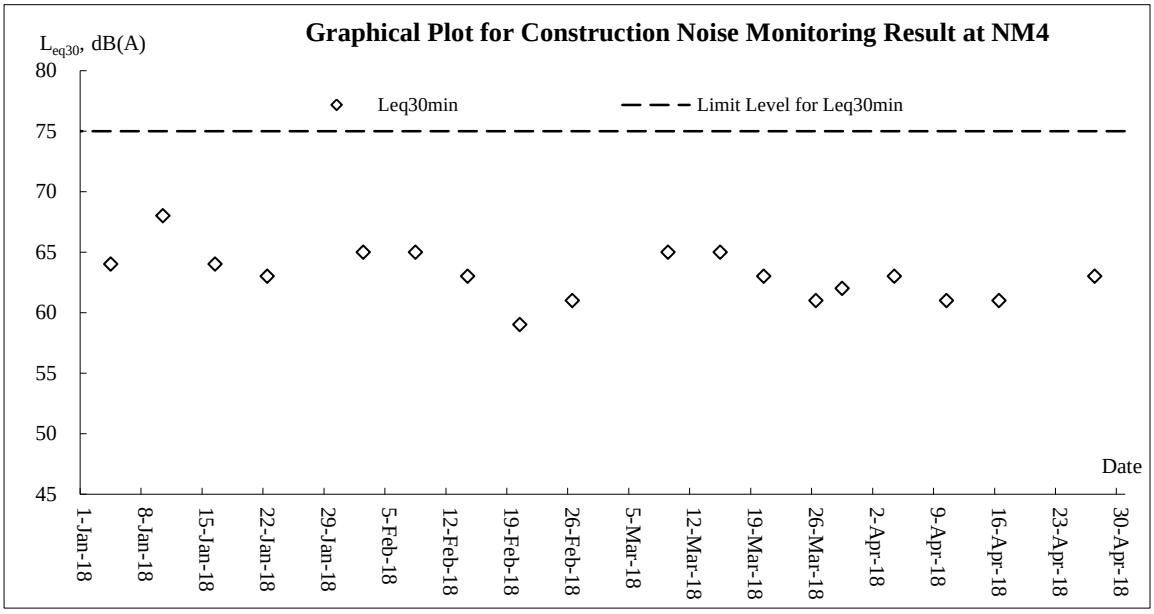
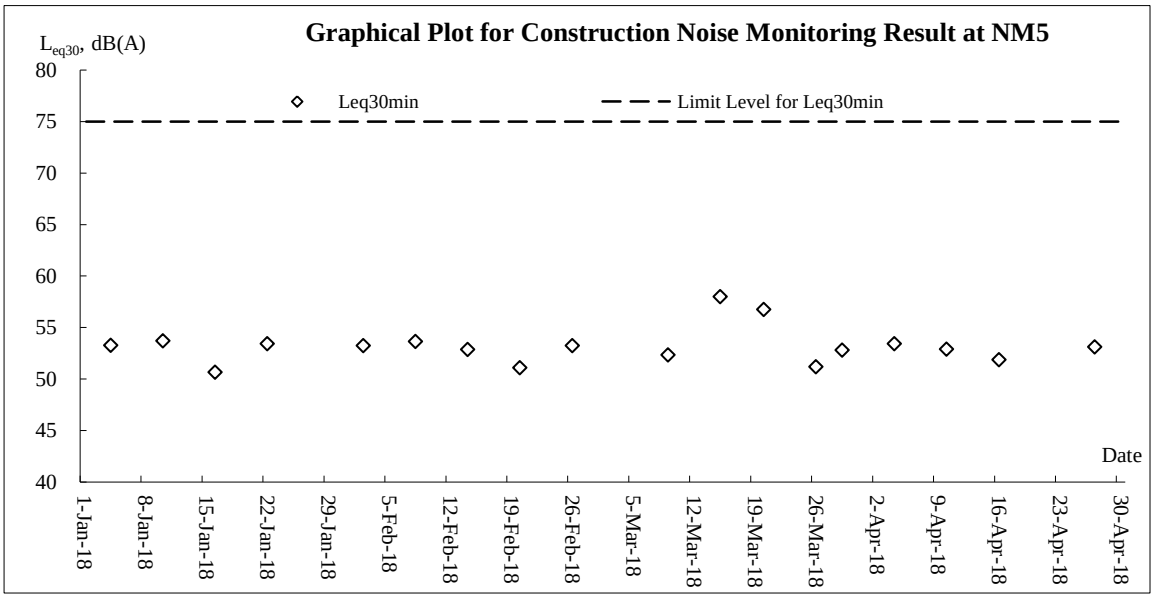
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM3
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM4
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM5
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
40
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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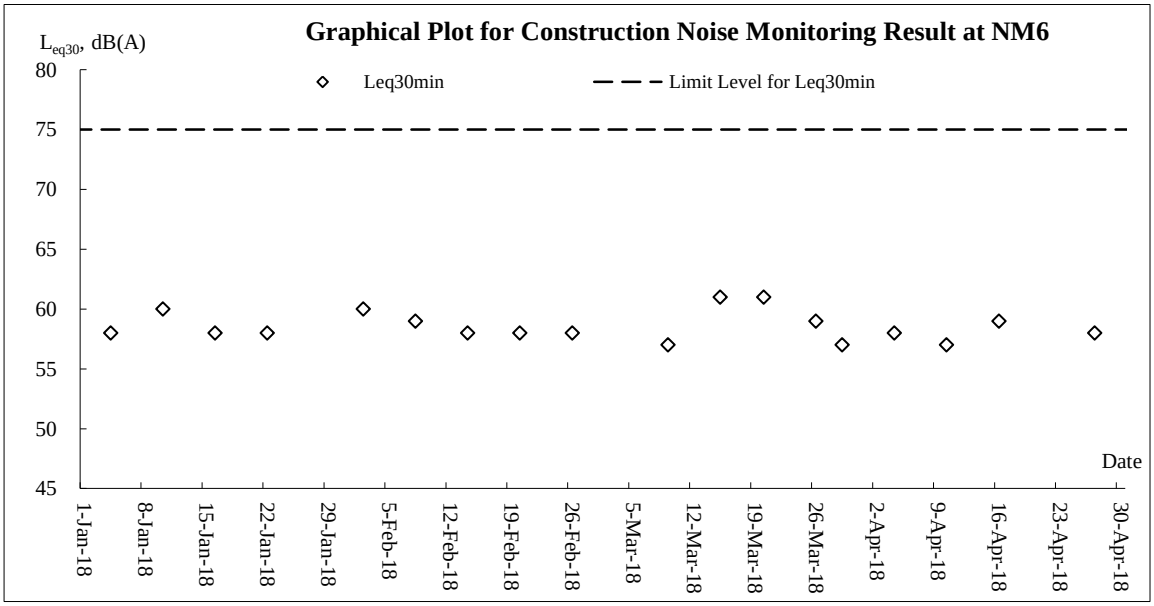
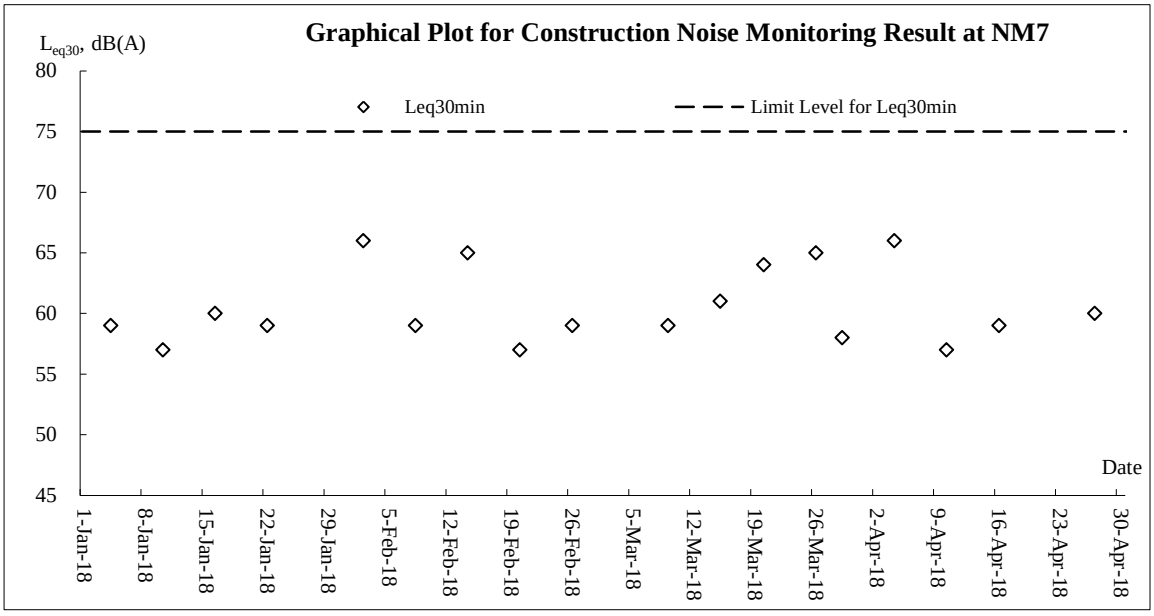
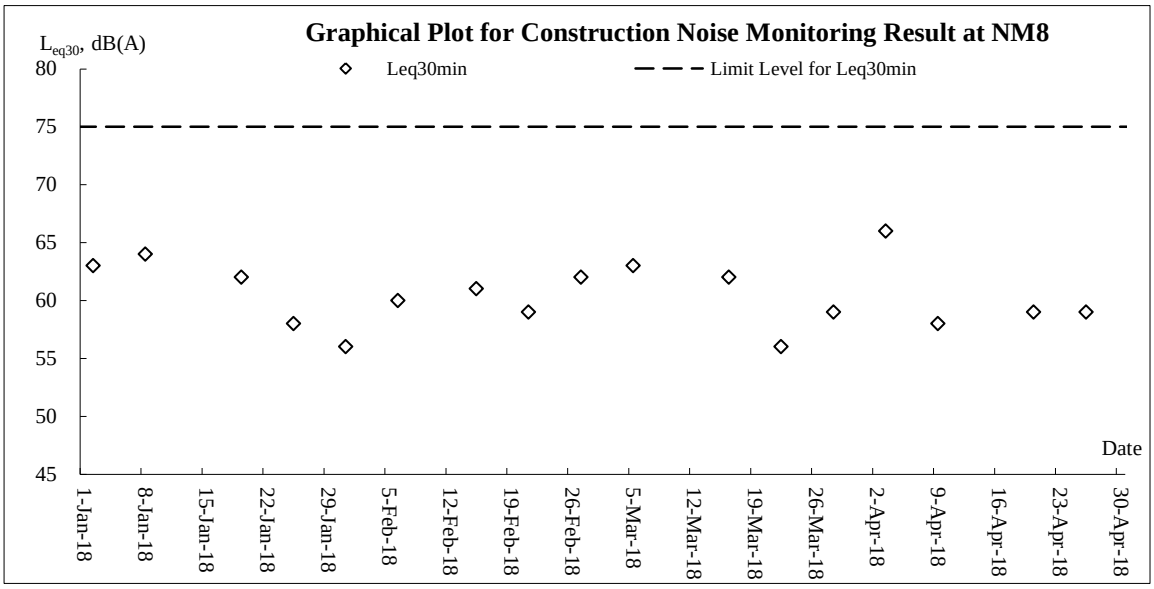
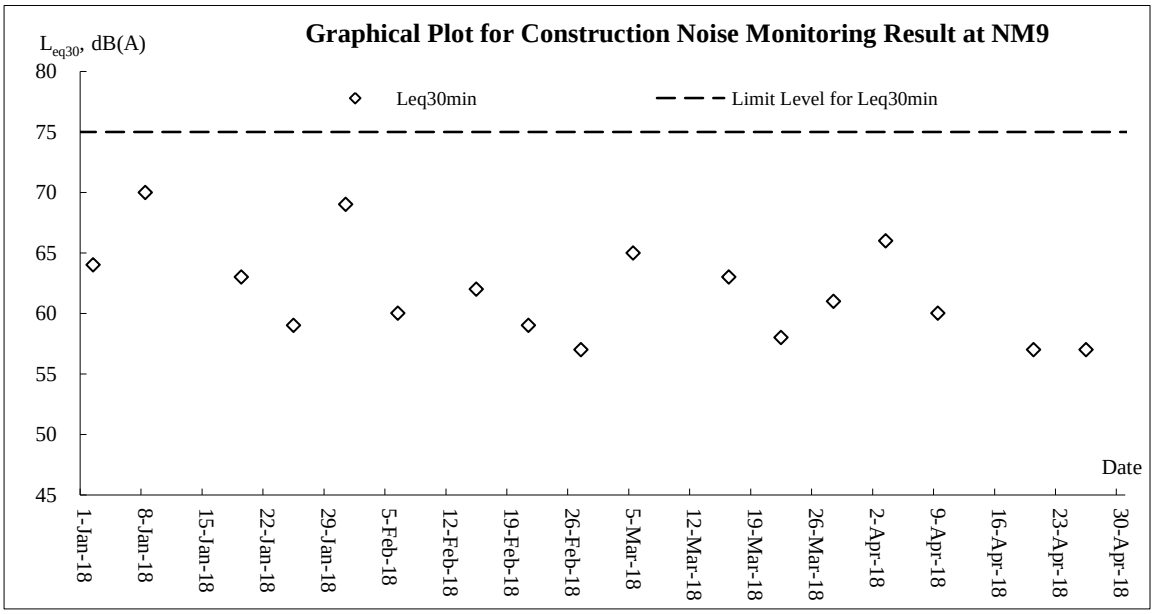
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM6
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM7
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM8
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM9
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
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26-Mar-18
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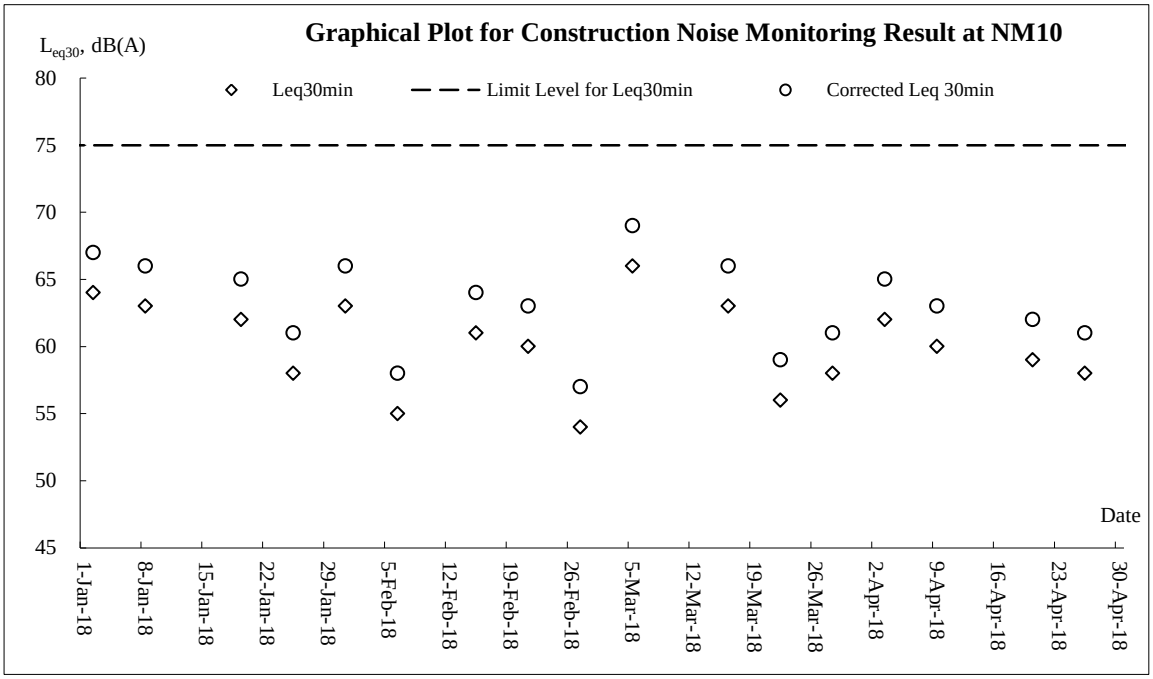
23-Apr-18
30-Apr-18


Graphical Plot for Construction Noise Monitoring Result at NM10
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
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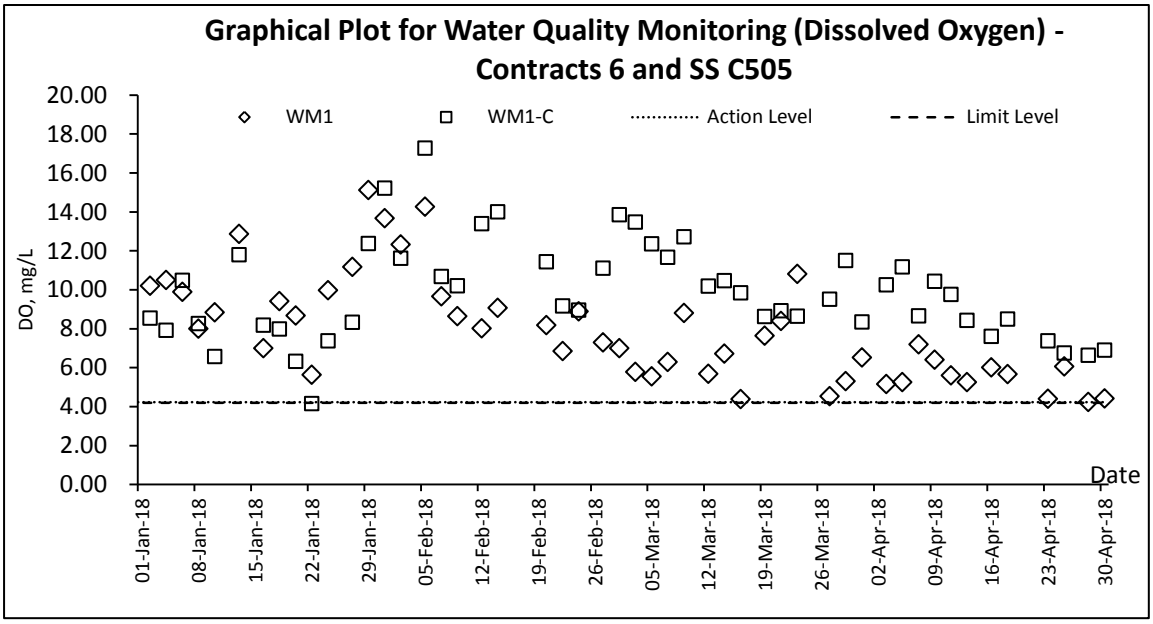
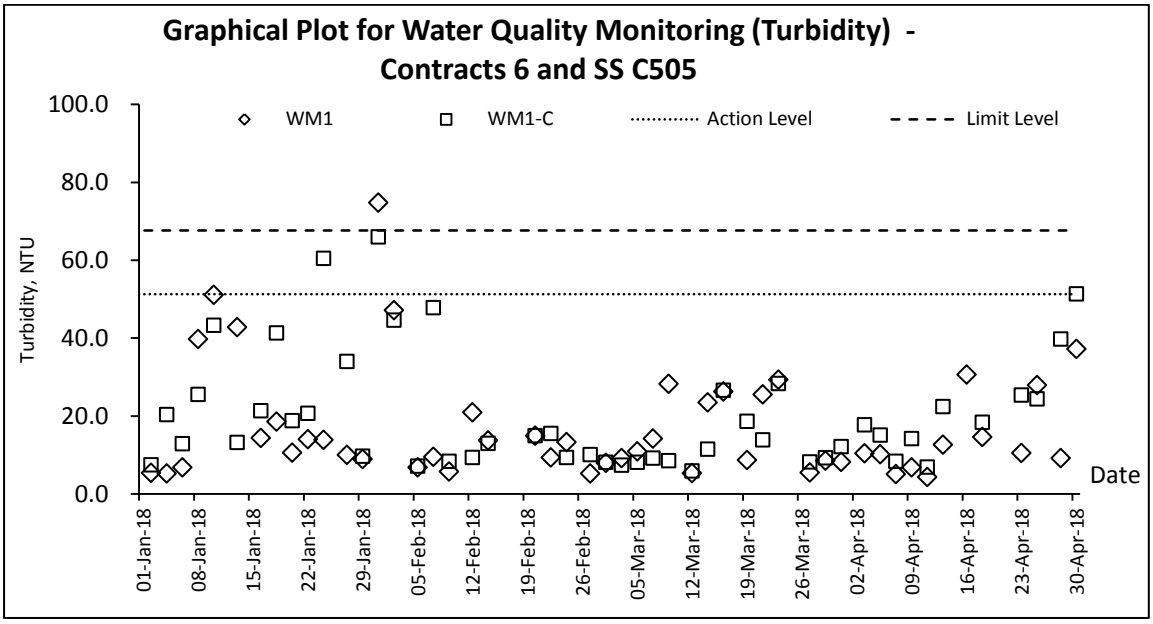
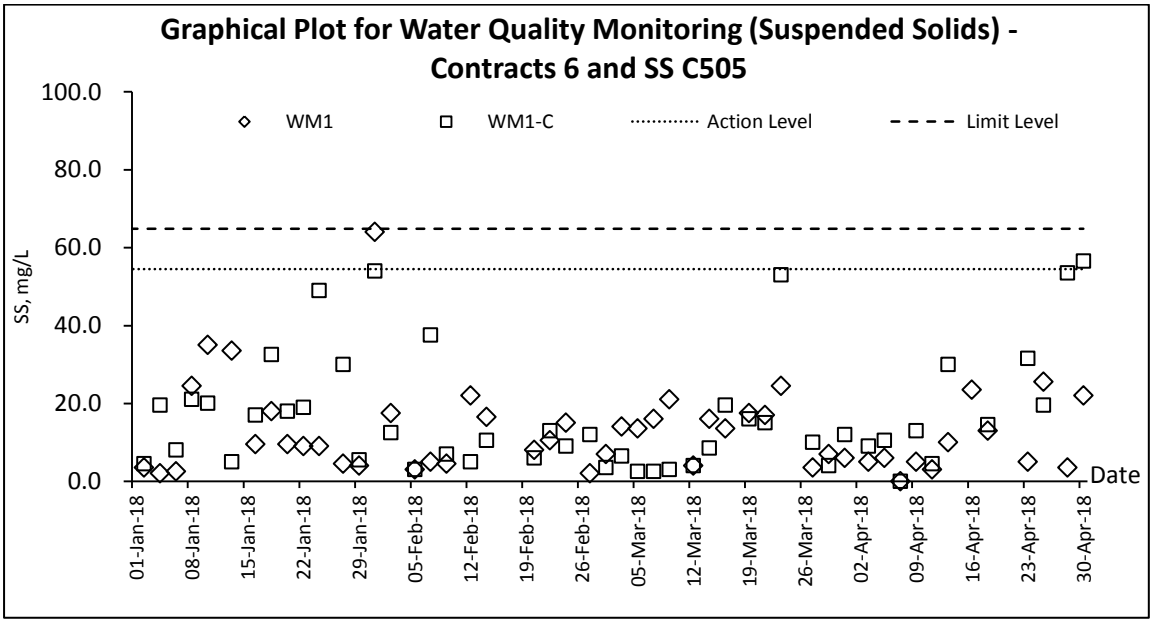
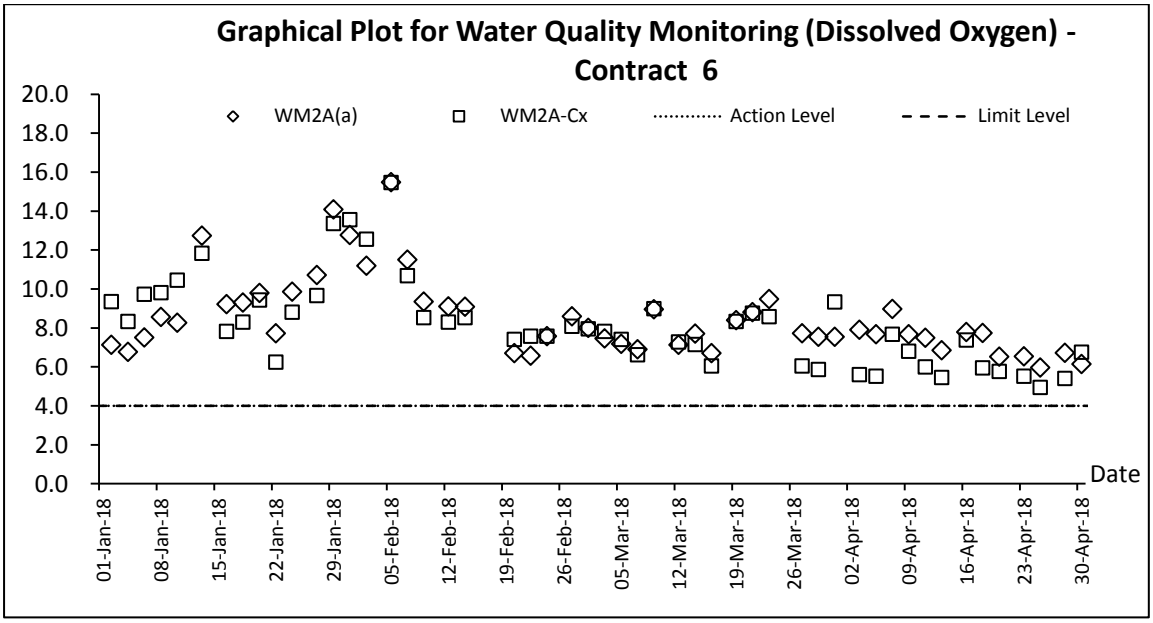
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18

Water Quality








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-Jan-18
08-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
05-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
05-Mar-18
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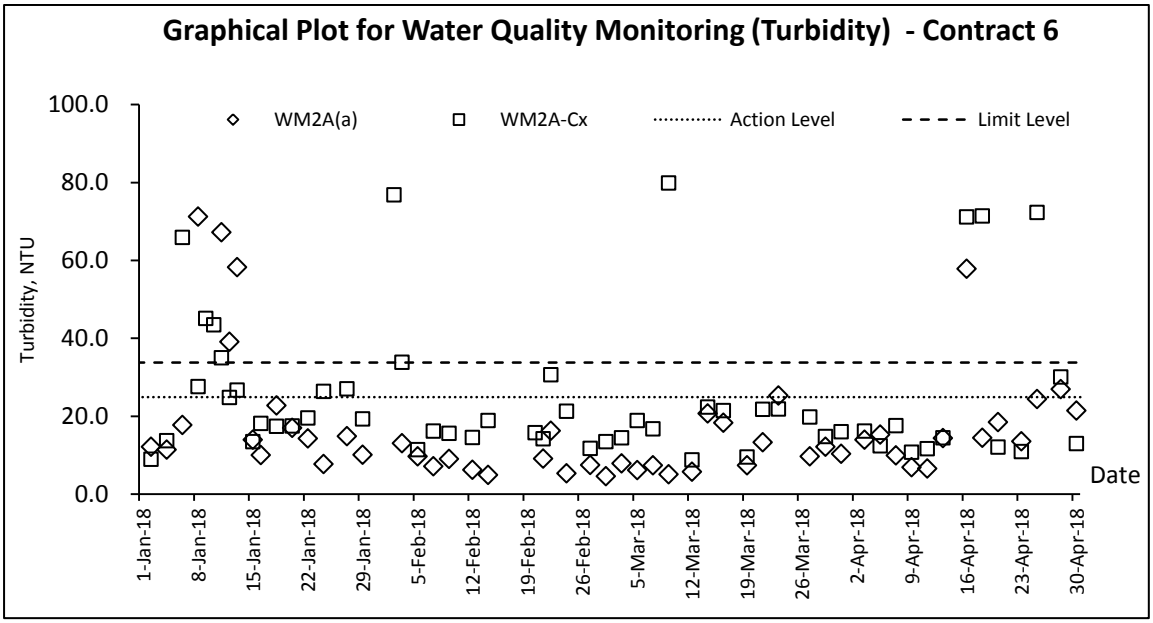
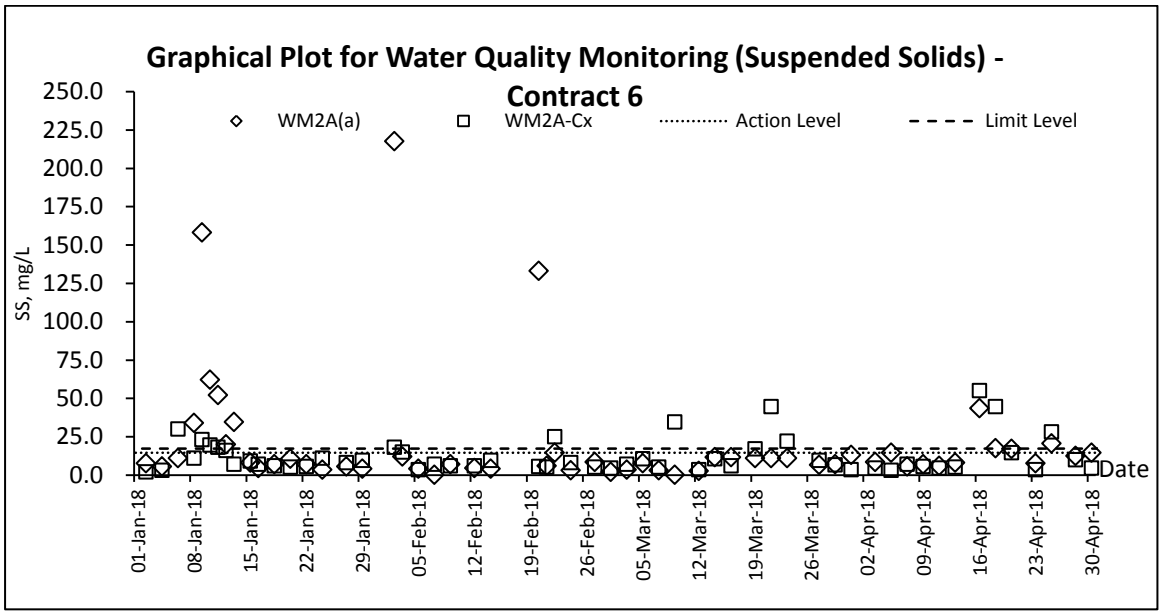
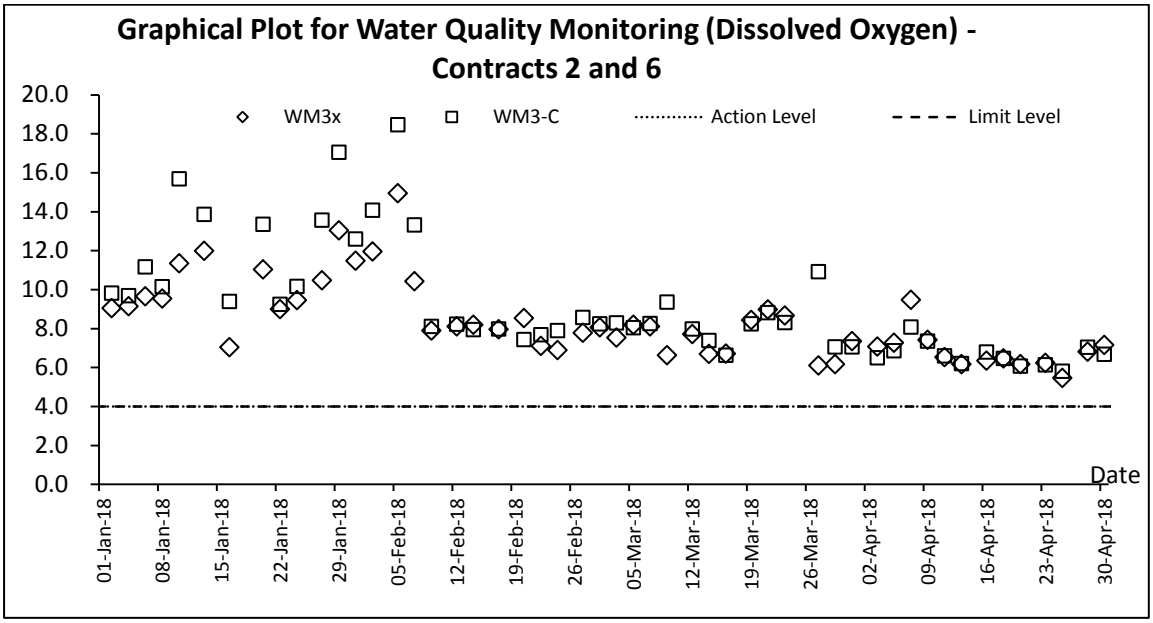
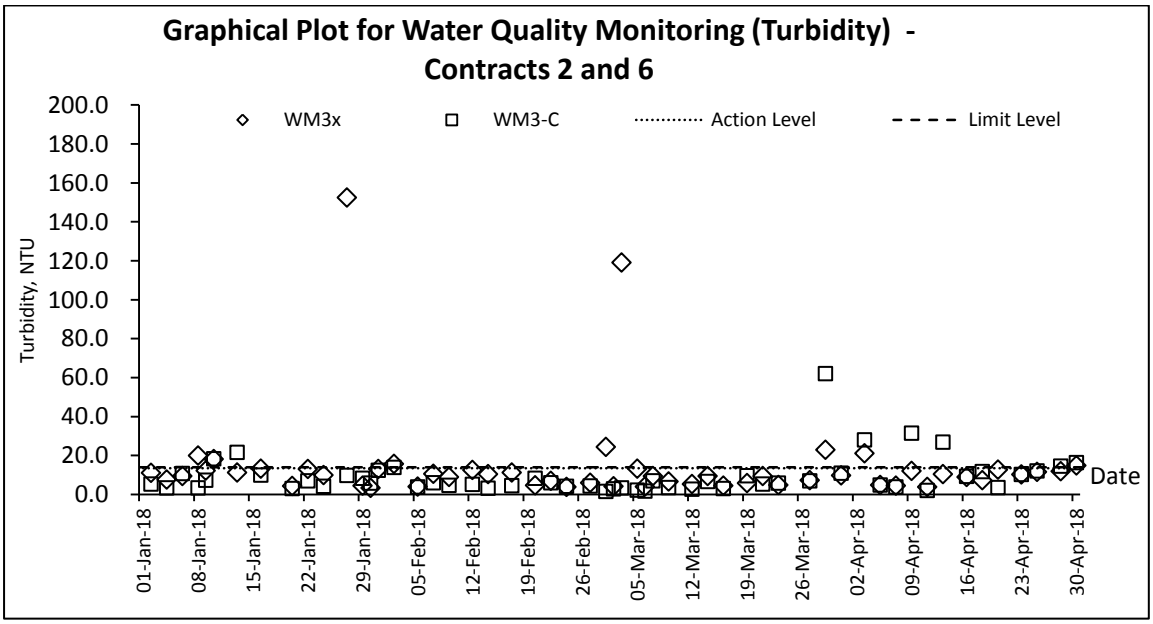
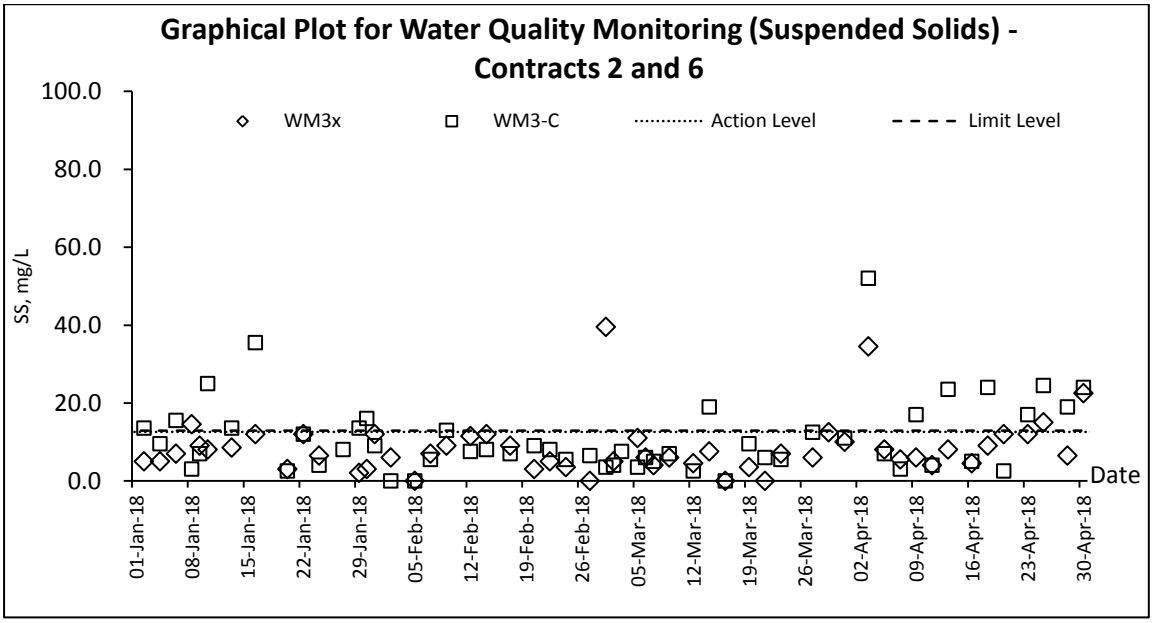
26-Mar-18
02-Apr-18
09-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18

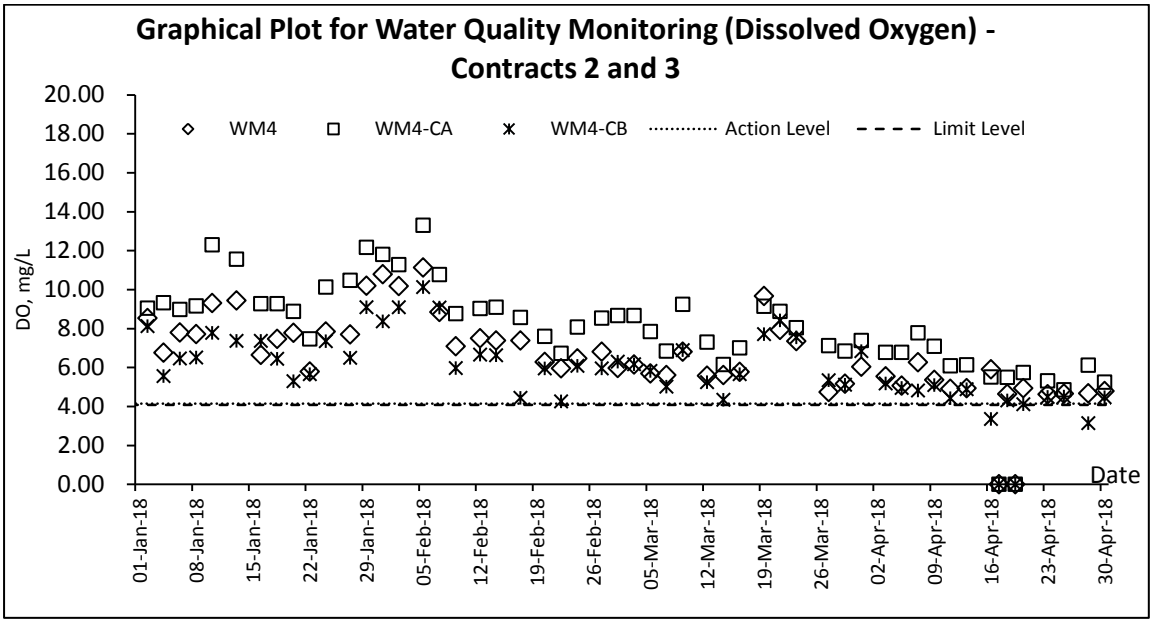

Graphical Plot for Water Quality Monitoring (Turbidity) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
Turbidity, NTU
100.0
80.0
60.0
40.0
20.0
0.0
Date
1-Jan-18
8-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
5-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
5-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
2-Apr-18
9-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18

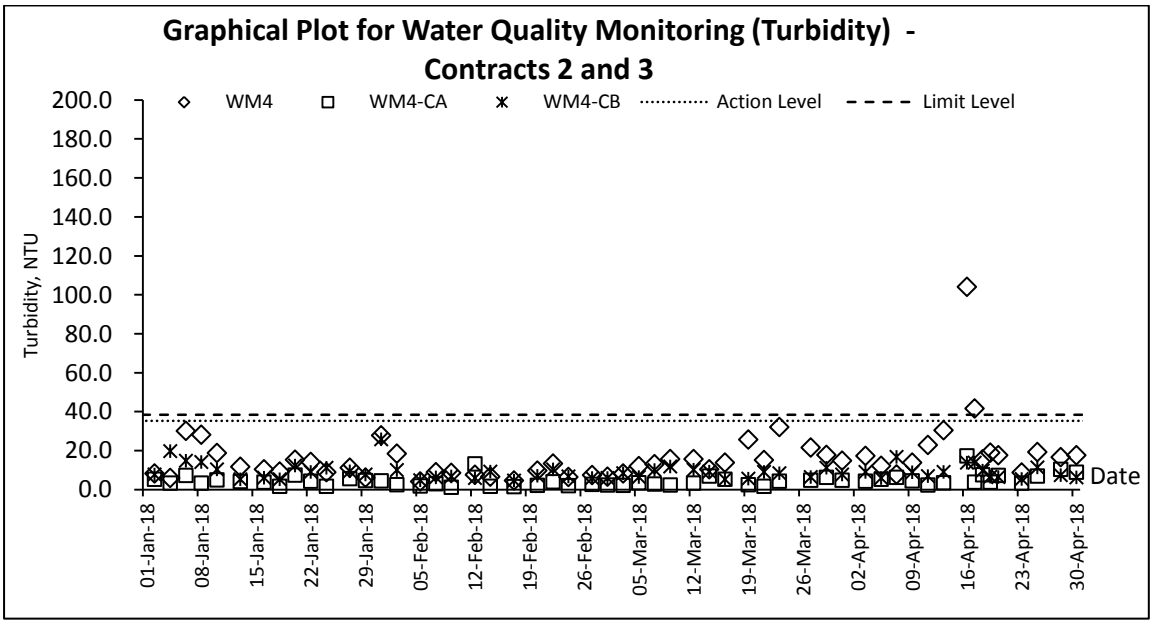

Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
SS, mg/L
250.0
225.0
200.0
175.0
150.0
125.0
100.0
75.0
50.0
25.0
0.0
Date
01-Jan-18
08-Jan-18
15-Jan-18
22-Jan-18
29-Jan-18
05-Feb-18
12-Feb-18
19-Feb-18
26-Feb-18
05-Mar-18
12-Mar-18
19-Mar-18
26-Mar-18
02-Apr-18
09-Apr-18
16-Apr-18
23-Apr-18
30-Apr-18

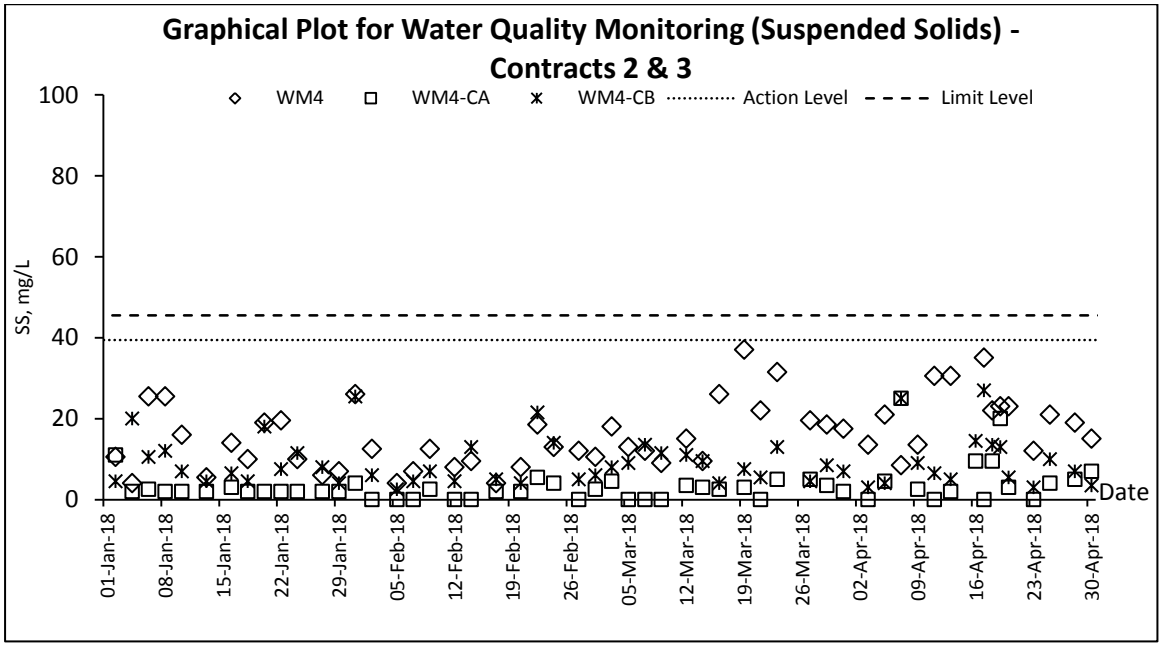

Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
Date


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
Turbidity, NTU
Date


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
SS, mg/L
Date


Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
DO, mg/L
Date


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
Turbidity, NTU
Date


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 & 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
SS, mg/L
Date

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-Apr-18	Sun	Hot and dry in the afternoon. Light winds.	0	24.2	7.1	85.1	SE
2-Apr-18	Mon	Hot and dry in the afternoon. Light winds.	0	23.9	6.6	70.5	E/SE
3-Apr-18	Tue	Hot and dry in the afternoon. Light winds.	0	23.6	7.3	72.5	E/SE
4-Apr-18	Wed	Mainly fine.	0	23.9	7.3	74	E/NE
5-Apr-18	Thu	Hot and dry in the afternoon. Light winds.	0	24.5	8.2	66	E/SE
6-Apr-18	Fri	Hot and dry in the afternoon. Light winds.	Trace	21.8	12.7	74	N
7-Apr-18	Sat	Mainly fine.	Trace	16.6	11.1	73	E
8-Apr-18	Sun	Light to moderate east to southeasterly winds.Mainly fine.	0	16.6	6.1	56	E/NE
9-Apr-18	Mon	Light to moderate east to southeasterly winds.Mainly fine.	0	19.8	6.6	73.5	E/NE
10-Apr-18	Tue	Moderate easterly winds, occasionally fresh offshore.	0	23.1	7	75.5	E/NE
11-Apr-18	Wed	Hot and dry in the afternoon. Light winds.	0	24.5	6.5	78.2	E/NE
12-Apr-18	Thu	Mainly fine.	0	26	6.6	77	E/SE
13-Apr-18	Fri	Light to moderate east to southeasterly winds.Mainly fine.	Trace	27.6	8.5	74	E/SE
14-Apr-18	Sat	Mainly fine.	Trace	26.5	8.4	84	SE
15-Apr-18	Sun	Cloudy to overcast with rain.	17.2	20.7	7.5	84.5	N/NW
16-Apr-18	Mon	Cloudy to overcast with rain.	2	16	6.1	89.2	N/NW
17-Apr-18	Tue	Mainly cloudy. Bright periods in the afternoon.	0.2	19.8	5.4	78.2	N/NW
18-Apr-18	Wed	Mainly cloudy. Bright periods in the afternoon.	0.1	23	7.3	75.5	E/NE
19-Apr-18	Thu	Mainly cloudy with one or two showers.	0	23.6	7.8	69.7	E/NE
20-Apr-18	Fri	Moderate easterly winds.	Trace	24.5	9.5	73.7	E
21-Apr-18	Sat	Mainly cloudy with one or two showers.	Trace	25.5	8.1	71.1	NE
22-Apr-18	Sun	Moderate easterly winds.	Trace	26.2	8.2	78.5	E
23-Apr-18	Mon	Moderate easterly winds.	Trace	26.6	6.5	76.7	E/NE
24-Apr-18	Tue	Moderate east to northeasterly winds.	8.2	25.3	5.7	84.7	E/NE
25-Apr-18	Wed	Cloudy. Isolated showers in the afternoon.	Trace	22.5	3.5	79.7	E/NE
26-Apr-18	Thu	Fine and hot. Light to moderate southerly winds.	0.3	23.2	5.6	83.7	E/NE
27-Apr-18	Fri	Fine and hot. Light to moderate southerly winds.	Trace	24.7	4.5	82.2	E/NE
28-Apr-18	Sat	Fine and hot. Light to moderate southerly winds.	0.1	25.2	4.6	82.1	E
29-Apr-18	Sun	Fine and hot. Light to moderate southerly winds.	Trace	26.6	6.8	81.2	E/NE
30-Apr-18	Mon	Fine and hot. Light to moderate southerly winds.	Trace	26.5	6.9	82.5	E/NE

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 2018

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

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (Recycled)	Chemical Waste	General Refuse (in '000 m3)
	[a+b+c+d)	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
January	86.6400	0.0000	0.0000	5.2900	81.3500	1.6570	45.0000	0.3100	2.8000	4.5760	0.6575
February	33.2700	0.0000	0.0000	3.6700	29.6000	1.3470	32.0000	0.2500	2.4000	1.9500	0.2850
March	39.6460	0.0000	0.0000	3.3460	36.3000	1.3380	36.0000	0.3050	2.7000	9.8560	0.6290
April	55.5979	0.0000	0.0000	3.3680	52.2299	1.2470	33.7800	0.3240	2.5000	0.0000	0.5748
May	0.0000										
June	0.0000										
Half-year total	215.1539	0.0000	0.0000	15.6740	199.4799	5.5890	146.7800	1.1890	10.4000	16.3820	2.1463
July	0.0000										
August	0.0000										
September	0.0000										
October	0.0000										
November	0.0000										
December	0.0000										
Yearly Total	215.1539	0.0000	0.0000	15.6740	199.4799	5.5890	146.7800	1.1890	10.4000	16.3820	2.1463

Year	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated	Broken Concrete (including rock for recycling into aggregates)	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported C&D Material	Metal	Paper/ Cardboard Packaging	Plastic (Recycled)	Chemical Waste	General Refuse (in '000 m3)
	[a+b+c+d)	(a)	(b)	(c)	(d)		(in '000kg)	(in '000kg)	(in kg)	(in '000kg)	(in '000m3)
2013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	220.6270	0.0000	0.0000	0.0000	0.0000
2014	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609
2015	570.9459	0.0000	20.8159	543.2162	6.9138	4.5492	37.6310	3.9220	11.9700	16.1920	1.1696
2016	905.0989	0.0000	7.4372	427.7834	469.8783	24.8350	430.5200	3.8500	18.7262	34.2936	1.9720
2017	741.9482	0.0000	8.0385	175.6792	558.2305	78.3865	1681.8000	4.0700	30.5175	48.7906	5.9610
2018	215.1539	0.0000	0.0000	15.6740	199.4799	5.5890	146.7800	1.1890	10.4000	16.3820	2.1463
Total	2858.5875	0.0000	39.0278	1538.7474	1280.8124	118.9842	2520.5680	13.4700	71.6207	126.5382	13.5098

Remark:

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

(All quantities rounded off to 3 decimal places)

Name of Department: CEDD

Contract No.: CV/2012/09

Monthly Summary Waste Flow Table for 2018 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m^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	3.089	0.304	0.060	0.000	2.725	0.923	0.000	0.000	0.000	0.000	0.150
Feb	2.697	0.256	0.150	0.000	2.292	1.144	0.000	0.000	0.000	0.000	0.095
Mar	1.524	0.141	0.120	0.000	1.263	0.211	0.000	0.000	0.000	0.000	0.085
Apr	2.880	0.786	0.360	0.000	1.734	0.788	0.000	0.000	0.000	0.000	0.125
May											
Jun											
Sub-total	10.190	1.487	0.690	0.000	8.013	3.066	0.000	0.000	0.000	0.000	0.455
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	10.190	1.487	0.690	0.000	8.013	3.066	0.000	0.000	0.000	0.000	0.455

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.
9. Assume the density of paper is 800 kg/m^3.

Forecast of Total Quantities of C&D Materials to be Generated from the Contract										
Total Quantity Generated	**Hard Rock and Large Broken Concrete**	**Reused in the Contract**	**Reused in other Projects**	**Diposal as Public Fill**	**Imported Fill**	**Metals**	**Paper/card board packaging**	**Plastics (see Note 3)**	**Chemical Waste**	**Others, e.g. general refuse**
(in '000m^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 '000m^3)**	**(in '000m^3)**
52.5	5.2	12.3	0.0	35.0	41.8	5.0	1.0	1.0	0.5	44.8

Notes:

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

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

(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works if equal to or exceed 50,000 m^3.

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

Contract No.: CV/2012/09

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

Item No.	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m^3)	Actual Quantities Used (m^3)	Remarks
1	Formwork for Construction of Retaining Wall NB67 Bay 2	Easy handling by manpower	132.53	132.53	
2	Formwork for Construction of Retaining Wall NB69	Easy handling by manpower	35.20	35.20	
3	Formwork for Construction of Retaining Wall NB70	Easy handling by manpower	90.00	90.00	
4	Formwork for Construction of Retaining Wall NB72	Easy handling by manpower	129.61	129.61	
5	Formwork for Construction of Retaining Wall NB73	Easy handling by manpower	72.00	72.00	
6	Formwork for Construction of Road Kerb	Easy handling by manpower	300.00	300.00	
7	Formwork for Construction of Drainage	Easy handling by manpower	300.00	300.00	
		Total Estimated Quantity of Timber Used	1059.34		

Notes:

(a) The Contractor shall list out all the work items requiring timber for use in temporary construction works. Several minor work items may be grouped into one for ease of updating.

(b) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring in accordance with the PS Clause 25.24(11)..

Appendix A

Name of Department: CEDD

Contract No.: NE/2014/02

Monthly Summary Waste Flow Table for 2018

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^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 '000m^3)
2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jan-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mar-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Apr-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
May-18											
Jun-18											
Jul-18											
Aug-18											
Sep-18											
Oct-18											
Nov-18											
Dec-18											
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

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

Notes :

(1) The performance targets are given in PS Clause 1.84(14).

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

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

(4) Estimate 6m3 capacity per dump truck

Monthly Summary Waste Flow Table for _2018__ (year)

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

Project : Liangtang / Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 6 Contract No.: CV/2013/08

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^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	4.152	0	0.629	1.947	1.576	0	0	0.240	0	0	0.892
Feb	2.740	0	0.867	0.544	1.329	0	0	0.402	0	0	0.578
Mar	3.269	0	1.581	0.969	0.719	0	0	0.380	0	0	0.725
Apr	2.901	0	1.955	0.255	0.691	0	0	0.360	0	0.000	0.921
May											
Jun											
Sub-total	13.062	0.000	5.032	3.715	4.315	0.000	0.000	1.382	0.000	0.000	3.116
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	1011.456	0.000	168.259	274.358	568.840	53.939	0.000	7.761	0.007	34.045	11.867

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 2018 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Non-Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
Jan	0.015	0	0	0	0.015	0	14.5	0.5	0.001	0	0.15
Feb	0	0	0	0	0	0	9	0.18	0.001	0	0.13
Mar	0.005	0	0	0	0.005	0	6	0.15	0.001	0	0.2
Apr	1.1	0	0	0	1.1	0	6.6	0.22	0.001	0	0.3
May											
June											
Sub-total	1.12	0	0	0	1.12	0	36.1	1.05	0.004	0	0.78
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	1.12	0	0	0	1.12	0	36.1	1.05	0.004	0	0.780

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 2018 [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	5.298	0.646	0.160	0.000	4.492
Feb	7.243	0.572	0.320	0.000	6.351
Mar	11.241	0.831	0.225	0.000	10.186
Apr	3.717	1.458	0.257	0.000	2.002
May					
Jun					
Sub-total	27.499	3.507	0.962	0.000	23.030
Jul					
Aug					
Sep					
Oct					
Nov					
Dec					
Total	27.499	3.507	0.962	0.000	23.030

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	375.870	375.870	0.220	0.220	0.032	0.032	0.000	0.000	0.000	0.000	1.918
Feb	0.000	0.000	720.120	720.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.223
Mar	0.000	0.000	220.860	220.860	0.830	0.830	0.005	0.005	0.000	0.000	0.005	0.005	2.711
Apr	0.000	0.000	202.130	202.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.470
May													
Jun													
Sub-total	0.000	0.000	1,518.980	1,518.980	1.050	1.050	0.037	0.037	0.000	0.000	0.005	0.005	9.322
Jul													
Aug													
Sep													
Oct													
Nov													
Dec													
Total	0.000	0.000	1,518.980	1,518.980	1.050	1.050	0.037	0.037	0.000	0.000	0.005	0.005	9.322

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					
202.13 tons of scrap metals were sent to Prosperity Metal Recycle Ltd. And Hop Hing Metal Works for recycling	2,916.35 tons of broken concrete were sent to Tailor Recycled Aggregates Ltd. for recycling.				

Notes:
(1) The performance targets are given in the Particular Specification on Environmental Management Plan.
(2) The waste flow table shall also include construction waste that are specified in the Contract to be imported for use at the site.
(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(4) Broken concrete for recycling into aggregates.
(5) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m^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. Daniel Ho	**Fax No**	**2638 7077**
Company	**Chun Wo Construction Ltd**		
cc			
From	**Nicola Hon**	**Date**	**7 May 2018**
Our Ref	TCS00670/13/300/**F1540a**	**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 WM4 on 16 and 17 April 2018 (Contract 3)**		

Dear Mr. Ho,

Further to the Notification of Exceedance (NOE) reference of the following.

TCS00670/13/300/F1517 dated 16 April 2018
TCS00670/13/300/F1522 dated 18 April 2018
TCS00670/13/300/F1533 dated 24 April 2018

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

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

Yours Faithfully,
For and on Behalf of
Action-United Environmental Services & Consulting

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Lu Pei Yu (CE/BCP, NTEDO, CEDD)	Fax	3547 1659
	Mr. Alan Lee (ER of C3, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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		16 Apr 2018	17 Apr 2018	16 Apr 2018
Location		**WM4**		
Time		11:05	10:25	11:05
Parameter		Turbidity (NTU)		Suspended Solids (mg/L)
Action Level		35.2 AND 120% of upstream control station of the same day		39.4 AND 120% of upstream control station of the same day
Limit Level		38.4 AND 130% of upstream control station of the same day		45.5 AND 130% of upstream control station of the same day
Measured Level	**WM4-CA**	17.4	3.8	9.5
	WM4-CB	13.9	13.8	14.5
	WM4	**104.0**	**41.6**	**103.5**
Exceedance		**Limit Level**	**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of C3 (Chun Wo), the construction activities carried out on 16 and 17 April 2018 were general site works such as excavation and road works. Moreover, construction of Retaining Wall was carried out at Location BC02 which next the stream to Ma Wat River. As water quality mitigation measure, water diversion was setup to divert the existing stream water to downstream area to prevent it from deteriorating by the construction works. 2. According to the site photos taken by ET on 16 and 17 April 2018, turbid water was observed at impact station WM4 whereas the water quality at control stations WM4-CA and WM4-CB were clear. **(Photos 1 to 6 and Figure 1)** Upon detection of the turbidity exceedance, inspection was carried out at upper part of the river course and it was observed that the water flowing from Box Culverts ID4 and ID5 (middle of the Contract 3) were clear. **(Photos 7 & 8 & Figure 1)** 3. On 16 April 2018, Chun Wo reported that unknown source of muddy water attributed to site area and the muddy water was finally entered Ma Wat River and got detected at WM4. It was suspected that the muddy water was via an underground pipe which connecting the box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3). **(Photo 9 & Figure 1)** Besides, during water quality monitoring on 17 April 2018, inflow of turbid water to Ma Wat River was observed and the source of unknown turbid water was out of the site boundary. **(Photo 10 & Figure 1)** 4. Joint site inspection by the RE, IEC, Chun Wo and ET was carried out on 18 April 2018 for site investigation. The findings of the inspection are summarized below. (a) At works area of BC02, flow diversion was set up as water mitigation measures for the works next to the stream. There was no flowing water in the diversion flow and mitigation measures were implemented to avoid the diverted water being contaminated by the construction activities. **(Photos 11 & 12)** (b) It was observed that the flow in Box Culvert BC02 was clear but trace amount of sediment/ mud was observed at channel		

	bed, which suspected to be caused by the inflow of muddy water from previous days. **(Photo 13)** (c) Wastewater treatment facilities were implemented throughout the site and no adverse water quality impact was observed in other areas. **(Photo 14)** (d) As water quality mitigation measures, the exposed surface was covered by tarpaulin sheet as far as practicable to minimize muddy runoff. **(Photo 15)** 5. In our investigation, no adverse water quality impact was observed during the site inspection on 18 April 2018. It was considered that the exceedances on 16 and 17 April 2018 were related to unknown source of muddy water outside the site boundary and unlikely caused by the works under Contract 3. 6. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM4 on 18 and 19 April 2018. However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 7 May 2018

Photo Record

Photo 1
During water quality monitoring on 16 April 2018, turbid water was observed at WM4.

Photo 2
During water quality monitoring on 16 April 2018, the water quality at WM4-CA was clear.

Photo 3
During water quality monitoring on 16 April 2018, the water quality at WM4-CB was clear.

Photo 4
During water quality monitoring on 17 April 2018, turbid water was observed at WM4.

Photo 5
During water quality monitoring on 17 April 2018, the water quality at WM4-CA was clear.

Photo 6
During water quality monitoring on 17 April 2018, the water quality at WM4-CB was clear.

Photo 7
Upon detection of the turbidity exceedance on 16 April 2018, inspection was carried out at upper part of the river course. It was observed that the water flowing from Box Culverts ID4 and ID5 (middle of the Contract 3) were clear.

Photo 8
Upon detection of the turbidity exceedance on 17 April 2018, inspection was carried out at upper part of the river course. It was observed that the water flowing from Box Culverts ID4 and ID5 (middle of the Contract 3) were clear.

Photo 9
On 16 April 2018, Chun Wo reported that unknown source of muddy water attributed to site area and the muddy water was finally entered Ma Wat River and got detected at WM4. It was suspected that the muddy water was via an underground pipe which connecting the box culvert in Kiu Tau Road (outside C3) to BC02 (under Contract 3).

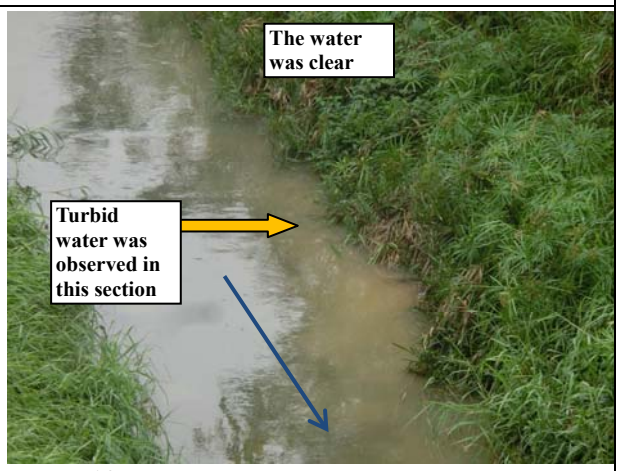


Photo 10
During water quality monitoring on 17 April 2018, inflow of turbid water to Ma Wat River was observed and the source of unknown turbid water was out of the site boundary.

Photo 11
At works area of BC02, flow diversion was set up as water mitigation measures for the works next to the stream.

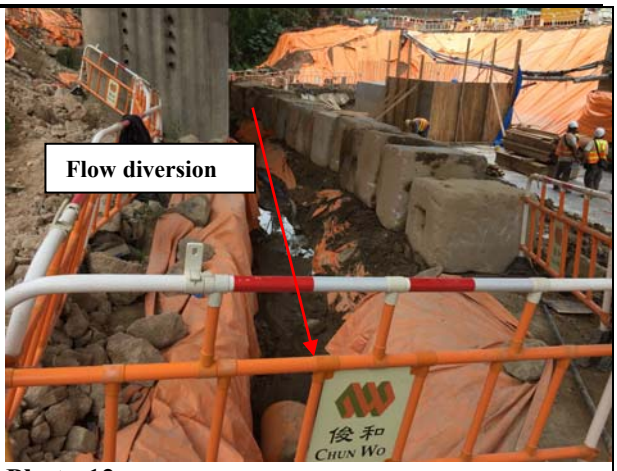


Photo 12
There was no flowing water in the diversion flow and mitigation measures were implemented to avoid the diverted water being contaminated by the construction activities.

Photo 13
It was observed that the flow in Box Culvert BC02 was clear but trace amount of sediment / mud was observed at channel bed, which suspected to be caused by the inflow of muddy water from previous days.

Photo 14
Wastewater treatment facilities were implemented throughout the site and no adverse water quality impact was observed in other areas.

Photo 15
As water quality mitigation measures, the exposed surface was covered by tarpaulin sheet as far as practicable to minimize muddy runoff.

Contract No. CV/2012/09
Liantang / Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructure Works - Contract 3

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

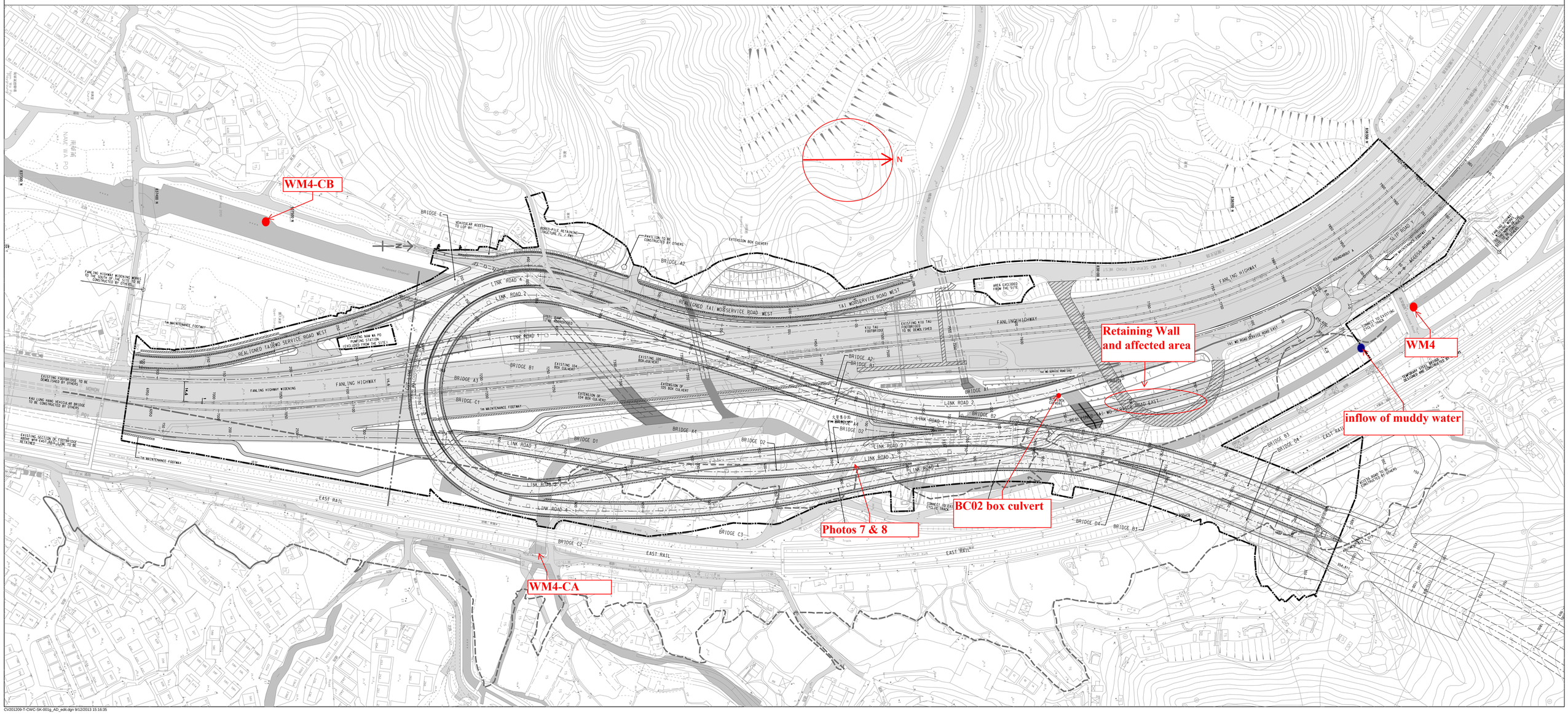


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Figure 1. Location of Water Quality Monitoring Location

AUES

Fax Cover Sheet

To	**Mr. Roger Lee**	**Fax No**	**by e-mail**	
Company	**Dragages Hong Kong Limited**			
cc				
From	**Nicola Hon**	**Date**	**4 May 2018**	
Our Ref	TCS00670/13/300/**F1539**	**No of Pages**	6	**(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008 Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works Investigation Report of Exceedance of Water Quality at Location WM4 on 16 and 17 April 2018 (Contract 2)**			

Dear Mr. Ho,

Further to the Notification of Exceedance (NOE) reference of the following.

TCS00670/13/300/F1518 dated 16 April 2018
TCS00670/13/300/F1523 dated 18 April 2018
TCS00670/13/300/F1534 dated 24 April 2018

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

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

Yours Faithfully,
For and on Behalf of
Action-United Environmental Services & Consulting

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Raymond Leong (CE/BCP, NTEDO, CEDD/C2)	Fax:	3547 1659
	Mr. Edwin Ching (RE, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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Agreement No. CE 45/2008
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	WM4-CB	13.9	13.8	14.5
	WM4	**104.0**	**41.6**	**103.5**
Exceedance		**Limit Level**	**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of Contract 2 (DHK), construction activities carried out at South Portal Site (SP) on 16 and 17 April 2018 included tunnel internal work, construction of retaining wall and backfilling and south ventilation building external wall finishing and EM&A installation. ***(Figure 1)*** The construction site was generally hard paved to minimize muddy runoff. 2. According to the site photos taken by ET on 16 and 17 April 2018, turbid water was observed at impact station WM4 whereas the water quality at control stations WM4-CA and WM4-CB were clear. **(Photos 1 to 6 and Figure 1)** Upon detection of the turbidity exceedance, inspection was carried out at upper part of the river course and it was observed that the water flowing from upstream area were clear. **(Photos 7 & 8 & Figure 1)** 3. On 16 April 2018, the Contractor of Contract 3 (Chun Wo) reported that unknown source of muddy water attributed to their site area and the muddy water was finally entered Ma Wat River and got detected at WM4. It was suspected that the muddy water was flowing from outside project boundary to Contract 3 site area via an underground pipe from Kiu Tau Road. **(Photo 9 & Figure 1)** Besides, during water quality monitoring on 17 April 2018, inflow of turbid water to Ma Wat River was observed and the source of unknown turbid water was out of the site boundary. **(Photo 10 & Figure 1)** 4. Weekly joint site inspection by the RE, DHK, IEC and ET was conducted on 13 April 2018. It was observed that wastewater treatment facilities implemented in South Portal Site was functioned properly and the discharge was clear. **(Photo 11)** The site was mostly hard paved and site hoarding with sealed foots was erected along the site boundary to minimize muddy surface runoff and prevent it from flowing outside the site. **(Photo 12)** No major water quality impact was observed adjacent to the river course. 5. In our investigation, DHK has properly implemented water mitigation measures such as well maintain the wastewater treatment facilities and hard paved most of the site surface. In		

	general, the condition of the South Portal Site under Contract 2 was in order and no adverse water quality impact was identified. It was considered that the exceedances were not related to the works under Contract 2. 6. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM4 on 18 and 19 April 2018. However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 4 May 2018

Photo Record

Photo 1
During water quality monitoring on 16 April 2018, turbid water was observed at WM4.

Photo 2
During water quality monitoring on 16 April 2018, the water quality at WM4-CA was clear.

Photo 3
During water quality monitoring on 16 April 2018, the water quality at WM4-CB was clear.

Photo 4
During water quality monitoring on 17 April 2018, turbid water was observed at WM4.

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During water quality monitoring on 17 April 2018, the water quality at WM4-CA was clear.

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During water quality monitoring on 17 April 2018, the water quality at WM4-CB was clear.

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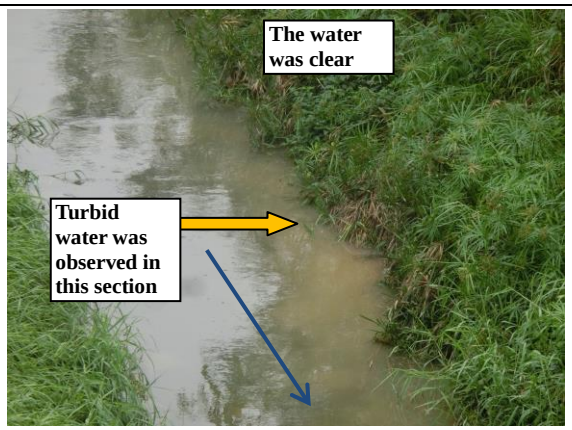
Upon detection of the turbidity exceedance on 16 April 2018, inspection was carried out at upper part of the river course and it was observed that the water flowing from upstream area were clear.

Photo 8
Upon detection of the turbidity exceedance on 17 april 2018, inspection was carried out at upper part of the river course and it was observed that the water flowing from upstream area were clear.

Photo 9
On 16 April 2018, Chun Wo reported that unknown source of muddy water attributed to their site area and the muddy water was finally entered Ma Wat River and WM4. It was suspected that the muddy water was flowing from outside project boundary to Contract 3 site area via an underground pipe from Kiu Tau Road.



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Weekly joint site inspection on 13 April 2018. It was observed that wastewater treatment facilities implemented in South Portal Site was functioned properly and the discharge was clear.

Photo 12
The site was mostly hard paved and site hoarding with sealed foots was erected along the site boundary to minimize muddy surface runoff and prevent it from flowing outside the site.

Contract No. CV/2012/09
Liantang / Heung Yuen Wai Boundary Control Point
Site Formation and Infrastructure Works - Contract 3

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

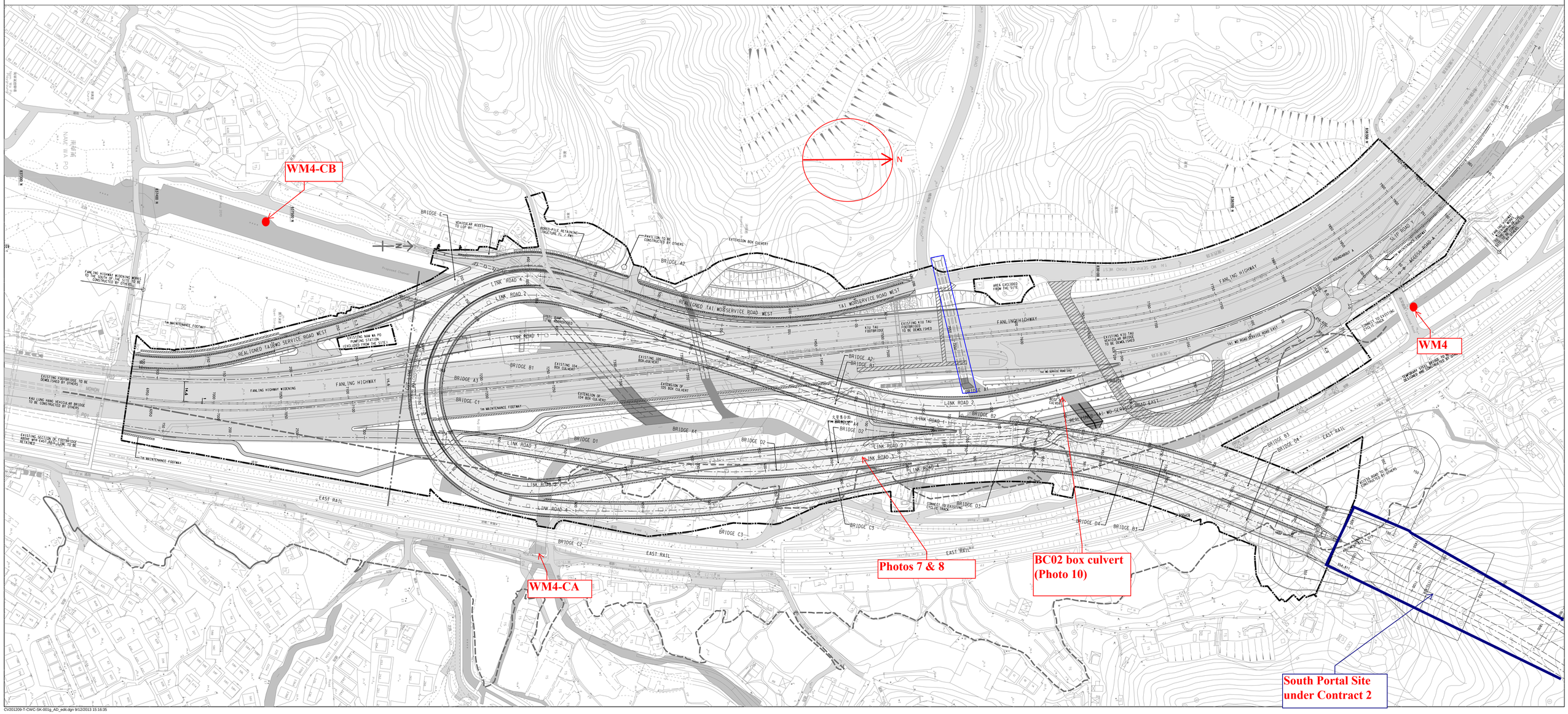

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Figure 1. Location of Water Quality Monitoring Location