



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.41) – DECEMBER 2016

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
(CEDD)

Date	Reference No.	Prepared By	Certified By
16 January 2017	TCS00694/13/600/R0862v2	 Nicola Hon (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	10 January 2017	First Submission
2	16 January 2017	Amended against the IEC's comments on 12 January 2017



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16 January 2017

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By Email & Post

Attention: Mr Simon LEUNG

Dear Sirs

**Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Monthly EM&A Report (No. 41) – December 2016**

With reference to the Monthly EM&A Report No. 41 for December 2016 (Version 2) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/C.

Thank you for your attention and please do not hesitate to contact the undersigned on tel. 3995-8120 or by email to antony.wong@smec.com; or our Mr Man CHEUNG on tel. 3995 8132 or by email to man.cheung@smec.com.

Yours faithfully
for and on behalf of
SMEC Asia Limited



Antony WONG

Independent Environmental Checker

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	AUES	-	Mr TW TAM	by email



EXECUTIVE SUMMARY

ES01 This is the 41st monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from 1 to 31 December 2016 (hereinafter ‘the Reporting Period’).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

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

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

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	162
	24-hour TSP	9	50
Construction Noise	L _{eq(30min)} Daytime	10	45
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C	13 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	13 Scheduled & 2 extra
		WM2B & WM2B-C	13 Scheduled & 0 extra
		WM3x & WM3-C	13 Scheduled & 0 extra
		WM4, WM4-CA & WM4-CB	13 Scheduled & 1 extra
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats	0
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	5
		Contract 3	4
		Contract 6	5
		Contract 7	4
		Contract SS C505	4

Note: Extra monitoring day was due to measurement results exceedance

ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

ES04 In the Reporting Period, no air quality and construction noise exceedances were recorded. For water quality monitoring, a total of eight (8) Action Level/ Limit Level exceedances were recorded. The summary of exceedance in the Reporting Period is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	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	-	--	--

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
	Turbidity	0	3	3	- All NOEs were concluded as non-project related	0	The Contractors were reminded to implement water quality mitigation measures in accordance with ISEMM of the EM&A Manual requirements
	SS	1	4	5		0	

ENVIRONMENTAL COMPLAINT

ES05 In this Reporting Period, one (1) documented environmental complaint was received in respect to respect nuisance generated by sheet piling. Investigation result revealed that the contractor has implemented noise mitigation measures to reduce the noise impact to the nearby resident and the complainant was satisfactory with the arrangement. The summary of complaint received in the Reporting Period is summarized below.

Reporting Period	Contract No	Environmental Complaint		
		Frequency	Complaint Nature	Project related complaint
1 – 31 Dec 2016	Contract 2	0	NA	NA
	Contract 3	0	NA	NA
	Contract 6	1	• Nuisance	1
	Contract 7	0	NA	NA
	SS C505	0	NA	NA

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

REPORTING CHANGE

ES07 In the Reporting period, no reporting changes were made.

SITE INSPECTION

ES08 In this Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 2** has been carried out by the RE, IEC, ET and the Contractor on **2, 9, 16, 19 and 30 December 2016**. No non-compliance was noted during the site inspection.

ES09 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 3** has been carried out by the RE, IEC, ET and the Contractor on **5, 12, 21 and 29 December 2016**. 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 6** has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22 and 29 December 2016**. 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 SS C505** has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 20 and 28 December 2016**. No non-compliance was noted during the site inspection.

ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 7** has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 20 and 28 December 2016**. No non-compliance was noted during the site inspection.

FUTURE KEY ISSUES

ES13 During dry season, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures.

ES14 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River or public area 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. Moreover, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.

ES15 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department is the Project Proponent and the Permit Holder of Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/C granted on 12 March 2015.
- 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 **41st** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **31 December 2016**.

1.2 REPORT STRUCTURE

- 1.2.1 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-
- Section 1 Introduction*
 - Section 2 Project Organization and Construction Progress*
 - Section 3 Summary of Impact Monitoring Requirements*
 - Section 4 Air Quality Monitoring*
 - Section 5 Construction Noise Monitoring*
 - Section 6 Water Quality Monitoring*

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

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

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

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

2.1.5 Contract 4 has awarded in mid-April 2016. However, the major construction work still is not yet commenced. The scope of work of the Contract 4 includes:

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

Contract 5 (CV/2013/03)

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

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

Contract 6 (CV/2013/08)

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

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

Contract 7 (NE/2014/03)

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

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

ArchSD Contract No. SS C505

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

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

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

2.2 PROJECT ORGANIZATION

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

Civil Engineering and Development Department (CEDD)

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

Architectural Services Department (ArchSD)

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

Environmental Protection Department (EPD)

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

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

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

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

Engineer or Engineers Representative (ER)

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

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

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

The Contractor(s)

2.2.7 There will be one contractor for each individual works contract. Once the contractors are appointed, EPD, ET and IEC will be notified the details of the contractor.

2.2.8 The Contractor for Contracts under CEDD should report to the ER. For ArchSD Contract, the Contractor should report to the Architect or Architect's Representative (AR). The duties and responsibilities of the Contractor are:

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

Environmental Team (ET)

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

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

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

- Liaison with the client departments, Engineer/Engineer's Representative, ET, IEC and the Contractor(s) of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

Independent Environmental Checker (IEC)

- 2.2.11 One IEC will be employed for this Project. Once the IEC is appointed, EPD, ER, the Architect and ET will be notified the details of the IEC.
- 2.2.12 The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should be employed by the Permit Holder (i.e., CEDD) prior to the commencement of the construction of the Project. The IEC should have at least 10 years' experience in EM&A and have relevant professional qualifications. The appointment of IEC should be subject to the approval of EPD. The IEC should:
- Provide proactive advice to the ER and the Project Proponent on EM&A matters related to the project, independent from the management of construction works, but empowered to audit the environmental performance of construction
 - Review and audit all aspects of the EM&A programme implemented by the ET
 - Review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET
 - Arrange and conduct regular, at least monthly site inspections of the works during construction phase, and ad hoc inspections if significant environmental problems are identified
 - Check compliance with the agreed Event / Action Plan in the event of any exceedance
 - Check compliance with the procedures for carrying out complaint investigation
 - Check the effectiveness of corrective measures
 - Feedback audit results to ET by signing off relevant EM&A proforma
 - Check that the mitigation measures are effectively implemented
 - Verify the log-book(s) mentioned in Condition 2.2 of the EP, notify the Director by fax, within one working day of receipt of notification from the ET Leader of each and every occurrence, change of circumstances or non-compliance with the EIA Report and/or the EP, which might affect the monitoring or control of adverse environmental impacts from the Project
 - Report the works conducted, the findings, recommendation and improvement of the site inspections, after reviewing ET's and Contractor's works, and advices to the ER and Project Proponent on a monthly basis
 - Liaison with the client departments, Engineer/Engineer's Representative, the Architect, ET, IEC and the Contractor of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

2.3 CONCURRENT PROJECTS

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

2.4 CONSTRUCTION PROGRESS

- 2.4.1 In the Reporting Period, the major construction activity conducted under the Project is located in Contracts 2, 3, 6, 7 and SS C505 and they are summarized in below. Moreover, 3-month rolling construction program for all the current contracts is enclosed in **Appendix C**.

Contract 2 (CV/2012/08)

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

- | | | |
|----------------|---|--|
| Mid-Vent | • | Stud tunnel and cavern excavation |
| Portal | • | Adit invert slab, waterproofing and lining |
| | • | Ventilation building superstructure and backfilling |
| North Portal | • | Slope stabilization and retaining wall |
| | • | Southbound Tunnel Boring Machine (TBM) excavation |
| | • | Northbound bench excavation |
| | • | Tunnel enlargement and construction of cross passage |
| | • | Tunnel internal structure and cross passage |
| | • | ventilation building foundation |
| South Portal | • | Southbound and northbound Drill & Blast Excavation |
| | • | South ventilation and building superstructure |
| | • | Tunnel invert, waterproofing and lining |
| Admin Building | • | Building superstructure and external wall |

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
- Demolition of existing Vehicular Bridge
- Footbridge construction
- Storm drains laying
- Noise barrier construction
- Pier / pier table construction
- Pile cap works
- Portal beam construction
- Retaining wall construction
- Road works
- Sewer works
- Utilities Duct Laying
- Viaduct segment erection
- Water Main Laying
- Extended Podium construction
- Construction of remaining base Slab of Box Culvert ID4
- Slope reinstatement works near Bridge E
- Utilities duct laying
- Viaduct segment erection
- Demolition of existing WSD Telemetry House

Contract 4 (Contract number to be assigned)

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

Contract 5 (CV/2013/03)

2.4.5 As advised by the ER, 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:

- Bored Piling

- Pile Cap Construction
- Bridge Pier Construction
- Bridge Segment Erection
- Tunnel Excavation
- Sewage Treatment Plant Construction
- 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:

- Piling Works at Bridges A and E
- Pile Caps Construction at Bridges A, B, D and E
- Column construction at Bridge C
- 2nd floor slab construction at Bridge C

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.4, 5, 6, 7, 9, 10, 11 and 36 construction
- Excavation for drainage works for Building no. 4 & 5
- Pile cap construction for Building no. 7
- Tower crane operation
- Bridge construction works including construction of bridge column, retaining wall, pile cap and pier
- Underground drainage works
- Mock up for south entrance double curve cladding
- Formwork and falsework for PTB's slab construction
- Construction PTB M/F & 1/F flat slab
- Steel beam works for maintenance platform for PTB
- Pile cap construction for PTB, including excavation and backfilling works
- Bridge deck construction for Bridges 1 – 5
- Footing construction

2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

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

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

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

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
Contract 2				
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864	31 Dec 2013	Till Contract ends
2	Chemical Waste Producer Registration	<i>North Portal</i> Waste Producers Number: No.5213-652-D2523-01	25 Mar 2014	Till Contract ends
		<i>Mid-Vent Portal</i> Waste Producers Number: No.5213-634-D2524-01	25 Mar 2014	Till Contract ends
		<i>South Portal</i> Waste Producers Number: No.5213-634-D2526-01	9 Apr 2014	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014	8 Oct 2014	30 Sep 2019
		No.: W5/11389	28 Mar 2014	31 Mar 2019
		No. WT00023063-2015	18 Dec 2015	31 Mar 2019
		No.: W5/11392	28 Mar 2014	31 Mar 2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	8 Jan 2014	Till Contract ends
5	Construction Noise Permit	GW-RN0457-16	22 Jun 2016	14 Dec 2016
		GW-RN0435-16	27 Jun 2016	26 Dec 2016
		GW-RN0543-16	18 Jul 2016	13 Jan 2017
		GW-RN0579-16	11 Aug 2016	07 Jan 2017
		GW-RN0604-16	11 Aug 2016	07 Jan 2017
		GW-RN0695-16	18 Sep 2016	17 Mar 2017
		GW-RN0700-16	20 Sep 2016	19 Feb 2017
		GW-RN0759-16	12 Oct 2016	11 Apr 2017
		GW-RN0780-16	27 Oct 2016	26 Dec 2016
		GW-RN0788-16	27 Oct 2016	26 Dec 2016
		GW-RN0800-16	01 Nov 2016	29 Apr 2017
		GW-RN0822-16	09 Nov 2016	08 May 2017
		GW-RN0823-16	09 Nov 2016	08 May 2017
		GW-RN0839-16	20 Nov 2016	07 May 2017
		GW-RN0852-16	23 Nov 2016	2 May 2017
		GW-RN0895-16	20 Dec 2016	11 Jun 2017
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)	12-Apr-2016	11-Apr-2021
Contract 3				

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
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-RN0414-16	18 Jun 2016	17 Dec 2016
		GW-RN0434-16	22 Jun 2016	21 Dec 2016
		GW-RN0525-16	20 Jul 2016	7 Jan 2017
		GW-RN0549-16	30 Jul 2016	9 Jan 2017
		GW-RN0561-16	16 Aug 2016	11 Feb 2017
		GW-RN0580-16	25 Aug 2016	24 Feb 2017
		GW-RN0581-16	25 Aug 2016	24 Feb 2017
		GW-RN0596-16	17 Aug 2016	15 Feb 2017
		GW-RN0619-16	22 Aug 2016	14 Feb 2017
		GW-RN0646-16	10 Sep 2016	9 Mar 2017
		GW-RN0649-16	3 Sep 2016	7 Jan 2017
		GW-RN0653-16	11 Sep 2016	10 Mar 2017
		GW-RN0654-16	15 Sep 2016	14 Mar 2017
		GW-RN0708-16	8 Oct 2016	28 Jan 2017
		GW-RN0711-16	1 Oct 2016	13 Jan 2017
		GW-RN0720-16	4 Oct 2016	31 Mar 2017
		GW-RN0729-16	5 Oct 2016	31 Mar 2017
		GW-RN0756-16	18 Oct 2016	13 Apr 2017
		GW-RN0759-16	5 Nov 2016	29 Apr 2017
		GW-RN0816-16	13 Nov2016	27 Mar 2017
		GW-RN0833-16	13 Nov2016	10 May 2017
		GW-RN0836-16	15 Nov2016	31 Mar 2017
		GW-RN0843-16	18 Nov2016	17 May 2017
		GW-RN0856-16	17 Nov2016	7 Jan 2017
GW-RN0870-16	30 Nov2016	13 May 2017		
GW-RN0871-16	29 Nov2016	20 May 2017		
GW-RN0872-16	29 Nov2016	20 May 2017		
GW-RN0901-16	11 Dec 2016	4 Jun 2017		
GW-RN0939-16	22 Dec 2016	21 Jun 2017		
GW-RN0947-16	24 Dec 2016	15 Jun 2017		
GW-RN0965-16	28 Dec 2016	13 Jun 2017		

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
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 Construction Waste	Account No. 7017351	29 Apr 13	Till the end of Contract
Contract 6				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390614	29 Jun 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-652-C3969-01	31 Aug 2015	Till the end of Contract
3	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022707	9 Jul 2015	Till the end of Contract
4	Water Pollution Control Ordinance - Discharge License	No.: WT00024574-2016	31 May 2016	31 May 2021
		No.: WT00024576-2016	31 May 2016	31 May 2021
		No.: WT00024742-2016	14 June 2016	30 June 2021
		No.: WT00024746-2016	14 June 2016	30 June 2021
5	Construction Noise Permit	GW-RW0588-16	19 Oct 2016	18 Apr 2017
		GW-RN0766-16	21 Oct 2016	20 Jan 2017
		GW-RN0915-16	20 Dec 2016	14 Mar 2017
		GW-RN0937-16	3 Jan 2017	31 Mar 2017
		GW-RN0964-16	6 Jan 2017	5 Apr 2017
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

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
5	Construction Noise Permit	GW-RN0806-16	5 Nov 2016	4 May 2017
		PP-RN0020-16	16 Jul 2016	14 Jan 2017
		GW-RN0520-16	23 Jul 2016	22 Jan 2017
Contract 7				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024129	21 Jan 2016	Till the end of Contract
5	Construction Noise Permit	GW-RN0799-16	5 Nov 2016	4 May 2017
Contract 4				
1	Air pollution Control (Construction Dust) Regulation	Form of Notification of Construction work has submitted to EPD in July 2016.		
2	Chemical Waste Producer Registration	Application is under preparation		
3	Water Pollution Control Ordinance - Discharge License	Application is under preparation		
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Application is under preparation		

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

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

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

3.2 MONITORING PARAMETERS

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

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

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

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP by Real-Time Portable Dust Meter; and • 24-hour TSP by High Volume Air Sampler.
Noise	<ul style="list-style-type: none"> • $L_{eq(30min)}$ 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 <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Water depth (m); and • Temperature (°C).
	Laboratory Analysis <ul style="list-style-type: none"> • Suspended Solids (mg/L)

3.3 MONITORING LOCATIONS

3.3.1 The designated monitoring locations as recommended in the *EM&A Manual* are shown in *Appendix D*. As the access to some of the designated monitoring locations was questionable due to safety reason or denied by the landlords, alternative locations therefore have had proposed. The proposed alternative monitoring locations has updated in the revised EM&A Programme which verified by IEC and certified by ET Leader prior submitted to EPD on 10 July 2013. *Table 3-2*, *Table 3-3* and *Table 3-4* are respectively listed the air quality, construction noise and water quality monitoring locations for the Project and a map showing these monitoring stations is presented in *Appendix E*.

Table 3-2 Impact Monitoring Stations - Air Quality

Station ID	Description	Works Area	Related to the Work Contract
AM1b^	Open area at Tsung Yuen Ha Village	BCP	SS C505 Contract 7
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 6
AM3	Ta Kwu Ling Fire Service Station of Ta	LMH to Frontier	Contract 6

Station ID	Description	Works Area	Related to the Work Contract
	Kwu Ling Village.	Closed Area	
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 AM1 to AM1a was submitted to EPD on 24 March 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (6) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).*

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

^ Proposal for change of air quality monitoring locations was enclosed in the updated EM&A Programme which approval by EPD on 29 Mar 2016.

Table 3-3 Impact Monitoring Stations - Construction Noise

Station ID	Description	Works Area	Related to the Work Contract
NM1	Tsung Yuen Ha Village House No. 63	BCP	SS C505 Contract 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 on 29th March 2016. If the measured water depth of the monitoring station is lower than 150 mm, alternative location (WM3x and WM2A-Controlx) based on the criteria were selected to perform water monitoring in accordance with the updated EM&A Programme (Rev. 05) (Section 4.1.4)

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

3.4 MONITORING FREQUENCY AND PERIOD

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

Air Quality Monitoring

3.4.1 Frequency of impact air quality monitoring is as follows:

- 1-hour TSP 3 times every six days during course of works

- 24-hour TSP Once every 6 days during course of works.

Noise Monitoring

3.4.2 One set of $L_{eq(30min)}$ as 6 consecutive $L_{eq(5min)}$ between 0700-1900 hours on normal weekdays and once every week during course of works. If construction work necessary to carry out at other time periods, i.e. restricted time period (19:00 to 07:00 the next morning and whole day on public holidays) (hereinafter referred as “the restricted hours”), 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 Cesva CB-5 or Rion NC-74*
Portable Wind Speed Indicator	Testo Anemometer

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

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

Water Quality Monitoring

3.5.10 DO and water temperature should be measured in-situ by a DO/temperature meter. The instrument should be portable and weatherproof using a DC power source. It should have a membrane electrode with automatic temperature compensation complete with a cable. The equipment should be capable of measuring:

- a DO level in the range of 0-20 mg/l and 0-200% saturation; and
- a temperature of between 0 and 45 degree Celsius.

3.5.11 A portable pH meter capable of measuring a range between 0.0 and 14.0 should be provided to measure pH under the specified conditions accordingly to the APHA Standard Methods.

3.5.12 The instrument should be portable and weatherproof using a DC power source. It should have a photoelectric sensor capable of measuring turbidity between 0-1000 NTU.

3.5.13 A portable, battery-operated echo sounder or tape measure will be used for the determination of water depth at each designated monitoring station as appropriate.

3.5.14 A water sampler e.g. Kahlsico Water Sampler, which is a transparent PVC cylinder with capacity not less than 2 litres, will be used for water sampling if water depth over than 0.5m. For sampling from very shallow water depths e.g. <0.5 m, water sample collection will be directly from water surface below 100mm use sampling plastic bottle to avoid inclusion of bottom sediment or humus. Moreover, Teflon/stainless steel bailer or self-made sampling buckets maybe used for water sampling. The equipment used for sampling will be depended the sampling location and depth situations.

- 3.5.15 Water samples for laboratory measurement of SS will be collected in high density polythene bottles, packed in ice (cooled to 4 °C without being frozen), and delivered to the laboratory in the same day as the samples were collected.
- 3.5.16 Analysis of suspended solids should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 2 mg/L.
- 3.5.17 Water quality monitoring equipment used in the impact monitoring is listed in **Table 3-7**. Suspended solids (SS) analysis is carried out by a local HOKLAS-accredited laboratory, namely *ALS Technichem (HK) Pty Ltd*.

Table 3-7 Water Quality Monitoring Equipment

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

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

3.6 MONITORING METHODOLOGY

1-hour TSP Monitoring

- 3.6.1 The 1-hour TSP monitor was a brand named “Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter” which is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90° light scattering. The 1-hour TSP monitor consists of the following:
- A pump to draw sample aerosol through the optic chamber where TSP is measured;
 - A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
 - A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

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

24-hour TSP Monitoring

- 3.6.3 The equipment used for 24-hour TSP measurement is Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The High Volume Air Sampler (HVS) consists of the following:
- An anodized aluminum shelter;
 - A 8”x10” stainless steel filter holder;
 - A blower motor assembly;
 - A continuous flow/pressure recorder;

- (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}). $L_{eq(30min)}$ in six consecutive $L_{eq(5min)}$ measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays; $L_{eq(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.
- 3.6.8 Prior of noise measurement, the accuracy of the sound level meter is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking is performed before and after the noise measurement.

Water Quality

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

Sampling Procedure

- 3.6.10 A Digital Global Positioning System (GPS) is used to identify the designated monitoring stations prior to water sampling. A portable, battery-operated echo sounder or tape measurement is used for the determination of water depth at each station. At each station, water sample would be collected from 0.1m below water surface or the water surface to prevent the river bed sediment for stirring.
- 3.6.11 The sample container will be rinsed with a portion of the water sample. The water sample then will be transferred to the high-density polythene bottles as provided by the laboratory, labeled with a unique sample number and sealed with a screw cap.
- 3.6.12 Before sampling, general information such as the date and time of sampling, weather condition as well as the personnel responsible for the monitoring would be recorded on the field data sheet.
- 3.6.13 A 'Willow' 33-liter plastic cool box packed with ice will be used to preserve the water samples prior to arrival at the laboratory for chemical determination. The water temperature of the cool box is maintained at a temperature as close to 4°C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

In-situ Measurement

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

- 3.6.15 A portable AZ Model 8685 is used for in-situ pH measurement. The pH meter is capable of measuring pH in the range of 0 – 14 and readable to 0.1.
- 3.6.16 A portable Hach 2100Q Turbidimeter is used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU.
- 3.6.17 All in-situ measurement equipment are calibrated by HOKLAS accredited laboratory of three month interval.

Laboratory Analysis

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

3.7 EQUIPMENT CALIBRATION

- 3.7.1 Calibration of the HVS is performed upon installation and thereafter at bimonthly intervals in accordance with the manufacturer’s instruction using the certified standard calibrator (TISCH Model TE-5025A). Moreover, the Calibration Kit would be calibrated annually. The calibration data are properly documented and the records are maintained by ET for future reference.
- 3.7.2 The 1-hour TSP meter was calibrated by the supplier prior to purchase. Zero response of the equipment would be checked before and after each monitoring event. Annually calibration with the High Volume Sampler (HVS) in same condition would be undertaken by the Laboratory.
- 3.7.3 The sound level meter and calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.
- 3.7.4 All water quality monitoring equipment would be calibrated by HOKLAS accredited laboratory of three month intervals.
- 3.7.5 The calibration certificates of all monitoring equipment used for the impact monitoring program in the Reporting Period and the HOKLAS accredited certificate of laboratory are attached in *Appendix F*.

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

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

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

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

Table 3-9 Action and Limit Levels for Construction Noise

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

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

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

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location				
		WM1	WM2A(a)	WM2B	WM3x	WM4
DO (mg/L)	Action Level	(*)4.23	(**)4.00	(*)4.74	(**)4.00	(*)4.14
	Limit Level	(#)4.19	(**)4.00	(#)4.60	(**)4.00	(#)4.08
Turbidity (NTU)	Action Level	51.3	24.9	11.4	13.4	35.2
		AND 120% of upstream control station of the same day				
	Limit Level	67.6	33.8	12.3	14.0	38.4
		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, 6, 7 and Contract SS C505. Hence, air quality monitoring was performed at all designated locations.

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

4.2 AIR QUALITY MONITORING RESULTS

4.2.1 In the Reporting Period, a total of **162** events of 1-hour TSP and **50** 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 ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
6-Dec-16	117	2-Dec-16	9:36	88	103	110
12-Dec-16	59	8-Dec-16	9:33	81	87	102
17-Dec-16	88	14-Dec-16	9:24	87	87	92
22-Dec-16	58	20-Dec-16	9:35	112	103	101
28-Dec-16	86	23-Dec-16	13:01	69	73	77
		29-Dec-16	9:20	127	118	108
Average (Range)	82 (58 – 117)	Average (Range)		96 (69 – 127)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
6-Dec-16	145	2-Dec-16	9:26	113	125	130
12-Dec-16	145	8-Dec-16	9:19	89	96	109
17-Dec-16	122	14-Dec-16	9:48	91	93	87
22-Dec-16	86	20-Dec-16	9:53	114	113	113
28-Dec-16	106	23-Dec-16	13:03	67	71	75
		29-Dec-16	9:15	122	121	117
Average (Range)	131 (86 – 145)	Average (Range)		103 (67 – 130)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
6-Dec-16	138	2-Dec-16	9:21	119	125	130
12-Dec-16	75	8-Dec-16	13:29	107	111	117
17-Dec-16	122	14-Dec-16	13:05	105	109	114
22-Dec-16	115	20-Dec-16	12:49	150	122	116
28-Dec-16	126	23-Dec-16	13:07	69	71	73
		29-Dec-16	9:08	150	142	125
Average (Range)	115 (75 – 138)	Average (Range)		114 (69 – 150)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
2-Dec-16	90	3-Dec-16	8:53	63	64	64
8-Dec-16	115	9-Dec-16	9:27	91	85	82
14-Dec-16	86	15-Dec-16	9:07	91	97	95
20-Dec-16	88	21-Dec-16	9:22	115	105	103
23-Dec-16	40	24-Dec-16	8:57	69	73	77
29-Dec-16	71	30-Dec-16	9:55	80	82	92
Average (Range)	82 (40 – 115)	Average (Range)		85 (63 – 115)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
2-Dec-16	100	3-Dec-16	8:49	67	68	68
8-Dec-16	53	9-Dec-16	9:25	86	89	84
14-Dec-16	75	15-Dec-16	12:55	88	93	91
20-Dec-16	119	21-Dec-16	9:44	109	102	95
23-Dec-16	81	24-Dec-16	8:59	72	72	75
29-Dec-16	95	30-Dec-16	9:46	76	78	88
Average (Range)	87 (53 – 119)	Average (Range)		83 (67 – 109)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
2-Dec-16	135	3-Dec-16	9:01	69	72	73
8-Dec-16	103	9-Dec-16	9:17	87	88	85
14-Dec-16	142	15-Dec-16	9:13	84	86	82
20-Dec-16	115	21-Dec-16	9:33	104	94	97
23-Dec-16	73	24-Dec-16	9:13	69	74	79
29-Dec-16	88	30-Dec-16	9:32	102	130	126
Average (Range)	109 (73 – 142)	Average (Range)		89 (69 – 130)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
2-Dec-16	88	3-Dec-16	13:00	65	67	68
8-Dec-16	109	9-Dec-16	9:10	89	90	98
14-Dec-16	117	15-Dec-16	9:44	84	74	75
20-Dec-16	70	21-Dec-16	9:55	91	94	96
23-Dec-16	84	24-Dec-16	9:31	76	78	77
29-Dec-16	129	30-Dec-16	9:22	88	98	100
Average (Range)	100 (70 – 129)	Average (Range)		84 (65 – 100)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
2-Dec-16	93	3-Dec-16	13:05	67	68	66
8-Dec-16	99	9-Dec-16	9:00	89	91	93
14-Dec-16	75	15-Dec-16	10:31	79	78	74
20-Dec-16	50	21-Dec-16	13:02	85	86	90
23-Dec-16	36	24-Dec-16	13:00	72	75	79
29-Dec-16	87	30-Dec-16	9:10	60	61	64
Average (Range)	73 (36 – 99)	Average (Range)		77 (60 -93)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
6-Dec-16	85	2-Dec-16	13:08	181	162	149
13-Dec-16#	67	8-Dec-16	13:18	161	140	129
17-Dec-16	57	14-Dec-16	13:18	85	95	97
22-Dec-16	60	20-Dec-16	13:06	112	105	135
28-Dec-16	60	23-Dec-16	13:00	74	78	82
		29-Dec-16	13:02	133	99	97
Average (Range)	66 (57 – 85)	Average (Range)		117 (74– 181)		

Remark (#) power failure of HVS was occurred on 12 December 2016 and re-sampling was conducted on 13 December 2016.

- 4.2.1 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.
- 4.2.2 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, 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 (NORMAL DAYTIME)

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

Table 5-1 Summary of Construction Noise Monitoring Results

Construction Noise Level ($L_{eq30min}$), dB(A)					
Date	NM1	NM2a ^(*)	NM8	NM9	NM10 ^(*)
2-Dec-16	56	64	58	61	68
8-Dec-16	55	61	58	62	65
14-Dec-16	61	65	60	61	64
20-Dec-16	63	72	59	63	66
29-Dec-16	55	64	58	62	66
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
9-Dec-16	64	69	59	56	65
15-Dec-16	65	65	59	62	69
21-Dec-16	63	67	62	67	71
30-Dec-16	63	64	49	59	61
Limit Level	75 dB(A)				

- 5.2.2 As shown in *Tables 5-1 and 5-2*, the noise level measured at all designated monitoring locations were below 75dB(A). Moreover, no valid noise complaint (which triggered Action Level exceedance) was recorded in the Reporting Period.

5.3 NOISE MONITORING RESULTS (RESTRICTED HOURS)

- 5.3.1 In the Reporting Period, CNPs were granted by Contracts 2, 3, 6, 7 and SS C505 for use of Powered Mechanical Equipment (PME) during restricted hour. As confirmed by both Contractors with their works schedules, construction works would be conducted at Contract 2, 3, 6 and SS C505 during restricted hours with the granted CNP. Noise monitoring was therefore conducted at the relevant noise monitoring locations during respective restricted hour periods.
- 5.3.2 Based on the works schedule by the Contractor of Contracts 2, 3, 6, 7 and SS C505, the involved noise monitoring locations included NM1, NM4, NM5, NM7, NM8, NM9 and NM10 and the noise monitoring results are summarized in *Tables 5-3 and 5-4*.

Table 5-3 Summary of Construction Noise Monitoring Results (Evening Time)

Construction Noise Level (L_{eq5min}), dB(A)					
Date	NM1	NM4	NM5	NM7	NM8
	L_{eq5min}	L_{eq5min}	L_{eq5min}	L_{eq5min}	L_{eq5min}
2-Dec-16	48.7	--	48.3	53.6	58.7
9-Dec-16	--	--	47.3	48.0	55.6
16-Dec-16	--	44.9	48.2	44.0	58.0
20-Dec-16	--	55.4	49.9	54.3	57.3
30-Dec-16	--	49.6	48.3	60.1	57.8
Observation/ other noise source	Occasionally dogs barking from village	noise from vehicle and occasionally dogs barking from village	Noise from vehicle parking, occasionally dogs barking from village	Noise from water flowing in the gully, occasionally dogs barking from village	Traffic noise from trains as NM8 close to train tracks and occasionally dogs barking from village

Remarks: 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 5-4 Summary of Construction Noise Monitoring Results (Night Time)

Construction Noise Level (L_{eq5min}), dB(A)					
Date (#)	NM5	NM7	NM8	NM9	NM10 ^(*)
	L_{eq5min}	L_{eq5min}	L_{eq5min}	L_{eq5min}	L_{eq5min}
2-Dec-16	45.5	54.1	52.4	62.9	60.3
9-Dec-16	47.4	48.7	59.6	60.8	59.6
16-Dec-16	53.2	46.9	58.0	--	--
20-Dec-16	49.5	57.1	58.0	60.2	60.1
30-Dec-16	45.6	44.0	57.6	--	--
Observation/ other noise source	Noise from vehicle parking, occasionally dogs barking from village	Noise from water flowing in the gully, occasionally dogs barking from village	Traffic noise from trains as NM8 close to train tracks and occasionally dogs barking from village	Traffic noise from trains as NM9 close to train tracks and occasionally dogs barking from village	Traffic noise from highway and occasionally dogs barking from village

Remarks: 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.

(#) the monitoring date for NM9 and NM10 shall be the next day of the "Date"

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

5.3.3

According to the site records by the monitoring team, no construction noise from the construction was noted during the course of monitoring at all locations. On the other hand, traffic noise was dominated at NM8 and NM9 since the monitoring locations were closed to the train tracks and occasionally noise from vehicle and dogs barking were recorded at all stations. Therefore, it is considered that the measurement results were likely to be the background noise.

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, 6, 7 and Contract SS C505 and water quality monitoring was performed at all designated locations. The water quality monitoring schedule is presented in *Appendix H*. The monitoring results are summarized in the following sub-sections.

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of thirteen (13) sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances were recorded at WM2A(a), and WM4, according to “*Event and Action Plan*” stipulation, one (1) and two (2) additional water quality monitoring day was conducted for WM2A(a) and WM4 respectively and its control stations in the reporting period.

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

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

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
2-Dec-16	8.3	8.5	7.1	18.7	15.7	16.8	19.5	10.5	21.5
6-Dec-16	8.4	8.4	7.1	16.5	5.0	13.6	23.5	2.0	18.0
8-Dec-16	8.4	8.4	7.1	14.6	4.1	8.9	12.0	<2	8.0
10-Dec-16	8.5	8.7	7.3	14.3	5.0	19.5	12.5	<2	20.0
13-Dec-16	7.7	7.7	6.0	23.0	21.9	12.0	27.0	7.5	12.0
15-Dec-16	8.8	8.6	7.4	17.6	4.9	15.3	18.5	<2	14.0
17-Dec-16	8.7	9.2	7.2	<u>80.5</u>	4.0	14.9	<u>117.5</u>	4.0	16.0
19-Dec-16	8.3	8.1	6.2	11.7	4.4	9.6	11.5	3.0	9.5
20-Dec-16#	--	--	--	6.1	2.2	6.2	6.0	<2	6.0
21-Dec-16	7.7	8.0	5.5	16.1	5.4	17.6	19.5	2.5	15.0
23-Dec-16	8.1	8.1	6.9	12.1	5.6	13.9	10.5	2.0	13.0
27-Dec-16	7.7	8.5	6.3	24.7	9.9	17.9	20.0	3.0	17.0
29-Dec-16	9.3	9.1	7.5	14.4	4.3	9.8	13.5	<2	5.5
31-Dec-16	8.7	9.1	7.1	10.9	3.1	19.7	11.5	2.5	17.5

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 5, 6 and SS C505

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
2-Dec-16	8.5	9.1	50.8	6.0	48.0	2.5
6-Dec-16	8.1	8.5	11.8	5.4	14.5	3.5
8-Dec-16	8.4	9.1	18.4	7.1	19.5	2.0
10-Dec-16	8.5	8.7	32.3	6.2	31.5	<2
13-Dec-16	7.8	9.3	31.2	11.7	31.5	<2
15-Dec-16	8.7	8.8	40.7	5.7	39.5	2.5
17-Dec-16	9.5	9.4	15.9	4.0	16.0	3.0
19-Dec-16	7.7	8.9	30.5	4.3	29.0	<1
21-Dec-16	7.7	6.1	13.1	4.7	12.5	4.0
23-Dec-16	7.9	7.3	13.0	3.9	9.5	2.5
27-Dec-16	7.6	6.9	13.0	8.3	9.0	4.0
29-Dec-16	8.7	7.2	12.6	13.2	29.5	2.5

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
31-Dec-16	8.6	8.6	11.4	3.8	10.0	3.0

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

Date	Dissolved Oxygen (mg/L)				Turbidity (NTU)				Suspended Solids (mg/L)			
	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C
2-Dec-16	8.4	8.4	9.0	7.3	23.7	9.7	6.1	2.9	14.5	4.0	3.5	<2
6-Dec-16	8.1	8.3	8.9	7.5	58.3	9.3	6.8	4.2	62.5	5.0	5.5	2.5
7-Dec-16#	--	--	--	--	19.7	7.0	--	--	17.0	<2	--	--
8-Dec-16	8.4	8.3	9.0	7.5	23.5	10.7	7.3	3.7	23.5	3.0	3.5	<2
10-Dec-16	8.6	8.4	8.9	7.3	20.6	11.0	7.9	3.0	14.5	<2	5.0	<2
13-Dec-16	7.9	7.6	7.9	7.0	10.2	8.1	7.8	3.5	7.0	<2	11.0	<2
15-Dec-16	8.3	8.3	9.4	7.2	12.9	7.8	6.3	3.9	13.0	2.0	2.5	<2
17-Dec-16	9.0	9.0	9.2	8.0	20.8	7.0	3.4	2.0	14.0	<2	3.0	<2
19-Dec-16	8.4	8.1	8.9	6.8	9.9	7.1	6.6	2.4	9.0	4.0	5.5	2.0
21-Dec-16	7.8	7.8	8.1	7.1	18.6	11.7	11.2	2.7	14.0	<2	10.0	<2
23-Dec-16	7.1	8.0	8.4	7.0	22.9	8.6	7.9	3.4	14.5	2.5	6.5	<2
27-Dec-16	7.4	8.1	7.6	7.2	36.1	37.8	11.1	2.3	19.0	16.5	10.0	<2
29-Dec-16	8.7	8.7	9.1	7.3	86.4	6.7	11.2	4.7	80.5	3.0	10.5	<2
30-Dec-16#	--	--	--	--	11.1	7.2	--	--	10.0	<2	--	--
31-Dec-16	8.8	8.6	8.9	7.2	20.9	9.6	5.3	2.9	14.0	2.0	3.0	<2

Remarks: bold with underline indicated Limit Level exceedance

bold with italic indicated Action Level exceedance

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

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-C	WM3x	WM3-C	WM3x	WM3-C
2-Dec-16	7.0	7.0	12.6	3.5	11.0	5.0
6-Dec-16	7.8	6.8	10.0	3.9	14.0	12.5
8-Dec-16	7.8	7.2	5.3	5.5	6.5	9.5
10-Dec-16	8.0	6.9	5.6	3.2	4.0	2.5
13-Dec-16	7.2	6.0	11.3	17.5	10.0	37.0
15-Dec-16	7.4	7.1	13.1	5.2	13.0	11.5
17-Dec-16	8.9	7.7	6.4	2.9	5.0	8.0
19-Dec-16	7.7	7.1	13.4	4.0	12.5	5.5
21-Dec-16	7.7	6.1	13.1	4.7	12.5	4.0
23-Dec-16	7.9	7.3	13.0	3.9	9.5	2.5
27-Dec-16	7.6	6.9	13.0	8.3	9.0	4.0
29-Dec-16	8.7	7.2	12.6	13.2	9.5	5.0
31-Dec-16	8.6	8.6	11.4	3.8	12.5	9.0

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(a)	0	0	0	2	1	3	1	5	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	1	0	1	0	2	0	0

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance		Project Related exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
No of Exceedance	0	0	0	3	1	4	1	7	0	0

6.2.3 In this Reporting Period, a total of eight (8) Action Limit (AL)/ Limit Level (LL) exceedances, namely three (3) LL exceedance of turbidity and five (5) AL/LL exceedances of Suspended Solids were recorded for the Project and they are summarized in **Table 6-5**. According to the investigation result, all exceedances were concluded as non-project related.

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
6, 7 and 8 Dec 2016	WM2A(a) (C6)	NTU &SS	The IR revealed that the water mitigation measures implemented on site was in order and no adverse water impact was identified. Moreover, there were no rain recorded during the exceedance days and surface runoff generated from the site area was unlikely to occur. It is considered the exceedances were due to natural variation and unlikely caused by the works under the project.
17 Dec 2016	WM4 (C2 and C3)	NTU &SS	The IR revealed that suspected direct discharge of untreated water was observed from construction site by the utility contractor near Tai Wo Service Road West (TWSRW) and muddy water was found at the box culvert under its site area. In our investigation, it is considered that exceedances were not likely related to the works under both Contracts 2 and 6.
29 Dec 2016	WM2A(a) (C6)	NTU &SS	The IR revealed that the water mitigation measures implemented on site was in order and no adverse water impact was identified. Moreover, there were no rain recorded during the exceedance days and surface runoff generated from the site area was unlikely to occur. It is considered the exceedances were due to natural variation 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 and it was not required in the Reporting Period.

8 WASTE MANAGEMENT

8.1 GENERAL WASTE MANAGEMENT

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

8.2 RECORDS OF WASTE QUANTITIES

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

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

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

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

Type of Waste	Contract 2		Contract 3		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m ³)	75.9804	--	0.675	--	27.056	--	0	--	6.713	--	110.4244
Reused in this Contract (Inert) (in '000 m ³)	0.9293	--	0.120	--	9.811	--	0	--	6.440	--	17.3003
Reused in other Contracts/ Projects (Inert) (in '000 m ³)	26.2843	C6/ NENT# & other projects approved by the ER	0	--	5.810	C5 & other projects approved by the ER	0	--	0	--	32.0943
Disposal as Public Fill (Inert) (in '000 m ³)	48.7668	Tuen Mun 38	0.425	Tuen Mun 38	11.435	Tuen Mun 38	0	--	0.273	TKO 137	60.8998

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

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

Type of Waste	Contract 2		Contract 3		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
Recycled Metal ('000kg) #	21.7910	Licensed collector	0.001	Licensed collector	0	--	0.1	Licensed collector	298.052	Licensed collector	0.001#+319.843
Recycled Paper / Cardboard Packing ('000kg) #	0.3200	Licensed collector	0	-	0	--	0.04	Licensed collector	0	--	0.36
Recycled Plastic ('000kg) #	2.5000	Licensed collector	0	-	0	--	0.001	Licensed collector	0.053	Licensed collector	2.554
Chemical Wastes ('000kg) #	3.3000	Licensed collector	0	-	0	--	0	--	0	--	3.3000
General Refuses ('000m ³)	0.2052	NENT	0.120	NENT	0.065	NENT	0.005	NENT	0.390	NENT	0.7852

Remark #: Unit of recycled metal, recycled paper/ cardboard packing, recycled plastic and chemical waste for Contract 3 was in ('000m³).

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 **2, 9, 16, 19 and 30 December 2016**. 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
2 December 2016	<ul style="list-style-type: none"> NRMM label for the truck was missing. NRMM label should be displayed for all NRMM using on site (South Portal) 	<ul style="list-style-type: none"> NRMM label was displayed on the truck.
9 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
16 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
19 December 2016	<ul style="list-style-type: none"> The contractor was reminded that the waste oil inside the drip tray should be clean more frequently to prevent spillage from drip tray (South Portal). 	<ul style="list-style-type: none"> Not required for reminder
30 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA

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 **5, 12, 21 and 29 December 2016**. 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
5 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
12 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
21 December 2016	<ul style="list-style-type: none"> Chemical container without drip tray was observed in SH9, the Contractor should provide drip tray underneath for all chemical container to prevent contamination. 	<ul style="list-style-type: none"> Chemical containe without drip tray were removed.

Date	Findings / Deficiencies	Follow-Up Status
29 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> Not required for reminder

Contract 6

9.2.5 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 **1, 8, 15, 22 and 29 December 2016**. No non-compliance was noted.

9.2.6 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
24 November 2016 (last reporting month)	<ul style="list-style-type: none"> Inefficient wheel-washing facility at Bridge D was observed, the Contractor should maintain the wheel-washing facility and improve the cleanliness at the public road. 	<ul style="list-style-type: none"> Water level in wheel washing basin has been lowered so as to avoid overflow. Cleanliness in the public road has been maintained.
1 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
8 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
15 December 2016	<ul style="list-style-type: none"> It was reminded that the mitigation measures for construction waste disposal via chute should be maintained properly. 	<ul style="list-style-type: none"> Not required for reminder
22 December 2016	<ul style="list-style-type: none"> It was reminded that cleanliness of the site exit should be maintained. 	<ul style="list-style-type: none"> Not required for reminder
29 December 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA

Contract SS C505

9.2.7 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **7, 14, 20 and 28 December 2016**. No non-compliance was noted.

9.2.8 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
7 December 2016	<ul style="list-style-type: none"> Stagnant water was observed at drainage channel near training center. The Contractor should remove the stagnant water to prevent mosquito breeding. 	<ul style="list-style-type: none"> Stagnant water was removed.

Date	Findings / Deficiencies	Follow-Up Status
	<ul style="list-style-type: none"> Muddy sediment was observed at drainage channel near Building 1, 2&3. The Contractor should remove the sediment to keep the drainage channel function properly. 	<ul style="list-style-type: none"> Muddy sediment was removed and pump was provided to prevent accumulation of stagnant water.
14 December 2016	<ul style="list-style-type: none"> Dusty stockpile without proper cover was observed near Building 4. The Contractor should provide proper cover to the stockpile to reduce dust generation. Chemical container without drip tray was observed near Building 1, 2 & 3. The Contractor should place the container into drip tray to prevent land contamination. 	<ul style="list-style-type: none"> The dusty stockpile was covered properly. Chemical containers were placed into drip tray.
20 December 2016	<ul style="list-style-type: none"> Scattered general refuse was observed in the working area of PTB, the Contractor should remove the general refuse and provide rubbish bag for the collection. The NEL was not provided for the idle air compressor, the Contractor should provide the NEL before any use. (Location: PTB) The label of NRMM was not provided for the idle air compressor, the Contractor should provide the NRMM label before any use. (Location: PTB) 	<ul style="list-style-type: none"> General refuse was removed. The NEL was provided for the air compressor. The label of NRMM was provided for the air compressor.
28 December 2016	<ul style="list-style-type: none"> Stagnant water was observed at drainage channel near training center. The Contractor should remove the stagnant water to prevent mosquito breeding. Chemical container without drip tray was observed near Building 4. The Contractor should place the container into drip tray to avoid land contamination. General refuse was observed at drainage channel near Building 1-3. The Contractor should remove the general refuse and maintain good waste management. 	<ul style="list-style-type: none"> Stagnant water was removed. Chemical container was removed. General refuse was removed from the drainage channel.

Contract 7

9.2.9 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, 20 and 28 December 2016**. No non-compliance was noted.

9.2.10 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 December 2016	<ul style="list-style-type: none"> • No adverse environmental issue was observed. 	<ul style="list-style-type: none"> • NA
13 December 2016	<ul style="list-style-type: none"> • No adverse environmental issue was observed 	<ul style="list-style-type: none"> • NA
20 December 2016	<ul style="list-style-type: none"> • No adverse environmental issue was observed 	<ul style="list-style-type: none"> • NA
28 December 2016	<ul style="list-style-type: none"> • Opened door of air compressor was observed at bridge E. The Contractor should ensure the door was closed to reduce noise generation. 	<ul style="list-style-type: none"> • The door of the air compressor was closed.

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

Other Contracts

9.2.12 Since the construction work of Contract 5 has substantially completed and Contract 4 has not commenced, no site inspection was performed.

10 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

10.1.1 In the Reporting Period, no summons and prosecution under the EM&A Programme was lodged for all Contracts. However, one (1) documented environmental complaint was received in respect to nuisance generated by the sheet piling work. Investigation report has completed by the ET and the detail of the complaint and the investigation results are presented below.

Investigation Result for the Documented Complaints received by project hotline on 19 December 2016 (Contracts 6)

- 10.1.2 A complaint was received from the project hotline on 19 December 2016 regarding the complainant dissatisfied with the construction noise and vibration generated by the construction works which affecting her residence. She requested immediate follow up and associated improvement from relevant department. The Contractor of Contract 6 (CCKJV) has immediately liaised with the complainant and it was figured out that the main concern of the complainant was the vibration generated by the sheet piling work. Therefore, it was not considered as a noise complaint and no Action level was triggered. Besides, vibration is not an environmental aspect under EM&A programme for this complaint location.
- 10.1.3 Upon receipt the complaint on 19 December 2016, CCKJV advised that sheet piling was carried out at Bridge C close to the complainant's residence. To mitigate the noise impact to the resident in Ping Yeung Village, erection of acoustic mat as temporary noise barrier was installed between the piling area and the residential area.
- 10.1.4 Joint site inspection among the RE, IEC, Contractor of Contract 6 (CCKJV) and ET was carried out on 22 December 2016 in the complaint location for investigation. The status of implemented mitigation measures provided by CCKJV were inspected and assessed. The observations during site inspection area summarized below.
- (a) Sheet piling was carried out at Bridge C close to the complainant's residence. Erection of acoustic mat as temporary noise barrier was installed between the piling area and the residential area.
 - (b) The current method of sheet piling works was using vibration hammer which considered not a noisy activity.
- 10.1.5 According to the noise monitoring result at the nearest monitoring location NM3 in Ping Yeung Village in November and December 2016, the monitoring results were ranged between 57 to 65dB(A) and there were no exceedance of construction noise recorded.
- 10.1.6 In our investigation, CCKJV has implemented noise mitigation measures to further reduce the noise impact to the nearby resident. To eliminate the inconvenience caused to the nearby resident, CCKJV agreed to start the sheetpile work after 9:00am every day and the concerned piling works is expected to be completed in early January 2017. The complainant was satisfactory with the arrangement undertaken by CCKJV.
- 10.1.7 Since the most construction areas under the Contract are close to the resident of village, CCKJV was reminded to implement the mitigation measures as far as practicable as recommended in the EM&A Programme.
- 10.1.8 Upon receipt of the complaint, follow up action has been undertaken by both Contractor promptly to resolve the complaints and deficiencies. During the complaint investigation work, the Contractor was co-operated with the ET in providing all the necessary information and assistance for completion of the investigation. Investigation report for the complained has been submitted to all relevant parties for review.
- 10.1.9 The statistical summary table of environmental complaint is presented in **Tables 10-1, 10-2 and 10-3**.

Table 10-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
19 May 2014 – 30 Nov 2016	Contract 2	0	23	<ul style="list-style-type: none"> • (13) Water Quality • (7) Dust • (2) Noise • (1) dust & noise 	(3) water (2) dust (1) noise
06 Nov 2013 – 30 Nov 2016	Contract 3	0	4	<ul style="list-style-type: none"> • (1) Dust • (2) Water quality • (1) Noise 	0
16 Aug 2013 – 30 Nov 2016	Contract 5	0	4	<ul style="list-style-type: none"> • (3) Dust • (1) Noise 	0
16 Aug 2013 – 30 Nov 2016	Contract 6	0	28	<ul style="list-style-type: none"> • (21) Water Quality • (6) Dust • (1) Noise 	(6) water (2) dust
15 Feb 2016 – 30 Nov 2016	Contract 7	0	1	<ul style="list-style-type: none"> • (1) Noise 	NA
16 Aug 2013 – 30 Nov 2016	SS C505	0	2	<ul style="list-style-type: none"> • (1) Noise • (1) dust 	0
1 – 31 Dec 2016	Contract 2	0	23	<ul style="list-style-type: none"> • (13) Water Quality • (7) Dust • (2) Noise • (1) dust & noise 	0
	Contract 3	0	4	<ul style="list-style-type: none"> • (1) Dust • (2) Water quality • (1) Noise 	0
	Contract 6	1	29	<ul style="list-style-type: none"> • (21) Water Quality • (6) Dust • (1) Noise • (1) Nuisance 	1 (Nuisance)
	Contract 7	0	1	<ul style="list-style-type: none"> • (1) Noise 	0
	SS C505	0	2	<ul style="list-style-type: none"> • (1) Noise • (1) dust 	0

Table 10-2 Statistical Summary of Environmental Summons

Reporting Period	Contract No	Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 30 Nov 2016	Contract 2	0	0	NA
06 Nov 2013 – 30 Nov 2016	Contract 3	0	0	NA
16 Aug 2013 – 30 Nov 2016	Contract 5	0	0	NA
16 Aug 2013 – 30 Nov 2016	Contract 6	0	0	NA
15 Feb 2016 – 30 Nov 2016	Contract 7	0	0	NA
16 Aug 2013 – 30 Nov 2016	SS C505	0	0	NA
1 – 31 Dec 2016	Contract 2	0	0	NA
	Contract 3	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 Prosecution

Reporting Period	Contract No	Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 30 Nov 2016	Contract 2	0	0	NA
06 Nov 2013 – 30 Nov 2016	Contract 3	0	0	NA
16 Aug 2013 – 30 Nov 2016	Contract 5	0	0	NA
16 Aug 2013 – 30 Nov 2016	Contract 6	0	0	NA
15 Feb 2016 – 30 Nov 2016	Contract 7	0	0	NA
16 Aug 2013 – 30 Nov 2016	SS C505	0	0	NA
1 – 31 Dec 2016	Contract 2	0	0	NA
	Contract 3	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

The Other Contracts

- 10.1.10 Since the construction works at the Contract 5 was substantially completed and Contract 4 has not yet commenced, no environmental complaint, summons and prosecution under the EM&A Programme are registered in the Reporting Period.

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, 5, 6, 7 and Contract SS C505 in this Reporting Period are summarized in *Table 11-1*.

Table 11-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> Wastewater to be treated by the wastewater treatment facilities i.e. sedimentation tank or similar facility before discharge.
Air Quality	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Stud tunnel D&B excavation preparation for TBM South drive breakthrough Adit invert slab, water proofing and lining Connecting structure and ventilation building superstructure works
North Portal	<ul style="list-style-type: none"> Northbound tunnel bench mechanical excavation Southbound TBM excavation Southbound tunnel excavation by TBM Construction of cross passage and internal structure Retaining walls and slope stabilizations North ventilation building superstructure
South Portal	<ul style="list-style-type: none"> Southbound and Northbound D&B excavation South ventilation building superstructure Tunnel invert, waterproofing and lining
Admin Building	<ul style="list-style-type: none"> Construction of superstructure, permanent drainage, external wall, internal fitting out and curtain wall installation

Contract 3

- Boundary Wall for Pumping Station
- Cable detection and trial trenches
- Construction of Remaining Slab of Box Culvert ID05
- Demolition of Valve Control House
- Footbridge construction
- Gabion wall construction
- Re-provisioning of Kiu Tau Footbridge
- Storm drains laying
- Noise barrier construction
- Pier / Pier Table construction
- Pile cap works
- Portal beam construction
- Retaining Wall construction
- Road works
- Sewer works
- Slope reinstatement works near Bridge E
- Utilities duct laying
- Viaduct segment erection
- Water Main Laying
- Demolition of existing WSD Telemetry House

Contract 6

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

Contract 7

- Piling Works at Bridge E
- U-trough construction at Bridge A
- Pile caps construction at Bridge A and E
- Column construction at Bridge B and D
- 2nd floor construction of Bridge C

Contract SS C505

- Building no.4, 5, 6, 7, 9, 10, 11 and 36 construction
- Excavation for drainage works for Building no. 4 & 5
- Pile cap construction for Building no. 7
- Roof construction for Building no.36
- Tower crane operation
- Bridge construction works including construction of bridge column, retaining wall, pile cap and pier
- Underground drainage works
- Mock up for south entrance double curve cladding
- Formwork and falsework for PTB's slab construction
- Construction PTB M/F & 1/F flat slab
- Steel beam works for maintenance platform for PTB
- Pile cap construction for PTB, including excavation and backfilling works
- Bridge deck construction for Bridges 1 - 5
- Footing construction

11.3 KEY ISSUES FOR THE COMING MONTH

- 11.3.1 Key issues to be considered in the coming month for Contracts 2, 3, 6, 7 and SS C505 include:
- Implementation of control measures for rainstorm;
 - Regular clearance of stagnant water during wet season;
 - Implementation of dust suppression measures at all times;
 - Potential wastewater quality impact due to surface runoff;
 - Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
 - Disposal of empty engine oil containers within site area;
 - Ensure dust suppression measures are implemented properly;
 - Sediment catch-pits and silt removal facilities should be regularly maintained;
 - Management of chemical wastes;
 - Discharge of site effluent to the nearby wetland, stockpiling or disposal of materials, and any dredging or construction area at this area are prohibited;
 - Follow-up of improvement on general waste management issues; and
 - Implementation of construction noise preventative control measures
- 11.3.2 Since the construction work of Contract 4 has not commenced, no environmental issue is presented.

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 CONCLUSIONS

- 12.1.1 This is the 41st monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 31 December 2016.
- 12.1.2 For air quality monitoring, no 1-hour and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.
- 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, eight (8) AL/LL exceedances, namely three (3) LL exceedance of turbidity and five (5) AL/LL exceedances of Suspended Solids were recorded for the Project. According to the investigation result, all exceedances were concluded as works related under Contract 6.
- 12.1.5 No environmental summons or successful prosecutions were recorded in the Reporting Period.
- 12.1.6 In this Reporting Period, one (1) documented environmental complaint was received in respect to nuisance generated by sheet piling. Investigation result revealed that the contractor has implemented noise mitigation measures to reduce the noise impact to the nearby resident and the complainant was satisfactory with the arrangement.
- 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, 6, 7 and SS C505 in accordance with the EM&A Manual stipulation. No non-compliance observed during the site inspection.

12.2 RECOMMENDATIONS

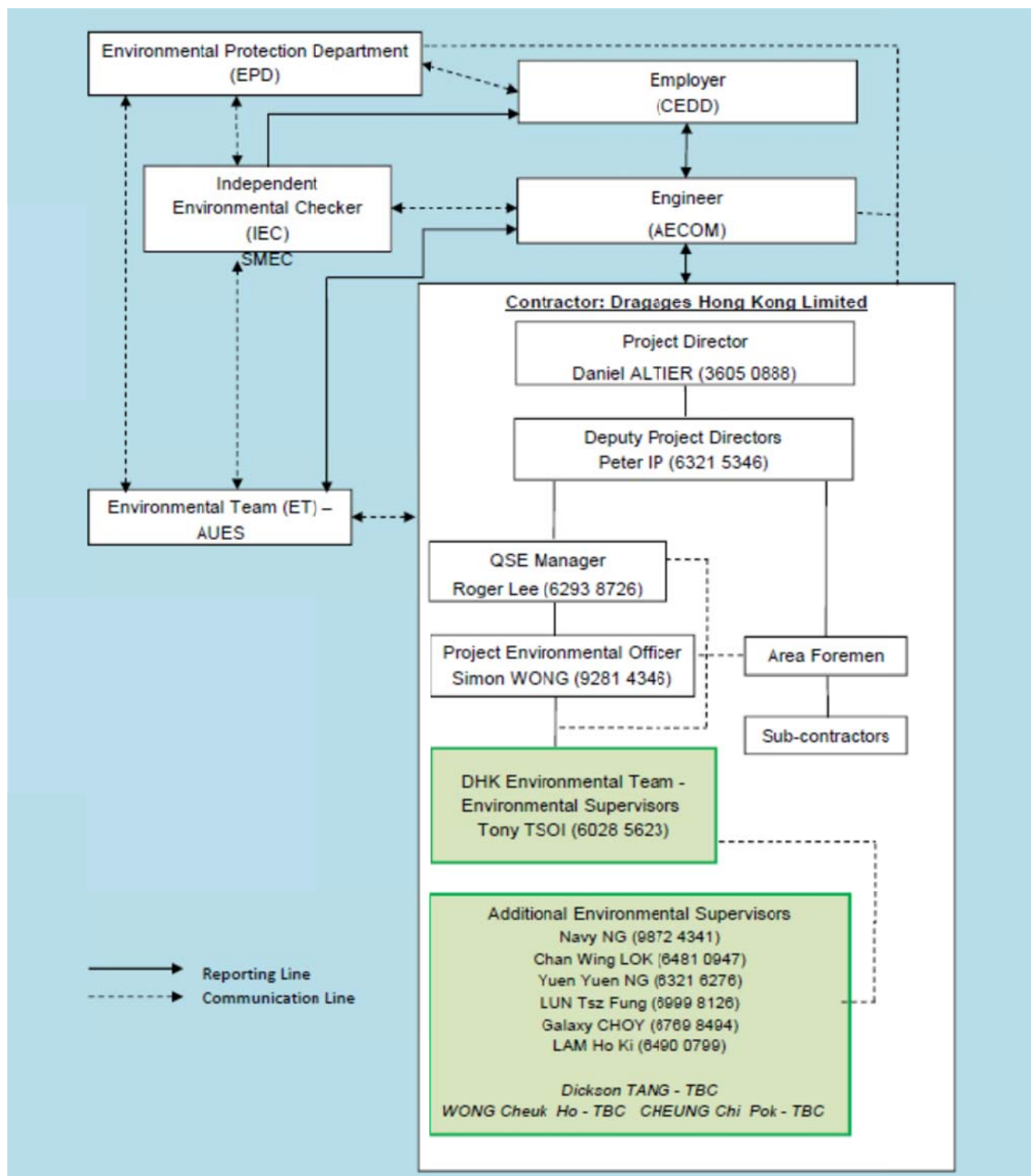
- 12.2.1 During dry season, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures properly.
- 12.2.2 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River or public area 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. Moreover, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.
- 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 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be kept to prevent mosquito breeding on site.

Appendix A

Layout plan of the Project

Appendix B

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	CT Wong	2171 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	2171 3004	2171 3299
DHK	Deputy Project Manager	Peter Ip	6321 5346	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3004	2171 3299
DHK	Environmental Supervisor	Tony Tsoi	6028 5623	2171 3299
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

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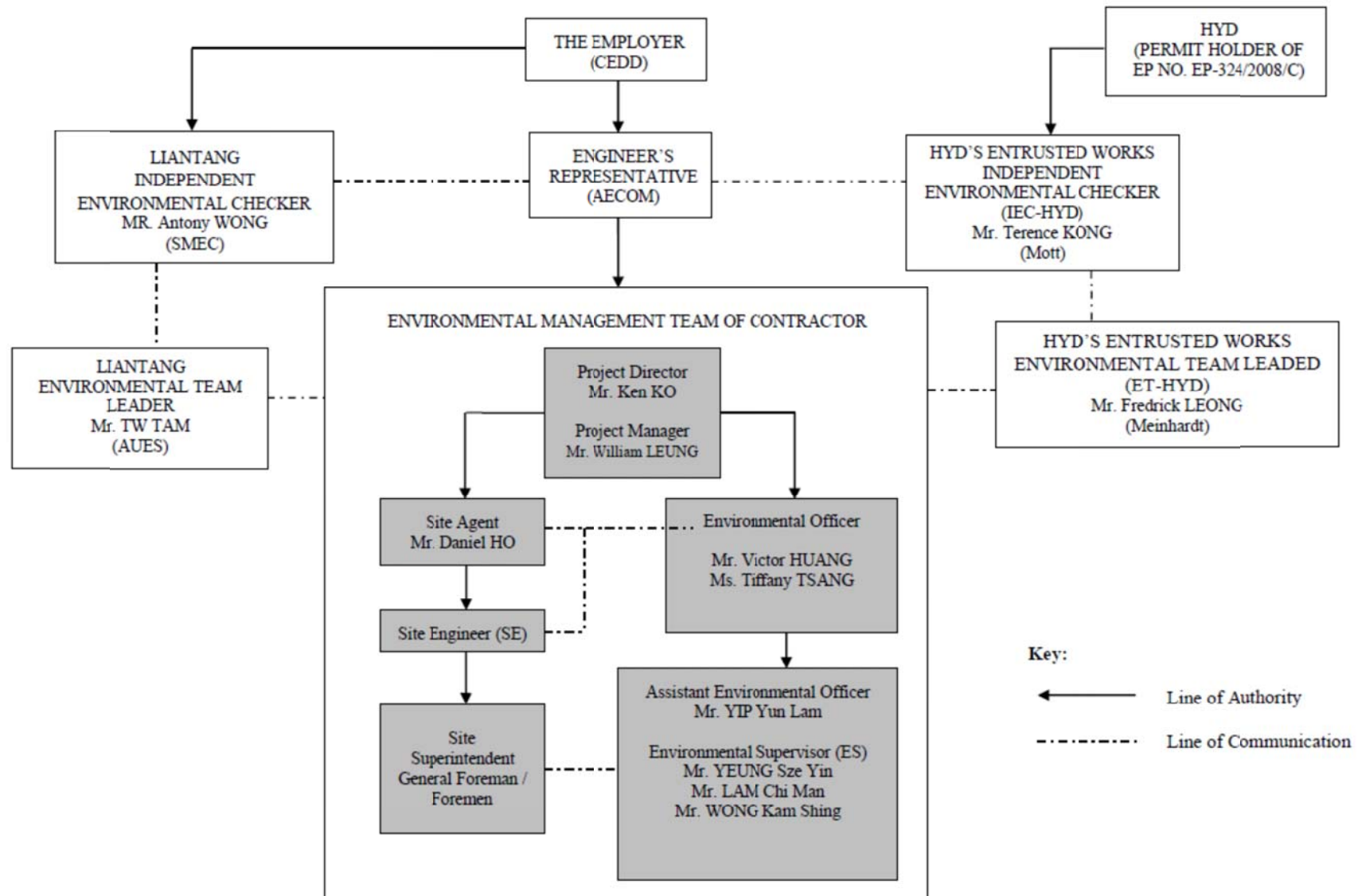
CEDD (Employer) – Civil Engineering and Development Department

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 3300	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	Victor Huang Tiffany Tsang	2638 6115	2638 7077
Chun Wo	Assistant Environmental Officer	Yip Yun Lam	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

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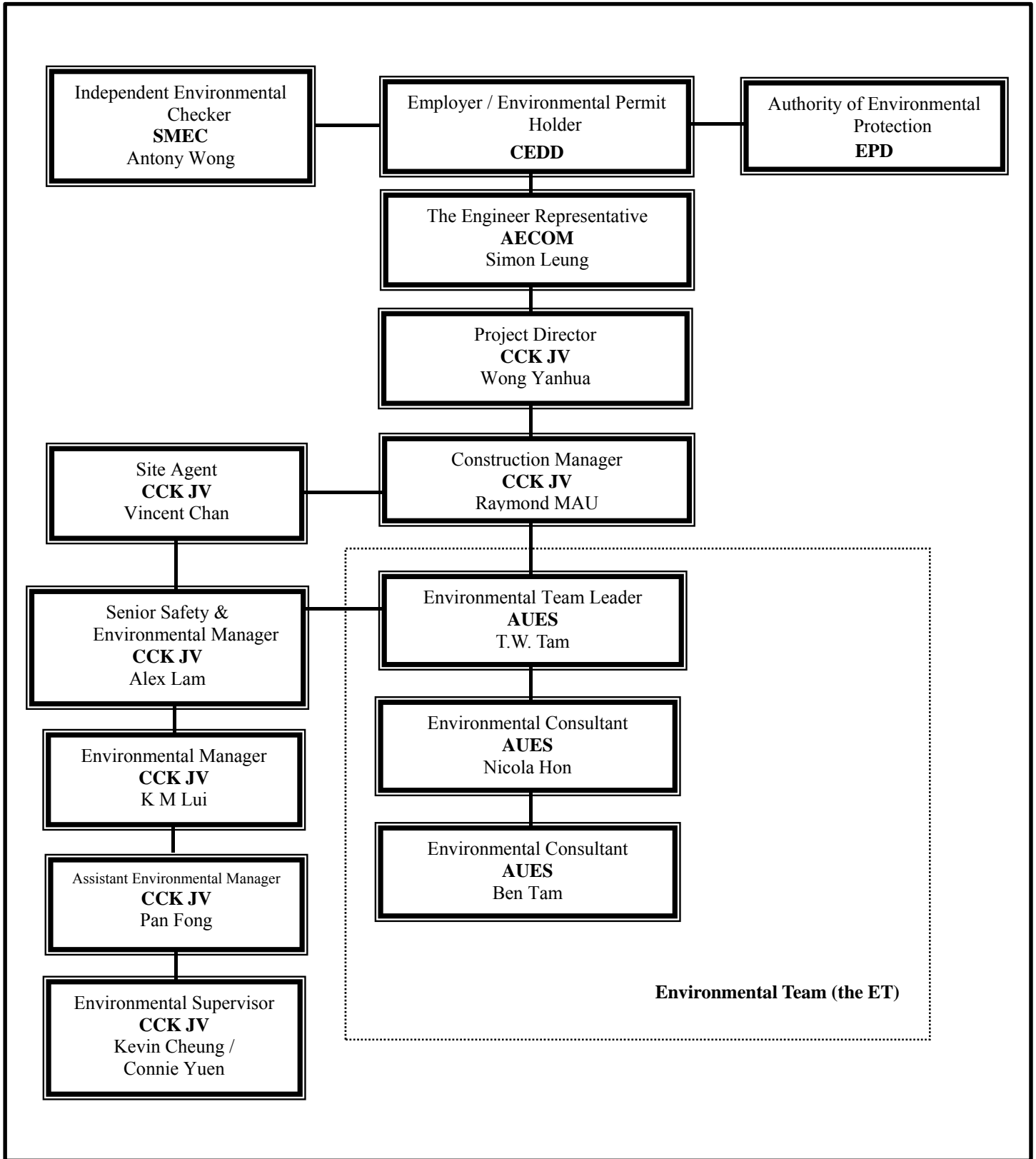
CEDD (Employer) – Civil Engineering and Development Department

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 – 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	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
CCK JV	Project Director	Wang Yanhua	6190 4212	--
CCK JV	Construction Manager	Raymond Mau Sai-Wai	9011 5340	--
CCK JV	Site Agent	Vincent Chan	9655 9404	--
CCK JV	Senior Safety & Environmental Manager	Alex Lam	5547 0181	--
CCK JV	Environmental Manager	K M Lui	51138223	--
CCK JV	Assistant Environmental Officer	Pan Fong	9436 9432	--
CCK JV	Environmental Supervisor	Kevin Cheung/ Connie Yuen	6316 6931 6117 1344	--
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

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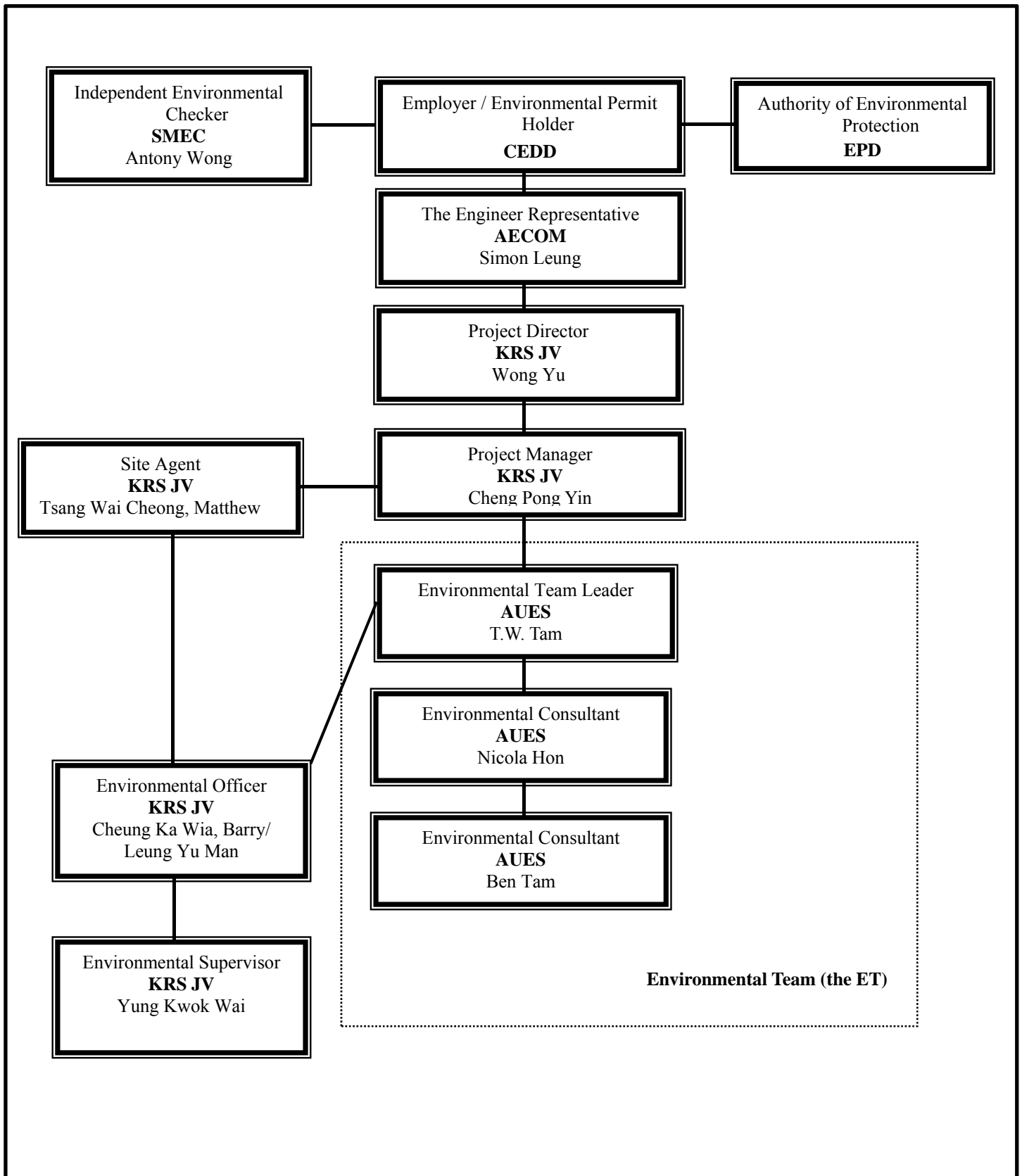
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization –NE/2014/03

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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Simon Leung	2674 2273	2674 7732
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
KRSJV	Project Director	Wong Yu	2682 6691	2682 2783
KRSJV	Project Manager	Cheng Pong Yin	9023 4821	2682 2783
KRSJV	Site Agent	Tsang Wai Cheong, Matthew	9705 7536	2682 2783
KRSJV	Environmental Officer	Cheung Ka Wia, Barry	6117 2339	2682 2783
KRSJV	Environmental Officer	Leung Yu Man	6592 3084	2682 2783
KRSJV	Environmental Supervisor	Yung Kwok Wai	6592 3084	2682 2783
AUES	Environmental Team Leader	TW Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079

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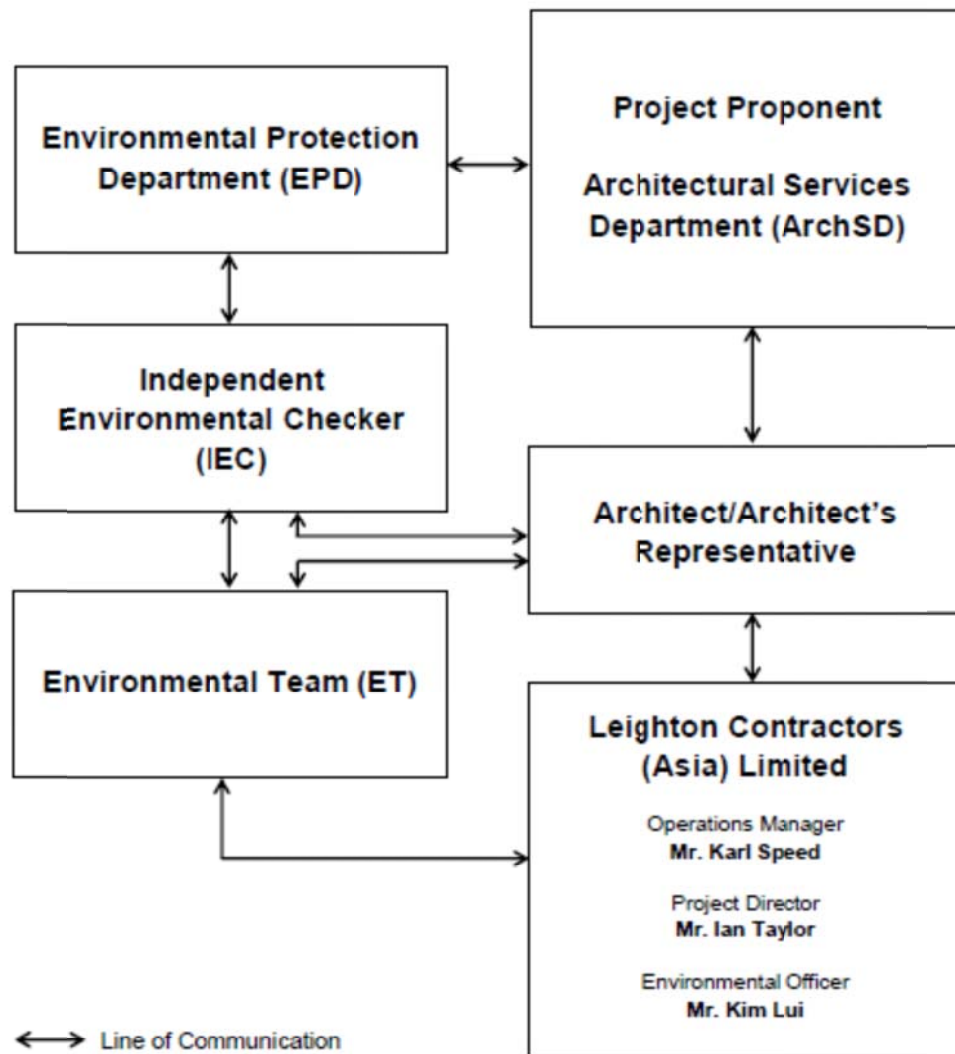
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organigram

Environmental Management Organization for Contract SS C505

Contact Details of Key Personnel for Contract SS C505

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
ArchSD	Works agent for the Development Bureau (DEVB)	Mr. William Cheng	2867 3904	2804 6805
Ronald Lu & Partners	Architect/ Architect's Representative	Mr. Justin Cheung	3189 9272	2834 5442
SMEC	Independent Environmental Checker	Mr. Antony Wong	3995 8120	3995 8101
Leighton	Operation Manager	Mr. Karl Speed	2823 1433	25298784
Leighton	Project Director	Mr. Ian Taylor	2858 1519	2858 1899
Leighton	Environmental Officer	Mr. Kim Lui	3973 1069	-
Leighton	Assistant Environmental Officer	Ms. Penny Yiu	3973 0818	-
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079

Legend:

ArchSD (Project Proponent) – Architectural Services Department

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

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

SMEC (IEC) – SMEC Asia Limited

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

Appendix C

3-month rolling construction program

Contract 2

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 (December 2016, January and February 2017) Construction Rolling Program

Item	Construction Activities
1	Boundary Wall for Pumping Station
2	Cable Detection and Trial Trenches
3	Construction of Remaining Slab of Box Culvert ID05
4	Demolition of Valve Control House
5	Footbridge Construction
6	Gabion Wall construction
7	Re-provisioning of Kiu Tau Footbridge
8	Storm Drains Laying
9	Noise Barrier Construction
10	Pier / Pier Table Construction
11	Pile Cap Works
12	Portal Beam Construction
13	Retaining Wall Construction
14	Road Works
15	Sewer Works
16	Slope Reinstatement Works near Bridge E
17	Utilities Duct Laying
18	Viaduct Segment Erection
19	Water Main Laying
20	Demolition of Existing WSD Telemetry House

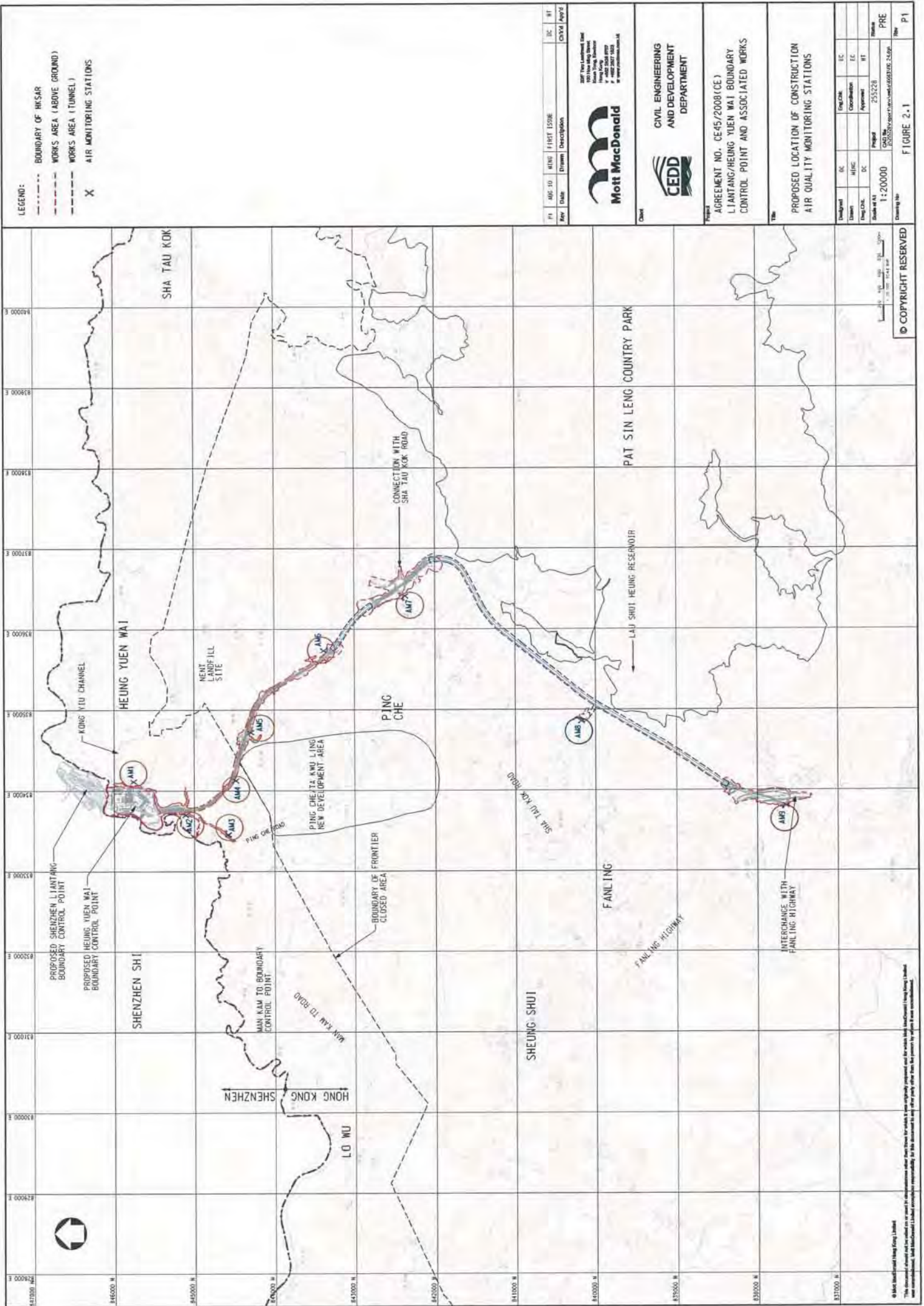
Contract 6

Contract 7

Contract SS C505

Appendix D

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



LEGEND:

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

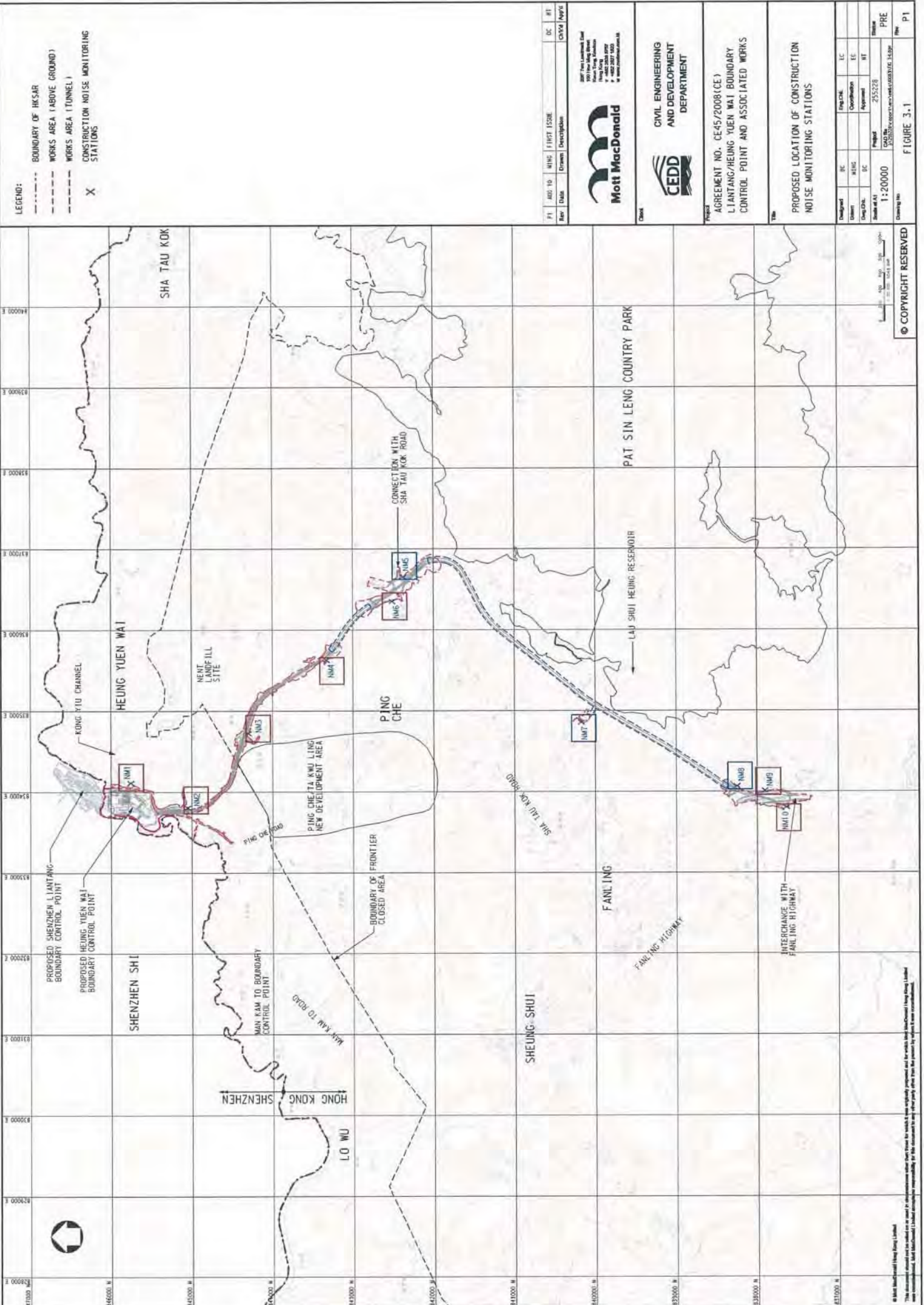
PI	REV	NO	DATE	DESCRIPTION	BY	CHK



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

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Author	IC	ENG	EC
Checker	HEC	CHK	EC
Approver	DC	APP	WT
Date	25/3/2008		
Scale	1:20000		
Project	CE45/2008(CE)		
Sheet No.	CE45/2008/002		
Version	PRE		
Page No.	1		



- LEGEND:
- BOUNDARY OF HKSAR
 - - - WORKS AREA (ABOVE GROUND)
 - - - WORKS AREA (TUNNEL)
 - X CONSTRUCTION NOISE MONITORING STATIONS

PI	ADD TO	NING	FIRST ISSUE	DC	RE
Rev	Date	Drawn	Description	Checked	Appr'd



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Hong Kong
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Fax: +852 2500 8223
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DEPARTMENT

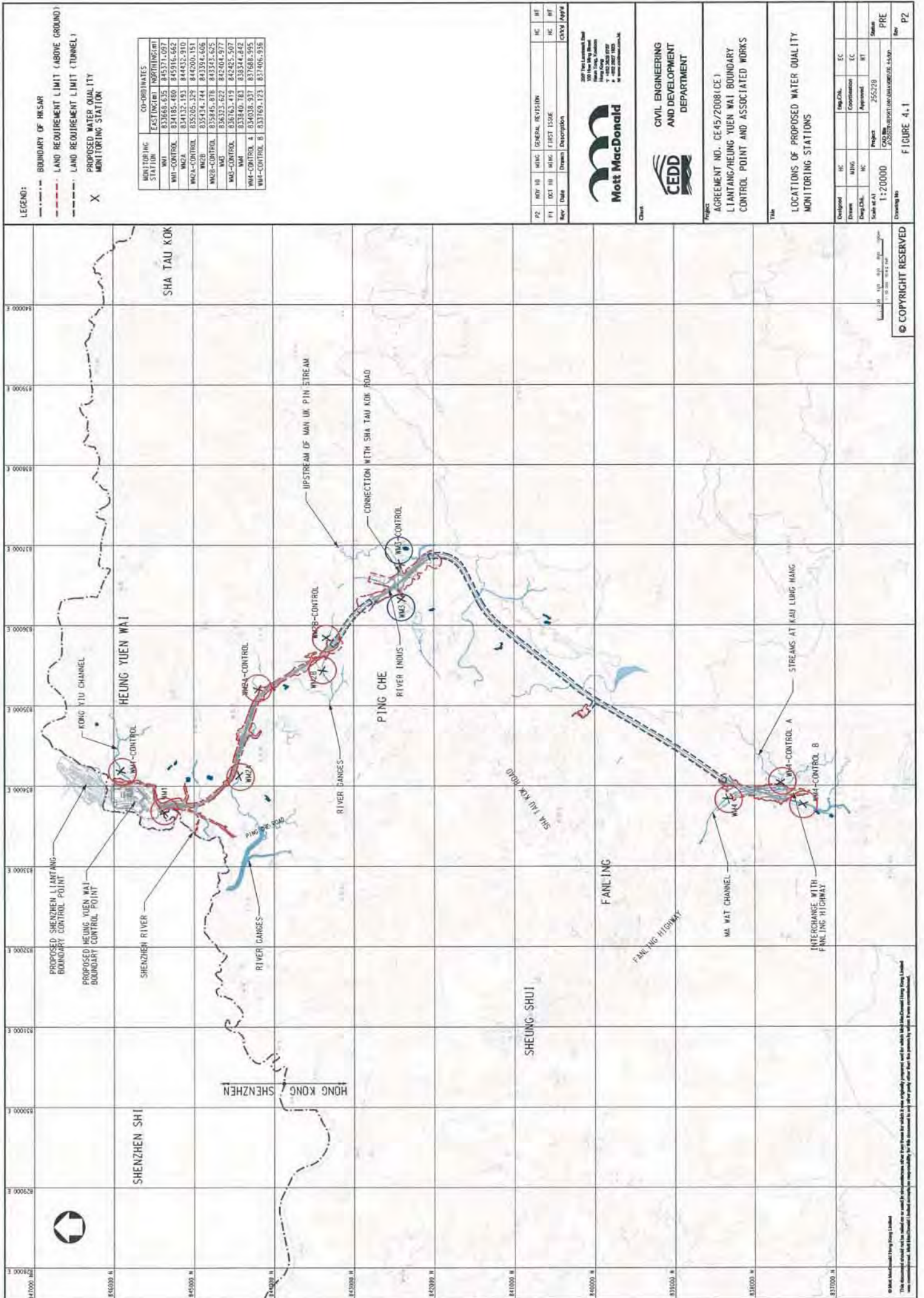
Project
AGREEMENT NO. CE-45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY
CONTROL POINT AND ASSOCIATED WORKS

Proposed
LOCATION OF CONSTRUCTION
NOISE MONITORING STATIONS

Designated	IC	Pre-Check	EC
Station	N/ING	Description	EC
Design/Check	DC	Approval	BT
Scale at A1	1:20000	Project	255228
Scale at A2	1:20000	CD/ID No.	CE45/2008(CE)001/016.1-10pr
Drawing No.		Sheet	PRE
		Rev	P1

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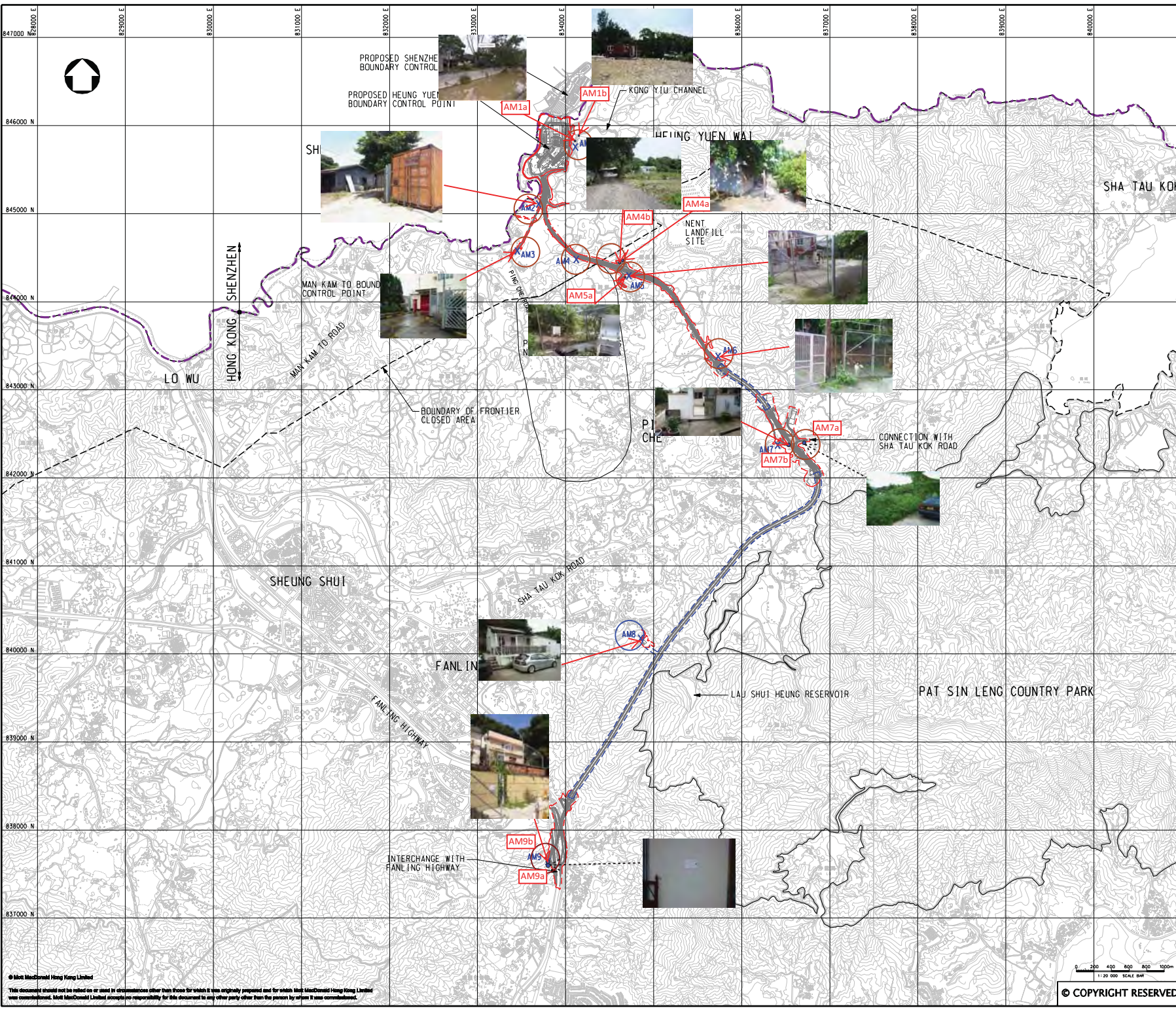
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LIANTANG/HUANG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

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Eng. Chk.			
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Project	255278		
Client	PRE		
Drawing No	F IGURE 4.1		
Rev	P2		

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Appendix E

Monitoring Locations for Impact Monitoring



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

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

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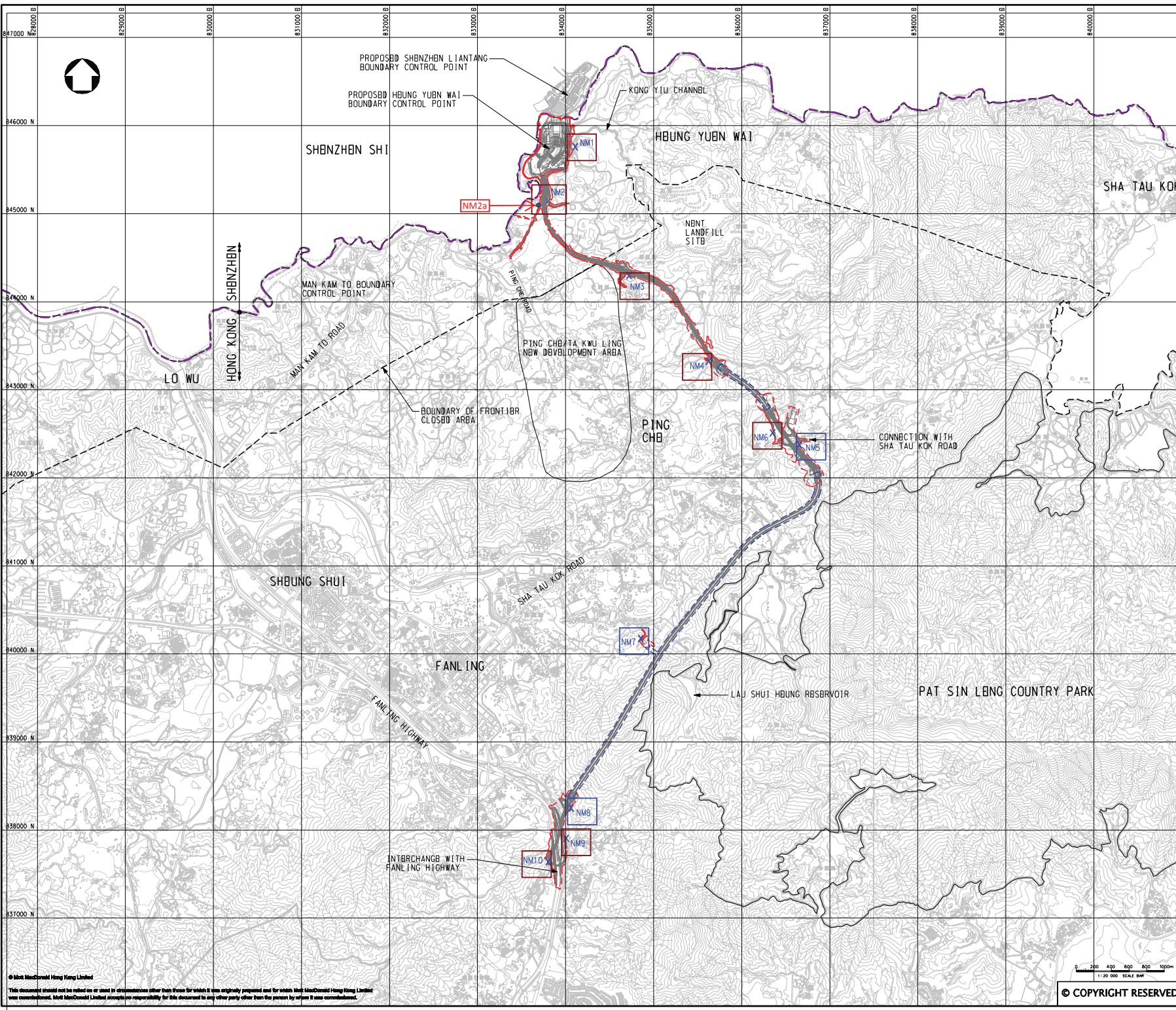
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Project
 AGREEMENT NO. CE45/2008(CE)
 LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title
 PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Designed	DC	Eng.Chk.	EC	
Drawn	MING	Coordination	EC	
Draw.Chk.	DC	Approved	HT	
Scale at A1	1:20000	Project	255228	Status
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Drawing No				Rev
				P1

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

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



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F +852 2827 1823
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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

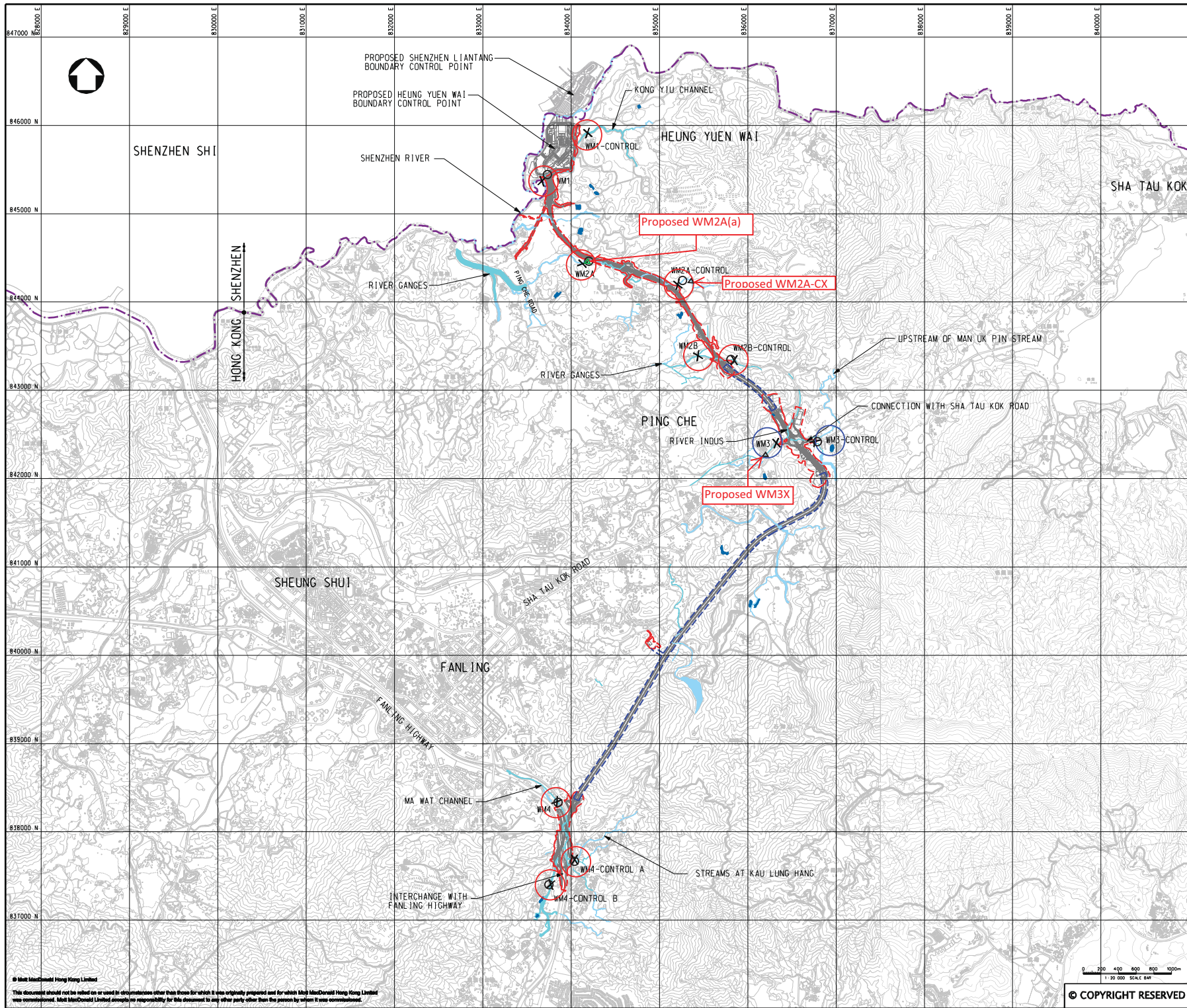
Title
 PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

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Drawn	MING	Coordination	BC	
Dep.Chk.	DC	Approved	HT	
Scale of A1	1:20000	Project	255228	Status
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Drawing No				Rev
				P1

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

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

Station ID	Location recommended in EM&A Manual		Location found during site visit	
	Coordinates		Coordinates	
	Easting	Northing	Easting	Northing
WM1	83468.833	84577.072	83467	84542
WM1-Control	83485.480	84591.667	83485	84517
WM2A	83412.319	84432.910	83420	84513
WM2A-Control	83505.329	84400.151	83520	84424
WM2B	83514.744	84339.606	83535	84397
WM2B-Control	83565.878	84343.625	83535	84351
WM3	83623.622	84265.377	83624	84202
WM3-Control	83675.410	84243.507	83675	84200
WM4	83540.781	83834.842	83550	83838
WM4-Control A	84018.937	83764.995	84028	83765
WM4-Control B	83769.123	83740.916	83760	83735

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 Water Quality Monitoring Location in May 2016

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

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

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Title
LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

Designed	HC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	HC	Approved	HT
Scale at A1	Project 255228		Status
1:20000	CAD file 1125228\REP\PORT1\EM&A\WQMS\LOC_A1.dgn		PRE
Drawing No	Appendix C		Rev P2

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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: 24/10/2016
Location ID : AM1b	Next Calibration Date: 24/12/2016
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.2	6.2	12.4	1.764	51	50.75	Slope =	36.7893	
13	4.7	4.7	9.4	1.538	45	44.78	Intercept =	-12.8904	
10	3.6	3.6	7.2	1.348	38	37.82	Corr. coeff. =	0.9967	
7	2.5	2.5	5.0	1.126	28	27.86			
5	1.4	1.4	2.8	0.846	18	17.91			

Calculations :

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

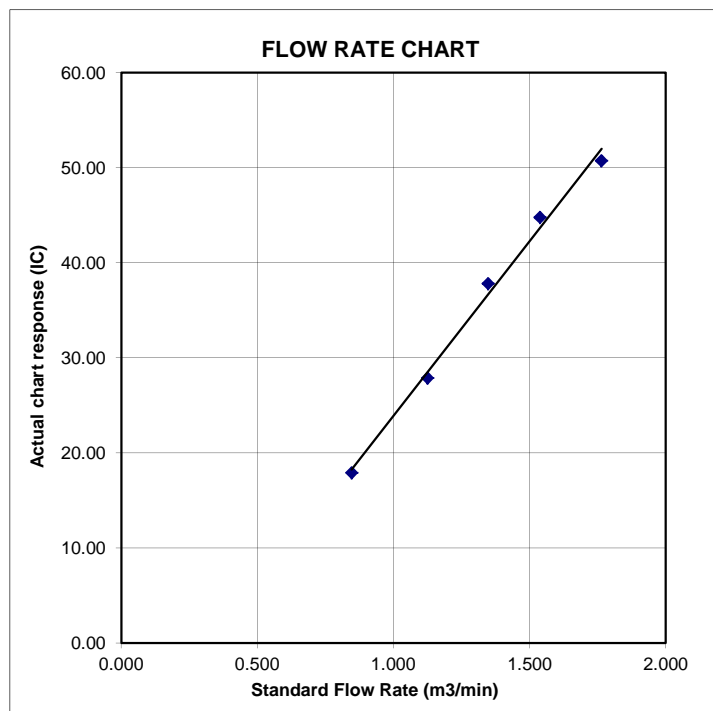
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road	Date of Calibration:	24/10/2016
Location ID : AM2	Next Calibration Date:	24/12/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.750	55	54.73	Slope = 32.5271 Intercept = -1.0373 Corr. coeff. = 0.9970
13	4.7	4.7	9.4	1.538	50	49.76	
10	3.6	3.6	7.2	1.348	44	43.79	
7	2.4	2.4	4.8	1.103	35	34.83	
5	1.4	1.4	2.8	0.846	26	25.87	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

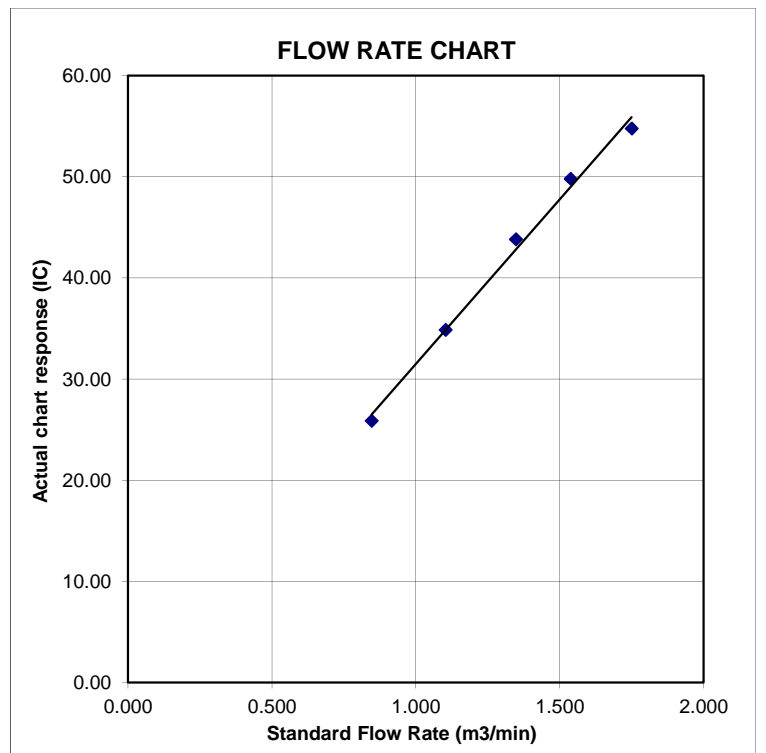
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 24/10/2016
 Next Calibration Date: 24/12/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.692	57	56.72	Slope = 29.2918 Intercept = 6.8324 Corr. coeff. = 0.9957
13	4.5	4.5	9.0	1.505	50	49.76	
10	3.4	3.4	6.8	1.310	46	45.78	
7	2.2	2.2	4.4	1.057	39	38.81	
5	1.4	1.4	2.8	0.846	31	30.85	

Calculations :

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

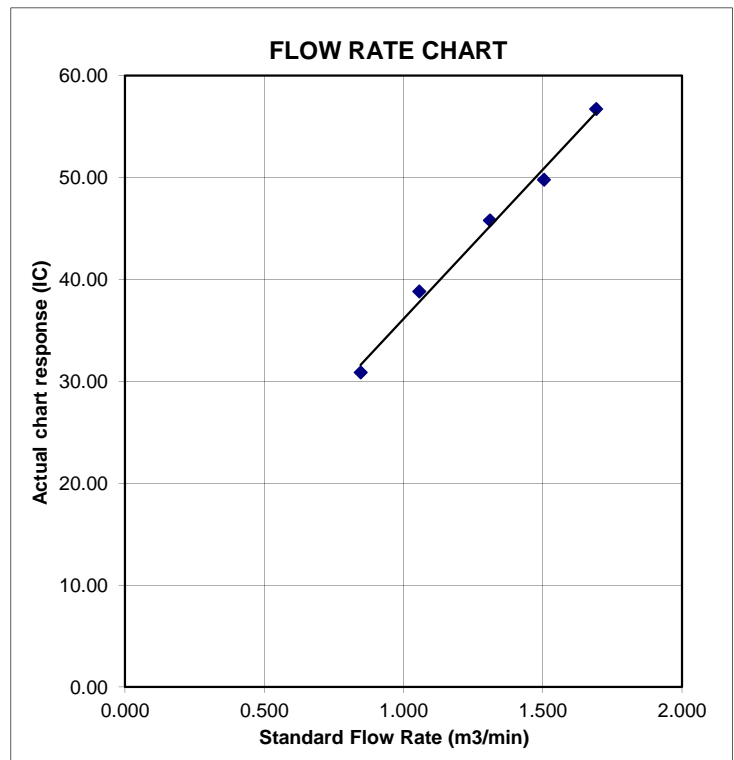
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village	Date of Calibration:	24/10/2016
Location ID : AM4b	Next Calibration Date:	24/12/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.6	5.6	11.2	1.677	56	55.73	Slope = 29.4637 Intercept = 6.8795 Corr. coeff. = 0.9973
13	4.4	4.4	8.8	1.488	51	50.75	
10	3.3	3.3	6.6	1.291	46	45.78	
7	2.1	2.1	4.2	1.033	38	37.82	
5	1.5	1.5	3.0	0.875	32	31.85	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

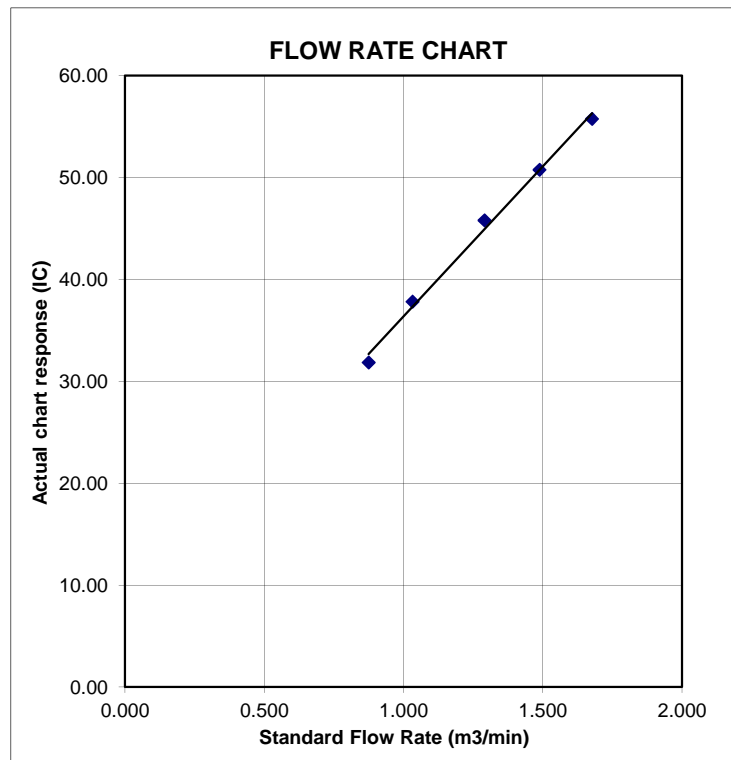
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House	Date of Calibration:	24/10/2016
Location ID : AM5a	Next Calibration Date:	24/12/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.764	53	52.74	Slope = 34.6053 Intercept = -7.9320 Corr. coeff. = 0.9993
13	4.9	4.9	9.8	1.570	47	46.77	
10	3.8	3.8	7.6	1.384	40	39.81	
7	2.4	2.4	4.8	1.103	31	30.85	
5	1.5	1.5	3.0	0.875	22	21.89	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

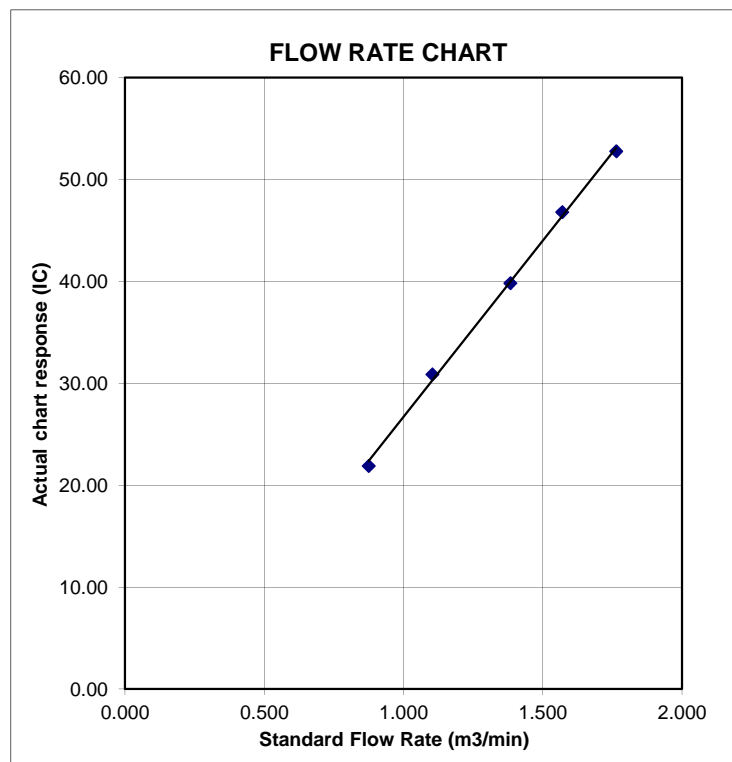
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House	Date of Calibration:	24/10/2016
Location ID : AM6	Next Calibration Date:	24/12/2016
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.764	57	56.72	Slope = 35.0492 Intercept = -4.9242 Corr. coeff. = 0.9984
13	4.9	4.9	9.8	1.570	50	49.76	
10	3.6	3.6	7.2	1.348	43	42.79	
7	2.3	2.3	4.6	1.080	34	33.84	
5	1.7	1.5	3.2	0.904	26	25.87	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

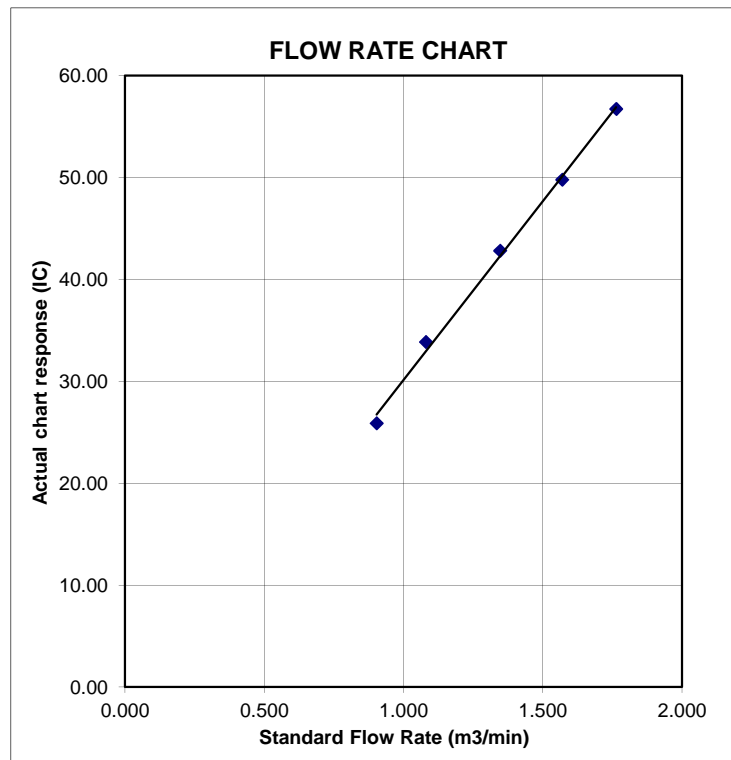
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village

Date of Calibration: 24/10/2016

Location ID : AM7b

Next Calibration Date: 24/12/2016

Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa) 1011.3
 Temperature (°C) 27.3

Corrected Pressure (mm Hg) 758.475
 Temperature (K) 300

CALIBRATION ORIFICE

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

Qstd Slope -> 2.00411
 Qstd Intercept -> -0.03059

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.2	4.2	8.4	1.454	56	51.00	Slope = 31.3023 Intercept = 5.8059 Corr. coeff. = 0.9993
13	3.4	3.4	6.8	1.310	53	47.00	
10	2.6	2.6	5.2	1.148	48	42.00	
7	1.8	1.8	3.6	0.957	41	36.00	
5	1.3	1.3	2.6	0.816	38	31.00	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

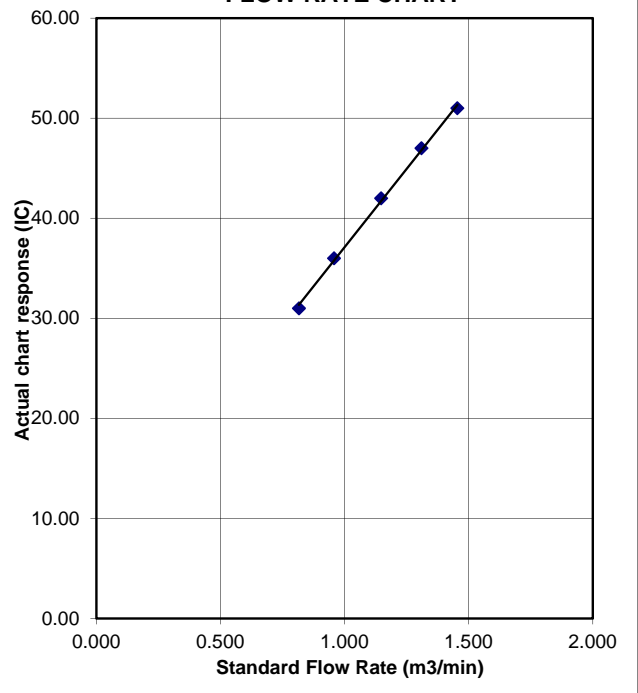
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4
 Location ID : AM8

Date of Calibration: 24/10/2016
 Next Calibration Date: 24/12/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 32.7068 Intercept = 5.3232 Corr. coeff. = 0.9985
18	5.9	5.9	11.8	1.721	62	61.70	
13	4.5	4.5	9.0	1.505	54	53.74	
10	3.5	3.5	7.0	1.329	50	49.76	
7	2.2	2.2	4.4	1.057	40	39.81	
5	1.3	1.3	2.6	0.816	32	31.85	

Calculations :

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

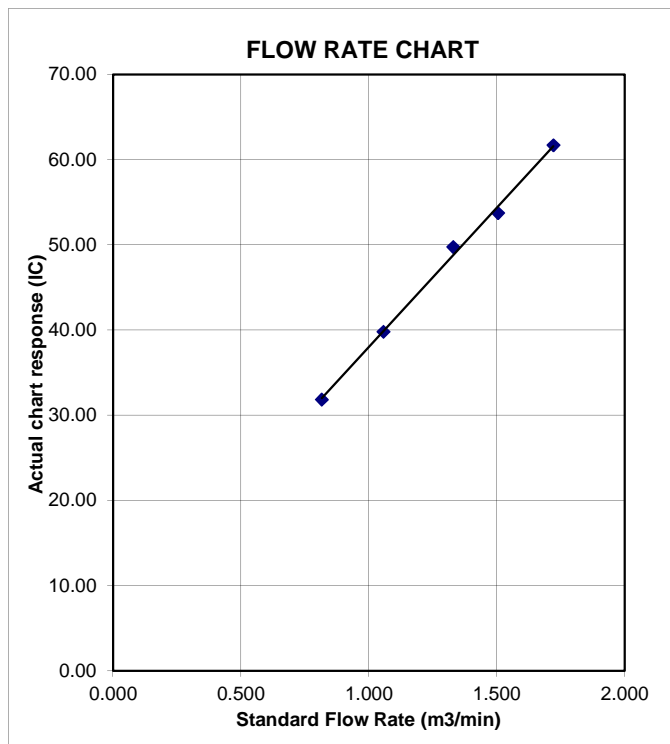
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80
 Location ID : AM9b

Date of Calibration: 24/10/2016
 Next Calibration Date: 24/12/2016
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1011.3	Corrected Pressure (mm Hg)	758.475
Temperature (°C)	27.3	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.662	55	54.73	Slope = 29.0126 Intercept = 6.0983 Corr. coeff. = 0.9986
13	4.5	4.5	9.0	1.505	50	49.76	
10	3.5	3.5	7.0	1.329	44	43.79	
7	2.3	2.3	4.6	1.080	38	37.82	
5	1.3	1.3	2.6	0.816	30	29.85	

Calculations :

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

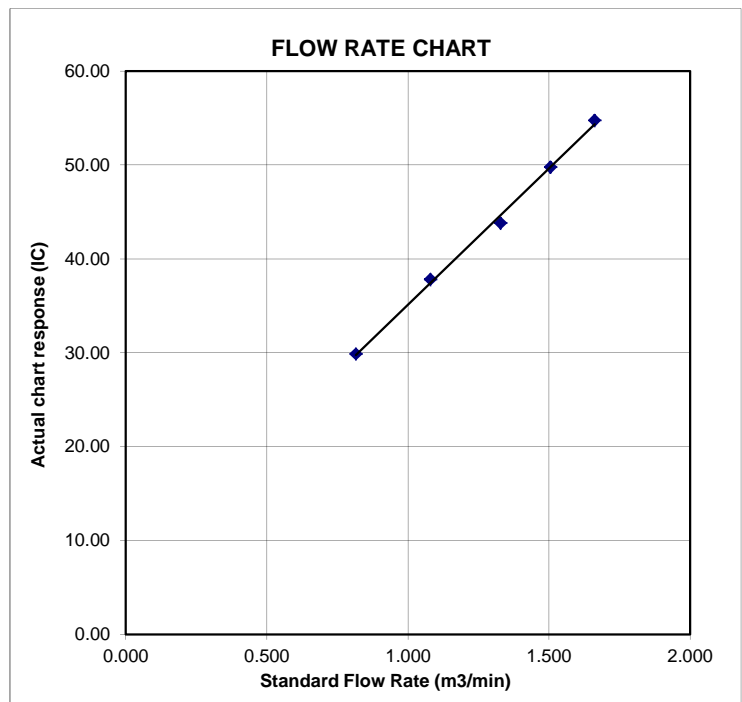
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village	Date of Calibration: 24/12/2016
Location ID : AM1b	Next Calibration Date: 24/2/2017
	Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa) 1019.2	Corrected Pressure (mm Hg) 764.4
Temperature (°C) 18.1	Temperature (K) 291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.1	6.1	12.2	1.784	50	50.74	Slope = 25.3669 Intercept = 6.5971 Corr. coeff. = 0.9944		
13	4.9	4.9	9.8	1.600	47	47.69			
10	3.6	3.6	7.2	1.374	42	42.62			
7	2.6	2.6	5.2	1.170	36	36.53			
5	1.5	1.5	3.0	0.892	28	28.41			

Calculations :

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

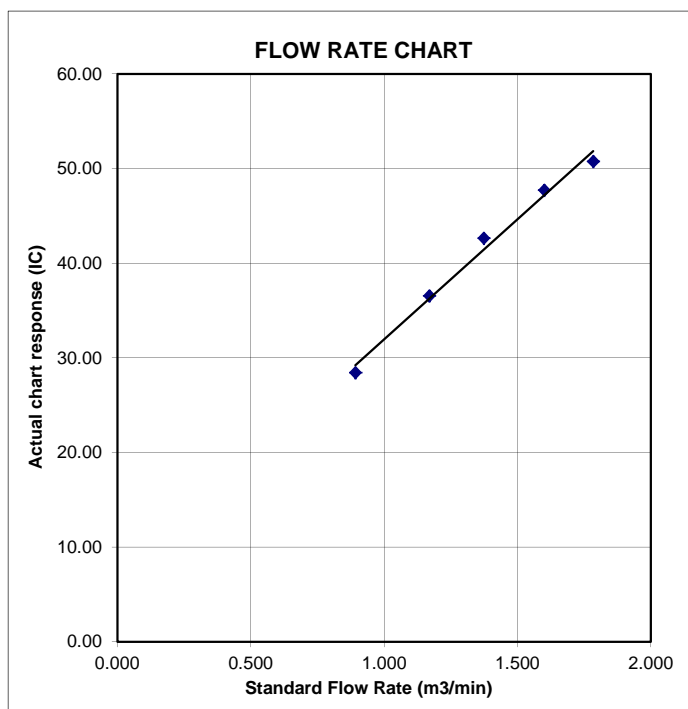
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road	Date of Calibration:	24/12/2016
Location ID : AM2	Next Calibration Date:	24/2/2017
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.769	54	54.79	Slope = 32.4736 Intercept = -2.0693 Corr. coeff. = 0.9978
13	4.7	4.7	9.4	1.568	49	49.72	
10	3.7	3.7	7.4	1.393	42	42.62	
7	2.3	2.3	4.6	1.101	34	34.50	
5	1.4	1.4	2.8	0.862	25	25.37	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

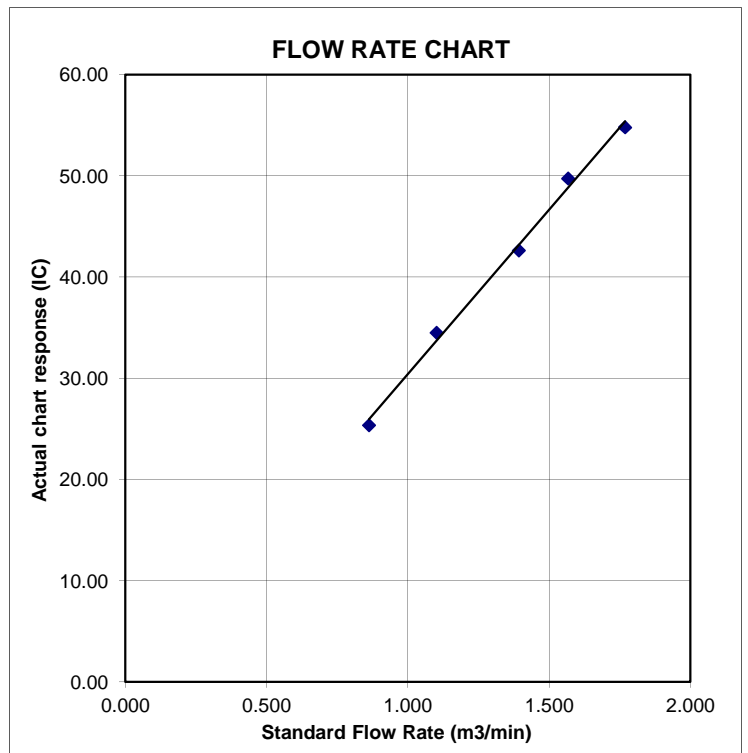
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 24/12/2016
 Next Calibration Date: 24/2/2017
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.695	57	57.84	Slope = 29.4892 Intercept = 6.3998 Corr. coeff. = 0.9925
13	4.8	4.8	9.6	1.584	52	52.76	
10	3.6	3.6	7.2	1.374	45	45.66	
7	2.7	2.7	5.4	1.192	40	40.59	
5	1.3	1.4	2.7	0.847	32	32.47	

Calculations :

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

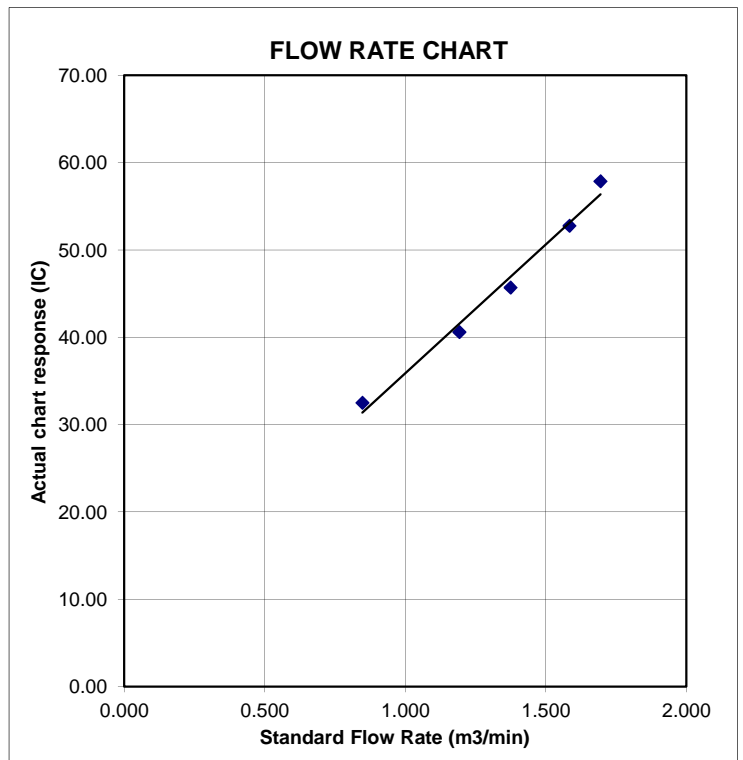
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village	Date of Calibration:	24/12/2016
Location ID : AM4b	Next Calibration Date:	24/2/2017
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.5	11.0	1.695	58	58.85	Slope = 37.2438 Intercept = -4.5869 Corr. coeff. = 0.9992
13	4.5	4.5	9.0	1.534	51	51.75	
10	3.4	3.4	6.8	1.336	45	45.66	
7	2.3	2.3	4.6	1.101	36	36.53	
5	1.4	1.4	2.8	0.862	27	27.40	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

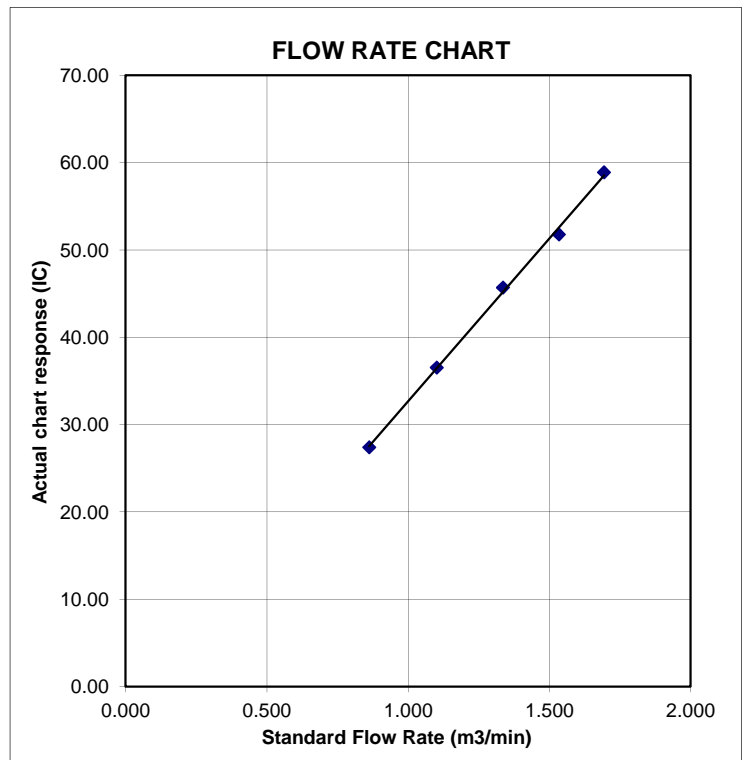
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House	Date of Calibration:	24/12/2016
Location ID : AM5a	Next Calibration Date:	24/2/2017
	Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

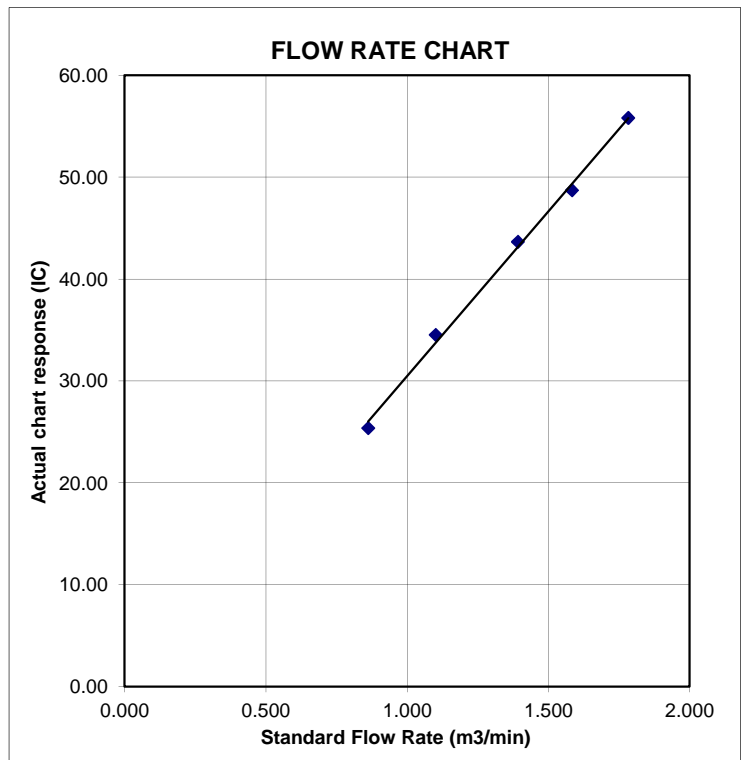
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.784	55	55.81	Slope = 32.3303 Intercept = -1.8749 Corr. coeff. = 0.9986
13	4.8	4.8	9.6	1.584	48	48.71	
10	3.7	3.7	7.4	1.393	43	43.63	
7	2.3	2.3	4.6	1.101	34	34.50	
5	1.4	1.4	2.8	0.862	25	25.37	

Calculations :

$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$
 Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

$1/m((I)[\text{Sqrt}(298/Tav)(Pav/760)]-b)$
 m = sampler slope
 b = sampler intercept
 I = chart response
 Tav = daily average temperature
 Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House
 Location ID : AM6

Date of Calibration: 24/12/2016
 Next Calibration Date: 24/2/2017
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.784	58	58.85	Slope = 34.2523 Intercept = -3.3101 Corr. coeff. = 0.9965
13	5	5	10.0	1.616	51	51.75	
10	3.9	3.9	7.8	1.429	44	44.65	
7	2.3	2.3	4.6	1.101	33	33.49	
5	1.5	1.5	3.0	0.892	28	28.41	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

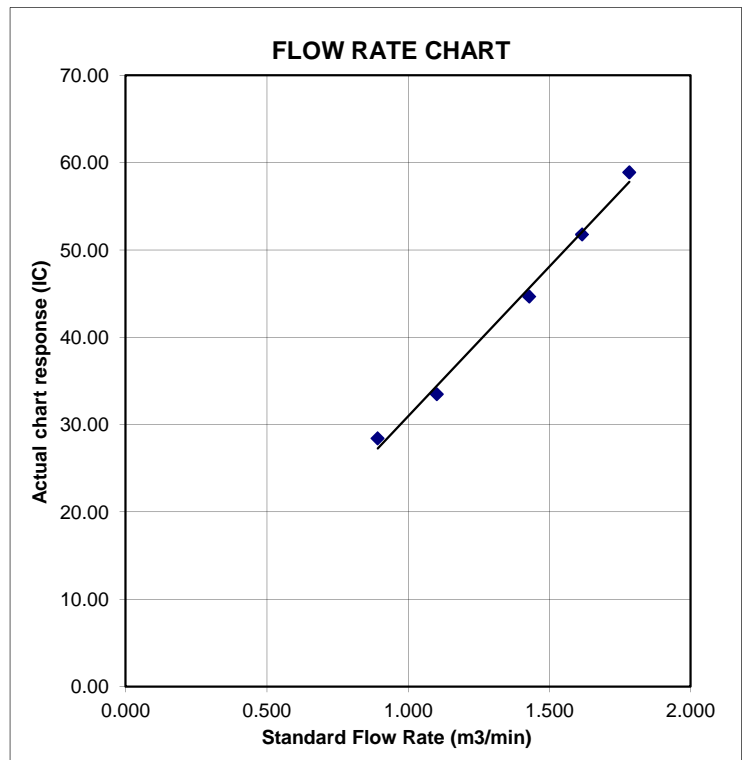
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village

Date of Calibration: 24/12/2016

Location ID : AM7b

Next Calibration Date: 24/2/2017

Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa) 1019.2
 Temperature (°C) 18.1

Corrected Pressure (mm Hg) 764.4
 Temperature (K) 291

CALIBRATION ORIFICE

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

Qstd Slope -> 2.00411
 Qstd Intercept -> -0.03059

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4.4	4.4	8.8	1.517	58	58.85	Slope = 32.9385 Intercept = 9.0367 Corr. coeff. = 0.9992
13	3.5	3.5	7.0	1.355	53	53.78	
10	2.7	2.7	5.4	1.192	48	48.71	
7	1.8	1.8	3.6	0.976	40	40.59	
5	1.1	1.1	2.2	0.766	34	34.50	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

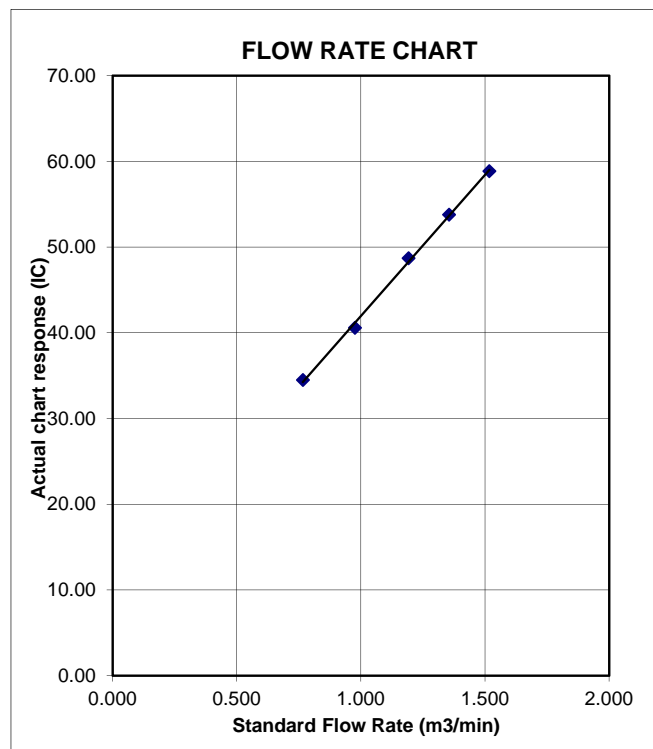
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Po Kat Tsai Village No. 4
 Location ID : AM8

Date of Calibration: 24/12/2016
 Next Calibration Date: 24/2/2017
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 34.2289 Intercept = 6.0270 Corr. coeff. = 0.9989
18	5.6	5.6	11.2	1.710	63	63.93	
13	4.4	4.4	8.8	1.517	58	58.85	
10	3.4	3.4	6.8	1.336	51	51.75	
7	2.2	2.2	4.4	1.077	42	42.62	
5	1.3	1.3	2.6	0.832	34	34.50	

Calculations :

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

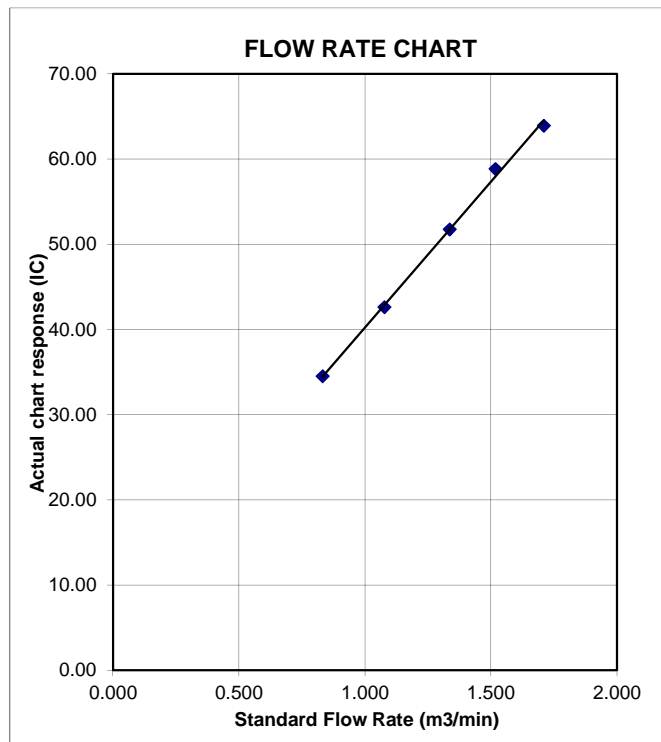
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80
 Location ID : AM9b

Date of Calibration: 24/12/2016
 Next Calibration Date: 24/2/2017
 Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1019.2	Corrected Pressure (mm Hg)	764.4
Temperature (°C)	18.1	Temperature (K)	291

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6.0	12.0	1.769	53	53.78	Slope = 34.4503 Intercept = -6.8178 Corr. coeff. = 0.9992
13	4.8	4.8	9.6	1.584	47	47.69	
10	3.7	3.7	7.4	1.393	41	41.60	
7	2.4	2.4	4.8	1.125	32	32.47	
5	1.5	1.5	3.0	0.892	23	23.34	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

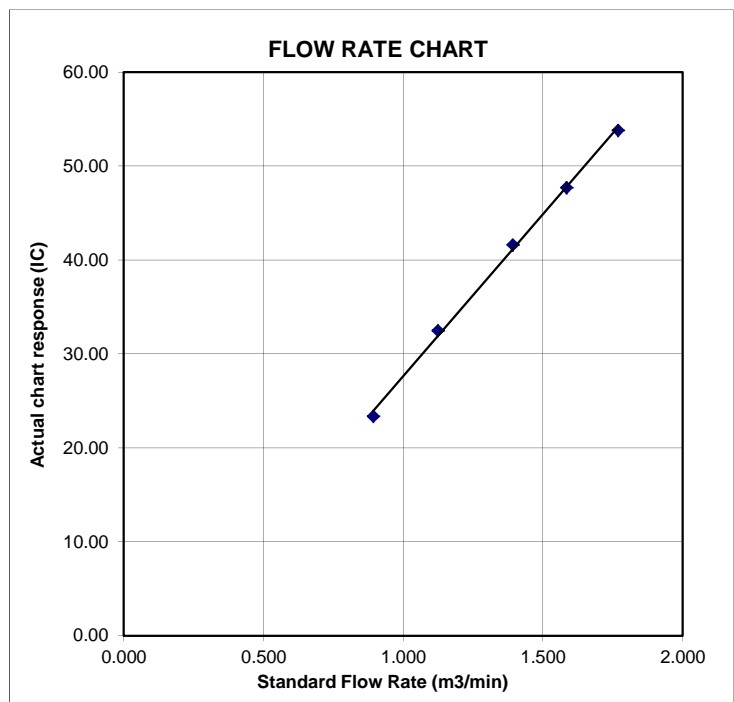
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





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

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

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

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

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9866	0.7165	1.4078	0.9957	0.7231	0.8896
0.9824	1.0117	1.9909	0.9914	1.0210	1.2581
0.9804	1.1256	2.2259	0.9894	1.1360	1.4066
0.9793	1.1785	2.3345	0.9883	1.1893	1.4753
0.9741	1.4200	2.8155	0.9830	1.4330	1.7792
Qstd slope (m) = 2.00411			Qa slope (m) = 1.25494		
intercept (b) = -0.03059			intercept (b) = -0.01933		
coefficient (r) = 0.99995			coefficient (r) = 0.99995		
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}

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

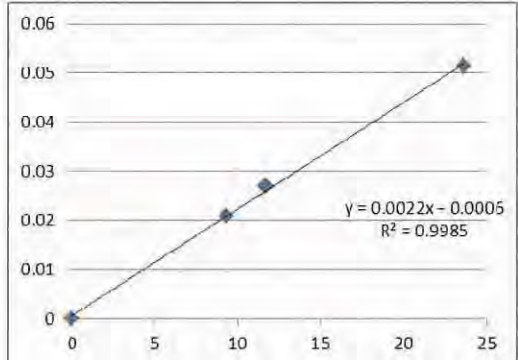
Testing Date: 4 to 6 January 2016

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

Sensitivity Adjustment Scale Setting (Before Calibration) 593 (CPM)
 Sensitivity Adjustment Scale Setting (After Calibration) 596 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022
 Correlation Coefficient 0.9985
 Date of Issue 11 January 2016



Remarks:

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

Operator : Donald Kwok Signature : [Signature] Date : 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

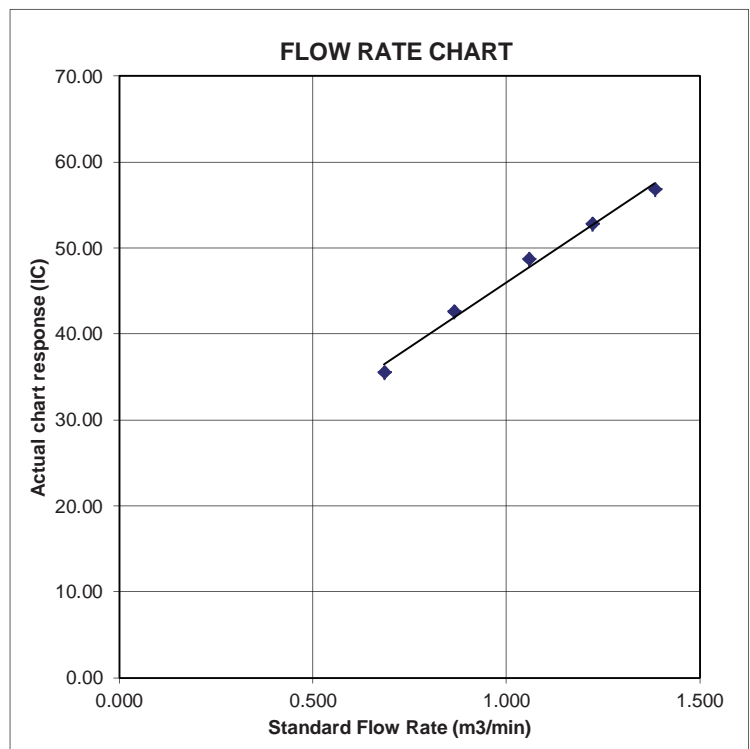
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

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

For subsequent calculation of sampler flow:

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

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



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 366409
 Equipment Ref: EQ109
 Job Order HK1603560

Standard Equipment:

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

Equipment Verification Results:

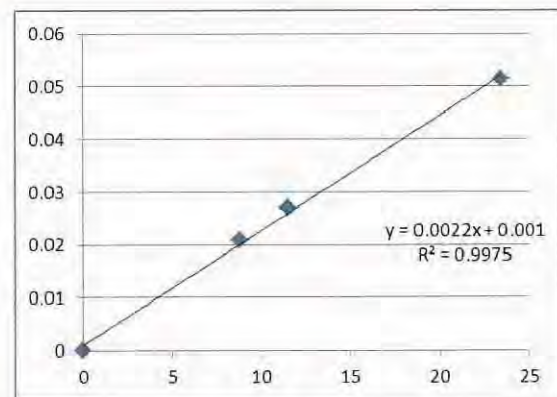
Testing Date: 4 to 6 January 2016

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

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


Linear Regression of Y or X

Slope (K-factor): 0.0022
 Correlation Coefficient 0.9975
 Date of Issue 11 January 2016



Remarks:

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

Operator : Donald Kwok Signature :  Date : 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

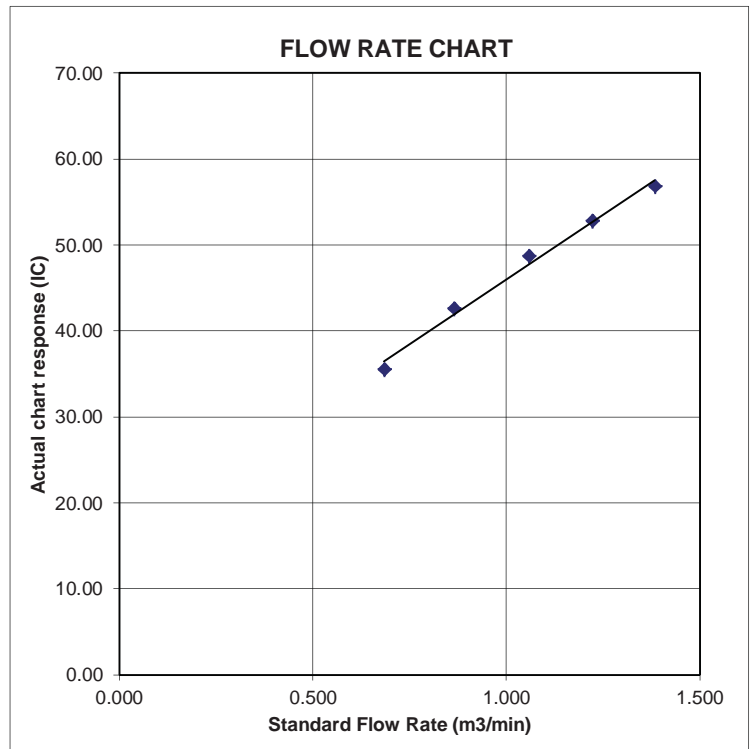
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Q_{std} = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Q_{std} slope
 b = calibrator Q_{std} intercept
 T_a = actual temperature during calibration (deg K)
 P_{std} = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope
 b = sampler intercept
 I = chart response
 T_{av} = daily average temperature
 P_{av} = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 366410
 Equipment Ref: EQ110
 Job Order HK1603561

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

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

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

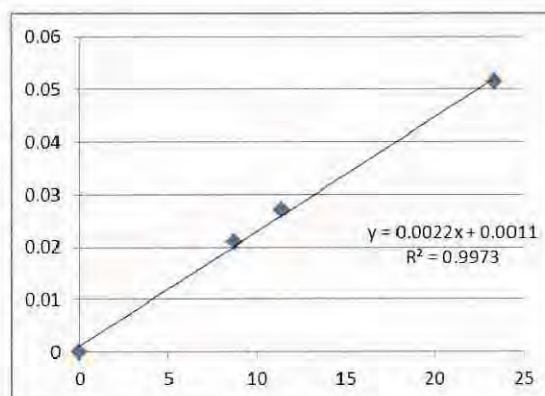
Sensitivity Adjustment Scale Setting (After Calibration) 661 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9973

Date of Issue 11 January 2016



Remarks:

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

Operator: Donald Kwok Signature: Date: 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

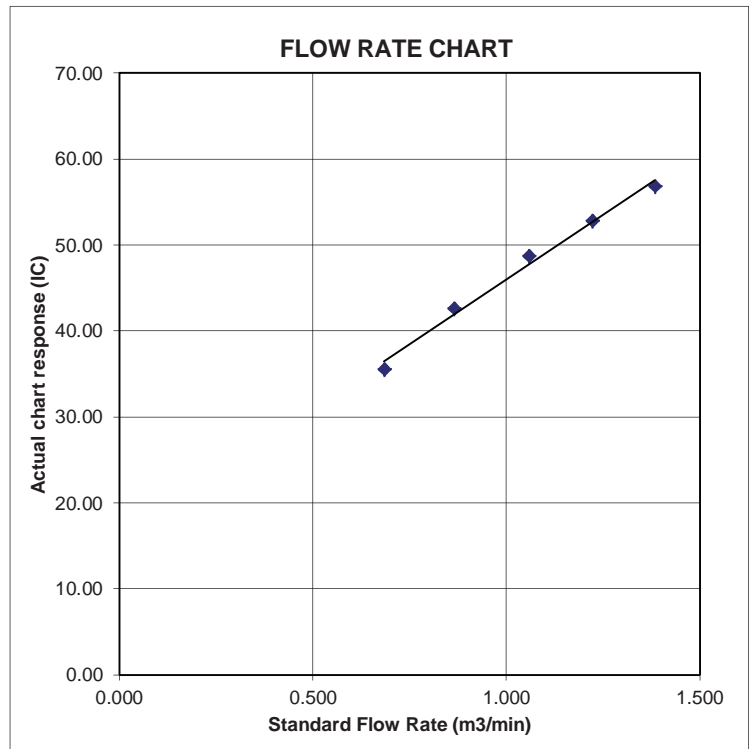
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Q_{std} = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Q_{std} slope
 b = calibrator Q_{std} intercept
 T_a = actual temperature during calibration (deg K)
 P_{std} = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope
 b = sampler intercept
 I = chart response
 T_{av} = daily average temperature
 P_{av} = daily average pressure



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 3Y6503
 Equipment Ref: EQ112
 Job Order HK1603553

Standard Equipment:

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

Equipment Verification Results:

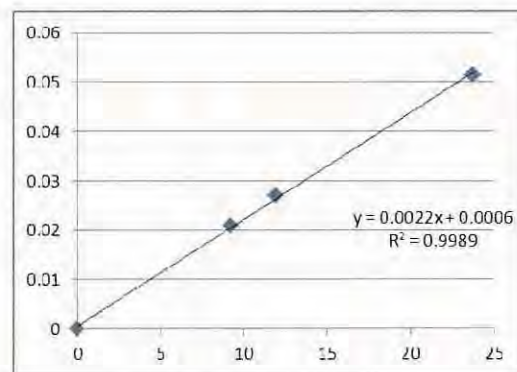
Testing Date: 4 to 6 January 2016

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

Sensitivity Adjustment Scale Setting (Before Calibration) 642 (CPM)
 Sensitivity Adjustment Scale Setting (After Calibration) 648 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022
 Correlation Coefficient 0.9989
 Date of Issue 11 January 2016



Remarks:

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

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

Operator: Donald Kwok Signature: [Signature] Date: 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

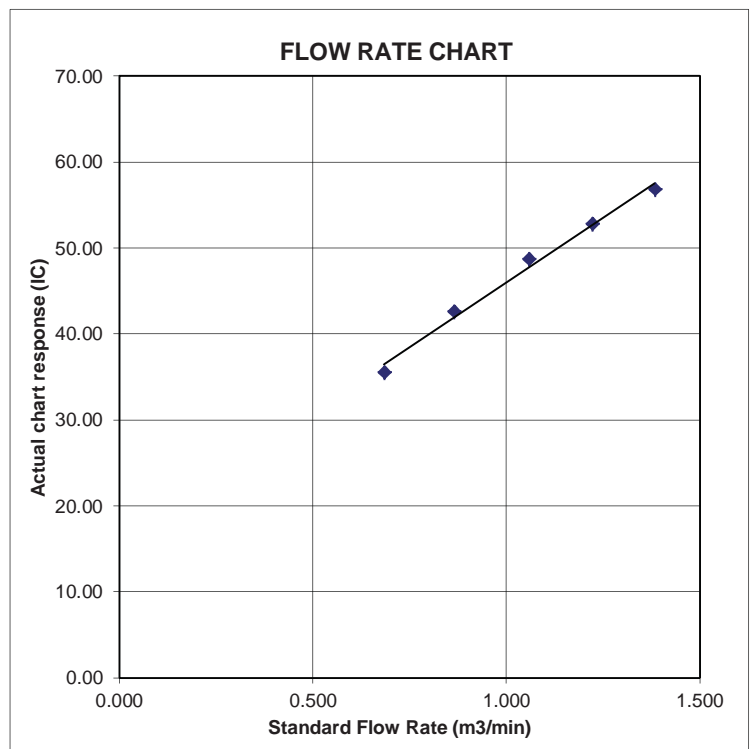
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

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

For subsequent calculation of sampler flow:

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

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



Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
 Manufacturer: Sibata LD-3B
 Serial No. 3Y6505
 Equipment Ref: EQ114
 Job Order HK1603562

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

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

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

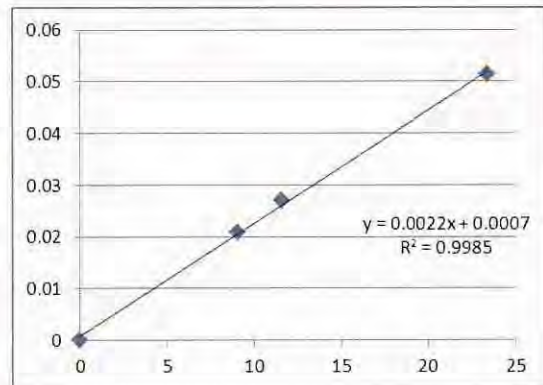
Sensitivity Adjustment Scale Setting (After Calibration) 585 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022


Correlation Coefficient 0.9985


Date of Issue 11 January 2016



Remarks:

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

Operator : Donald Kwok Signature :  Date : 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

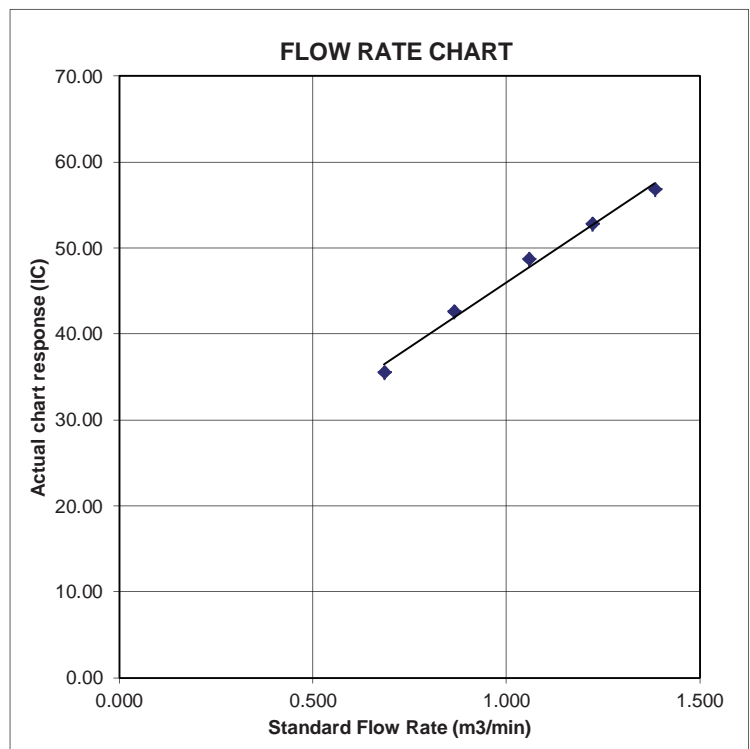
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

Q_{std} = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Q_{std} slope
 b = calibrator Q_{std} intercept
 T_a = actual temperature during calibration (deg K)
 P_{std} = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope
 b = sampler intercept
 I = chart response
 T_{av} = daily average temperature
 P_{av} = daily average pressure





Certificate of Calibration

校正證書

Certificate No. : C162996
證書編號

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

Date of Receipt / 收件日期 : 26 May 2016

Description / 儀器名稱 : Integrating Sound Level Meter (EQ065)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2337676
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C

Relative Humidity / 相對濕度 : (55 ± 20)%

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016


TEST RESULTS / 測試結果

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

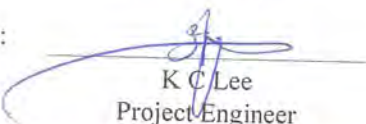
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

6 June 2016

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室所書面批准。

Certificate of Calibration

校正證書

Certificate No. : C162996

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

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

6.2.2 Tone Burst Signal (2 kHz)

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

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.9	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.4	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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

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Certificate of Calibration

校正證書

Certificate No. : C162996
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.2	-3.0 ± 1.5
					63 Hz	93.2	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)	
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)			
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.2	± 0.5	
			60 sec.					1/10 ²	90	90.1	± 0.5
								1/10 ³	80	79.8	± 1.0
			5 min.					1/10 ⁴	70	69.8	± 1.0

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

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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Sun Creation Engineering Limited - Calibration & Testing Laboratory

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

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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



Certificate of Calibration

校正證書

Certificate No. : C162991
證書編號

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

Date of Receipt / 收件日期 : 24 May 2016

Description / 儀器名稱 : Sound Calibrator (EQ083)
 Manufacturer / 製造商 : Rion
 Model No. / 型號 : NC-74
 Serial No. / 編號 : 34246492
 Supplied By / 委託者 : Action-United Environmental Services and Consulting
 Unit A, 20/F., Gold King Industrial Building,
 35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

Line Voltage / 電壓 : ---

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016

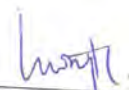
TEST RESULTS / 測試結果

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

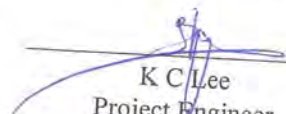
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

3 June 2016

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

校正證書

Certificate No. : C162991
證書編號

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

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2

5.2 Frequency Accuracy

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

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

Note :

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



Certificate of Calibration 校正證書

Certificate No. : C161797
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0662) Date of Receipt / 收件日期 : 22 March 2016
Description / 儀器名稱 : Sound Level Meter (EQ014)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142580
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 6 April 2016

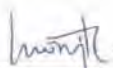
TEST RESULTS / 測試結果

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


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

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

7 April 2016

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

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Certificate of Calibration

校正證書

Certificate No. : C161797

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
2. Self-calibration using the internal standard (After Adjustment) was performed before the test 6.1.1.2 to 6.3.2.
3. The results presented are the mean of 3 measurements at each calibration point.
4. Test equipment :

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

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Adjustment

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

* Out of IEC 61672 Class 1 Spec.

- 6.1.1.2 After Adjustment

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

- 6.1.2 Linearity

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

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

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

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Certificate of Calibration

校正證書

Certificate No. : C161797
證書編號

6.2 Time Weighting

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

6.3 Frequency Weighting

6.3.1 A-Weighting

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

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	91.0	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.6	-6.2 (+3.0 ; -6.0)

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

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

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

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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



Certificate of Calibration

校正證書

Certificate No. : C161797
證書編號

- Remarks : - UUT Microphone Model No. : UC-59 & S/N : 07725
- Mfr's Spec. : IEC 61672 Class 1
- Uncertainties of Applied Value :
- | | | |
|--------|------------------|--------------------------|
| 94 dB | : 63 Hz - 125 Hz | : ± 0.35 dB |
| | 250 Hz - 500 Hz | : ± 0.30 dB |
| | 1 kHz | : ± 0.20 dB |
| | 2 kHz - 4 kHz | : ± 0.35 dB |
| | 8 kHz | : ± 0.45 dB |
| | 12.5 kHz | : ± 0.70 dB |
| 104 dB | : 1 kHz | : ± 0.10 dB (Ref. 94 dB) |
| 114 dB | : 1 kHz | : ± 0.10 dB (Ref. 94 dB) |
- The uncertainties are for a confidence probability of not less than 95 %.

Note :

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

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Certificate of Calibration 校正證書

Certificate No. : C162177
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 14 April 2016
Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285762
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 April 2016

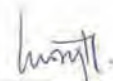
TEST RESULTS / 測試結果

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

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

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

Tested By
測試



H T Wong
Technical Officer

Certified By
核證



K C Lee
Project Engineer

Date of Issue
簽發日期

27 April 2016

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

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

Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

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

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

- Test procedure : MA101N.

- Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.2

- 6.1.1.2 After Self-calibration

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

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

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

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

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

Sun Creation Engineering Limited - Calibration & Testing Laboratory

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

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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

Certificate of Calibration

校正證書

Certificate No. : C162177

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

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

6.2.2 Tone Burst Signal (2 kHz)

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

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	55.1	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.7	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	91.0	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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

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

Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.5	-3.0 ± 1.5
					63 Hz	93.4	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	92.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)	
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)			
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5	
								1/10 ²	90	89.9	± 0.5
								1/10 ³	80	79.2	± 1.0
								1/10 ⁴	70	69.2	± 1.0
			60 sec.								
			5 min.								

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

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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Certificate of Calibration 校正證書

Certificate No. : C162438
證書編號

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

Date of Receipt / 收件日期 : 5 May 2016

Description / 儀器名稱 : Acoustical Calibrator (EQ081)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2326408
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016

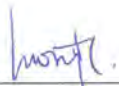
TEST RESULTS / 測試結果

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

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

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

11 May 2016

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

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Certificate of Calibration

校正證書

Certificate No. : C162438
證書編號

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

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.0		

5.2 Frequency Accuracy

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

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

Note :

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



Certificate of Calibration 校正證書

Certificate No. : C162125
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-0843) Date of Receipt / 收件日期 : 14 April 2016
Description / 儀器名稱 : Acoustical Calibrator (EQ082)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 4231
Serial No. / 編號 : 2713428
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : $(23 \pm 2)^{\circ}\text{C}$ Relative Humidity / 相對濕度 : $(55 \pm 20)\%$
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 22 April 2016

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K C Lee
Project Engineer

Date of Issue : 25 April 2016
簽發日期

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

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



Certificate of Calibration

校正證書

Certificate No. : C162125
證書編號

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

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL130	Universal Counter	C153519
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

- Test procedure : MA100N.
- Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.2	± 0.2
114 dB, 1 kHz	114.1		

5.2 Frequency Accuracy

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

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

Note :

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

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1645660
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/11/2016
DATE OF ISSUE: 16/11/2016

COMMENTS

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

Scope of Test: Dissolved Oxygen and Temperature
Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 14 November, 2016

NOTES

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


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

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1645660
Sub-Batch: 0
Date of Issue: 16/11/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: Pro 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 14 November, 2016 Date of next Calibration: 14 February, 2017

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.00	3.88	-0.12
6.50	6.37	-0.13
8.36	8.20	-0.16
Tolerance Limit (mg/L)		±0.20

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
7.5	8.2	+0.7
24.0	23.1	-0.9
41.5	42.3	+0.8
Tolerance Limit (°C)		±2.0

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


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



ALS Technichem (HK) Pty Ltd
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Kwai Chung, N.T., Hong Kong
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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

CONTACT: MR BEN TAM
CLIENT: ACTION UNITED ENVIRO SERVICES
ADDRESS: RM A 20/F., GOLDEN KING IND BLDG,
NO. 35-41 TAI LIN PAI ROAD,
KWAI CHUNG,
N.T., HONG KONG

WORK ORDER: HK1645662
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/11/2016
DATE OF ISSUE: 16/11/2016

COMMENTS

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

Scope of Test: pH and Temperature
Description: pH Meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1064457
Equipment No.: --
Date of Calibration: 14 November, 2016

NOTES

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


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

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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1645662
Sub-batch: 0
Date of Issue: 16/11/2016
Client: ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1064457
Equipment No.: --

Date of Calibration: 14 November, 2016 **Date of next Calibration:** 14 February, 2017

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.1	+0.10
7.0	7.1	+0.10
10.0	9.8	-0.20
Tolerance Limit (pH Unit)		±0.20

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
6.5	6.5	+0.0
24.0	23.5	-0.5
38.0	37.5	-0.5
Tolerance Limit (°C)		±2.0

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

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

WORK ORDER: HK1645701
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11/11/2016
DATE OF ISSUE: 15/11/2016

COMMENTS

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

Scope of Test: Turbidity
Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 12 November, 2016

NOTES

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


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

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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1645701
Sub-batch: 0
Date of Issue: 15/11/2016
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 12 November, 2016 Date of next Calibration: 12 February, 2017

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.76	--
4	4.29	+7.3
40	43.4	+8.5
80	86.2	+7.8
400	410	+2.5
800	852	+6.5
	Tolerance Limit (%)	±10.0

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

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

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 the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 4. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented;	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not
	and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	the ER accordingly; 5. Monitor the implementation of remedial measures.	5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event and Action Plan for Construction Noise

Event		ET	IEC	ER	Action Contractor
Action Level	1. Notify ER, IEC and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the IEC and Contractor on remedial measures required; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the investigation results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Advise the ER on the effectiveness of the proposed remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures.	1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals.	
Limit Level	1. Inform IEC, ER, Contractor and EPD; 2. Repeat measurements to confirm findings; 3. Increase monitoring frequency; 4. Identify source and investigate the cause of exceedance; 5. Carry out analysis of Contractor's working procedures; 6. Discuss with the IEC, Contractor and ER on remedial measures required; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Supervise the implementation of remedial measures; 5. If exceedance continues, consider stopping the Contractor to continue working on that portion of work which causes the exceedance until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated.	

Event and Action Plan for Water Quality

EVENT	ACTION CONTRACTOR			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment; 4. Consider changes of working methods; 5. Discuss with 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 –December 2016

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
THU	1-DEC-16				
FRI	2-DEC-16	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
SAT	3-DEC-16	AM4b, AM5, AM6, AM7b & AM8			
SUN	4-DEC-16				
MON	5-DEC-16				
TUE	6-DEC-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
WED	7-DEC-16				
THU	8-DEC-16	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
FRI	9-DEC-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	
SAT	10-DEC-16				All Water Quality Monitoring Locations
SUN	11-DEC-16				
MON	12-DEC-16		AM1b, AM2, AM3 & AM9b		
TUE	13-DEC-16				All Water Quality Monitoring Locations
WED	14-DEC-16	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	
THU	15-DEC-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
FRI	16-DEC-16				
SAT	17-DEC-16		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
SUN	18-DEC-16				
MON	19-DEC-16				All Water Quality Monitoring Locations
TUE	20-DEC-16	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	
WED	21-DEC-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
THU	22-DEC-16		AM1b, AM2, AM3 & AM9b		
FRI	23-DEC-16	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
SAT	24-DEC-16	AM4b, AM5, AM6, AM7b & AM8			
SUN	25-DEC-16				
MON	26-DEC-16				
TUE	27-DEC-16				All Water Quality Monitoring Locations
WED	28-DEC-16		AM1b, AM2, AM3 & AM9b		
THU	29-DEC-16	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
FRI	30-DEC-16	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	
SAT	31-DEC-16				All Water Quality Monitoring Locations

	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for next Reporting Period –January 2017

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Sun	1-Jan-17				
Mon	2-Jan-17				
Tue	3-Jan-17		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Wed	4-Jan-17	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	
Thu	5-Jan-17	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Fri	6-Jan-17				
Sat	7-Jan-17				All Water Quality Monitoring Locations
Sun	8-Jan-17				
Mon	9-Jan-17		AM1b, AM2, AM3 & AM9b		
Tue	10-Jan-17	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	All Water Quality Monitoring Locations
Wed	11-Jan-17	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	
Thu	12-Jan-17				All Water Quality Monitoring Locations
Fri	13-Jan-17				
Sat	14-Jan-17		AM1b, AM2, AM3 & AM9b		All Water Quality Monitoring Locations
Sun	15-Jan-17				
Mon	16-Jan-17	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8	NM1, NM2a, NM8, NM9 & NM10	
Tue	17-Jan-17	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Wed	18-Jan-17				
Thu	19-Jan-17				All Water Quality Monitoring Locations
Fri	20-Jan-17		AM1b, AM2, AM3 & AM9b		
Sat	21-Jan-17	AM1b, AM2, AM3 & AM9b	AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sun	22-Jan-17				
Mon	23-Jan-17	AM4b, AM5, AM6, AM7b & AM8		NM3, NM4, NM5, NM6 & NM7	All Water Quality Monitoring Locations
Tue	24-Jan-17				
Wed	25-Jan-17				All Water Quality Monitoring Locations
Thu	26-Jan-17	AM1b, AM2, AM3 & AM9b	AM1b, AM2, AM3 & AM9b	NM1, NM2a, NM8, NM9 & NM10	
Fri	27-Jan-17	AM4b, AM5, AM6, AM7b & AM8	AM4b, AM5, AM6, AM7b & AM8		All Water Quality Monitoring Locations
Sat	28-Jan-17				
Sun	29-Jan-17				
Mon	30-Jan-17				
Tue	31-Jan-17				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 (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
AM1b – Open Area, Tsung Yuen Ha Village															
6-Dec-16	20261	12385.37	12409.48	1446.60	52	52	52.0	20.8	1020.7	1.78	2574	2.8774	3.1796	0.3022	117
12-Dec-16	20276	12409.48	12433.62	1448.40	50	50	50.0	21.1	1015.1	1.72	2491	2.8595	3.0073	0.1478	59
17-Dec-16	20294	12433.62	12457.77	1449.00	50	50	50.0	16.6	1023.2	1.74	2515	2.8130	3.0334	0.2204	88
22-Dec-16	20322	12457.77	12481.27	1410.00	52	52	52.0	22.4	1016.8	1.77	2499	2.8604	3.0061	0.1457	58
28-Dec-16	20330	12481.27	12504.77	1410.00	50	50	50.0	14	1023	1.76	2479	2.8586	3.0730	0.2144	86
AM2 - Village House near Lin Ma Hang Road															
6-Dec-16	20260	7904.19	7927.98	1427.40	40	40	40.0	20.8	1020.7	1.27	1820	2.8732	3.1373	0.2641	145
12-Dec-16	20275	7927.98	7951.78	1428.00	31	31	31.0	21.1	1015.1	0.99	1417	2.8588	3.0646	0.2058	145
17-Dec-16	20293	7951.78	7975.61	1429.80	35	36	35.5	16.6	1023.2	1.14	1636	2.8061	3.0065	0.2004	122
22-Dec-16	20321	7975.61	7999.11	1410.00	34	34	34.0	22.4	1016.8	1.08	1528	2.8597	2.9906	0.1309	86
28-Dec-16	20329	7999.11	8022.61	1410.00	34	34	34.0	14	1023	1.14	1601	2.8113	2.9813	0.1700	106
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
6-Dec-16	20270	9044.14	9068.14	1440.00	58	58	58.0	20.8	1020.7	1.77	2546	2.8504	3.2025	0.3521	138
12-Dec-16	20274	9068.14	9092.14	1440.00	55	55	55.0	21.1	1015.1	1.66	2388	2.8624	3.0423	0.1799	75
17-Dec-16	20292	9092.14	9116.14	1440.00	55	55	55.0	16.6	1023.2	1.68	2420	2.8011	3.0974	0.2963	122
22-Dec-16	20320	9116.14	9140.14	1440.00	55	55	55.0	22.4	1016.8	1.66	2384	2.8661	3.1406	0.2745	115
28-Dec-16	20331	9140.14	9164.14	1440.00	50	50	50.0	14	1023	1.52	2187	2.8335	3.1091	0.2756	126
AM4b - House no. 10B1 Nga Yiu Ha Village															
2-Dec-16	20256	11025.47	11049.47	1440.00	42	42	42.0	20.5	1022.6	1.21	1742	2.8408	2.9975	0.1567	90
8-Dec-16	20269	11049.47	11073.47	1440.00	42	42	42.0	19.2	1016.5	1.21	1740	2.8771	3.0767	0.1996	115
14-Dec-16	20280	11073.47	11097.47	1440.00	42	42	42.0	21.4	1018.2	1.20	1734	2.8423	2.9908	0.1485	86
20-Dec-16	20297	11097.47	11121.47	1440.00	42	42	42.0	21.3	1017.3	1.20	1733	2.7999	2.9520	0.1521	88
23-Dec-16	20324	11121.47	11145.47	1440.00	52	52	52.0	20.2	1019	1.55	2233	2.8491	2.9384	0.0893	40
29-Dec-16	20355	11145.47	11169.46	1439.40	34	34	34.0	15.9	1024	1.06	1519	2.8269	2.9348	0.1079	71
AM5a - Ping Yeung Village House															
2-Dec-16	20236	8872.42	8896.12	1422.00	50	50	50.0	20.5	1022.6	1.69	2406	2.8300	3.0712	0.2412	100
8-Dec-16	20268	8896.12	8920.12	1440.00	50	50	50.0	19.2	1016.5	1.69	2435	2.8735	3.0029	0.1294	53
14-Dec-16	20278	8920.12	8944.12	1440.00	50	50	50.0	21.4	1018.2	1.69	2428	2.8262	3.0090	0.1828	75
20-Dec-16	20298	8944.12	8968.12	1440.00	32	32	32.0	21.3	1017.3	1.16	1673	2.8055	3.0039	0.1984	119
23-Dec-16	20325	8968.12	8992.12	1440.00	50	50	50.0	20.2	1019	1.69	2433	2.8508	3.0490	0.1982	81
29-Dec-16	20352	8992.12	9016.12	1440.00	52	52	52.0	15.9	1024	1.70	2448	2.8126	3.0462	0.2336	95

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
AM6 - Wo Keng Shan Village House															
2-Dec-16	20237	7454.39	7478.39	1440.00	44	44	44.0	20.5	1022.6	1.41	2032	2.8241	3.0994	0.2753	135
8-Dec-16	20264	7478.39	7502.39	1440.00	44	44	44.0	19.2	1016.5	1.41	2031	2.8570	3.0671	0.2101	103
14-Dec-16	20281	7502.39	7526.39	1440.00	48	48	48.0	21.4	1018.2	1.52	2191	2.8427	3.1540	0.3113	142
20-Dec-16	20299	7526.39	7550.40	1440.60	35	35	35.0	21.3	1017.3	1.15	1653	2.8185	3.0091	0.1906	115
23-Dec-16	20326	7550.40	7574.40	1440.60	20	20	20.0	20.2	1019.0	0.72	1033	2.8512	2.9263	0.0751	73
29-Dec-16	20353	7574.40	7598.39	1440.60	30	30	30.0	15.9	1024.0	0.99	1427	2.8155	2.9414	0.1259	88
AM7b - Loi Tung Village House															
2-Dec-16	20238	16490.64	16514.65	1440.60	28	28	28.0	20.5	1022.6	0.72	1037	2.8401	2.9318	0.0917	88
8-Dec-16	20263	16514.65	16538.65	1440.00	28	28	28.0	19.2	1016.5	0.72	1036	2.8718	2.9850	0.1132	109
14-Dec-16	20282	16538.65	16562.65	1440.00	28	28	28.0	21.4	1018.2	0.72	1032	2.8126	2.9335	0.1209	117
20-Dec-16	20300	16562.65	16586.65	1440.00	28	28	28.0	21.3	1017.3	0.72	1032	2.8070	2.8797	0.0727	70
23-Dec-16	20327	16586.65	16610.65	1440.00	30	30	30.0	20.2	1019	0.78	1128	2.8370	2.9317	0.0947	84
29-Dec-16	20354	16610.65	16634.65	1440.00	30	30	30.0	15.9	1024	0.66	944	2.8016	2.9237	0.1221	129
AM8 - Po Kat Tsai Village No. 4															
2-Dec-16	20255	10397.18	10421.19	1440.60	44	44	44.0	20.5	1022.6	1.20	1727	2.8568	3.0181	0.1613	93
8-Dec-16	20271	10421.19	10445.19	1440.00	43	43	43.0	19.2	1016.5	1.17	1680	2.8575	3.0240	0.1665	99
14-Dec-16	20279	10445.19	10469.19	1440.00	42	42	42.0	21.4	1018.2	1.13	1631	2.8147	2.9373	0.1226	75
20-Dec-16	20301	10469.19	10493.19	1440.00	42	42	42.0	21.3	1017.3	1.13	1630	2.8225	2.9034	0.0809	50
23-Dec-16	20328	10493.19	10517.19	1440.00	43	43	43.0	20.2	1019	1.17	1680	2.8173	2.8783	0.0610	36
29-Dec-16	20356	10517.19	10541.19	1440.00	44	44	44.0	15.9	1024	1.14	1636	2.8162	2.9591	0.1429	87
AM9b - Nam Wa Po Village House No. 80															
6-Dec-16	20262	17800.42	17824.41	1439.40	26	26	26.0	20.8	1020.7	0.70	1001	2.8680	2.9531	0.0851	85
13-Dec-16 (#)	20295	17824.41	17848.41	1440.00	30	30	30.0	21.1	1015.1	0.83	1197	2.8266	2.9067	0.0801	67
17-Dec-16	20296	17848.41	17872.41	1440.00	34	34	34.0	16.6	1023.2	0.98	1417	2.8297	2.9100	0.0803	57
22-Dec-16	20323	17872.41	17896.41	1440.00	30	30	30.0	22.4	1016.8	0.83	1195	2.8467	2.9182	0.0715	60
28-Dec-16	20332	17896.41	17920.41	1440.00	26	28	27.0	14	1023	1.00	1440	2.8291	2.9154	0.0863	60

Remark (#) power failure of HVS was occurred on 12 December 2016 and re-sampling was conducted on 13 December 2016.

Construction Noise Monitoring Results, dB(A)

Date	Start Time	1 st Leq _{5min} n	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq30	façade correction
NM1 - Tsung Yuen Ha Village House No. 63																					
2-Dec-16	9:46	54.4	56.8	48.1	55.8	57.2	47.3	54.6	57.3	46.2	55.2	58.5	47.3	57.1	59.2	49.1	56.2	60.1	48.2	56	NA
8-Dec-16	9:36	54.6	57.4	48.6	54.3	57.6	50.3	54.9	57.8	50.5	55.7	58.6	51.1	53.5	56.2	50.2	54.3	56.8	49.6	55	NA
14-Dec-16	9:19	54.8	57.0	46.5	60.9	64.0	46.0	59.1	63.5	48.5	53.9	56.5	46.0	59.1	61.5	48.0	66.2	62.5	47.5	61	NA
20-Dec-16	9:29	64.0	67.0	58.5	64.4	66.5	55.5	61.6	63.5	56.0	61.1	63.0	56.5	62.7	64.0	55.5	63.7	64.0	56.0	63	NA
29-Dec-16	9:30	55.8	57.1	53.8	55.0	56.6	53.1	55.8	57.3	53.3	55.0	56.6	52.9	53.9	55.6	52.2	53.7	55.0	52.0	55	NA
NM2a - Village House near Lin Ma Hang Road																					
2-Dec-16	10:38	59.9	62.0	51.3	61.4	64.3	54.8	57.2	62.4	52.9	58.9	62.6	53.8	61.6	64.8	56.2	62.6	65.8	54.7	61	64
8-Dec-16	10:17	58.2	61.4	53.2	57.7	59.4	53.4	57.2	60.7	52.2	59.3	61.6	52.8	57.7	64.2	53.4	56.3	62.2	53.6	58	61
14-Dec-16	10:09	53.4	56.0	44.0	61.2	67.0	49.5	65.2	70.0	52.5	62.3	63.0	50.0	63.7	68.5	45.5	59.4	63.0	44.5	62	65
20-Dec-16	10:16	70.6	72.5	67.0	67.8	70.0	64.0	68.1	70.0	64.5	67.4	69.5	64.5	68.7	70.0	64.5	70.8	72.0	64.5	69	72
29-Dec-16	10:25	60.4	64.1	51.3	61.0	64.1	53.9	59.8	61.8	51.1	60.9	64.9	52.7	60.8	64.5	51.8	61.7	65.3	52.9	61	64
NM3 - Ping Yeung Village House																					
9-Dec-16	9:51	67.2	70.0	59.4	62.8	65.1	59.0	63.0	65.0	59.0	62.8	64.9	59.1	64.0	65.5	58.2	61.8	63.6	57.1	64	NA
15-Dec-16	9:16	65.8	64.2	55.7	66.7	67.1	54.3	65.4	68.3	56.7	62.7	64.6	58.3	65.4	66.2	59.4	61.7	63.8	60.0	65	NA
21-Dec-16	9:15	64.0	65.0	61.5	63.0	63.5	62.0	62.6	63.0	61.5	62.8	63.5	61.5	63.0	63.5	62.0	63.2	64.5	61.5	63	NA
30-Dec-16	10:10	62.1	63.5	60.1	66.4	68.9	60.0	61.4	62.5	60.1	62.4	63.4	61.1	62.5	63.5	60.6	62.5	63.4	61.6	63	NA
NM4 - Wo Keng Shan Village House																					
9-Dec-16	9:17	66.1	65.7	53.9	67.1	66.8	55.4	73.3	69.4	55.1	66.6	69.4	58.0	68.6	70.2	54.5	62.8	64.8	54.6	69	NA
15-Dec-16	10:04	64.2	66.4	54.2	66.7	68.4	55.2	65.2	67.0	56.7	65.1	66.8	55.2	67.1	68.4	57.1	63.2	65.5	55.4	65	NA
21-Dec-16	9:57	66.1	68.0	62.5	68.3	70.5	65.0	67.0	68.5	64.5	65.2	67.0	62.0	65.1	67.5	61.0	67.7	69.5	63.5	67	NA
30-Dec-16	9:38	64.9	65.7	50.0	62.6	64.8	49.0	64.3	65.0	50.2	65.3	67.2	50.6	61.2	58.8	47.0	66.1	71.0	47.7	64	NA
NM5 - Ping Yeung Village House																					
9-Dec-16	10:29	55.7	57.1	52.1	56.6	57.8	53.8	59.4	62.3	53.9	57.3	59.0	52.9	60.1	62.0	54.0	60.0	61.9	54.0	59	NA
15-Dec-16	9:40	53.0	55.0	48.0	57.4	54.5	47.5	55.5	58.0	46.0	51.1	53.0	44.5	56.7	55.5	46.5	64.3	68.5	48.0	59	NA
21-Dec-16	10:54	66.6	70.5	58.5	59.3	60.5	57.5	60.6	61.5	57.0	59.6	60.5	57.0	60.7	60.0	56.5	56.9	57.0	56.0	62	NA
30-Dec-16	11:20	50.3	52.5	46.1	50.0	53.7	44.9	49.1	52.1	44.2	48.8	52.2	43.3	49.0	52.5	44.4	48.9	51.8	43.7	49	NA
NM6 - Tai Tong Wu Village House 2																					
9-Dec-16	11:03	58.7	62.0	53.5	54.4	54.9	53.3	54.6	55.5	53.1	54.6	55.1	53.3	54.2	55.0	53.0	56.1	58.8	53.0	56	NA
15-Dec-16	10:22	68.1	65.0	47.0	58.7	60.0	49.0	55.9	57.5	49.5	57.1	58.0	48.5	54.9	57.0	48.0	54.4	57.0	47.0	62	NA
21-Dec-16	11:31	69.1	71.0	64.5	65.6	67.5	62.0	68.5	70.0	65.5	65.2	66.0	62.0	65.6	67.0	63.0	64.8	66.5	63.0	67	NA
30-Dec-16	10:45	58.0	61.5	49.2	58.5	61.1	52.0	60.3	62.2	54.3	58.1	60.5	53.9	57.9	60.7	52.3	58.8	61.1	53.5	59	NA

Date	Start Time	1 st Leq _{5mi} n	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq30	façade correction
NM7 – Po Kat Tsai Village																					
9-Dec-16	11:41	63.4	65.8	58.9	63.6	66.0	59.4	68.5	71.1	61.4	64.5	67.4	60.1	65.0	67.5	59.0	64.3	66.9	57.0	65	NA
15-Dec-16	11:10	70.0	72.5	60.5	68.0	71.0	61.5	68.4	71.0	62.0	70.3	72.5	60.0	66.9	69.0	61.5	68.4	71.0	61.0	69	NA
21-Dec-16	13:06	73.0	73.0	63.0	71.5	70.5	64.5	67.4	69.0	63.0	70.8	73.5	63.5	71.0	73.0	64.0	72.2	75.5	64.5	71	NA
30-Dec-16	13:00	63.2	61.6	51.1	61.7	65.3	50.9	58.3	61.0	51.7	63.3	62.8	49.3	60.6	65.7	51.6	58.6	59.1	52.0	61	NA
NM8 - Village House, Tong Hang																					
2-Dec-16	9:43	58.7	64.3	50.2	57.2	63.4	50	58.7	64	51.6	57.8	63.7	50.8	57.7	63.7	51	56	62.5	50.8	58	NA
8-Dec-16	9:35	58	63.7	47	59	63.4	47.1	60.8	66.2	48.4	55.1	60.8	46.4	57.4	62.8	47.6	58.6	63.7	47.8	58	NA
14-Dec-16	9:48	59.3	64.1	53.2	59.8	65.7	54	59.3	64.5	53.8	58.3	63.1	52	60.5	65.1	54.5	59.7	64.5	53	60	NA
20-Dec-16	9:42	58.6	63.2	47	59.4	63.7	47.6	60.6	65	48	58.8	63.3	47.5	57.7	62	46.7	55.4	61.5	46.4	59	NA
29-Dec-16	9:38	56.8	56.3	51.5	57.7	62.6	51.5	55.5	58.4	51.7	57.9	61.8	52	57.8	60.4	51.5	60.8	62.8	52.9	58	NA
NM9 - Village House, Kiu Tau Village																					
2-Dec-16	10:26	61.6	63.9	58.4	60.8	62.9	57.7	62.7	65.4	58.0	60.5	63.9	56.8	59.4	61.4	56.8	61.6	63.6	57.0	61	NA
8-Dec-16	10:16	61.8	64.8	58.7	60.7	62.5	58.0	62.5	65.2	58.8	61.5	63.6	58.2	62.7	64.2	59.2	61.8	63.6	58.5	62	NA
14-Dec-16	10:35	62.1	66.8	58.5	60.3	63.4	58.0	61.2	65.2	57.5	62.2	66.7	58.5	61.7	65.5	57.7	60.5	64.2	57.9	61	NA
20-Dec-16	10:29	62.3	66.5	58.1	64.4	67.7	58.7	60.8	62.9	58.0	61.4	65.0	58.6	64.8	67.1	59.9	64.5	66.5	59.4	63	NA
29-Dec-16	10:24	61.8	64.0	58.8	60.2	62.1	58.3	62.6	65.7	58.7	63.4	66.5	59.2	62.1	65.8	58.9	61.4	64.4	57.6	62	NA
NM10 - Nam Wa Po Village House No. 80																					
2-Dec-16	15:08	64.6	65.2	62.3	65.8	66.7	62.3	64.9	65.5	62.0	65.5	65.6	60.9	63.7	63.8	59.9	62.5	62.9	59.4	65	68
8-Dec-16	10:58	62.2	63.3	60.6	62.2	63.3	60.9	62.4	63.9	60.3	61.9	63.0	60.4	62.5	64.7	61.5	61.8	63.5	60.0	62	65
14-Dec-16	13:50	60.3	61.7	58.4	60.0	61.4	58.2	60.4	61.8	58.6	61.2	62.5	59.9	60.8	61.2	58.3	61.7	61.3	58.6	61	64
20-Dec-16	11:17	64.7	66.1	59.0	61.2	63.4	58.5	62.6	63.2	59.7	62.9	64.0	60.0	62.0	63.4	59.3	61.6	63.7	58.5	63	66
29-Dec-16	11:09	65.7	68.4	61.0	63.0	65.8	60.6	62.4	65.1	59.0	62.8	65.8	60.7	62.9	65.9	59.8	61.4	64.9	58.7	63	66

Noise Monitoring Results for Restricted Hour, dB(A)

Evening Time						Night Time					
Date	Start Time	Leq _{5min}	L10	L90	façade correction Leq _{5min}	Date	Start Time	Leq _{5min}	L10	L90	façade correction Leq _{5min}
NM1 – Tsung Yuen Ha											
2-Dec-16	22:35	48.7	50.7	45.7	NA	--	--	--	--	--	--
NM4 - Wo Keng Shan Village House											
16-Dec-16	22:05	44.9	47.1	35.8	NA	--	--	--	--	--	--
20-Dec-16	21:58	55.4	47.1	44.1	NA	--	--	--	--	--	--
30-Dec-16	22:10	49.6	47.3	33.2	NA	--	--	--	--	--	--
NM5– Ping Yeung Village House											
2-Dec-16	22:54	48.3	50.1	38.5	NA	2-Dec-16	23:00	45.5	48.6	38.7	NA
9-Dec-16	22:34	47.3	48.4	40.1	NA	9-Dec-16	23:00	47.4	50.1	39.3	NA
16-Dec-16	22:30	48.2	51.5	40.5	NA	16-Dec-16	23:00	53.2	53.9	42.0	NA
20-Dec-16	22:22	49.9	52.8	41.9	NA	20-Dec-16	23:00	49.5	51.9	42.5	NA
30-Dec-16	22:25	48.3	51.8	41.5	NA	30-Dec-16	23:00	45.6	48.9	39.0	NA
NM7 – Po Kat Tsai Village											
2-Dec-16	22:11	53.6	54.1	52.9	NA	2-Dec-16	23:15	54.1	53.6	52.4	NA
9-Dec-16	22:19	48.0	49.2	45.3	NA	9-Dec-16	23:14	48.7	49.7	47.3	NA
16-Dec-16	21:49	44.0	44.9	41.9	NA	16-Dec-16	23:20	46.9	47.7	44.3	NA
20-Dec-16	21:38	54.3	54.6	53.9	NA	20-Dec-16	23:15	57.1	59.3	53.7	NA
30-Dec-16	21:50	60.1	59.7	43.9	NA	31-Dec-16	0:05	44.0	45.2	42.6	NA
NM8 - Village House, Tong Hang											
2-Dec-16	21:34	58.7	64.5	44.4	NA	2-Dec-16	23:39	52.4	49.5	43.7	NA
9-Dec-16	21:47	55.6	55.9	46.3	NA	9-Dec-16	23:39	59.6	66.0	44.2	NA
16-Dec-16	21:16	58.0	64.2	45.8	NA	16-Dec-16	23:58	58.0	63.6	45.1	NA
20-Dec-16	21:07	57.3	63.3	45.3	NA	20-Dec-16	23:38	58.0	62.7	45.8	NA
30-Dec-16	21:21	57.8	64.6	46.5	NA	31-Dec-16	0:27	57.6	63.8	45.4	NA
NM9 - Village House, Kiu Tau Village											
--	--	--	--	--	--	3-Dec-16	0:00	62.9	67	53.1	NA
--	--	--	--	--	--	10-Dec-16	0:00	60.8	65.3	52.9	NA
--	--	--	--	--	--	21-Dec-16	0:00	60.2	63	53.2	NA
NM10 - Nam Wa Po Village House No. 80											
--	--	--	--	--	--	3-Dec-16	0:25	57.3	61.4	56.7	60.3
--	--	--	--	--	--	10-Dec-16	0:11	56.6	61.3	56.8	59.6
--	--	--	--	--	--	21-Dec-16	0:11	57.2	62.1	57.7	60.1

Water Quality Monitoring Data for Contract 6 and SS C505

Date	2-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	19	19.0	9.12	9.1	97.0	96.8	6.5	6.0	9.4	9.4	2	2.5
			19		9.1		96.6		5.6		9.4		3	
WM1	10:15	0.26	18.7	18.7	8.47	8.5	90.7	90.9	51.2	50.8	9.2	9.2	46	48.0
			18.7		8.49		91.0		50.4		9.2		50	

Date	6-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	19.7	19.7	8.44	8.5	90.5	91.2	5.4	5.4	9	9.0	4	3.5
			19.7		8.54		91.8		5.5		9		3	
WM1	10:10	0.26	19.8	19.8	8.02	8.1	88.1	88.5	12.1	11.8	8.7	8.7	15	14.5
			19.8		8.08		88.9		11.5		8.7		14	

Date	8-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:30	0.34	18.4	18.4	9.07	9.1	94.6	94.5	7.2	7.1	9.5	9.5	2	2.0
			18.4		9.06		94.4		6.9		9.5		2	
WM1	10:40	0.20	18.2	18.2	8.41	8.4	88.9	89.1	18.7	18.4	9.2	9.2	19	19.5
			18.2		8.44		89.3		18.1		9.2		20	

Date	10-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	18	18.0	8.67	8.7	90.2	90.3	6.3	6.2	8.9	8.9	<2	<2
			18		8.72		90.3		6.0		8.9		<2	
WM1	10:10	0.26	17.9	17.9	8.48	8.5	89.4	89.6	32.1	32.3	8.6	8.6	32	31.5
			17.9		8.53		89.7		32.4		8.6		31	

Date	13-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:25	0.34	22.2	22.2	9.28	9.3	106.2	106.4	12.3	11.7	9.2	9.2	<2	<2
			22.2		9.31		106.5		11.1		9.2		<2	
WM1	11:35	0.26	21.9	21.9	7.74	7.8	88.7	89.2	31.4	31.2	9.1	9.1	32	31.5
			21.9		7.84		89.7		30.9		9.1		31	

Date	15-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	17.2	17.2	8.77	8.8	90.5	90.4	6.0	5.7	9.3	9.3	2	2.5
			17.2		8.74		90.2		5.3		9.3		3	
WM1	10:10	0.26	17.1	17.1	8.72	8.7	90.6	90.7	42.2	40.7	8.9	8.9	39	39.5
			17.1		8.74		90.7		39.2		8.9		40	

Date	17-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	16.3	16.3	9.39	9.4	95.4	95.5	4.1	4.0	10.4	10.4	3	3.0
			16.3		9.41		95.6		3.9		10.4		3	
WM1	10:10	0.26	16	16.0	9.48	9.5	95.9	96.0	15.6	15.9	10	10.0	17	16.0
			16		9.49		96.0		16.2		10		15	

Date	19-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:45	0.34	19.9	19.9	8.91	8.9	96.3	96.4	4.6	4.3	9.1	9.1	<2	<1
			19.9		8.92		96.5		4.1		9.1		<2	
WM1	10:55	0.26	20.6	20.6	7.74	7.7	85.4	85.5	31.7	30.5	8.9	8.9	28	29.0
			20.6		7.73		85.5		29.2		8.9		30	

Date	21-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:40	0.03	23.8	23.8	6.08	6.1	72.0	71.8	4.4	4.7	8.10	8.1	4	4.0
			23.8		6.05		71.6		5.0		8.10		4	
WM3	10:55	0.15	21.6	21.6	7.68	7.7	87.1	86.9	13.4	13.1	8.40	8.4	12	12.5
			21.6		7.65		86.7		12.8		8.40		13	

Date	23-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	9:27	0.18	22.6	22.7	7.27	7.3	84.5	85.2	4.0	3.9	7.50	7.5	2	2.5
			22.7		7.35		85.8		3.9		7.50		3	
WM3	9:14	0.19	20.6	20.7	7.82	7.9	86.1	86.8	12.7	13.0	7.90	7.9	10	9.5
			20.7		7.94		87.5		13.3		7.90		9	

Date	27-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:39	0.17	21.7	21.8	6.97	6.9	79.5	80.0	8.4	8.3	7.60	7.6	4	4.0
			21.8		6.87		80.5		8.2		7.60		4	
WM3	10:47	0.14	21.3	21.3	7.59	7.6	85.7	86.0	13.1	13.0	7.90	7.9	9	9.0
			21.3		7.63		86.3		12.9		7.90		9	

Date	29-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:50	0.03	20.3	20.3	7.21	7.2	80.2	80.4	13.0	13.2	8.6	8.6	2	2.5
			20.3		7.26		80.5		13.3		8.6		3	
WM3	11:05	0.15	18.3	18.3	8.68	8.7	92.4	92.3	13.3	12.6	8.9	8.9	28	29.5
			18.3		8.65		92.2		11.8		8.9		31	

Date	31-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:16	0.24	19.1	19.1	8.61	8.6	84.4	85.2	3.8	3.8	8.6	8.6	3	3.0
			19		8.65		85.9		3.8		8.6		<2	
WM3	11:28	0.15	19.1	19.1	8.61	8.6	93.0	93.4	11.1	11.4	9.1	9.1	10	10.0
			19		8.65		93.7		11.7		9.1		10	

Water Quality Monitoring Data for Contract 2 and 3

Date	2-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:10	0.18	20.2	20.2	8.53	8.5	94.4	94.4	16.0	15.7	10.3	10.3	10	10.5
			20.2		8.52		94.4		15.3		10.3		11	
WM4-CB	13:25	0.31	21.6	21.6	7.14	7.1	81.4	81.3	16.8	16.8	10	10.0	22	21.5
			21.6		7.13		81.1		16.7		10		21	
WM4	13:00	0.14	20.3	20.3	8.26	8.3	91.7	91.8	19.3	18.7	10.4	10.4	19	19.5
			20.3		8.27		91.9		18.0		10.4		20	

Date	6-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:10	0.18	20.9	20.9	8.42	8.4	94.4	94.5	5.4	5.0	10.4	10.4	2	2.0
			20.9		8.42		94.6		4.6		10.4		2	
WM4-CB	13:26	0.31	21.7	21.7	7.09	7.1	80.9	80.8	13.0	13.6	9.6	9.6	17	18.0
			21.7		7.08		80.6		14.2		9.6		19	
WM4	13:00	0.14	20.6	20.6	8.43	8.4	93.9	93.9	16.6	16.5	10.4	10.4	24	23.5
			20.6		8.42		93.9		16.3		10.4		23	

Date	8-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:10	0.18	21.1	21.1	8.43	8.4	94.8	95.1	3.9	4.1	9.4	9.4	<2	<2
			21.1		8.46		95.3		4.2		9.4		<2	
WM4-CB	13:20	0.31	23.2	23.2	7.1	7.1	83.3	83.4	9.1	8.9	8.7	8.7	8	8.0
			23.2		7.12		83.5		8.8		8.7		8	
WM4	13:00	0.14	21.4	21.4	8.42	8.4	95.3	95.4	14.8	14.6	9	9.0	12	12.0
			21.4		8.44		95.5		14.3		9		12	

Date	10-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:10	0.18	20	20.0	8.64	8.7	95.3	95.4	5.2	5.0	9.2	9.2	<2	<2
			20		8.68		95.5		4.7		9.2		<2	
WM4-CB	13:20	0.31	21.9	21.9	7.32	7.3	83.8	83.7	19.5	19.5	8.6	8.6	21	20.0
			21.9		7.31		83.6		19.4		8.6		19	
WM4	13:00	0.14	20.5	20.5	8.48	8.5	93.9	93.9	15.2	14.3	8.8	8.8	13	12.5
			20.5		8.42		93.8		13.4		8.8		12	

Date		13-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:40	0.18	24.4	24.4	7.64	7.7	91.8	91.9	22.6	21.9	9.9	9.9	8	7.5
			24.4		7.66		92.0		21.1		9.9		7	
WM4-CB	13:50	0.31	26	26.0	5.98	6.0	73.8	73.8	11.8	12.0	9.4	9.4	12	12.0
			26		5.97		73.7		12.2		9.4		12	
WM4	13:30	0.14	24.8	24.8	7.69	7.7	92.5	92.6	22.8	23.0	10	10.0	27	27.0
			24.8		7.7		92.6		23.2		10		27	

Date		15-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	20.2	20.2	8.61	8.6	95.1	95.2	5.0	4.9	10.1	10.1	<2	<2
			20.2		8.64		95.3		4.7		10.1		<2	
WM4-CB	13:30	0.31	21.3	21.3	7.36	7.4	83.2	83.2	16.4	15.3	9.9	9.9	15	14.0
			21.3		7.35		83.1		14.1		9.9		13	
WM4	13:00	0.14	19.7	19.7	8.75	8.8	96.0	96.1	18.8	17.6	9.9	9.9	19	18.5
			19.7		8.78		96.2		16.3		9.9		18	

Date		17-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:15	0.18	18	18.0	9.1	9.2	96.5	96.6	4.0	4.0	9.7	9.7	4	4.0
			18		9.2		96.7		3.9		9.7		4	
WM4-CB	12:30	0.31	19.9	19.9	7.2	7.2	79.2	79.3	15.4	14.9	9.4	9.4	16	16.0
			19.9		7.2		79.3		14.4		9.4		16	
WM4	12:00	0.14	18.1	18.1	8.7	8.7	92.6	92.7	79.4	80.5	9.7	9.7	119	117.5
			18.1		8.7		92.7		81.6		9.7		116	

Date		19-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	22.2	22.2	8.08	8.1	92.8	93.0	4.7	4.4	9.1	9.1	3	3.0
			22.2		8.09		93.2		4.1		9.1		3	
WM4-CB	13:30	0.31	23.9	23.9	6.19	6.2	73.4	73.8	9.5	9.6	8.7	8.7	9	9.5
			23.9		6.22		74.1		9.7		8.7		10	
WM4	13:00	0.14	22.5	22.5	8.32	8.3	95.9	96.1	12.0	11.7	9.1	9.1	12	11.5
			22.5		8.34		96.3		11.4		9.1		11	

Date	20-Dec-16#													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18							2.4	2.2			<2	<2
							2.0							
WM4-CB	13:30	0.31							6.2	6.2			6	6.0
							6.1							
WM4	13:00	0.14							6.1	6.1			6	6.0
							6.2							

Date	21-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:30	0.18	21.5	21.5	7.99	8.0	90.3	90.3	5.6	5.4	9.1	9.1	3	2.5
			21.5		7.98		90.3		5.2		9.1		2	
WM4-CB	11:20	0.31	22.3	22.3	5.57	5.5	64.3	63.3	17.0	17.6	8.5	8.5	14	15.0
			22.3		5.43		62.3		18.2		8.5		16	
WM4	11:10	0.14	22.2	22.2	7.69	7.7	88.3	88.2	17.1	16.1	9	9.0	20	19.5
			22.2		7.68		88.0		15.1		9		19	

Date	23-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:25	0.15	20	20.0	8.11	8.1	88.7	89.1	5.6	5.6	8.9	8.9	<2	2.0
			20		8.14		89.4		5.6		8.9		2	
WM4-CB	13:46	0.38	20.7	20.8	6.85	6.9	76.9	77.2	14.4	13.9	8.5	8.5	12	13.0
			20.8		6.89		77.5		13.3		8.5		14	
WM4	13:07	0.19	19.8	19.9	8.05	8.1	88.7	89.1	12.1	12.1	8.4	8.4	10	10.5
			19.9		8.11		89.5		12.1		8.4		11	

Date	27-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:49	0.17	19.4	19.5	8.45	8.5	91.6	92.5	9.8	9.9	8.7	8.7	4	3.0
			19.5		8.5		93.3		9.9		8.7		2	
WM4-CB	12:04	0.34	20.3	20.4	6.26	6.3	69.3	69.9	17.7	17.9	8.2	8.2	16	17.0
			20.4		6.37		70.4		18.0		8.2		18	
WM4	11:36	0.21	19.9	19.9	7.66	7.7	84.2	84.8	24.1	24.7	8.3	8.3	21	20.0
			19.9		7.7		85.3		25.3		8.3		19	

Date	29-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:35	0.18	16.9	16.9	9.12	9.1	94.5	94.6	4.5	4.3	8.7	8.7	<2	<2
			16.9		9.14		94.6		4.1		8.7		<2	
WM4-CB	11:45	0.31	18.3	18.3	7.51	7.5	80.1	80.1	9.7	9.8	8.3	8.3	6	5.5
			18.3		7.5		80.0		9.8		8.3		5	
WM4	11:20	0.14	16.6	16.6	9.32	9.3	95.8	95.9	14.8	14.4	8.7	8.7	14	13.5
			16.6		9.36		96.0		13.9		8.7		13	

Date	31-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:20	0.18	18.2	18.2	9.02	9.1	95.3	96.2	3.1	3.1	8.9	8.9	2	2.5
			18.2		9.13		97.0		3.1		8.9		3	
WM4-CB	12:39	0.30	21.4	21.5	7.07	7.1	80.2	80.7	19.4	19.7	8.6	8.6	18	17.5
			21.54		7.13		81.1		19.9		8.6		17	
WM4	12:07	0.20	19.8	19.8	8.66	8.7	95.3	96.0	10.3	10.9	8.9	8.9	12	11.5
			19.8		8.69		96.7		11.4		8.9		11	

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

	Action Level
	Limit Level

Water Quality Monitoring Data for Contract 6

Date	2-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.28	19	19.0	8.36	8.4	90.2	90.3	10.1	9.7	9.30	9.3	4	4.0
			19		8.37		90.3		9.3		9.30		4	
WM2A	10:25	0.17	18.8	18.8	8.33	8.4	89.2	89.6	23.5	23.7	9.20	9.2	14	14.5
			18.8		8.37		89.9		23.8		9.20		15	

Date	6-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:35	0.28	19.3	19.3	8.3	8.3	89.8	89.9	9.3	9.3	8.90	8.9	5	5.0
			19.3		8.31		90.0		9.2		8.90		5	
WM2A	10:25	0.17	20.5	20.5	8.06	8.1	89.5	89.8	56.2	58.3	8.60	8.6	65	62.5
			20.5		8.09		90.1		60.4		8.60		60	

Date	7-Dec-16#													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:25	0.28							7.2	7.0			<2	<2
							6.8							
WM2A	10:15	0.17							19.9	19.7			17	17.0
							19.4							

Date	8-Dec-16#													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:08	0.28	18.4	18.4	8.26	8.3	87.9	88.2	11.0	10.7	9.50	9.5	3	3.0
			18.4		8.31		88.4		10.3		9.50		3	
WM2A	10:55	0.17	18.7	18.7	8.42	8.4	90.2	90.4	22.0	23.5	9.00	9.0	24	23.5
			18.7		8.44		90.5		24.9		9.00		23	

Date	10-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.28	18.6	18.6	8.44	8.4	90.3	90.3	11.0	11.0	8.80	8.8	<2	<2
			18.6		8.44		90.2		10.9		8.80		<2	
WM2A	10:25	0.17	18.3	18.3	8.65	8.6	92.0	91.9	21.5	20.6	8.50	8.5	14	14.5
			18.3		8.64		91.8		19.7		8.50		15	

Date		13-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:15	0.28	21.4	21.4	7.48	7.6	85.0	85.6	8.2	8.1	8.70	8.7	<2	<2
			21.4		7.63		86.2		8.0		8.70			
WM2A	11:50	0.17	21.9	21.9	7.82	7.9	89.1	89.9	10.2	10.2	9.00	9.0	7	7.0
			21.9		8		90.7		10.1		9.00		7	

Date		15-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.28	17.9	17.9	8.26	8.3	87.4	87.5	7.8	7.8	8.80	8.8	<2	2.0
			17.9		8.3		87.6		7.8		8.80		2	
WM2A	10:25	0.17	18.4	18.4	8.3	8.3	88.4	88.5	13.0	12.9	8.90	8.9	14	13.0
			18.4		8.39		88.6		12.8		8.90		12	

Date		17-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:35	0.28	16	12.5	8.94	9.0	91.9	92.0	7.1	7.0	9.40	9.4	<2	<2
			9		8.96		92.1		6.9		9.40			
WM2A	10:20	0.17	16.9	16.7	9.02	9.0	93.1	93.2	20.5	20.8	9.20	9.2	14	14.0
			16.5		9.03		93.2		21.1		9.20		14	

Date		19-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:25	0.28	19.7	19.7	8.12	8.1	88.5	88.6	7.1	7.1	8.80	8.8	4	4.0
			19.7		8.13		88.7		7.1		8.80		4	
WM2A	11:10	0.17	19.4	19.4	8.35	8.4	90.5	90.7	10.6	9.9	9.00	9.0	9	9.0
			19.4		8.37		90.9		9.2		9.00		9	

Date		21-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:15	0.28	20.6	20.6	7.79	7.8	86.7	86.8	12.0	11.7	8.70	8.7	<2	<2
			20.6		7.8		86.8		11.4		8.70		<2	
WM2A	10:00	0.17	20.5	20.5	7.77	7.8	86.3	86.4	18.7	18.6	8.80	8.8	14	14.0
			20.5		7.78		86.4		18.4		8.80		14	

Date		23-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:19	0.31	19.2	19.3	7.96	8.0	85.7	86.1	8.5	8.6	9.10	9.1	3	2.5
			19.3		7.98		86.4		8.6		9.10		2	
WM2A	10:33	0.18	19.8	19.8	7.07	7.1	77.7	78.1	22.7	22.9	8.80	8.8	14	14.5
			19.7		7.13		78.5		23.1		8.80		15	

Date		27-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:59	0.29	19.2	19.2	8.03	8.1	86.5	86.9	37.1	37.8	8.30	8.3	17	16.5
			19.2		8.17		87.3		38.4		8.30		16	
WM2A	9:48	0.17	19.5	19.5	7.37	7.4	80.3	80.7	36.4	36.1	8.40	8.4	19	19.0
			19.5		7.41		81.1		35.7		8.40		19	

Date		29-Dec-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:10	0.28	15.6	15.6	8.71	8.7	87.8	87.9	6.7	6.7	7.80	7.8	4	3.0
			15.6		8.76		88.0		6.6		7.80		2	
WM2A	10:00	0.17	14.4	14.4	8.69	8.7	86.1	86.5	88.1	86.4	8.00	8.0	84	80.5
			14.4		8.79		86.9		84.6		8.00		77	

Date		30-Dec-16#												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:15	0.28							7.5	7.2			<2	<2
							7.0				<2			
WM2A	10:30	0.17							11.5	11.1			10	10.0
							10.6				10			

Date	31-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:31	0.38	16.7	16.7	8.61	8.6	88.2	88.8	9.5	9.6	8.50	8.5	2	2.0
			16.7		8.64		89.3		9.6		8.50		<2	
WM2A	10:17	0.17	16	16.0	8.82	8.8	89.6	90.0	20.7	20.9	8.70	8.7	14	14.0
			16		8.85		90.3		21.1		8.70		14	

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

	Action Level
	Limit Level

Date														
2-Dec-16														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:00	0.02	22.5	22.5	7.32	7.3	84.6	84.7	2.9	2.9	9.60	9.6	<2	<2
			22.5		7.33		84.8		3.0		9.60			
WM2B	10:50	0.02	20.5	20.5	8.93	9.0	99.3	99.8	6.3	6.1	9.30	9.3	3	3.5
			20.5		9.01		100.2		6.0		9.30		4	

Date														
6-Dec-16														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:00	0.02	22.2	22.2	7.47	7.5	86.3	86.0	4.7	4.2	9.80	9.8	2	2.5
			22.2		7.44		85.7		3.7		9.80		3	
WM2B	10:50	0.02	20.4	20.4	8.86	8.9	98.2	98.5	7.0	6.8	9.20	9.2	5	5.5
			20.4		8.88		98.8		6.5		9.20		6	

Date														
8-Dec-16														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:40	0.02	22.4	22.4	7.51	7.5	86.8	86.8	3.9	3.7	9.80	9.8	<2	<2
			22.4		7.5		86.7		3.5		9.80		<2	
WM2B	11:25	0.02	19.7	19.7	8.98	9.0	98.4	98.6	7.2	7.3	8.90	8.9	4	3.5
			19.7		9.01		98.7		7.3		8.90		3	

Date														
10-Dec-16														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:10	0.02	22.5	22.5	7.29	7.3	84.3	84.2	2.8	3.0	9.20	9.2	<2	<2
			22.5		7.28		84.1		3.2		9.20		<2	
WM2B	10:55	0.02	18.5	18.5	8.95	8.9	97.5	97.4	7.6	7.9	8.80	8.8	6	5.0
			18.5		8.94		97.3		8.2		8.80		4	

Date														
13-Dec-16														
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	12:35	0.02	22.9	22.9	6.96	7.0	80.9	80.9	3.5	3.5	9.10	9.1	<2	<2
			22.9		6.95		80.8		3.4		9.10		<2	
WM2B	12:25	0.02	22.7	22.7	7.85	7.9	91.9	92.0	7.7	7.8	9.00	9.0	12	11.0
			22.7		7.87		92.0		8.0		9.00		10	

Date	15-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:05	0.02	21.8	21.8	7.21	7.2	82.4	82.4	4.2	3.9	9.30	9.3	<2	<2
			21.8		7.21		82.3		3.5		9.30		<2	
WM2B	10:55	0.02	18.5	18.5	9.37	9.4	100.6	100.8	6.4	6.3	8.80	8.8	3	2.5
			18.5		9.43		100.9		6.3		8.80		2	

Date	17-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:55	0.02	19.7	19.7	7.94	8.0	87.6	87.7	2.1	2.0	9.50	9.5	<2	<2
			19.7		7.96		87.7		1.9		9.50		<2	
WM2B	10:45	0.02	17.9	17.9	9.22	9.2	97.4	97.5	3.6	3.4	9.20	9.2	3	3.0
			17.9		9.23		97.5		3.2		9.20		3	

Date	19-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:45	0.02	22.2	22.2	6.92	6.8	80.1	78.9	2.6	2.4	10.00	10.0	2	2.0
			22.2		6.75		77.7		2.2		10.00		2	
WM2B	11:35	0.02	21	21.0	8.38	8.9	93.9	94.3	7.0	6.6	9.30	9.3	6	5.5
			21		9.42		94.7		6.3		9.30		5	

Date	21-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:25	0.02	22.4	22.4	7.09	7.1	82.0	81.9	2.7	2.7	9.70	9.7	<2	<2
			22.4		7.08		81.8		2.7		9.70		<2	
WM2B	10:30	0.02	21.8	21.8	8.09	8.1	92.1	92.3	11.0	11.2	9.00	9.0	10	10.0
			21.8		8.11		92.5		11.3		9.00		10	

Date	23-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	9:43	0.02	22.1	22.1	6.95	7.0	79.6	79.5	3.3	3.4	9.20	9.2	<2	<2
			22.1		6.97		79.4		3.5		9.20		<2	
WM2B	9:56	0.02	19.6	19.7	8.32	8.4	91.0	91.9	7.9	7.9	9.20	9.2	7	6.5
			19.7		8.43		92.7		8.0		9.20		6	

Date	27-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:28	0.02	21.9	21.9	7.1	7.2	81.4	81.9	2.3	2.3	8.90	8.9	<2	<2
			21.9		7.2		82.3		2.4		8.90		<2	
WM2B	10:11	0.02	20.8	20.8	7.44	7.6	86.6	87.1	11.3	11.1	8.50	8.5	10	10.0
			20.8		7.81		87.5		10.9		8.50		10	

Date	29-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	10:35	0.02	21.1	21.1	7.3	7.3	82.9	82.9	4.9	4.7	9.00	9.0	<2	<2
			21.1		7.29		82.8		4.5		9.00		<2	
WM2B	10:20	0.02	16	16.0	9.04	9.1	92.1	92.2	11.0	11.2	9.00	9.0	10	10.5
			16		9.1		92.2		11.3		9.00		11	

Date	31-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2B-C	11:00	0.02	17.5	17.5	7.17	7.2	81.9	82.1	2.9	2.9	9.2	9.2	<2	<2
			17.5		7.21		82.3		2.9		9.2		<2	
WM2B	10:47	0.02	17.1	17.1	8.96	8.9	93.7	93.2	5.3	5.3	8.5	8.5	3	3.0
			17.1		8.9		92.7		5.3		8.5		3	

Water Quality Monitoring Data for Contract 2 and 6

Date	2-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:15	0.03	23.2	23.2	6.94	7.0	81.3	81.6	3.6	3.5	10.10	10.1	4	5.0
			23.2		6.96		81.9		3.4		10.10		6	
WM3x	11:25	0.15	20.6	20.6	6.94	7.0	77.1	77.6	12.9	12.6	10.30	10.3	11	11.0
			20.6		7.01		78.1		12.2		10.30		11	

Date	6-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:15	0.03	23.3	23.3	6.76	6.8	79.3	79.3	4.1	3.9	11.20	11.2	13	12.5
			23.3		6.75		79.3		3.7		11.20		12	
WM3x	11:25	0.15	21.3	21.3	7.84	7.8	88.5	88.4	10.2	10.0	10.70	10.7	14	14.0
			21.3		7.81		88.2		9.8		10.70		14	

Date	8-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:50	0.03	23	23.0	7.24	7.2	84.4	84.3	5.6	5.5	7.90	7.9	10	9.5
			23		7.18		84.1		5.4		7.90		9	
WM3x	12:00	0.15	20.5	20.5	7.84	7.8	86.9	86.8	5.6	5.3	8.20	8.2	7	6.5
			20.5		7.82		86.7		5.1		8.20		6	

Date	10-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:20	0.03	23.4	23.4	6.97	6.9	81.9	81.7	3.4	3.2	7.70	7.7	2	2.5
			23.4		6.92		81.5		3.0		7.70		3	
WM3x	11:30	0.15	20.1	20.1	7.99	8.0	87.5	87.2	5.8	5.6	8.70	8.7	5	4.0
			20.1		7.92		86.9		5.4		8.70		3	

Date	13-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:45	0.03	24.9	24.9	5.97	6.0	72.4	72.5	17.9	17.5	10.90	10.9	36	37.0
			24.9		5.98		72.6		17.0		10.90		38	
WM3x	12:55	0.15	23.3	23.3	7.16	7.2	83.7	83.8	12.1	11.3	10.40	10.4	10	10.0
			23.3		7.17		83.8		10.4		10.40		10	

Date	15-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:20	0.03	22.2	22.2	7.08	7.1	81.6	81.8	5.6	5.2	10.70	10.7	11	11.5
			22.2		7.11		81.9		4.9		10.70		12	
WM3x	11:35	0.15	20.3	20.3	7.35	7.4	81.4	81.5	13.4	13.1	10.00	10.0	13	13.0
			20.3		7.36		81.5		12.7		10.00		13	

Date	17-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:05	0.03	20.5	20.5	7.68	7.7	85.2	85.3	3.0	2.9	10.10	10.1	7	8.0
			20.5		7.69		85.3		2.8		10.10		9	
WM3x	11:20	0.15	18.9	18.9	8.88	8.9	95.4	95.5	6.2	6.4	9.20	9.2	5	5.0
			18.9		8.9		95.5		6.5		9.20		5	

Date	19-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:00	0.03	23.4	23.4	7.08	7.1	83.2	83.3	4.3	4.0	8.10	8.1	6	5.5
			23.4		7.1		83.3		3.8		8.10		5	
WM3x	12:15	0.15	21.2	21.2	7.64	7.7	85.9	86.2	13.4	13.4	8.40	8.4	12	12.5
			21.2		7.66		86.4		13.3		8.40		13	

Date	21-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:40	0.03	23.8	23.8	6.08	6.1	72.0	71.8	4.4	4.7	8.10	8.1	4	4.0
			23.8		6.05		71.6		5.0		8.10		4	
WM3x	10:55	0.15	21.6	21.6	7.68	7.7	87.1	86.9	13.4	13.1	8.40	8.4	12	12.5
			21.6		7.65		86.7		12.8		8.40		13	

Date	23-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	9:27	0.18	22.6	22.7	7.27	7.3	84.5	85.2	4.0	3.9	7.50	7.5	2	2.5
			22.7		7.35		85.8		3.9		7.50		3	
WM3x	9:14	0.19	20.6	20.7	7.82	7.9	86.1	86.8	12.7	13.0	7.90	7.9	10	9.5
			20.7		7.94		87.5		13.3		7.90		9	

Date	27-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:39	0.17	21.7	21.8	6.97	6.9	79.5	80.0	8.4	8.3	7.60	7.6	4	4.0
			21.8		6.87		80.5		8.2		7.60		4	
WM3x	10:47	0.14	21.3	21.3	7.59	7.6	85.7	86.0	13.1	13.0	7.90	7.9	9	9.0
			21.3		7.63		86.3		12.9		7.90		9	

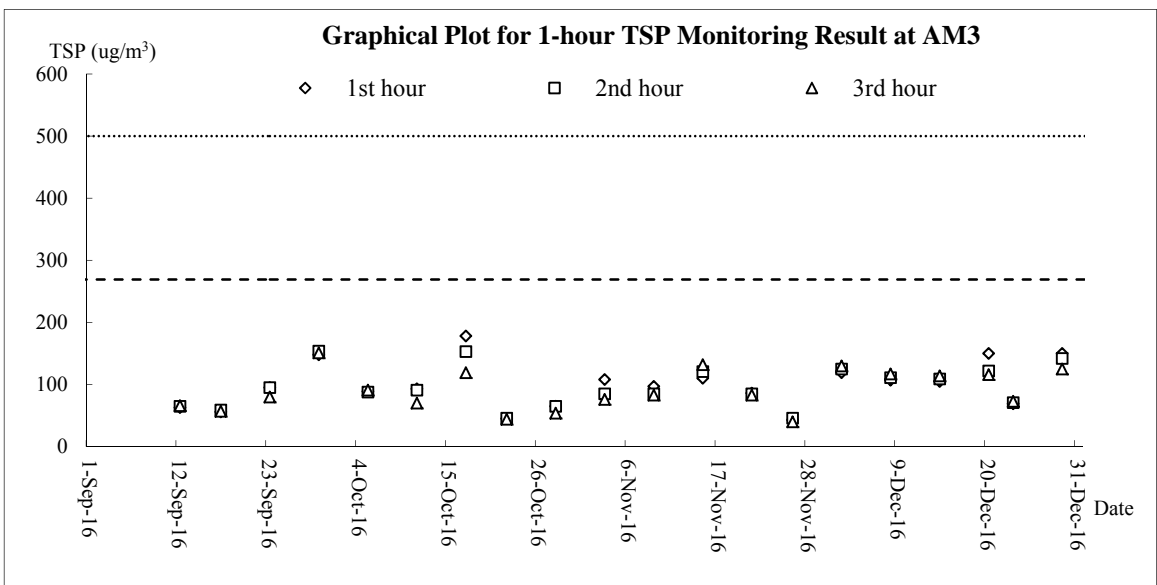
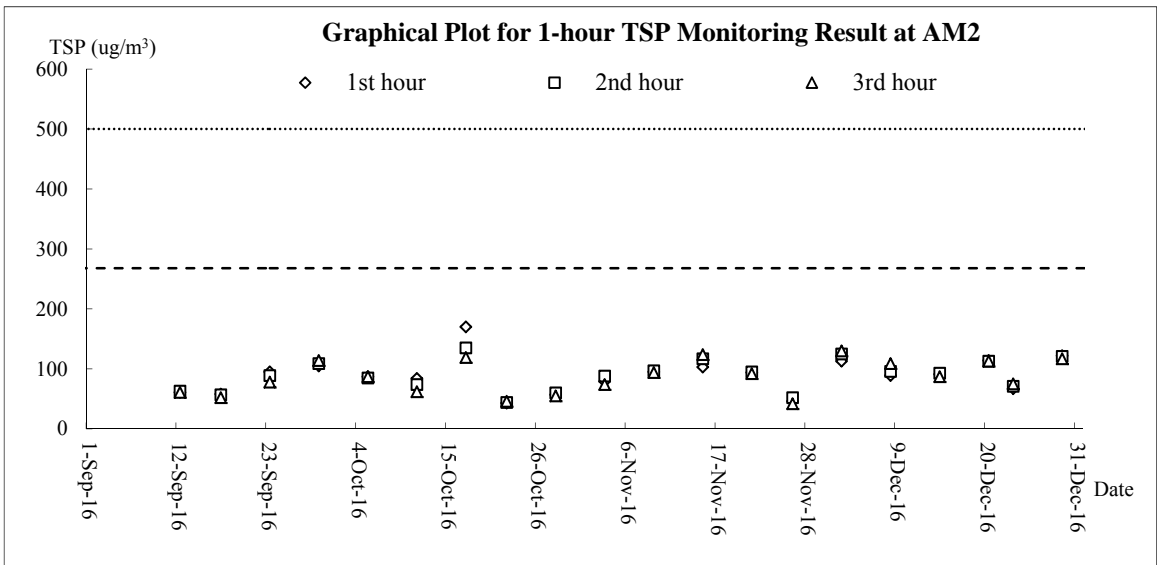
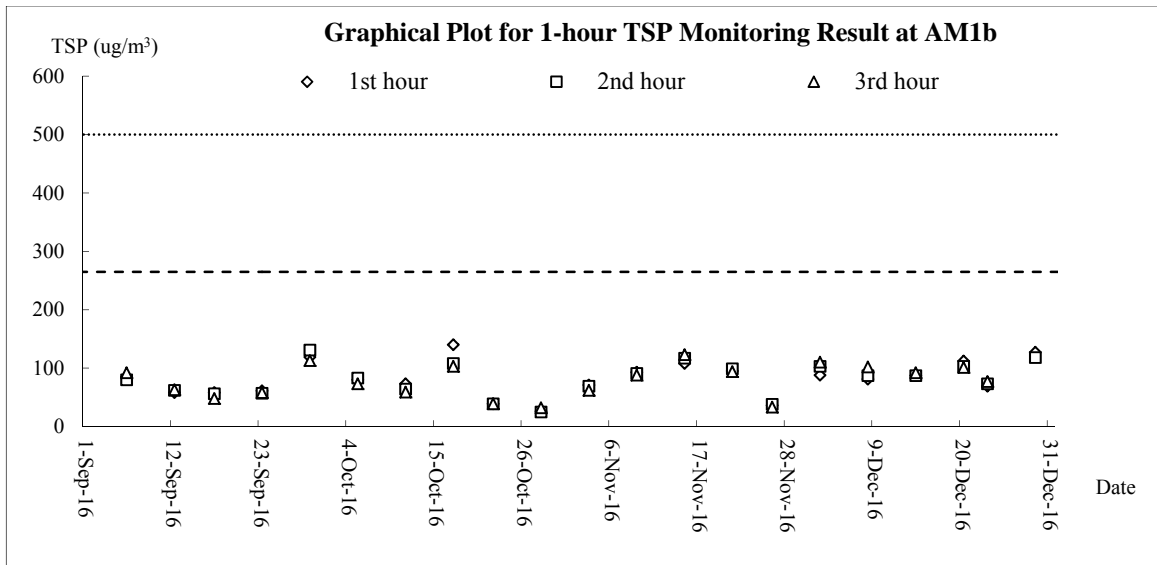
Date	29-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:50	0.03	20.3	20.3	7.21	7.2	80.2	80.4	13.0	13.2	8.6	8.6	5	5.0
			20.3		7.26		80.5		13.3		8.6		5	
WM3x	11:05	0.15	18.3	18.3	8.68	8.7	92.4	92.3	13.3	12.6	8.9	8.9	10	9.5
			18.3		8.65		92.2		11.8		8.9		9	

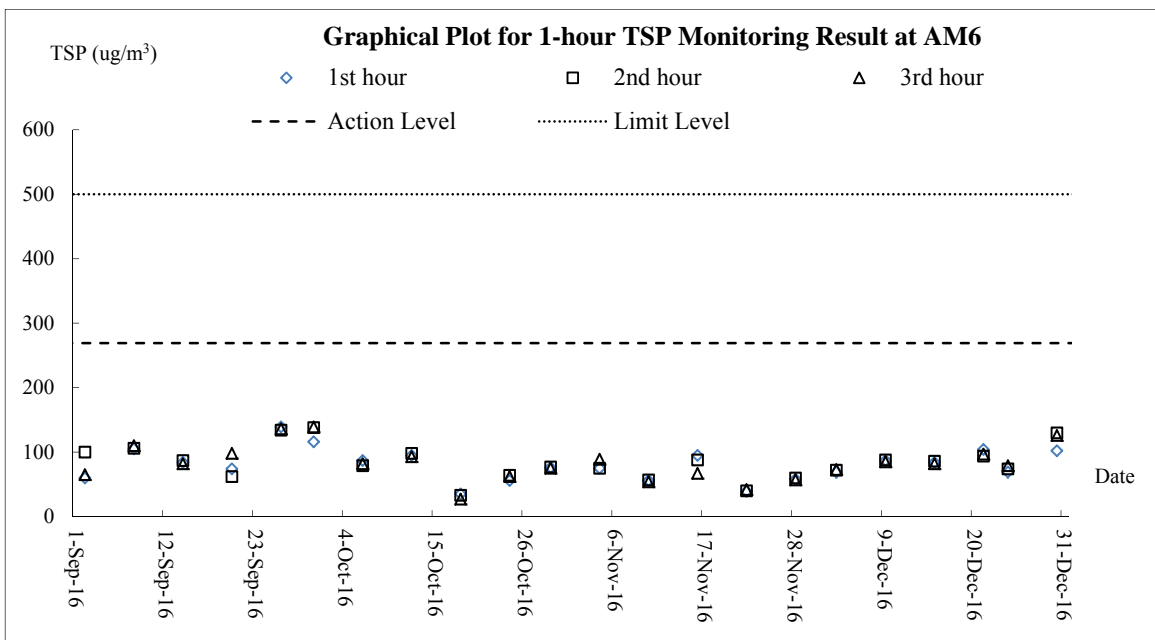
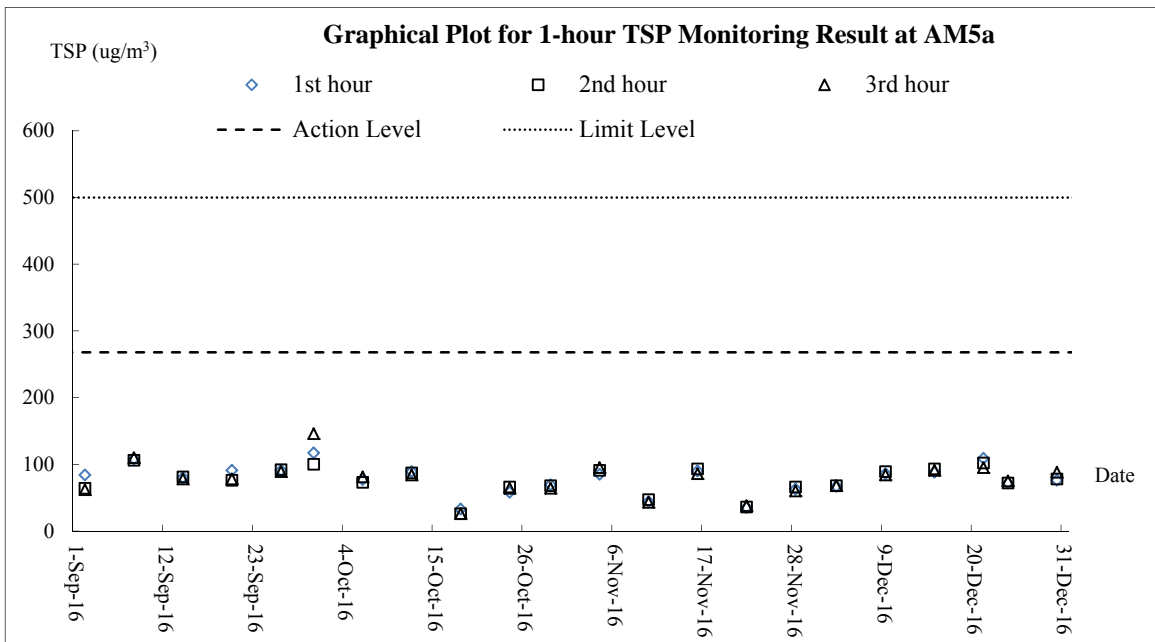
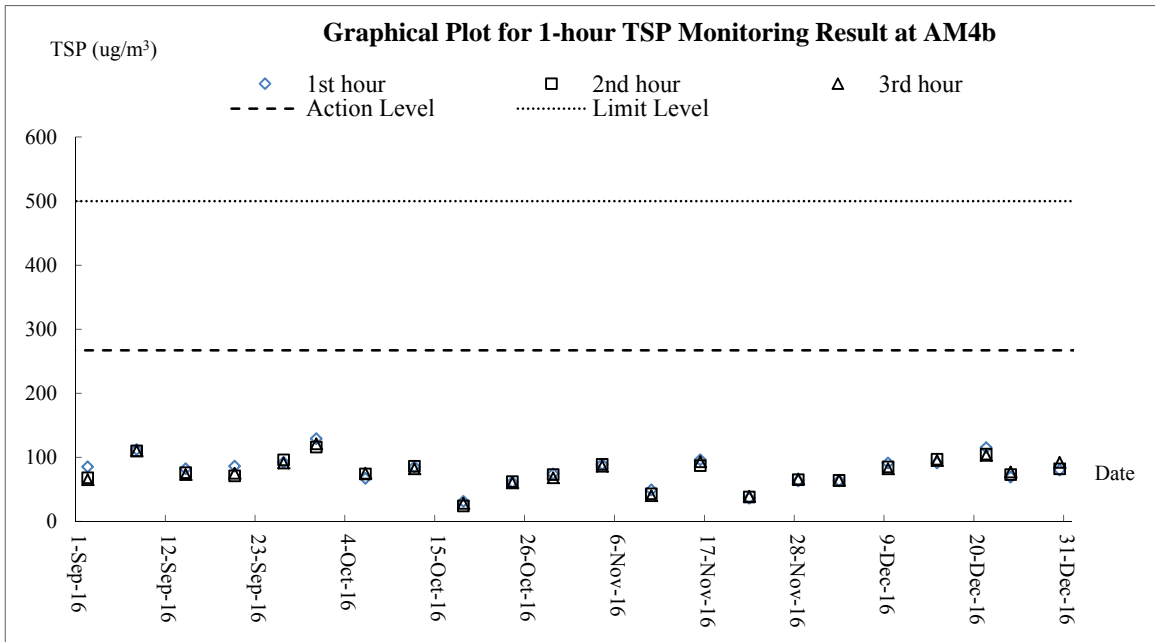
Date	31-Dec-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:16	0.24	19.1	19.1	8.61	8.6	84.4	85.2	3.8	3.8	8.6	8.6	9	9.0
			19		8.65		85.9		3.8		8.6		9	
WM3x	11:28	0.15	19.1	19.1	8.61	8.6	93.0	93.4	11.1	11.4	9.1	9.1	13	12.5
			19		8.65		93.7		11.7		9.1		12	

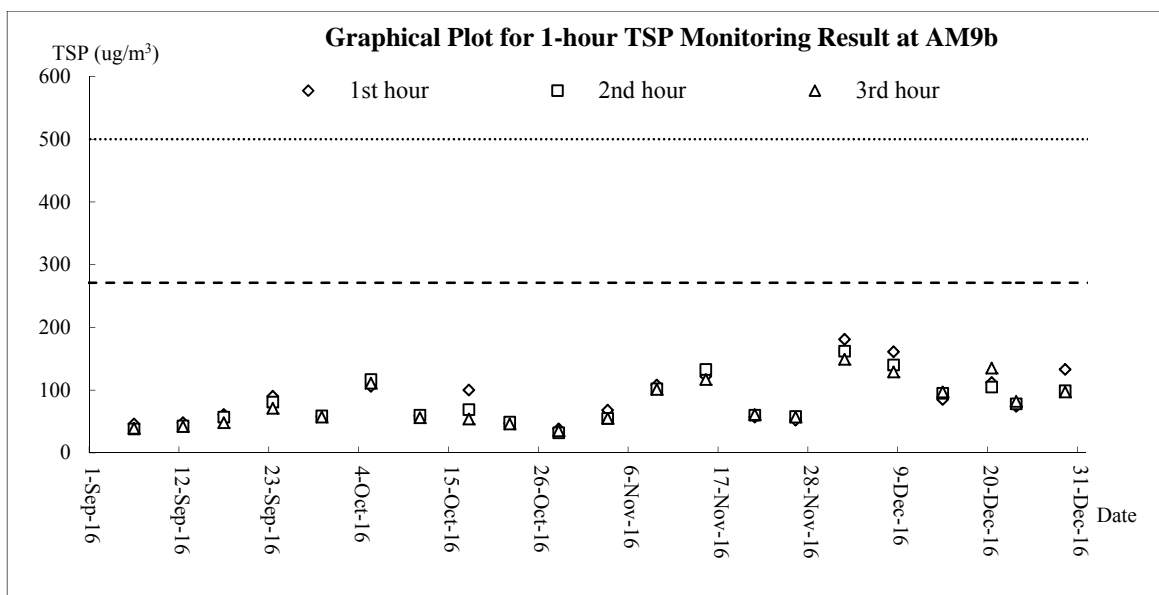
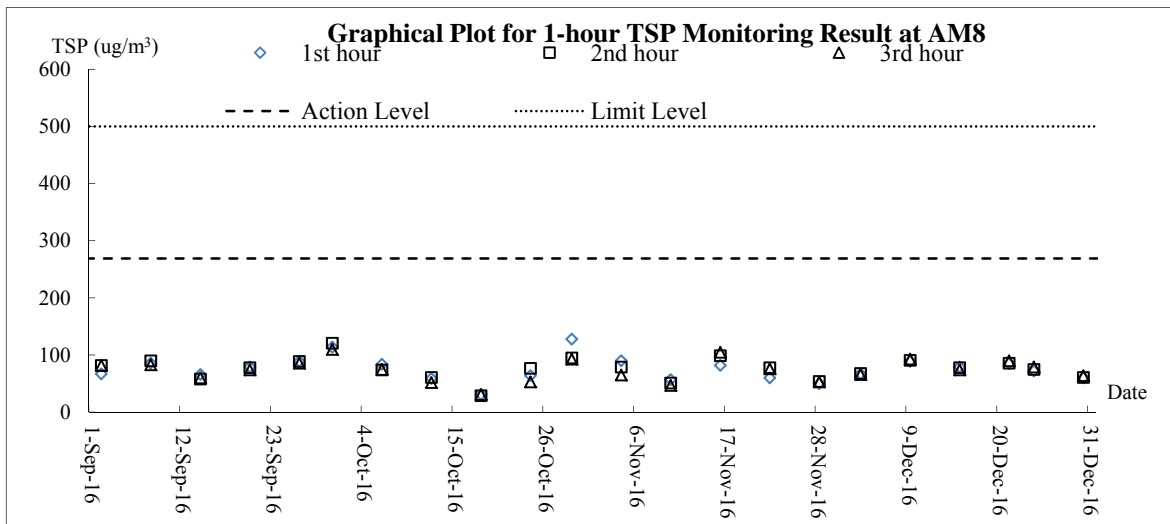
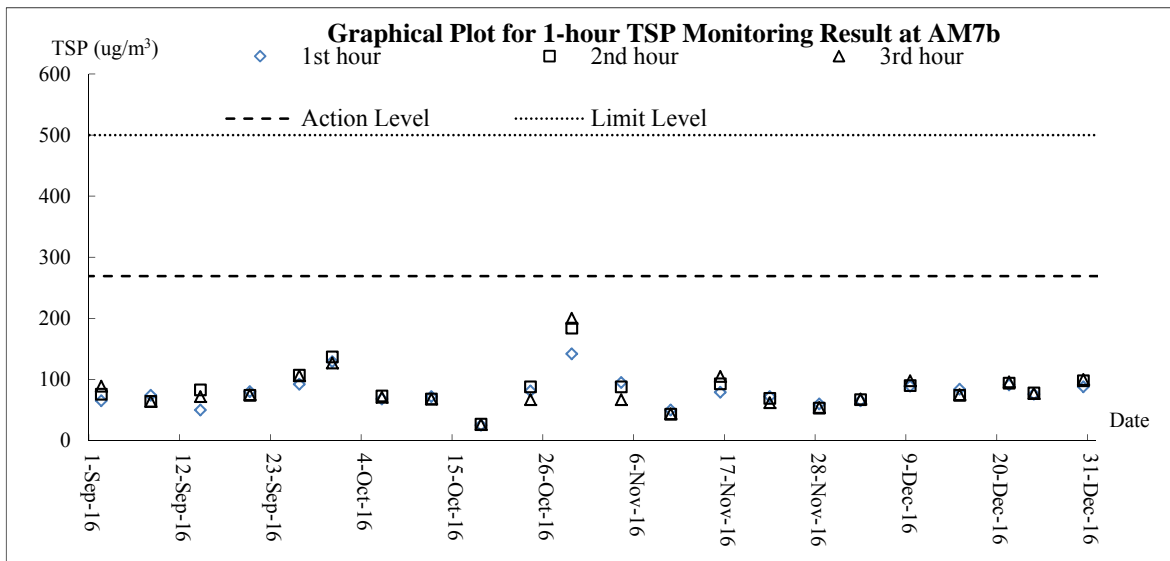
Appendix J

Graphical Plots for Monitoring Result

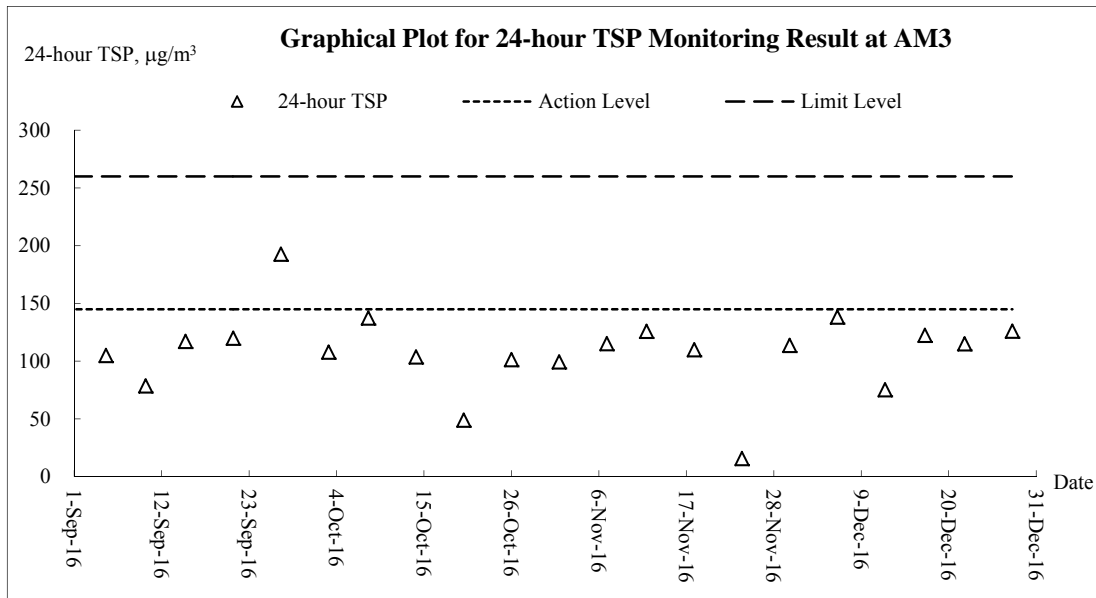
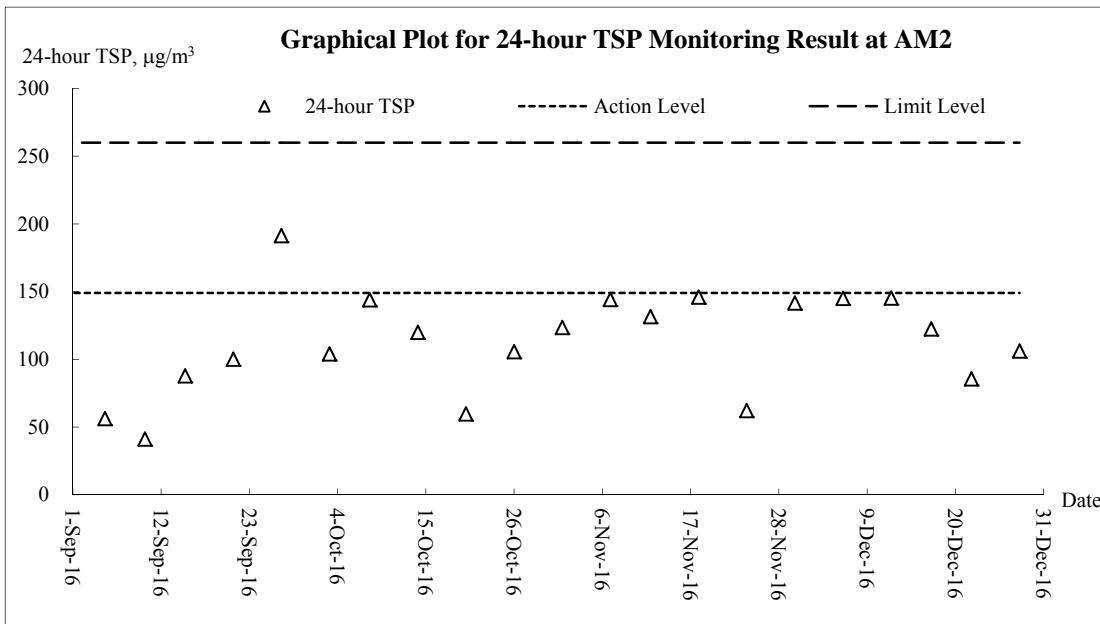
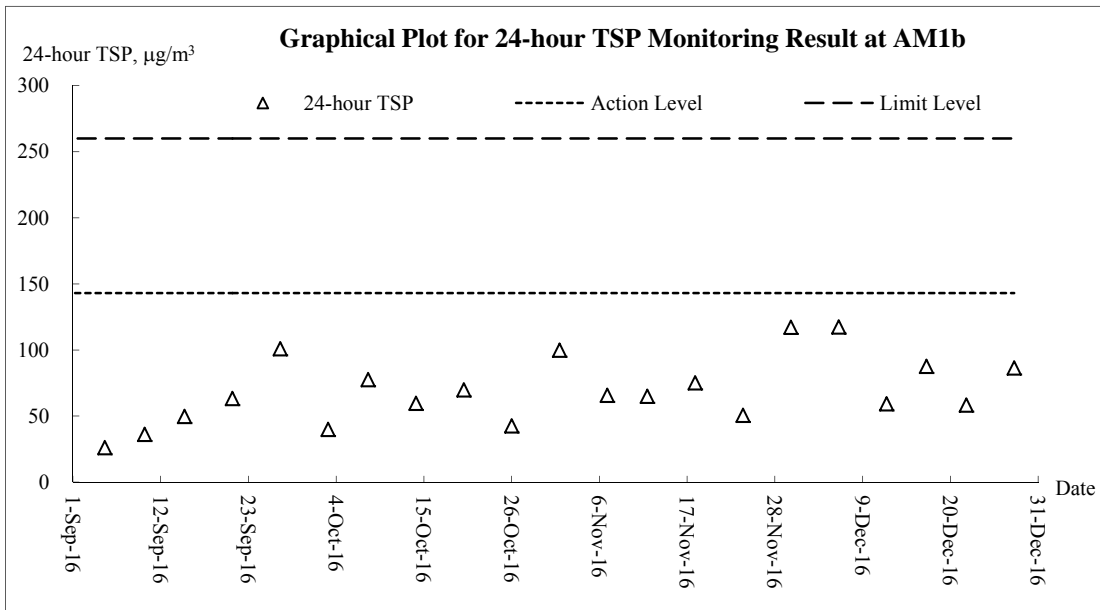
Air Quality – 1-hour TSP



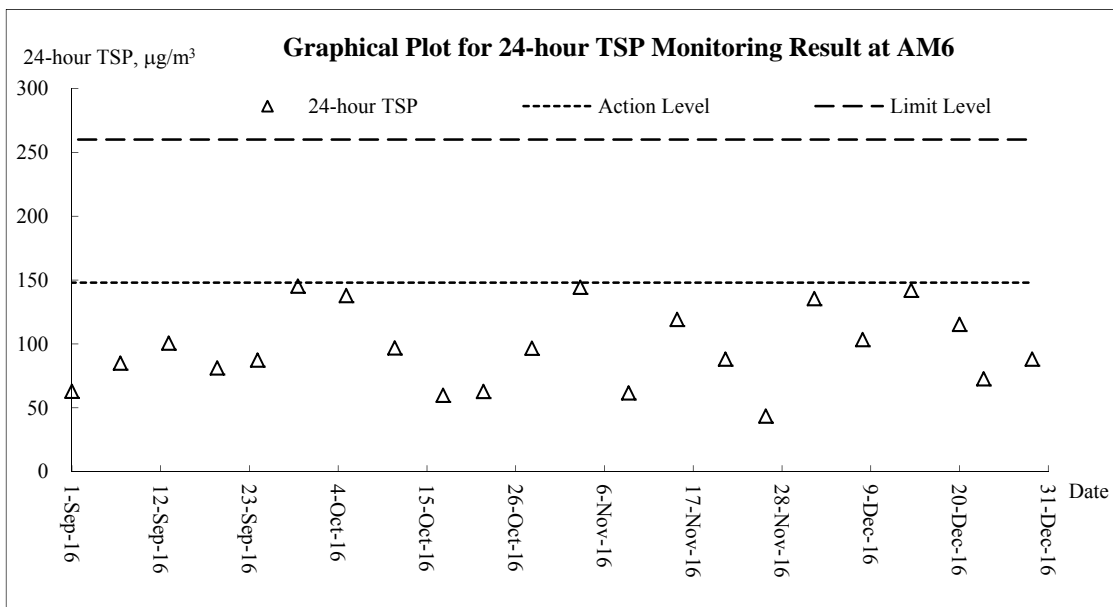
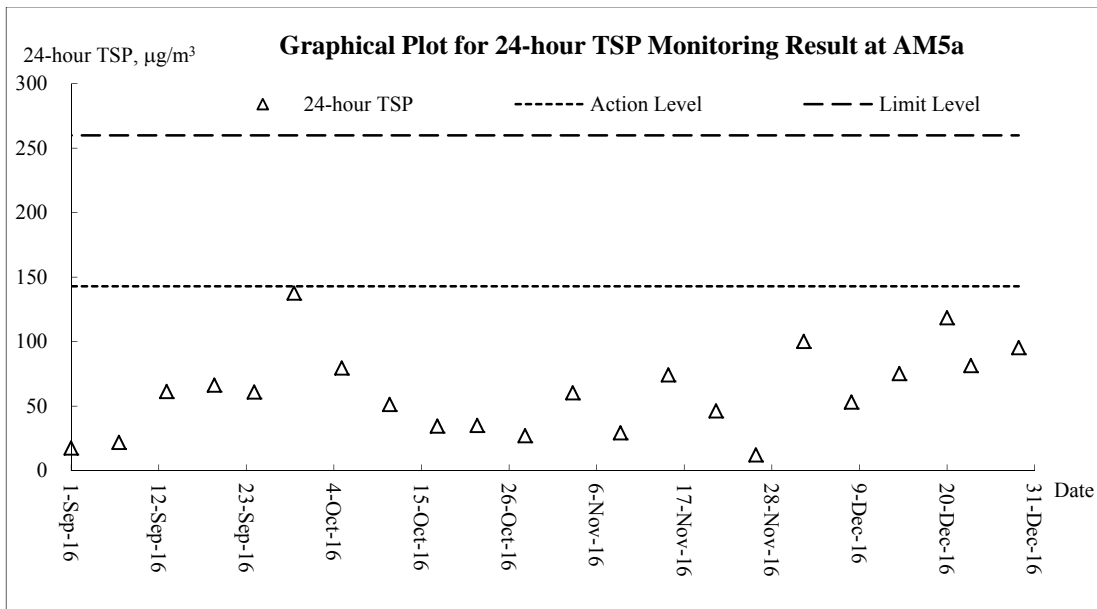
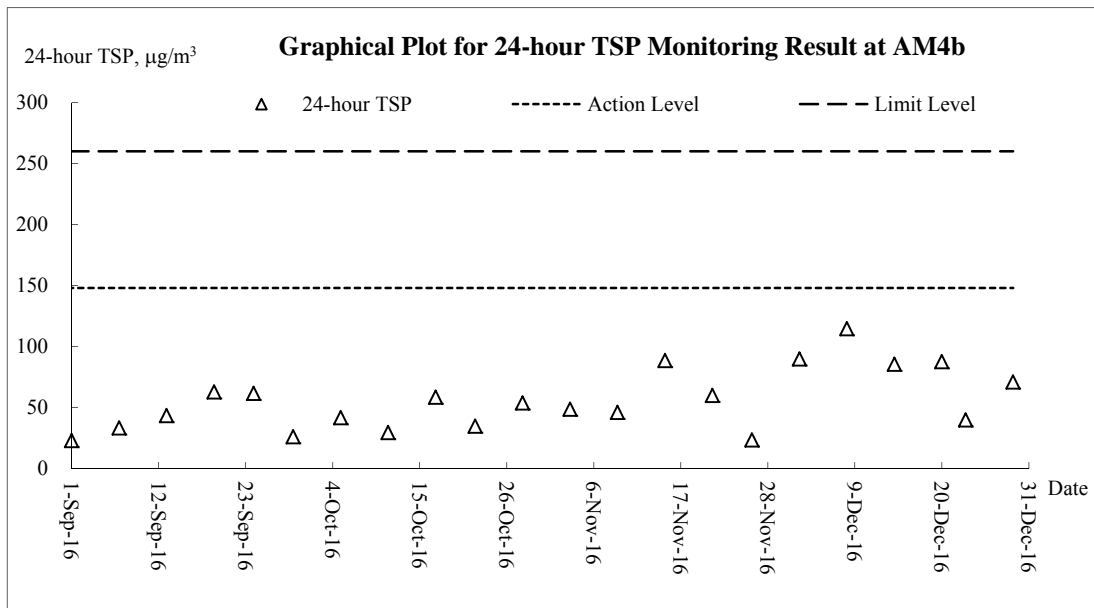


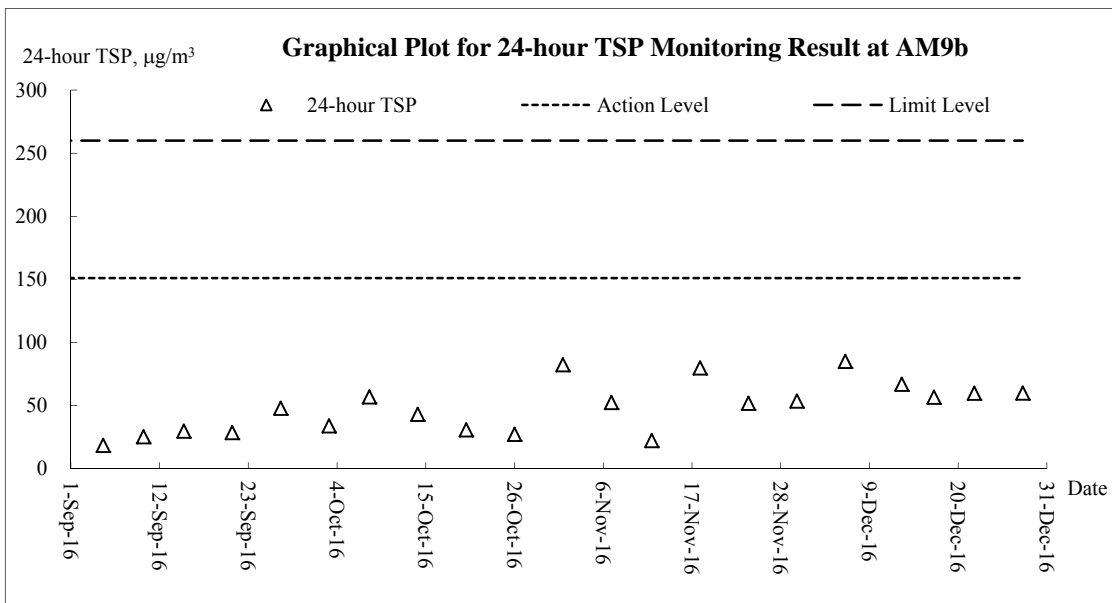
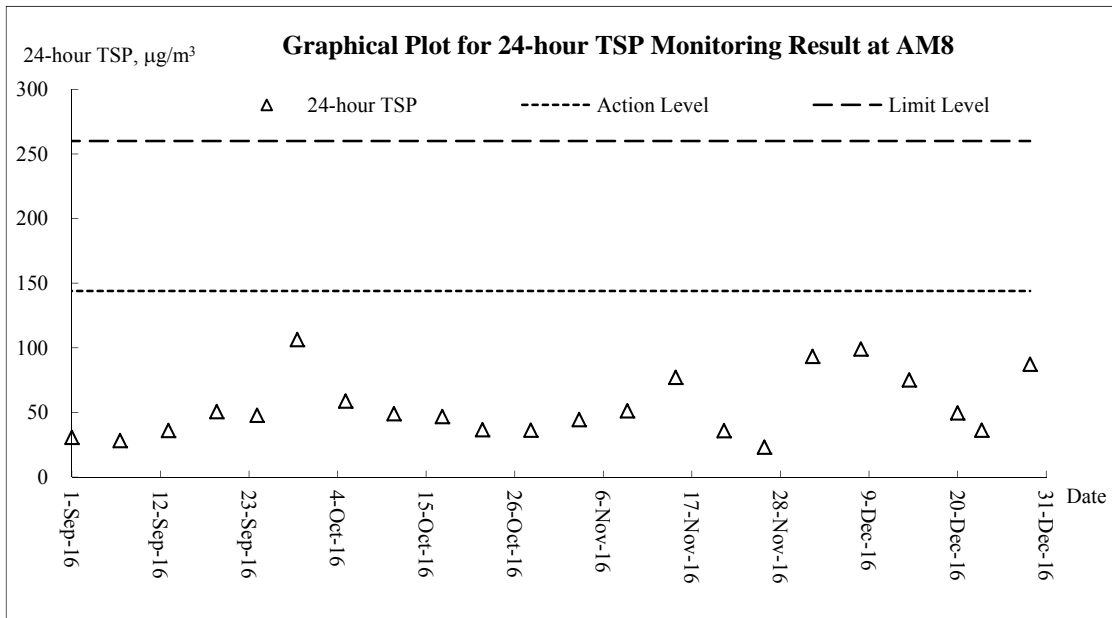
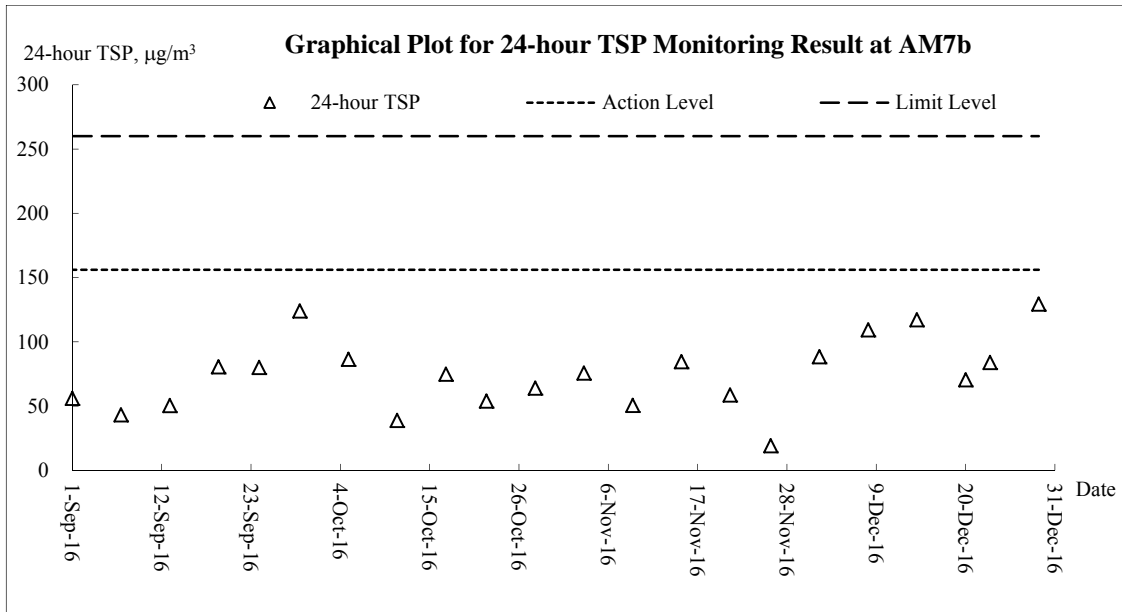


Air Quality – 24-hour TSP

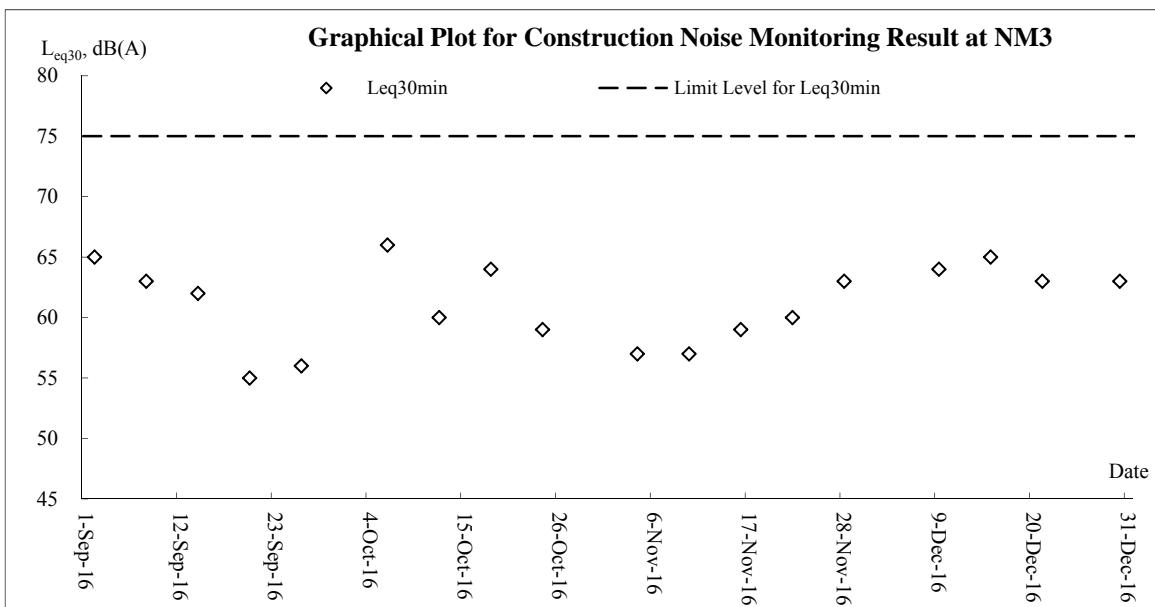
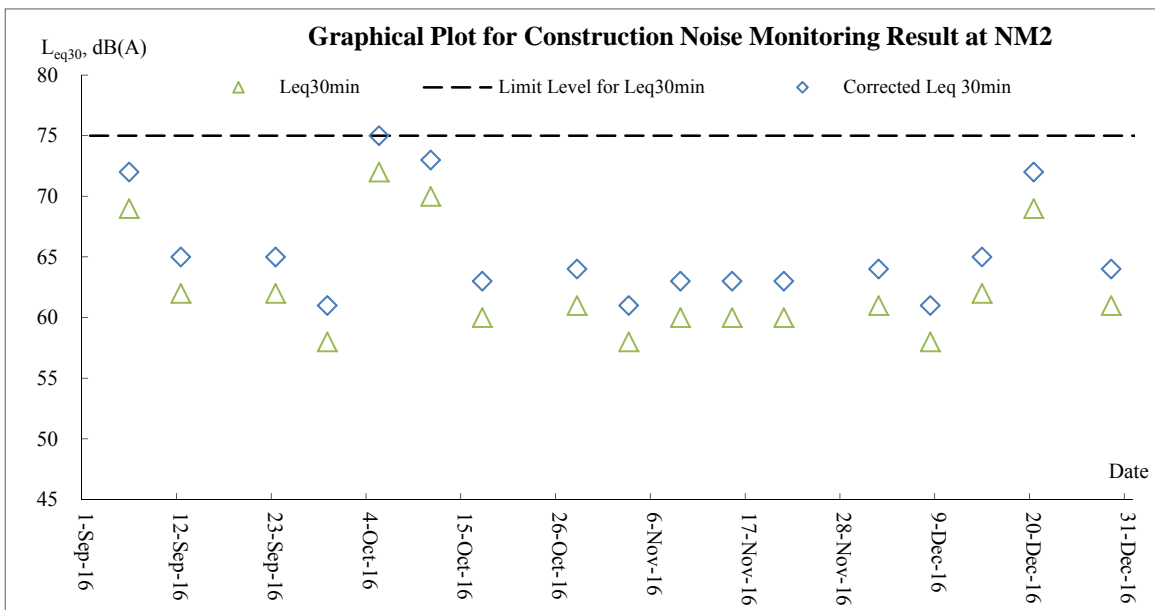
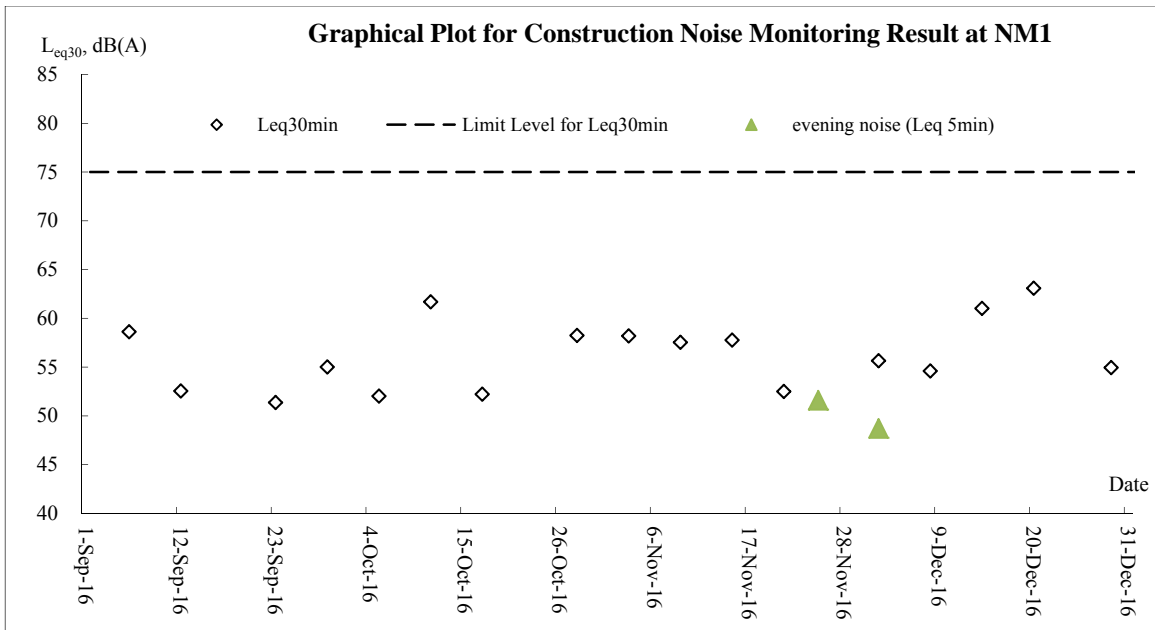


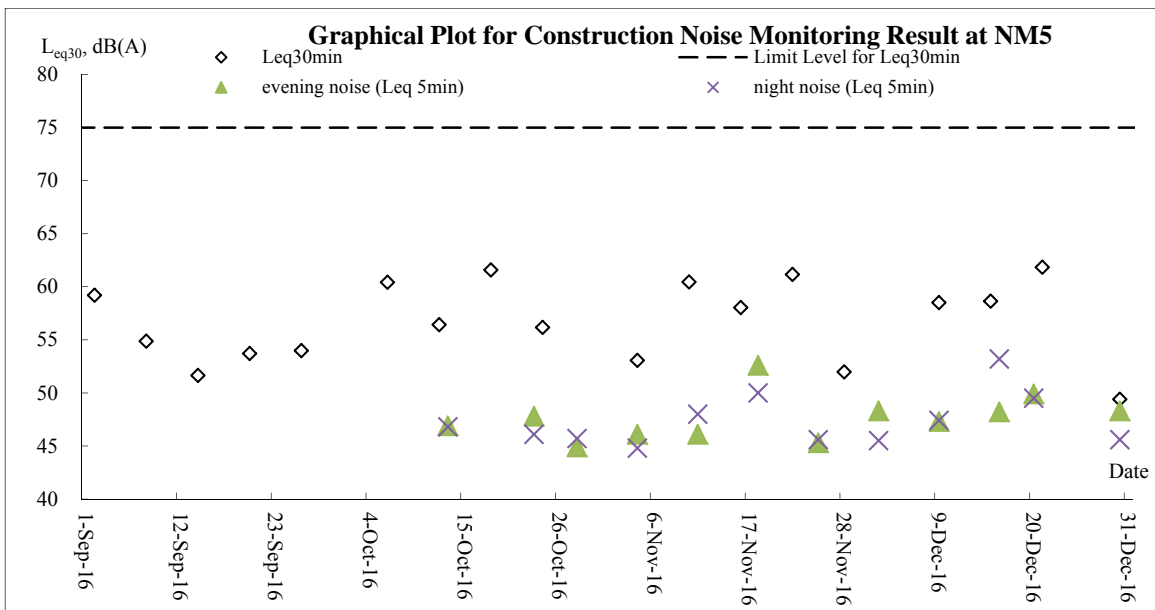
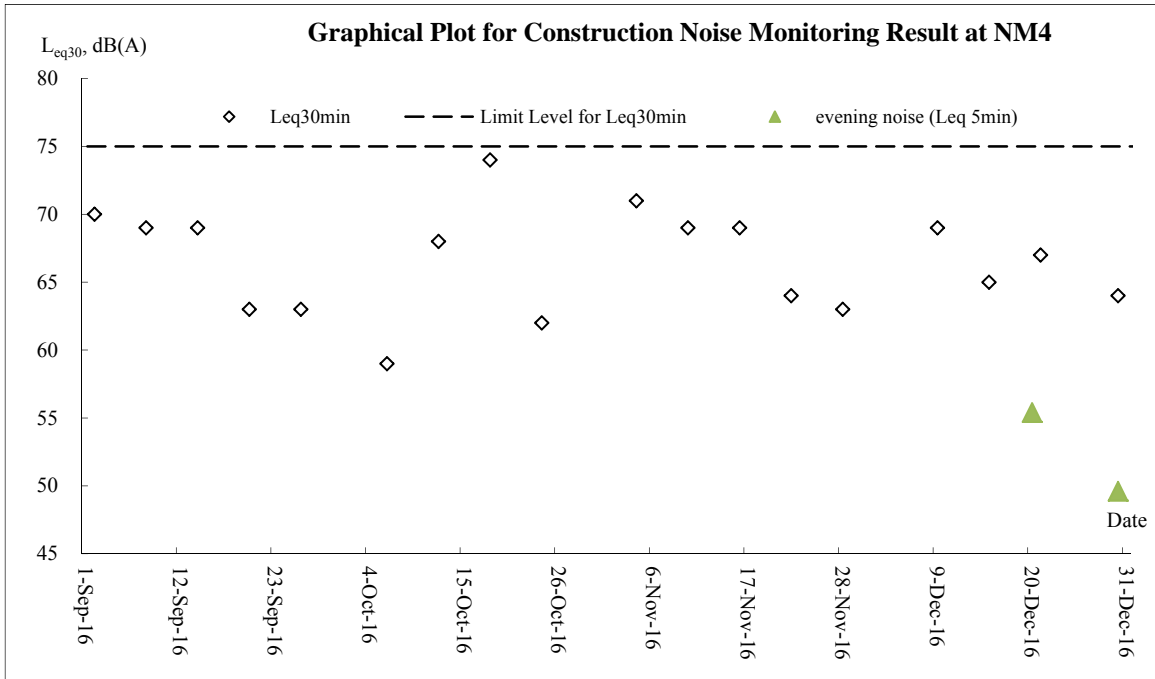
Agreement No. CE 45/2008 (CE)
 Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
 Monthly Environmental Monitoring & Audit Report (No.41) – December 2016

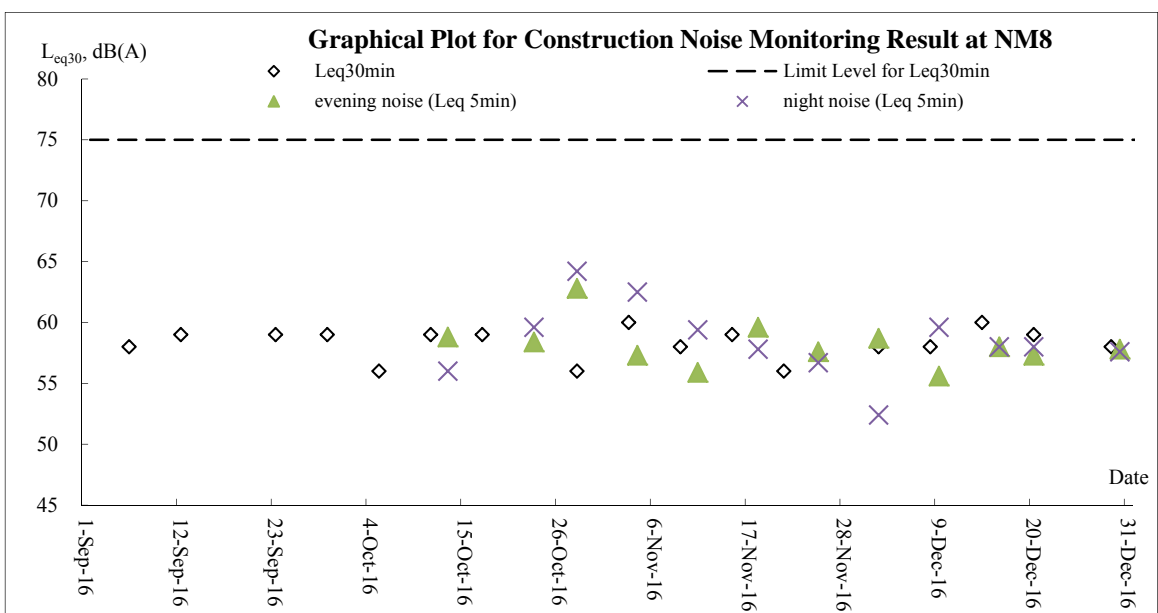
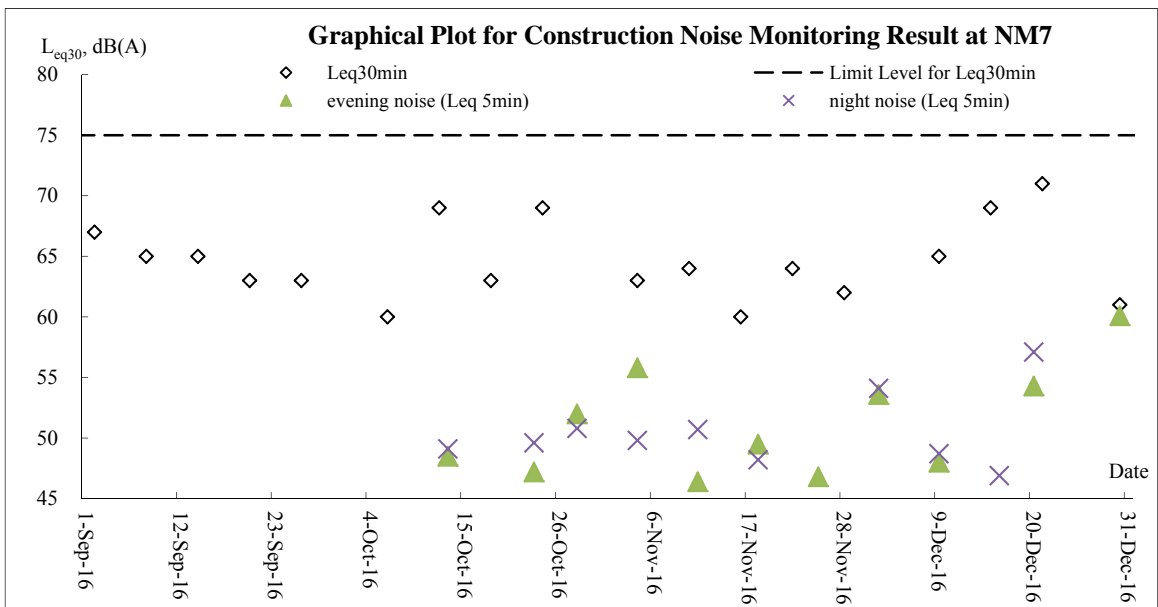
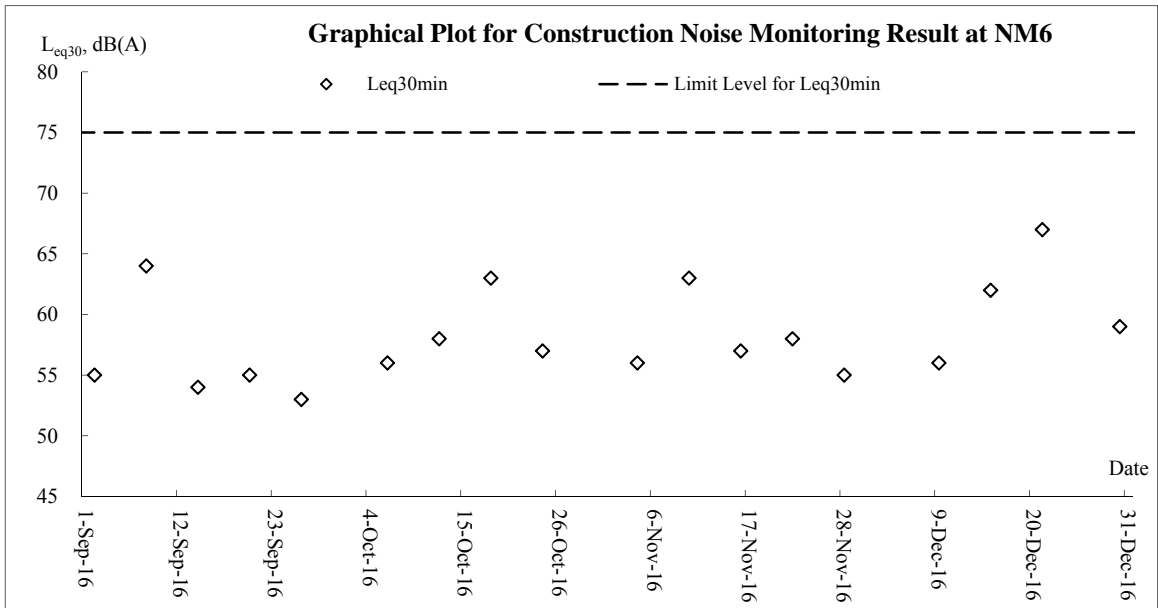


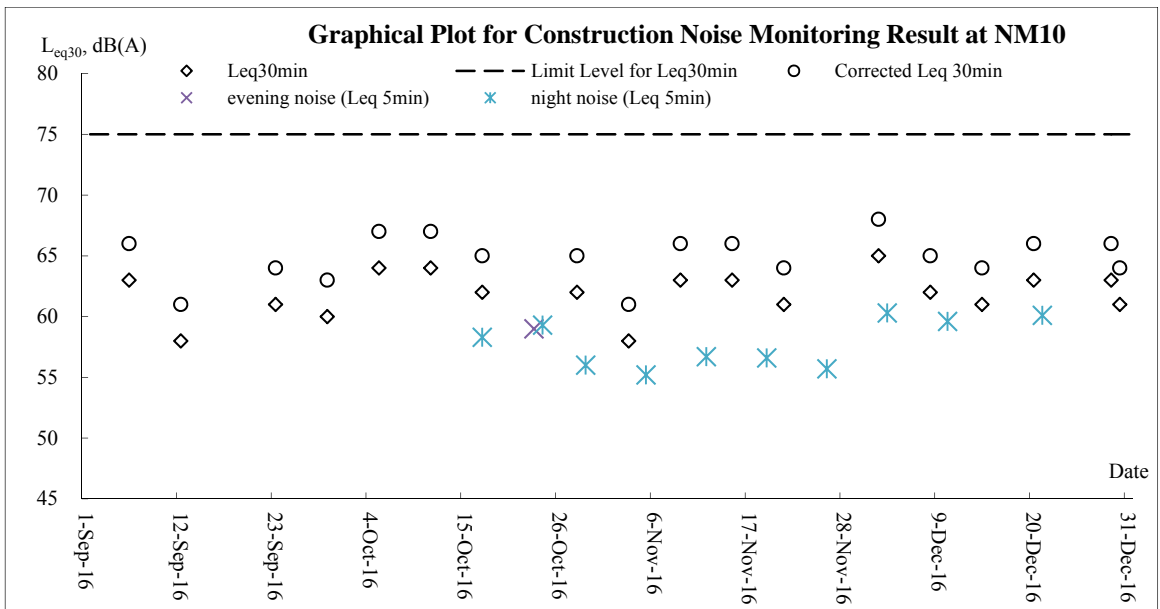
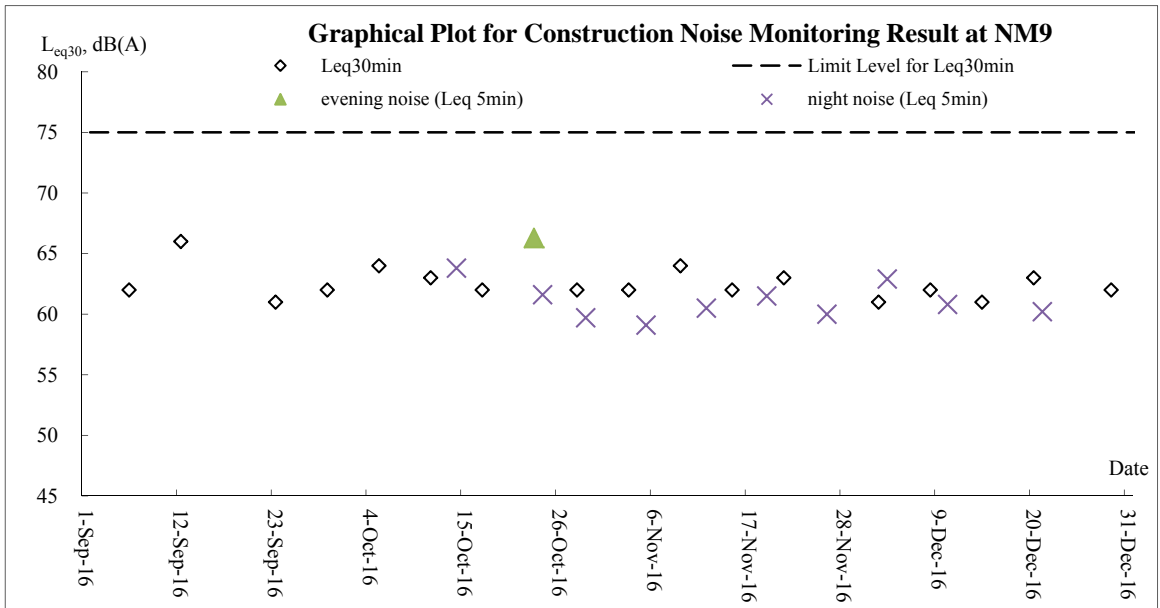


Noise

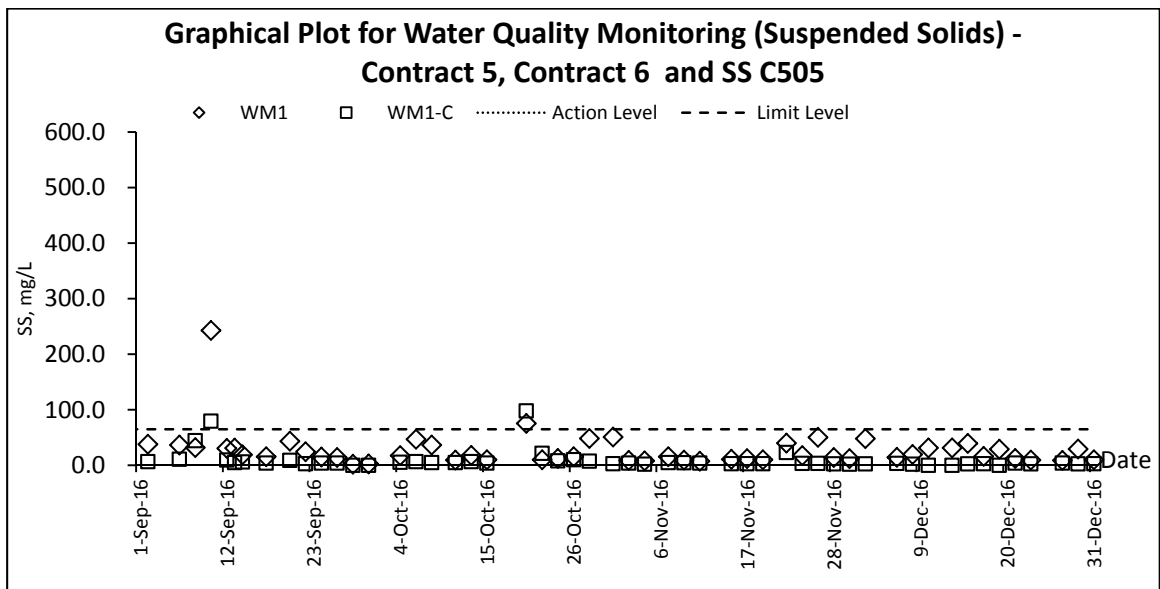
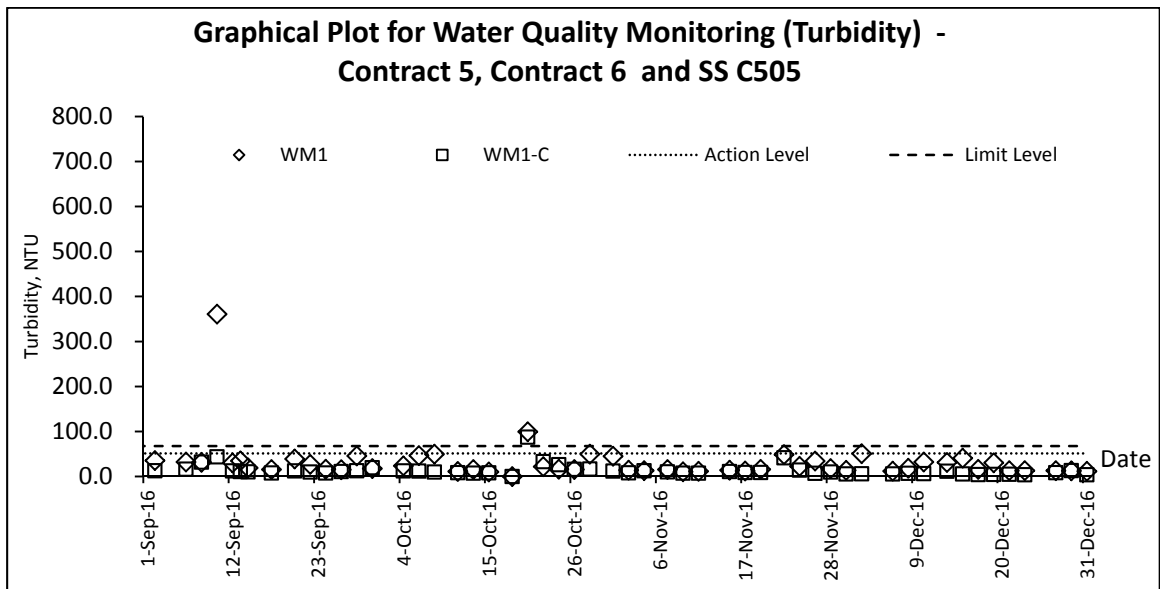
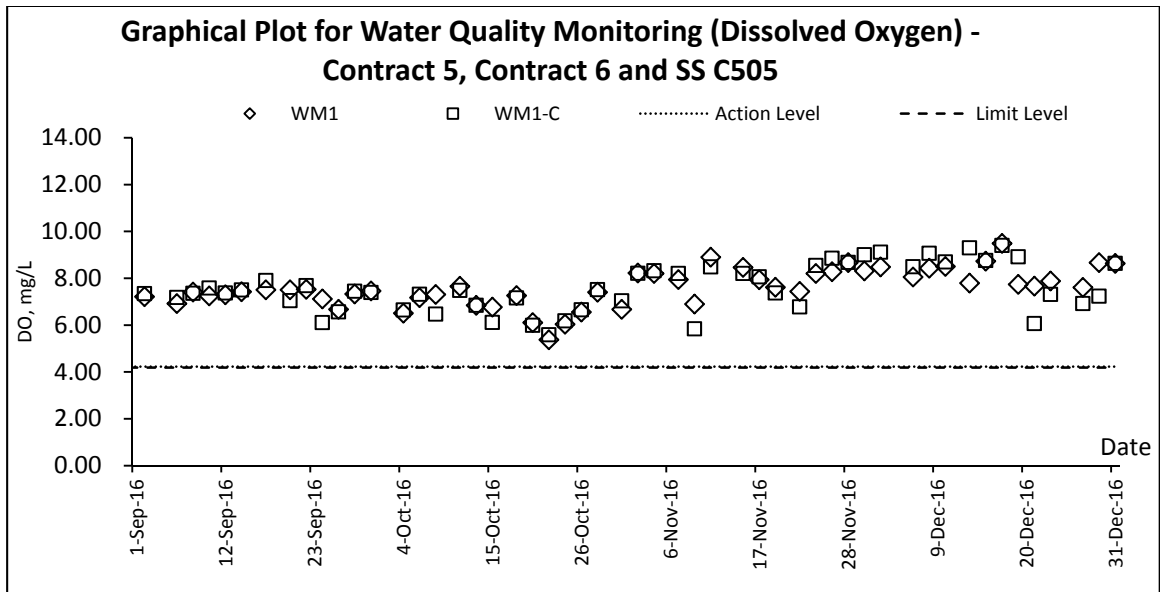


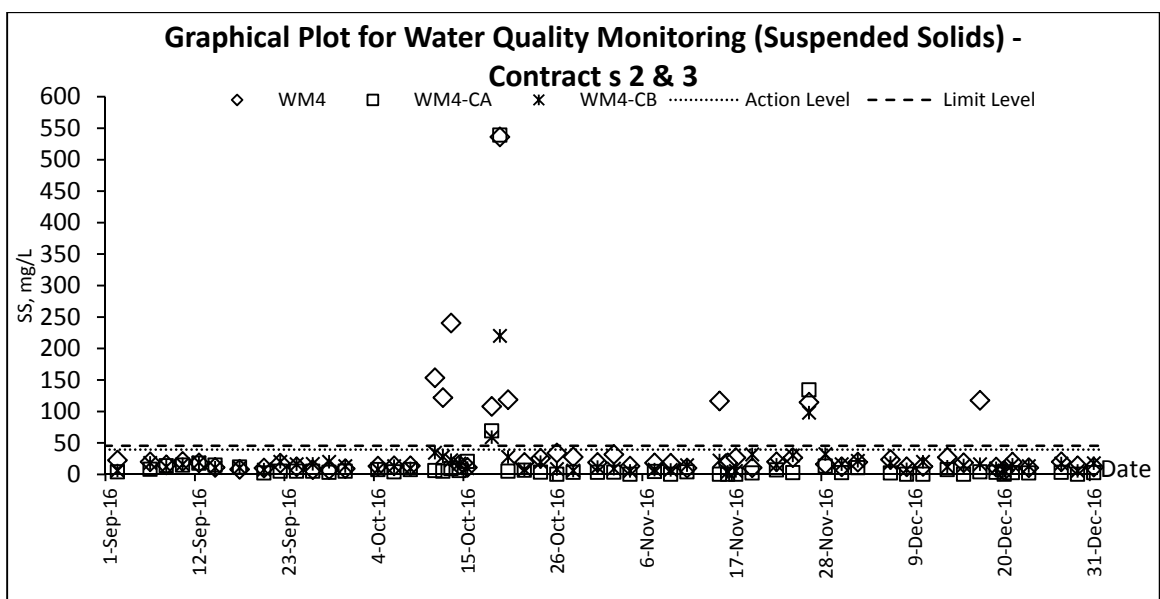
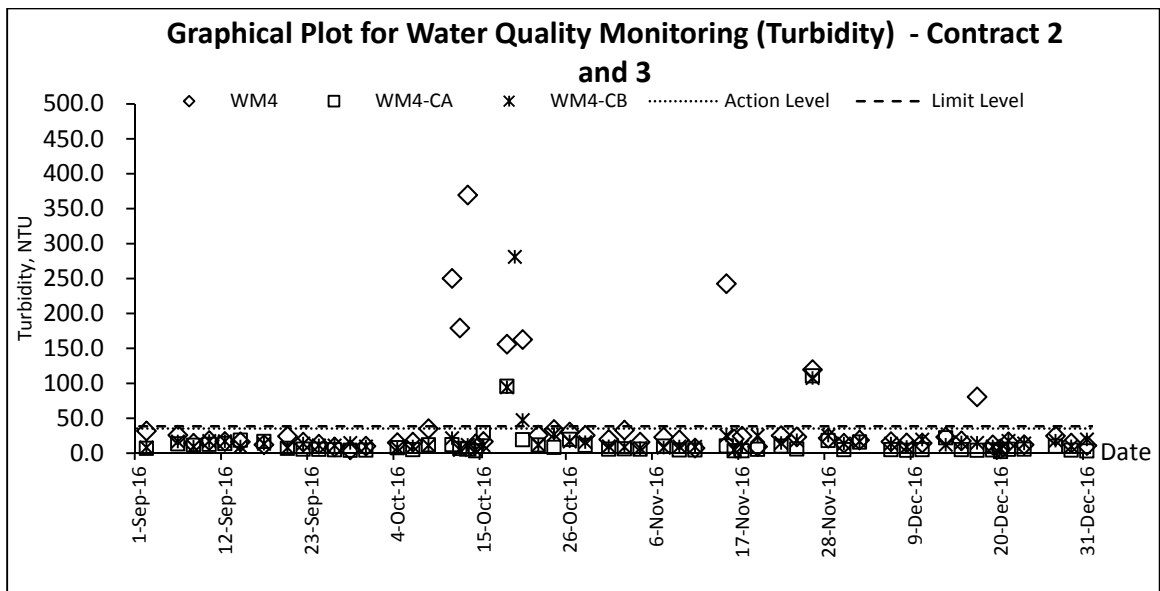
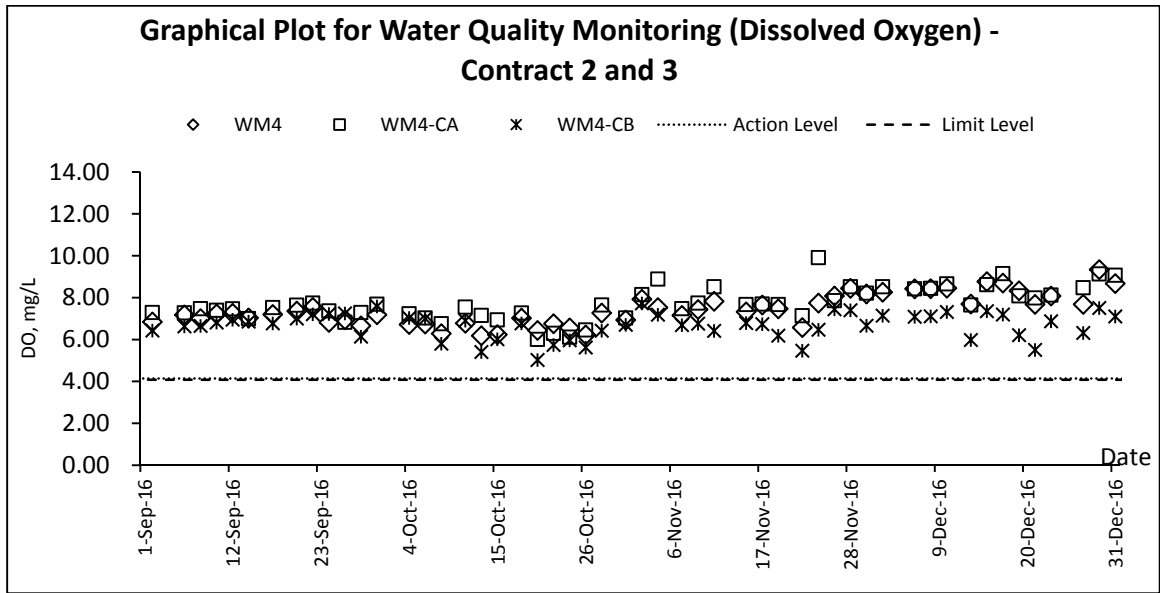


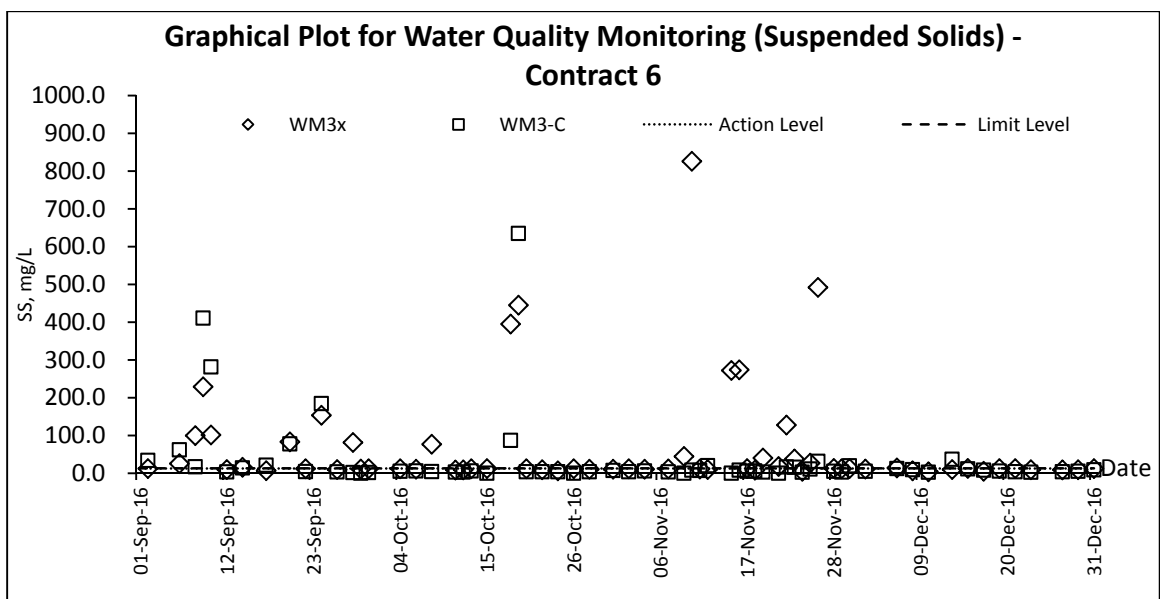
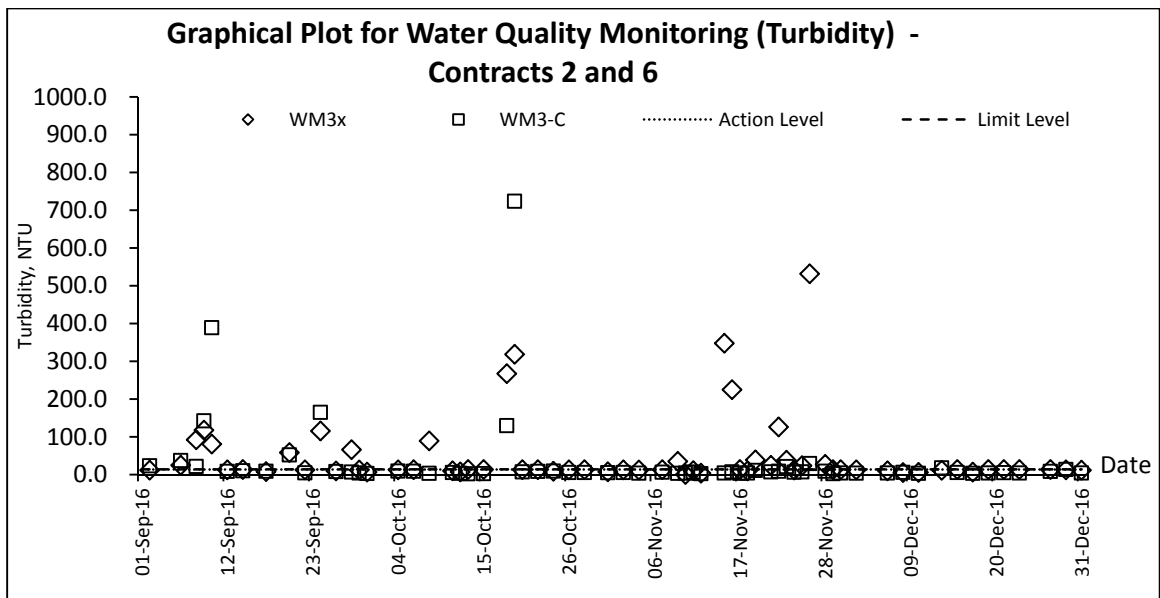
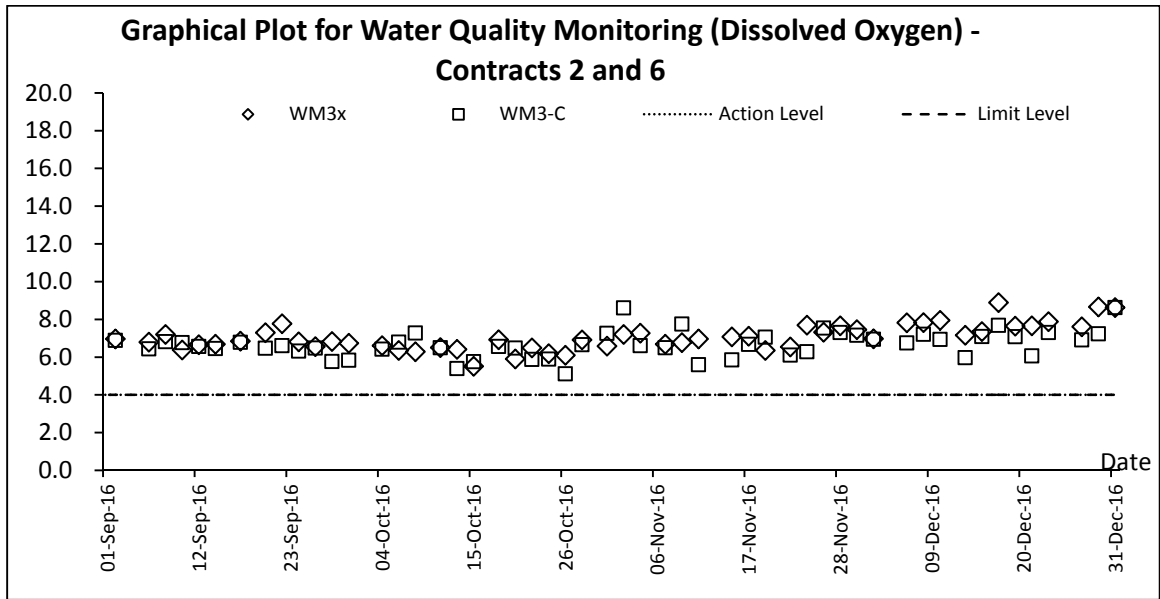


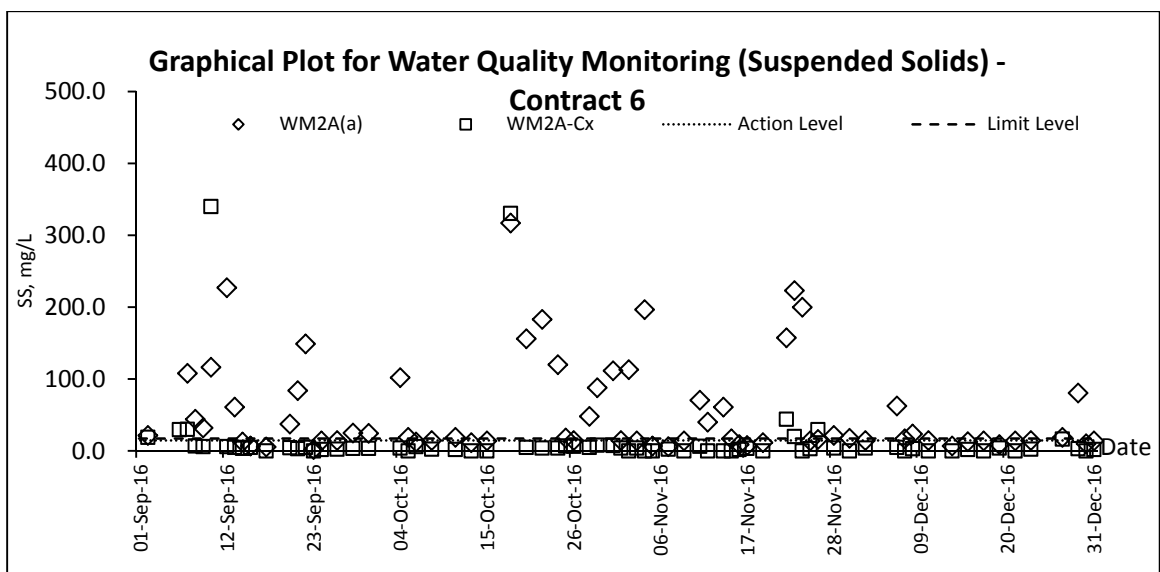
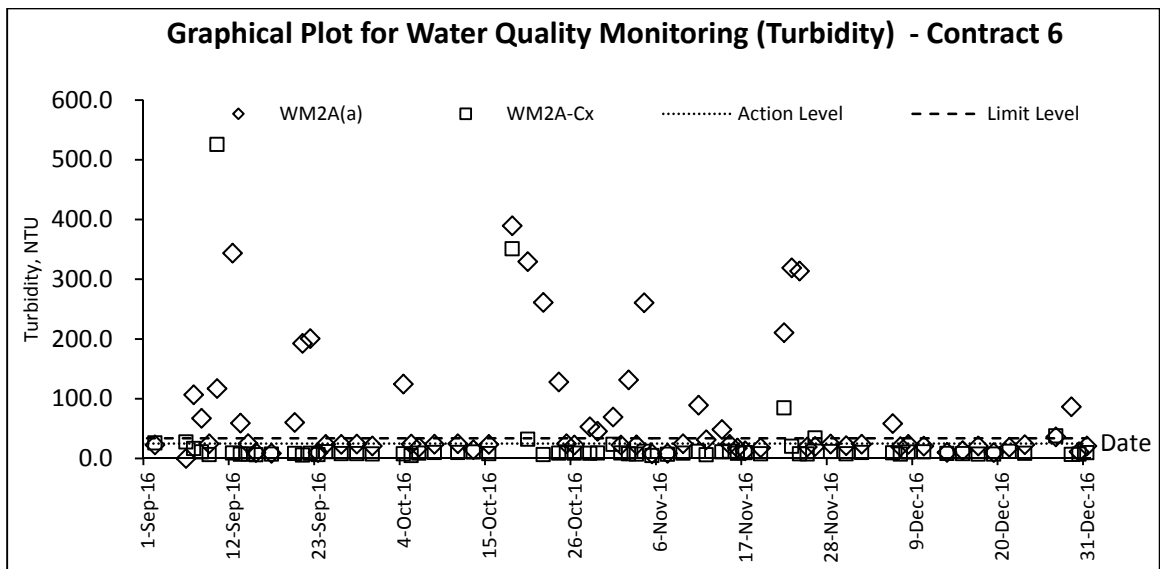
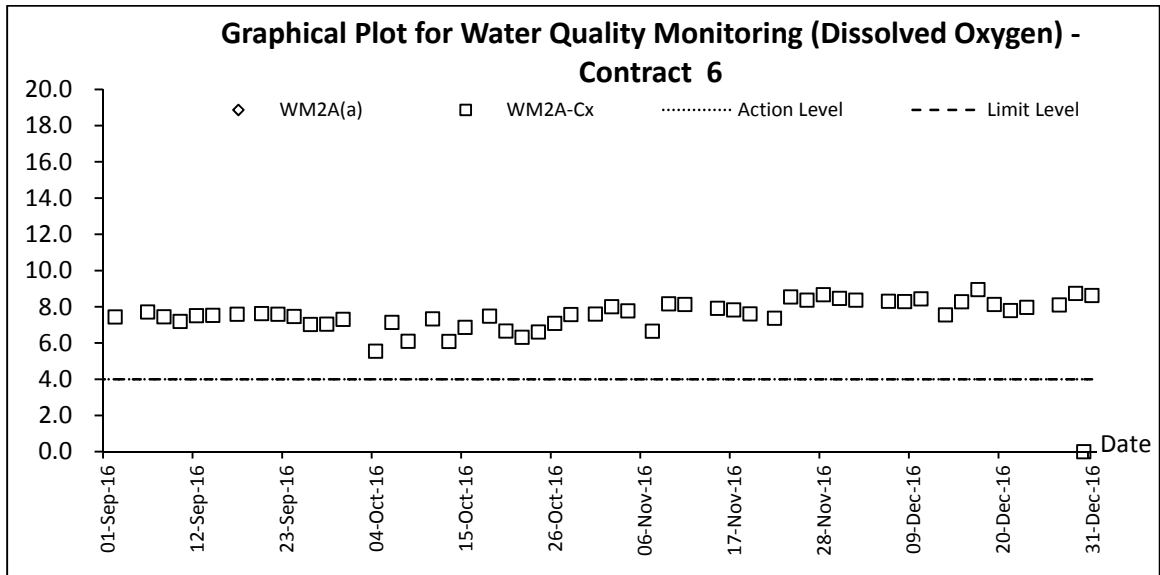


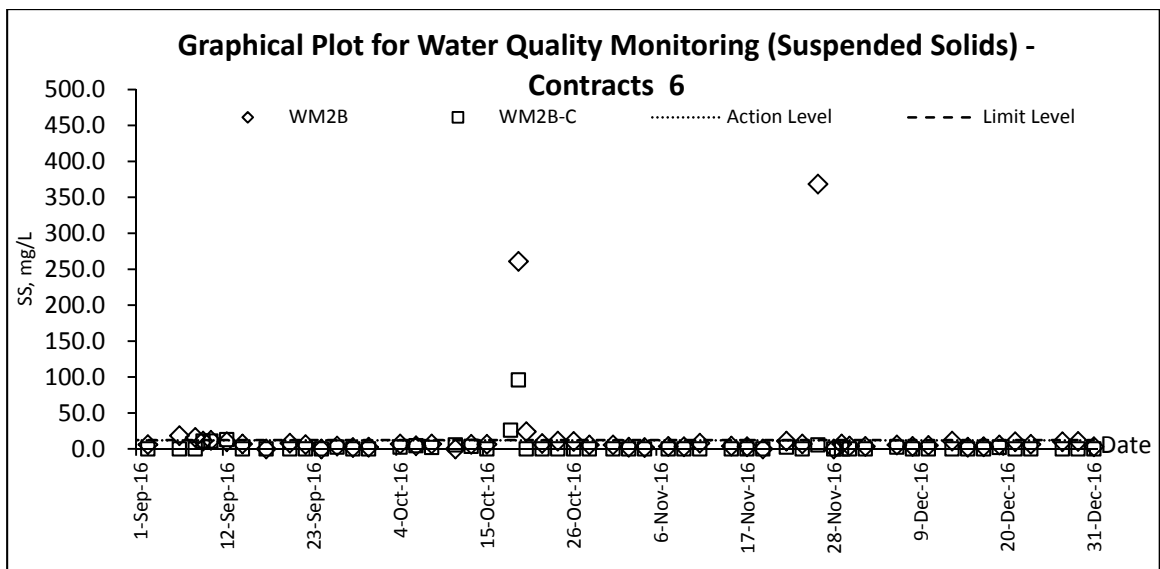
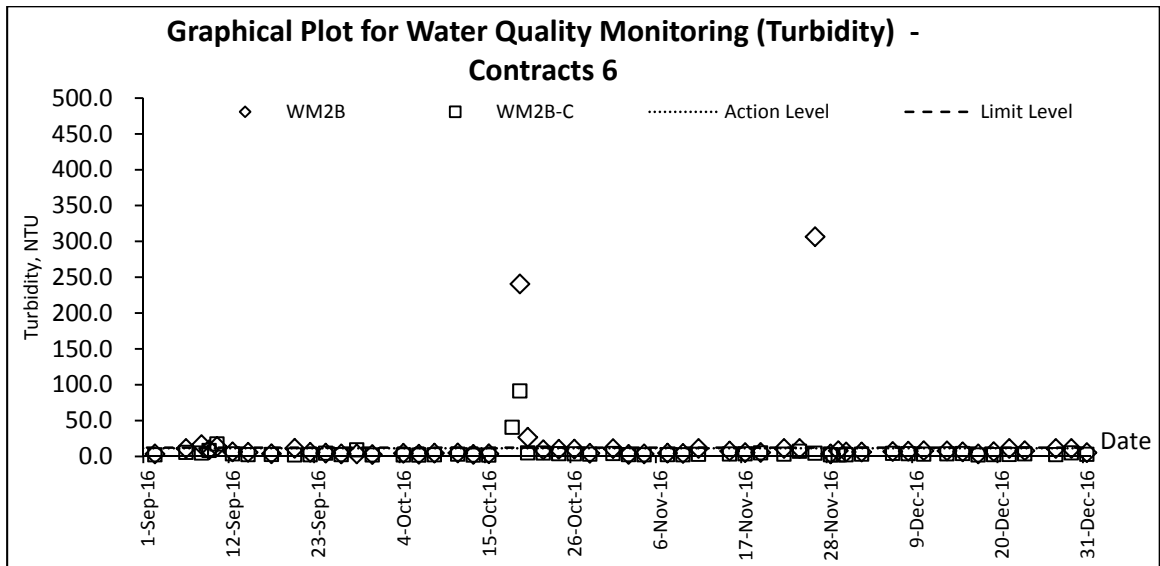
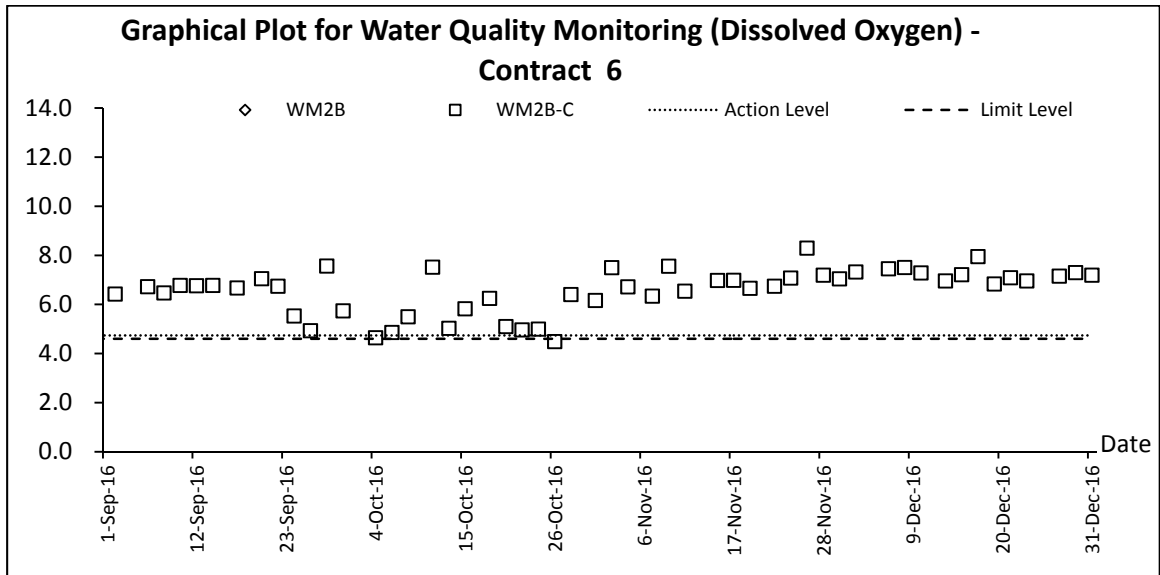
Water Quality











Appendix K

Meteorological Data

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Dec-16	Thu	Fine and dry. Moderate northerly winds.	0	7.7	70.5	N/NW	7.7
2-Dec-16	Fri	Fine and dry. Moderate northerly winds.	0	4.5	71.2	N/NW	4.5
3-Dec-16	Sat	Mainly fine and dry. Moderate northeasterly winds.	0	4.5	69	E/NE	4.5
4-Dec-16	Sun	Fine and dry. Moderate northerly winds.	Trace	23.1	6	73.5	N/NE
5-Dec-16	Mon	Fine and dry. Moderate northerly winds.	0	7.2	74	N	7.2
6-Dec-16	Tue	Mainly fine and dry. Moderate northeasterly winds.	Trace	10.9	50	N	10.9
7-Dec-16	Wed	Mainly fine and dry. Moderate northeasterly winds.	Trace	4.5	64	N/NW	4.5
8-Dec-16	Thu	Fine and dry. Light to moderate northeasterly winds.	0	4.1	67.5	S/SE	4.1
9-Dec-16	Fri	Sunny periods. Moderate easterly winds.	0	5.6	68	E/NE	5.6
10-Dec-16	Sat	Sunny periods. Moderate easterly winds.	0	20.3	6.2	71.2	E/SE
11-Dec-16	Sun	Sunny periods. Moderate easterly winds.	Trace	10.6	70	E	10.6
12-Dec-16	Mon	Sunny periods. Moderate easterly winds.	Trace	7.8	73	E/NE	7.8
13-Dec-16	Tue	Sunny periods. Moderate easterly winds.	Trace	4.7	74.5	N/NW	4.7
14-Dec-16	Wed	Sunny periods. Moderate easterly winds.	Trace	14.3	56.7	N	14.3
15-Dec-16	Thu	Sunny periods. Moderate easterly winds.	0	12.5	57	N	12.5
16-Dec-16	Fri	Mainly fine. Moderate easterly winds.	0	9.6	55.5	N	9.6
17-Dec-16	Sat	Mainly fine. Moderate easterly winds.	0	14.4	7.4	72.5	E/SE
18-Dec-16	Sun	Mainly fine. Moderate easterly winds.	0	6	73	E/NE	6
19-Dec-16	Mon	Mainly fine. Moderate easterly winds.	0	7.5	70	E/NE	7.5
20-Dec-16	Tue	Sunny periods. Moderate easterly winds.	0	3.6	74	E	3.6
21-Dec-16	Wed	Mainly fine. Moderate easterly winds.	2.8	6.5	86.2	E	6.5
22-Dec-16	Thu	Sunny periods. Moderate easterly winds.	0.2	9.7	71.5	N/NW	9.7
23-Dec-16	Fri	Moderate easterly winds, strengthening gradually.	Trace	5.9	64	N/NW	5.9
24-Dec-16	Sat	Mainly fine. Moderate easterly winds.	3.7	17.5	9.2	68.2	N/NE
25-Dec-16	Sun	Mainly fine. Moderate easterly winds.	Trace	19.1	8.1	67.8	N/NE
26-Dec-16	Mon	Sunny periods. Moderate easterly winds.	0	22.1	9.5	64.5	N/NE
27-Dec-16	Tue	Mainly fine. Moderate easterly winds.	0	20	51	N	20
28-Dec-16	Wed	Sunny periods. Moderate easterly winds.	0	10.7	55	N	10.7
29-Dec-16	Thu	Moderate easterly winds, strengthening gradually.	0	14.6	44	N/NW	14.6
30-Dec-16	Fri	Mainly fine. Moderate easterly winds.	0	7	63.2	N/NW	7
31-Dec-16	Sat	Mainly fine. Moderate easterly winds.	0	17.9	7.3	60.5	N/NE

Appendix L

Waste Flow Table

Monthly Summary Waste Flow Table for 2016 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in m ³)	(in '000m ³)
Jan	2.683	0.253	0.030	0.000	2.400	0.799	0.001	0.000	0.000	0.000	0.115
Feb	1.877	0.651	0.020	0.000	1.205	1.141	0.000	0.000	0.000	0.000	0.110
Mar	1.501	0.417	0.000	0.000	1.084	0.831	0.000	0.000	0.001	0.000	0.090
Apr	0.472	0.046	0.018	0.000	0.408	0.647	0.000	0.000	0.000	0.000	0.135
May	0.488	0.013	0.000	0.000	0.475	2.479	0.000	0.000	0.000	0.000	0.105
Jun	0.523	0.103	0.000	0.000	0.420	0.716	0.000	0.000	0.001	0.000	0.135
Sub-total	7.544	1.483	0.068	0.000	5.993	6.613	0.001	0.000	0.002	0.000	0.690
Jul	0.565	0.019	0.000	0.000	0.546	1.407	0.000	0.001	0.004	1.000	0.085
Aug	0.582	0.088	0.000	0.000	0.494	0.715	0.000	0.000	0.001	0.000	0.105
Sep	1.797	0.604	0.258	0.000	0.935	0.038	0.001	0.000	0.002	0.000	0.090
Oct	1.115	0.485	0.177	0.000	0.453	0.395	0.000	0.000	0.002	0.800	0.120
Nov	0.747	0.140	0.201	0.000	0.407	0.714	0.001	0.000	0.001	0.000	0.125
Dec	0.675	0.130	0.120	0.000	0.425	0.353	0.001	0.000	0.000	0.000	0.120
Total	13.025	2.948	0.824	0.000	9.252	10.235	0.004	0.001	0.012	1.800	1.335

- Note:**
1. Assume the density of soil fill is 2 ton/m³.
 2. Assume the density of rock and broken concrete is 2.5 ton/m³.
 3. Assume each truck of C&D wastes is 5m³.
 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/m³.
 8. Assume the density of plastic is 941 kg/m³.

Monthly Summary Waste Flow Table for 2016 (year)

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

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

Contract No.: CV/2013/08

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m ³)
Jan	58.943	0	3.811	12.131	43.001	31.248	0	0	0	0	0.695
Feb	74.418	0	8.785	39.85	25.783	6.552	0	0.097	0	0	0.339
Mar	43.764	0	6.438	12.034	25.292	3.288	0	0.206	0.007	0	0.042
Apr	33.767	0	1.933	5.759	26.075	0	0	0.221	0	0	0.070
May	51.115	0	3.229	17.469	30.417	0.928	0	0.211	0	0	0.079
Jun	61.126	0	6.921	23.286	30.919	3.693	0	0.166	0	0	0.043
Sub-total	323.133	0	31.117	110.529	181.487	45.709	0	0.901	0.007	0	1.268
Jul	73.407	0	0.951	32.858	39.598	0.827	0	0.271	0	0	0.094
Aug	45.652	0	6.653	5.933	33.066	0	0	0.323	0	0	0.110
Sep	31.086	0	2.089	11.529	17.468	0.048	0	0.231	0	0	0.049
Oct	36.479	0	5.359	9.743	21.377	0.01	0	0.273	0	1.475	0.075
Nov	35.682	0	8.541	4.298	22.843	0.03	0	0.252	0	0	0.115
Dec	27.056	0	9.811	5.810	11.435	0.066	0	0	0	0	0.065
Total	741.718	0	83.055	197.484	461.179	53.939	0	2.545	0.007	33.755	4.852

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

MONTHLY SUMMARY WASTE FLOW TABLE

Name of Department: CEDD

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

Contract No.: NE/2014/03

Monthly Summary Waste Flow Table for 2016 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	0	0	0	0	0	0	0	0	0	0	0
Feb	0.16	0	0	0	0.16	0	0	0	0	0	0
Mar	0.135	0	0	0	0.135	0	0	0	0	0	0.005
Apr	0.313	0	0	0	0.313	0	0	0	0	0	0.005
May	0.505	0	0	0	0.505	0	0	0	0	0	0
June	0.613	0	0	0	0.613	0	0	0.005	0.001	0	0
Sub-total	1.726	0	0	0	1.726	0	0	0.005	0.001	0	0.01
July	0.207	0	0	0	0.207	0	0	0.047	0.001	0	0
Aug	0.464	0	0	0	0.464	0	0	0.03	0.001	0	0
Sept	0.207	0	0	0	0.207	0	0.1	0.05	0.001	0	0
Oct	0	0	0	0	0	0	0.2	0.04	0.001	0	0
Nov	0	0	0	0	0	0	0.1	0.04	0.001	0	0.005
Dec	0	0	0	0	0	0	0.1	0.04	0.001	0	0.005
Total	2.604	0	0	0	2.604	0	0.5	0.252	0.007	0	0.02

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

Contract No. / Works Order No.: - SSC505**Monthly Summary Waste Flow Table for 2016** [year] [to be submitted not later than the 15th day of each month following reporting month]

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

Month	Actual Quantities of Inert Construction Waste Generated Monthly				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Broken Concrete (see Note 4)	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)
Jan	0.800	0	0	0	0.800
Feb	0.858	0	0	0	0.858
Mar	0.793	0	0	0	0.793
Apr	0.111	0	0	0	0.111
May	1.087	0	1.074	0	0.013
Jun	8.645	0	8.541	0	0.104
Sub-total	12.293	0	9.615	0	2.678
Jul	2.942	0	2.884	0	0.059
Aug	4.247	0	4.182	0	0.065
Sep	2.963	0	2.911	0	0.052
Oct	8.665	0	7.501	0	1.164
Nov	4.841	0	4.048	0	0.793
Dec	6.713	0	6.440	0	0.273
Total	42.663	0	37.580	0	5.083

Month	Actual Quantities of Non-inert Construction Waste Generated Monthly												
	Timber		Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Other Recyclable Materials (see Page 3)		General Refuse disposed of at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m ³)
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	4.73	4.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072
Feb	0.000	0.000	0.0004	0.0004	0.0186	0.0186	0.000	0.000	0.000	0.000	0.021	0.021	0.065
Mar	0	0	52.752	52.752	0.044	0.044	0	0	0	0	0.05	0.05	0.059
Apr	0	0	1465.5906	1465.5906	0.09	0.09	0	0	0	0	0.084	0.084	0.091
May	0	0	1587.5818	1587.5818	0	0	0.004	0.004	0	0	0.153	0.153	0.156
Jun	0	0	725.0582	725.0582	0.33	0.33	0.0045	0.0045	0	0	0.067	0.067	0.117
Sub-total	0	0	3818.7330	3818.7330	0.4826	0.4826	0.0085	0.0085	0	0	0.375	0.375	0.559
Jul	0	0	265.690	265.690	0.430	0.430	0.020	0.020	0.000	0.000	0.194	0.194	0.189
Aug	0	0	298.260	298.260	0.360	0.360	0.025	0.025	0.000	0.000	0.069	0.069	0.228
Sep	0	0	572.15	572.15	0.370	0.370	0.048	0.048	0.000	0.000	0.088	0.088	0.241
Oct	0	0	287.87	287.87	0.36	0.36	0.098	0.098	0.000	0.000	0.112	0.112	0.189
Nov	0	0	268.18	268.18	0.54	0.54	0.087	0.087	0.000	0.000	0.0765	0.0765	0.423
Dec	0	0	298.052	298.052	0	0	0.053	0.053	0.000	0.000	0.0095	0.0095	0.390
Total	0	0	5808.935	5808.935	2.543	2.543	0.339	0.339	0.000	0.000	0.923	0.923	2.217

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					
9.5kg of cans were sent to Kong Han for recycling.	53kg of plastic bottles were sent to Action Health for recycling.	298 tons of scrap metals from LCAL were sent for recycling			

- Notes:
- (1) The performance targets are given in the Particular Specification on Environmental Management Plan.
 - (2) The waste flow table shall also include construction waste that are specified in the Contract to be imported for use at the site.
 - (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
 - (4) Broken concrete for recycling into aggregates.
 - (5) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m³ 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	<p>General Dust Control Measures</p> <p>The following dust suppression measures should be implemented:</p> <ul style="list-style-type: none"> ■ 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	<p>Best Practice for Dust Control</p> <p>The relevant best practices for dust control as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good site management</i></p> <ul style="list-style-type: none"> ■ 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. <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> ■ 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?
		<p>concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</p> <ul style="list-style-type: none"> Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. <p><i>Exposed Earth</i></p> <ul style="list-style-type: none"> Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. <p><i>Loading, Unloading or Transfer of Dusty Materials</i></p> <ul style="list-style-type: none"> All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. <p><i>Debris Handling</i></p> <ul style="list-style-type: none"> 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. <p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> 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. <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> 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. <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> 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?
		<p><i>Site hoarding</i></p> <ul style="list-style-type: none"> 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. <p><i>Blasting</i></p> <ul style="list-style-type: none"> The areas within 30m from the blasting area should be wetted with water prior to blasting. 					
<u>Air Quality Impact (Operation)</u>							
3.5.2.2	2.2	<p>The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site:</p> <ul style="list-style-type: none"> 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
<u>Noise Impact (Construction)</u>							
4.4.1.4	3.1	<p>Adoption of Quieter PME</p> <p>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.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p>Use of Movable Noise Barrier</p> <p>The use of movable barrier for certain PME can further alleviate the construction noise impacts. In general, a 5 dB(A) reduction for movable PME and 10 dB(A) for stationary PME can be achieved depending on the actual design of the movable noise barrier. The Contractor shall be responsible for design of the movable noise barrier with due consideration given to the size of the PME and the requirement for intercepting the line of sight between the NSRs and PME. Barrier material with surface mass in excess of 7 kg/m² is recommended to achieve the predicted screening effect.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p>Use of Noise Enclosure/ Acoustic Shed</p> <p>The use of noise enclosure or acoustic shed is to cover stationary PME such as air compressor and concrete pump. With the adoption of the noise enclosure, the PME could be completely screened, and noise reduction of 15 dB(A) can be achieved according to the GW-TM.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
4.4.1.4	3.1	<p>Use of Noise Insulating Fabric</p> <p>Noise insulating fabric can be adopted for certain PME (e.g. drill rig, pilling auger etc). The insulating fabric should be lapped such that there are no openings or gaps on the joints. Technical data from manufacturers state that by using the Fabric, a noise reduction of over 10 dB(A) can be achieved on noise level.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p>Good Site Practice</p> <p>The good site practices listed below should be followed during each phase of construction:</p> <ul style="list-style-type: none"> • 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)							
<u>Road Traffic Noise</u>							
Table 4.42 and Figure 4.20.1 to 4.20.4	3.2	Erection of noise barrier/ enclosure along the viaduct section.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	EIAO and NCO
<u>Fixed Plant Noise</u>							
Table 4.46	3.2	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.5.2.4	3.2	<p>The following noise reduction measures shall be considered as far as practicable during operation:</p> <ul style="list-style-type: none"> 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	<p>Construction site runoff and drainage</p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> 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?
		<p>Temporary ditches should be provided to facilitate the runoff discharge into stormwater drainage system through a sediment/silt trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates, if practical.</p> <ul style="list-style-type: none"> ▪ 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?
		<p>the erosive potential of surface water flows.</p> <ul style="list-style-type: none"> ▪ 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	<p>Good site practices for works within water gathering grounds</p> <p>The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:</p>	To minimize water quality impacts to the water gathering grounds	Contractor	Construction Works Sites within the water gathering	Construction Phase	ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> ▪ 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?
		<p>Water Supplies.</p> <ul style="list-style-type: none"> ▪ 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	<p>Good site practices of general construction activities</p> <p>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</p> <p>Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</p>	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	<p>Sewage effluent from construction workforce</p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.</p>	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA Recommendation and Water Pollution Control Ordinance (WPCO)
5.6.1.4	4.1	<p>Hydrogeological Impact</p> <p>Grout injection works would be conducted before blasting, for sealing a limited area around the tunnel with a grout of a suitable strength for controlling the potential groundwater inflows. The pre-injection grouting method would be supplemented by post-injection grouting where necessary to further enhance the groundwater inflow control. On-site treatment for the groundwater ingress pumped out would be required to remove any contamination by grouting materials before discharge off-site.</p>	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
<u>Water Quality Impact (Operation)</u>							
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?
<u>Sewage and Sewerage Treatment Impact (Construction)</u>							
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
<u>Sewage and Sewerage Treatment Impact (Operation)</u>							
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
<u>Waste Management Implication (Construction)</u>							
7.6.1.1	6	<p>Good Site Practices</p> <p>Adverse impacts related to waste management such as potential hazard, air, odour, noise, wastewater discharge and public transport as mentioned in section 3.4.7.2 (ii)(c) of the Study Brief are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> ▪ 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?
		<p>such odour is not anticipated to be an issue to distant sensitive receivers</p> <ul style="list-style-type: none"> ▪ 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	<p>Waste Reduction Measures</p> <p>Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> ▪ 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?
		<p>of waste generated and avoid unnecessary generation of waste</p> <ul style="list-style-type: none"> 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	<p>C&D Materials</p> <p>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:</p> <ul style="list-style-type: none"> 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	<p>General refuse</p> <p>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.</p>	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
7.6.1.5	6	<p>Chemical waste</p> <p>If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical</p>	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

Appendix N

Investigation Report for Exceedance

To **Mr. Vincent Chan** Fax No **By e-mail**

Company **CRBC-CEC-Kaden JV**

cc

From **Nicola Hon** Date **20 December 2016**

Our Ref **TCS00694/13/300/F0808** No of Pages **7 (Incl. cover sheet)**

RE **Agreement No. CE 45/2008**
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM2A(a) on 6, 7
and 8 December 2016

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

Dear Sir,

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

TCS00694/13/300/F0785 dated 7 December 2016
TCS00694/13/300/F0800 dated 14 December 2016
TCS00694/13/300/F0805 dated 19 December 2016

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

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

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

Nicola Hon
Environmental Consultant

Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Steve Lo (CE/BCP, NTWDO, CEDD)	Fax:	3547 1659
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008			
Date		6 Dec 2016	6 Dec 2016	7 Dec 2016	8 Dec 2016
Location		WM2A(a)			
Time		10:25	10:25	10:15	10:55
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)		
Action Level		24.9 AND 120% of upstream control station of the same day	14.6 AND 120% of upstream control station of the same day		
Limit Level		33.8 AND 130% of upstream control station of the same day	17.3 AND 130% of upstream control station of the same day		
Measured Levels	WM2A-C	9.3	5.0	<2	3.0
	WM2A(a)	58.3	62.5	17.0	23.5
Exceedance		Limit level	Limit level	Action level	Limit level
Investigation Results, Recommendations & Mitigation Measures		<p>1. According to the site information provided from the Contractor of Contract 6 (CCKJV), construction activities carried out on 6 to 8 December 2016 at Bridge D (upstream of WM2A(a)) were mainly bridge column and pier construction. The monitoring locations and works area are shown in Figure 1.</p> <p>2. According to the site photo taken by the monitoring team on 6 December 2016, slightly turbid water was observed at the existing river course and WM2A(a) while the water quality at WM2A-C was clear. On 7 and 8 December 2016, the water quality at both WM2A-C and WM2A(a) were clear. (Photo 1 to 6)</p> <p>3. During weekly joint site inspection conducted at Bridge D on 8 December 2016, the water mitigation measures were properly implemented. The observation during the site inspection is summarized below.</p> <p>(a) Works at Bridge D was mainly bridge column and pier construction and there was no discharge due to nature of works. (Photo 7)</p> <p>(b) The water quality in the river course within the site area was clear and no muddy discharge was observed. (Photo 8)</p> <p>(c) Wastewater treatment facilities (3 nos. of AquaSed) were provided for Bridge D (Figures 1 and 2 and Photo 9) According to the daily record of wastewater treatment systems provided by the Contractor of Contract 6, the wastewater discharge from the site was compliance with the Discharge Licences requirements.</p> <p>(d) A sump pit was constructed to preliminary settle the suspended particulates in the water before diverted to the AquaSed for proper treatment. (Photo 10)</p> <p>(e) To minimize the muddy runoff from the site, concrete block as</p>			

	<p>temporary bund was provided align the river course and no turbid runoff and discharge was made from the site. Also The Contractor has covered the exposed slopes as far as practicable. <i>(Photo 11 and 12)</i></p> <p>4. In our investigation, the implementation of water mitigation measures on site was in order and no adverse water quality impact was observed. Moreover, there were no rain recorded on the exceedance days and muddy runoff from the site was unlikely to occur. It is considered that the exceedances on 6 to 8 December 2016 were due natural variation and not caused by the works under the Contract.</p> <p>5. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. Since the SS result required 5 working days to process, the need for repeated measurement could only rely on the result of turbidity which is in-situ measurement. There were no repeated monitoring on 9 December 2016 as no exceedance of turbidity recorded at the day before. Moreover, there were no exceedances recorded on 10 and 13 December 2016. Nevertheless, the Contractor should continually implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.</p>
--	---

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature :



Date : 20 December 2016

Photo Record



Photo 1

On 6 December 2016, the water quality observed at WM2A(a) was slightly turbid.



Photo 2

On 6 December 2016, the water quality observed at WM2A-C was clear.



Photo 3

On 7 December 2016, the water quality observed at WM2A(a) was clear.



Photo 4

On 7 December 2016, the water quality observed at WM2A-C was clear.



Photo 5

On 8 December 2016, the water quality observed at WM2A(a) was clear.



Photo 6

On 8 December 2016, the water quality observed at WM2A-C was clear.



Photo 7
Works at Bridge D was mainly bridge column and pier construction and there was no discharge due to nature of works.



Photo 8
The water quality in the river course within the site area was clear and no muddy discharge was observed.



Photo 9
Wastewater treatment facilities were provided for Bridge D



Photo 10
A sump pit was constructed to preliminary settled the particulates in the water before diverted to the AquaSed for proper treatment.



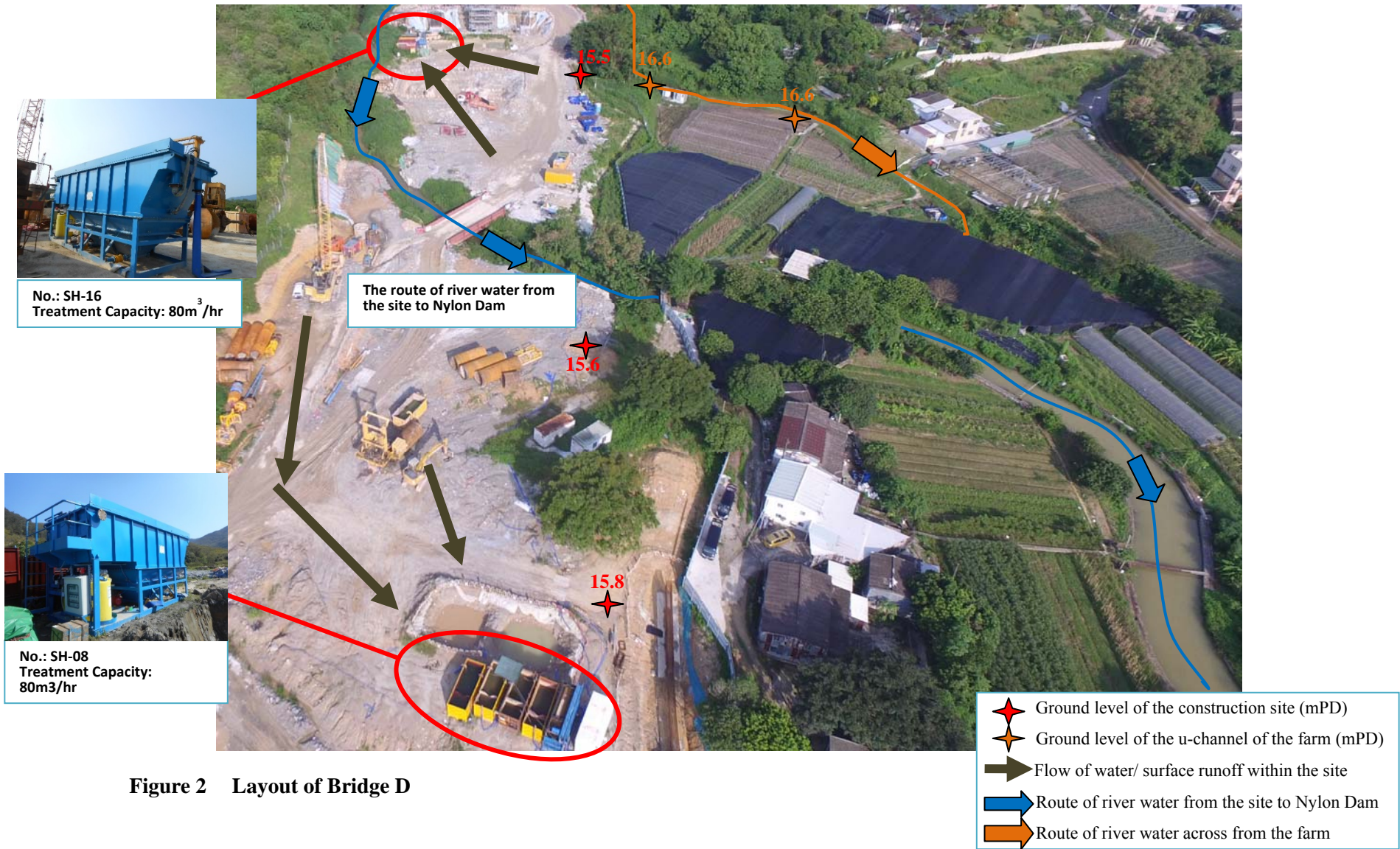
Photo 11
To minimize the muddy runoff from the site, concrete block as temporary bund was provided align the river course and no turbid runoff and discharge was made from the site.



Photo 12
The Contractor has covered the exposed slopes as far as practicable to minimize muddy runoff.



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



To Mr. Roger Lee **Fax No** 2717 3299

Company Dragages Hong Kong Limited

cc

From Nicola Hon **Date** 4 January 2017

Our Ref TCS00697/13/300/F0823 **No of Pages** 4 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM4 on 17
December 2016 (Contract 2)

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Dear Mr. Lee,

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

TCS00670/13/300/F0807 dated 19 December 2016
TCS00670/13/300/F0816 dated 28 December 2016.

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

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

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



Nicola Hon
Environmental Consultant

Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. B.K. Chow (CE/BCP, NTWDO, CEDD/C2)	Fax:	3547 1659
	Mr. CT Wong (PER, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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

Project		CE 45/2008	
Date		17 December 2016	
Location		WM4	
Time		12:00	
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	4.0	4.0
	WM4-CB	14.9	16.0
	WM4	80.5	117.5
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures	<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor of Contract 2 (DHK), construction activities carried out at South Portal during 17 December 2016 included tunnel excavation and ventilation building superstructure. 2. According to the site record from the monitoring team on 17 December 2016, turbid water was observed at WM4 and slightly turbid water was observed at WM4-CB while the water quality at WM4-CA was visually clear. <i>(Photo 1 to 3 and Figure 1)</i> 3. As reported by Contractor of Contract 3, suspected direct discharge of untreated water was observed from construction site by the utility contractor near Tai Wo Service Road West (TWSRW) and muddy water was found at the box culvert under its site area. It is suspected that the muddy water detected at WM4 was come from other construction site. <i>(Photo 4 and 5)</i> 4. During weekly site inspection at South Portal by ET in December 2016, the condition was generally in order and no adverse water quality impacts under the Contract were identified. In our investigation, it is considered that exceedances were not likely related to the works under the Contract. 5. 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. In view of the subsequent monitoring result, no exceedances were triggered at WM4 on 19 and 20 December 2016. 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 January 2017

Photo Record



Photo 1

Turbid water was observed at WM4 on 17 December 2016.



Photo 2

The water quality at WM4-CA was visually clear on 17 December 2016.



Photo 3

The water quality at WM4-CB was slightly turbid clear on 17 December 2016.



Photo 4

Suspected direct discharge of untreated water was observed from construction site by the utility contractor near Tai Wo Service Road West.



Photo 5

Turbid water was observed at the box culvert under site area by the utility Contractor (Photo 4).

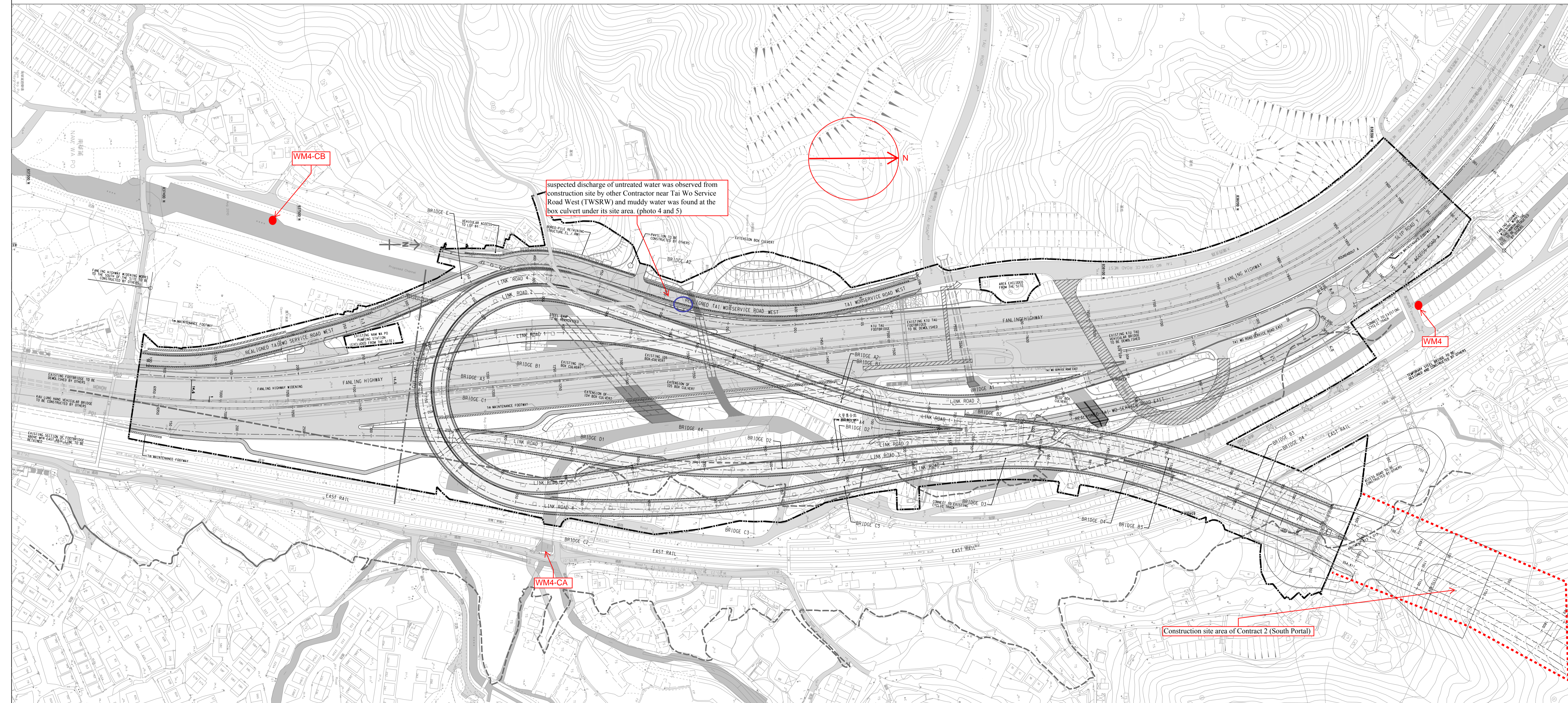


Figure 1. Location of Water Quality Monitoring Location

To Mr. Daniel Ho **Fax No** 2638 7077

Company Chun Wo Construction Ltd

cc

From Nicola Hon **Date** 4 January 2017

Our Ref TCS00670/13/300/F0822 **No of Pages** 4 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM4 on 17
December 2016 (Contract 3)

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Dear Mr. Ho,

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

TCS00670/13/300/F0806 dated 19 December 2016
TCS00670/13/300/F0815 dated 28 December 2016.

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

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

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



Nicola Hon
Environmental Consultant

Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Desmond Lam (CE/BCP, NTEDO, CEDD/C3)	Fax	3547 1659
	Mr. Alan Lee (ER of C3, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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

Project		CE 45/2008	
Date		17 December 2016	
Location		WM4	
Time		12:00	
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	4.0	4.0
	WM4-CB	14.9	16.0
	WM4	80.5	117.5
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor of C3 (Chun Wo), the construction activities carried out on 17 December 2016 were mainly general site works such as excavation, breaking work, erection of formwork and backfilling which as same as the past months and these activities would not generated excessive wastewater. 2. According to the site record from the monitoring team on 17 December 2016, turbid water was observed at WM4 and slightly turbid water was observed at WM4-CB while the water quality at WM4-CA was visually clear. <i>(Photo 1 to 3 and Figure 1)</i> 3. Inspection was carried out by Chun Wo on 17 December 2016 and it was reported that suspected direct discharge of untreated water was observed from construction site by the utility contractor near Tai Wo Service Road West (TWSRW) and muddy water was found at the box culvert under its site area. It is suspected that the muddy water detected at WM4 was come from other construction site. <i>(Photo 4 and 5)</i> 4. During weekly site inspection by ET on 12 and 21 December 2016, the condition was generally in order and no adverse water quality impacts under the Contract were identified. In our investigation, it is considered that exceedances were not likely related to the works under the Contract. 5. 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. In view of the subsequent monitoring result, no exceedances were triggered at WM4 on 19 and 20 December 2016. 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 January 2017 _____

Photo Record



Photo 1

Turbid water was observed at WM4 on 17 December 2016.



Photo 2

The water quality at WM4-CA was visually clear on 17 December 2016.



Photo 3

The water quality at WM4-CB was slightly turbid clear on 17 December 2016.



Photo 4

Suspected direct discharge of untreated water was observed from construction site by the utility contractor near Tai Wo Service Road West.



Photo 5

Turbid water was observed at the box culvert under site area by the utility Contractor (Photo 4).

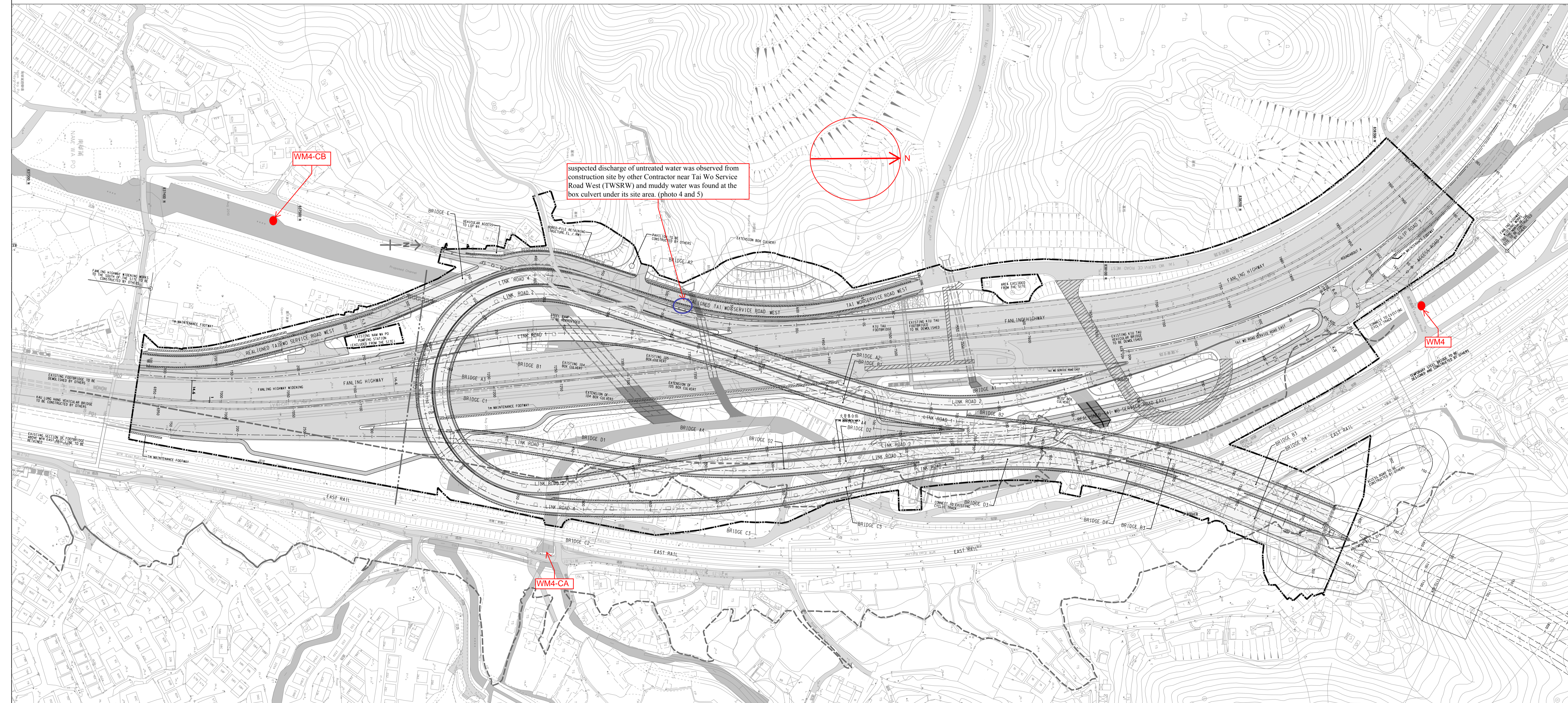


Figure 1. Location of Water Quality Monitoring Location

To **Mr. Vincent Chan** **Fax No** **By e-mail**

Company **CRBC-CEC-Kaden JV**

cc

From **Nicola Hon** **Date** **11 January 2017**

Our Ref TCS00694/13/300/**F0832** **No of Pages** **7** **(Incl. cover sheet)**

RE **Agreement No. CE 45/2008**
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM2A(a) on 29
December 2016

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Dear Sir,

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

TCS00694/13/300/F0821 dated 30 December 2016

TCS00694/13/300/F0827 dated 9 January 2017

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

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

Yours Faithfully,
For and on Behalf of

Action-United Environmental Services & Consulting



Nicola Hon
Environmental Consultant

Encl.

c.c.	Mr. David Chan (EPD)	Fax:	2685 1155
	Mr. Steve Lo (CE/BCP, NTWDO, CEDD)	Fax:	3547 1659
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		29 Dec 2016	
Location		WM2A(a)	
Time		10:00	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		24.9 AND 120% of upstream control station of the same day	14.6 AND 120% of upstream control station of the same day
Limit Level		33.8 AND 130% of upstream control station of the same day	17.3 AND 130% of upstream control station of the same day
Measured Levels	WM2A-C	6.7	3.0
	WM2A(a)	86.4	80.5
Exceedance		Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the Contractor of Contract 6 (CCKJV), construction activities carried out on 29 December 2016 at Bridge D (upstream of WM2A(a)) were mainly bridge column and pier construction. The monitoring locations and works area are shown in Figure 1. 2. According to the site photo taken by the monitoring team on 29 December 2016, turbid water was observed at the existing river course and WM2A(a) while the water quality at WM2A-C was clear. <i>(Photo 1 to 2)</i> 3. During weekly joint site inspection conducted at Bridge D on 29 December 2016, the water mitigation measures were properly implemented. The observation during the site inspection is summarized below. <ol style="list-style-type: none"> (a) Works at Bridge D was mainly bridge column and pier construction and there was no discharge due to nature of works. <i>(Photo 3)</i> (b) Wastewater treatment facilities (3 nos. of AquaSed) were provided for Bridge D <i>(Figures 1 and 2 and Photo 4)</i> According to the daily record of wastewater treatment systems provided by the Contractor of Contract 6, the wastewater discharge from the site was compliance with the Discharge Licences requirements. (c) A sump pit was constructed to preliminary settle the suspended particulates in the water before diverted to the AquaSed for proper treatment. <i>(Photo 5)</i> (d) To minimize the muddy runoff from the site, concrete block as temporary bund was provided align the river course and no turbid runoff and discharge was made from the site. Also The Contractor has covered the exposed slopes as far as practicable. <i>(Photo 6)</i> 	

	<p>4. In our investigation, the implementation of water mitigation measures on site was in order and no adverse water quality impact was observed. Moreover, there were no rain recorded on the exceedance days and muddy runoff from the site was unlikely to occur. It is considered that the exceedances on 29 December 2016 were due natural variation and not caused by the works under the Contract.</p> <p>5. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were no exceedances recorded on 30 and 31 December 2016. Nevertheless, the Contractor should continually implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.</p>
--	---

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 11 January 2017

Photo Record



Photo 1
On 29 December 2016, the water quality observed at WM2A(a) was turbid.



Photo 2
On 29 December 2016, the water quality observed at WM2A-C was clear.



Photo 3
Works at Bridge D was mainly bridge column and pier construction and there was no discharge due to nature of works.



Photo 4
Wastewater treatment facilities were provided for Bridge D



Photo 5
A sump pit was constructed to preliminary settled the particulates in the water before diverted to the AquaSed for proper treatment.



Photo 6
To minimize the muddy runoff from the site, concrete block as temporary bund was provided align the river course and no turbid runoff and discharge was made from the site.



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

