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.64) – NOVEMBER 2018

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT (CEDD)

Date	Reference No.	Prepared By	Certified By
13 December 2018	TCS00694/13/600/R1906v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	10 December 2018	First Submission
2	13 December 2018	Amended according to the IEC's comment on 11 and 13 December 2018

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14 December 2018

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

By Email & Post

Attention: Mr Simon LEUNG

Dear Sir

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Monthly EM&A Report (No. 64) – November 2018

With reference to the Monthly EM&A Report No. 64 for November 2018 (Version 2) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/D.

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

Yours faithfully

Antony WONG
Independent Environmental Checker

cc	CEDD/BCP	-	Mr LU Pei Yu / Mr William CHEUNG	by fax: 3547 1659
	ArchSD	-	Mr William WL CHENG	by fax: 2804 6805
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EXECUTIVE SUMMARY

ES01 This is the **64th** monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 30 November 2018** (hereinafter 'the Reporting Period').

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

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

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

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	147
	24-hour TSP	9	45
Construction Noise	$L_{eq(30min)}$ Daytime	10	45
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C	12 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	12 Scheduled & 5 extra
		WM2B & WM2B-C	12 Scheduled & 0 extra (*)
		WM3x &WM3-C	12 Scheduled & 3 extra
		WM4, WM4-CA &WM4-CB	12 Scheduled & 0 extra
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats and transect	1
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	5
		Contract 3	5
		Contract 4	5
		Contract 6	5
		Contract 7	5
		Contract SS C505 (#)	4

Remark: (#) IEC only joined one (1) event of site inspection for Contract SS C505.
(*) In the whole Reporting Period, water sampling was unable to carry out at WM2B and WM2B-C due to shallow water (water depth under 150mm)

ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

ES04 In the Reporting Period, no construction noise exceedance and valid noise complaint was recorded. For air quality monitoring, one (1) Action Level exceedances of 24-hour TSP was recorded. Moreover, eleven (11) Limit Level exceedances were recorded during water quality monitoring. 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	--	--	--

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
	24-hour TSP	**1**	0	0	Not project related	0	--
Construction Noise	$L_{eq(30min)}$ Daytime	0	0	0	--	--	--
Water Quality	DO	0	0	0	--	--	--
	Turbidity	**0**	**5**	**5**	Refer to ES.06		The Contractor should fully implement water quality mitigation measure.
	SS	**0**	**6**	**6**			

ES05 There was one (1) Action Level exceedance of 24-hour TSP recorded at Location AM2. Investigation result revealed that the Contractor has implemented dust mitigation measures to control the dust generated under the Project. It was concluded that the exceedance was related to other dust source such as frequent road traffic apart from the project and work area owned by other project without proper maintenance site exit along Lin Ma Hang Road and unlikely due to the works under Contract works.

ES06 A total of eleven (11) Limit Level exceedances were recorded during water quality monitoring. Investigation for cause of water quality exceedances have conducted by ET. Investigation report revealed that the exceedances recorded at WM2A(a) on 2 November 2018 and WM3x on 17 November 2018 was not caused by the works under the Project. Investigation report revealed that the exceedance recorded at WM3x on 10 November was caused to the isolated incident of burst water pipe which related to the works under Contract 6. Furthermore, the investigation for exceedances recorded at WM2A(a) on 26, 27 and 28 November 2018 are still underway by ET and the investigation result will be presented in next Monthly EM&A Report.

ENVIRONMENTAL COMPLAINT

ES07 In this Reporting Period, one (1) documented environmental complaint was received from EPD on 19 November 2018 concerning about the dust impact generated from the demolition work for a temporary bridge near Kau Lung Hang with insufficient dust control measures. Remedial action was undertaken by the Contractor immediately and satisfied by EPD. Follow up investigation was conducted by ET and it was observed that the situation was improved. Investigation report for the complaint is underway by ET.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES08 No environmental summons and prosecutions were recorded in the Reporting Period.

REPORTING CHANGE

ES09 No reporting changes were made in the Reporting Period.

SITE INSPECTION

ES10 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, 23 and 30 November 2018**. No non-compliance was noted during the site inspection.

ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract 3*** has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 21 and 29 November 2018**. 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 4** has been carried out by the RE, IEC, ET and the Contractor on **2, 9, 16, 19 and 30 November 2018**. No non-compliance was noted.

ES13 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 November 2018**. No non-compliance was noted during the site inspection.

ES14 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 **2, 9, 16, 20 and 30 November 2018**. No non-compliance was noted during the site inspection.

ES15 In the Reporting Period, joint site inspection to evaluate the site environmental performance at ***Contract SS C505*** has been carried out by the RE, ET and the Contractor on **7, 14, 21 and 28 November 2018** in which IEC joined the site inspection on **28 November 2018**. No non-compliance was noted during the site inspection.

FUTURE KEY ISSUES

ES16 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 as appropriately.

ES17 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River, Kwan Tei River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River.

ES18 In addition, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.

ES19 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.

ES20 Since most of construction sites under the Project are located adjacent to villages, the Contractors should fully implement air quality mitigation measures to reduce construction dust emission.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

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

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

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

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

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

1.1.5 This is **64th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **30 November 2018**.

1.2 REPORT STRUCTURE

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

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

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

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

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

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

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

Contract 5 (CV/2013/03)

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

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

Contract 6 (CV/2013/08)

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

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

Contract 7 (NE/2014/03)

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

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

ArchSD Contract No. SS C505

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

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

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

2.2 PROJECT ORGANIZATION

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

Civil Engineering and Development Department (CEDD)

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

Architectural Services Department (ArchSD)

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

Environmental Protection Department (EPD)

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

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

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

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

Engineer or Engineers Representative (ER)

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

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

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

The Contractor(s)

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

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

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

Environmental Team (ET)

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

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

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

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

Independent Environmental Checker (IEC)

2.2.11 One IEC will be employed for this Project. Once the IEC is appointed, EPD, ER, the Architect and ET will be notified the details of the IEC.

2.2.12 The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor or the ET for the Project. The IEC should be employed by the Permit Holder (i.e., CEDD) prior to the commencement of the construction of the Project. The IEC should have at least 10 years' experience in EM&A and have relevant professional qualifications. The appointment of IEC should be subject to the approval of EPD. The IEC should:

- Provide proactive advice to the ER and the Project Proponent on EM&A matters related to the project, independent from the management of construction works, but empowered to audit the environmental performance of construction
- Review and audit all aspects of the EM&A programme implemented by the ET
- Review and verify the monitoring data and all submissions in connection with the EP and EM&A Manual submitted by the ET
- Arrange and conduct regular, at least monthly site inspections of the works during construction phase, and ad hoc inspections if significant environmental problems are identified
- Check compliance with the agreed Event / Action Plan in the event of any exceedance
- Check compliance with the procedures for carrying out complaint investigation
- Check the effectiveness of corrective measures
- Feedback audit results to ET by signing off relevant EM&A proforma
- Check that the mitigation measures are effectively implemented
- Verify the log-book(s) mentioned in Condition 2.2 of the EP, notify the Director by fax, within one working day of receipt of notification from the ET Leader of each and every occurrence, change of circumstances or non-compliance with the EIA Report and/or the EP, which might affect the monitoring or control of adverse environmental impacts from the Project
- Report the works conducted, the findings, recommendation and improvement of the site inspections, after reviewing ET's and Contractor's works, and advices to the ER and Project Proponent on a monthly basis
- Liaison with the client departments, Engineer/Engineer's Representative, the Architect, ET, lEC and the Contractor of the concurrent projects as listed under Section 2.3 below regarding the cumulative impact issues.

2.3 CONCURRENT PROJECTS

2.3.1 The concurrent construction works that may be carried out include, but not limited to, the following:

(a) Regulation of Shenzhen River Stage IV;

(b) Widening of Fanling Highway – Tai Hang to Wo Hop Shek Interchange – Contract No. HY/2012/06;

(c) Construction of BCP facilities in Shenzhen.

2.4 CONSTRUCTION PROGRESS

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

Contract 2 (CV/2012/08)

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

Mid-Vent Portal	• Ventilation building fit out and E&M installation • Construction of flexible barrier, permanent drainage and external works • Demolition of CLP transformer room & external reinstatement works • Soft landscaping works
North Portal	• Ventilation building fit out and E&M installation • Construction of flexible barrier, permanent drainage and slip road • Cladding installation, road paving and E&M works inside the tunnel • Dismantling of MS water treatment plant and workshop • External landscaping, backfilling and reinstatement works • Soft landscaping works
South Portal	• Ventilation building fit out and E&M installation • Construction of flexible barrier, permanent drainage and slip road • Cladding installation, road paving and E&M works inside the tunnel • External landscaping, backfilling and reinstatement works • Soft landscaping works • Dismantling of temporary steel bridge across the MTR railway track
Admin Building	• Building fit out and E&M installation • External reinstatement and soft landscaping works

Contract 3 (CV/2012/09)

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

- Cable detection and trial trenches
- Remaining works on new Footbridge
- Noise barrier construction
- Road pavement works
- Water main laying works (on Grade and on bridge deck)
- Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
- Road Drainage Works
- Waterproofing works on bridge deck
- Bitumen paving on bridge deck
- Construction of Pavilion and Pai Lau
- Construction of retaining wall
- Landscaping works

Contract 4 (NE/2014/02)

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

- E&M installation at Admin Building
- E&M installation at Ventilation Building
- E&M installation at tunnel
- Cladding installation at Cheung Shan Tunnel
- Sign installation

Contract 5 (CV/2013/03)

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

Contract 6 (CV/2013/08)

2.4.6 Contract 6 has awarded in June 2015 and construction work was commenced on 23 October 2015.

In this Reporting Period, construction activities conducted are listed below:

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

Contract 7 (NE/2014/03)

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

- Profile barrier construction at Bridges A & E
- Noise barrier construction at Bridge D &E
- Parapet installation at Bridge A, B, D & E
- Waterproofing and Drainage works at roof of Bridge C
- Drainage and watermains at perimeter road
- Bitumen pavement at Bridge A, B, D & E

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:

- Passenger Terminal Building (PTB) G/F - Plant Room Structure Works, Backfiling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
- PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases ABWF Works, Hall Block External Façade, Southern Entrance Construction & Major Plant Rooms
- PTB - External Works incl. Building 21-24, M/F External Wall (Ewall), Roof & Upper Roof Roofing Works, Podium Coach Canopy, 21&22 (C&PC KIOSKS) & 23&24 (PC Examination Building & MSRVSS) Superstructure & ABWF Works and MEP Installation, Podium Open Area Waterproofing, Paving, Hard and Soft Landscaping works, Ambulance Canopy / Glazed Canopy
- Bridge C Integrated ABWF and MEP Installation Works (C7 Portion) - Arrival & Departure Hall, Staircases, Test & Commissioning
- Bldg 1 - C&ED Detector Dog Base Phase 1 - Integrated ABWF & MEP Works Works at G/F & R/F
- Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F and Observation Tower (incluidng Lift)
- Bldg 3 - Fire Station and Drill Tower Phase 1 - External Works, Integradted ABWF & MEP Works at G/F to UR/F, Drill Tower
- Bldg 4 - Cargo Examination Building (Inbound) Phase 1 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, and Loading Dock
- Bldg 5 - Cargo Examination Building (Outbound) Phase 2 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
- Bldg 6 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) Phase 1 - External Works (Fence Wall), Integrated ABWF & MEP Works at G/F to R/F
- Bldg 7 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) Phase 2 - External Works, Integrated ABWF & MEP Works at G/F
- Bldg 8 - MXRVSS (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 9 - MXRVSS (Outbound) Phase 2 - Structure Works at G/F, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 10 - GV Kiosk (Inbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF and MEP Works at G/F & R/F

- Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 12 - Public Toilets (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 13 - Public Toilets (Outbound) Phase 2 - Structures Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 14 - Disinsection Facilities (Inbound) Phase 2 - Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 15 - Disinsection Facilities (Outbound) Phase 2 - Substructure and Structure Works, Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 16 - Weigh Station Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 17 - EUVSS & Monitoring Room Phase 2 - Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 18 - Refuse Collection Point Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 25 - Traffic Control Office (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 26 - Traffic Control Office (Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 27 - Inspection Post Phase 2 - Integrated ABWF and MEP Work at G/F & Envelope
- Bldg 28 - Guard Booth (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 29 - Guard Booth (Vehicle Detention Area) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 30 - Guard Booth (Outbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 31 - Guard Booth (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 32/33/34/35 - Steel Canopies Phase 2 - Structure Works, Integrated ABWF and MEP Works
- Bldg 37/38/39/40 - Elevated Walkway (E1, E2, E3 & E4) Phase 2 - Structures Works, ABWF and BS Works
- Vehicular bridges 1 to 5 Phase 3 - Retaining walls, Road and Finishes Works
- External Works - CLP Cable & Power ON Transfer room
- External Works - Water Meter Room Connection (Inbound & Outbound)
- External Works - External Utilities Works for Phase 1 & 2 FS Inspection, DSD Inspection
- External Works - Road & Pavement Works for Inbound Phase 1 FS Inspection (Concrete Pavement)
- External Works - Landscape for Inbound & Outbound Area
- Testing & Commissioning (T&C) and FSD/SCCU Inspection - Phase 1 - Bldg 1 to 4, 6 & 36

2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

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

- Wetland Compensation Plan

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

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

Item	Description	License/Permit Status			
		Ref. no.		Effective Date	Expiry Date
Contract 2					
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864		31 Dec 2013	Till Contract ends
2	Chemical Waste Producer Registration	***North Portal*** Waste Producers Number: No.5213-652-D2523-01		25 Mar 2014	Till Contract ends
		Mid-Vent Portal Waste Producers Number: No.5213-634-D2524-01		25 Mar 2014	Till Contract ends
		South Portal Waste Producers Number: No.5213-634-D2526-01		9 Apr 2014	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014 (South Portal)		3 Mar 2014	28 Feb 2019
		No. WT00023063-2015 (North Portal)		18 Dec 2015	31 Mar 2019
		No.: W5/1I392 (Admin Building)		28 Mar 2014	31 Mar 2019
		No.: WT00025594-2016 (Mid-Vent Portal)		7 Oct 2016	31 Mar 2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105		8 Jan 2014	Till Contract ends
5	Construction Noise Permit	GW-RN0211-18	North Portal	10-May-2018	09-Nov-2018
		GW-RN0212-18		10-May-2018	09-Nov-2018
		GW-RN0307-18		18-Jun-2018	17-Dec-2018
		GW-RN0660-18		26-Nov-2018	25-Jan-2019
		GW-RN0661-18		26-Nov-2018	25-Jan-2019
		GW-RN0400-18	Mid Vent	06-Aug-2018	01-Feb-2019
		GW-RN0401-18		06-Aug-2018	31-Jan-2019
		GW-RN0511-18	South Portal	30-Sep-2018	25-Mar-2019
		GW-RN0513-18		30-Sep-2018	25-Mar-2019
		GW-RN0523-18	Admin Bldg	28-Sep-2018	27-Mar-2019
		GW-RN0522-18	Cheung Shan Tunnel	26-Sep-2018	22-Mar-2019
6	Specified Process License (Mortar Plant	L-3-251(1)		12 Apr 2016	11 Apr 2021

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Operation)			
Contract 3				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101	17 Jul 2013	Till Contract ends
2	Chemical Waste Producer Registration	Waste Producers Number: No.:5113-634-C3817-01	7 Oct 2013	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.:WT00032188 – 2018	20 Sep 2018	31 Aug 2023
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914	2 Aug 2013	Till Contract ends
5	Construction Noise Permit	GW-RN0259-18	19 Jun 2018	17 Dec 2018
		GW-RN0305-18	22 Jun 2018	17 Dec 2018
		GW-RN0366-18	9 Jul 2018	18 Dec 2018
		GW-RN0361-18	15 Jul 2018	18 Dec 2018
		GW-RN0388-18	25 Aug 2018	24 Feb 2019
		GW-RN0424-18	01 Sep 2018	21 Feb 2019
		GW-RN0425-18	22 Aug 2018	21 Feb 2019
		GW-RN0454-18	06 Sep 2018	05 Mar 2019
		GW-RN0509-18	10 Oct 2018	17 Dec 2018
		GW-RN0566-18	29 Oct 2018	04 Apr 2019
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-RW0481-18	14 Sep 2018	13 Mar 2019
		GW-RW0595-18	30 Oct 2018	28 Feb 2019
Contract SS C505				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	13 Jul 2015	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
2	Chemical Waste Producer Registration	Waste Producer No.: 5213-642-L1048-07	16 Sep 2015	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024865-2016	8 Jul 2016	30 Nov 2020
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022831	23 Jul 2015	Till the end of Contract
5	Construction Noise Permit	GW-RN0637-18	9 Nov 2018	8 Jan 2019
		GW-RN0529-18	5 Oct 2018	3 Apr 2019
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-RN0206-18	8 May 2018	4 Nov 2018
Contract 4				
1	Air pollution Control (Construction Dust) Regulation	Ref. No. 405353	22 July 2016	Till the end of Contract
2	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024973	13 May 2016	Till the end of Contract
3	Construction Noise Permit	GW-RN0568-18	15 Oct 2018	14 Dec 2018
	Construction Noise Permit	GW-RN0697-18	10 Dec 2018	9 Feb 2019

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

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

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

3.2 MONITORING PARAMETERS

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

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

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

Table 3-1 Summary of EM&A Requirements

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

3.3 MONITORING LOCATIONS

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

Table 3-2 Impact Monitoring Stations - Air Quality

Station ID	Description	Works Area	Related to the Work Contract
AM1c (*)	Open area of Tsung Yuen Ha Village No. 63	BCP	SS C505 Contract 7
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 6

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

 # Proposal for the change of air quality monitoring location from AM9a to AM9b was submitted to EPD on 4 Nov 2013 after verified by the IEC and it was approved by EPD (EPD's ref.: (15) in EP 2/N7/A/52 Pt.10 dated 8 Nov 2013).
@ Proposal for the change of air quality monitoring location from AM7a to AM7b was submitted to EPD on 4 June 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (7) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).
^ Proposal for change of air quality monitoring locations was enclosed in the updated EM&A Programme which approval by EPD on 29 Mar 2016. Besides, Location AM1b was temporary suspended (24-hour TSP monitoring) since 27 April 2018 as the rented land was demolished and returned to the landlord.
** Revised proposal for alterative location AM1c was submitted to EPD on 31 October 2018 after verified by the IEC and it was approved by EPD (EPD's ref.: ( ) in Ax (1) to EP 2/N7/A/52 Pt.26 dated 26 November 2018)*

Table 3-3 Impact Monitoring Stations - Construction Noise

Station ID	Description	Works Area	Related to the Work Contract
NM1	Tsung Yuen Ha Village House No. 63	BCP	SS C505 Contract 7
NM2a#	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	833 679	845 421	Alternative location located at upstream 51m of the	SS C505 Contract 6

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

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

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

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

3.4 MONITORING FREQUENCY AND PERIOD

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

Air Quality Monitoring

3.4.1 Frequency of impact air quality monitoring is as follows:

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

Noise Monitoring

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

Water Quality Monitoring

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

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

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

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

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

Table 3-5 Air Quality Monitoring Equipment

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

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

Wind Data Monitoring Equipment

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

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

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

3.5.6 Under this situation, the ET proposed alternative methods to obtain representative wind data. Meteorological information as extracted from "the Hong Kong Observatory Ta Kwu Ling Station" is alternative method to obtain representative wind data. For Ta Kwu Ling Station, it is located

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

Noise Monitoring

3.5.7 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

3.5.8 Noise monitoring equipment to be used for monitoring is listed in ***Table 3-6***.

Table 3-6 Construction Noise Monitoring Equipment

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

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

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

Water Quality Monitoring

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

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

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

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

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

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

3.5.15 Water samples for laboratory measurement of SS will be collected in high density polythene bottles, packed in ice (cooled to 4 ºC without being frozen), and delivered to the laboratory in the

same day as the samples were collected.

3.5.16 Analysis of suspended solids should be carried out in a HOKLAS or other accredited laboratory. Water samples of about 1L should be collected at the monitoring stations for carrying out the laboratory suspended solids determination. The SS determination work should start within 24 hours after collection of the water samples. The SS analyses should follow the *APHA Standard Methods 2540D* with Limit of Reporting of 2 mg/L.

3.5.17 Water quality monitoring equipment used in the impact monitoring is listed in ***Table 3-7***. Suspended solids (SS) analysis is carried out by a local HOKLAS-accredited laboratory, namely *ALS Technichem (HK) Pty Ltd*.

Table 3-7 Water Quality Monitoring Equipment

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

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

3.6 MONITORING METHODOLOGY

1-hour TSP Monitoring

3.6.1 The 1-hour TSP monitor was a brand named "Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter" which is a portable, battery-operated laser photometer. The 1-hour TSP meter provides a real time 1-hour TSP measurement based on 90^{o} light scattering. The 1-hour TSP monitor consists of the following:

(a.) A pump to draw sample aerosol through the optic chamber where TSP is measured;
(b.) A sheath air system to isolate the aerosol in the chamber to keep the optics clean for maximum reliability; and
(c.) A built-in data logger compatible with Windows based program to facilitate data collection, analysis and reporting.

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

24-hour TSP Monitoring

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

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

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

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

Noise Monitoring

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

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

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

Water Quality

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

Sampling Procedure

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

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

(a) the alternative location should be either upstream or downstream of the original location and at the same the river/drain channel
(b) the alternative location should be within 15m far from the original location
(c) if no suitable alternative location could be found within 15m far from the original location, the sampling at that location will be cancelled since sampling at too far from the designated location could not make a representative sample.

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

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

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

In-situ Measurement

3.6.15 YSI Professional Plus is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation and pH measurement.

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 (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM1c	265	143	500	260
AM2	268	149		

Monitoring Station	Action Level (μg /m^3)		Limit Level (μg/m^3)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
AM3	269	145		
AM4b	267	148		
AM5a	268	143		
AM6	269	148		
AM7b	275	156		
AM8	269	144		
AM9b	271	151		

Table 3-9 Action and Limit Levels for Construction Noise

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

Note 1: Acceptable Noise Levels for school should be reduced to 70 dB(A) and65 dB(A) during examination period.

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

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location				
		WM1	WM2A(a)	WM2B	WM3x	WM4
DO (mg/L)	Action Level	(*)4.23	(**)4.00	(*)4.74	(**)4.00	(*)4.14
	Limit Level	(#)4.19	(**)4.00	(#)4.60	(**)4.00	(#)4.08
Turbidity (NTU)	Action Level	51.3	24.9	11.4	13.4	35.2
		AND 120% of upstream control station of the same day				
	Limit Level	67.6	33.8	12.3	14.0	38.4
		AND 130% of upstream control station of the same day				
SS (mg/L)	Action Level	54.5	14.6	11.8	12.6	39.4
		AND 120% of upstream control station of the same day				
	Limit Level	64.9	17.3	12.4	12.9	45.5
		AND 130% of upstream control station of the same day				

Remarks:

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

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

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

3.8.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan which presented in ***Appendix G.***

3.9 DATA MANAGEMENT AND DATA QA/QC CONTROL

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

3.9.2 For monitoring parameters that require laboratory analysis, the local laboratory shall follow the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory tests.

4 AIR QUALITY MONITORING

4.1 GENERAL

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

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

4.2 AIR QUALITY MONITORING RESULTS

4.2.1 In the Reporting Period, a total of ***147*** events of 1-hour TSP and ***45*** events 24-hours TSP monitoring were carried out and the monitoring results are summarized in ***Tables 4-1 to 4-9***. The detailed 24-hour TSP monitoring data are presented in ***Appendix I*** and the relevant graphical plots are shown in ***Appendix J***.

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
6-Nov-18	35	1-Nov-18	9:57	86	81	84
12-Nov-18	81	7-Nov-18	10:40	87	80	79
17-Nov-18	41	13-Nov-18	9:30	67	84	69
23-Nov-18	86	19-Nov-18	14:03	55	58	58
29-Nov-18	36	24-Nov-18	9:36	71	72	69
--	--	30-Nov-18	11:41	62	57	58
Average (Range)	**56 (35-86)**	Average (Range)		**71 (55 – 87)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
6-Nov-18	145	1-Nov-18	9:52	105	109	106
12-Nov-18	***232***	7-Nov-18	10:55	93	92	88
17-Nov-18	92	13-Nov-18	9:50	113	127	133
23-Nov-18	144	19-Nov-18	13:12	99	122	113
29-Nov-18	75	24-Nov-18	9:48	101	98	90
--	--	30-Nov-18	9:53	94	101	105
Average (Range)	**138 (75 – 232)**	Average (Range)		**105 (88 – 133)**		

Bold and italic indicated Action Level exceedance

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
6-Nov-18	42	1-Nov-18	9:48	97	98	97
12-Nov-18	92	7-Nov-18	14:15	110	103	121
17-Nov-18	116	13-Nov-18	12:45	89	93	88
23-Nov-18	83	19-Nov-18	9:50	99	86	80
29-Nov-18	18	24-Nov-18	13:21	88	91	92
--	--	30-Nov-18	8:32	88	84	81

Date	24-hour TSP ($\mu g/m^3$)	1-hour TSP ($\mu g/m^3$)				
		Date	Start Time	1st reading	2nd reading	3rd reading
Average (Range)	**70 (18 – 116)**	Average (Range)		**94 (80 – 121)**		

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

Date	24-hour TSP ($\mu g/m^3$)	1-hour TSP ($\mu g/m^3$)				
		Date	Start Time	1st reading	2nd reading	3rd reading
2-Nov-18	76	6-Nov-18	10:50	93	92	88
8-Nov-18	98	12-Nov-18	9:10	37	45	49
14-Nov-18	31	17-Nov-18	9:11	36	39	40
20-Nov-18	80	23-Nov-18	9:24	43	47	51
26-Nov-18	70	29-Nov-18	9:35	33	35	38
Average (Range)	**71 (31 – 98)**	Average (Range)		**51 (33 – 93)**		

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

Date	24-hour TSP ($\mu g/m^3$)	1-hour TSP ($\mu g/m^3$)				
		Date	Start Time	1st reading	2nd reading	3rd reading
2-Nov-18	123	6-Nov-18	10:55	91	84	83
8-Nov-18	84	12-Nov-18	9:08	76	78	82
14-Nov-18	86	17-Nov-18	9:09	89	88	90
20-Nov-18	71	23-Nov-18	9:22	74	80	88
26-Nov-18	31	29-Nov-18	9:33	68	70	77
Average (Range)	**79 (31 – 123)**	Average (Range)		**81 (68 – 91)**		

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

Date	24-hour TSP ($\mu g/m^3$)	1-hour TSP ($\mu g/m^3$)				
		Date	Start Time	1st reading	2nd reading	3rd reading
2-Nov-18	128	6-Nov-18	10:30	95	90	81
8-Nov-18	144	12-Nov-18	9:02	38	40	45
14-Nov-18	115	17-Nov-18	9:02	33	35	38
20-Nov-18	111	23-Nov-18	9:16	44	46	49
26-Nov-18	106	29-Nov-18	9:26	34	37	39
Average (Range)	**121 (106 – 144)**	Average (Range)		**50 (33 – 95)**		

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

Date	24-hour TSP ($\mu g/m^3$)	1-hour TSP ($\mu g/m^3$)				
		Date	Start Time	1st reading	2nd reading	3rd reading
2-Nov-18	131	6-Nov-18	9:20	89	91	90
8-Nov-18	122	12-Nov-18	9:30	115	113	112
14-Nov-18	144	17-Nov-18	9:54	86	86	84
20-Nov-18	115	23-Nov-18	13:00	92	82	86
26-Nov-18	39	29-Nov-18	9:21	76	79	80

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
Average (Range)	**110 (39 – 144)**	Average (Range)		**91 (76– 115)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
2-Nov-18	66	6-Nov-18	13:20	54	52	51
8-Nov-18	39	12-Nov-18	13:02	57	57	61
14-Nov-18	93	17-Nov-18	13:40	47	45	44
20-Nov-18	52	23-Nov-18	13:26	47	48	47
26-Nov-18	22	29-Nov-18	9:12	32	35	39
Average (Range)	**54 (22 – 93)**	Average (Range)		**48 (32 – 61)**		

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

Date	24-hour TSP (μg/m³)	1-hour TSP (μg/m³)				
		Date	Start Time	1st reading	2nd reading	3rd reading
6-Nov-18	20	1-Nov-18	9:30	62	60	62
12-Nov-18	22	7-Nov-18	9:39	53	58	54
17-Nov-18	24	13-Nov-18	9:25	67	65	66
23-Nov-18	68	19-Nov-18	9:40	66	69	62
29-Nov-18	23	24-Nov-18	9:30	61	64	59
--	--	30-Nov-18	9:30	64	63	58
Average (Range)	**31 (20 – 68)**	Average (Range)		**62 (53 – 69)**		

4.2.2 As shown in ***Tables 4-1 to 4-9***, all the 1-hour TSP monitoring results were below the Action/Limit Levels. For 24-hour TSP monitoring, one (1) Action Level exceedances was recorded at AM2 on 12 November 2018. Notification of Exceedance (NOE) was issued to all relevant parties upon confirmation of the exceedance. The meteorological data during the impact monitoring days are summarized in ***Appendix K***.

4.2.3 Investigation for the cause of exceedance on 12 November 2018 was conducted by ET. Investigation result revealed that the Contractor has implemented dust mitigation measures to control the dust generated under the Project. It was concluded that the exceedance was related to other dust source such as frequent road traffic apart from the project and work area owned by other project without proper maintenance site exit along Lin Ma Hang Road and unlikely due to the works under Contract works.

4.2.4 Investigation Reports for 24-hour TSP exceedance recorded at AM2 and AM3 on 31 October 2018 had completed. The investigation result revealed that the major dust source leaded to the TSP exceedance was the traffic dust along Lin Ma Hang Road and the Project only has minor contribution to the exceedance. The Contractor should fully implement the dust mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

4.2.5 The details of the completed investigation reports for the exceedances are attached in ***Appendix N***.

5 CONSTRUCTION NOISE MONITORING

5.1 GENERAL

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

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

5.2 NOISE MONITORING RESULTS

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

Table 5-1 Summary of Construction Noise Monitoring Results

Construction Noise Level ($L_{eq30min}$), dB(A)					
Date	**NM1**	**NM2a(*)**	**NM8**	**NM9**	**NM10(*)**
1-Nov-18	52	69	56	66	61
7-Nov-18	55	70	55	65	60
13-Nov-18	57	71	61	64	66
19-Nov-18	49	71	55	55	56
30-Nov-18	60	74	59	65	63
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**
6-Nov-18	65	64	58	60	63
12-Nov-18	58	65	59	63	66
23-Nov-18	58	62	58	59	62
29-Nov-18	60	63	54	59	63
Limit Level	**75 dB(A)**				

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

6 WATER QUALITY MONITORING

6.1 GENERAL

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

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of **twelve (12)** sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances was recorded at WM2A(a) and WM3x, according to "*Event and Action Plan*" stipulation, **5** and **3** additional water quality monitoring day was conducted for WM2A(a) and WM3x and its control stations.

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

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

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
2-Nov-18	6.8	7.5	6.4	7.5	3.5	6.0	8.5	2.0	7.5
6-Nov-18	6.4	6.7	5.9	7.0	3.3	5.0	3.5	<2	4.0
8-Nov-18	6.1	7.2	5.9	9.2	3.0	5.4	10.5	4.0	5.5
10-Nov-18	6.7	7.3	5.1	34.1	18.1	14.6	28.0	3.0	3.5
13-Nov-18	6.4	7.6	5.7	11.8	4.4	7.6	13.0	5.5	8.0
15-Nov-18	7.3	8.3	6.5	10.0	7.7	9.6	5.5	3.5	12.5
17-Nov-18	6.7	8.0	5.2	10.2	4.2	10.9	5.5	2.0	11.5
20-Nov-18	7.3	8.4	6.1	18.2	6.2	7.6	16.0	<2	5.5
22-Nov-18	21.6	8.7	7.9	10.1	4.0	6.4	16.0	2.0	13.0
24-Nov-18	7.8	8.9	6.6	11.6	3.3	7.2	16.0	<2	5.0
26-Nov-18	8.3	7.3	7.9	34.0	3.3	10.5	38.0	2.0	9.5
29-Nov-18	7.7	8.9	6.1	10.0	2.6	6.8	12.5	<2	8.0

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
2-Nov-18	7.6	7.4	9.2	5.5	7.5	3.0
6-Nov-18	6.7	7.3	15.3	5.6	9.0	<2
8-Nov-18	6.6	6.0	14.9	6.7	14.0	4.5
10-Nov-18	6.6	6.0	17.9	13.2	14.5	5.0
13-Nov-18	6.9	6.2	19.2	6.4	12.5	2.0
15-Nov-18	8.5	7.8	21.1	5.3	15.0	3.0
17-Nov-18	8.0	7.0	17.0	7.2	13.5	4.5
20-Nov-18	8.0	7.2	20.6	7.3	16.5	2.0
22-Nov-18	8.6	10.3	30.0	10.8	24.5	8.5
24-Nov-18	7.6	7.9	29.4	10.2	21.0	2.0
26-Nov-18	8.4	8.4	30.4	17.4	21.0	10.0
29-Nov-18	8.2	8.5	17.7	4.4	13.5	2.0

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-Nov-18	7.2	7.4	*	*	**120.0**	14.1	*	*	**95.5**	6.5	*	*
3-Nov-18#	#	#	*	*	14.8	11.9	*	*	13.0	6.0	*	*
5-Nov-18#	#	#	*	*	22.8	9.2	*	*	14.0	7.0	*	*
6-Nov-18	7.0	6.9	*	*	19.7	11.4	*	*	13.0	2.0	*	*
8-Nov-18	6.4	6.4	*	*	10.6	14.5	*	*	9.0	6.0	*	*
10-Nov-18	6.6	7.0	*	*	7.7	14.5	*	*	5.5	5.0	*	*
13-Nov-18	6.7	7.1	*	*	16.2	19.7	*	*	14.5	9.5	*	*
15-Nov-18	8.0	7.7	*	*	17.0	17.1	*	*	11.0	7.0	*	*
17-Nov-18	8.0	7.3	*	*	9.9	21.5	*	*	6.5	15.0	*	*
20-Nov-18	7.8	7.7	*	*	7.1	15.0	*	*	3.0	4.5	*	*
22-Nov-18	8.2	7.8	*	*	13.7	22.7	*	*	8.5	7.0	*	*
24-Nov-18	8.3	7.9	*	*	8.4	26.3	*	*	4.0	26.0	*	*
26-Nov-18	8.2	8.3	*	*	**304.0**	17.1	*	*	**201.0**	8.5	*	*
27-Nov-18#	#	#	*	*	24.5	7.8	*	*	**29.0**	11.0	*	*
28-Nov-18#	#	#	*	*	**overrange**	36.8	*	*	**812.0**	16.0	*	*
29-Nov-18	8.2	7.7	*	*	35.9	40.9	*	*	28.0	23.5	*	*
30-Nov-18#	#	#	*	*	25.2	24.4	*	*	22.0	20.0	*	*

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

Bold and underline indicated Limit Level exceedance

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

Table 6-4 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
1-Nov-18#	#	#	11.0	7.5	11.0	6.0
2-Nov-18	7.2	6.5	13.3	4.4	10.0	4.5
6-Nov-18	6.4	6.4	5.6	2.2	4.0	<2
8-Nov-18	6.5	6.7	3.0	4.6	3.5	3.5
10-Nov-18	6.6	6.5	**overrange**	34.8	**3130.0**	38.5
12-Nov-18#	#	#	13.1	4.5	12.0	4.0
13-Nov-18	6.5	6.4	11.1	45.9	8.0	45.5
15-Nov-18	7.7	7.7	24.3	21.6	10.5	18.0
17-Nov-18	7.4	7.1	**99.1**	7.1	**79.0**	10.0
19-Nov-18#	#	#	2.9	2.4	3.0	3.0
20-Nov-18	7.8	7.6	6.7	3.8	4.0	2.0
22-Nov-18	7.6	7.6	59.7	142.5	52.5	312.0
24-Nov-18	8.1	7.8	26.9	24.4	34.0	34.5
26-Nov-18	8.2	7.9	13.3	8.3	12.5	9.0
29-Nov-18	7.9	7.7	13.1	8.8	12.5	7.0

Bold and underline indicated Limit Level exceedance

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

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

Location	Dissolved Oxygen		Turbidity		Suspended Solids		Total Exceedance		Project Related exceedance	
	AL	LL	AL	LL	AL	LL	AL	LL	AL	LL
WM1	0	0	0	0	0	0	0	0	0	0
WM2A(a)	0	0	0	**3**	0	**4**	0	**7**	0	**0 #**
WM2B	0	0	0	0	0	0	0	0	0	0
WM3x	0	0	0	**2**	0	**2**	0	**4**	0	**2**
WM4	0	0	0	0	0	0	0	0	0	0
No of Exceedance	0	0	0	**5**	0	**6**	0	**11**	0	**2 #**

 # The exceedances recorded at WM2A(a) on 26, 27 and 28 November are still underway by ET.

6.2.3 In this Reporting Period, a total of eleven (11) Limit Level exceedances were recorded during water quality monitoring. Investigation for cause of water quality exceedances have conducted by ET. Investigation report revealed that the exceedances recorded at WM2A(a) on 2 November 2018 and WM3x on 17 November 2018 was not caused by the works under the Project. Investigation report revealed that the exceedances recorded at WM3x on 10 November was caused to the isolated incident of burst water pipe which related to the works under Contract 6. Furthermore, the investigation for exceedances recorded at WM2A(a) on 26, 27 and 28 November 2018 are still underway by ET and the investigation result will be presented in next Monthly EM&A Report.

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

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

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
27 and 29 October 2018 (last reporting period)	WM2A(a)	Turbidity & SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. Since improper discharge from another project was observed and there was no adverse water quality impact observed during the site inspection at works area of Bridge D. It is concluded that the exceedances were unlikely caused by the works under the Project.
27, 29 and 30 October 2018 (last reporting period)	WM3x	Turbidity & SS	In our investigation, the CCKJV had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were unlikely caused by the works under Contract 6. In our investigation, the DHK had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified at North Portal Site and Admin Building Site during site inspection. It is considered that the exceedances were unlikely caused by the works under Contract 2.
2 November 2018	WM2A(a)	Turbidity & SS	In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. Since improper discharge from another project was happened occasionally which affected the stream water quality and there was no adverse water quality impact observed during the site inspection at works area

			of Bridge D. It is concluded that the exceedances were unlikely caused by the works under the Project.
10 November 2018	WM3x	Turbidity & SS	In our investigation, the CCKJV had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were caused to the isolated incident of burst water pipe which related to the works under Contract 6. In our investigation, the DHK had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified at North Portal Site and Admin Building Site during site inspection. It is considered that the exceedances were caused to the isolated incident of burst water pipe under Contract 6 and unlikely caused by the works under Contract 2.
17 November 2018	WM3x	Turbidity & SS	In our investigation, the CCKJV had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were related to the ingress of muddy water from other party and unlikely caused by the works under Contract 6. In our investigation, the DHK had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified at North Portal Site and Admin Building Site during site inspection. It is considered that the exceedances were related to the ingress of muddy water from other party and unlikely caused by the works under Contract 2.
26, 27 and 28 November 2018	WM2A(a)	Turbidity & SS	The investigation is underway by ET and the investigation findings will be presented in next Reporting Period.

7 ECOLOGY MONITORING

7.1 GENERAL

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

7.1.2 The Ecology Monitoring for period of September to November 2018 was carried out on 20th and 23rd November 2018 by transects inspection and quadrat monitoring. The Quarterly Ecological Monitoring Report (September to November 2018) which verified by IEC has submitted to EPD as supplementary of the EM&A Report (November 2018) in December 2018.

8 WASTE MANAGEMENT

8.1 GENERAL WASTE MANAGEMENT

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

8.2 RECORDS OF WASTE QUANTITIES

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

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

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

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Qty.
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m^3)	**1.9760**	--	**1.938**	--	0	--	**0.310**	--	0	--	**4.702**	--	**8.926**
Reused in this Contract (Inert) (in '000 m^3)	0	--	**0.296**	--	0	--	**0**	--	0	--	**0.186**	--	**0.482**
Reused in other Contracts/ Projects (Inert) (in '000 m^3)	**0.1760**	Recycling facility as approved alternative site	0	--	0	--	**0**	--	0	--	0	--	**0.176**
Disposal as Public Fill (Inert) (in '000 m^3)	**1.8000**	Tuen Mun 38	**1.281**	Tuen Mun 38	0	--	**0.310**	Tuen Mun 38	0	--	**3.608**	TKO 137	**6.999**

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

Type of Waste	Contract 2		Contract 3		Contract 4		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
Recycled Metal ('000kg) #	0	--	0	-	0	--	0	--	**0.3**	Licensed collector	**240.200**	Licensed collector	**240.5**
Recycled Paper / Cardboard Packing ('000kg) #	**0.1780**	Licensed collector	0	-	0	-	**0.345**	Licensed collector	**0.1**	Licensed collector	**0.340**	Licensed collector	**0.963**
Recycled Plastic ('000kg) #	**1.8200**	Licensed collector	0	-	0	--	0	--	**0.001**	Licensed collector	**0.300**	Licensed collector	**2.121**
Chemical Wastes ('000kg) #	**0**	Licensed collector	0	-	0	--	0	--	0	--	0	--	0
General Refuses ('000m^3)	**0.5690**	NENT	**0.160**	NENT	**0.018**	NENT	**0.929**	NENT	**0.2**	NENT	**1.372**	NENT	**3.248**

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

9 SITE INSPECTION

9.1 REQUIREMENTS

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

9.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

Contract 2

9.2.1 In the Reporting Period, joint site inspection for Contract 2 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **2, 9, 16, 23 and 30 November 2018**. No non-compliance was noted.

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

Table 9-1 Site Observations for Contract 2

Date	Findings / Deficiencies	Follow-Up Status
2 November 2018	• The Contractor was reminded to maintain the wetsep function properly.	• Not required for reminder.
9 November 2018	• pH panel was observed out of order at south portal. The Contractor should fix the panel and maintain the wetsep function properly. • Suspended chemical was observed on the ground at North Portal. The Contractor should clean it up and disposed as chemical waste.	• The pH panel was fixed. • The chemical was removed.
16 November 2018	• Seepage was observed underneath the earth bund at South Portal. The Contractor should provide proper mitigation measure to prevent seepage.	• Seepage was removed.
23 November 2018	• Accumulation of general refuse was observed at North Portal. The Contractor should remove the refuse regularly. • The Contractor was reminded to clean the mud at North Portal. • The Contractor was reminded to update the wastewater treatment system to EPD if there has any change.	• The general refuse was removed. • Not required for reminder. • Not required for reminder.
30 November 2018	• No adverse environmental issue was observed.	• 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 **1, 8, 15, 21 and 29 November 2018**. No non-compliance was noted.

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

Table 9-2 Site Observations for Contract 3

Date	Findings / Deficiencies	Follow-Up Status
1 November 2018	• The Contractor was reminded to maintain the public road and pedestrian clean and tidy. • The Contractor was reminded to cover the slope properly.	• Not required for reminder. • Not required for reminder.

Date	Findings / Deficiencies	Follow-Up Status
8 November 2018	• No adverse environmental issue was observed.	• NA
15 November 2018	• Oil stain was observed on the ground at West Road. The Contractor should remove the stain and dispose as chemical waste. • The Contractor was reminded to cover the slope with tarpaulin sheets properly.	• The oil stain was cleared. • Not required for reminder.
21 November 2018	• The Contractor was reminded to fully implement the dust suppression measures in particular dry season.	• Not required for reminder.
29 November 2018	• No adverse environmental issue was observed.	• NA

Contract 4

9.2.5 In the Reporting Period, joint site inspection for Contract 4 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **2, 9, 16, 19 and 30 November 2018**. No non-compliance was noted.

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

Table 9-3 Site Observations for Contract 4

Date	Findings / Deficiencies	Follow-Up Status
2 November 2018	• No adverse environmental issue was observed.	• NA
9 November 2018	• No adverse environmental issue was observed.	• NA
16 November 2018	• No adverse environmental issue was observed.	• NA
19 November 2018	• No adverse environmental issue was observed.	• NA
30 November 2018	• No adverse environmental issue was observed.	• NA

Contract 6

9.2.7 In the Reporting Period, joint site inspection for Contract 6 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **1, 8, 15, 22 and 29 November 2018**. No non-compliance was noted.

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

Table 9-4 Site Observations for Contract 6

Date	Findings / Deficiencies	Follow-Up Status
1 November 2018	• Muddy trail was observed at Lin Ma Hang road near wheel washing facility. The Contractor should clean the trail and provide proper mitigation measures to ensure no muddy trail present at public road.	• Muddy trail was cleaned.
8 November 2018	• Disconnected pipe and muddy water discharge were observed at bridge A. The Contractor should fix the pipe and ensure no muddy runoff to the stream.	• The pipe was fixed.
15 November 2018	• No adverse environmental issue was observed.	• NA
22 November	• Muddy trails was observed at site reentrance	• The muddy trails

Date	Findings / Deficiencies	Follow-Up Status
2018	near Liang Ma Hang Road. The Contractor was advised to thoroughly wash the vehicles with high pressure jet before leaving site. • Accumulation of general refuse was observed near auto wheel washing facility. The Contractor should dispose general refused regularly. • The Contactor was reminded to clean accumulation of stagnant water under bridge to avoid mosquito breeding.	was cleaned and high pressure jet was provided. • The general refuse was removed. • Not required for reminder.
29 November 2018	• No adverse environmental issue was observed.	• NA

Contract SS C505

9.2.9 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, ET and the Contractor on **7, 14, 21 and 28 November 2018** in which IEC joined the site inspection on **28 November 2018**. No non-compliance was noted.

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

Table 9-5 Site Observations for Contract SS C505

Date	Findings / Deficiencies	Follow-Up Status
7 November 2018	• No adverse environmental issue was observed.	• NA
14 November 2018	• The contractor was reminded to remove stagnant water regularly.	• Not required for reminder.
21 November 2018	• The Contractor was reminded to remove stagnant water regularly. • The Contractor was reminded to cover opened cement bags with tarpaulin sheets properly.	• Not required for reminder. • Not required for reminder.
28 November 2018	• Suspended chemical was observed at building 16 and 4. The Contractor was advised to clean it up and dispose as chemical waste.	• To be reported in next reporting period.

Contract 7

9.2.11 In the Reporting Period, joint site inspection for Contract 7 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **2, 9, 16, 20 and 30 November 2018**. No non-compliance was noted.

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

Table 9-6 Site Observations for Contract 7

Date	Findings / Deficiencies	Follow-Up Status
2 November 2018	• No adverse environmental issue was observed.	• NA
9 November 2018	• The Contractor was reminded to remove stagnant water regularly.	• Not required for reminder.
16 November 2018	• No adverse environmental issue was observed.	• NA
20 November 2018	• No adverse environmental issue was observed.	• NA

Date	Findings / Deficiencies	Follow-Up Status
30 November 2018	• No adverse environmental issue was observed.	• NA

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

10 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTIONS

10.1.1 In the Reporting Period, one (1) documented environmental complaint was received under the EM&A programme with respective to the dust issues under Contract 2. No summons and prosecution under the EM&A Programme was lodged for all Contracts. The status of the investigation report in previous months is summarized below.

Date of complaint	Complaint Detail	Investigation Status
19 November 2018	A public complaint was was received from EPD on 19 November 2018 concerning about the dust impact generated from the demolition work for a temporary bridge near Kau Lung Hang with insufficient dust control measures. Remedial action was undertaken by the Contractor immediately and satisfied by EPD.	Follow up investigation was conducted by ET and it was observed that the situation was improved. Investigation report for the complaint is underway by ET.

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

Table 10-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
19 May 2014 – 31 October 2018	Contract 2	0	**36**	• **(19)Water Quality** • **(8) Dust** • **(5) Noise** • **(1) dust & noise** • **(1) waste management** • **(1) Water quality and dust**	**(7) water quality** **(2) dust** **(1) noise**
06 Nov 2013 – 31 October 2018	Contract 3	0	**6**	• **(2) Dust** • **(3) Water quality** • **(1) Noise**	**0**
16 Aug 2013 – 31 October 2018	Contract 5	0	**4**	• **(3) Dust** • **(1) Noise**	**0**
16 Aug 2013 – 31 October 2018	Contract 6	0	**42**	• **(24) Water Quality** • **(10) Dust** • **(3) Noise** • **(1) Nuisance** • **(1) Noise and dust** • **(2) Water quality and dust** • **(1) Water quality and noise**	**(8) water quality** **(3) dust** **(1) Nuisance** **(1) Water quality and dust** **(1) Water quality and noise**
15 Feb 2016 – 31 October 2018	Contract 7	0	**3**	• **(1) Noise** • **(2) Water quality and dust**	**(1) Water quality and dust**
16 Aug 2013 – 31 October 2018	SS C505	0	**5**	• **(1) Noise** • **(1) dust** • **(2) Water quality and dust** • **(1) Water quality**	**(1) Water quality and dust**

Reporting Period	Contract No	Environmental Complaint Statistics			Project related complaint
		Frequency	Cumulative	Complaint Nature	
1 – 30 November 2018	Contract 2	**1**	**37**	• **(19)Water Quality** • **(10) Dust** • **(5) Noise** • **(1) dust & noise** • **(1) waste management** • **(1) Water quality and dust**	• **(1) Dust**
	Contract 3	0	**6**	• **(2) Dust** • **(3) Water quality** • **(1) Noise**	NA
	Contract 4	0	0	NA	NA
	Contract 6	0	**42**	• **(24) Water Quality** • **(10) Dust** • **(3) Noise** • **(1) Nuisance** • **(1) Noise and dust** • **(2) Water quality and dust** • **(1) Water quality and noise**	NA
	Contract 7	0	**3**	• **(1) Noise** • **(2) Water quality and dust**	NA
	SS C505	0	**5**	• **(1) Noise** • **(1) dust** • **(2) Water quality and dust** • **(1) Water quality**	NA

Table 10-2 Statistical Summary of Environmental Summons

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

Table 10-3 Statistical Summary of Environmental Prosecutions

Reporting Period	Contract No	Environmental Prosecutions Statistics		
		Frequency	Cumulative	Complaint Nature

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

11 IMPLEMENTATION STATUS OF MITIGATION MEASURES

11.1 GENERAL REQUIREMENTS

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

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

Table 11-1 Environmental Mitigation Measures

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

11.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

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

Contract 2

Mid-Vent Portal	• Ventilation building fit out and defect rectification • Construction of flexible barrier • External reinstatement and landscaping works • Testing and Commissioning for E&M facilities
North Portal	• Construction slip road and permanent drainage • Road paving and cladding installation inside the tunnel • External reinstatement and landscaping works • Dismantling of MS slurry and waste water treatment plant • North ventilation building fit out and defect rectification • Testing and Commissioning for E&M facilities • Construction of flexible barrier
South Portal	• Construction slip road and permanent drainage • Road paving and cladding installation inside the tunnel • South ventilation building fit out and defect rectification • Testing and Commissioning for E&M facililties • Construction of flexible barrier • External backfilling, reinstatement and landscaping works.

Admin Building	• Defect rectification • External reinstatement and landscaping works

Contract 3

- Cable detection and trial trenches
- Remaining works on new Footbridge
- Noise barrier construction
- Road pavement works
- Water main laying works (on Grade and on bridge deck)
- Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
- Road Drainage Works
- Waterproofing works on bridge deck
- Bitumen paving on bridge deck
- Construction of Pavilion and Pai Lau
- Construction of retaining wall
- Landscaping works

Contract 4

- E&M installation at Admin Building
- E&M installation at Ventilation Building
- E&M installation at tunnel
- Cladding installation at Cheung Shan Tunnel
- Sign installation

Contract 6

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

Contract 7

- Profile barrier construction at Bridge A and E
- Noise barrier construction at Bridge D and E
- Parapet installation at Bridge A, B, D and E
- Drainage pipe laying at Bridge A, B, D and E
- Waterproofing and drainage works at Roof of Bridge C
- Bitumen pavement at Bridge A and E
- Street lighting and CCTV installation at perimeter road

Contract SS C505

- Passenger Terminal Building (PTB) G/F - Plant Room Structure Works, Backfiling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
- PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases ABWF Works, Hall Block External Façade, Southern Entrance Construction & Major Plant Rooms, EAC Doors
- PTB - External Works incl. Building 21-24, M/F External Wall (Ewall), Roof & Upper Roof Roofing Works, Podium Coach Canopy, 21&22 (C&PC KIOSKS) & 23&24 (PC Examination Building & MXRVSS) Superstructure & ABWF Works and MEP Installation, Podium Open Area Waterproofing, Paving, Hard and Soft Landscaping works, Ambulance Canopy / Glazed Canopy
- Bridge C Integrated ABWF and MEP Installation Works (C7 Portion) - Arrival & Departure Hall, Staircases, Test & Commissioning
- Bldg 1 - C&ED Detector Dog Base Phase 1 - Integrated ABWF & MEP Works Works at G/F & R/F

- Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F and Observation Tower (incluidng Lift)
- Bldg 3 - Fire Station and Drill Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to UR/F, Drill Tower
- Bldg 4 - Cargo Examination Building (Inbound) Phase 1 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, and Loading Dock
- Bldg 5 - Cargo Examination Building (Outbound) Phase 2 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
- Bldg 6 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) Phase 1 - External Works (Fence Wall), Integrated ABWF & MEP Works at G/F to R/F
- Bldg 7 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) Phase 2 - External Works, Integrated ABWF & MEP Works at G/F
- Bldg 8 - MXRVSS (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 9 - MXRVSS (Outbound) Phase 2 - Structure Works at G/F, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 10 - GV Kiosk (Inbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF and MEP Works at G/F & R/F
- Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF & MEP Works at G/F & R/F
- Bldg 12 - Public Toilets (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F
- Bldg 13 - Public Toilets (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F
- Bldg 14 - Disinsection Facilities (Inbound) Phase 2 - Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 15 - Disinsection Facilities (Outbound) Phase 2 - Substructure Works, Integrated ABWF & MEP Works at G/F & Envelope
- Bldg 16 - Weigh Station Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 17 - EUVSS & Monitoring Room Phase 2 - Structure Works, Integrated ABWF & MEP Works at G/F & R/F, End User Room
- Bldg 18 - Refuse Collection Point Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 25 - Traffic Control Office (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 26 - Traffic Control Office (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 27 - Inspection Post Phase 2 - Integrated ABWF and MEP Work at G/F & Envelope
- Bldg 28 - Guard Booth (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 29 - Guard Booth (Vehicle Detention Area) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 30 - Guard Booth (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 31 - Guard Booth (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & Envelope
- Bldg 32/33/34 - Steel Canopy 1 to 3 Phase 2 - Integrated ABWF and MEP Works
- Bldg 35 - Steel Canopy 4 Phase 2 - Structure Works, Integrated ABWF and MEP Works
- Bldg 36 - Fire Hydrant Tank & Pump Room Phase 1 - Integrated ABWF and MEP Works at R/F
- Bldg 37/38/39 - Elevated Walkway (E1, E2 & E3) Phase 2 - Structures Works, ABWF and BS Works
- Bldg 40 - Elevated Walkway E4 Phase 2 - Structures Works, ABWF and BS Works
- Vehicular Bridges 1 to 5 Phase 3 - Retaining walls, Road and Finishes Works
- External Works - CLP Cable & Power ON Transfer room

- External Works - Water Meter Room Connection (Inbound & Outbound)
- External Works - External Utilities Works for Phase 2 FS Inspection, DSD Inspection
- External Works - Road & Pavement Works for Inbound Phase 1 FS Inspection (Concrete Pavement), for Phase 2 FS Inspection - Detailed
- External Works - Landscape for Inbound & Outbound Area
- Testing & Commissioning (T&C) and FSD/SCCU Inspection - Phase 1 - Bldg 1 to 4, 6, 36 & EVA Phase 1
- Testing & Commissioning (T&C) and FSD/SCCU Inspection - Phase 2 - CBO, FXO, Inbound & Outbound Groups
- Testing & Commissioning (T&C) and FSD/SCCU Inspection - Phase 3 - EVA & PTB

11.3 KEY ISSUES FOR THE COMING MONTH

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

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

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 CONCLUSIONS

12.1.1 This is the **64th** monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1** to **30 November 2018**.

12.1.2 For air quality monitoring, no 1-hour TSP monitoring results triggered the Action /Limit Level, however, one (1) Action Level exceedances of 24-hour TSP were recorded. Investigation result revealed that the Contractor has implemented dust mitigation measures to control the dust generated under the Project. It was concluded that the exceedance was related to other dust source such as frequent road traffic apart from the project and work area owned by other project without proper maintenance site exit along Lin Ma Hang Road and unlikely due to the works under Contract works.

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

12.1.4 For water quality monitoring, a total of eleven (11) Limit Level exceedances, namely five (5) Limit Level exceedance of turbidity and six (6) Limit Level exceedances of Suspended Solids were recorded for the Project. Investigation for cause of water quality exceedances have conducted by ET. Investigation report revealed that the exceedances recorded at WM2A(a) on 2 November 2018 and WM3x on 17 November 2018 was not caused by the works under the Project. Investigation report revealed that the exceedance recorded at WM3x on 10 November was caused to the isolated incident of burst water pipe which related to the works under Contract 6. Furthermore, the investigation for exceedances recorded at WM2A(a) on 26, 27 and 28 November 2018 are still underway by ET and the investigation result will be presented in next Monthly EM&A Report.

12.1.5 In this Reporting Period, one (1) documented environmental complaint was received from EPD on 19 November 2018 concerning about the dust impact generated from the demolition work for a temporary bridge near Kau Lung Hang with insufficient dust control measures. Remedial action was undertaken by the Contractor immediately and satisfied by EPD. Follow up investigation was conducted by ET and it was observed that the situation was improved. Investigation report for the complaint is underway by ET.

12.1.6 No summons and prosecution under the EM&A Programme was lodged in the Reporting Period.

12.1.7 During the Reporting Period, weekly joint site inspection by the RE, IEC, ET with the relevant Main-contractor were carried out for Contracts 2, 3, 4, 6 and 7 in accordance with the EM&A Manual stipulation. For Contract SS C505, weekly joint site inspection was carried out by the RE, IEC, ET and main-contractor whereas IEC performed monthly site inspection. No non-compliance observed during the site inspection.

12.2 RECOMMENDATIONS

12.2.1 During 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 as appropriately.

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, Kwan Tei River or public area should be properly maintained.

12.2.3 The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual. 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.

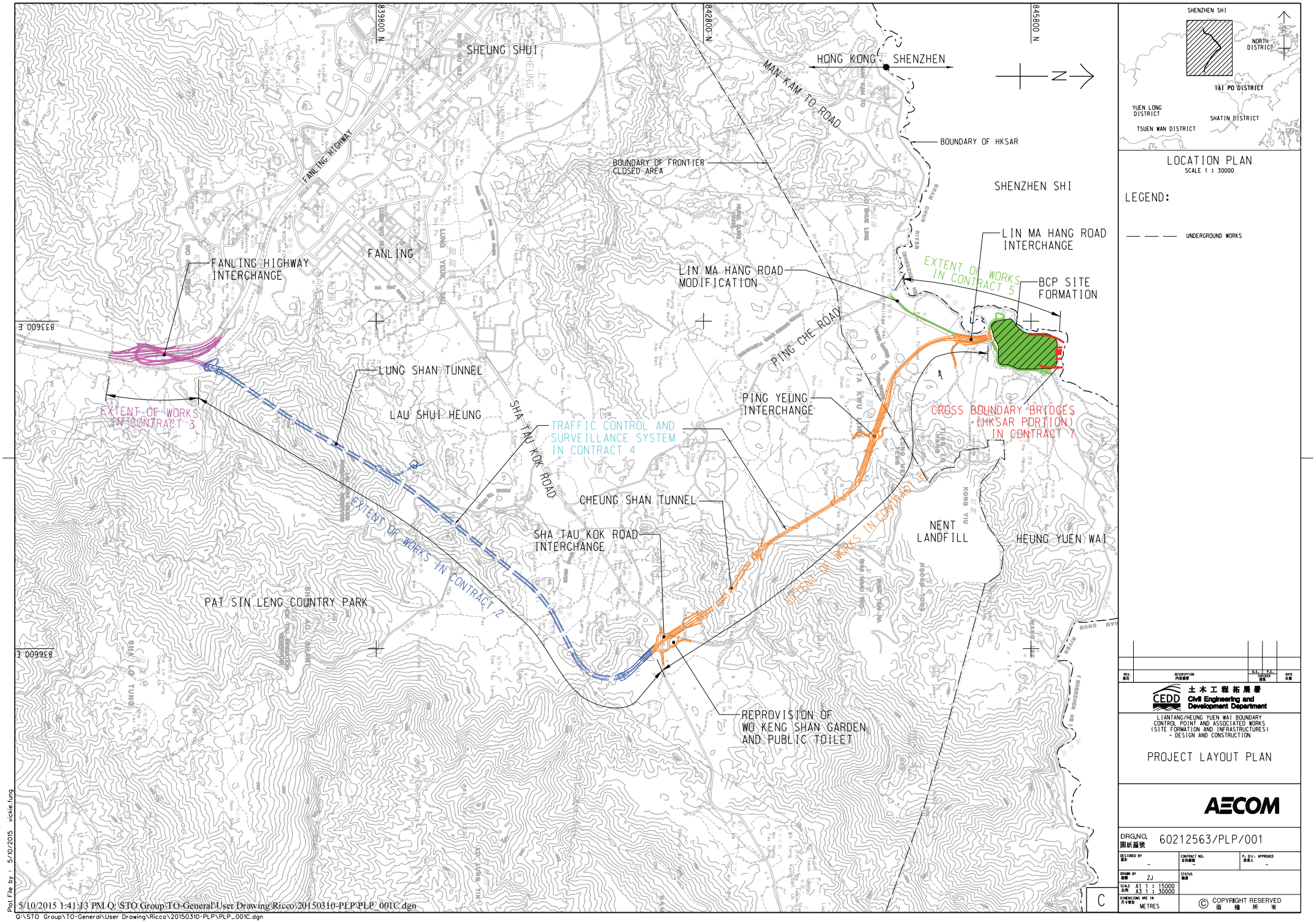
12.2.4 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

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

12.2.6 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


839800 N
842800 N
845800 N
836600 E
SHEUNG SHUI
FANLING HIGHWAY
FANLING
HONG KONG
SHENZHEN
MAN KAM TO ROAD
BOUNDARY OF HKSAR
BOUNDARY OF FRONTIER CLOSED AREA
SHENZHEN SHI
LIN MA HANG ROAD INTERCHANGE
EXTENT OF WORKS IN CONTRACT 5
BCP SITE FORMATION
FANLING HIGHWAY INTERCHANGE
LIN MA HANG ROAD MODIFICATION
PING CHE ROAD
LUNG SHAN TUNNEL
EXTENT OF WORKS IN CONTRACT 3
LAU SHUI HEUNG
SHA TAU KOK ROAD
TRAFFIC CONTROL AND SURVEILLANCE SYSTEM IN CONTRACT 4
PING YEUNG INTERCHANGE
CROSS BOUNDARY BRIDGES (HKSAR PORTION) IN CONTRACT 7
CHEUNG SHAN TUNNEL
SHA TAU KOK ROAD INTERCHANGE
EXTENT OF WORKS IN CONTRACT 2
EXTENT OF WORKS IN CONTRACT 6
NENT LANDFILL
HEUNG YUEN WAI
PAT SIN LENG COUNTRY PARK
REPROVISION OF WO KENG SHAN GARDEN AND PUBLIC TOILET
SHENZHEN SHI
NORTH DISTRICT
TAI PO DISTRICT
YUEN LONG DISTRICT
SHATIN DISTRICT
TSUEN WAN DISTRICT
LOCATION PLAN
SCALE 1 : 30000
LEGEND:
UNDERGROUND WORKS
REV. 修訂
DESCRIPTION 內容摘要
D.E. P.E. CHECKED 審核
DATE 日期
土木工程拓展署
Civil Engineering and Development Department
CEDD
LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS (SITE FORMATION AND INFRASTRUCTURES) - DESIGN AND CONSTRUCTION
PROJECT LAYOUT PLAN
AECOM
DRG.NO. 圖紙編號 60212563/PLP/001
DESIGNED BY 設計 -
CONTRACT NO. 合約編號 -
P. DIV. APPROVED 批准人 -
DRAWN BY 繪圖 ZJ
STATUS 狀況
SCALE 比例 A1 1 : 15000 A3 1 : 30000
DIMENSIONS ARE IN 尺寸單位 METRES
© COPYRIGHT RESERVED 版權所有
C
Plot File by : 5/10/2015 vickie.fung
5/10/2015 1:41:13 PM Q:\STO Group\TO-General\User Drawing\Ricco\20150310-PLP\PLP_001C.dgn
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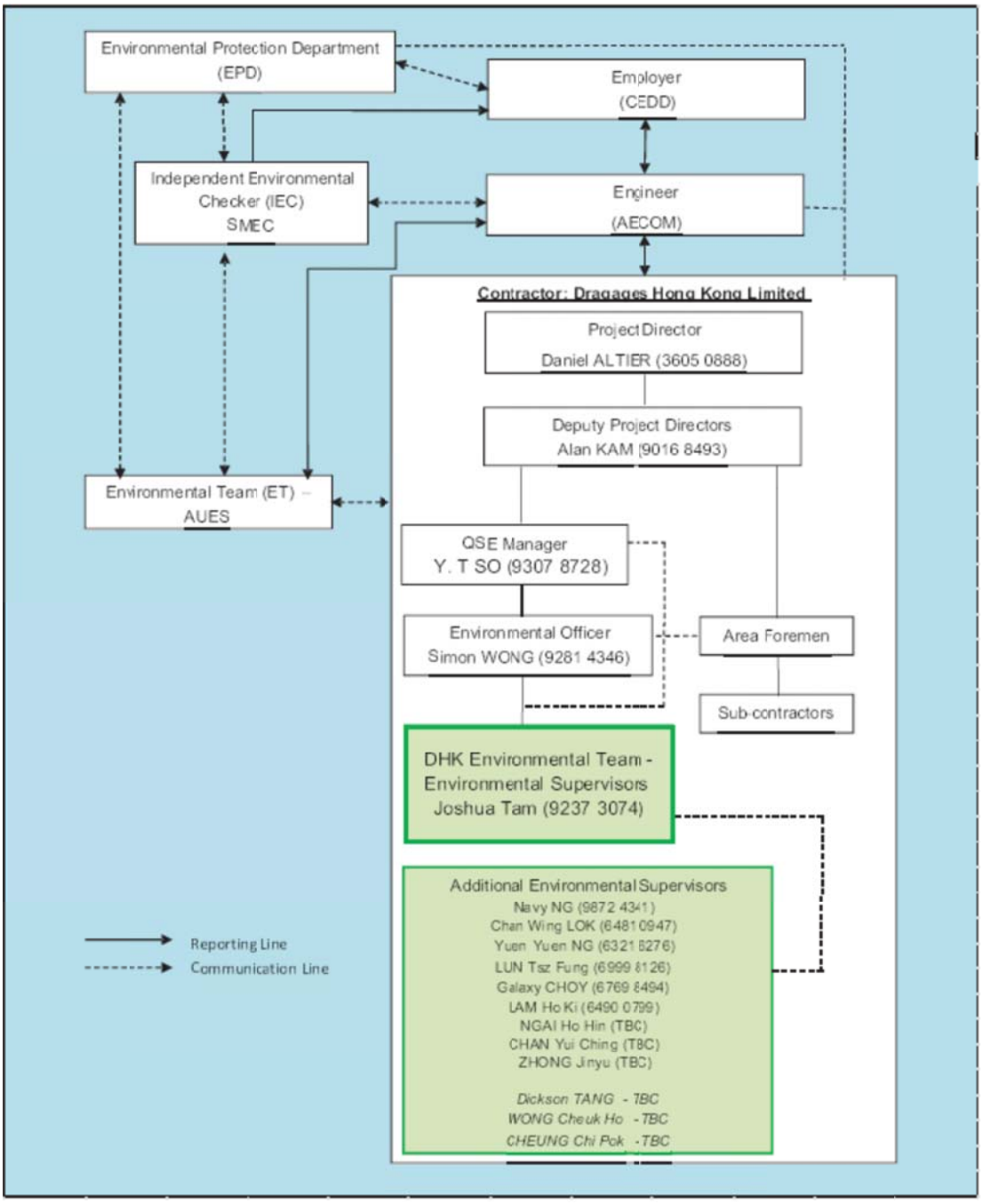
Appendix B

Organization Chart



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

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Edwin Ching	2171 3301	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	3605 0888	2171 3299
DHK	Deputy Project Director	Alan Kam	9016 8493	2171 3299
DHK	QSE Manager	Y. T So	9307 8728	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3017	2171 3299
DHK	Environmental Supervisor	Joshua Tam	9237 3074	2171 3299
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

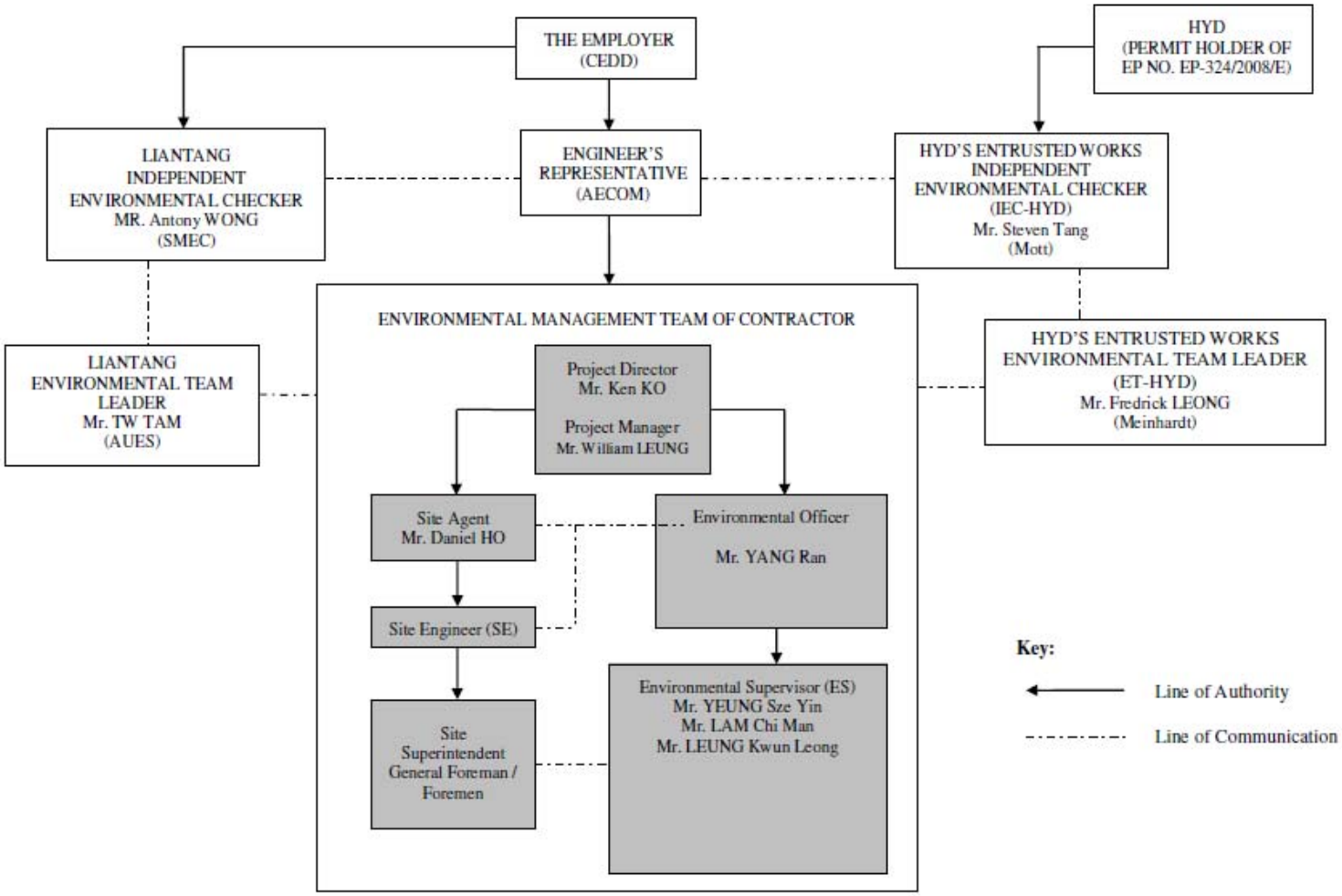
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

DHK(Main Contractor) –Dragages Hong Kong Ltd.

SMEC (IEC) – SMEC Asia Limited

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



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

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

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

Legend:

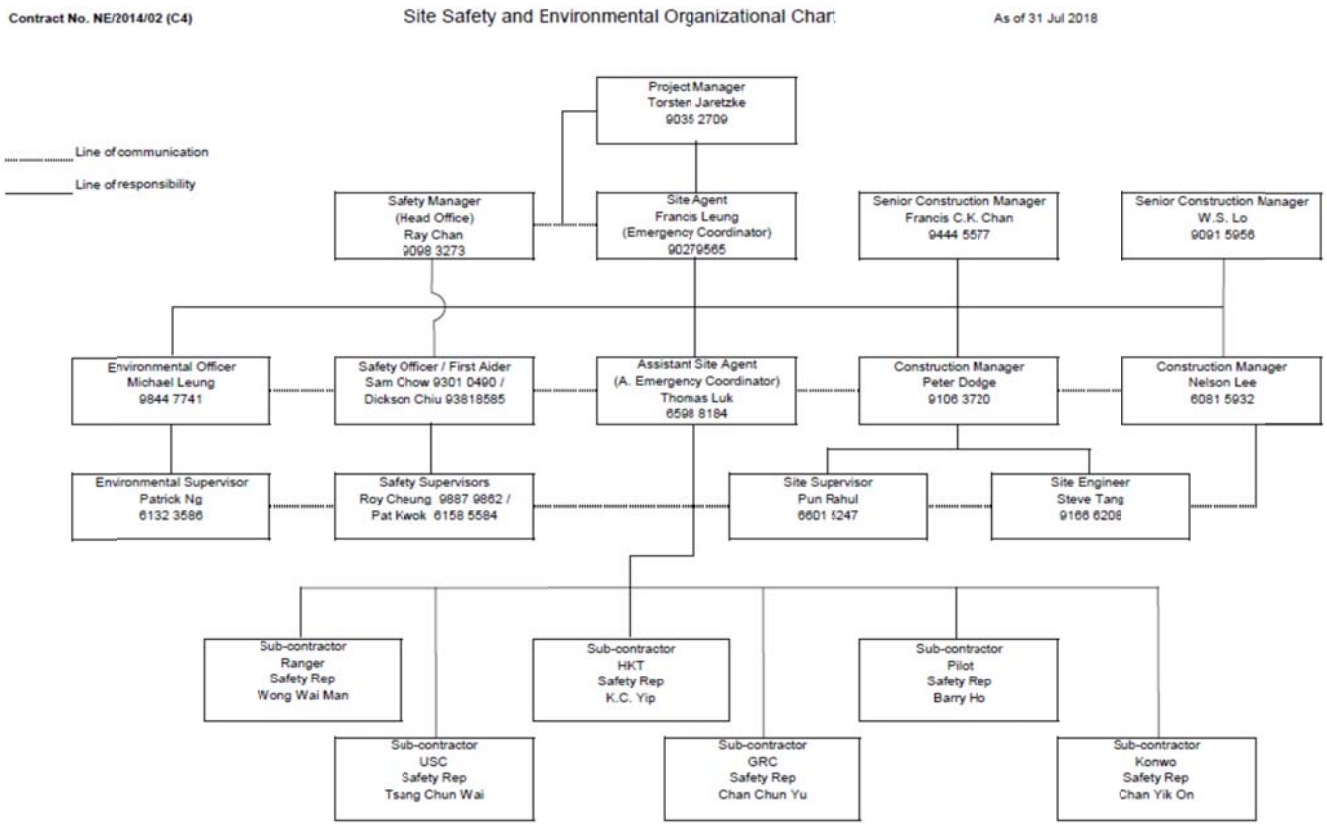
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



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

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Leo Lai	2171 3310	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Siemens	Project Manager	Torsetn Jaretzke	9035 2709	--
Siemens	Site Agent	Francis Leung	9027 9565	--
Siemens	Environmental Officer	Michael Leung	9844 7741	--
Siemens	Environmental Supervisors	Eric Lee	9092 3356	--
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:

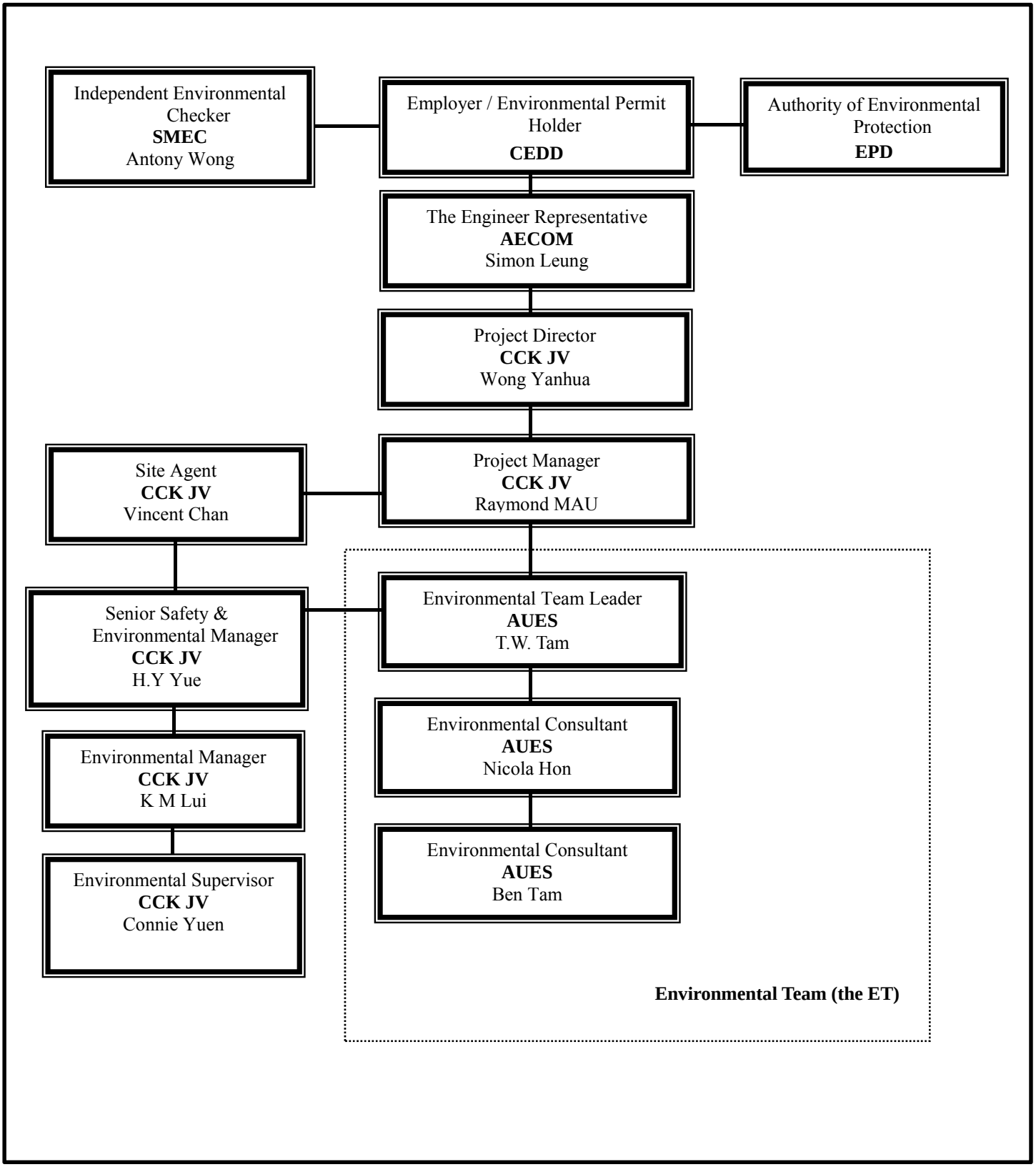
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

Siemens (Main Contractor) – Siemens Ltd.

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization – CV/2013/08

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

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

Legend:

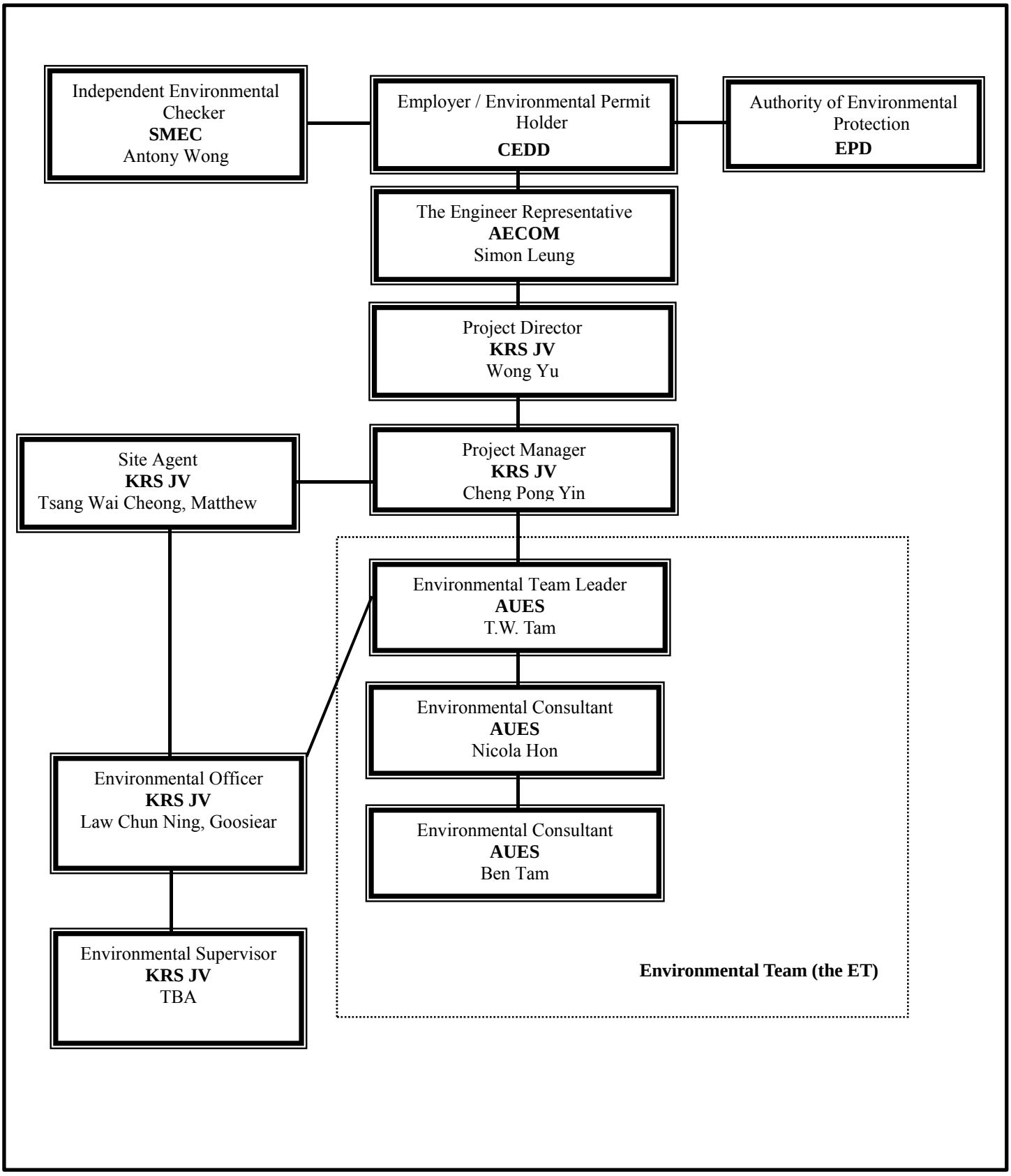
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization –NE/2014/03

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

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

Legend:

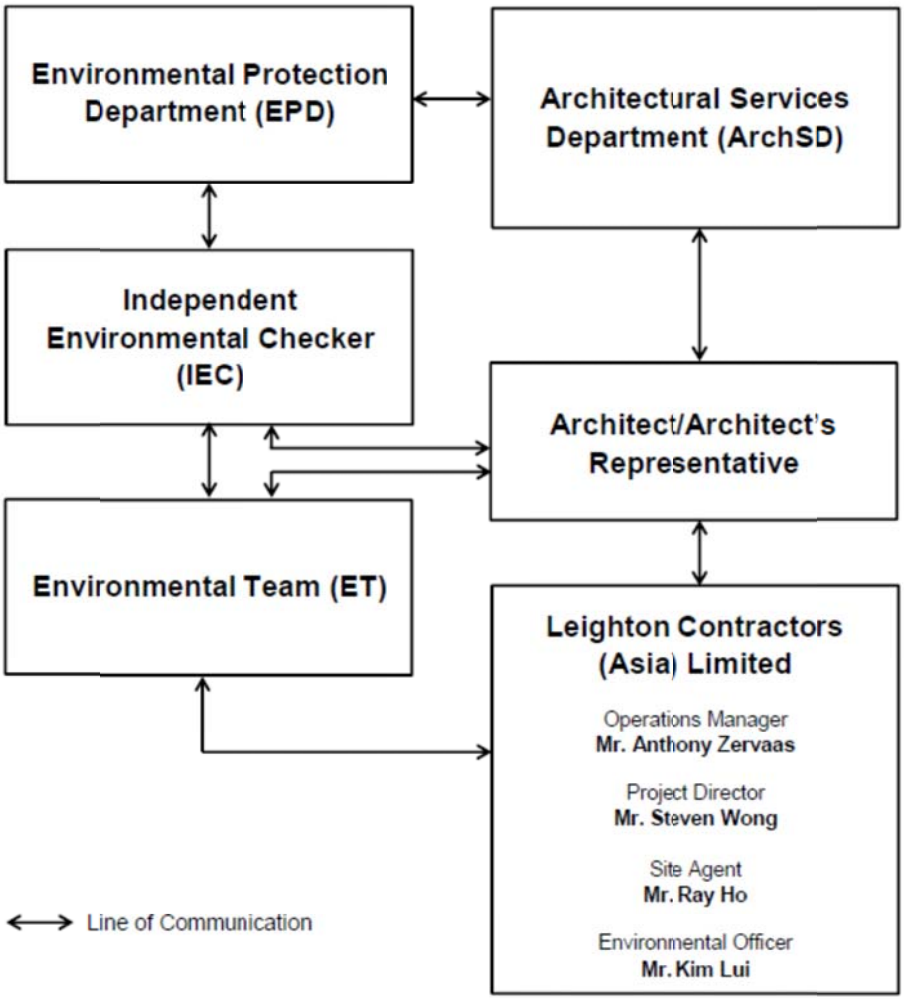
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organigram

Environmental Management Organization for Contract SS C505

Contact Details of Key Personnel for Contract SS C505

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

Legend:

ArchSD (Project Proponent) –Architectural Services Department

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

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

SMEC (IEC) – SMEC Asia Limited

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

Appendix C

3-month rolling construction program

Contract 2

Liantang / Heung Yuen Wai Boundary Control Point and Associated Works
CEDD Contract No: CV/2012/08
Main Contractor: Dragages Hong Kong Ltd

Tentative Three Months (Nov 2018, Dec 2018 and Jan 2019) Construction Rolling Progam

Item	Construction Activites
1	Admin Bldg - Defect rectification
2	Admin Bldg - External reinstatement and landscaping works
3	Mid-Vent Portal - Ventilation building fit out and defect rectification
4	Mid-Vent Portal - Construction of flexible barrier
5	Mid-Vent Portal - External reinstatement and landscaping works
6	Mid-Vent Portal - Testing and Commissioning for E&M facilities
7	North Portal - Construction slip road and permanent drainage
8	North Portal - Road paving and cladding installation inside the tunnel
9	North Portal - External reinstatement and landscaping works
10	North Portal - Dismantling of MS slurry and waste water treatment plant
11	North Portal - North ventilation building fit out and defect rectification
12	North Portal - Testing and Commissioning for E&M facililties
13	North Portal - Construction of flexible barrier
14	South Portal - Construction slip road and permanent drainage
15	South Portal - Road paving and cladding installation inside the tunnel
16	South Portal - South ventilation building fit out and defect rectification
17	South Portal - Testing and Commissioning for E&M facililties
18	South Portal - Construction of flexible barrier
19	South Portal - External backfilling, reinstatement and landscaping works.

Contract 3

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

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

Tentative Three Months (November 2018, December 2018 and January 2019) Construction Rolling Progam

Item	Construction Activites
1	Cable detection and trial trenches
2	Remaining works on new Footbridge
3	Noise barrier construction
4	Road pavement works
5	Water main laying works (on Grade and on bridge deck)
6	Installation of Noise barrier steel column & panel, and sign gantry (on Grade and on bridge deck)
7	Road Drainage Works
8	Waterproofing works on bridge deck
9	Bitumen paving on bridge deck
10	Construction of Pavilion and Pai Lau
11	Construction of retaining wall
12	Landscaping works

Contract 4

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

SIEMENS
Ingenuity for life

Tentative Three Months (Nov 2018, Dec 2018 and Jan 2019) Construction Rolling Progam

Item	Construction Activites
1	E&M installation at admin building
2	E&M installation at Ventilation Building
3	E&M installation at tunnel
4	Cladding installation at Cheung Shan Tunnel
5	Sign Installation

Contract 6

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

CRBC-CEC-KADEN Joint Venture

Tentative Three Months (November, December 2018 and January 2019) Construction Rolling Progam

Item	Construction Activites
1	Bridge Construction
2	Tunneling Works
3	Sewage Treatment Plant Construction
4	Tunnel Ventilation Building Construction
5	Slip Road/At-grade Road/Periphery Road Construction

Contract 7

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

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

Tentative Three Months(November 2018, December 2018, January 2019) Construction Rolling Progam

Item	Construction Activites
1	Bridge A - Profile Barrier
2	Bridge A - Street Lighting, Drainage and Parapet Construction
3	Bridge B - Street Lighting, Drainage and Parapet Construction
4	Bridge C - Waterproofing & Drainage at roof slab
5	Bridge C - Green Roof System
6	Bridge D - Street Lighting, Drainage and Parapet Construction
7	Bridge D - Noise Barrier Construction
8	Bridge E - Profile Barrier
9	Bridge E - Street Lighting, Drainage and Parapet Construction
10	Bridge E - Noise Barrier Construction
11	Perimeter Road - Drainage and Watermains
12	Perimeter Road - Bitumen Pavement
13	Shenzhen River Reinstatement
14	Portion Z - Landscape Softwork

Contract SS C505

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

LEIGHTON 禮頓

Tentative Three Months (November & December 2018, January 2019) Construction Rolling Progam

Item	Construction Activites
1	Passenger Terminal Building (PTB) G/F - Plant Room Structure Works, Backfiling & Drainage, Under Ground Utilities, Fence Wall and On Grade Slab
2	PTB - ABWF Works & MEP Installation - Front/Back of House Area, External Staircases, External Staircases ABWF Works, Hall Block External Façade, Southern Entrance Construction & Major Plant Rooms, EAC Doors
3	PTB - External Works incl. Building 21-24, M/F External Wall (Ewall), Roof & Upper Roof Roofing Works, Podium Coach Canopy, 21&22 (C&PC KIOSKS) & 23&24 (PC Examination Building & MXRVSS) Superstructure & ABWF Works and MEP Installation, Podium Open Area Waterproofing, Paving, Hard and Soft Landscaping works, Ambulance Canopy / Glazed Canopy
4	Bridge C Integrated ABWF and MEP Installation Works (C7 Portion) - Arrival & Departure Hall, Staircases, Test & Commissioning
5	Bldg 1 - C&ED Detector Dog Base Phase 1 - Integrated ABWF & MEP Works Works at G/F & R/F
6	Bldg 2 - HKPF Building and Observation Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to 4/F and Observation Tower (incluidng Lift)
7	Bldg 3 - Fire Station and Drill Tower Phase 1 - External Works, Integrated ABWF & MEP Works at G/F to UR/F, Drill Tower
8	Bldg 4 - Cargo Examination Building (Inbound) Phase 1 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, and Loading Dock
9	Bldg 5 - Cargo Examination Building (Outbound) Phase 2 - External Works at G/F under Steel Roof, Integrated ABWF & MEP Works at G/F to R/F, Loading Dock
10	Bldg 6 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) Phase 1 - External Works (Fence Wall), Integrated ABWF & MEP Works at G/F to R/F
11	Bldg 7 - Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) Phase 2 - External Works, Integrated ABWF & MEP Works at G/F
12	Bldg 8 - MXRVSS (Inbound) Phase 2 - Structure Works, Integrated ABWF and MEP Works at G/F & R/F
13	Bldg 9 - MXRVSS (Outbound) Phase 2 - Structure Works at G/F, Integrated ABWF and MEP Works at G/F & Envelope
14	Bldg 10 - GV Kiosk (Inbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF and MEP Works at G/F & R/F
15	Bldg 11 - GV Kiosk (Outbound) Phase 2 - On-Grade Slab, Steel Structure Works, Integrated ABWF & MEP Works at G/F & R/F
16	Bldg 12 - Public Toilets (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F
17	Bldg 13 - Public Toilets (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F
18	Bldg 14 - Disinsection Facilities (Inbound) Phase 2 - Integrated ABWF & MEP Works at G/F & Envelope
19	Bldg 15 - Disinsection Facilities (Outbound) Phase 2 - Substructure Works, Integrated ABWF & MEP Works at G/F & Envelope
20	Bldg 16 - Weigh Station Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
21	Bldg 17 - EUVSS & Monitoring Room Phase 2 - Structure Works, Integrated ABWF & MEP Works at G/F & R/F, End User Room
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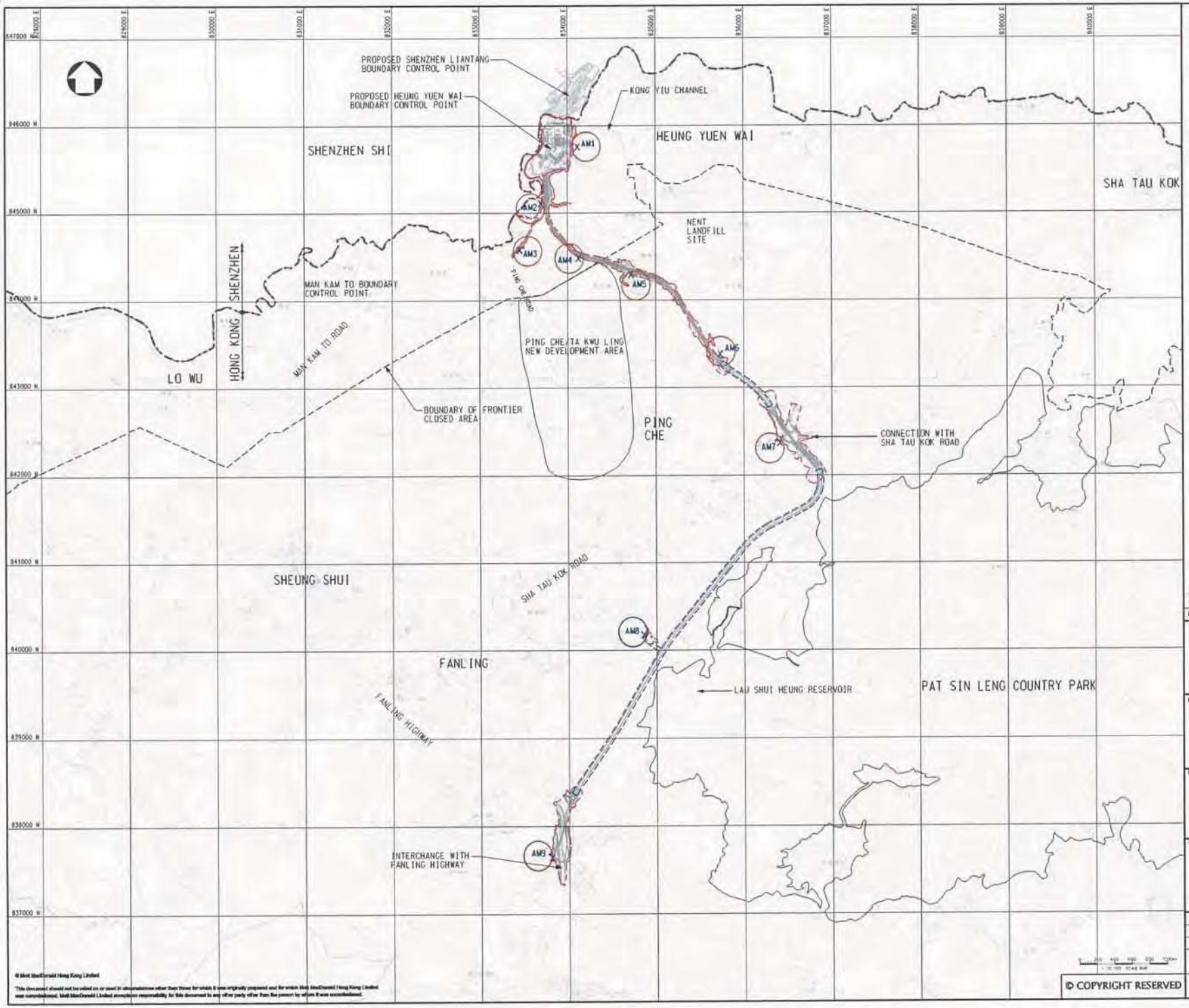
24	Bldg 26 - Traffic Control Office (Outbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope
25	Bldg 27 - Inspection Post Phase 2 - Integrated ABWF and MEP Work at G/F & Envelope
26	Bldg 28 - Guard Booth (Inbound) Phase 2 - Integrated ABWF and MEP Works at G/F & Envelope

Appendix D

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



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

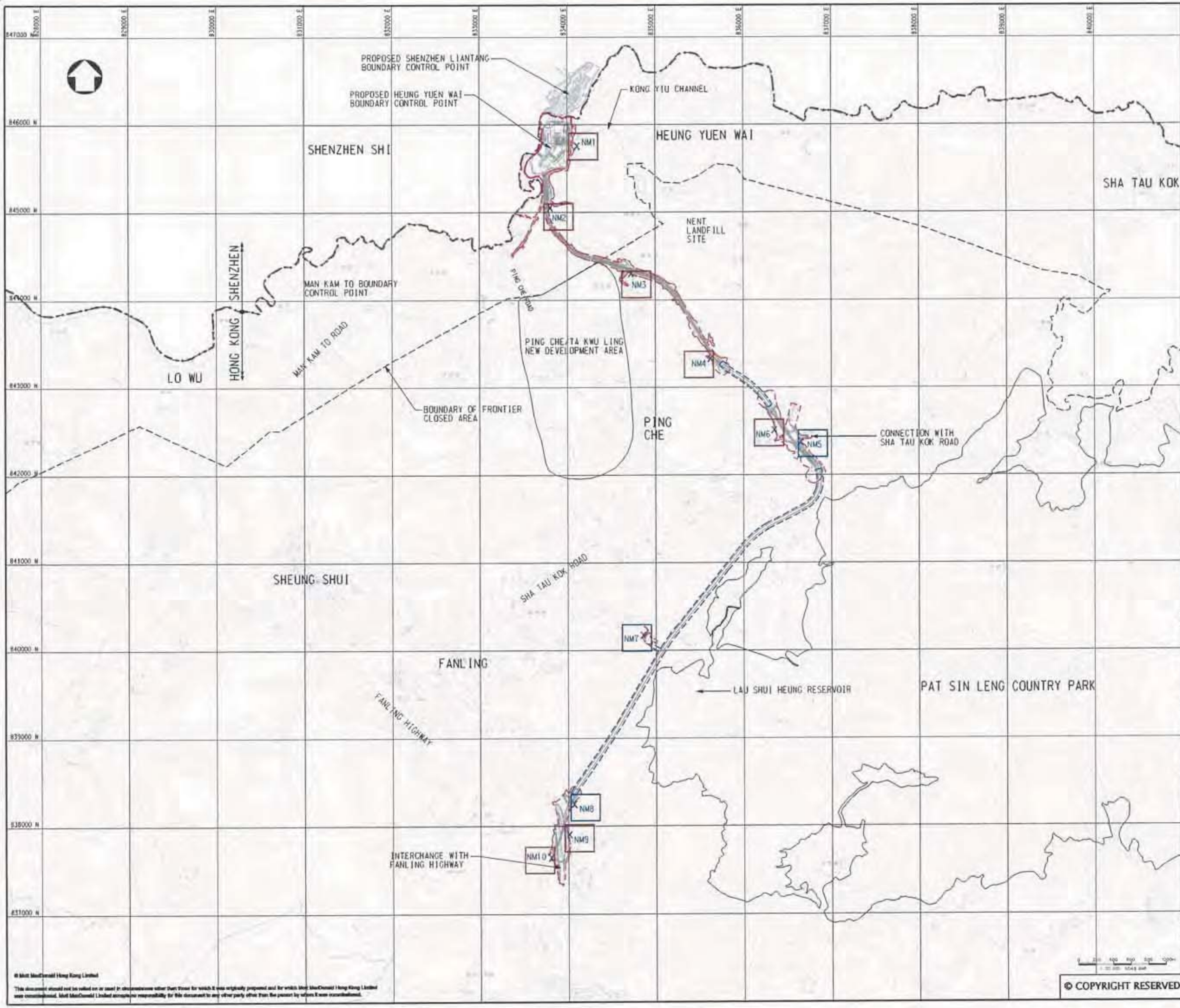
Mott MacDonald

Client: CEDD — CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Title: PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

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



LEGEND:

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

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

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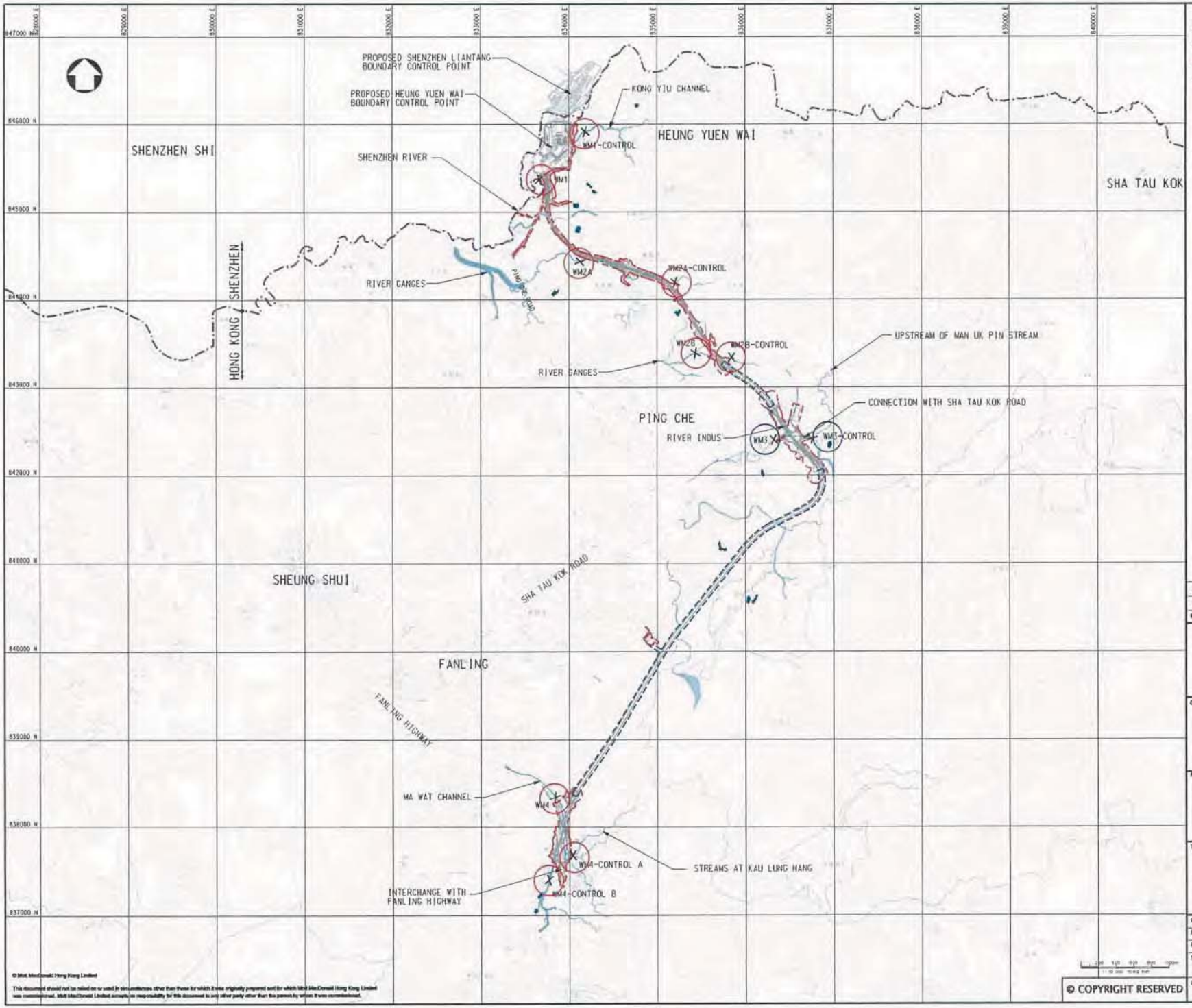
Client: CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Title: PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC	Eng Chk	EC
Drawn	WING	Coordination	EC
Dwg Chk	DC	Approved	HT
Scale at A1	1:20000	Project	255228
Drawing No	FIGURE 3.1	Status	PRE
		Rev	P1



LEGEND:

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

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

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

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Client: CEDD — CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

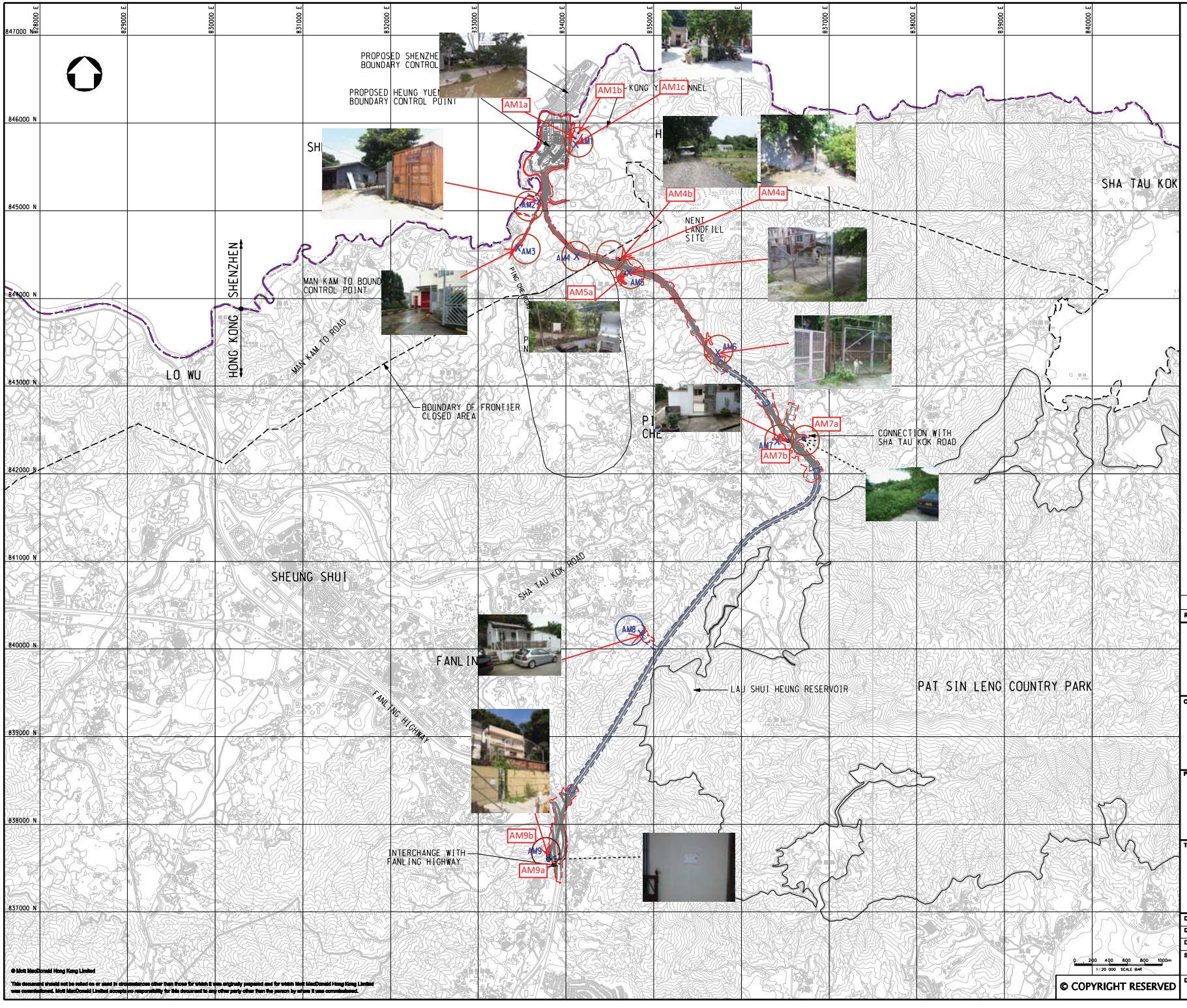
Project: AGREEMENT NO. CE45/2008(CE) LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS

Title: LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

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

Appendix E

Monitoring Locations for Impact Monitoring



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

Mott MacDonald
20/F Two Landmark East
100 How Ming Street
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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

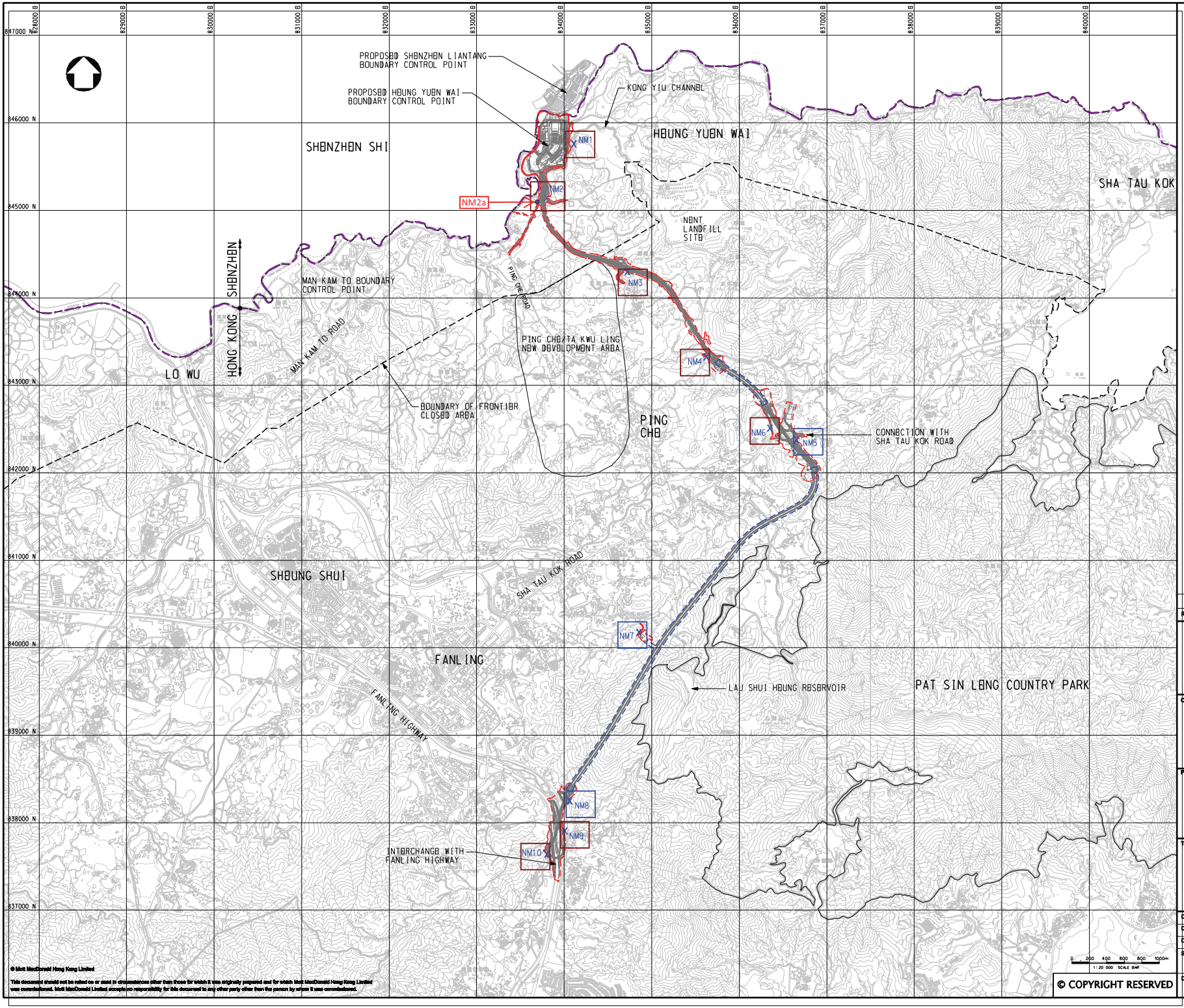
Project

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

Title

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Designed	DC		Eng.Chk.	EC	
Drawn	MING		Coordination	EC	
Dwg.Chk.	DC		Approved	HT	
Scale at A1	1:20000	Project	255228	Status	PRE
		CAD file	j:\255228\report\env\em&a\00B3\FIG 2-1.dgn		
Drawing No	FIGURE 2.1			Rev	P1



LEGEND:

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

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

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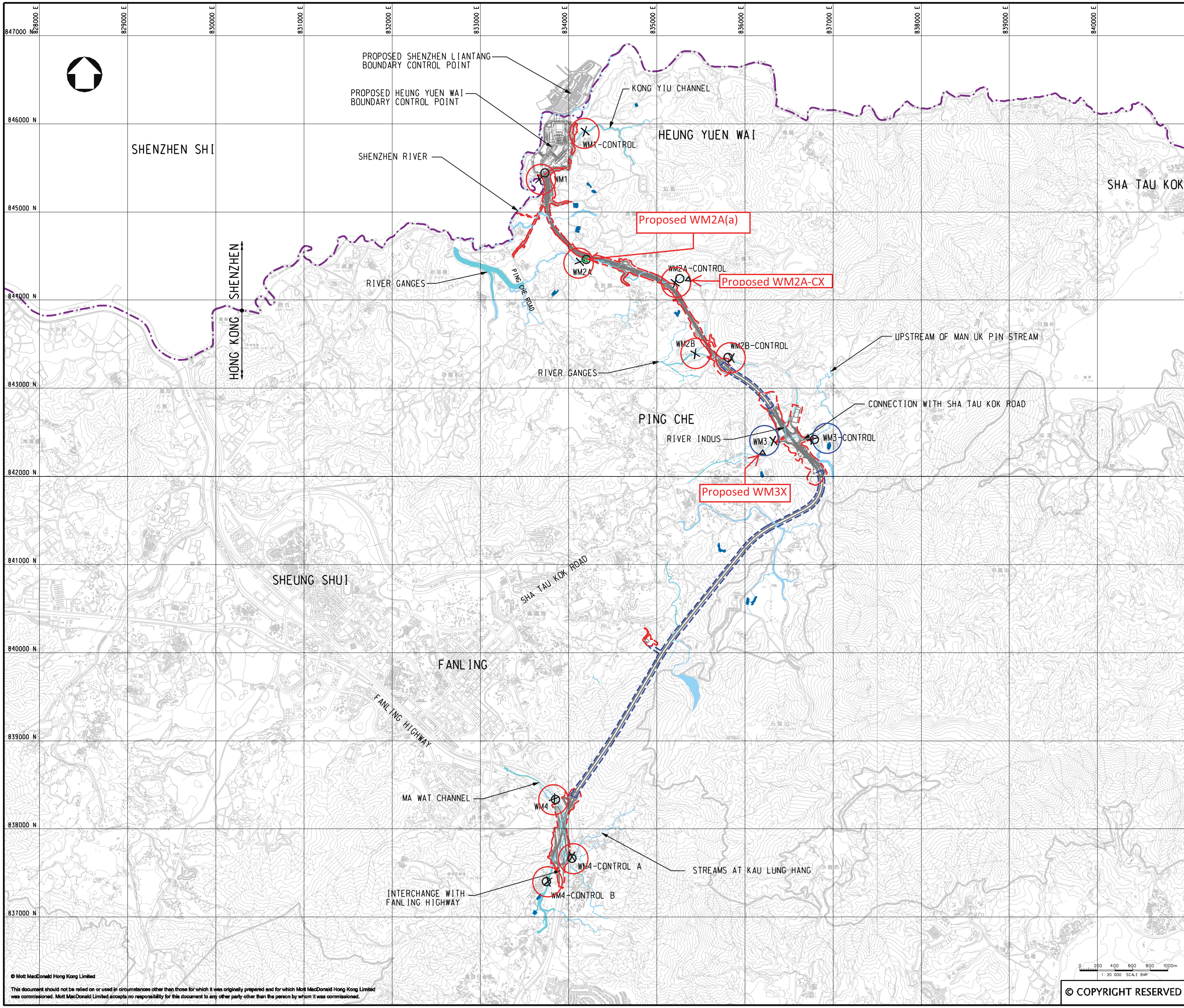
Project

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

Title

PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC		Eng.Chk.	BC	
Drawn	MING		Coordination	BC	
Dwg.Chk.	DC		Approved	HT	
Scale at A1	1:20000	Project	255228	Status	PRE
		CAD file	j:\255228\report\env\em&o\00B3\FIG 3-1.dgn		
Drawing No	FIGURE 3.1			Rev	P1



LEGEND:

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

Station ID	Location recommended in EM&A Manual		Location found during site visit	
	Coordinates		Coordinates	
	Easting	Northing	Easting	Northing
WM1	833668.635	845571.097	833679	845421
WM1 Control	834185.480	845916.662	834185	845917
WM2A	834132.193	844432.910	834204	844471
WM2A-Control	835205.329	844200.151	835270	844243
WM2B	835434.744	843394.606	835433	843397
WM2B-Control	835845.878	843343.625	835835	843351
WM3	836323.622	842404.977	836324	842407
WM3-Control	836763.419	842425.507	836763	842400
WM4	833840.783	838344.842	833850	838338
WM4-Control A	834038.937	837668.995	834028	837695
WM4-Control B	833769.123	837406.936	833760	837395

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

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

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

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Client

CEDD CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project

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

Title

LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

Designed	HC	Eng.Chk.	EC
Drawn	MING	Coordination	EC
Dwg.Chk.	HC	Approved	HT
Scale at A1: 1:20000	Project: 255228		Status: PRE
Drawing No: Appendix C			Rev: P2

Appendix F

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village		Date of Calibration:	24/9/2018
Location ID : AM1c		Next Calibration Date:	24/11/2018
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1011.1	Corrected Pressure (mm Hg)	758.325
Temperature (ºC)	27.0	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.5	5.7	11.2	1.668	46	45.80	Slope = 27.5780
13	4.4	4.4	8.8	1.480	42	41.81	Intercept = 0.2924
10	3.5	3.3	6.8	1.303	36	35.84	Corr. coeff. = 0.9981
7	2.2	2.2	4.4	1.052	30	29.87	
5	1.2	1.3	2.5	0.797	22	21.90	

Calculations :

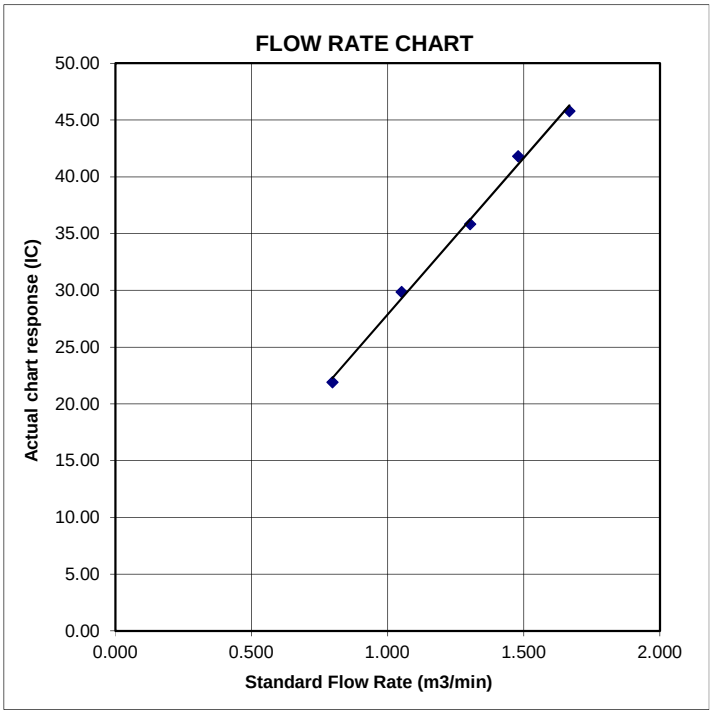
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village		Date of Calibration:	24/11/2018
Location ID : AM1c		Next Calibration Date:	24/1/2019
		Technician:	Eric

CONDITIONS

Sea Level Pressure (hPa)	1019.7	Corrected Pressure (mm Hg)	764.775
Temperature (°C)	21.7	Temperature (K)	295

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.6	5.6	11.2	1.689	46	46.40	Slope = 27.5780
13	4.4	4.4	8.8	1.500	42	42.37	Intercept = 0.3030
10	3.4	3.4	6.8	1.320	36	36.31	Corr. coeff. = 0.9981
7	2.2	2.2	4.4	1.066	30	30.26	
5	1.1	1.4	2.5	0.808	22	22.19	

Calculations :

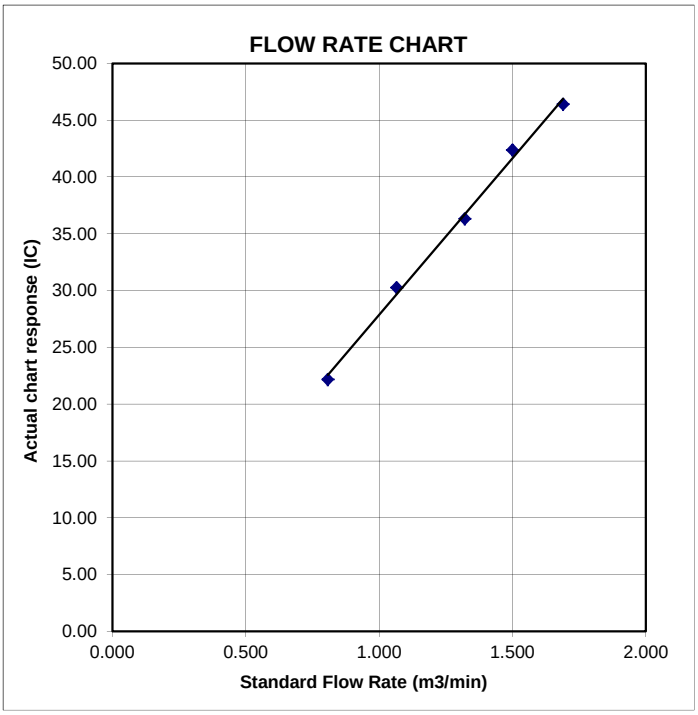
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road		Date of Calibration:	6/10/2018
Location ID : AM2		Next Calibration Date:	6/12/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (ºC)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected
18	0.4	11.4	11.8	1.714	54	53.84
13	-0.9	10.1	9.2	1.515	48	47.86
10	-1.9	9.2	7.3	1.352	44	43.87
7	-3.2	7.9	4.7	1.088	36	35.89
5	-4.1	7.0	2.9	0.859	28	27.92

LINEAR REGRESSION

Slope = 29.9580
Intercept = 2.7646
Corr. coeff. = 0.9986

Calculations :

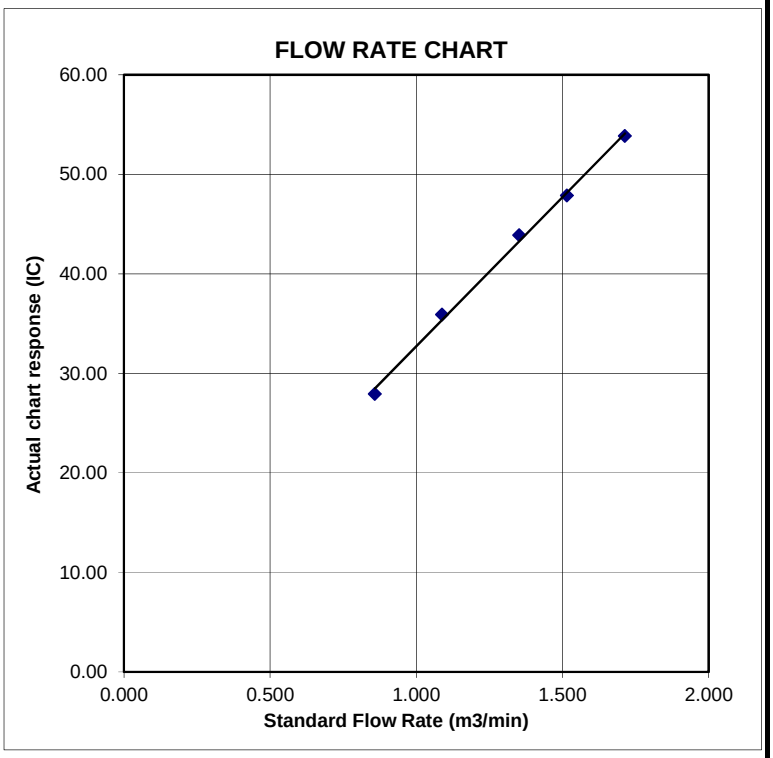
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ta Kwu Ling Fire Service Station		Date of Calibration:	6/10/2018
Location ID : AM3		Next Calibration Date:	6/12/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (ºC)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.5	11.5	12.0	1.728	54	53.84	Slope = 29.2673
13	-0.8	9.5	8.7	1.474	48	47.86	Intercept = 4.0856
10	-2.0	8.5	6.5	1.277	42	41.88	Corr. coeff. = 0.9970
7	-3.3	7.8	4.5	1.065	36	35.89	
5	-4.2	7.0	2.8	0.844	28	27.92	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

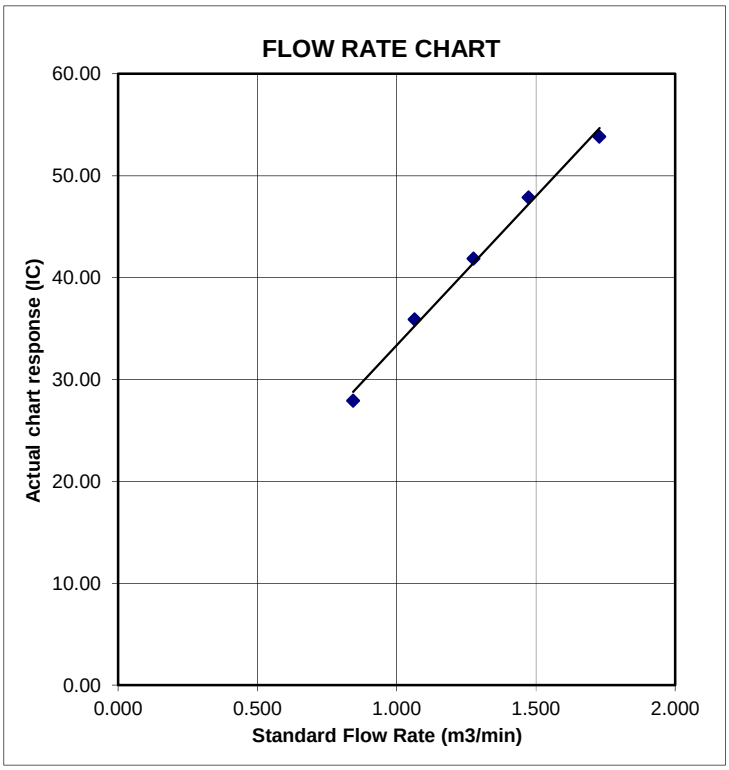
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nga Yiu Ha Village		Date of Calibration:	6/10/2018
Location ID : AM4b		Next Calibration Date:	6/12/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (ºC)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	-0.2	11	10.8	1.640	51	50.85	Slope = 25.4343
13	-1.5	9.7	8.2	1.432	46	45.86	Intercept = 9.3044
10	-2.5	9	6.5	1.277	42	41.88	Corr. coeff. = 0.9999
7	-3.6	7.6	4.0	1.005	35	34.90	
5	-4.3	6.9	2.6	0.814	30	29.91	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

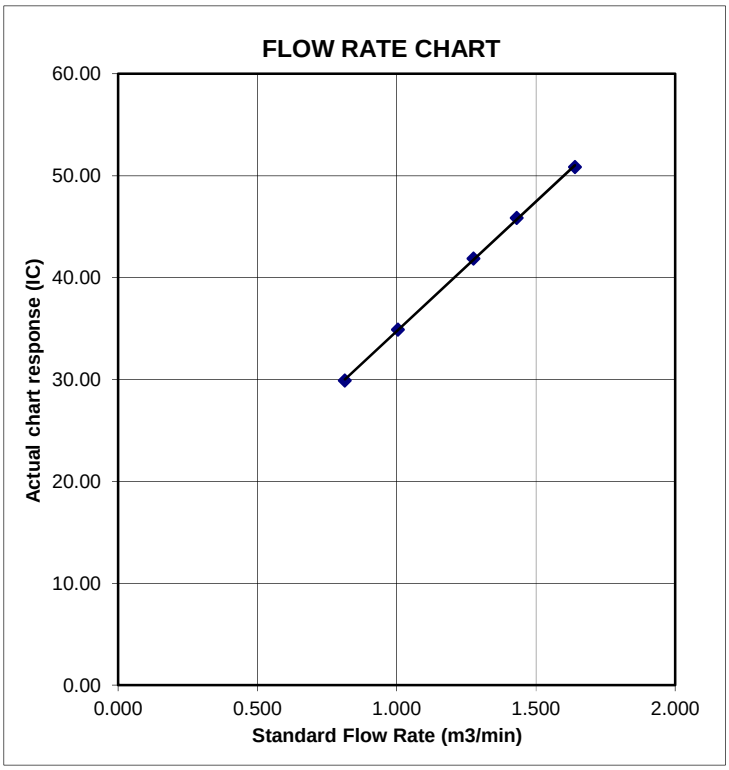
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House		Date of Calibration:	6/10/2018
Location ID : AM5a		Next Calibration Date:	6/12/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (ºC)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.1	10.9	11.0	1.655	51	50.85	Slope = 35.1355
13	-1.1	10	8.9	1.491	46	45.86	Intercept = -6.4788
10	-2.2	8.8	6.6	1.286	40	39.88	Corr. coeff. = 0.9954
7	-3.3	7.8	4.5	1.065	32	31.90	
5	-4.0	7.0	3.0	0.873	23	22.93	

Calculations :

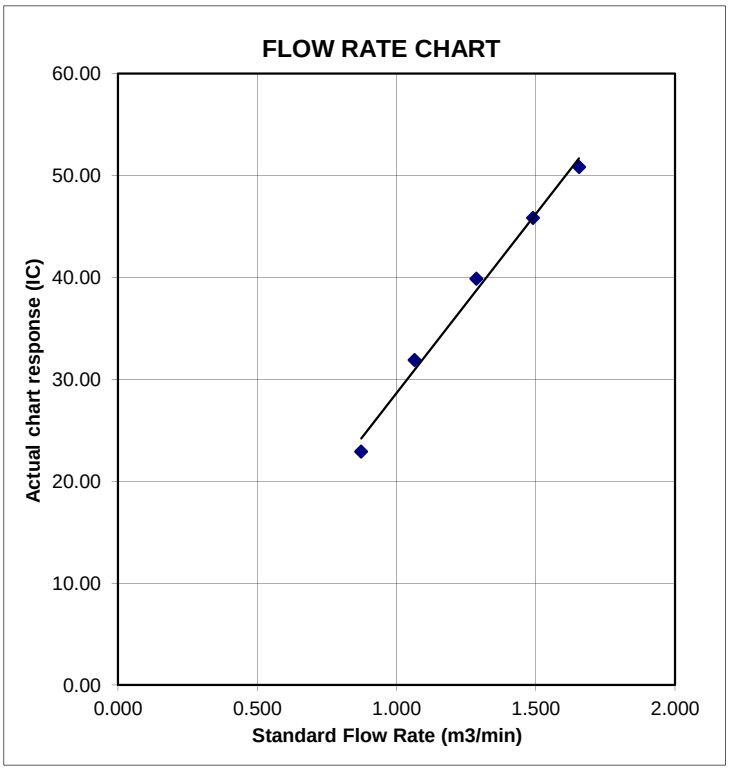
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House		Date of Calibration:	6/10/2018
Location ID : AM6		Next Calibration Date:	6/12/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (ºC)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.1	11.2	11.3	1.677	60	59.82	Slope = 34.9447
13	-1.3	9.9	8.6	1.466	54	53.84	Intercept = 2.3726
10	-2.1	9	6.9	1.315	50	49.85	Corr. coeff. = 0.9958
7	-3.3	7.8	4.5	1.065	40	39.88	
5	-4.2	6.8	2.6	0.814	30	29.91	

Calculations :

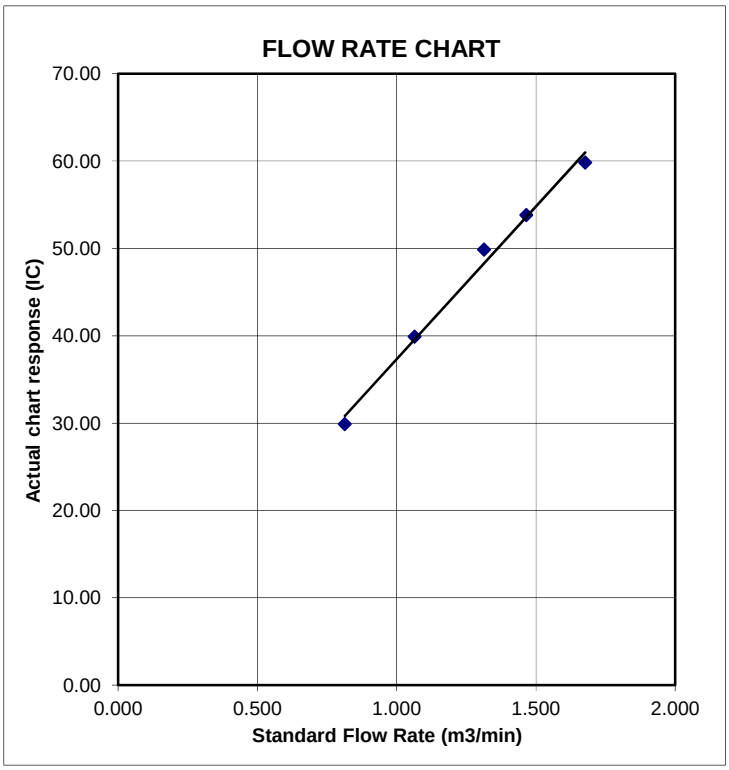
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 6/10/2018
Next Calibration Date: 6/12/2018
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.2	11.2	11.4	1.685	58	57.83	Slope = 34.5040
13	-0.9	10.2	9.3	1.523	51	50.85	Intercept = -0.6376
10	-2	9.1	7.1	1.333	47	46.86	Corr. coeff. = 0.9956
7	-3.3	7.8	4.5	1.065	35	34.90	
5	-4.2	6.8	2.6	0.814	28	27.92	

Calculations :

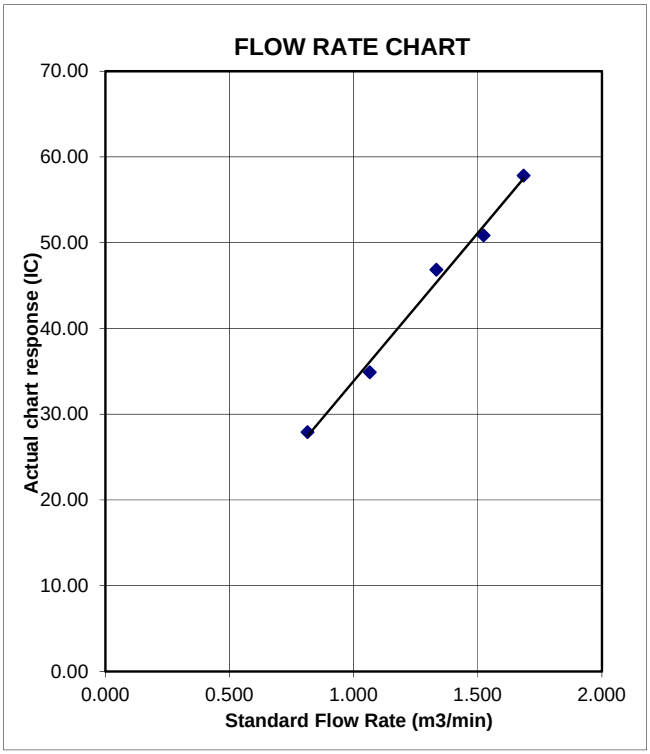
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 6/10/2018
Next Calibration Date: 6/12/2018
Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (°C)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	-0.2	11.1	10.9	1.648	54	53.84	Slope = 41.7016
13	-1.3	10.1	8.8	1.482	48	47.86	Intercept = -14.1664
10	-2.2	9.2	7.0	1.324	42	41.88	Corr. coeff. = 0.9990
7	-3.5	7.9	4.4	1.054	30	29.91	
5	-4.3	7.0	2.7	0.829	20	19.94	

Calculations :

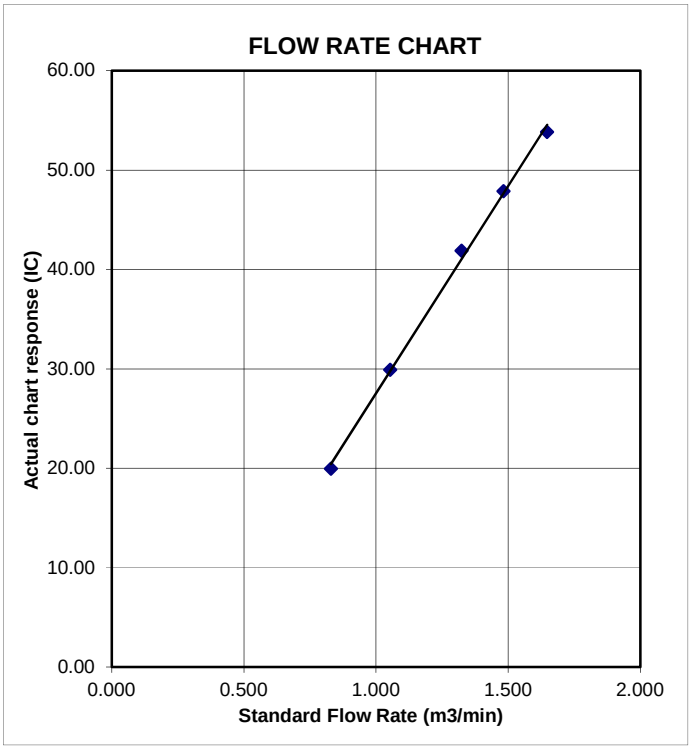
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Nam Wa Po Village House No. 80		Date of Calibration:	6/10/2018
Location ID : AM9b		Next Calibration Date:	6/12/2018
		Technician:	Fai So

CONDITIONS

Sea Level Pressure (hPa)	1013.4	Corrected Pressure (mm Hg)	760.05
Temperature (ºC)	26.8	Temperature (K)	300

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	0.7	11.8	12.5	1.763	54	53.84	Slope = 30.0889
13	-0.7	10.3	9.6	1.547	49	48.85	Intercept = 1.6929
10	-1.8	9.2	7.4	1.361	44	43.87	Corr. coeff. = 0.9962
7	-3.2	8	4.8	1.100	34	33.90	
5	-4.0	7.0	3.0	0.873	28	27.92	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart respones

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

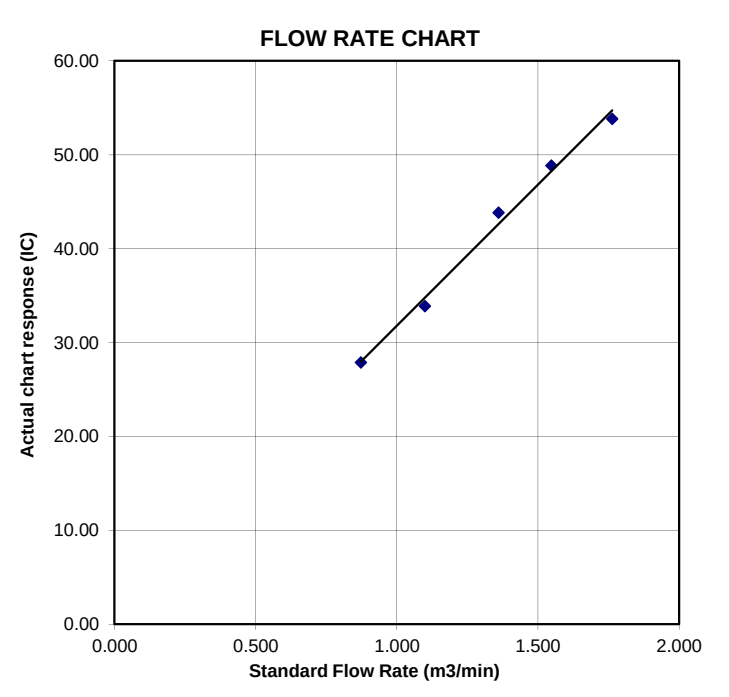
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TISCH Environmental

RECALIBRATION DUE DATE:
February 13, 2019

Certificate of Calibration

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

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

Data Tabulation

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

Calculations

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

For subsequent flow rate calculations:

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

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

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

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

RECALIBRATION

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

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

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FAX: (513)467-900

ALS Technichem (HK) Pty Ltd

ALS Laboratory Group
ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1825890**
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 12-APR-2018
		DATE OF ISSUE	: 19-APR-2018
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1825890
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1825890-001	S/N: 456658	Equipments	12-Apr-2018	S/N: 456658

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	456658
Equipment Ref:	EQ115
Job Order	HK1825890

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	27 February 2018

Equipment Verification Results:

Calibration Date: 12 & 13 March 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	9:50 ~ 11:57	19.6	1019.0	0.073	4333	34.2
2hr14min	12:05 ~ 14:19	19.6	1019.0	0.075	4469	33.3
2hr17min	9:50 ~ 12:07	20.9	1016.7	0.075	4912	35.7

Sensitivity Adjustment Scale Setting (Before Calibration) 705 (CPM)

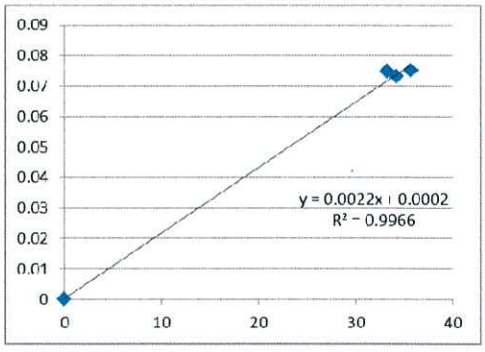
Sensitivity Adjustment Scale Setting (After Calibration) 705 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9983

Date of Issue 15 March 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 15 March 2018

QC Reviewer : Ben Tam Signature : Date : 15 March 2018

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	27-Feb-18
Location ID :	Calibration Room	Next Calibration Date:	27-May-18

CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	19.1	Temperature (K)	292

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.694	52	52.63	Slope = 39.8525
13	5.1	5.1	10.2	1.538	46	46.55	Intercept = -14.3322
10	3.9	3.9	7.8	1.346	40	40.48	Corr. coeff. = 0.9974
8	2.6	2.6	5.2	1.101	30	30.36	
5	1.7	1.7	3.4	0.893	20	20.24	

Calculations :

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

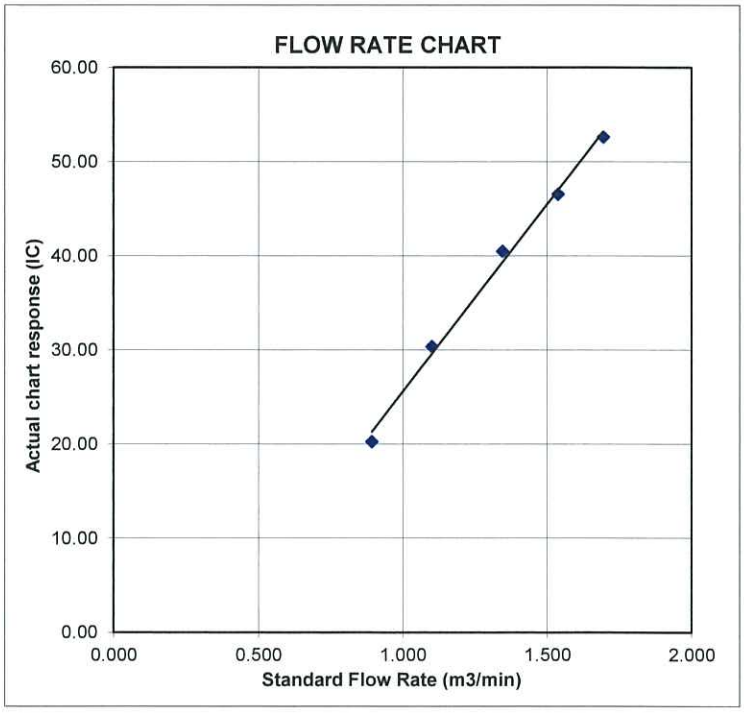
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1815074**
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 5-JAN-2018
		DATE OF ISSUE	: 5-FEB-2018
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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.

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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1815074
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1815074-001	S/N: 3Y6505	AIR	05-Jan-2018	S/N: 3Y6505

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

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

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

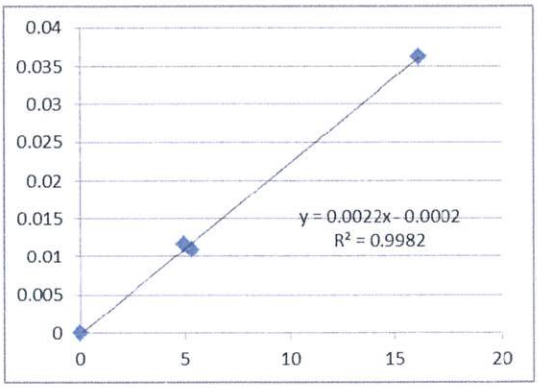
Sensitivity Adjustment Scale Setting (After Calibration) 590 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9991

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

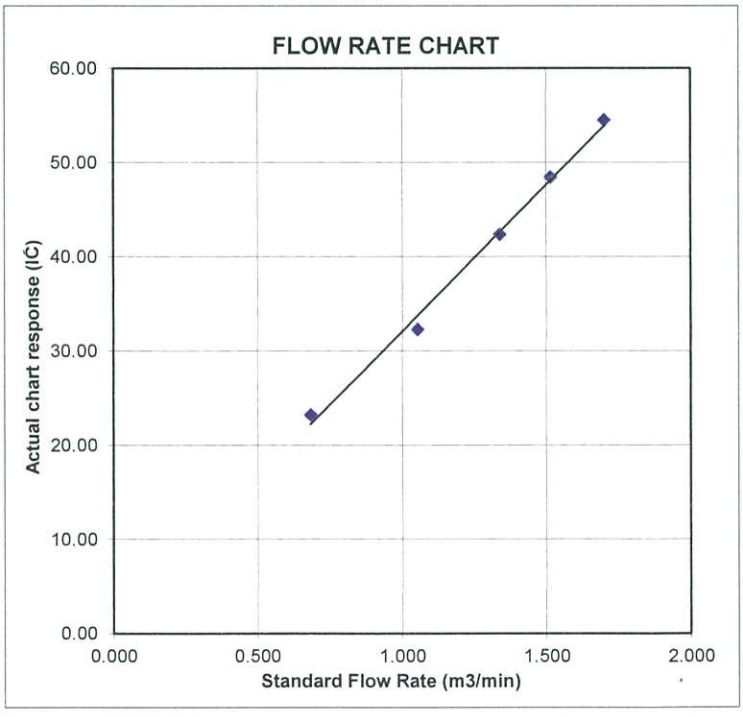
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1825889**
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 12-APR-2018
		DATE OF ISSUE	: 19-APR-2018
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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.

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Part of the ALS Laboratory Group
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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1825889
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1825889-001	S/N: 3Y6502	Equipments	12-Apr-2018	S/N: 3Y6502

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	3Y6502
Equipment Ref:	EQ113
Job Order	HK1825889

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	27 February 2018

Equipment Verification Results:

Calibration Date: 12 & 13 March 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	9:50 ~ 11:57	19.6	1019.0	0.073	4322	34.1
2hr14min	12:05 ~ 14:19	19.6	1019.0	0.075	4416	32.9
2hr17min	9:50 ~ 12:07	20.9	1016.7	0.075	4811	35.0

Sensitivity Adjustment Scale Setting (Before Calibration) 573 (CPM)

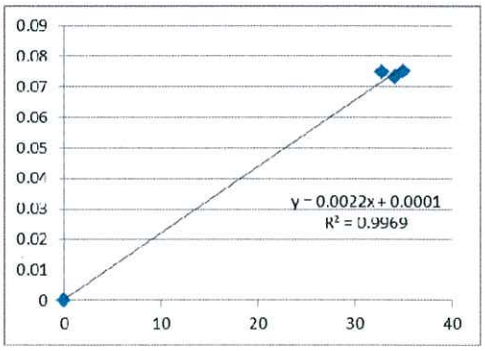
Sensitivity Adjustment Scale Setting (After Calibration) 573 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9984

Date of Issue 15 March 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 15 March 2018

QC Reviewer : Ben Tam Signature : Date : 15 March 2018

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	27-Feb-18
Location ID :	Calibration Room	Next Calibration Date:	27-May-18

CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	19.1	Temperature (K)	292

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.694	52	52.63	Slope = 39.8525
13	5.1	5.1	10.2	1.538	46	46.55	Intercept = -14.3322
10	3.9	3.9	7.8	1.346	40	40.48	Corr. coeff. = 0.9974
8	2.6	2.6	5.2	1.101	30	30.36	
5	1.7	1.7	3.4	0.893	20	20.24	

Calculations :

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

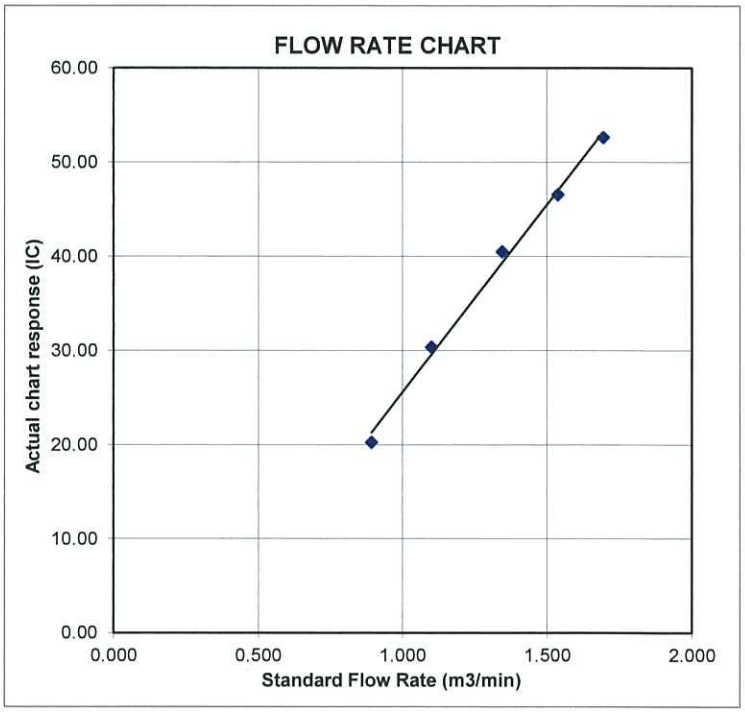
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1815072**
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 5-JAN-2018
		DATE OF ISSUE	: 5-FEB-2018
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
Richard Fung	General Manager

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.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1815072
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ----

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1815072-001	S/N: 366410	AIR	05-Jan-2018	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 5 January 2018

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

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

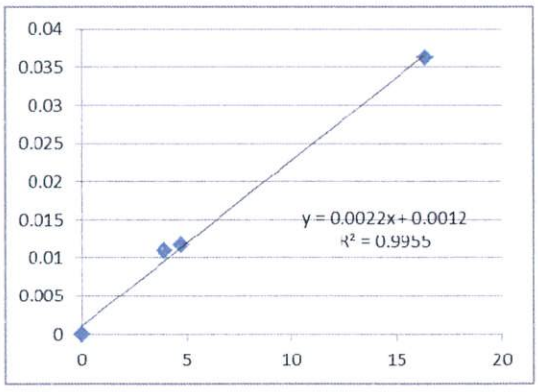
Sensitivity Adjustment Scale Setting (After Calibration) 669 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9977

Date of Issue 9 January 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 9 January 2018

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

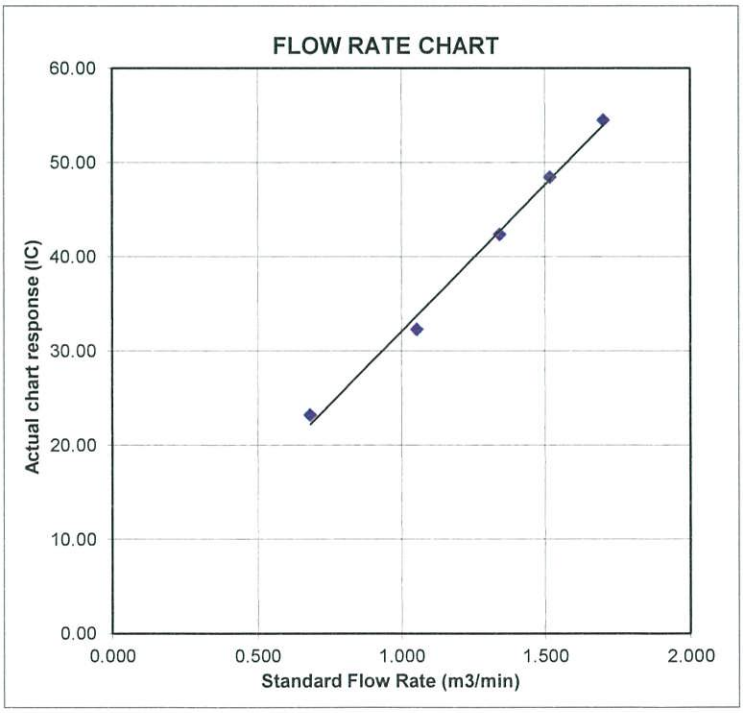
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



ALS Technichem (HK) Pty Ltd

ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: **HK1825886**
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 12-APR-2018
		DATE OF ISSUE	: 19-APR-2018
PROJECT	: ITEM B5 (CALIBRATION SERVICE) OF WATER ANALYSIS IN YEAR 2018	NO. OF SAMPLES	: 1
		CLIENT ORDER	:

General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

This document has been signed by those names that appear on this report and are the authorised signatories

Signatories	*Position*
p.p Richard Fung	General Manager

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.

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group
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Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER	: HK1825886
SUB-BATCH	: 1
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT	: ITEM B5 (CALIBRATION SERVICE) OF WATER ANALYSIS IN YEAR 2018

ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1825886-001	S/N. 366407	Equipments	17-Apr-2018	S/N. 366407

Equipment Verification Report (TSP)

Equipment Calibrated:

Type:	Laser Dust monitor
Manufacturer:	Sibata LD-3B
Serial No.	366407
Equipment Ref:	EQ107
Job Order	HK1825886

Standard Equipment:

Standard Equipment:	Higher Volume Sampler
Location & Location ID:	AUES office (calibration room)
Equipment Ref:	HVS 018
Last Calibration Date:	27 February 2018

Equipment Verification Results:

Testing Date: 12 & 13 March 2018

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m^3 (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	9:50 ~ 11:57	19.6	1019.0	0.073	4126	32.6
2hr14min	12:05 ~ 14:19	19.6	1019.0	0.075	4414	32.8
2hr17min	9:50 ~ 12:07	20.9	1016.7	0.075	4723	34.4

Sensitivity Adjustment Scale Setting (Before Calibration) 565 (CPM)

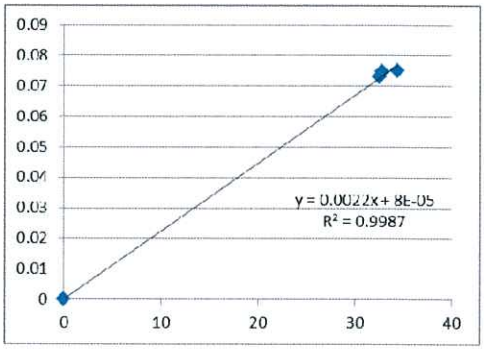
Sensitivity Adjustment Scale Setting (After Calibration) 566 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient (R) 0.9993

Date of Issue 15 March 2018



Remarks:

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

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

Operator : Martin Li Signature : Date : 15 March 2018

QC Reviewer : Ben Tam Signature : Date : 15 March 2018

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration:	27-Feb-18
Location ID :	Calibration Room	Next Calibration Date:	27-May-18

CONDITIONS

Sea Level Pressure (hPa)	1017.3	Corrected Pressure (mm Hg)	762.975
Temperature (°C)	19.1	Temperature (K)	292

CALIBRATION ORIFICE

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

CALIBRATION

Plate No.	H20 (L) (in)	H2O (R) (in)	H20 (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.694	52	52.63	Slope = 39.8525
13	5.1	5.1	10.2	1.538	46	46.55	Intercept = -14.3322
10	3.9	3.9	7.8	1.346	40	40.48	Corr. coeff. = 0.9974
8	2.6	2.6	5.2	1.101	30	30.36	
5	1.7	1.7	3.4	0.893	20	20.24	

Calculations :

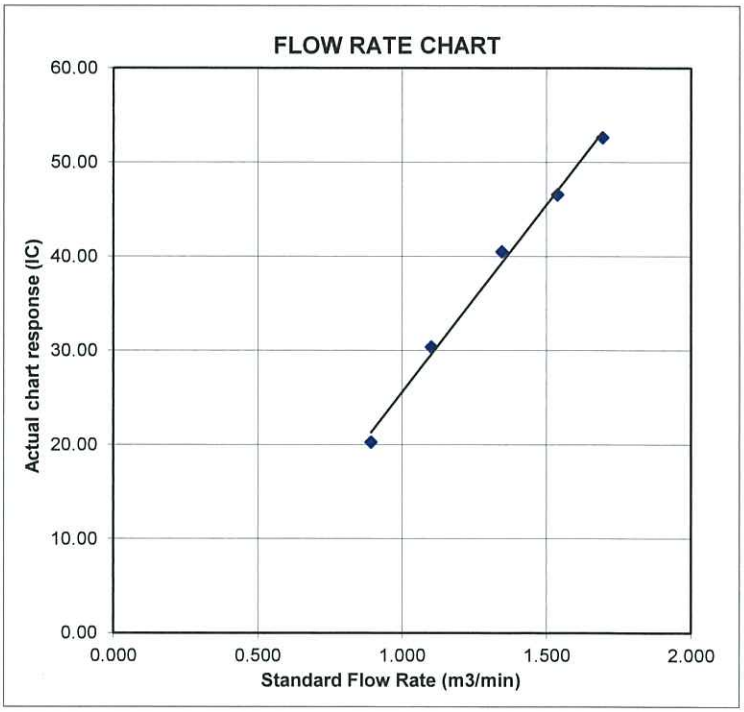
Qstd = 1/m[Sqrt(H20(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]

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

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)

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



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

Certificate of Calibration
校正證書

Certificate No. : C183261
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867) Date of Receipt / 收件日期 : 12 June 2018

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

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 18 June 2018

TEST RESULTS / 測試結果

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

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

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Engineer

Date of Issue 簽發日期 : 20 June 2018

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C183261
證書編號

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

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

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C181288

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C183260
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867) Date of Receipt / 收件日期 : 12 June 2018

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 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 18 June 2018

TEST RESULTS / 測試結果

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

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

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Engineer

Date of Issue 簽發日期 : 20 June 2018

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

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

Certificate of Calibration
校正證書

Certificate No. : C183260
證書編號

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

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

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C173864
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C181288

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory
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輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
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輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C182473
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867) Date of Receipt / 收件日期 : 26 April 2018

Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 12 May 2018

TEST RESULTS / 測試結果

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

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

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 15 May 2018

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 — 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C182473
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

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

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C180024
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	94.3	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L_A	A	Fast	94.00	1	94.3 (Ref.)
				104.00		104.3
				114.00		114.3

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

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L_A	A	Fast	94.00	1	94.3	Ref.
			Slow			94.3	± 0.3

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
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Certificate of Calibration
校正證書

Certificate No. : C182473
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_A	A	Fast	94.00	63 Hz	68.0	-26.2 ± 1.5
					125 Hz	78.1	-16.1 ± 1.5
					250 Hz	85.6	-8.6 ± 1.4
					500 Hz	91.0	-3.2 ± 1.4
					1 kHz	94.3	Ref.
					2 kHz	95.5	+1.2 ± 1.6
					4 kHz	95.3	+1.0 ± 1.6
					8 kHz	93.3	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.9	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_C	C	Fast	94.00	63 Hz	93.5	-0.8 ± 1.5
					125 Hz	94.1	-0.2 ± 1.5
					250 Hz	94.3	0.0 ± 1.4
					500 Hz	94.3	0.0 ± 1.4
					1 kHz	94.3	Ref.
					2 kHz	94.1	-0.2 ± 1.6
					4 kHz	93.5	-0.8 ± 1.6
					8 kHz	91.4	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.9	-6.2 (+3.0 ; -6.0)

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

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

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

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

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

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

Certificate of Calibration
校正證書

Certificate No. : C183086
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867) Date of Receipt / 收件日期 : 29 May 2018

Description / 儀器名稱 : Integrating Sound Level Meter (EQ009)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285722
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 June 2018

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 : K C Lee
Engineer

Certified By 核證 : H C Chan
Engineer

Date of Issue 簽發日期 : 11 June 2018

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
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Certificate No. : C183086
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1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

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

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

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C180024
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L_{AFP}	A	F	94.00	1	94.1

6.1.1.2 After Self-calibration

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

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L_{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

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Certificate No. : C183086
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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	104.9	-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	54.5	-39.4 ± 1.5
					63 Hz	67.8	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.8	-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	92.8	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.7	-4.3 (+3.0 ; -6.0)

Certificate of Calibration
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Certificate No. : C183086
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	90.9	-3.0 ± 1.5
					63 Hz	93.1	-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	93.1	-0.8 ± 1.0
					8 kHz	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.7	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L_{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
						$1/10^2$		90	90.0	± 0.5
			60 sec.			$1/10^3$		80	79.0	± 1.0
			5 min.			$1/10^4$		70	69.1	± 1.0

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

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

- Uncertainties of Applied Value :

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

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

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

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1848018
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	05-Sep-2018
		DATE OF ISSUE:	11-Sep-2018

COMMENTS

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

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

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

Scope of Test:	Conductivity, Dissolved Oxygen, pH Value, Salinity and Temperature
Equipment Type:	Multifunctional Meter
Brand Name:	YSI
Model No.:	Professional Plus
Serial No.:	10G101946
Equipment No.:	--
Date of Calibration:	11 September, 2018

NOTES

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

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1848018

SUB-BATCH: 0
DATE OF ISSUE: 11-Sep-2018
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 11 September, 2018 Date of Next Calibration: 11 December, 2018

PARAMETERS:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (µS/cm)	Displayed Reading (µS/cm)	Tolerance (%)
146.9	158.8	+8.1
6667	6387	-4.2
12890	12700	-1.5
58670	57251	-2.4
	Tolerance Limit (%)	±10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.21	3.04	-0.17
5.42	5.56	+0.14
7.85	7.80	-0.05
	Tolerance Limit (mg/L)	±0.20

pH Value

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

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.07	+0.07
7.0	7.09	+0.09
10.0	9.94	-0.06
	Tolerance Limit (pH unit)	±0.20

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1848018

SUB-BATCH: 0
DATE OF ISSUE: 11-Sep-2018
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 11 September, 2018 Date of Next Calibration: 11 December, 2018

PARAMETERS:

Salinity

Method Ref: APHA (21st edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.94	-0.6
20	19.38	-3.1
30	30.19	+0.6
	Tolerance Limit (%)	±10.0

Temperature

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

Expected Reading (^{o}C)	Displayed Reading (^{o}C)	Tolerance (^{o}C)
13.3	14.1	+0.8
24.0	25.0	+1.0
37.2	37.1	-0.1
	Tolerance Limit (^{o}C)	±2.0

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

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK1847322
CLIENT:	ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T., HONG KONG.	SUB-BATCH:	0
		LABORATORY:	HONG KONG
		DATE RECEIVED:	03-Sep-2018
		DATE OF ISSUE:	10-Sep-2018

COMMENTS

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

Scope of Test:	Turbidity
Equipment Type:	Turbidimeter
Brand Name:	Hach
Model No.:	2100Q
Serial No.:	12060C18266
Equipment No.:	--
Date of Calibration:	04 September, 2018

NOTES

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

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

WORK ORDER: HK1847322

SUB-BATCH: 0
DATE OF ISSUE: 10-Sep-2018
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter
Brand Name: Hach
Model No.: 2100Q
Serial No.: 12060C18266
Equipment No.: --
Date of Calibration: 04 September, 2018 Date of Next Calibration: 04 December, 2018

PARAMETERS:
Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.18	--
4	--	N/A
40	40.30	+0.7
80	86.2	+7.8
400	386	-3.5
800	801	+0.1
	Tolerance Limit (%)	±10.0

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic

Appendix G

Event and Action Plan

Event and Action Plan for Air Quality

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

Event and Action Plan for Construction Noise

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

Event and Action Plan for Water Quality

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

Appendix H

Impact Monitoring Schedule

Impact Monitoring Schedule for Reporting Period – November 2018

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

	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for next Reporting Period – December 2018

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

	Monitoring Day
	Sunday or Public Holiday

Appendix I

Database of Monitoring Result

24-hour TSP Monitoring Data

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP ($\mu g/m^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
AM1c – Open Area, Tsung Yuen Ha Village No.63															
6-Nov-18	23244	15209.18	15233.19	1440.60	28	28	28.0	24.7	1017.5	1.01	1451	2.6444	2.6950	0.0506	35
12-Nov-18	23308	15233.19	15257.20	1440.60	28	28	28.0	24.9	1014.2	1.01	1448	2.6708	2.7877	0.1169	81
17-Nov-18	23335	15257.20	15281.22	1441.20	25	25	25.0	26.4	1018.1	0.90	1291	2.6886	2.7413	0.0527	41
23-Nov-18	23369	15281.22	15305.23	1440.60	25	25	25.0	21	1018.3	0.90	1303	2.7026	2.8144	0.1118	86
29-Nov-18	23326	15305.23	15329.25	1441.20	25	25	25.0	23.6	1022.7	0.90	1300	2.6665	2.7135	0.0470	36
AM2 - Village House near Lin Ma Hang Road															
6-Nov-18	23243	10827.10	10850.89	1427.40	42	42	42.0	24.7	1017.5	1.31	1875	2.6403	2.9121	0.2718	145
12-Nov-18	23309	10850.89	10874.63	1424.40	42	42	42.0	24.9	1014.2	1.31	1867	2.6794	3.1126	0.4332	***232***
17-Nov-18	23334	10874.63	10898.32	1421.40	42	42	42.0	26.4	1018.1	1.31	1862	2.6758	2.8466	0.1708	92
23-Nov-18	23370	10898.32	10921.83	1410.60	42	42	42.0	21	1018.3	1.32	1866	2.6867	2.9561	0.2694	144
29-Nov-18	23325	10921.83	10945.38	1413.00	42	42	42.0	23.6	1022.7	1.32	1864	2.6631	2.8031	0.1400	75
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
6-Nov-18	23242	11949.41	11973.42	1440.60	28	28	28.0	24.7	1017.5	0.82	1181	2.6447	2.6944	0.0497	42
12-Nov-18	23307	11973.42	11997.43	1440.60	30	30	30.0	24.9	1014.2	0.89	1276	2.6680	2.7851	0.1171	92
17-Nov-18	23333	11997.43	12021.45	1441.20	38	40	39.0	26.4	1018.1	1.19	1719	2.6728	2.8717	0.1989	116
23-Nov-18	23371	12021.45	12045.46	1440.60	32	38	35.0	21	1018.3	1.07	1538	2.6893	2.8172	0.1279	83
29-Nov-18	23327	12045.46	12069.49	1441.80	30	30	30.0	23.6	1022.7	0.89	1287	2.6628	2.6866	0.0238	18
AM4b - House no. 10B1 Nga Yiu Ha Village															
2-Nov-18	23241	13935.92	13959.93	1440.60	34	34	34.0	22.4	1015.5	0.98	1409	2.6546	2.7622	0.1076	76
8-Nov-18	23247	13959.93	13983.93	1440.00	36	36	36.0	25.2	1016.8	1.05	1514	2.6485	2.7966	0.1481	98
14-Nov-18	23313	13983.93	14007.53	1416.00	34	34	34.0	22.2	1017.2	0.98	1387	2.6766	2.7202	0.0436	31
20-Nov-18	23339	14007.53	14031.16	1417.80	35	35	35.0	20.7	1018.7	1.02	1452	2.6649	2.7804	0.1155	80
26-Nov-18	23344	14031.16	14055.16	1440.00	36	38	37.0	20.8	1018.4	1.10	1588	2.6664	2.7776	0.1112	70
AM5a - Ping Yeung Village House															
2-Nov-18	23240	12780.25	12803.79	1412.40	40	40	40.0	22.4	1015.5	1.33	1877	2.6587	2.8901	0.2314	123
8-Nov-18	23248	12803.79	12827.35	1413.60	25	25	25.0	25.2	1016.8	0.90	1268	2.6494	2.7564	0.1070	84
14-Nov-18	23312	12827.35	12850.90	1413.00	27	27	25.0	22.2	1017.2	0.90	1273	2.6865	2.7965	0.1100	86
20-Nov-18	23340	12850.90	12874.41	1410.60	30	30	25.0	20.7	1018.7	0.90	1274	2.6704	2.7605	0.0901	71
26-Nov-18	23343	12874.41	12897.95	1412.40	30	30	25.0	20.8	1018.4	0.90	1275	2.6671	2.7065	0.0394	31
AM6 - Wo Keng Shan Village House															

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-HR TSP ($\mu g/m^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	(℃)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
2-Nov-18	23226	10381.67	10405.67	1440.00	40	40	40.0	22.4	1015.5	1.08	1560	2.6397	2.8401	0.2004	128
8-Nov-18	23246	10405.67	10429.69	1441.20	38	38	38.0	25.2	1016.8	1.02	1472	2.6562	2.8683	0.2121	144
14-Nov-18	23311	10429.69	10453.69	1440.00	28	28	28.0	22.2	1017.2	0.74	1064	2.6806	2.8033	0.1227	115
20-Nov-18	23341	10453.69	10477.71	1441.20	28	28	28.0	20.7	1018.7	0.74	1068	2.6795	2.7981	0.1186	111
26-Nov-18	23342	10477.71	10501.71	1440.00	26	26	26.0	20.8	1018.4	0.68	984	2.6800	2.7842	0.1042	106
AM7b - Loi Tung Village House															
2-Nov-18	23224	19428.35	19452.31	1437.60	40	41	40.5	22.4	1015.5	1.20	1723	2.6475	2.8725	0.2250	131
8-Nov-18	23250	19452.31	19476.00	1421.40	40	40	40.0	25.2	1016.8	1.18	1676	2.6590	2.8636	0.2046	122
14-Nov-18	23252	19476.00	19499.94	1436.40	44	44	44.0	22.2	1017.2	1.30	1870	2.6368	2.9057	0.2689	144
20-Nov-18	23367	19499.94	19523.64	1422.00	44	44	44.0	23.1	1017.4	1.30	1849	2.6986	2.9106	0.2120	115
26-Nov-18	23345	19523.64	19547.34	1422.00	45	45	45.0	19	1018.9	1.34	1905	2.6822	2.7563	0.0741	39
AM8 - Po Kat Tsai Village No. 4															
2-Nov-18	23225	13324.58	13348.60	1441.20	36	38	37.0	22.4	1015.5	1.23	1775	2.6470	2.7636	0.1166	66
8-Nov-18	23270	13348.60	13372.59	1439.40	38	38	38.0	25.2	1016.8	1.25	1802	2.6803	2.7511	0.0708	39
14-Nov-18	23254	13372.59	13396.60	1440.60	34	34	34.0	22.2	1017.2	1.16	1672	2.6431	2.7986	0.1555	93
20-Nov-18	23368	13396.60	13420.61	1440.60	38	38	38.0	23.1	1017.4	1.26	1809	2.6819	2.7759	0.0940	52
26-Nov-18	23372	13420.61	13444.62	1440.60	30	30	30.0	19	1018.9	1.07	1539	2.7106	2.7448	0.0342	22
AM9b - Nam Wa Po Village House No. 80															
6-Nov-18	23282	20696.59	20720.62	1441.80	25	25	25.0	24.7	1017.5	0.78	1120	2.6749	2.6972	0.0223	20
12-Nov-18	23310	20720.62	20744.62	1440.00	25	25	25.0	26.9	996.5	0.77	1102	2.6825	2.7071	0.0246	22
17-Nov-18	23251	20744.62	20768.65	1441.80	25	25	25.0	26.4	1018.1	0.77	1117	2.6509	2.6780	0.0271	24
23-Nov-18	23324	20768.65	20792.68	1441.80	20	20	20.0	21	1018.3	0.61	886	2.6667	2.7271	0.0604	68
29-Nov-18	23384	20792.68	20816.60	1435.20	26	26	26.0	19.7	1019.4	0.82	1174	2.7019	2.7290	0.0271	23

Bold and italic indicated Action Level exceedance

Construction Noise Monitoring Results, dB(A)

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3nd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
NM1 - Tsung Yuen Ha Village House No. 63																					
1-Nov-18	11:45	54.8	54.8	48.7	50.7	52.5	48.3	50.0	52.1	46.5	49.6	51.0	46.4	49.5	52.7	45.6	52.2	54.6	46.1	52	NA
7-Nov-18	10:59	54.2	54.7	52.0	57.8	60.4	52.5	53.8	55.2	52.1	53.5	54.9	51.0	53.1	55.4	50.4	52.9	55.2	49.7	55	NA
13-Nov-18	10:51	56.4	58.2	54.4	56.9	58.4	55.3	58.7	60.2	56.8	57.1	58.7	54.9	57.1	58.3	54.1	56.2	58.3	53.6	57	NA
19-Nov-18	14:20	51.1	50.0	47.5	49.9	48.5	45.0	50.3	49.5	45.5	47.2	48.0	46.0	48.9	48.5	45.5	47.0	48.0	45.5	49	NA
30-Nov-18	12:53	50.8	55.1	45.7	63.6	57.3	47.0	61.7	64.9	50.4	52.9	55.3	48.7	62.1	61.0	50.5	50.8	55.1	45.7	60	NA
NM2a - Village House near Lin Ma Hang Road																					
1-Nov-18	13:00	69.2	71.9	51.6	57.3	61.1	47.3	63.4	67.1	48.2	59.3	62.5	46.4	58.3	62.5	47.0	71.2	66.1	47.7	66	69
7-Nov-18	12:49	69.8	68.8	52.6	64.0	65.8	49.1	62.8	66.6	53.4	63.3	65.8	57.6	66.5	70.4	58.8	69.6	72.2	59.3	67	70
13-Nov-18	11:50	70.9	73.5	47.7	60.7	62.7	44.3	61.7	64.8	46.6	64.9	64.6	43.0	73.7	78.3	44.4	53.8	57.6	41.8	68	71
19-Nov-18	15:11	68.2	70.0	63.5	67.8	71.0	62.0	67.7	70.0	63.5	68.1	71.0	62.5	68.8	71.5	63.0	68.6	71.5	62.5	68	71
30-Nov-18	10:26	72.2	73.5	60.3	70.3	73.3	59.0	68.6	72.4	58.3	71.0	73.3	65.6	74.8	79.2	60.6	66.9	69.8	56.3	71	74
NM3 - Ping Yeung Village House																					
6-Nov-18	10:29	69.1	72.8	59.7	64.0	66.9	56.4	61.4	64.3	55.5	63.3	66.4	54.3	61.8	65.5	42.4	64.7	65.6	55.6	65	NA
12-Nov-18	10:57	53.7	53.5	50.6	56.9	56.4	50.0	58.3	58.1	50.0	61.6	64.1	50.1	57.9	57.7	50.3	56.2	56.1	50.6	58	NA
23-Nov-18	10:26	58.8	60.4	52.2	58.4	62.5	52.7	55.5	58.7	51.5	56.6	59.5	51.4	57.2	60.6	52.2	58.6	61.9	52.3	58	NA
29-Nov-18	9:36	61.8	64.0	54.9	60.2	63.7	53.9	60.4	62.8	53.5	59.8	61.4	53.9	57.4	60.6	53.3	58.6	62.3	54.0	60	NA
NM4 - Wo Keng Shan Village House																					
6-Nov-18	9:37	66.4	68.9	55.9	61.9	64.8	54.2	63.8	64.5	54.0	67.5	71.0	54.3	62.2	62.0	52.0	59.0	61.0	50.1	64	NA
12-Nov-18	11:34	63.8	65.8	48.9	68.7	73.3	50.7	63.0	63.1	50.1	60.6	61.7	50.2	62.7	63.2	50.7	64.3	65.0	50.1	65	NA
23-Nov-18	11:22	65.7	66.7	51.4	63.3	63.0	50.0	59.5	60.5	49.5	62.6	62.7	51.7	60.5	61.3	51.6	58.7	59.2	50.8	62	NA
29-Nov-18	10:27	64.4	63.6	52.1	65.7	64.9	51.1	63.3	62.8	51.7	61.5	60.1	51.2	59.4	59.7	51.3	60.6	60.1	51.5	63	NA
NM5– Ping Yeung Village House																					
6-Nov-18	9:36	55.9	57.5	53.0	56.3	58.0	53.5	55.9	57.5	53.5	58.5	60.5	54.5	59.2	61.0	53.5	61.5	63.0	55.5	58	NA
12-Nov-18	9:52	60.7	62.0	57.5	58.8	59.5	57.0	60.2	61.5	57.0	57.4	58.5	55.5	59.8	59.0	55.0	57.7	58.0	55.0	59	NA
23-Nov-18	9:41	58.4	59.2	56.0	58.9	59.3	55.9	57.7	58.2	55.6	57.5	58.5	55.2	56.7	57.9	55.3	60.3	61.0	55.6	58	NA
29-Nov-18	13:52	54.1	55.4	49.5	51.7	54.1	48.7	53.5	54.7	48.6	54.7	55.5	48.9	55.0	55.6	49.6	53.3	56.9	50.2	54	NA
NM6 – Tai Tong Wu Village House 2																					
6-Nov-18	10:28	59.8	62.0	49.5	57.9	61.5	49.0	61.2	64.5	50.5	61.1	64.0	52.0	57.9	61.0	49.0	61.5	64.5	51.0	60	NA
12-Nov-18	10:47	63.5	65.5	59.0	63.9	67.0	59.0	62.9	66.0	57.0	64.2	67.5	57.0	60.3	62.5	56.0	59.8	62.5	56.0	63	NA
23-Nov-18	10:30	59.4	63.0	54.8	58.1	61.3	52.9	58.5	61.6	54.2	57.8	59.9	52.8	59.9	60.6	54.8	58.3	59.7	53.8	59	NA
29-Nov-18	14:33	57.6	60.2	52.0	58.4	61.1	51.9	60.6	62.7	52.8	57.8	59.1	51.1	59.4	62.3	52.7	58.2	61.6	52.3	59	NA
NM7 – Po Kat Tsai Village																					

Date	Start Time	1st Leq_{5min}	L10	L90	2nd Leq_{5min}	L10	L90	3rd Leq_{5min}	L10	L90	4th Leq_{5min}	L10	L90	5th Leq_{5min}	L10	L90	6th Leq_{5min}	L10	L90	Leq30	façade correction
6-Nov-18	13:13	61.1	62.5	58.5	60.8	62.0	59.0	62.4	64.5	59.5	63.5	67.0	59.0	63.7	66.0	60.0	63.7	67.0	58.0	63	NA
12-Nov-18	13:07	64.2	67.0	56.5	63.5	67.0	56.0	67.1	69.5	56.5	67.0	71.0	56.0	67.0	69.0	56.0	65.1	69.0	56.5	66	NA
23-Nov-18	11:23	65.6	63.7	53.2	60.8	63.2	53.2	59.8	62.7	53.2	60.8	63.7	54.2	61.1	64.2	54.2	63.0	66.2	55.2	62	NA
29-Nov-18	11:42	65.6	72.4	56.4	63.8	70.8	55.8	61.9	68.9	54.9	61.6	67.7	54.5	61.1	65.8	54.9	60.1	64.9	55.9	63	NA
NM8 - Village House, Tong Hang																					
1-Nov-18	10:58	57	59.7	53.1	57.9	60.5	52.2	54.9	57.3	52.6	55.5	58.9	52.4	55.1	56	53.9	56.1	58.3	54.6	56	NA
7-Nov-18	11:22	56.8	58	52	54.3	56.5	50.5	52.9	55	50.5	54	56.5	50.5	55.2	57.5	50.5	54.4	56.5	50.5	55	NA
13-Nov-18	11:18	60	63.5	52	65.8	57.5	52.5	56.6	56	51.5	56.7	59.5	51.5	61.5	64.5	52.5	55.7	57	51	61	NA
19-Nov-18	10:54	60.1	65	40.6	40.7	42.1	40.3	57.8	64.5	41.2	42.2	43.3	40	51.3	56.6	41.7	51.3	63	46.3	55	NA
30-Nov-18	10:57	59.6	63	51	59.5	62.9	52.4	57.3	61.3	50	57.7	62	47.2	59.1	62.2	52	60.4	64.1	50.4	59	NA
NM9 - Village House, Kiu Tau Village																					
1-Nov-18	10:14	63.9	56.7	62.2	63.2	64.6	61.9	64.2	65.7	62.5	64.7	66.6	62.2	65.7	67.2	62.7	64.5	66.3	61.9	66	NA
7-Nov-18	10:27	63.7	66.0	59.0	63.0	66.5	57.5	61.5	63.5	57.0	62.1	64.5	57.0	64.1	66.0	59.0	63.4	66.5	57.0	65	NA
13-Nov-18	10:23	63.1	68.0	54.0	68.2	67.5	54.5	59.8	63.0	53.5	64.4	64.0	54.0	60.0	61.5	53.5	61.0	60.5	53.5	64	NA
19-Nov-18	10:13	52.4	49.7	46.6	50.5	50.4	47.4	56.4	60.5	47.5	50.5	54.8	46.7	47.5	48.9	45.0	47.3	48.8	45.3	55	NA
30-Nov-18	10:13	64.1	66.4	57.6	63.8	65.9	58.7	65.4	68.3	59.2	62.1	65.3	56.0	61.3	63.8	55.4	60.6	63.2	54.7	65	NA
NM10 - Nam Wa Po Village House No. 80																					
1-Nov-18	9:23	57.9	60.0	52.6	59.5	60.2	54.8	59.0	62.0	55.2	57.8	59.3	56.1	56.7	58.0	54.6	56.0	57.8	54.2	58	61
7-Nov-18	9:31	57.1	59.0	52.5	55.5	57.5	51.5	55.7	58.0	51.5	59.1	62.0	52.5	56.2	57.0	52.0	59.4	62.5	51.5	57	60
13-Nov-18	9:34	58.9	60.5	54.5	66.3	64.5	54.5	62.1	64.0	55.0	58.3	60.0	51.0	66.4	68.5	55.0	55.7	57.0	53.5	63	66
19-Nov-18	9:33	52.8	54.6	50.5	52.2	53.6	50.2	53.8	55.2	52.1	54.1	55.9	52.0	53.8	55.0	52.4	53.2	54.7	51.1	53	56
30-Nov-18	9:26	62.1	63.3	60.1	62.0	63.9	53.2	57.3	60.8	51.0	58.7	60.2	56.1	57.2	58.5	55.6	59.9	60.9	58.4	60	63

Water Quality Monitoring Data for Contract 6 and SS C505

Date	2-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:30	0.25	20.3	20.3	7.42	7.4	82.0	82.1	5.6	5.5	7.37	7.4	3	3.0
			20.3		7.42		82.1		5.3		7.37		3	
WM1	10:15	0.20	21	21.0	7.6	7.6	85.5	85.7	9.3	9.2	8.36	8.4	8	7.5
			21		7.62		85.8		9.1		8.36		7	

Date	6-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	11:00	0.25	24	24.0	7.29	7.3	86.8	86.9	5.4	5.6	7.6	7.6	<2	<2
			24		7.3		86.9		5.8		7.6		<2	
WM1	10:50	0.20	24.9	24.9	6.72	6.7	81.4	81.6	14.7	15.3	7.78	7.8	9	9.0
			24.9		6.74		81.8		15.8		7.78		9	

Date	8-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:10	0.30	24.1	24.1	6	6.0	71.5	71.7	6.6	6.7	7.41	7.4	4	4.5
			24.1		6.04		71.9		6.7		7.41		5	
WM1	10:00	0.20	25	25.0	6.66	6.6	80.7	80.6	14.4	14.9	7.92	7.9	14	14.0
			25		6.63		80.4		15.4		7.92		14	

Date	10-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:15	0.30	23.2	23.2	5.94	6.0	69.4	70.2	13.1	13.2	7.5	7.5	4	5.0
			23.2		6.06		71.0		13.2		7.5		6	
WM1	9:05	0.20	23.8	23.8	6.58	6.6	77.8	77.9	18.1	17.9	7.94	7.9	15	14.5
			23.8		6.59		77.9		17.6		7.94		14	

Date	13-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:50	0.30	22.4	22.4	6.03	6.2	69.5	71.0	6.5	6.4	7.4	7.4	2	2.0
			22.4		6.33		72.4		6.3		7.4		2	
WM1	9:40	0.20	23.7	23.7	6.9	6.9	81.7	81.4	19.8	19.2	7.77	7.8	12	12.5
			23.7		6.86		81.1		18.5		7.77		13	

Date	15-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:10	0.30	21.5	21.5	7.81	7.8	91.0	91.1	5.3	5.3	7.2	7.2	<2	3.0
			21.5		7.82		91.1		5.3		7.2		3	
WM1	10:00	0.20	22.5	22.5	8.48	8.5	100.2	100.2	20.8	21.1	6.9	6.9	15	15.0
			22.5		8.44		100.1		21.3		6.9		15	

Date	17-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:40	0.30	23.6	23.6	6.99	7.0	82.5	82.6	7.0	7.2	6.9	6.9	4	4.5
			23.6		7		82.6		7.5		6.9		5	
WM1	9:30	0.20	24.1	24.1	8.03	8.0	95.6	95.4	17.0	17.0	7	7.0	13	13.5
			24.1		8.01		95.1		16.9		7		14	

Date	20-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:40	0.30	22.3	22.3	7.22	7.2	83.0	83.2	7.2	7.3	7.1	7.1	2	2.0
			22.3		7.24		83.3		7.5		7.1		<2	
WM1	9:30	0.20	22.9	22.9	8	8.0	93.1	93.2	20.2	20.6	7.1	7.1	16	16.5
			22.9		8.02		93.2		20.9		7.1		17	

Date	22-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	14:40	0.30	21.4	21.4	10.28	10.3	115.7	115.8	10.8	10.8	6.9	6.9	8	8.5
			21.4		10.29		115.9		10.7		6.9		9	
WM1	14:30	0.20	22.9	22.9	8.6	8.6	100.1	100.2	33.0	30.0	6.9	6.9	25	24.5
			22.9		8.61		100.2		26.9		6.9		24	

Date	24-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	9:50	0.30	20.8	20.8	7.88	7.9	88.0	88.2	10.5	10.2	7.1	7.1	<2	2.0
			20.8		7.89		88.3		9.9		7.1		2	
WM1	9:40	0.18	21.4	21.4	7.57	7.6	85.5	85.3	28.8	29.4	7.1	7.1	20	21.0
			21.4		7.55		85.1		30.0		7.1		22	

Date	26-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:35	0.35	20.8	20.8	8.33	8.4	92.9	93.2	17.4	17.4	7.2	7.2	10	10.0
			20.8		8.37		93.5		17.3		7.2		10	
WM1	10:15	0.20	20.3	20.3	8.36	8.4	92.4	92.6	30.1	30.4	7.1	7.1	20	21.0
			20.3		8.38		92.8		30.6		7.1		22	

Date	29-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM1-C	10:05	0.30	20.2	20.2	8.48	8.5	93.1	93.4	4.5	4.4	6.9	6.9	2	2.0
			20.2		8.5		93.6		4.4		6.9		2	
WM1	10:00	0.20	21.1	21.1	8.2	8.2	92.2	92.4	18.1	17.7	6.9	6.9	13	13.5
			21.1		8.22		92.5		17.3		6.9		14	

Water Quality Monitoring Data for Contract 2 and 3

Date	2-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:55	0.15	22.3	22.3	7.42	7.5	85.4	86.0	3.6	3.5	7.65	7.7	2	2.0
			22.3		7.51		86.5		3.4		7.65		<2	
WM4-CB	12:10	0.22	24	24.0	6.34	6.4	74.6	74.9	6.0	6.0	7.11	7.1	7	7.5
			24		6.39		75.2		5.9		7.11		8	
WM4	11:50	0.20	22.5	22.5	6.79	6.8	78.4	78.3	7.3	7.5	7.71	7.7	9	8.5
			22.5		6.77		78.1		7.8		7.71		8	

Date	6-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	12:40	0.15	26.8	26.8	6.67	6.7	83.4	83.6	3.5	3.3	7.69	7.7	<2	<2
			26.8		6.67		83.7		3.2		7.69		<2	
WM4-CB	12:50	0.23	28.1	28.1	5.91	5.9	75.9	76.0	4.8	5.0	7.24	7.2	4	4.0
			28.1		5.91		76.0		5.3		7.24		4	
WM4	12:35	0.20	26.7	26.7	6.46	6.4	80.8	79.7	7.6	7.0	7.74	7.7	3	3.5
			26.7		6.27		78.5		6.4		7.74		4	

Date	8-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:40	0.15	25.5	25.5	7.2	7.2	88.0	87.8	3.2	3.0	7.61	7.6	4	4.0
			25.5		7.18		87.6		2.8		7.61		4	
WM4-CB	11:50	0.25	26.4	26.4	5.9	5.9	73.3	73.4	5.4	5.4	7.2	7.2	5	5.5
			26.4		5.91		73.4		5.5		7.2		6	
WM4	11:30	0.20	25.8	25.8	6.05	6.1	74.3	74.4	8.8	9.2	7.67	7.7	10	10.5
			25.8		6.06		74.5		9.6		7.67		11	

Date	10-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	10:55	0.15	23.5	23.5	7.27	7.3	85.8	85.9	18.1	18.1	7.67	7.7	3	3.0
			23.5		7.29		85.9		18.0		7.67		3	
WM4-CB	11:05	0.25	24.4	24.4	5.03	5.1	60.3	60.5	14.6	14.6	7.23	7.2	3	3.5
			24.4		5.07		60.7		14.6		7.23		4	
WM4	10:45	0.20	24	24.0	6.68	6.7	79.4	79.5	34.2	34.1	7.54	7.5	27	28.0
			24		6.69		79.5		33.9		7.54		29	

Date	13-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:15	0.15	24.8	24.8	7.7	7.6	93.0	91.7	4.4	4.4	7.92	7.9	5	5.5
			24.8		7.46		90.3		4.4		7.92		6	
WM4-CB	11:30	0.25	26	26.0	5.72	5.7	70.7	70.6	7.9	7.6	7.65	7.7	8	8.0

			26		5.74		70.5		7.3		7.65		8	
WM4	11:05	0.20	25.3	25.3	6.42	6.4	78.3	78.6	11.4	11.8	7.76	7.8	14	13.0
			25.3		6.46		78.9		12.2		7.76		12	

Date	**15-Nov-18**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:25	0.15	23.5	23.5	8.27	8.3	97.2	97.3	7.7	7.7	7.3	7.3	3	3.5
			23.5		8.26		97.3		7.7		7.3		4	
WM4-CB	11:35	0.25	24.2	24.2	6.52	6.5	77.6	77.8	9.8	9.6	7	7.0	13	12.5
			24.2		6.54		77.9		9.5		7		12	
WM4	11:15	0.20	23.7	23.7	7.3	7.3	86.3	86.5	10.0	10.0	7.3	7.3	5	5.5
			23.7		7.32		86.6		10.0		7.3		6	

Date	**17-Nov-18**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:00	0.15	23.9	23.9	7.98	8.0	94.2	94.5	4.5	4.2	7.1	7.1	2	2.0
			23.9		8		94.8		3.8		7.1		<2	
WM4-CB	11:05	0.25	24.5	24.5	5.2	5.2	62.2	62.5	11.4	10.9	7	7.0	12	11.5
			24.5		5.22		62.8		10.3		7		11	
WM4	10:50	0.20	24.3	24.3	6.65	6.7	79.2	79.4	10.9	10.2	7.1	7.1	6	5.5
			24.3		6.67		79.6		9.6		7.1		5	

Date	**20-Nov-18**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:05	0.15	23.4	23.4	8.36	8.4	98.0	98.1	5.9	6.2	7.3	7.3	<2	<2
			23.4		8.37		98.1		6.4		7.3		<2	
WM4-CB	11:20	0.23	24.2	24.2	6.06	6.1	72.2	72.3	7.7	7.6	7.1	7.1	5	5.5
			24.2		6.08		72.4		7.6		7.1		6	
WM4	11:00	0.20	24	24.0	7.25	7.3	86.0	86.2	18.1	18.2	7.3	7.3	16	16.0
			24		7.26		86.3		18.2		7.3		16	

Date	**22-Nov-18**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	10:20	0.15	21.8	21.8	8.75	8.7	99.8	99.8	4.1	4.0	8.06	8.1	2	2.0
			21.8		8.74		99.7		3.9		8.06		2	
WM4-CB	10:45	0.23	21.9	21.9	7.88	7.9	90.6	90.7	6.1	6.4	7.94	7.9	12	13.0
			21.9		7.88		90.7		6.7		7.93		14	
WM4	10:00	0.20	21.6	21.6	21.6	21.6	96.4	96.5	9.8	10.1	7.78	7.8	16	16.0
			21.6		21.6		96.5		10.3		7.77		16	

Date	**24-Nov-18**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	11:20	0.15	22.7	22.7	8.92	8.9	103.5	103.8	3.7	3.3	7.1	7.1	<2	<2

			22.7		8.94		104.1		2.9		7.1		<2	
WM4-CB	11:30	0.25	24.1	24.1	6.6	6.6	78.5	78.8	7.2	7.2	7.1	7.1	5	5.0
			24.1		6.63		79.0		7.2		7.1		5	
WM4	11:15	0.20	23.2	23.2	7.79	7.8	90.9	91.1	11.5	11.6	7.2	7.2	17	16.0
			23.2		7.81		91.3		11.7		7.2		15	

Date	**26-Nov-18**													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-CA	14:32	0.15	22.4	22.4	7.3	7.3	86.4	85.8	3.1	3.3	7	7.0	2	2.0
			22.4		7.24		85.2		3.6		7		<2	
WM4-CB	14:07	0.26	22.8	22.8	7.89	7.9	90.8	91.0	10.7	10.5	6.9	6.9	9	9.5
			22.8		7.91		91.2		10.3		6.9		10	
WM4	14:54	0.22	22.6	22.6	8.23	8.3	95.2	94.7	33.8	34.0	6.9	6.9	39	38.0
			22.6		8.3		94.2		34.1		6.9		37	

Water Quality Monitoring Data for Contract 6

Date	**2-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:55	0.25	20.9	20.9	7.4	7.4	82.8	82.7	13.6	14.1	7.35	7.4	7	6.5
			20.9		7.38		82.6		14.5		7.35		6	
WM2A	10:45	0.20	20.9	20.9	7.18	7.2	80.5	80.3	120.0	**120.0**	7.41	7.4	95	**95.5**
			20.9		7.14		80.1		120.0		7.41		96	

Date	**3-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.25							12.2	11.9			6	6.0
									11.7				6	
WM2A	10:30	0.20							14.7	14.8			13	13.0
									14.8				13	

Date	**5-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:35	0.25							9.3	9.2			7	7.0
									9.2				7	
WM2A	11:25	0.20							23.6	22.8			14	14.0
									22.0				14	

Date	**6-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:30	0.25	23.4	23.4	6.94	6.9	81.6	81.6	11.6	11.4	7.37	7.4	2	2.0
			23.4		6.92		81.5		11.2		7.37		<2	
WM2A	10:40	0.20	24.4	24.4	6.95	7.0	83.3	83.4	20.4	19.7	8.28	8.3	13	13.0
			24.4		6.96		83.4		18.9		8.28		13	

Date	**8-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:30	0.25	23.6	23.6	6.43	6.4	75.8	75.7	13.5	14.5	7.35	7.4	6	6.0
			23.6		6.41		75.6		15.5		7.35		6	
WM2A	10:20	0.20	24.2	24.2	6.42	6.4	76.6	76.7	10.9	10.6	7.43	7.4	9	9.0
			24.2		6.43		76.7		10.3		7.43		9	

Date	**10-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:45	0.25	22.8	22.8	6.95	7.0	80.7	80.8	14.2	14.5	7.21	7.2	5	5.0
			22.8		6.97		80.8		14.8		7.21		5	
WM2A	9:30	0.20	23.2	23.2	6.56	6.6	76.8	77.3	7.6	7.7	7.51	7.5	5	5.5
			23.2		6.64		77.8		7.7		7.51		6	

Date	**13-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:20	0.25	22.5	22.5	7.16	7.1	82.6	81.8	20.9	19.7	7.48	7.5	10	9.5
			22.5		7.02		80.9		18.4		7.48		9	
WM2A	10:05	0.20	23.1	23.1	6.71	6.7	78.3	78.4	16.6	16.2	7.53	7.5	14	14.5
			23.1		6.73		78.4		15.8		7.53		15	

Date	**15-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:35	0.25	22.7	22.7	7.7	7.7	89.2	89.3	17.4	17.1	7.40	7.4	7	7.0
			22.7		7.72		89.4		16.7		7.40		7	
WM2A	10:20	0.20	21.5	21.5	7.98	8.0	92.9	93.1	17.5	17.0	7.20	7.2	11	11.0
			21.5		7.99		93.3		16.5		7.20		11	

Date	**17-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:05	0.25	23.4	23.4	7.34	7.3	86.1	86.3	21.4	21.5	7.00	7.0	18	15.0
			23.4		7.35		86.4		21.6		7.00		12	
WM2A	9:55	0.20	23.3	23.3	7.79	8.0	90.7	91.0	9.5	9.9	7.00	7.0	7	6.5
			23.3		8.15		91.2		10.3		7.00		6	

Date	**20-Nov-18**															
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:05	0.23	22.3	22.3	7.7	7.7	88.0	88.1	15.2	15.0	7.10	7.1	4	4.5
			22.3		7.71		88.1		14.8		7.10		5	
WM2A	9:55	0.20	22.6	22.6	7.8	7.8	90.2	90.4	7.1	7.1	7.10	7.1	3	3.0
			22.6		7.82		90.5		7.1		7.10		3	

Date	**22-Nov-18**

Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	15:00	0.23	21.4	21.4	7.76	7.8	87.4	87.6	22.4	22.7	7.00	7.0	7	7.0
			21.4		7.79		87.7		22.9		7.00		7	
WM2A	14:50	0.20	22.2	22.2	8.15	8.2	93.5	93.7	13.9	13.7	7.00	7.0	9	8.5
			22.2		8.17		93.9		13.5		7.00		8	

Date	**24-Nov-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:15	0.23	21.1	21.1	7.89	7.9	88.1	88.4	26.4	26.3	7.10	7.1	25	26.0
			21.1		7.92		88.6		26.2		7.10		27	
WM2A	10:00	0.20	21.1	21.1	8.32	8.3	93.5	93.7	8.6	8.4	7.10	7.1	4	4.0
			21.1		8.34		93.9		8.2		7.10		4	

Date	**26-Nov-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:45	0.25	20.3	20.3	8.2	8.3	90.3	90.6	16.8	17.1	7.10	7.1	9	8.5
			20.3		8.4		90.9		17.4		7.10		8	
WM2A	12:30	0.23	20.2	20.2	8.17	8.2	90.2	90.5	303.0	**304.0**	7.10	7.1	196	**201.0**
			20.2		8.21		90.7		305.0		7.10		206	

Date	**27-Nov-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	12:30	0.23							7.3	7.8			11	11.0
									8.3				11	
WM2A	12:40	0.20							24.0	24.5			29	**29.0**
									24.9				29	

Date	**28-Nov-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:40	0.25							36.3	36.8			16	16.0
									37.2				16	
WM2A	11:30	0.20							over range	**overrange**			812	**812.0**
													812	

Date	**29-Nov-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:55	0.25	21.1	21.1	7.67	7.7	86.1	86.5	40.9	40.9	7.00	7.0	23	23.5

			21.1		7.7		86.8		40.9		7.00		24	
WM2A	10:20	0.20	21.2	21.2	8.14	8.2	91.6	91.9	35.7	35.9	6.90	6.9	28	28.0
			21.2		8.17		92.1		36.0		6.90		28	

Date	**30-Nov-18**													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:30	0.25							23.8	24.4			20	20.0
									24.9				20	
WM2A	11:20	0.20							24.9	25.2			22	22.0
									25.4				22	

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

	Action Level
	Limit Level

Water Quality Monitoring Data for Contract 2 and 6

Date	1-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:00	0.15							7.8	7.5			6	6.0
									7.3				6	
WM3	11:10	0.20							10.2	11.0			11	11.0
									11.8				11	

Date	2-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:05	0.15	24.6	24.6	6.54	6.5	78.7	78.8	4.1	4.4	9.64	9.6	5	4.5
			24.6		6.55		78.9		4.6		9.64		4	
WM3	11:20	0.20	24.5	24.5	7.36	7.2	88.1	86.6	13.2	13.3	8.34	8.3	10	10.0
			24.5		7.09		85.0		13.4		8.34		10	

Date	6-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:30	0.15	27	27.0	6.38	6.4	80.1	80.1	2.2	2.2	10.06	10.1	<2	<2
			27		6.37		80.0		2.2		10.06		<2	
WM3	11:40	0.20	25	25.0	6.4	6.4	77.7	77.5	5.3	5.6	8.7	8.7	4	4.0
			25		6.39		77.3		5.8		8.7		4	

Date	8-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:00	0.15	27	27.0	6.73	6.7	84.6	84.4	4.6	4.6	9.77	9.8	3	3.5
			27		6.71		84.1		4.6		9.77		4	
WM3	11:15	0.20	25.3	25.3	6.48	6.5	79.1	79.2	3.2	3.0	8.23	8.2	4	3.5
			25.3		6.49		79.2		2.9		8.23		3	

Date	10-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:05	0.20	25.6	25.6	6.51	6.5	79.6	80.0	35.6	34.8	9.86	9.9	40	38.5
			25.6		6.56		80.4		33.9		9.86		37	
WM3	10:15	0.25	23.9	23.9	6.59	6.6	78.3	78.4	overrange	**overrange**	8.72	8.7	3120	**3130.0**
			23.9		6.6		78.5		overrange		8.72		3140	

Date	12-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:30	0.15							4.2	4.5			4	4.0
									4.8				4	
WM3	11:40	0.20							13.3	13.1			12	12.0
									12.9				12	

Date	13-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM4-C	10:35	0.17	25.8	25.8	6.43	6.4	79.0	79.1	45.1	45.9	9.78	9.8	45	45.5
			25.8		6.43		79.1		46.7		9.78		46	
WM4	10:45	0.20	24.5	24.5	6.5	6.5	78.2	78.4	11.1	11.1	8.5	8.5	9	8.0
			24.5		6.49		78.6		11.1		8.5		7	

Date	15-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:50	0.15	24.8	24.8	7.65	7.7	92.2	92.3	21.2	21.6	8.5	8.5	18	18.0
			24.8		7.67		92.4		21.9		8.5		18	
WM3	11:00	0.20	23.7	23.7	7.66	7.7	90.6	90.8	24.1	24.3	7.8	7.8	10	10.5
			23.7		7.68		91.0		24.5		7.8		11	

Date	17-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:20	0.15	26	26.0	7.1	7.1	87.5	87.9	7.3	7.1	8.3	8.3	10	10.0
			26		7.15		88.2		7.0		8.3		10	
WM3	10:30	0.20	24.2	24.2	7.34	7.4	87.4	87.7	99.8	**99.1**	7.5	7.5	80	**79.0**
			24.2		7.37		87.9		98.3		7.5		78	

Date	19-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:30	0.15							2.3	2.4			3	3.0
									2.5				3	
WM3	11:40	0.20							3.2	2.9			3	3.0
									2.6				3	

Date	20-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	10:25	0.15	25.4	25.4	7.63	7.6	92.9	93.0	3.8	3.8	8.5	8.5	<2	2.0
			25.4		7.65		93.0		3.8		8.5		2	
WM3	10:35	0.20	23.6	23.6	7.81	7.8	92.1	92.2	6.6	6.7	7.6	7.6	4	4.0
			23.6		7.82		92.2		6.9		7.6		4	

Date	22-Nov-18															
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	15:15	0.15	25.5	25.5	7.54	7.6	92.2	92.5	147.0	142.5	9	9.0	318	312.0
			25.5		7.57		92.7		138.0		9		306	
WM3	15:25	0.20	23.4	23.4	7.55	7.6	88.3	88.5	61.8	59.7	7.8	7.8	52	52.5
			23.4		7.57		88.7		57.6		7.8		53	

Date	24-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM10-C	10:35	0.15	25.5	25.5	7.83	7.8	95.6	95.8	23.8	24.4	9	9.0	34	34.5
			25.5		7.85		96.0		25.0		9		35	
WM10	10:50	0.20	24.2	24.2	8.09	8.1	96.3	96.5	26.8	26.9	7.5	7.5	33	34.0
			24.2		8.1		96.6		26.9		7.5		35	

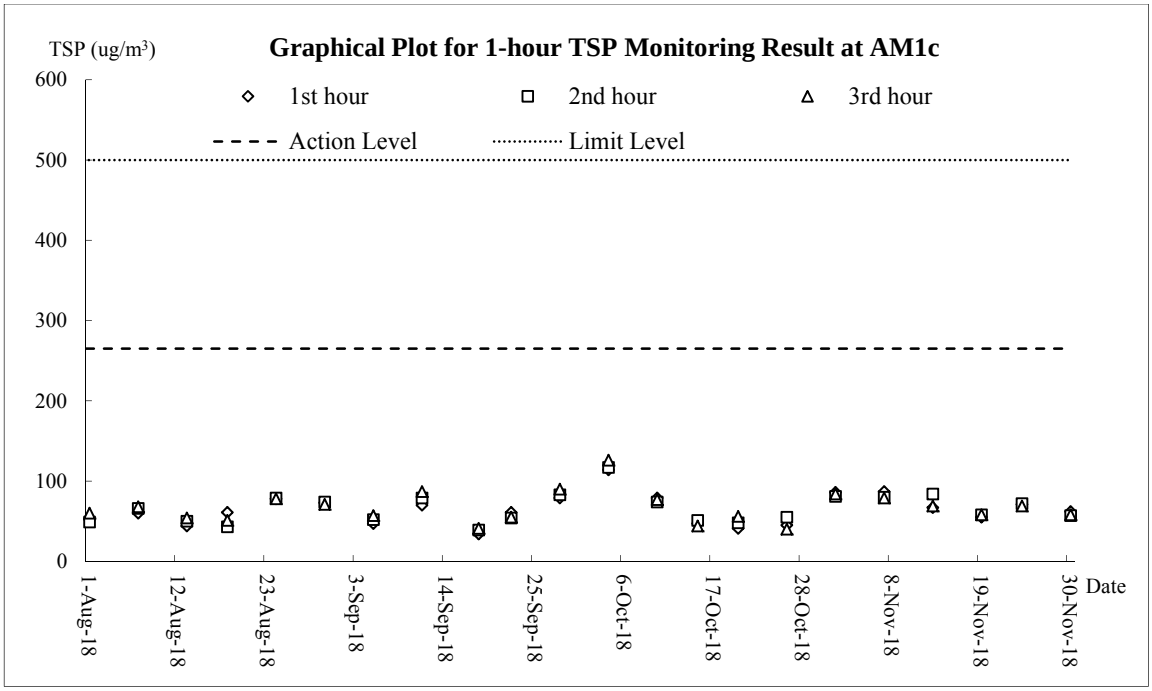
Date	26-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM11-C	13:00	0.18	24.1	24.1	7.9	7.9	93.9	94.1	7.3	8.3	7.9	7.9	9	9.0
			24.1		7.92		94.3		9.4		7.9		9	
WM11	13:15	0.20	21.6	21.6	8.18	8.2	92.6	92.8	13.1	13.3	7.5	7.5	12	12.5
			21.6		8.2		93.0		13.4		7.5		13	

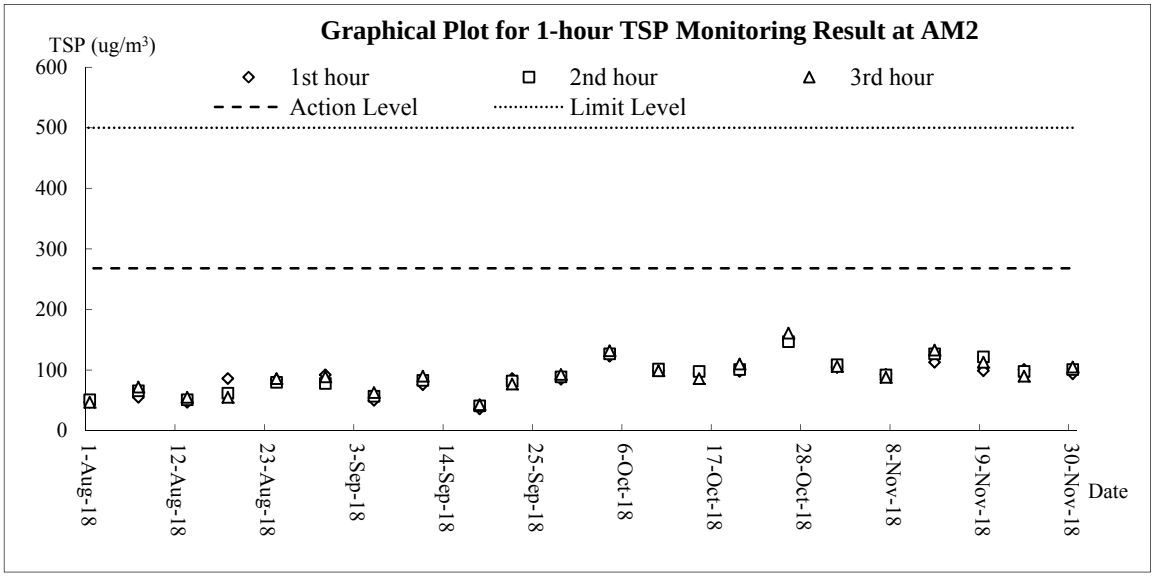
Date	29-Nov-18													
Location	**Time**	**Depth (m)**	**Temp (oC)**		**DO (mg/L)**		**DO (%)**		**Turbidity (NTU)**		**pH**		**SS(mg/L)**	
WM3-C	11:20	0.15	25	25.0	7.58	7.7	95.3	95.5	10.2	8.8	7.2	7.2	7	7.0
			25		7.9		95.7		7.5		7.2		7	
WM3	11:30	0.20	22.1	22.1	7.85	7.9	89.8	90.1	13.1	13.1	7.1	7.1	12	12.5
			22.1		7.88		90.3		13.0		7.1		13	

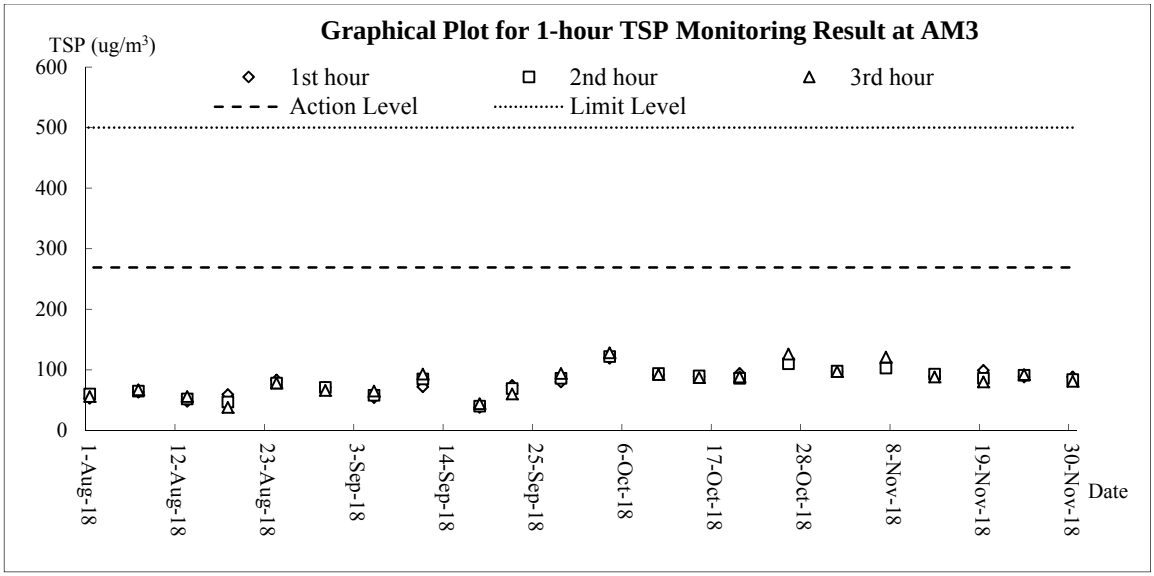
Appendix J

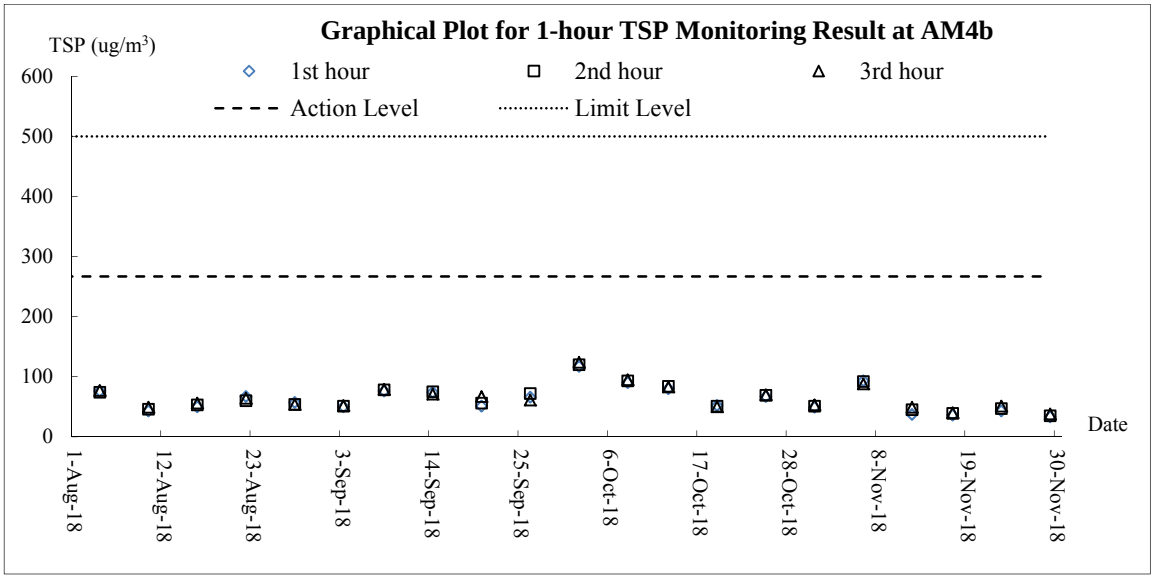
Graphical Plots for Monitoring Result

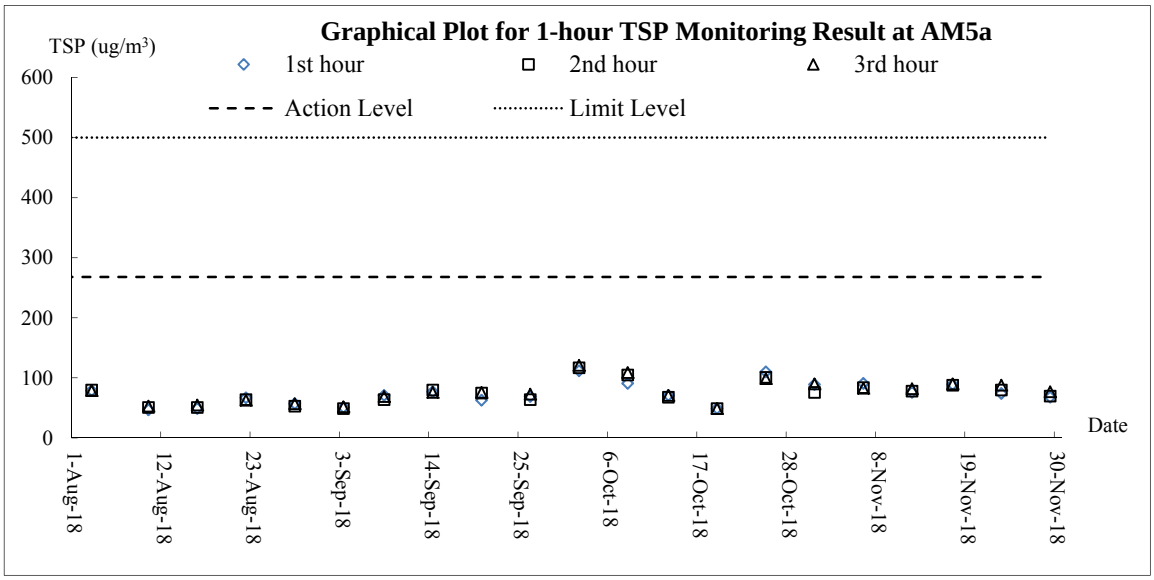
Air Quality – 1-hour TSP

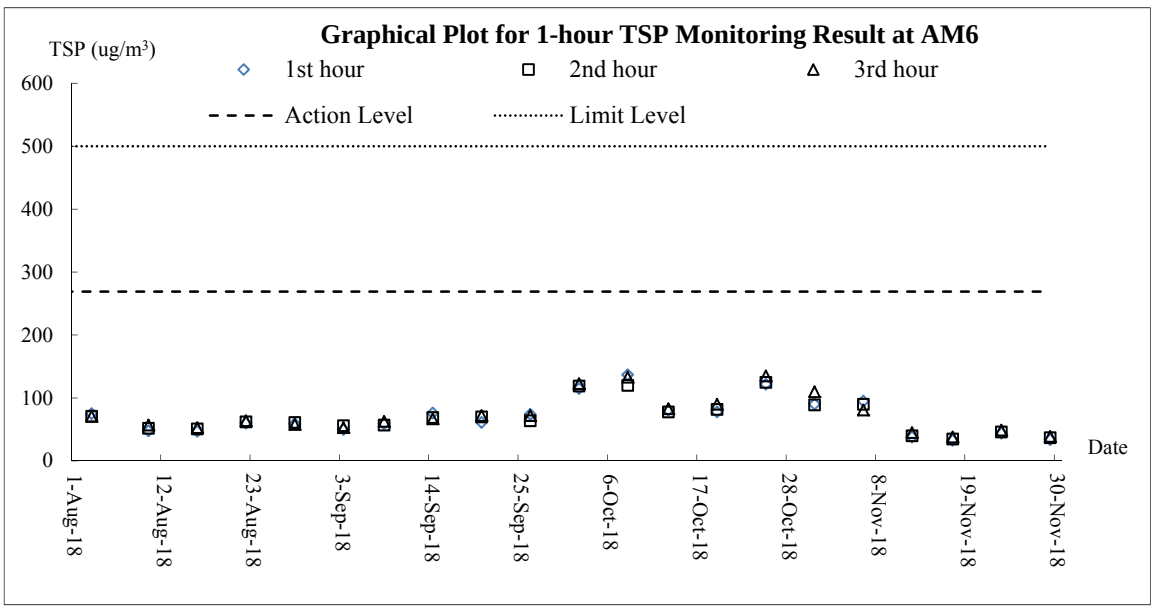


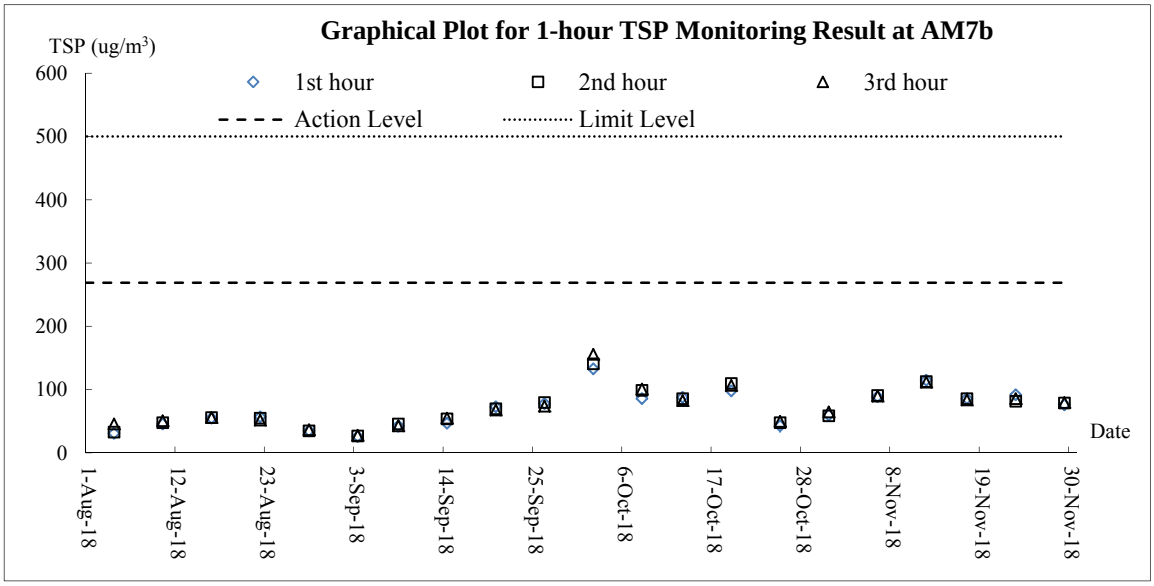


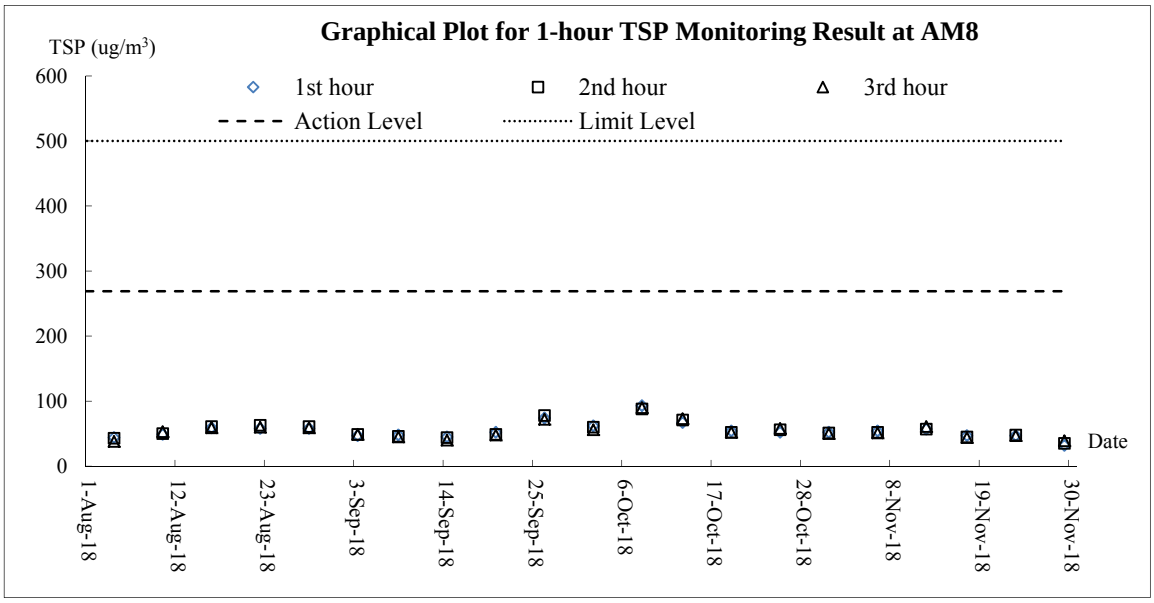


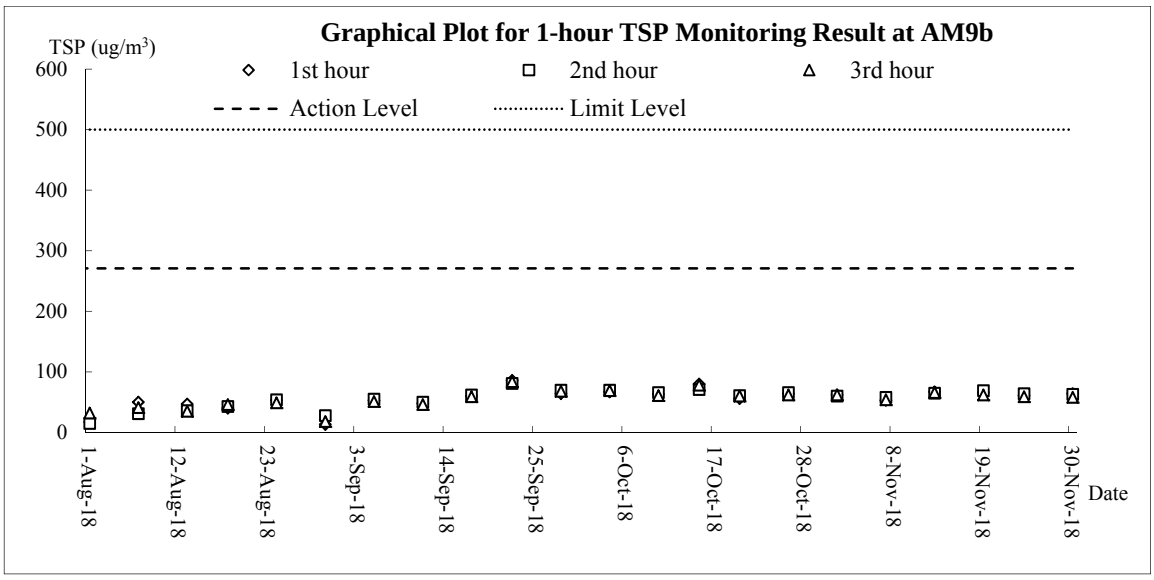

Graphical Plot for 1-hour TSP Monitoring Result at AM4b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18


Graphical Plot for 1-hour TSP Monitoring Result at AM5a
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

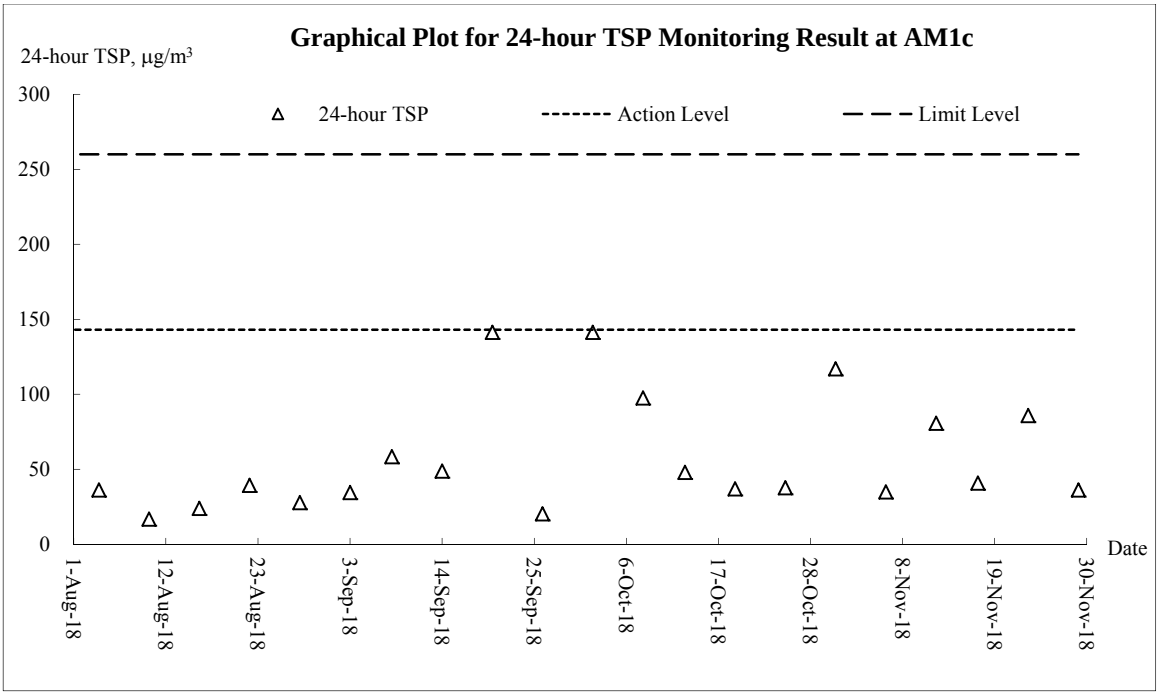

Graphical Plot for 1-hour TSP Monitoring Result at AM6
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

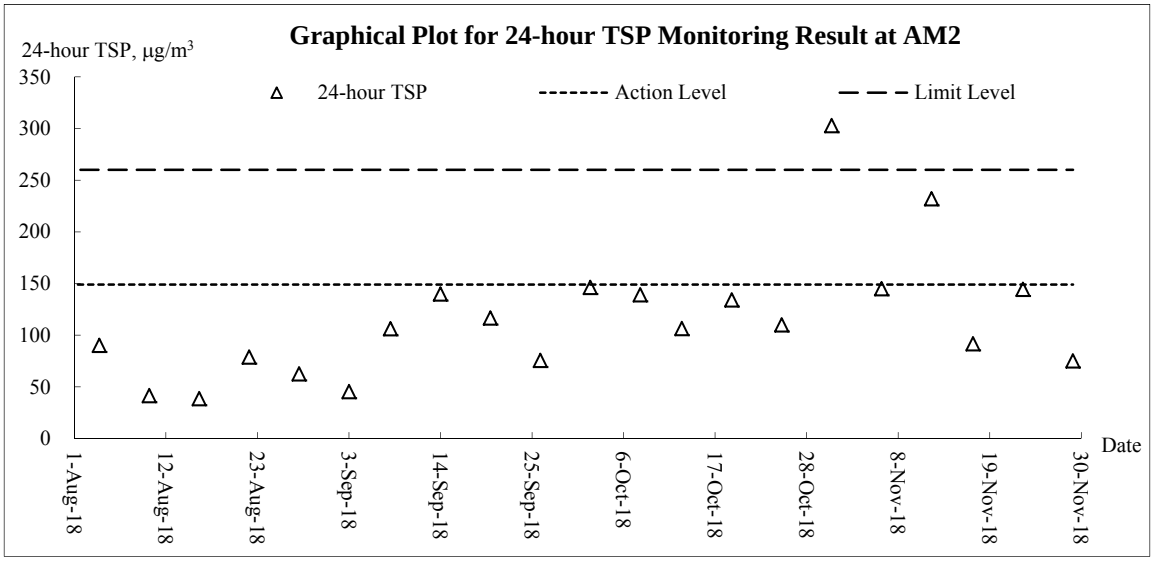

Graphical Plot for 1-hour TSP Monitoring Result at AM7b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

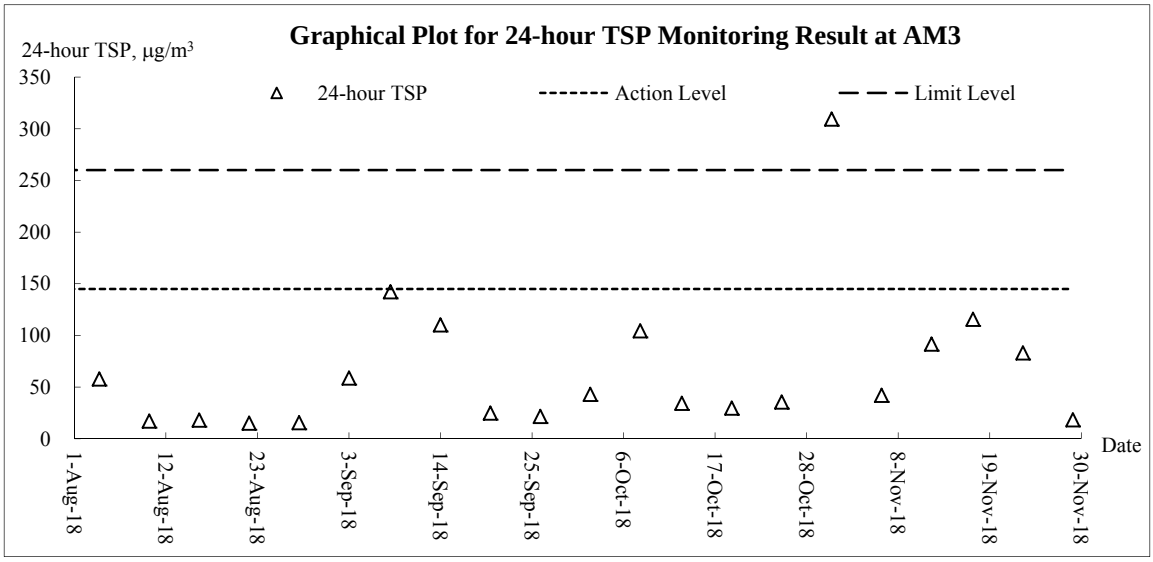

Graphical Plot for 1-hour TSP Monitoring Result at AM8
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

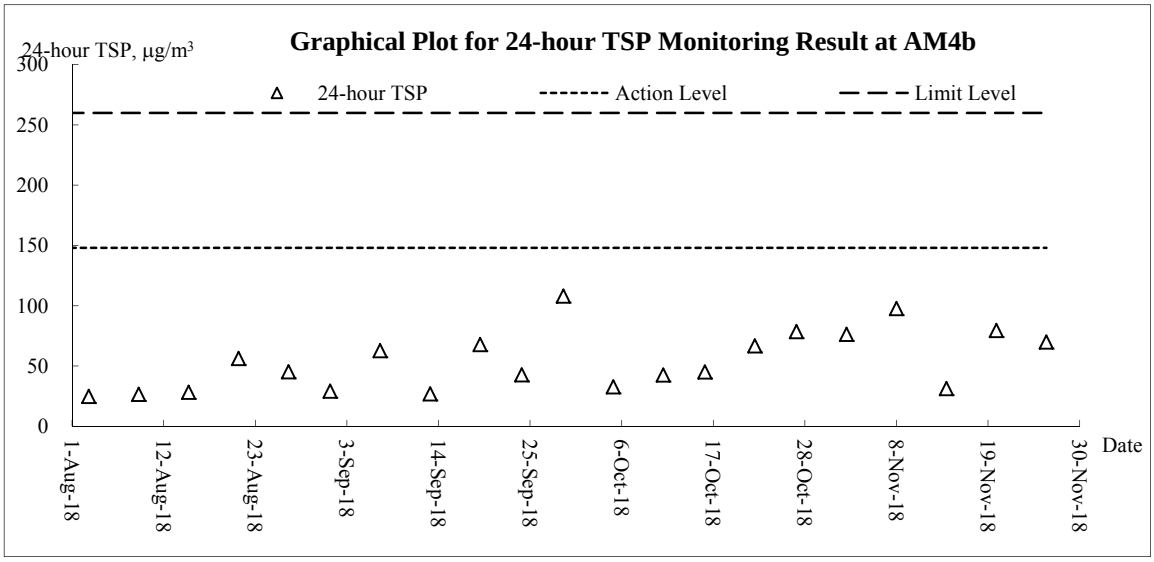

Graphical Plot for 1-hour TSP Monitoring Result at AM9b
TSP (ug/m3)
1st hour
2nd hour
3rd hour
Action Level
Limit Level
600
500
400
300
200
100
0
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

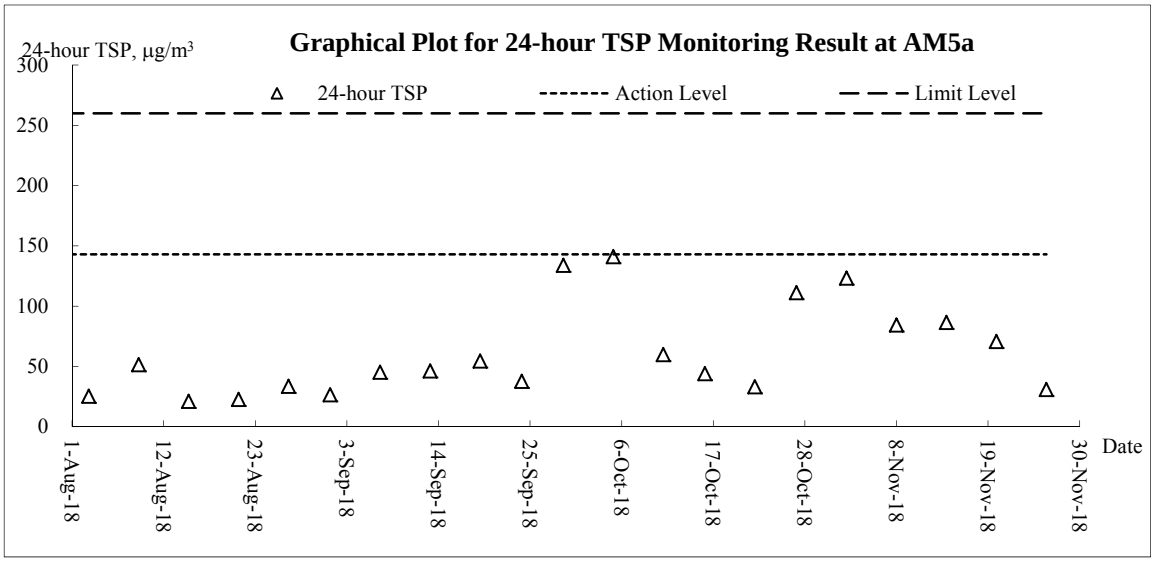
Air Quality – 24-hour TSP

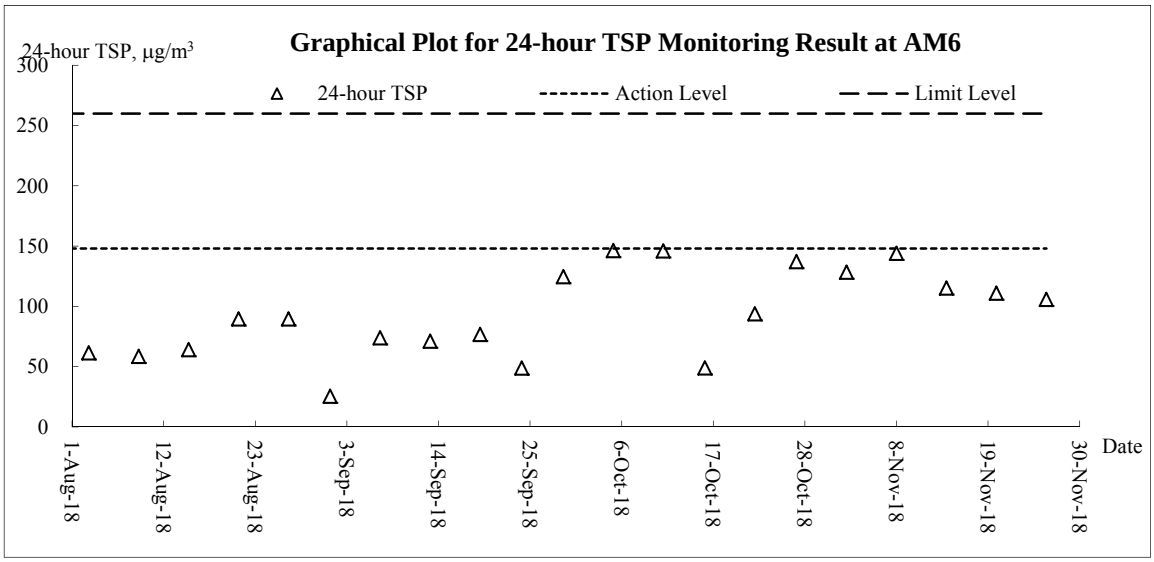


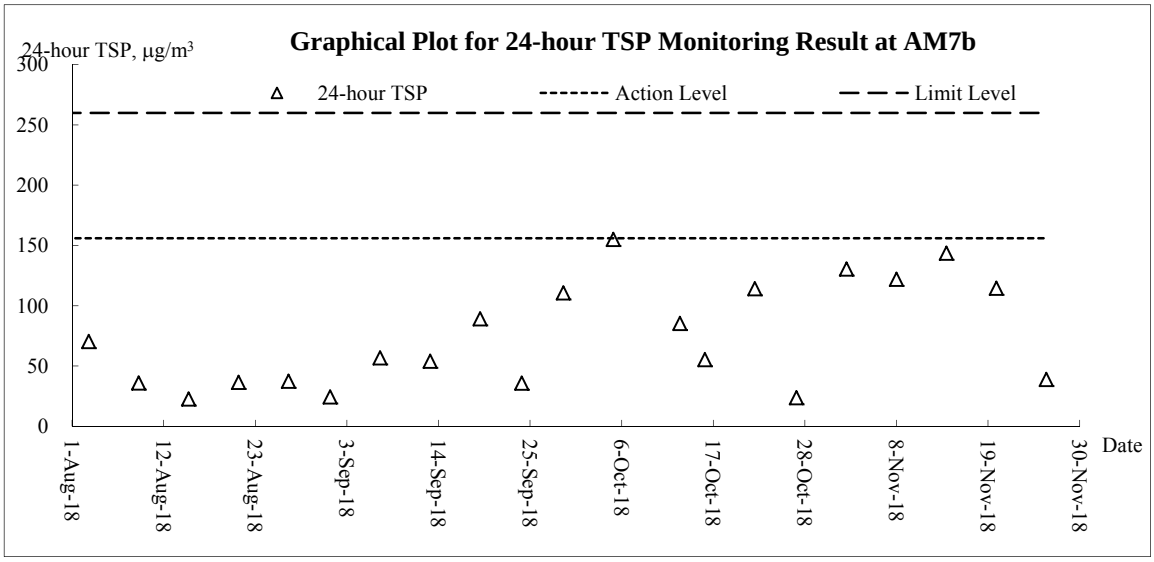


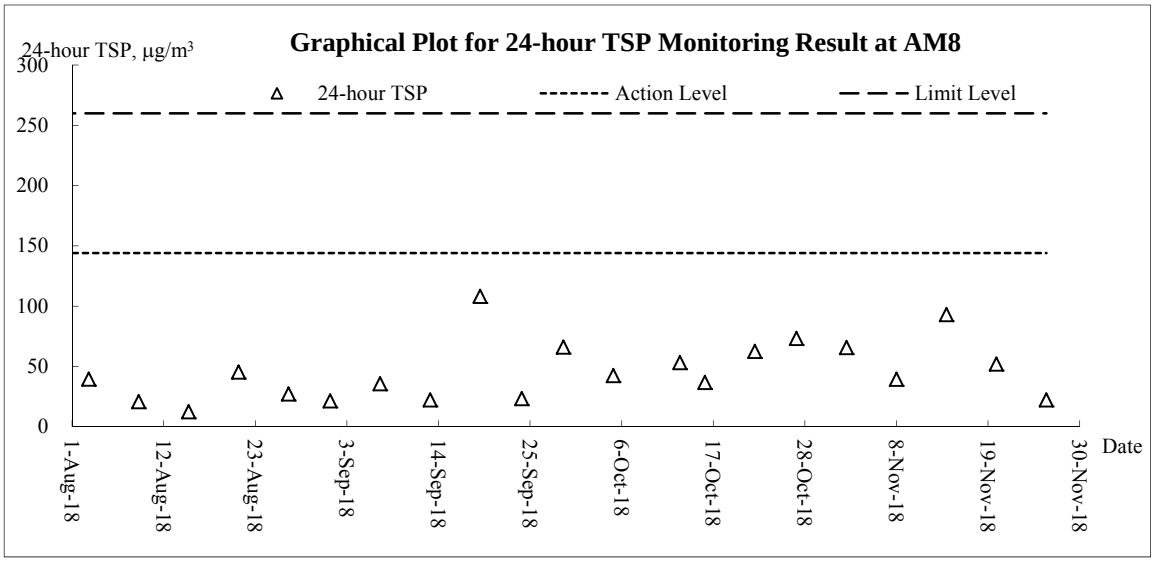


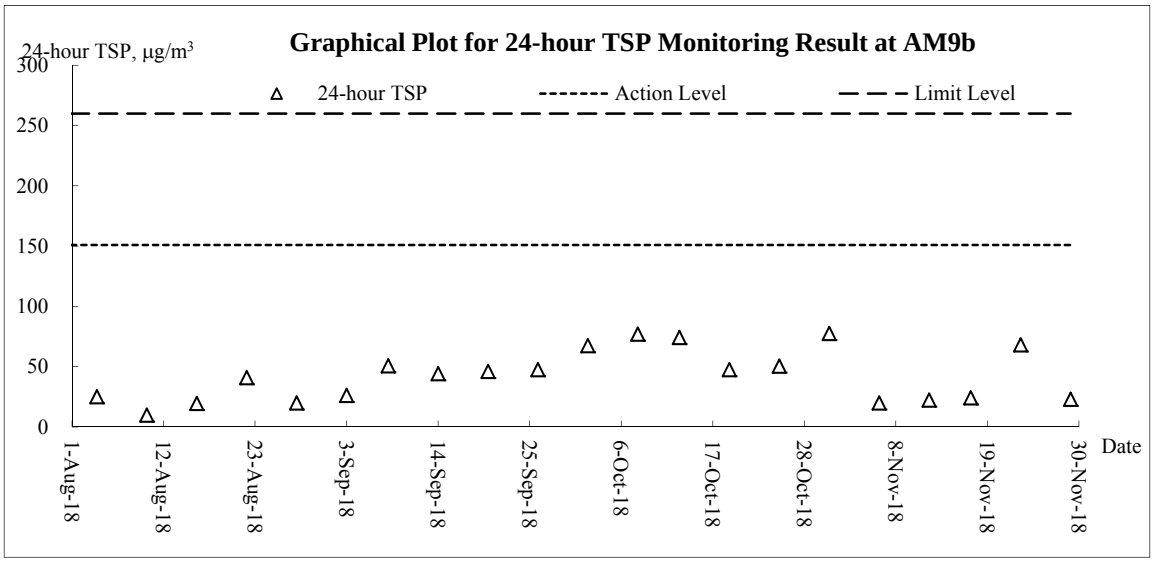

Graphical Plot for 24-hour TSP Monitoring Result at AM4b
24-hour TSP, µg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18
Date


Graphical Plot for 24-hour TSP Monitoring Result at AM5a
24-hour TSP, µg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18
Date

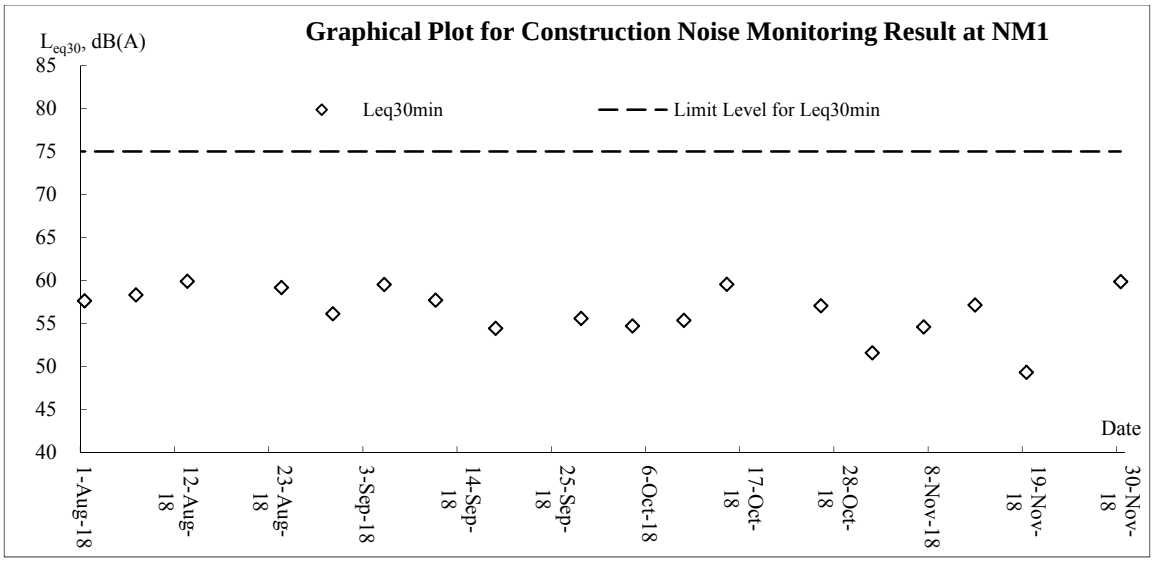

Graphical Plot for 24-hour TSP Monitoring Result at AM6
24-hour TSP, µg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18
Date

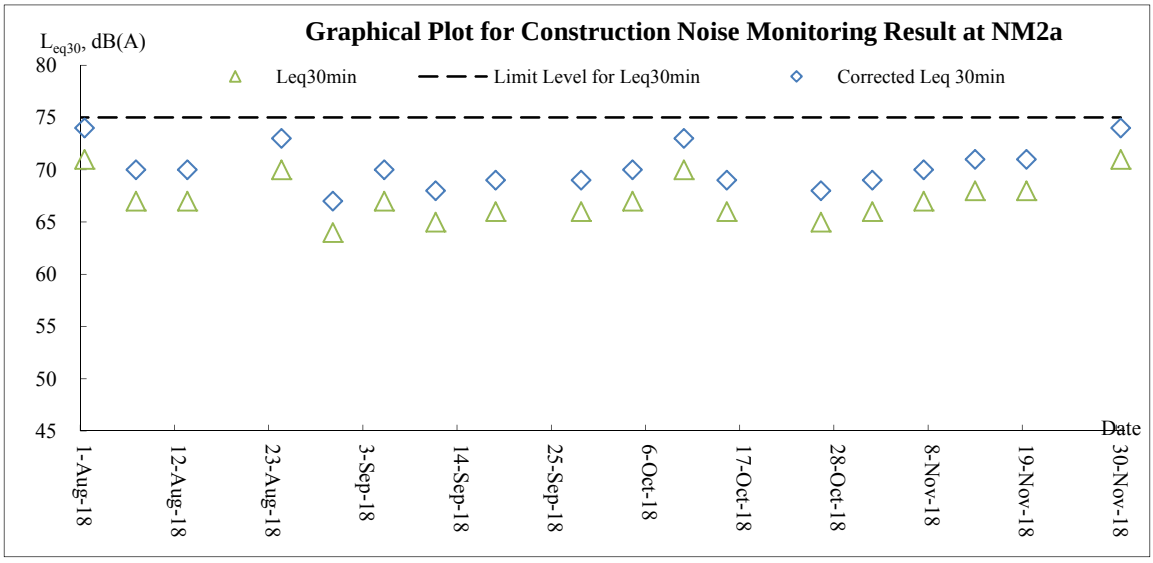

Graphical Plot for 24-hour TSP Monitoring Result at AM7b
24-hour TSP, µg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18
Date

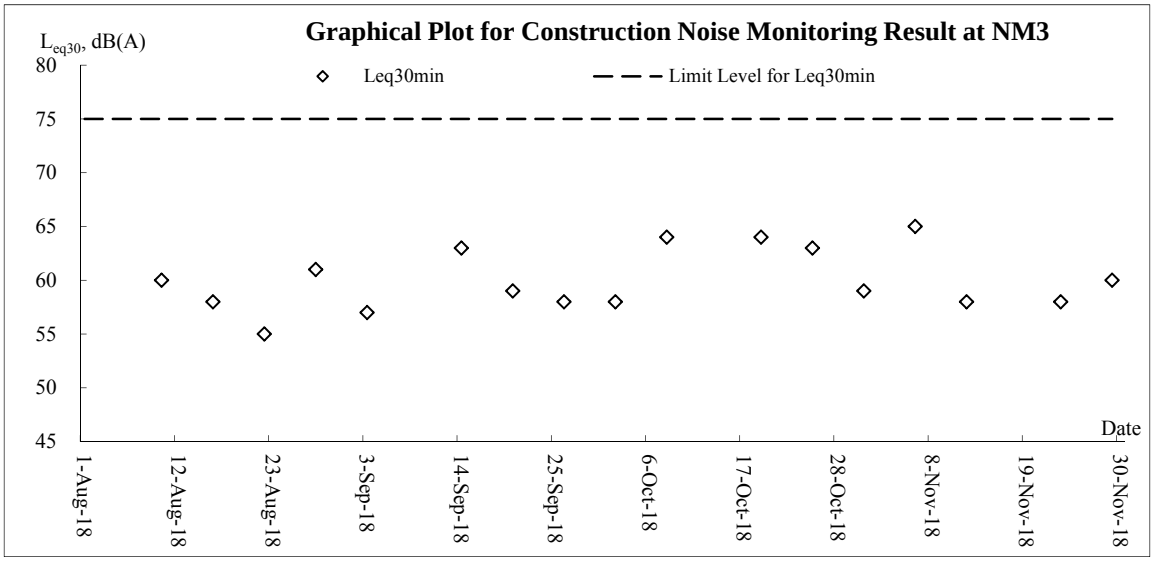

Graphical Plot for 24-hour TSP Monitoring Result at AM8
24-hour TSP, µg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18
Date

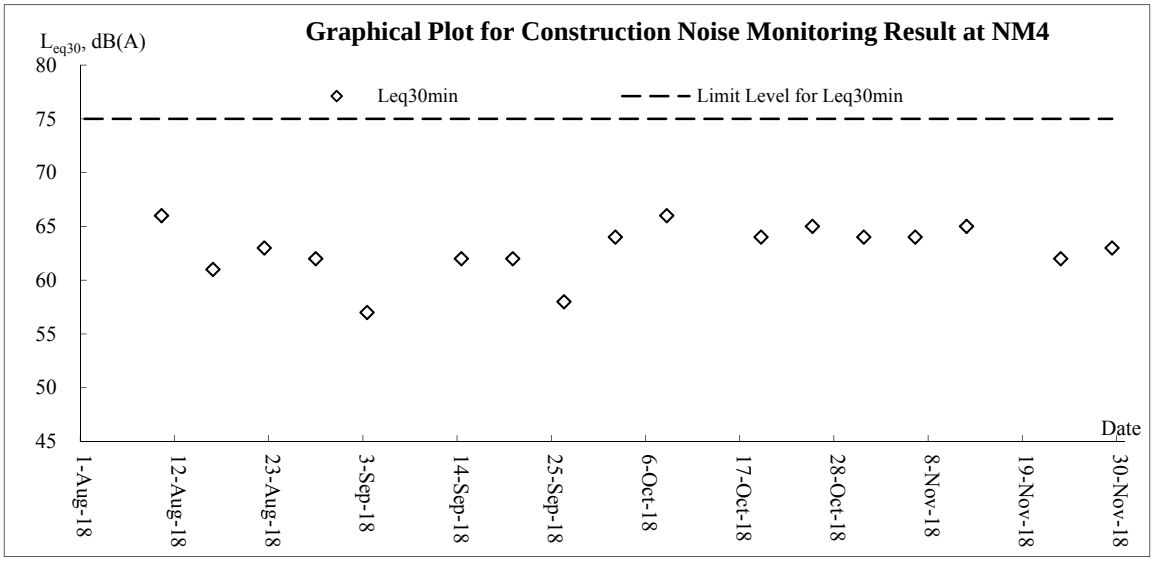

Graphical Plot for 24-hour TSP Monitoring Result at AM9b
24-hour TSP, µg/m³
24-hour TSP
Action Level
Limit Level
300
250
200
150
100
50
0
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18
Date

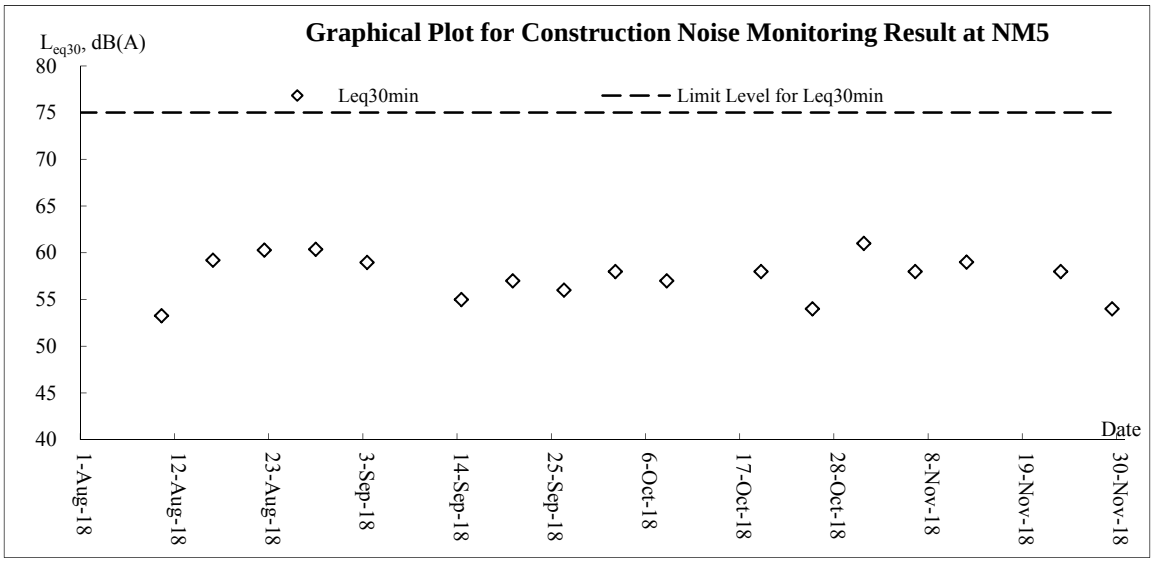
Noise

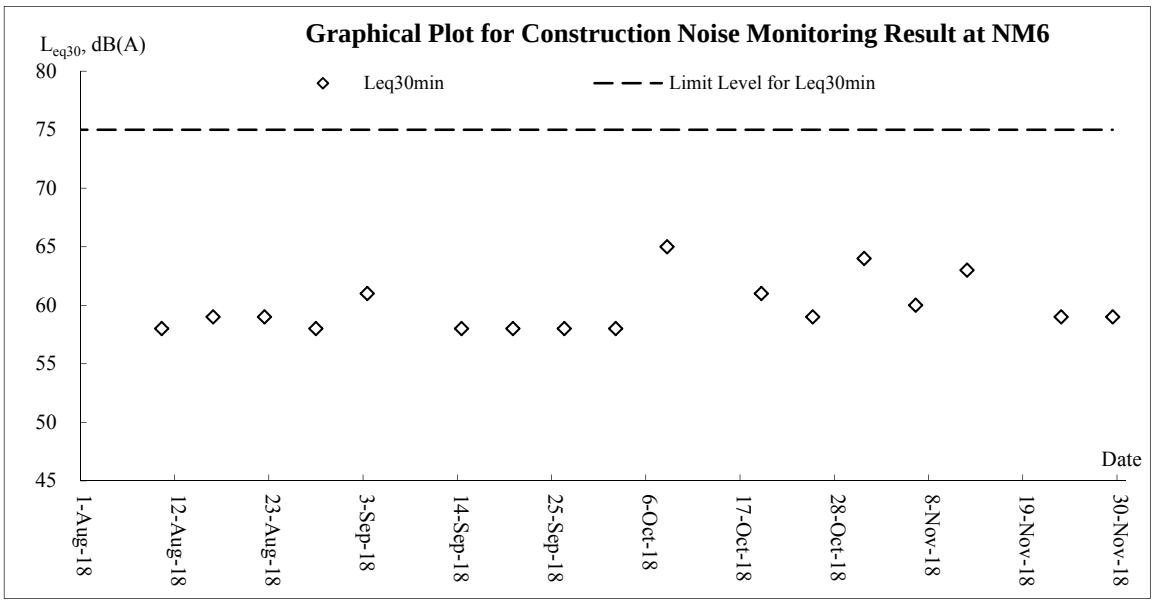

Graphical Plot for Construction Noise Monitoring Result at NM1
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
85
80
75
70
65
60
55
50
45
40
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

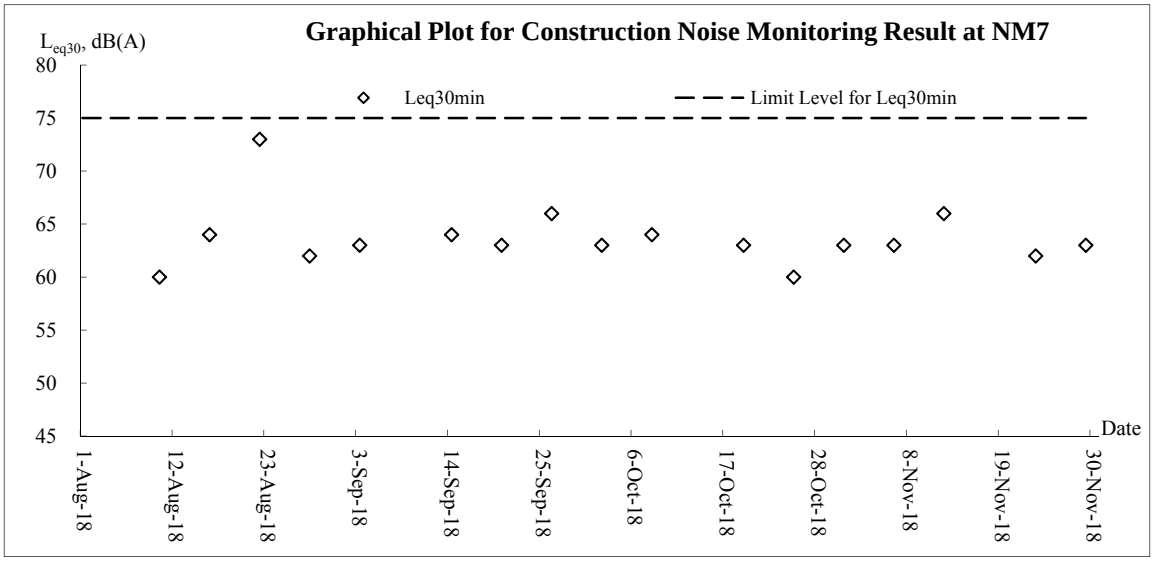

Graphical Plot for Construction Noise Monitoring Result at NM2a
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
Date
80
75
70
65
60
55
50
45
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

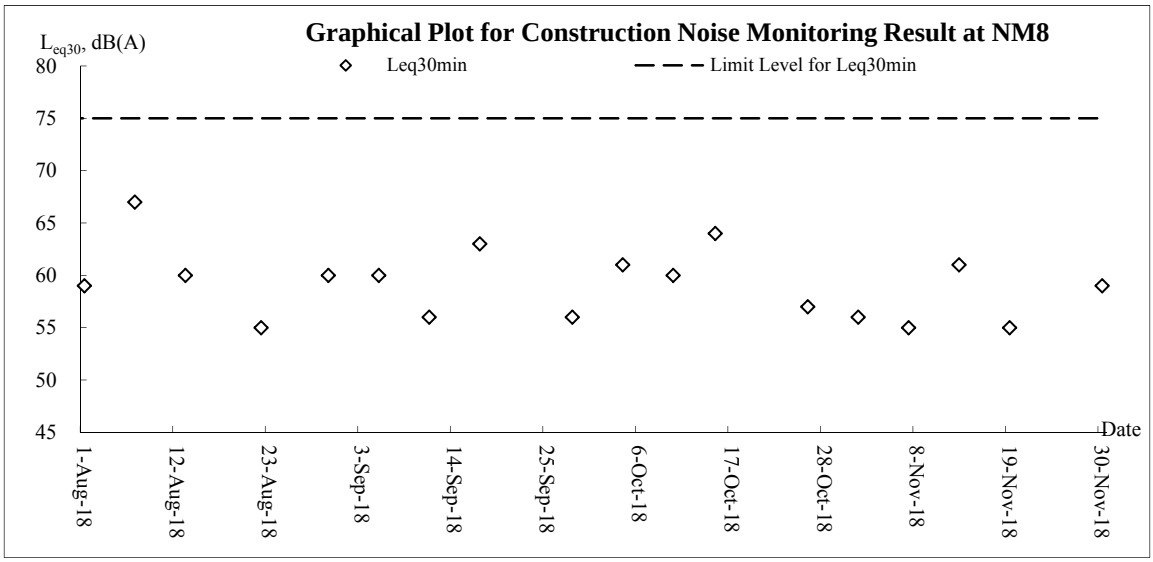

Graphical Plot for Construction Noise Monitoring Result at NM3
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Date
80
75
70
65
60
55
50
45
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

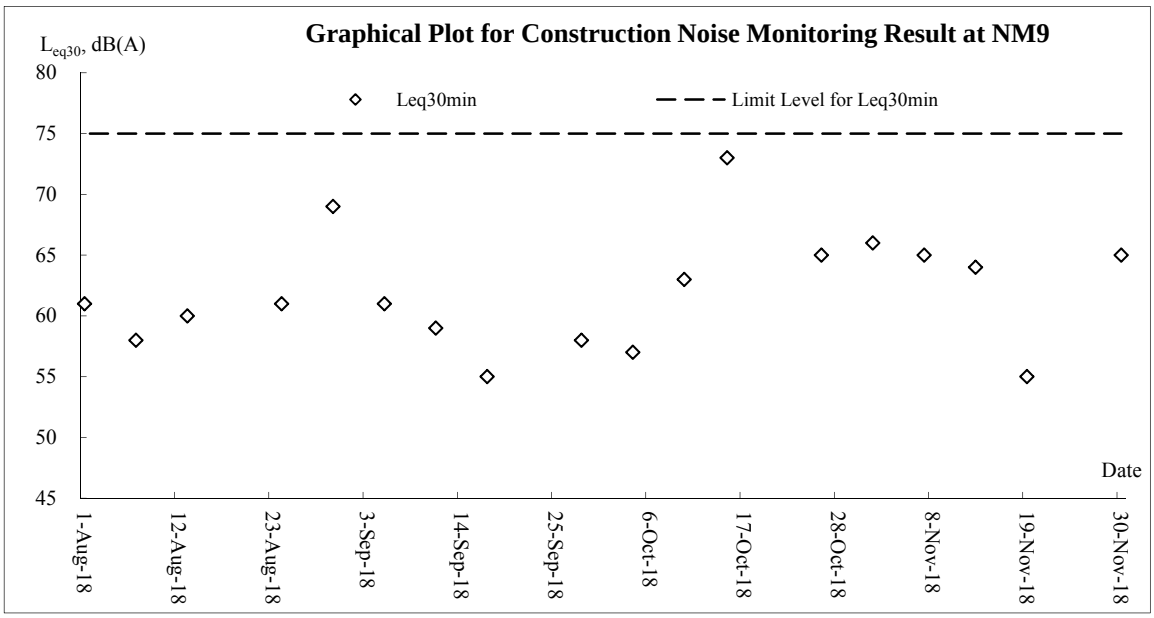

Graphical Plot for Construction Noise Monitoring Result at NM4
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

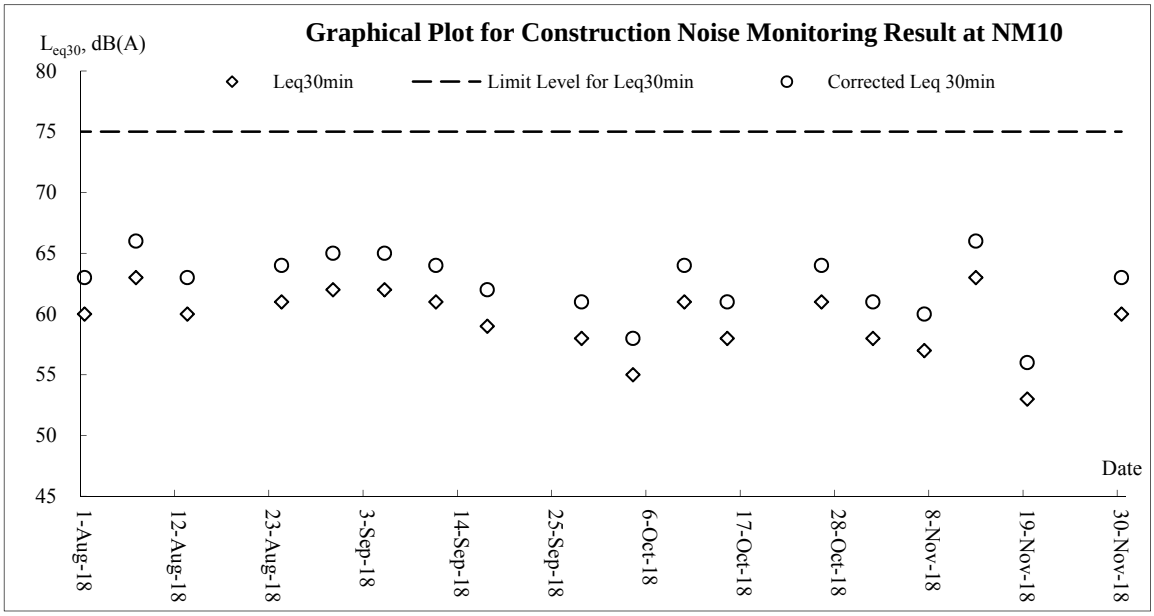

Graphical Plot for Construction Noise Monitoring Result at NM5
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
40
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18


Graphical Plot for Construction Noise Monitoring Result at NM6
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

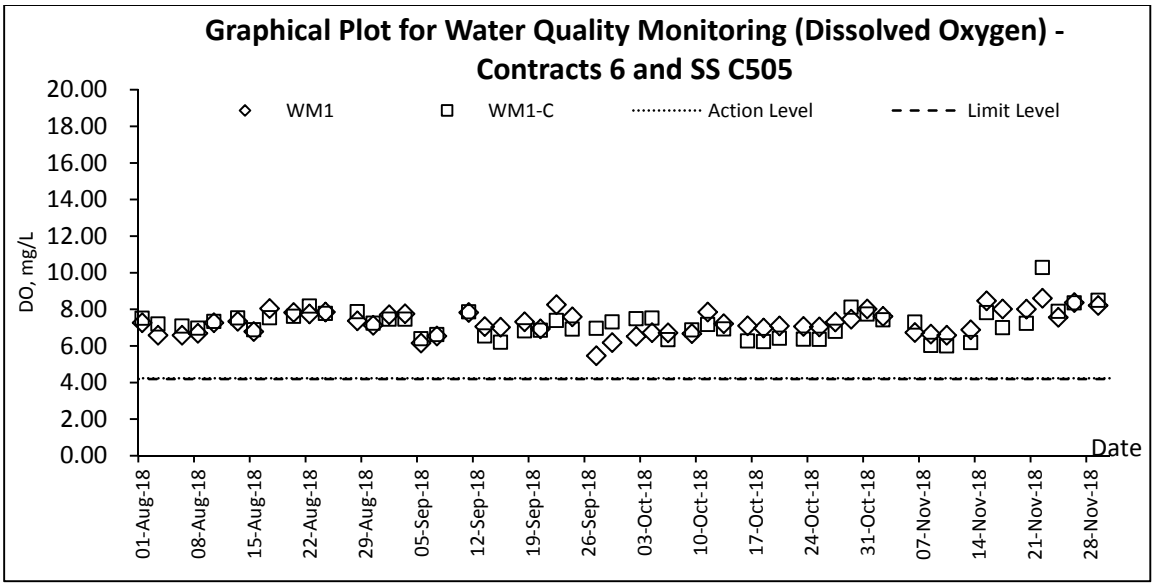

Graphical Plot for Construction Noise Monitoring Result at NM7
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

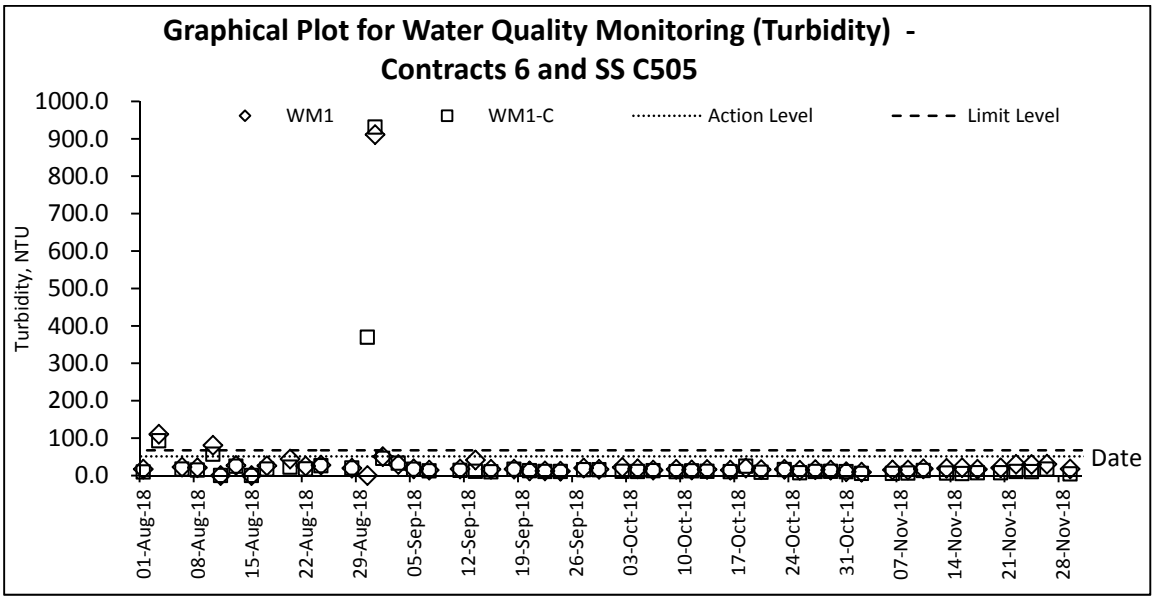

Graphical Plot for Construction Noise Monitoring Result at NM8
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

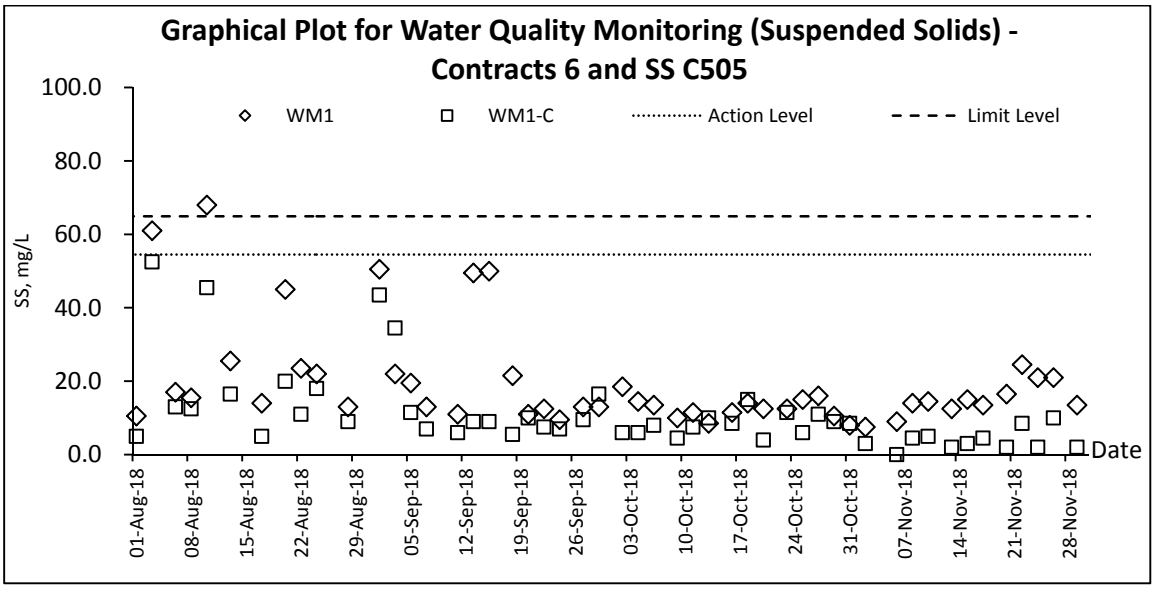

Graphical Plot for Construction Noise Monitoring Result at NM9
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
80
75
70
65
60
55
50
45
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

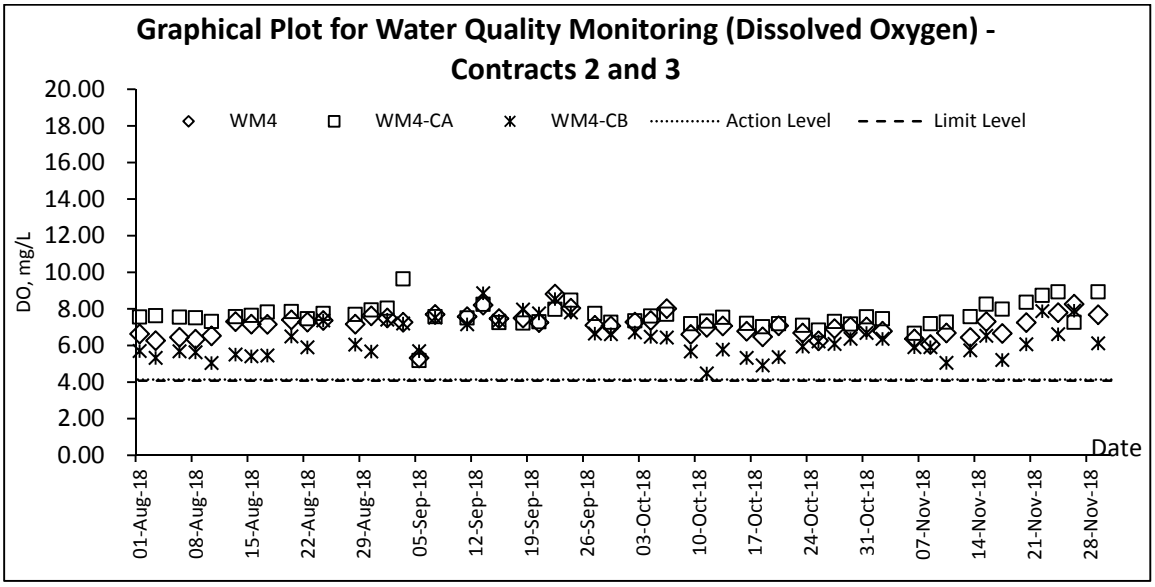

Graphical Plot for Construction Noise Monitoring Result at NM10
L_{eq30}, dB(A)
Leq30min
Limit Level for Leq30min
Corrected Leq 30min
80
75
70
65
60
55
50
45
Date
1-Aug-18
12-Aug-18
23-Aug-18
3-Sep-18
14-Sep-18
25-Sep-18
6-Oct-18
17-Oct-18
28-Oct-18
8-Nov-18
19-Nov-18
30-Nov-18

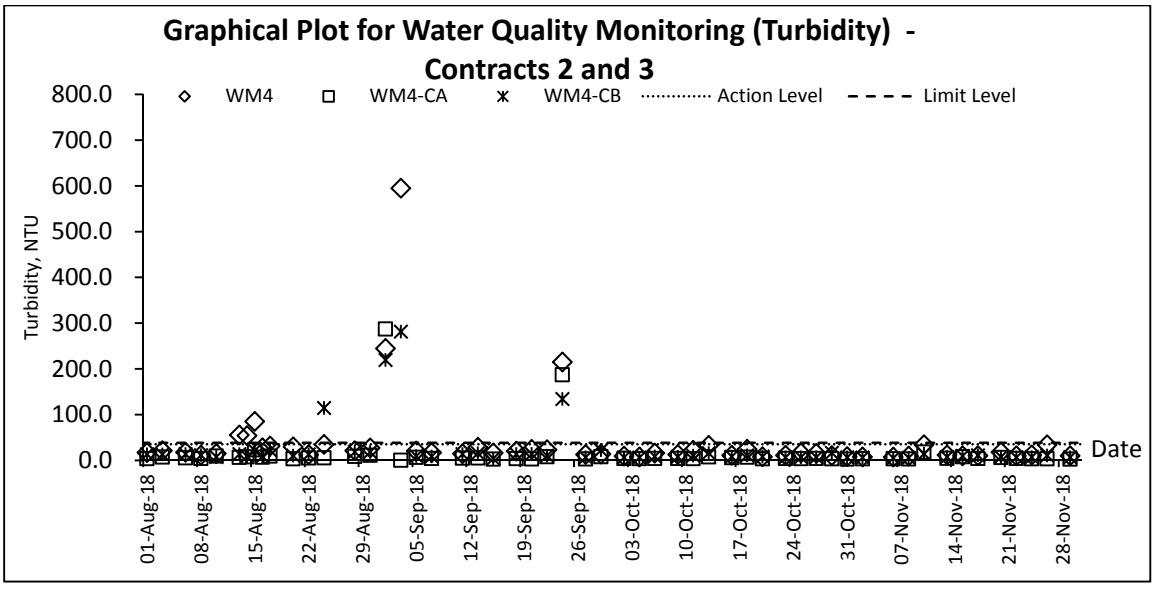
Water Quality








Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
DO, mg/L
20.00
18.00
16.00
14.00
12.00
10.00
8.00
6.00
4.00
2.00
0.00
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
10-Oct-18
17-Oct-18
24-Oct-18
31-Oct-18
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
Turbidity, NTU
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
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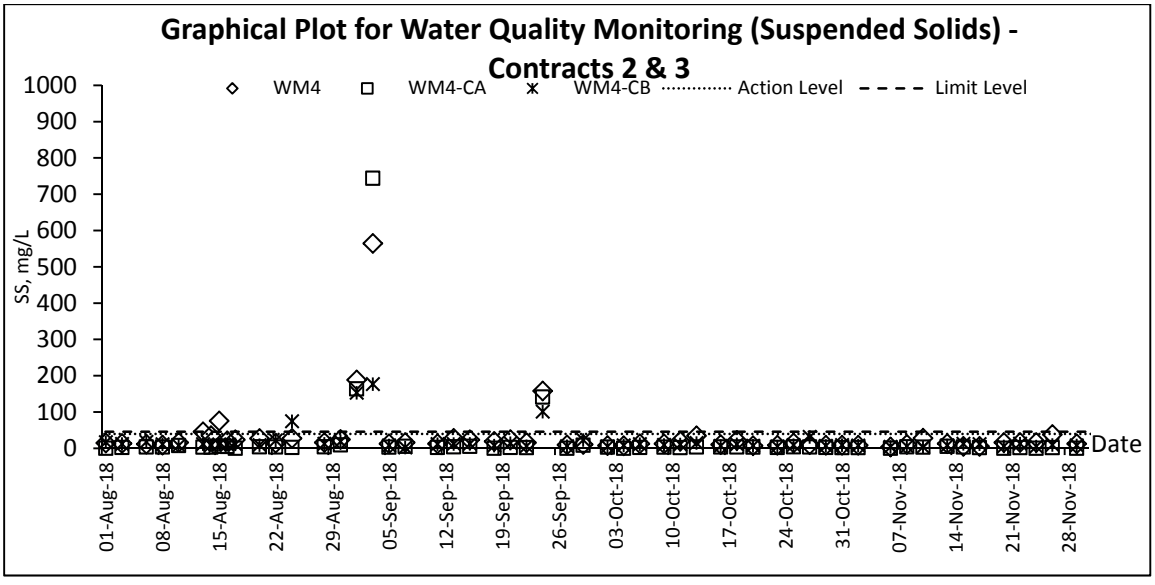
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 & 3
WM4
WM4-CA
WM4-CB
Action Level
Limit Level
SS, mg/L
1000
900
800
700
600
500
400
300
200
100
0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
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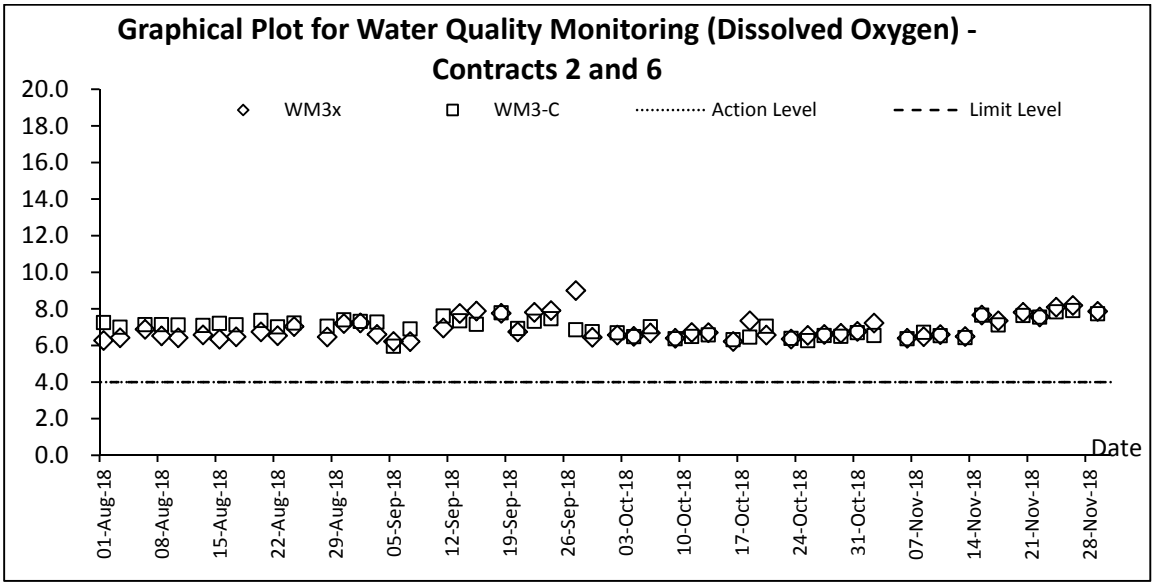
31-Oct-18
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
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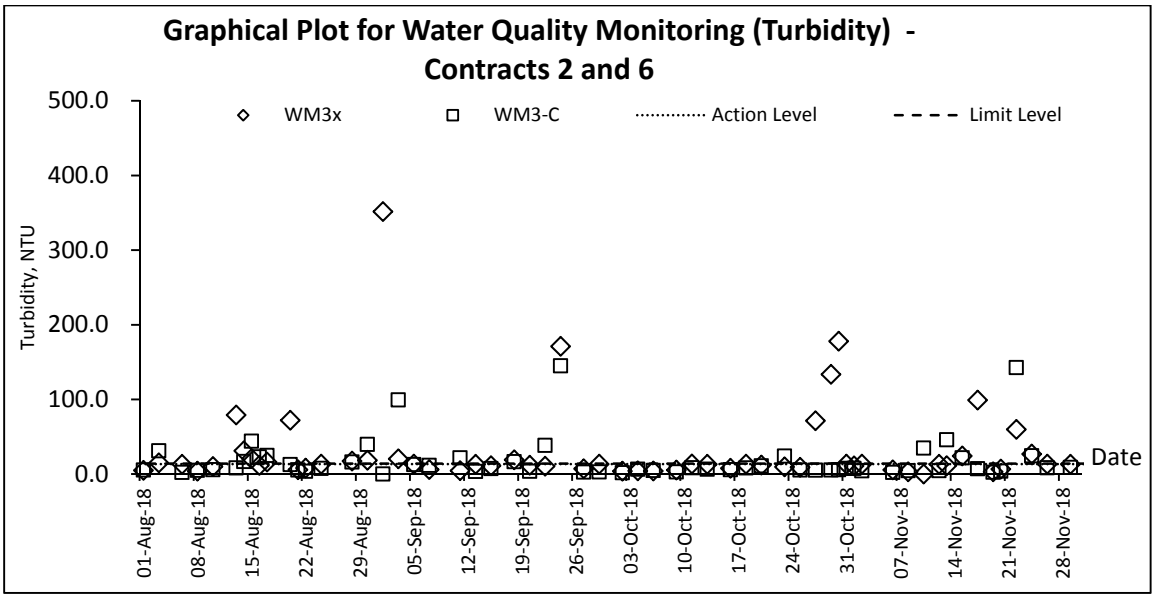
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Turbidity) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
Turbidity, NTU
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
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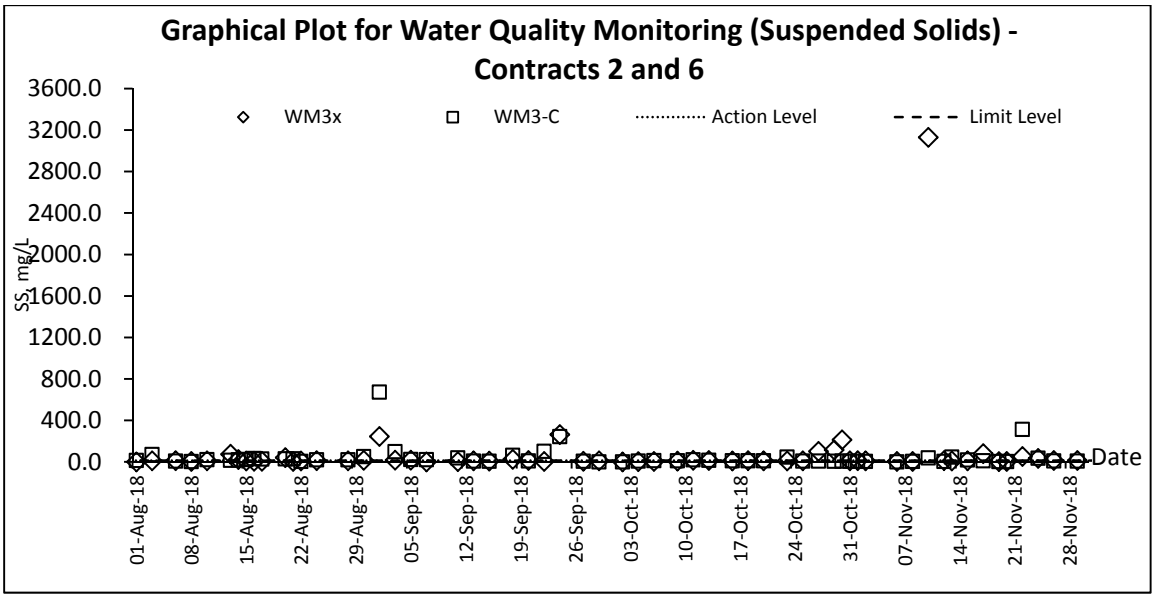
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contracts 2 and 6
WM3x
WM3-C
Action Level
Limit Level
SS, mg/L
3600.0
3200.0
2800.0
2400.0
2000.0
1600.0
1200.0
800.0
400.0
0.0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
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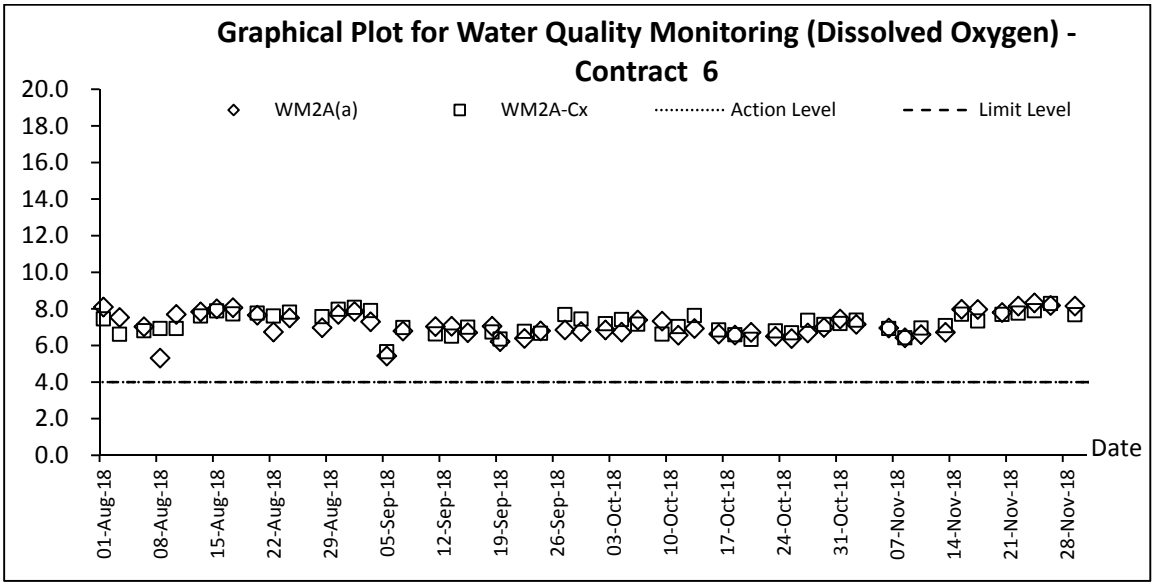
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Dissolved Oxygen) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
20.0
18.0
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
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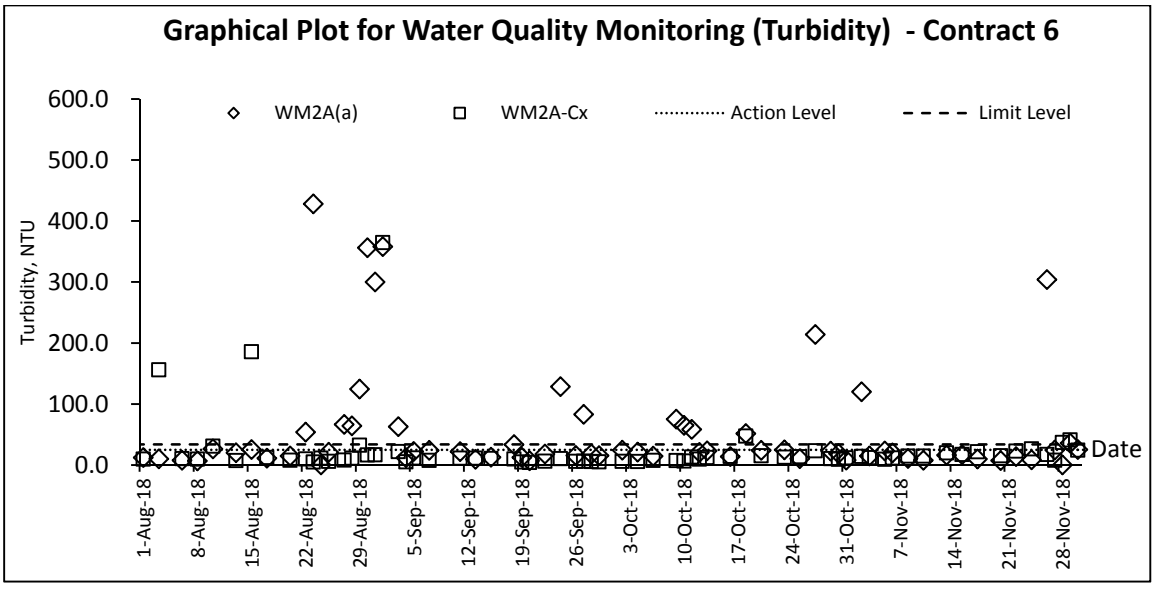
31-Oct-18
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Turbidity) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
Turbidity, NTU
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
1-Aug-18
8-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
5-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
3-Oct-18
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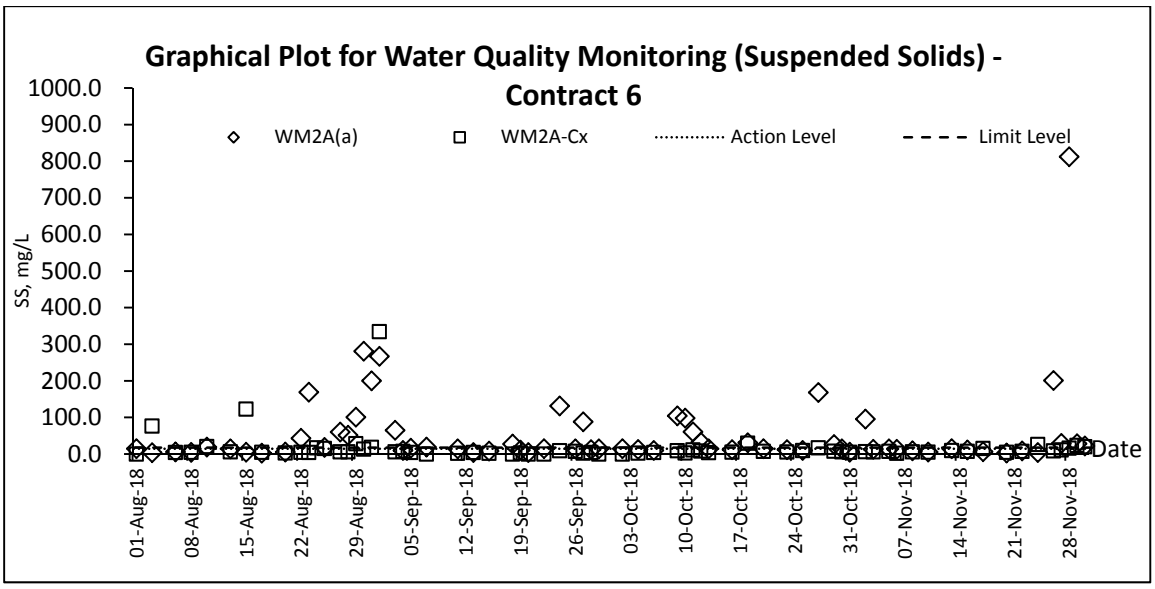
7-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18


Graphical Plot for Water Quality Monitoring (Suspended Solids) - Contract 6
WM2A(a)
WM2A-Cx
Action Level
Limit Level
SS, mg/L
1000.0
900.0
800.0
700.0
600.0
500.0
400.0
300.0
200.0
100.0
0.0
Date
01-Aug-18
08-Aug-18
15-Aug-18
22-Aug-18
29-Aug-18
05-Sep-18
12-Sep-18
19-Sep-18
26-Sep-18
03-Oct-18
10-Oct-18
17-Oct-18
24-Oct-18
31-Oct-18
07-Nov-18
14-Nov-18
21-Nov-18
28-Nov-18

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-Nov-18	Thu	Mainly cloudy. Very dry with sunny intervals at first.	0	24.1	19.4	34.5	N/NE
2-Nov-18	Fri	Mainly cloudy with one or two showers and bright periods.	0.1	21.5	13.9	64.2	N
3-Nov-18	Sat	Sunny periods. Moderate easterly winds, occasionally fresh offshore.	8.3	20.5	17.3	86.0	N
4-Nov-18	Sun	Moderate easterly winds, occasionally fresh offshore.	Trace	23.9	5.5	76.2	E
5-Nov-18	Mon	Mainly fine. Moderate east to northeasterly winds.	Trace	26.3	7.8	69.2	E/NE
6-Nov-18	Tue	Moderate east to northeasterly winds	0	25.3	7.4	70.5	E
7-Nov-18	Wed	Mainly fine. Moderate east to northeasterly winds.	0	26.1	6.1	71.7	E/SE
8-Nov-18	Thu	Mainly fine and dry.Moderate north to northeasterly winds.	Trace	25.4	9	73.5	N/NW
9-Nov-18	Fri	Sunny periods. Moderate northeasterly winds	0	23.9	7.5	68	N/NW
10-Nov-18	Sat	Mainly cloudy with sunny periods. Moderate east to northeasterly winds.	Trace	24.7	45.2	78.0	NE
11-Nov-18	Sun	Mainly cloudy. Moderate to fresh easterly winds	0	23.7	7.3	73.7	E/NE
12-Nov-18	Mon	Moderate to fresh easterly winds	Trace	25.4	6.1	68.5	N/NW
13-Nov-18	Tue	Moderate to fresh easterly winds	Trace	23.7	7	73.2	E
14-Nov-18	Wed	Moderate to fresh easterly winds, occasionally strong offshore at first.	Trace	25.1	10	67.5	E
15-Nov-18	Thu	Cloudy with a few rain patches.	Trace	24	47.5	72.5	E/SE
16-Nov-18	Fri	Mainly cloudy with a few rain patches.	1.1	24.4	10.3	81	E/SE
17-Nov-18	Sat	Sunny intervals. Moderate north to northeasterly winds	0.5	24	35.3	87.0	NE
18-Nov-18	Sun	Mainly cloudy. Bright periods in the afternoon	0	24.9	7.7	76.5	E
19-Nov-18	Mon	Moderate east to northeasterly winds, occasionally fresh.	0	23.6	9.6	70.5	N/NW
20-Nov-18	Tue	Sunny periods and relatively low visibility in the afternoon.	0.1	22.9	8.5	74.7	E/SE
21-Nov-18	Wed	Moderate easterly winds. Becoming fresh northerlies with a few rain patches later.	2.4	24.3	14.9	70.7	E/NE
22-Nov-18	Thu	Dry and appreciably cooler. Sunny periods.	0.2	20.1	16.5	53.7	N
23-Nov-18	Fri	Mainly fine. Moderate northerly winds	Trace	19.2	7.5	68	N/NW
24-Nov-18	Sat	Mainly fine. Moderate northerly winds	Trace	20.2	6.8	72.5	E
25-Nov-18	Sun	Cloudy with a few rain patches.	21	18.7	4	81.5	E/SE
26-Nov-18	Mon	Cloudy with a few rain patches.Moderate northeasterly winds.	15.7	18.5	4	85.5	N/NW
27-Nov-18	Tue	Cloudy with a few rain patches. Slightly cooler tonight.	16.3	19.1	4.5	81.2	N/NW
28-Nov-18	Wed	Mainly fine.Moderate easterly winds, occasionally fresh.	7.7	20.4	5	86.5	E
29-Nov-18	Thu	Mainly fine.Moderate easterly winds, occasionally fresh.	Trace	21	5.6	72.7	E/SE
30-Nov-18	Fri	Mainly fine. Dry in the afternoon. Moderate easterly winds	0	21.3	7.3	69.5	E

Appendix L

Waste Flow Table

APPENDIX G: MONTHLY SUMMARY WASTE FLOW TABLE

FOR: 2018

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill*	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse#
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000m^3)
Jan	86.6400	0.0000	0.0000	5.2900	81.3500	1.6570	45.0000	0.3100	2.8000	4.5760	0.6575
Feb	33.2700	0.0000	0.0000	3.6700	29.6000	1.3470	32.0000	0.2500	2.4000	1.9500	0.2850
Mar	39.7600	0.0000	0.0000	3.4600	36.3000	1.3380	36.0000	0.3050	2.7000	9.8560	0.6290
Apr	55.5979	0.0000	0.0000	3.3680	52.2299	1.2470	33.7800	0.3240	2.5000	0.0000	0.5748
May	12.9815	0.0000	0.0000	4.6780	8.3035	1.1470	30.1400	0.3040	2.6000	44.9600	0.7056
June	9.0720	0.0000	0.0000	3.1910	5.8810	1.2200	31.7800	0.2870	2.3000	0.1760	0.7534
Sub-total	237.3214	0.0000	0.0000	23.6570	213.6644	7.9560	208.7000	1.7800	15.3000	61.5180	3.6053
July	6.0440	0.0000	0.0000	0.5840	5.4600	1.4570	30.7500	0.2750	2.1000	1.5840	0.8810
Aug	5.4100	0.0000	0.0000	0.7600	4.6500	1.3520	31.5900	0.2570	2.2000	3.0800	0.8400
Sep	9.0100	0.0000	0.0000	3.0430	5.2250	1.3700	30.7800	0.2420	2.0000	1.2300	0.6690
Oct	3.2560	0.0000	0.0000	1.0850	1.8900	0.8760	24.0000	0.2030	2.0000	9.8560	0.3750
Nov	1.9760	0.0000	0.0000	0.1760	1.8000	0.0000	0.0000	0.1780	1.8200	0.0000	0.5690
Dec											
Sub-total	25.6960	0.0000	0.0000	5.6480	19.0250	5.0550	117.1200	1.1550	10.1200	15.7500	3.3340
Total	263.0174	0.0000	0.0000	29.3050	232.6894	13.0110	325.8200	2.9350	25.4200	77.2680	6.9393

Notes:

(1) The performance targets are given in PS 1.100(14)(a)

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

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

(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials.

(5) Assumption: 1m^3 of inert material weight 2.2 tonne 1m3 of non-inert material weight 1.6 tonne 1m3 of chemical waste weight 0.88 tonne

Name of Department: CEDD

Contract No.: CV/2012/09

Monthly Summary Waste Flow Table for 2018 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in m^3)	(in '000m^3)
Jan	3.089	0.304	0.060	0.000	2.725	0.923	0.000	0.000	0.000	0.000	0.150
Feb	2.697	0.256	0.150	0.000	2.292	1.144	0.000	0.000	0.000	0.000	0.095
Mar	1.524	0.141	0.120	0.000	1.263	0.211	0.000	0.000	0.000	0.000	0.085
Apr	2.880	0.786	0.360	0.000	1.734	0.788	0.000	0.000	0.000	0.000	0.125
May	1.164	0.290	0.101	0.000	0.773	0.185	0.000	0.000	0.000	0.000	0.150
Jun	0.862	0.082	0.515	0.000	0.265	0.000	0.000	0.000	0.000	0.000	0.110
Sub-total	12.216	1.859	1.306	0.000	9.051	3.251	0.000	0.000	0.000	0.000	0.715
Jul	1.520	0.261	0.476	0.000	0.783	0.039	0.000	0.000	0.000	0.000	0.135
Aug	2.372	0.478	0.613	0.000	1.281	0.193	0.000	0.000	0.000	0.000	0.095
Sep	1.709	0.361	0.381	0.000	0.967	0.272	0.000	0.000	0.000	0.000	0.150
Oct	1.198	0.316	0.000	0.000	0.882	0.000	0.000	0.000	0.000	0.000	0.115
Nov	1.938	0.361	0.296	0.000	1.281	0.000	0.000	0.000	0.000	0.000	0.160
Dec											
Total	20.953	3.636	3.072	0.000	14.245	3.755	0.000	0.000	0.000	0.000	1.370

Note:

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

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

Notes:

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

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

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

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

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

Contract No.: CV/2012/09

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

Item No.	Description of Works Process or Activity [see note (a) below]	Justifications for Using Timber in Temporary Construction Works	Est. Quantities of Timber Used (m^3)	Actual Quantities Used (m^3)	Remarks
1	Formwork for Construction of Noise Barrier	Easy handling by manpower	110.00	110.00	
2	Formwork for Construction of Retaining Wall	Easy handling by manpower	240.00	240.00	
3	Formwork for Construction of Road Works	Easy handling by manpower	200.00	200.00	
4	Formwork for Construction of Drainage	Easy handling by manpower	280.00	280.00	
		Total Estimated Quantity of Timber Used	830.00		

Notes:

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

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

Appendix A

Name of Department: CEDD

Contract No.: NE/2014/02

Monthly Summary Waste Flow Table for 2018

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m^3)
2016	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
2017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jan-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Mar-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Apr-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
May-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jun-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Jul-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sep-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Oct-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.012
Nov-18	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.018
Dec-18											
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030

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

Notes :

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

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

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

(4) Estimate 6m3 capacity per dump truck

Monthly Summary Waste Flow Table for 2018 (year)

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

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

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m^3)
Jan	4.152	0	0.629	1.947	1.576	0	0	0.240	0	0	0.892
Feb	2.740	0	0.867	0.544	1.329	0	0	0.402	0	0	0.578
Mar	3.269	0	1.581	0.969	0.719	0	0	0.380	0	0	0.725
Apr	2.901	0	0.255	1.955	0.691	0	0	0.360	0	0	0.921
May	3.194	0	0.068	1.964	1.162	0	0	0.384	0	0	1.340
Jun	2.206	0	0	0.9775	1.228	0	0	0.270	0	0	0.714
Sub-total	18.462	0.000	3.400	8.357	6.705	0.000	0.000	2.036	0.000	0.000	5.170
Jul	1.512	0	0	0.816	0.696	0	0	1.608	0	0	0.846
Aug	2.562	0	0	1.989	0.573	0.886	0	0.360	0	0	0.866
Sep	0.997	0	0	0.552	0.445	3.070	0	0.225	0	0	0.633
Oct	1.896	0	0	1.386	0.510	13.192	0	0.188	0	0	0.855
Nov	0.310	0	0	0	0.310	15.028	0	0.345	0	0	0.929
Dec											
Total	1024.132	0.000	166.627	283.743	573.764	86.115	0.000	11.141	0.007	34.045	18.050

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

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

(3) Broken concrete for recycling into aggregates.

Appendix I

MONTHLY SUMMARY WASTE FLOW TABLE

Name of Department: CEDD

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

Contract No.: NE/2014/03

Monthly Summary Waste Flow Table for 2018 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Non-Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m^3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000m3)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m3)
Jan	0.015	0	0	0	0.015	0	14.5	0.5	0.001	0	0.15
Feb	0	0	0	0	0	0	9	0.18	0.001	0	0.13
Mar	0.005	0	0	0	0.005	0	6	0.15	0.001	0	0.2
Apr	1.1	0	0	0	1.1	0	6.6	0.22	0.001	0	0.3
May	0.077	0	0	0	0.077	0	1.3	0.15	0.001	0	0.1
June	0	0	0	0	0	0	6	0.4	0.001	0	0.05
Sub-total	1.197	0	0	0	1.197	0	43.4	1.6	0.006	0	0.93
July	0.5	0	0	0	0.5	0	2.5	0.1	0.001	0	0.2
Aug	0.047	0	0	0	0.047	0	5.8	0.1	0.001	0	0.1
Sept	0.041	0	0	0	0.041	0	1.1	0.1	0.001	0	0.1
Oct	0.047	0	0	0	0.047	0	1.5	0.2	0.001	0	0.2
Nov	0	0	0	0	0	0	0.3	0.1	0.001	0	0.2
Dec											
Total	1.832	0	0	0	1.832	0	54.6	2.2	0.011	0	1.730

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

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

Contract No. / Works Order No.: - SSC505

Monthly Summary Waste Flow Table for 2018 [year] [to be submitted not later than the 15th day of each month following reporting month]

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

Month	Actual Quantities of Inert Construction Waste Generated Monthly				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Broken Concrete (see Note 4)	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)
Jan	5.298	0.646	0.160	0.000	4.492
Feb	7.243	0.572	0.320	0.000	6.351
Mar	11.241	0.831	0.225	0.000	10.186
Apr	3.717	1.458	0.257	0.000	2.002
May	5.346	0.788	0.300	0.000	4.258
Jun	6.828	0.661	0.376	0.000	5.792
Sub-total	39.672	4.956	1.638	0.000	33.079
Jul	11.637	0.051	0.282	0.000	11.304
Aug	16.440	0.142	0.263	0.000	16.036
Sep	7.849	0.116	0.161	0.000	7.573
Oct	3.619	1.148	0.196	0.000	2.275
Nov	4.702	0.908	0.186	0.000	3.608
Dec					
Total	83.919	7.321	2.726	0.000	73.873

Month	Actual Quantities of Non-inert Construction Waste Generated Monthly												
	Timber		Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Other Recyclable Materials (see Page 3)		General Refuse disposed of at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m^3)
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	375.870	375.870	0.220	0.220	0.032	0.032	0.000	0.000	0.000	0.000	1.918
Feb	0.000	0.000	720.120	720.120	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.223
Mar	0.000	0.000	220.860	220.860	0.830	0.830	0.005	0.005	0.000	0.000	0.005	0.005	2.711
Apr	0.000	0.000	202.130	202.130	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.470
May	0.000	0.000	294.330	294.330	0.000	0.000	0.042	0.042	0.000	0.000	0.000	0.000	2.490
Jun	0.000	0.000	242.170	242.170	0.990	0.990	0.000	0.000	1.200	0.000	0.000	0.000	2.997
Sub-total	0.000	0.000	2,055.480	2,055.480	2.040	2.040	0.079	0.079	1.200	0.000	0.005	0.005	14.809
Jul	0.000	0.000	218.990	218.990	0.280	0.280	0.000	0.000	0.000	0.000	0.000	0.000	3.146
Aug	0.000	0.000	466.220	466.220	0.230	0.230	0.000	0.000	1.200	0.000	0.000	0.000	3.114
Sep	0.000	0.000	153.620	153.620	0.620	0.620	0.033	0.033	0.000	0.000	0.000	0.000	2.704
Oct	0.000	0.000	351.580	351.580	0.460	0.460	0.490	0.490	0.000	0.000	0.000	0.000	2.035
Nov	0.000	0.000	240.200	240.200	0.340	0.340	0.300	0.300	0.000	0.000	0.000	0.000	1.372
Dec													
Total	0.000	0.000	3,486.090	3,486.090	3.970	3.970	0.902	0.902	2.400	0.000	0.005	0.005	27.180

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					
240.20 tons of scrap metals were sent to Global Metal Ltd. for recycling	1,816.67 tons of broken concrete were sent to Tailor Recycled Aggregates Ltd. for recycling.	340.0 kg of paper were sent to Lau Choi Kee Papers Co. Ltd. for recycling.	300 kg of plastic barriers were sent to 3R for recycling.		

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

Forecast of Total Quantities of C&D Materials to be Generated from the Contract										
Total Quantity Generated	Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastics	Chemical Waste	General refuse
(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
257.369	15.831	44.670	0.000	167.500	51.757	19,907.212	18.106	12.533	5.000	41.336

Appendix M

Implementation Schedule for Environmental Mitigation Measures

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Air Quality Impact (Construction)							
3.6.1.1	2.1	**General Dust Control Measures** The following dust suppression measures should be implemented: ■ Frequent water spraying for active construction areas (4 times per day for active areas in Po Kak Tsai and 8 times per day for all other active areas), including areas with heavy construction and slope cutting activities ■ 80% of stockpile areas should be covered by impervious sheets ■ Speed of trucks within the site should be controlled to about 10 km/hr ■ All haul roads within the site should be paved to avoid dust emission due to vehicular movement	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation
3.6.1.2	2.1	**Best Practice for Dust Control** The relevant best practices for dust control as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted to further reduce the construction dust impacts of the Project. These best practices include: *Good site management* ■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. ■ Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimize the release of visible dust emission. ■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly. ■ Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimizing generation of fugitive dust emissions. ■ The material should be handled properly to prevent fugitive dust emission before cleaning. *Disturbed Parts of the Roads* ■ Each and every main temporary access should be paved with	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or ■ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. *Exposed Earth* ■ Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. *Loading, Unloading or Transfer of Dusty Materials* ■ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. *Debris Handling* ■ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides. ■ Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped. *Transport of Dusty Materials* ■ Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards. *Wheel washing* ■ Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. *Use of vehicles* ■ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. ■ Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.				

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		Site hoarding ■ Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit. *Blasting* ■ The areas within 30m from the blasting area should be wetted with water prior to blasting.					
Air Quality Impact (Operation)							
3.5.2.2	2.2	The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site: ■ The treatment work will be totally enclosed. Negative pressure ventilation will be provided within the enclosure to avoid any fugitive odorous emission from the treatment work. ■ Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission. ■ Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity. ■ Chemical or biological deodorisation facilities with a minimum odour removal efficiency of 90% will be provided to treat potential odorous emissions from the treatment plant including sewage channels / tanks, filter press and screening facilities so as to minimize any potential odour impact to the nearby ASRs.	To minimize potential odour impact from operation of the proposed sewage treatment work at BCP	DSD	BCP	Operation Phase	EIA recommendation
Noise Impact (Construction)							
4.4.1.4	3.1	**Adoption of Quieter PME** Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in **Table 4.14**, which can be found in Hong Kong.	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

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

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	**Good Site Practice** The good site practices listed below should be followed during each phase of construction: • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; • Mobile plant, if any, should be sited as far from NSRs as possible; • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities.	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
Noise Impact (Operation)							
		Road Traffic Noise					
Table 4.42 and Figure 4.20.1 to 4.20.4	3.2	Erection of noise barrier/ enclosure along the viaduct section.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	EIAO and NCO
		Fixed Plant Noise					
Table 4.46	3.2	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.5.2.4	3.2	The following noise reduction measures shall be considered as far as practicable during operation: • Choose quieter plant such as those which have been effectively silenced; • Include noise levels specification when ordering new plant (including chillier and E/M equipment); • Locate fixed plant/louver away from any NSRs as far as practicable; • Locate fixed plant in walled plant rooms or in specially designed enclosures; • Locate noisy machines in a basement or a completely separate building; • Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and • Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIAO and NCO
Water Quality Impact (Construction)							
5.6.1.1	4.1	**Construction site runoff and drainage** The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts: ▪ At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractor prior to the commencement of construction. ▪ The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas.	To control site runoff and drainage; prevent high sediment loading from reaching the nearby watercourses	Contractor	Construction Works Sites	Construction Phase	Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		Temporary ditches should be provided to facilitate the runoff discharge into stormwater drainage system through a sediment/silt trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates, if practical. ▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractor prior to the commencement of construction. ▪ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times. ▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities. ▪ If surface excavation works cannot be avoided during the wet season (April to September), temporarily exposed slope/soil surfaces should be covered by tarpaulin or other means, as far as practicable, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC Note PN 1/94. ▪ The overall slope of the site should be kept to a minimum to reduce					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		the erosive potential of surface water flows. ▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. ▪ Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. ▪ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers. ▪ Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes. ▪ Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.					
5.6.1.1	4.1	**Good site practices for works within water gathering grounds** The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:	To minimize water quality impacts to the water gathering grounds	Contractor	Construction Works Sites within the water gathering	Construction Phase	ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments. ▪ No earth, building materials, oil or fuel, soil, toxic materials or any materials that may possibly cause contamination to water gathering grounds are allowed to be stockpiled on site. ▪ All surplus spoil should be removed from water gathering grounds as soon as possible. ▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks. ▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time. ▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion. ▪ Facilities for washing the wheels of vehicles before leaving the site should be provided. ▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately. ▪ No maintenance activities which may generate chemical wastes should be undertaken in the water gathering grounds. Vehicle maintenance should be confined to designated paved areas only and any spillages should be cleared up immediately using absorbents and waste oils should be collected in designated tanks prior to disposal off site. All storm water run-off from these areas should be discharged via oil/petrol separators and sand/silt removal traps. ▪ Any soil contaminated with fuel leaked from plant should be removed off site and the voids arising from removal of contaminated soil should be replaced by suitable material approved by the Director of Water Supplies. ▪ Provision of temporary toilet facilities and use of chemicals or insecticide of any kind are subject to the approval of the Director of Water Supplies. ▪ Drainage plans should be submitted for approval by the Director of			grounds		

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		Water Supplies. ▪ An unimpeded access through the waterworks access road should always be maintained. ▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March, ▪ Advance notice must be given before the commencement of works on site quoting WSD's approval letter reference.					
5.6.1.2	4.1	**Good site practices of general construction activities** Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used. Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	**Sewage effluent from construction workforce** Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA Recommendation and Water Pollution Control Ordinance (WPCO)
5.6.1.4	4.1	**Hydrogeological Impact** Grout injection works would be conducted before blasting, for sealing a limited area around the tunnel with a grout of a suitable strength for controlling the potential groundwater inflows. The pre-injection grouting method would be supplemented by post-injection grouting where necessary to further enhance the groundwater inflow control. On-site treatment for the groundwater ingress pumped out would be required to remove any contamination by grouting materials before discharge off-site.	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
Water Quality Impact (Operation)							
		No mitigation measure is required.					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Sewage and Sewerage Treatment Impact (Construction)							
6.7	5	The sewage generated by the on-site workforce should be collected in chemical toilets and disposed of off-site by a licensed waste collector.	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA recommendation and WPCO
Sewage and Sewerage Treatment Impact (Operation)							
6.6.3	5	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.	To minimize water quality impacts	DSD	BCP	Operation phase	EIA recommendation and WPCO
6.5.3	5	Sewage generated from the Administration Building will be discharged to the existing local sewerage system.	To minimize water quality impacts	DSD	Administration Building	Operation phase	EIA recommendation and WPCO
Waste Management Implication (Construction)							
7.6.1.1	6	**Good Site Practices** Adverse impacts related to waste management such as potential hazard, air, odour, noise, wastewater discharge and public transport as mentioned in section 3.4.7.2 (ii)(c) of the Study Brief are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include: ▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site ▪ Training of site personnel in proper waste management and chemical handling procedures ▪ Provision of sufficient waste disposal points and regular collection of waste ▪ Dust suppression measures as required under the Air Pollution Control (Construction Dust) Regulation should be followed as far as practicable. Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by covering trucks or in enclosed containers ▪ General refuse shall be removed away immediately for disposal. As	To minimize adverse environmental impact	Contractor	Construction works sites (general)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; Waste Disposal (Chemical Wastes) (General) Regulation; and ETWB TC(W) No. 19/2005, Environmental Management on Construction Site

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		such odour is not anticipated to be an issue to distant sensitive receivers ▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road ▪ Covers and water spraying system should be provided for the stockpiled C&D material to prevent dust impact or being washed away ▪ Designate different locations for storage of C&D material to enhance reuse ▪ Well planned programme for transportation of C&D material to lessen the off-site traffic impact. Well planned delivery programme for offsite disposal and imported filling material such that adverse noise impact from transporting of C&D material is not anticipated ▪ Site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be adopted as far as practicable, such as cleaning and maintenance of drainage systems regularly ▪ Provision of cover for the stockpile material, sand bag or earth bund as barrier to prevent material from washing away and entering the drains					
7.6.1.2	6	**Waste Reduction Measures** Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include: ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal ▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials ▪ Plan and stock construction materials carefully to minimise amount	To reduce the quantity of wastes	Contractor	Construction works sites (General)	Construction Phase	EIA recommendation and Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		of waste generated and avoid unnecessary generation of waste ▪ In addition to the above measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during handling, transportation and disposal of these wastes.					
7.6.1.3	6	**C&D Materials** In order to minimise impacts resulting from collection and transportation of C&D material for off-site disposal, the excavated materials should be reused on-site as backfilling material as far as practicable. The surplus rock and other inert C&D material would be disposed of at the Government's Public Fill Reception Facilities (PFRFs) at Tuen Mun Area 38 for beneficial use by other projects in the HKSAR as the last resort. C&D waste generated from general site clearance and tree felling works would require disposal to the designated landfill site. Other mitigation requirements are listed below: ▪ A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and ▪ In order to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) should be included.	To minimize impacts resulting from C&D material	Contractor	Construction Works Sites (General)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; and ETWB TCW No. 31/2004
7.6.1.4	6	**General refuse** General refuse should be stored in enclosed bins or compaction units separated from other C&D material. A reputable waste collector is to be employed by the Contractor to remove general refuse from the site separately. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' litter.	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
7.6.1.5	6	**Chemical waste** If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

Appendix N

Investigation Report for Exceedance

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**27 November 2018**
Our Ref	TCS00694/13/300/**F1876**	**No of Pages**	6 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008 Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works Investigation Report of Exceedance of Air Quality Monitoring (24-hour TSP) at Locations AM2 and AM3 on 31 October 2018**		

Dear Sir,

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

TCS00694/13/300/F1861 dated 6 November 2018

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

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

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

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

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

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project	CE 45/2008	
Date	**31 October 2018**	
Location	**AM2**	**AM3**
Time	00:00	00:00
Parameter	24 hour TSP ($\mu g/m^3$)	
Action Level	149	145
Limit Level	260	260
Measured Level	**303**	**309**
Exceedance	**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures	1. According to the site information provided from the Contractor of Contract 6 (CCKJV), the major site activities carried out on 31 October 2018 near works area of Lin Ma Hang were bridge installation, road paving and road division. The closest air monitoring location to the works area was Location AM2. Whereas, there were no site activities carried out close to air monitoring location AM3 and the distance between AM3 and the closest active construction site is about 550m. The monitoring location AM2 and AM3 and related works area are shown in ***Figure 1***. 2. Joint site inspection by the RE, IEC, CCKJV and ET was carried out on 1 and 8 November 2018 to audit the site environmental performance and the implementation of mitigation measures provided by the Contractor. The observations during site inspection are summarized below. (a) Location AM2 was located in a village house on LMH Road and the closest works area was located on the other side of LMH. (***Photo 1***) (b) The works area under Contract 6 and Location AM2 was separated by LMH Road. As advised by CCKJV, the number of site vehicles entering and leaving the site through Lin Ma Hang Road was limited in view of the work progress. As observed during site inspection, the main dust source was dominated by traffic dust from LMH Road. (***Photo 2***) (c) LT/C6 has 3 vehicle site exits on LMH Road. Wheel washing facilities were provided on the hard paved road within the site to avoid carrying of dust and soil to public road by site vehicles. During site inspection on 1 November 2018, muddy trail was observed at site exit of Bridge D, meanwhile, water spraying by water tanker was observed on Lin Ma Hang Road and the muddy trail was cleared immediately. On 8 November 2018, the condition of these site exit and adjoined LMH road was	

	satisfactory without mud and debris. (***Photo 3 to 5***) (d) Air quality monitoring station AM3 was far away from works area of the entire LT/HYW Project and no adverse dust impact due to the project work was observed at AM3. (***Photo 6 and Figure 1***) (e) Starting from AM3 towards Lin Ma Hang, there were several unknown site exits on LMH Road which all not belong to any Contracts of LT/HYW Project. Fugitive dust was observed when vehicles travelling on the road. The maintenance party/ ownership of these site exits are unknown. ***(Photo 6)*** Moreover, there were many other heavy vehicles apart from the project using LMH Road which causing traffic dust problem especially during dry season. (f) As advised by CCKJV, road bowser for water spraying on LMH Road was carried out in every normal working day as dust suppressive measure. The LMH Road was maintained wet and no fugitive dust was observed during vehicles travelling. ***(Photo 7)*** Moreover, road sweeper would also deploy on LMH Road in order to remove debris and gravels on road surface and minimize generation of muddy water during rain. The route of water tanker and road sweeper are fully covered the works area of LT/C6 which shown in ***Figure 1***. (g) No dusty work and stockpile of dusty material was observed within the works area of C6. 3. In our investigation, CCKJV has implemented dust mitigation measures to control the dust generated under the Project. The deficiency observed during site inspection had rectified by the continuous dust suppression measures promptly. There were many other heavy vehicles apart from the project using LMH Road and exceedance was also triggered at AM3 which far from the project site, therefore, it is considered that the major dust source leaded to the TSP exceedance was the traffic dust along Lin Ma Hang Road and the Project only has minor contribution to the exceedance. 4. The Contractor should fully implement the dust mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 27 November 2018

Photo Record

Photo 1
Location AM2 was located in a village house on LMH Road and the closest works area was located on the other side of LMH.

Photo 2
The works area under Contract 6 and Location AM2 was separated by LMH Road. As advised by CCKJV, the number of site vehicles entering and leaving the site through Lin Ma Hang Road was limited in view of the work progress. As observed during site inspection, the main dust source was dominated by traffic dust in LMH Road.

Photo 3 (Bridge Y exit under LT/C6)
Wheel washing facilities were provided on a paved road within works area of Bridge Y. The condition of Bridge Y Site Exit and adjoined LMH road was satisfactory without mud and debris.

Photo 4 (Chuk Yuen Road exit under LT/C6)
Wheel washing facilities were provided on a paved road within works area of Chuk Yuen Road. The condition of Chuk Yuen Road Site Exit and adjoined LMH road was satisfactory without mud and debris.

	
Photo 5 (Bridge D Site Exit under LT/C6) Wheel washing facilities were provided on a paved road within works area of Bridge D. The condition of Bridge D Site Exit and adjoined LMH road was satisfactory without mud and debris.	**Photo 6** No adverse dust impact due to the project work was observed at AM3. Moreover, there were several site exits along LMH Road and maintenance party/ ownership of these site exits were unknown. Fugitive dust was observed when vehicles travelling on the road.
	
Photo 7 During the site inspection, road bowser for water spraying on LMH Road was observed as dust suppressive measure. The LMH Road was maintained wet and no fugitive dust was observed during vehicles travelling.	

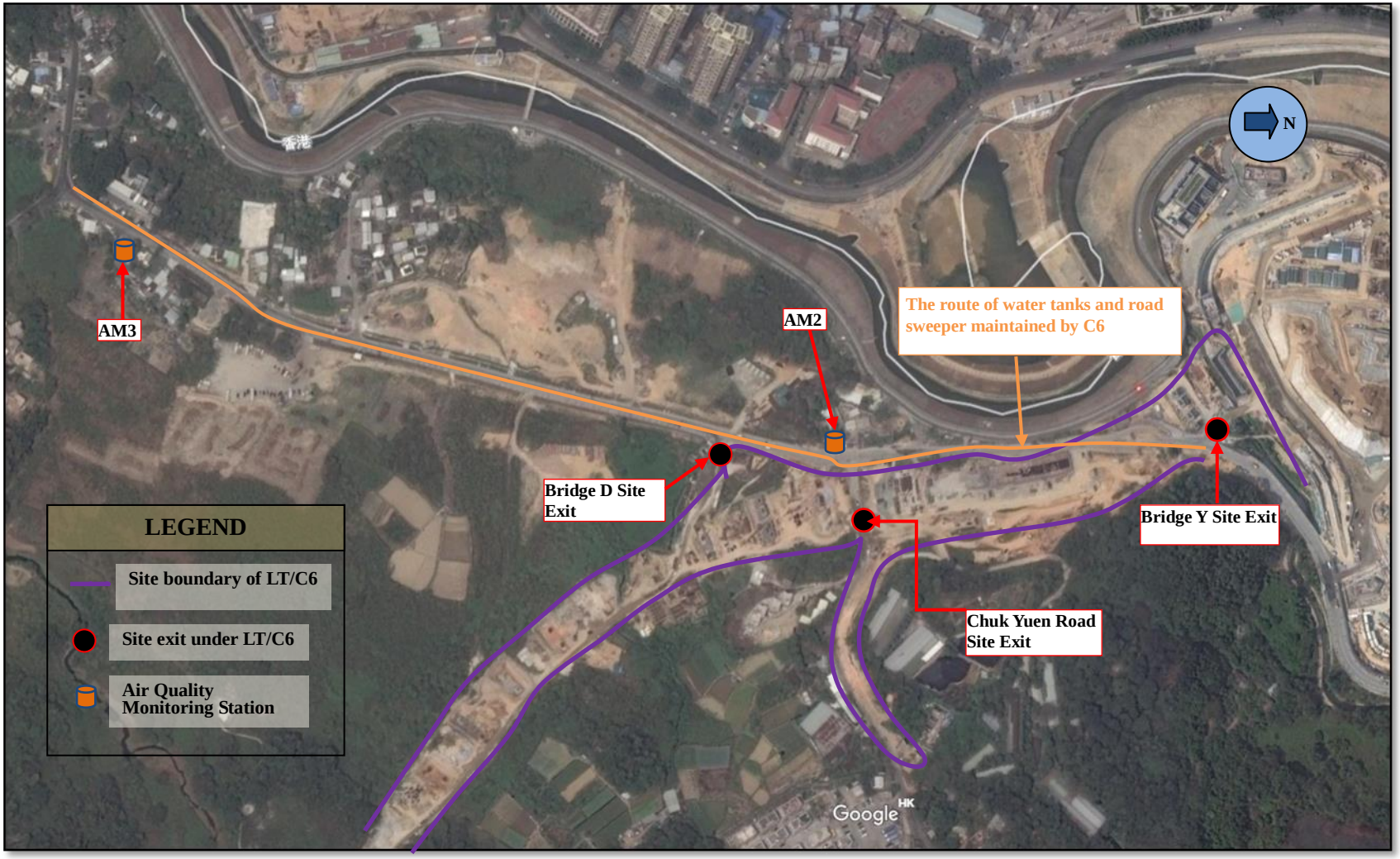


Figure 1 Layout of Air Quality Monitoring Locations AM2 and AM3

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**27 November 2018**
Our Ref	TCS00694/13/300/**F1883**	**No of Pages**	10 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008 Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works Investigation Report of Exceedance of Water Quality at Location WM3x on 27, 29 and 30 October 2018 (Contract 6)**		

Dear Sir,

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

TCS00694/13/300/F1842 dated 29 October 2018
TCS00694/13/300/F1847 dated 31 October 2018
TCS00694/13/300/F1859 dated 6 November 2018

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

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

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

Nicola Hon
Environmental Consultant
Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

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

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		27 Oct 2018	
Location		WM3x	
Time		11:25	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		13.4 AND 120% of upstream control station of the same day	12.6 AND 120% of upstream control station of the same day
Limit Level		14.0 AND 130% of upstream control station of the same day	12.9 AND 130% of upstream control station of the same day
Measured Level	**WM3-C**	5.2	7.0
	WM3x	**71.4**	**100.5**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of C6 (CCKJV), the construction activities carried out at South Portal Site (upstream of WM3x) on 27 October 2018 included construction of Sha Tau Kok Interchange and road diversion. The monitoring locations and works areas are illustrated in ***Figure 1***. 2. According to the site photo taken on 27 October 2018, turbid water was observed at WM3x while the water quality at WM3-C was clear. ***(Photos 1 & 2***) 3. Upon detection of the exceedance on 27 October 2018, inspection was carried out at the river channel crossing the works area of Contract 6 and it found that water flowing from site area of Contract 6 was clear. ***(Photo 3***) Moreover, self-checking on performance of wastewater treatment facility was conducted by CCKJV and the discharge was clear. ***(Photo 4***) 4. Weekly joint site inspection by RE, Contractor, IEC and ET was conducted on 25 October 2018 and 1 November 2018 to audit the site environmental performance. The findings of the inspection are summarized below:- (a) Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear. ***(Photo 5)*** (b) Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream. ***(Photo 6)*** (c) The construction site was general in order and no adverse water quality impact was observed. 5. In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were unlikely caused by the works under Contract 6. 6. According to Event and Action, the monitoring frequency at WM3x has	

	been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were exceedances triggered at WM3x on 29 and 30 October 2018 and another investigation will be conducted. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 27 November 2018

Photo Record

Photo 1
On 27 October 2018, the water quality at WM3x was turbid.

Photo 2
During water sampling on 27 October 2018, the water quality flowing at WM3-C was clear.

Photo 3
Upon detection of exceedance on 27 October 2018, inspection was carried out at the river channel crossing the works area of Contract 6 and it found that water flowing from site area of Contract 6 was clear.

Photo 4
Self-checking on performance of wastewater treatment facility was conducted by CCKJV on 27 October 2018 and the discharge was clear.

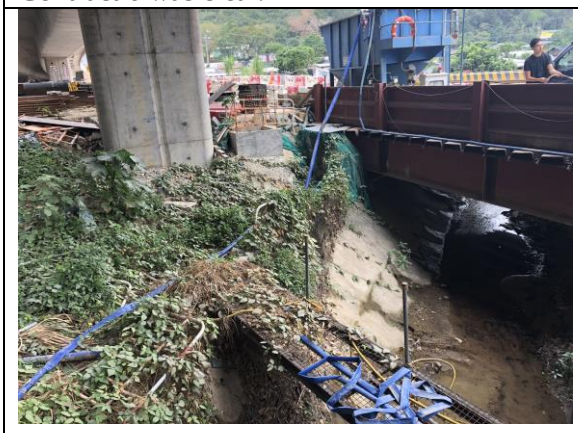


Photo 5
Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear.

Photo 6
Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream.

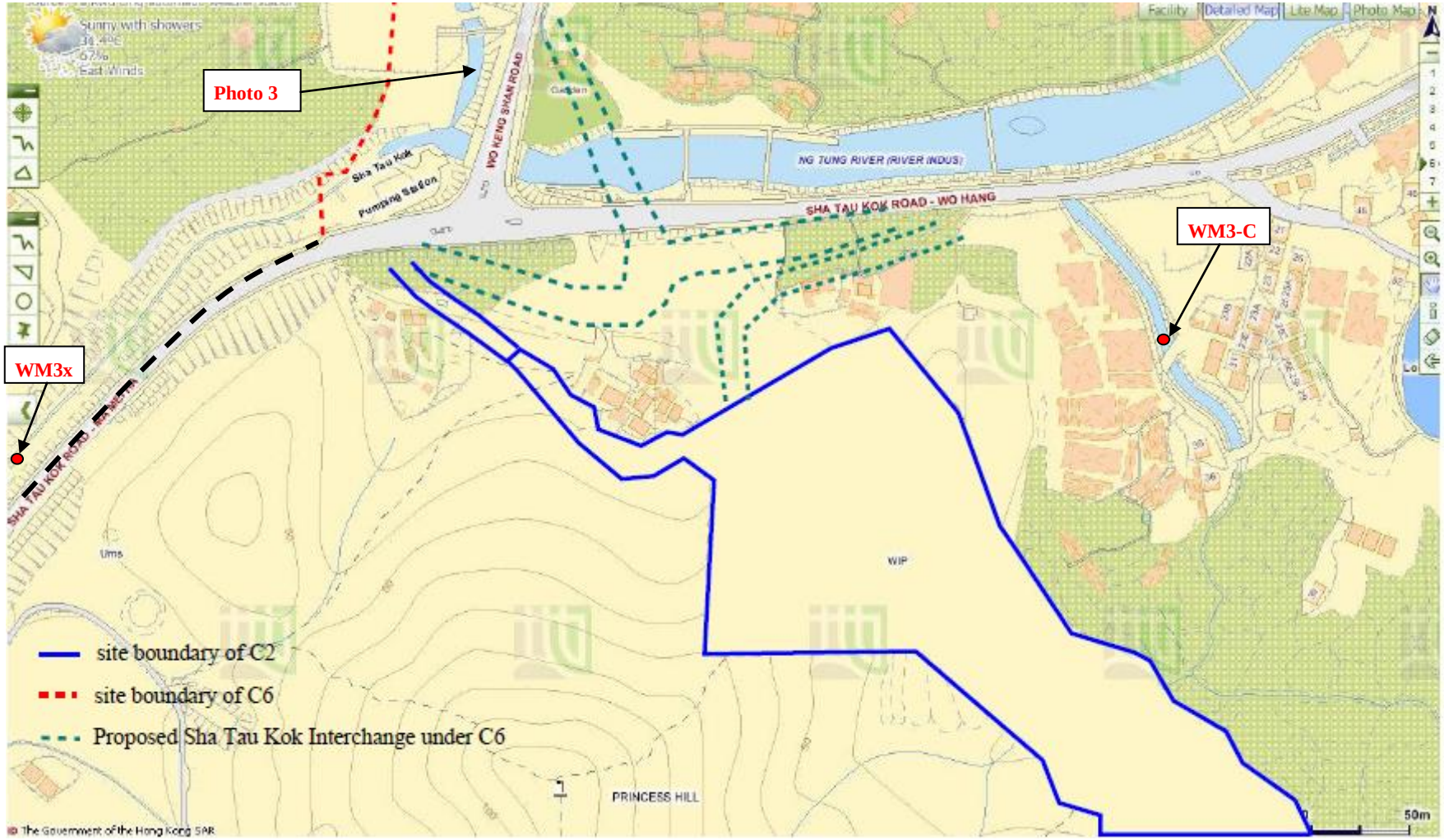


Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location

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 Oct 2018	30 Oct 2018	29 Oct 2018	30 Oct 2018
Location		WM3x			
Time		11:50	10:45	11:50	10:45
Parameter		Turbidity (NTU)		Suspended Solids (mg/L)	
Action Level		13.4 AND 120% of upstream control station of the same day		12.6 AND 120% of upstream control station of the same day	
Limit Level		14.0 AND 130% of upstream control station of the same day		12.9 AND 130% of upstream control station of the same day	
Measured Level	**WM3-C**	5.4	5.7	5.0	7.0
	WM3x	**133.5**	**178.0**	**114.5**	**213.0**
Exceedance		**Limit Level**	**Limit Level**	**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of C6 (CCKJV), the construction activities carried out at South Portal Site (upstream of WM3x) on 29 and 30 October 2018 included construction of Sha Tau Kok Interchange and road diversion. The monitoring locations and works areas are illustrated in ***Figure 1***. 2. According to the site photo taken on 29 and 30 October 2018, turbid water were observed at WM3x while the water quality at WM3-C were clear. Moreover, ingress of turbid water was observed from the adjacent access road of the channel. ***(Photos 1 to 4 & Figure 1***) 3. Upon detection of the exceedance on 29 and 30 October 2018, inspection was carried out at the river channel crossing the works area of Contract 6 and it was observed that water flowing from site area of Contract 6 was clear. ***(Photos 5 to 6***) 4. As reported by CCKJV, a fresh water supply pipe inside an excavation pit of C6's temporary site near Tai Tong Wu Village was incidentally bursted in the early morning of 29 October 2018 and the leaked water immediately filled up the excavation pit. ***(Photo 7***) Due to large amount of uncontrolled water leakage from the water pipe, turbid water inside the excavation pit was overflowed to the adjoined channel directly. ***(Photo 8***) CCKJV advised that the fresh water supply pipe was owned by Water Supplies Department (WSD) and maintenance work has been undertaken by WSD on the same day. However, large amount of turbid water retained at the edge of the adjoined channel which affecting the water quality at WM3x on both 29 and 30 October 2018. 5. Weekly joint site inspection by RE, Contractor, IEC and ET was conducted on 1 November 2018 to audit the site environmental performance. The findings of the inspection are summarized below:- (a) Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear. ***(Photo 9)***			

	(b) Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream. ***(Photo 10)*** (c) The construction site was general in order and no adverse water quality impact was observed. 6. In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. Since the burst water pipe is not caused by the contract works, it is considered that the exceedances were related to the one-off incident and unlikely caused by the works under Contract 6. 7. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM3x on 31 October and 1 November 2018. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 27 November 2018

Photo Record

Photo 1
On 29 October 2018, the water quality at WM3x was turbid. Moreover, ingress of turbid water was observed from the adjacent access road of the channel.

Photo 2
During water sampling on 29 October 2018, the water quality flowing at WM3-C was clear.

Photo 3
On 30 October 2018, the water quality at WM3x was turbid. Moreover, ingress of turbid water was observed from the adjacent access road of the channel.

Photo 4
During water sampling on 30 October 2018, the water quality flowing at WM3-C was clear.

Photo 5
Upon detection of exceedance on 29 October 2018, inspection was carried out at the river channel crossing the works area of Contract 6 and it found that water flowing from site area of Contract 6 was clear.

Photo 6
Upon detection of exceedance on 30 October 2018, inspection was carried out at the river channel crossing the works area Contract 6 and it found that water flowing from site area of Contract 6 was clear.

Photo 7

As reported by CCKJV, a fresh water supply pipe inside an excavation pit of C6's temporary site near Tai Tong Wu Village was incidentally bursted in the early morning of 29 October 2018 and the leaked water immediately filled up the excavation pit. CCKJV advised that the fresh water supply pipe was owned by WSD and maintenance work has been undertaken by WSD on the same day.

Photo 8

Due to large amount of uncontrolled water leakage from the water pipe, turbid water inside the excavation pit was overflowed to the adjoined channel directly. Large amount of turbid water retained at the edge of the adjoined channel which affecting the water quality at WM3x on both 29 and 30 October 2018.

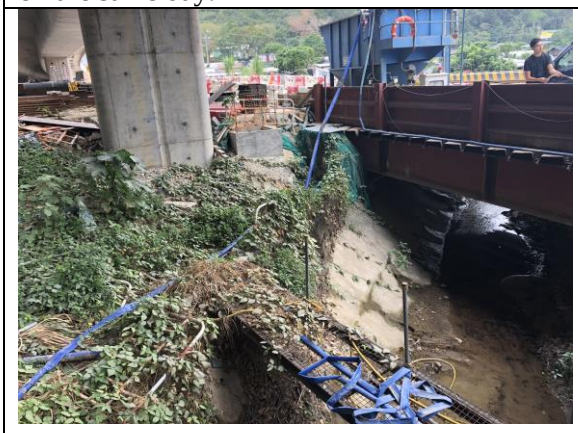


Photo 9

Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear.

Photo 10

Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream.

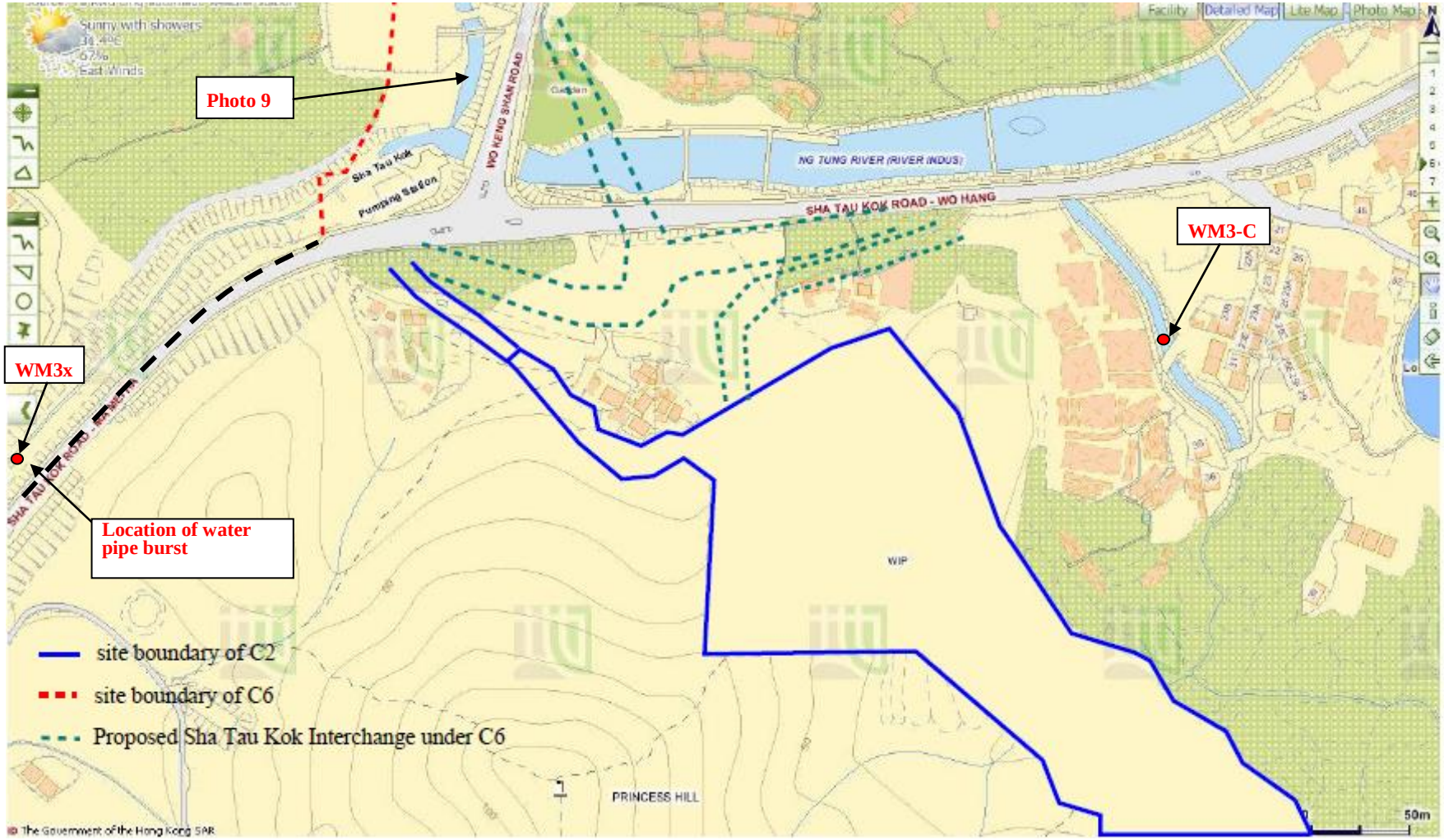


Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location

AUES

Fax Cover Sheet

To	**Mr. Alan Kam**	**Fax No**	**2717 3299**
Company	**Dragages Hong Kong Limited**		
cc			
From	**Nicola Hon**	**Date**	**29 November 2018**
Our Ref	TCS00697/13/300/**F1884a**	**No of Pages**	12 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008** **Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works** **Investigation Report of Exceedance of Water Quality at Location WM3x on 27, 29 and 30 October 2018 (Contract 2)**		

Dear Mr. Lee,

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

TCS00694/13/300/F1843 dated 29 October 2018
TCS00694/13/300/F1848 dated 31 October 2018
TCS00694/13/300/F1860 dated 6 November 2018

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

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

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

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Edwin Ching (CRE, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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

Project		CE 45/2008	
Date		27 Oct 2018	
Location		WM3x	
Time		11:25	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		13.4 AND 120% of upstream control station of the same day	12.6 AND 120% of upstream control station of the same day
Limit Level		14.0 AND 130% of upstream control station of the same day	12.9 AND 130% of upstream control station of the same day
Measured Level	**WM3-C**	5.2	7.0
	WM3x	**71.4**	**100.5**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures			

1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 27 October 2018 at North Portal Site included construction permanent drainage and of slip road, cladding installation, E&M work, road paving inside tunnel, fit out and E&M works for the ventilation building as well as landscaping work. Besides, building fit out, permanent drainage and E&M installation and landscaping works were carried out at Admin Building Site Portal. The relevant works area under C2 and the water monitoring locations are illustrated in ***Figure 1***.
2. According to the site photo taken on 27 October 2018, turbid water was observed at WM3x while the water quality at WM3-C was clear. ***(Photos 1 & 2***)
3. DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on daily basis while there was no discharge made in Admin Building. DHK reported that the visual test result revealed that the quality of discharge was acceptable under supervision by RE. ***(Photo 3***)
4. Joint site inspections with AECOM, IEC, DHK and ET were carried out on 26 October and 2 November 2018, the observation and implementation of water quality mitigation measures are summarized below.
   (a) Wastewater treatment facilities were in place at North Portal Site properly, and the water quality outside the discharge point at downstream Loi Tung Stream was visually clear. ***(Photos 4 and 5***)
   (b) At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited. The water quality at the adjacent channel was clear. ***(Photos 6 and 7***)
5. In our investigation, the Contractor had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified at North Portal Site and Admin Building Site during site inspection. It is considered that the exceedances were unlikely caused by the works under Contract 2.
6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were exceedances triggered at WM3x on 29 and 30 October 2018 and another investigation will be conducted. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 29 November 2018

Photo Record

Photo 1
On 27 October 2018, the water quality at WM3x was turbid.

Photo 2
During water sampling on 27 October 2018, the water quality flowing at WM3-C was clear.

Photo 3
DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on 27 Oct 2018. DHK reported that the visual test result revealed that the quality of discharge was acceptable under supervision by RE.

Photo 4
During site inspection on 2 November 2018, wastewater treatment facilities were in place at North Portal Site and the effluent quality to be discharge was visually clear.

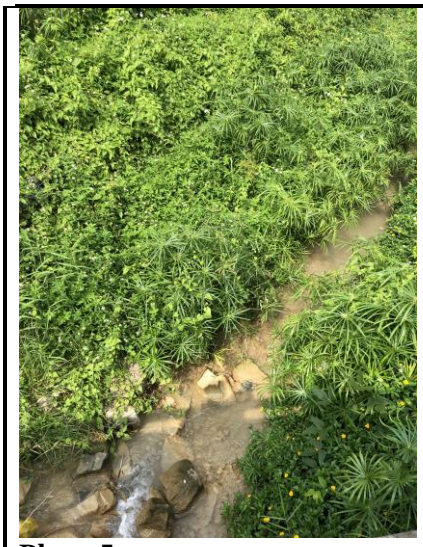

Photo 5
The water quality at Loi Tung steam which located at downstream of North Portal Site was visually clear.

Photo 6
At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited.

Photo 7
At Admin Building Site, the water quality at the adjacent channel was clear.

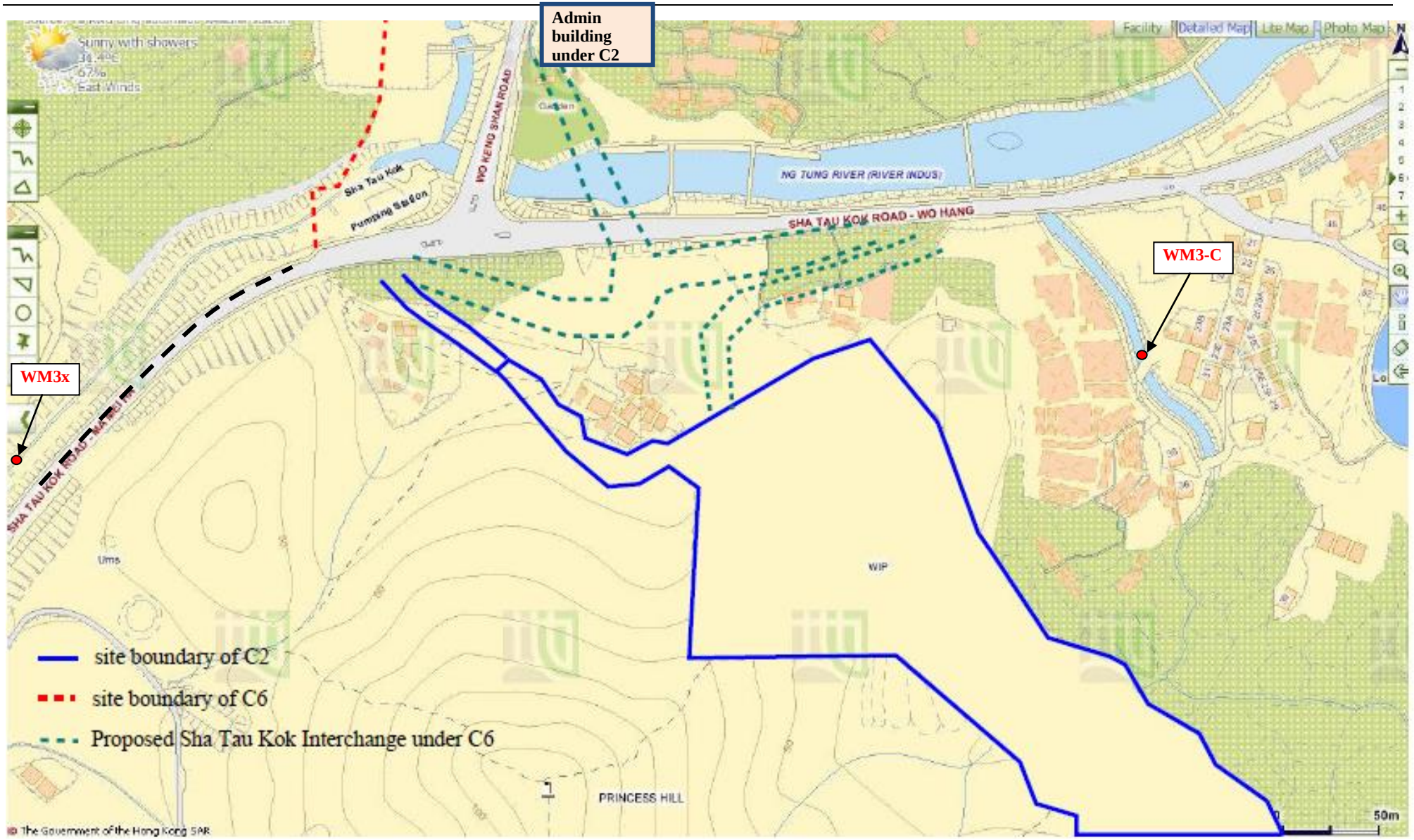

Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

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 Oct 2018	30 Oct 2018	29 Oct 2018	30 Oct 2018
Location		WM3x			
Time		11:50	10:45	11:50	10:45
Parameter		Turbidity (NTU)		Suspended Solids (mg/L)	
Action Level		13.4 AND 120% of upstream control station of the same day		12.6 AND 120% of upstream control station of the same day	
Limit Level		14.0 AND 130% of upstream control station of the same day		12.9 AND 130% of upstream control station of the same day	
Measured Level	**WM3-C**	5.4	5.7	5.0	7.0
	WM3x	**133.5**	**178.0**	**114.5**	**213.0**
Exceedance		**Limit Level**	**Limit Level**	**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures					

1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 29 and 30 October 2018 at North Portal Site included construction permanent drainage and of slip road, cladding installation, E&M work, road paving inside tunnel, fit out and E&M works for the ventilation building as well as landscaping work. Besides, building fit out, permanent drainage and E&M installation and landscaping works were carried out at Admin Building Site Portal. The relevant works area under C2 and the water monitoring locations are illustrated in ***Figure 1***.

2. According to the site photo taken on 29 and 30 October 2018, turbid water were observed at WM3x while the water quality at WM3-C were clear. Moreover, ingress of turbid water was observed from the adjacent access road of the channel. ***(Photos 1 to 4 & Figure 1***)

3. DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on daily basis while there was no discharge made in Admin Building. DHK reported that the visual test result revealed that the quality of discharge was acceptable under supervision by RE. ***(Photos 5 & 6***)

4. As reported by the Contractor of Contract 6, a fresh water supply pipe inside an excavation pit of C6's temporary site near Tai Tong Wu Village was incidentally bursted in the early morning of 29 October 2018 and the leaked water immediately filled up the excavation pit. ***(Photo 7***) Due to large amount of uncontrolled water leakage from the water pipe, turbid water inside the excavation pit was overflowed to the adjoined channel directly. ***(Photo 8***) The Contractor advised that the fresh water supply pipe was owned by Water Supplies Department (WSD) and maintenance work has been undertaken by WSD on the same day. However, large amount of turbid water retained at the edge of the adjoined channel which affecting the water quality at WM3x on both 29 and 30 October 2018.

5. Joint site inspections with AECOM, IEC, DHK and ET were carried out on 26 October and 2 November 2018, the observation and implementation of water quality mitigation measures are summarized below.

   (a) Wastewater treatment facilities were in place at North Portal Site properly, and the water quality outside the discharge point at downstream Loi Tung Stream was visually clear. ***(Photos 9 and 10***)

   (b) At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited. The water quality at the adjacent channel was clear. ***(Photos 11 and 12***)

6. In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site

	inspection. Since the burst water pipe is not caused by the contract works, it is considered that the exceedances were related to the one-off incident and unlikely caused by the works under Contract 2. 7. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM3x on 31 October and 1 November 2018. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 29 November 2018

Photo Record

Photo 1
On 29 October 2018, the water quality at WM3x was turbid. Moreover, ingress of turbid water was observed from the adjacent access road of the channel.

Photo 2
During water sampling on 29 October 2018, the water quality flowing at WM3-C was clear.

Photo 3
On 30 October 2018, the water quality at WM3x was turbid. Moreover, ingress of turbid water was observed from the adjacent access road of the channel.

Photo 4
During water sampling on 30 October 2018, the water quality flowing at WM3-C was clear.

Photo 5
DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on 29 Oct 2018. DHK reported that the visual test result revealed that the quality of discharge was acceptable under supervision by RE.

Photo 6
DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on 30 Oct 2018. DHK reported that the visual test result revealed that the quality of discharge was acceptable under supervision by RE.

Photo 7
As reported by Contractor of C6, a fresh water supply pipe inside an excavation pit of C6's temporary site near Tai Tong Wu Village was incidentally bursted in the early morning of 29 October 2018 and the leaked water immediately filled up the excavation pit. CCKJV advised that the fresh water supply pipe was owned by WSD and maintenance work has been undertaken by WSD on the same day.

Photo 8
Due to large amount of uncontrolled water leakage from the water pipe, turbid water inside the excavation pit was overflowed to the adjoined channel directly. Large amount of turbid water retained at the edge of the adjoined channel which affecting the water quality at WM3x on both 29 and 30 October 2018.

Photo 9
During site inspection on 2 November 2018, wastewater treatment facilities were in place at North Portal Site and the effluent quality to be discharge was visually clear.

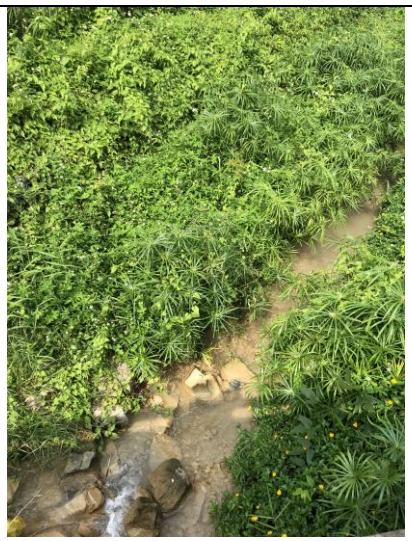

Photo 10
The water quality at Loi Tung steam which located at downstream of North Portal Site was visually clear.

Photo 11
At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited.

Photo 12
At Admin Building Site, the water quality at the adjacent channel was clear.

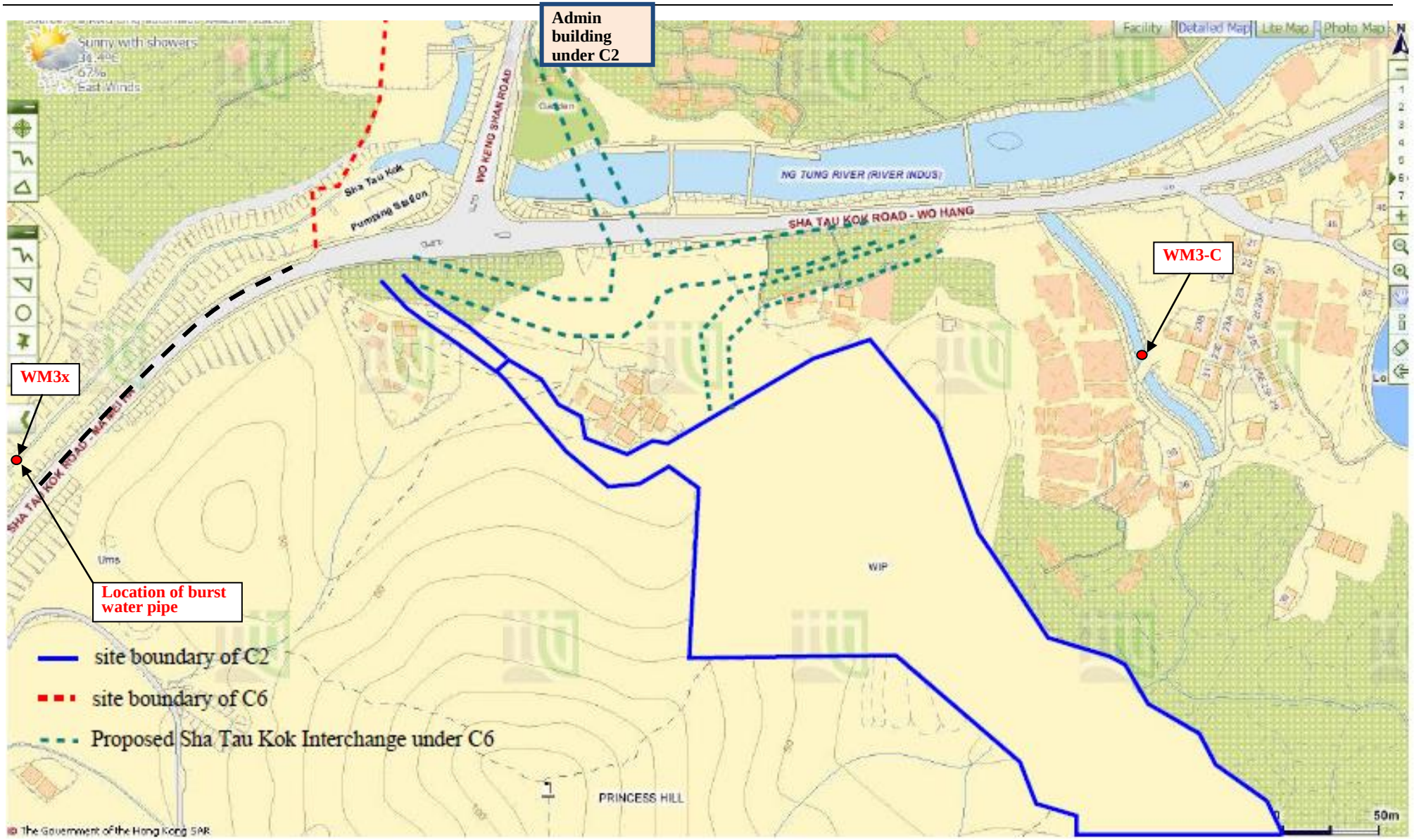

Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

AUES **Fax Cover Sheet**

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**27 November 2018**
Our Ref	TCS00694/13/300/**F1892a**	**No of Pages**	6 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008 Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works Investigation Report of Exceedance of Water Quality at Location WM2A(a) on 2 November 2018**		

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Dear Sir,

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

TCS00694/13/300/F1850 dated 2 November 2018
TCS00694/13/300/F1875 dated 18 November 2018

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

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

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

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

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Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		2 November 2018	
Location		WM2A(a)	
Time		10:45	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		24.9 AND 120% of upstream control station of the same day	14.6 AND 120% of upstream control station of the same day
Limit Level		33.8 AND 130% of upstream control station of the same day	17.3 AND 130% of upstream control station of the same day
Measured Levels	**WM2A-C**	14.1	6.5
	WM2A(a)	**120.0**	**95.5**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of Contract 6 (CCKJV), construction activities carried out on 2 November 2018 at Bridge D (upstream of WM2A(a)) was mainly bridge construction. The monitoring locations and work boundary are shown in ***Figure 1***. 2. According to the site photo taken by the monitoring team on 2 November 2018, muddy water was observed in WM2A(a) while the water quality at WM2A-C was clear. ***(Photos 1 to 2)*** 3. Upon detection of the turbidity exceedance, inspection was carried out at Nylon Dam which located at the intermediate of the construction site. It was observed that the water quality in the existing stream near Nylon Dam was in good condition. ***(Photo 3 and Figure 1)*** 4. During joint site inspection with the RE, IEC, CCKJV and ET on 18 October 2018, there was a construction area owned by another project discharging turbid water to the stream. As advised by CCKJV, the improper discharge from another project work was happened occasionally which affected the stream water quality. ***(Photo 4 and Figure 1)*** The construction site was still in operation on the exceedance date. 5. Weekly joint site inspections among the RE, IEC, CCKJV and ET were conducted on 1 November 2018 at Bridge D to audit the site environmental performance and implementation of mitigation measures, the observation during the site inspection is summarized below. (a) Bridge construction work was carried out at Bridge D. It was noted that wastewater generated from construction works was limited and CCKJV advised that there was no discharge on 1 November 2018. (***Photos 5 and 6)*** (b) It was observed that the water quality in the existing stream near Nylon Dam was in good condition. (***Photo 7)*** (c) Wastewater treatment facilites were properly provided for Bridge D	

	and funcation properly. (***Figure 1)*** (d) As water quality mitigation measures, open slopes were covered with tarpaulin sheet or hard paved as far as practicable to minimize muddy runoff. (***Photo 8)*** 6. In our investigation, CCKJV had implemented water quality mitigation measures such as providing tarpaulin sheet for open slope and surface to minimize muddy runoff. Since improper discharge from another project was happened occasionally which affected the stream water quality and there was no adverse water quality impact observed during the site inspection at works area of Bridge D. It is concluded that the exceedances were unlikely caused by the works under the Project. 7. According to the Event and Action Plan, the frequency of water monitoring shall be increased to daily when exceedance recorded. There were no exceedances recorded at subsequent monitoring on 3 and 5 November 2018. Nevertheless, the Contractor should continue implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 27 November 2018

Photo Record

Photo 1

On 2 November 2018, muddy water was observed at WM2A(a).

Photo 2

On 2 November 2018, the water quality at WM2A-C was clear.

Photo 3

On 2 November 2018, it was observed that the water quality in the existing stream near Nylon Dam was in good condition.

Photo 4

During joint site inspection on 18 October 2018, there was a construction area owned by another project discharging turbid water to the stream. As advised by CCKJV, the improper discharge from another project work was happened occasionally.

Photo 5

During site inspection on 1 November 2018, it was noted that wastewater generated from construction works was limited and CCKJV advised that there was no discharge on 1 November 2018.

Photo 6

Bridge construction work was carried out at Bridge D and wastewater generated from construction works was limited.

Photo 7

During joint site inspection on 1 November 2018, it was observed that the water quality in the existing stream near Nylon Dam was in good condition.

Photo 8

Open slopes were covered with tarpaulin sheet as far as practicable to minimize muddy runoff.

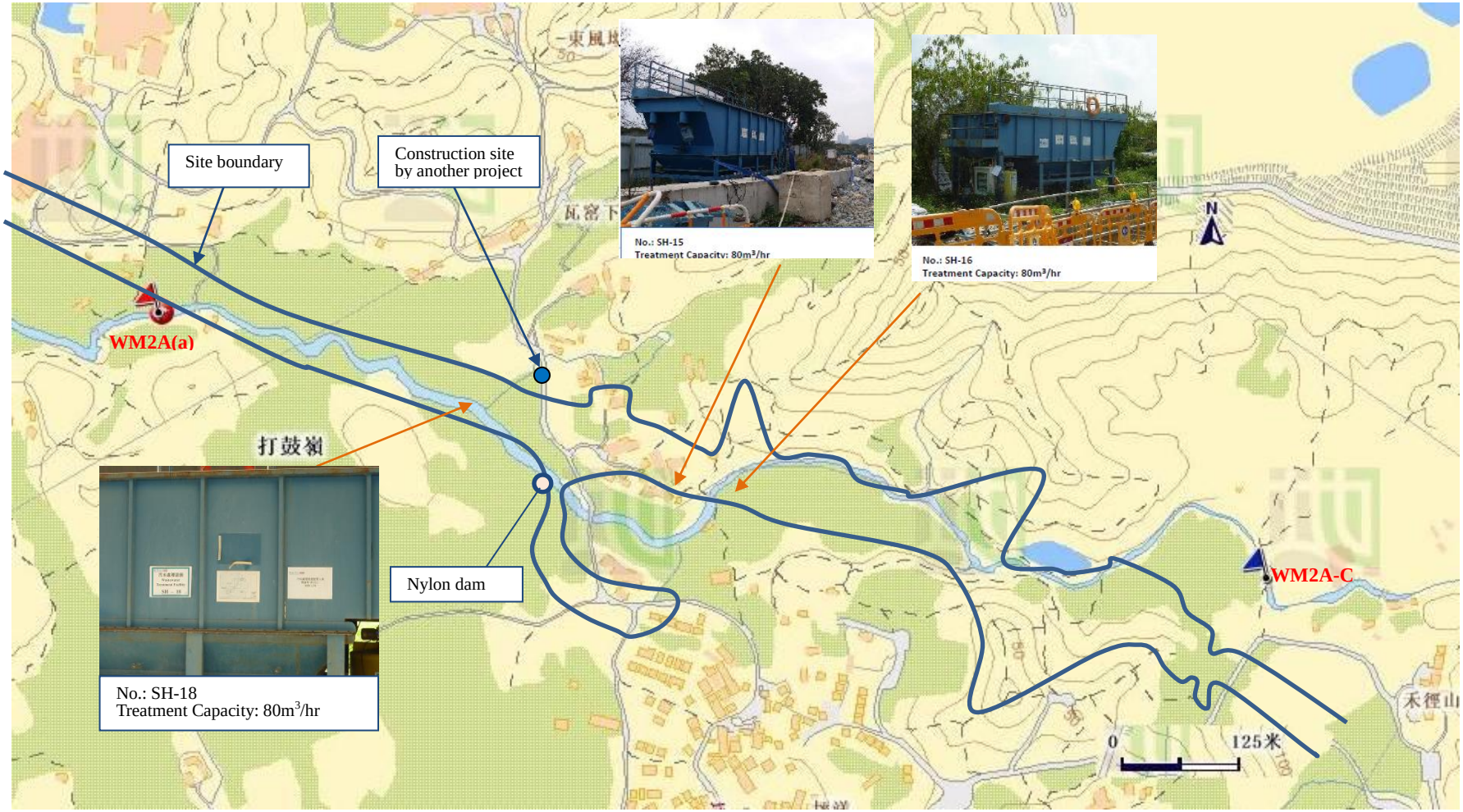

Figure 1 Location Map for Water Quality Monitoring Locations WM2A(a), WM2A-Control and work area under Contract

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**4 December2018**
Our Ref	TCS00694/13/300/**F1893**	**No of Pages**	6 **(Incl. cover sheet)**

RE **Agreement No. CE 45/2008**
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM3x on 10 November 2018 (Contract 6)

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Dear Sir,

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

TCS00694/13/300/F1868 dated 12 November 2018
TCS00694/13/300/F1883 dated 19 November 2018

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

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

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

Nicola Hon
Environmental Consultant
Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

安順聯合環境服務及顧問
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Flat A, 20/F, Gold King Industrial Building,
35-41, Tai Lin Pai Road,
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Tel (852) 2959-6059 Fax (852) 2959-6079

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		10 November 2018	
Location		WM3x	
Time		10:15	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		13.4 AND 120% of upstream control station of the same day	12.6 AND 120% of upstream control station of the same day
Limit Level		14.0 AND 130% of upstream control station of the same day	12.9 AND 130% of upstream control station of the same day
Measured Level	**WM3-C**	34.8	38.5
	WM3x	**Overrange (>999)**	**3130.0**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of C6 (CCKJV), the construction activities carried out at South Portal Site (upstream of WM3x) on 10 November 2018 included construction of Sha Tau Kok Interchange and road diversion. The monitoring locations and works areas are illustrated in ***Figure 1***. 2. According to the site photo taken on 10 November 2018, muddy water was observed at WM3x while the water quality at WM3-C was clear. ***(Photos 1 to 2 & Figure 1***) 3. As reported by CCKJV, a temporary water supply pipe burst inside Sha Tau Kok Interchange works area in the morning of 10 November 2018. As water quality mitigation measure, the slope adjacent the works area was covered by tarpaulin sheet to minimize muddy runoff. As remedial action, CCKJV immediately diverted the muddy water to the nearby wastewater treatment facility. However, the capacity of wastewater treatment facility was insufficient to cater unexpected large amount of muddy water generated by the incident, some uncontrolled leaked water from the burst pipe washed out the soil surface of the site and leaded to large amount of muddy water gushed down to the adjacent channel. ***(Photos 3 & 4)*** 4. Weekly joint site inspection by RE, Contractor, IEC and ET was conducted on 8 and 15 November 2018 to audit the site environmental performance. The findings of the inspection are summarized below:- (a) CCKJV has properly maintained water quality mitigation measures, such as covering the slope by tarpaulin sheet adjacent to the channel. ***(Photo 5)*** (b) Wastewater treatment facilities at South Portal were function properly. On 8 November 2018, disconnected pipe of AquaSed and muddy water discharge were observed at Bridge A. CCKJV re-connected the pipe instantly and it noticed that the muddy water discharge only lasted very short period of time which considered as an one-off incident. On 15 November 2018, it was observed that the water flowing in river channel within the construction site was visually clear. ***(Photo 6)***	

	(c) Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream. ***(Photo 7)*** (d) The construction site was general in order and no adverse water quality impact was observed. 5. In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were caused to the isolated incident of burst water pipe which related to the works under Contract 6. 6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM3x on 12 and 13 November 2018. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 4 December 2018

Photo Record

Photo 1
On 10 November 2018, muddy water was observed at WM3x.

Photo 2
During water sampling on 10 November 2018, the water quality flowing at WM3-C was clear.

Photo 3
As reported by CCKJV, a temporary water supply pipe burst inside Sha Tau Kok Interchange works area in the morning of 10 November 2018. As water quality mitigation measure, the slope adjacent the works area was covered by tarpaulin sheet to minimize muddy runoff. As remedial action, CCKJV immediately diverted the muddy water to the nearby wastewater treatment facility.

Photo 4
The capacity of wastewater treatment facility was insufficient to cater unexpected large amount of muddy water generated by the incident, some uncontrolled leaked water from the burst pipe washed out the soil surface of the site and leaded to large amount of muddy water gushed down to the adjacent channel.

 **Photo 5** CCKJV has properly maintained water quality mitigation measures, such as covering the slope by tarpaulin sheet adjacent to the channel.	 **Photo 6** Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear.
 **Photo 7** Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream.	

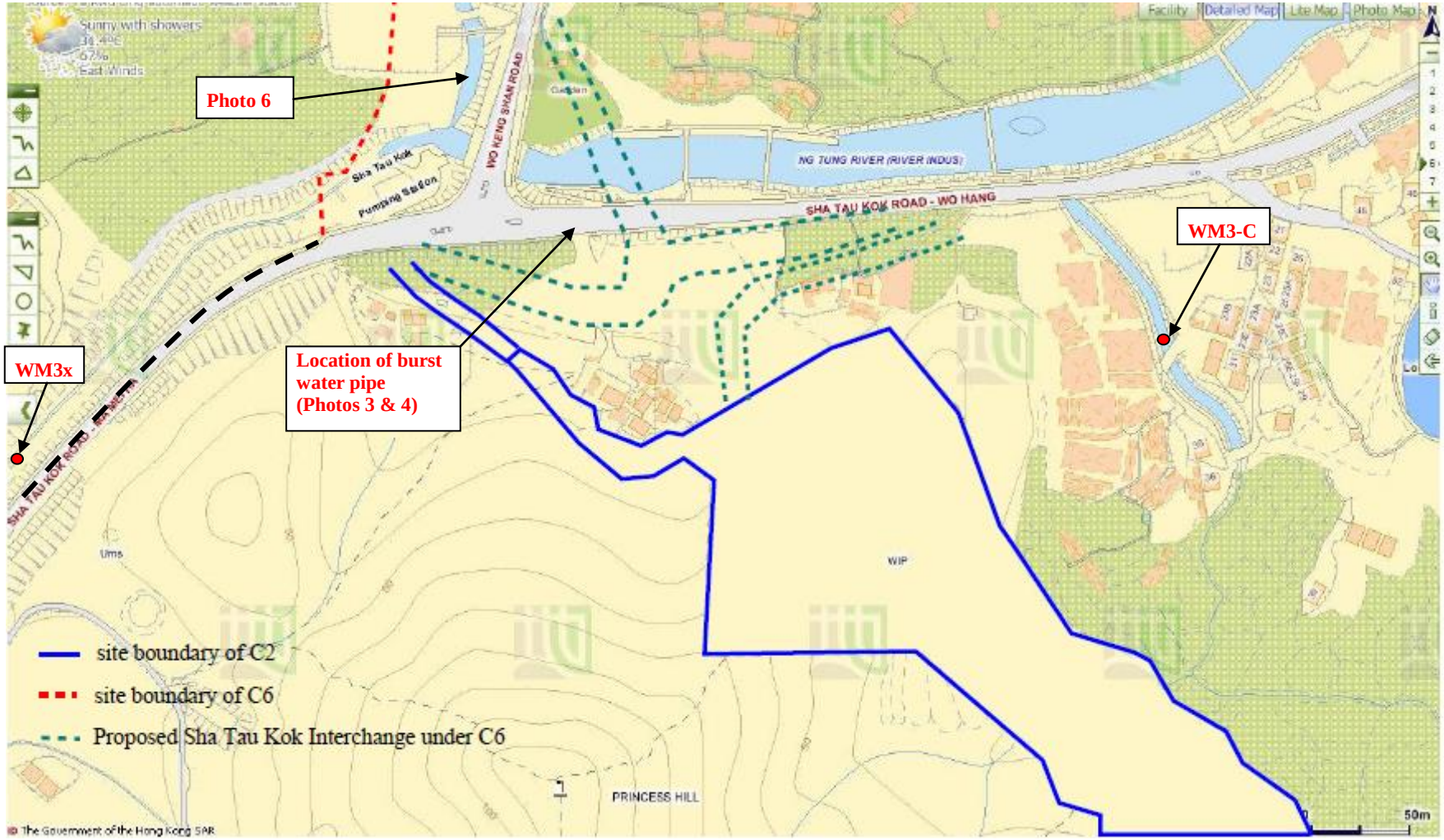

Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**4 December2018**
Our Ref	TCS00694/13/300/**F1898a**	**No of Pages**	5 **(Incl. cover sheet)**

RE **Agreement No. CE 45/2008**
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM3x on 17 November 2018 (Contract 6)

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Dear Sir,

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

TCS00694/13/300/F1881 dated 19 November 2018
TCS00694/13/300/F1895 dated 27 November 2018

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

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

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

Nicola Hon
Environmental Consultant
Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Simon Leung (ER of C6/ AECOM)	Fax:	2251 0698
	Mr. Antony Wong (IEC, SMEC)		By email

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Tel (852) 2959-6059 Fax (852) 2959-6079

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project		CE 45/2008	
Date		17 November 2018	
Location		WM3x	
Time		10:30	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		13.4 AND 120% of upstream control station of the same day	12.6 AND 120% of upstream control station of the same day
Limit Level		14.0 AND 130% of upstream control station of the same day	12.9 AND 130% of upstream control station of the same day
Measured Level	**WM3-C**	7.1	10.0
	WM3x	**99.1**	**79.0**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures		1. According to the site information provided by the Contractor of C6 (CCKJV), the construction activities carried out at South Portal Site (upstream of WM3x) on 17 November 2018 included construction of Sha Tau Kok Interchange and road diversion. The monitoring locations and works areas are illustrated in ***Figure 1***. 2. According to the site photo taken on 17 November 2018, turbid water was observed at WM3x while the water quality at WM3-C was clear. ***(Photos 1 to 2 & Figure 1***) 3. Upon detection of the exceedance on 17 November 2018, inspection was carried out at the river channel crossing the works area of Contract 6 and it found that water flowing from site area of Contract 6 was clear. ***(Photo 3***) However, it was observed that earthwork was carried out in Tai Tong Wu Village by other party and ingress of muddy water was from an outfall of Tai Tong Wu was observed. ***(Photo 4 and Figure 1***) 4. Weekly joint site inspection by RE, Contractor, IEC and ET was conducted on 15 November 2018 to audit the site environmental performance. The findings of the inspection are summarized below:- (a) Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear. ***(Photo 5)*** (b) Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream. ***(Photo 6)*** (c) The construction site was general in order and no adverse water quality impact was observed. 5. In our investigation, the Contractor had implemented water quality mitigation measures and no adverse water quality impact was observed during site inspection. It is considered that the exceedances were related to the ingress of muddy water from other party and unlikely caused by the works under Contract 6.	

	6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM3x on 19 and 20 November 2018. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

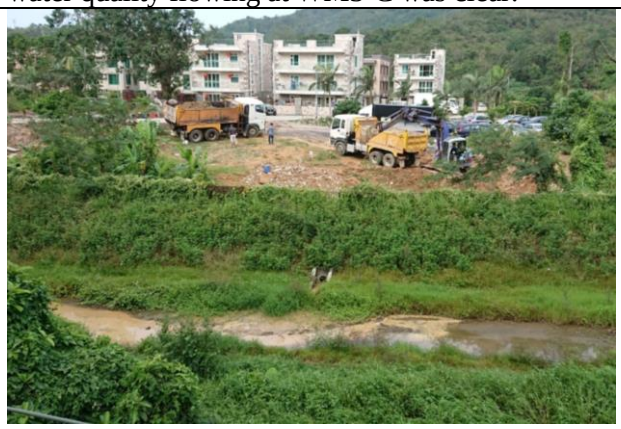
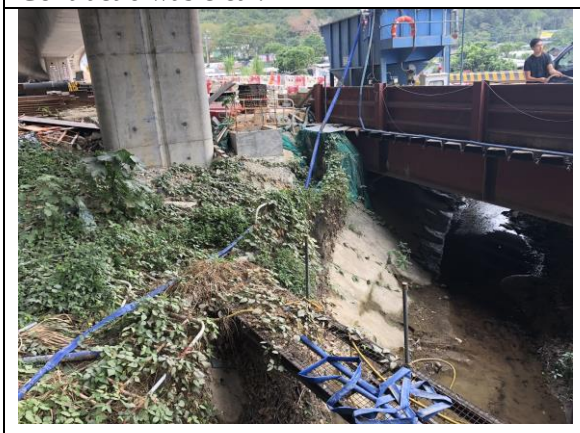
Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 4 December 2018

Photo Record

 **Photo 1** On 17 November 2018, turbid water was observed at WM3x.	 **Photo 2** During water sampling on 17 November 2018, the water quality flowing at WM3-C was clear.
 **Photo 3** Upon detection of the exceedance on 17 November 2018, inspection was carried out at the river channel crossing the works area of Contract 6 and it found that water flowing from site area of Contract 6 was clear.	 **Photo 4** During water monitoring on 17 November 2018, it was observed that earthwork was carried out in Tai Tong Wu Village by other party and ingress of muddy water was from an outfall of Tai Tong Wu was observed.
 **Photo 5** Wastewater treatment facilities at South Portal were function properly and the water flowing in river channel within the construction site was visually clear.	 **Photo 6** Site hoarding with footing sealed was erected at site boundary which adjacent to the stream to minimize the risk of site runoff flowing into the exiting stream.

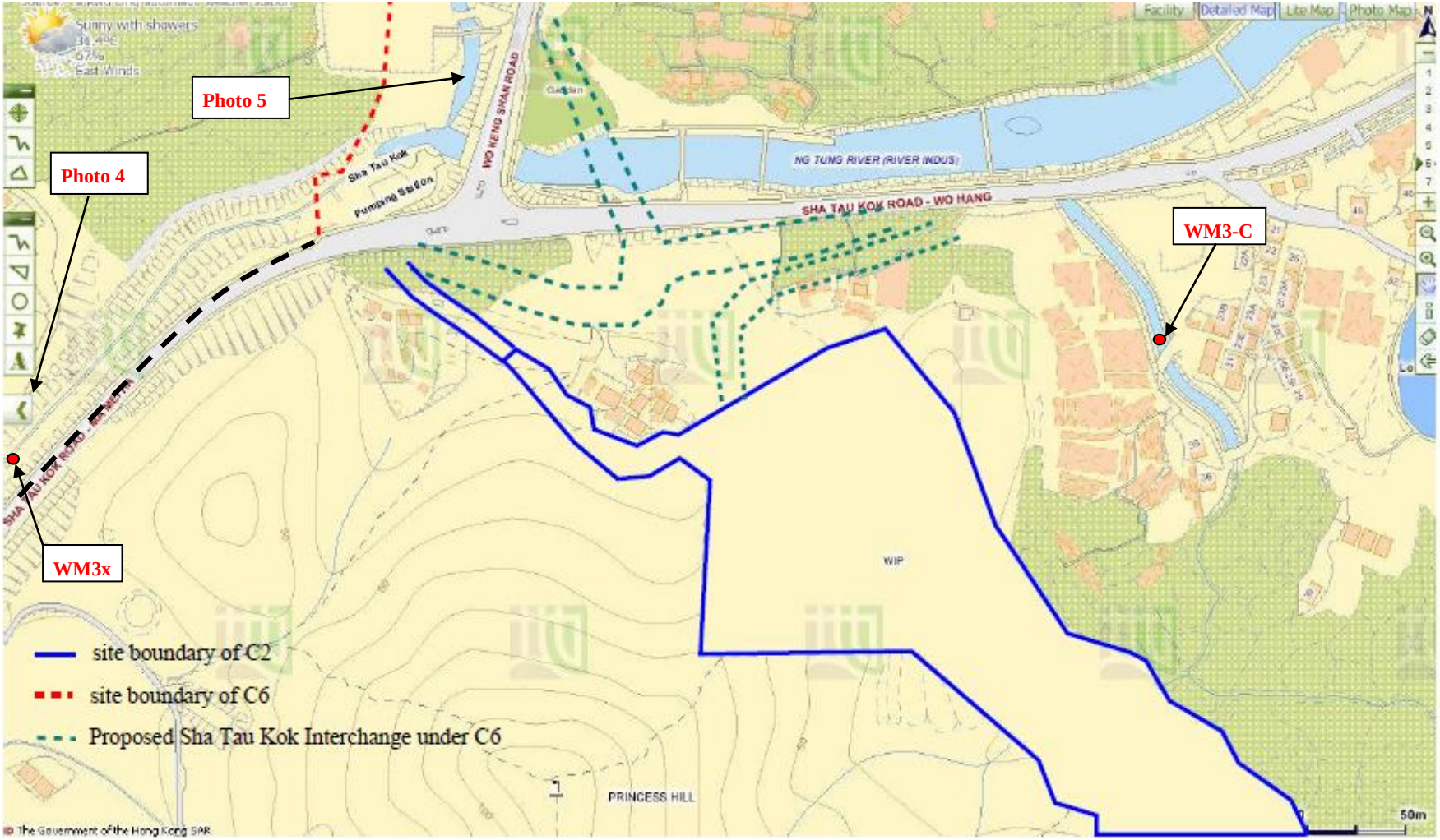


Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location

AUES

Fax Cover Sheet

To	**Mr. Alan Kam**	**Fax No**	**2717 3299**
Company	**Dragages Hong Kong Limited**		
cc			
From	**Nicola Hon**	**Date**	**10 December 2018**
Our Ref	TCS00697/13/300/**F1894a**	**No of Pages**	6 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008** **Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works** **Investigation Report of Exceedance of Water Quality at Location WM3x on 10 November 2018 (Contract 2)**		

Dear Sir,

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

TCS00694/13/300/F1869 dated 12 November 2018
TCS00694/13/300/F1884 dated 19 November 2018

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

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

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

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Edwin Ching (CRE, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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Tel (852) 2959-6059 Fax (852) 2959-6079

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

Project		CE 45/2008	
Date		10 November 2018	
Location		WM3x	
Time		10:15	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		13.4 AND 120% of upstream control station of the same day	12.6 AND 120% of upstream control station of the same day
Limit Level		14.0 AND 130% of upstream control station of the same day	12.9 AND 130% of upstream control station of the same day
Measured Level	**WM3-C**	34.8	38.5
	WM3x	**Overrange (>999)**	**3130.0**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures			

1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 10 November 2018 at North Portal Site included construction of permanent drainage and slip road, cladding installation, E&M work, road paving inside tunnel, fit out and E&M works for the ventilation building as well as landscaping work. Besides, building fit out, permanent drainage and E&M installation and landscaping works were carried out at Admin Building Site Portal. The relevant works area under C2 and the water monitoring locations are illustrated in ***Figure 1***.
2. According to the site photo taken on 10 November 2018, muddy water was observed at WM3x while the water quality at WM3-C was clear. ***(Photos 1 to 2 & Figure 1***)
3. As reported by the Contractor of Contract 6 (CCKJV), a temporary water supply pipe burst inside Sha Tau Kok Interchange works area under Contract 6 in the morning of 10 November 2018. As water quality mitigation measure, the slope adjacent the works area was covered by tarpaulin sheet to minimize muddy runoff. As remedial action, CCKJV immediately diverted the muddy water to the nearby wastewater treatment facility. However, the capacity of wastewater treatment facility was insufficient to cater unexpected large amount of muddy water generated by the incident, some uncontrolled leaked water from the burst pipe washed out the soil surface of the site and leaded to large amount of muddy water gushed down to the adjacent channel. ***(Photos 3 & 4)***
4. DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on daily basis while there was no discharge made in Admin Building. DHK reported that the visual test result revealed that the quality of discharge on 10 November 2018 was acceptable under supervision by RE. ***(Photo 5***)
5. Joint site inspections with AECOM, IEC, DHK and ET were carried out on 9 November 2018, the observation and implementation of water quality mitigation measures are summarized below.
   (a) Wastewater treatment facilities were in place at North Portal Site properly, and the water quality outside the discharge point at downstream Loi Tung Stream was visually clear. ***(Photos 6 and 7***)
   (b) At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited. The water quality at the adjacent channel was clear. ***(Photos 8 and 9***)
6. In our investigation, the Contractor had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was

	identified at North Portal Site and Admin Building Site during site inspection. It is considered that the exceedances were caused to the isolated incident of burst water pipe under Contract 6 and unlikely caused by the works under Contract 2. 7. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered at WM3x on 12 and 13 November 2018. Nevertheless, the Contractor should continually fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 10 December 2018

Photo Record

Photo 1
On 10 November 2018, muddy water was observed at WM3x.

Photo 2
During water sampling on 10 November 2018, the water quality flowing at WM3-C was clear.

Photo 3
As reported by CCKJV, a temporary water supply pipe burst inside Sha Tau Kok Interchange works area in the morning of 10 November 2018. As water quality mitigation measure, the slope adjacent the works area was covered by tarpaulin sheet to minimize muddy runoff. As remedial action, CCKJV immediately diverted the muddy water to the nearby wastewater treatment facility.

Photo 4
The capacity of wastewater treatment facility was insufficient to cater unexpected large amount of muddy water generated by the incident, some uncontrolled leaked water from the burst pipe washed out the soil surface of the site and leaded to large amount of muddy water gushed down to the adjacent channel.

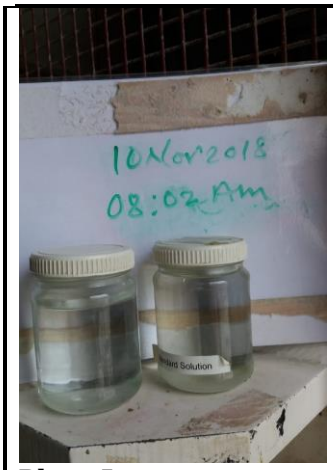

Photo 5
DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on 10 November 2018. DHK reported that the visual test result revealed that the quality of discharge was acceptable under supervision by RE.

Photo 6
During site inspection on 9 November 2018, wastewater treatment facilities were in place at North Portal Site and the effluent quality to be discharge was visually clear.

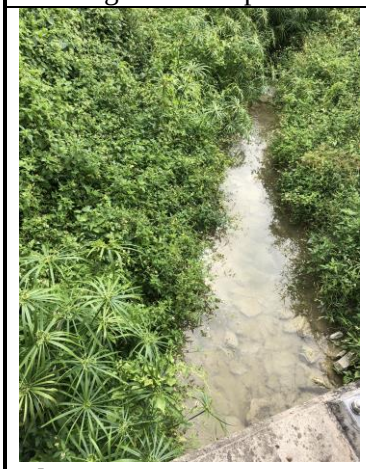

Photo 7
The water quality at Loi Tung steam which located at downstream of North Portal Site was visually clear.

Photo 8
At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited.

Photo 9
At Admin Building Site, the water quality at the adjacent channel was clear.

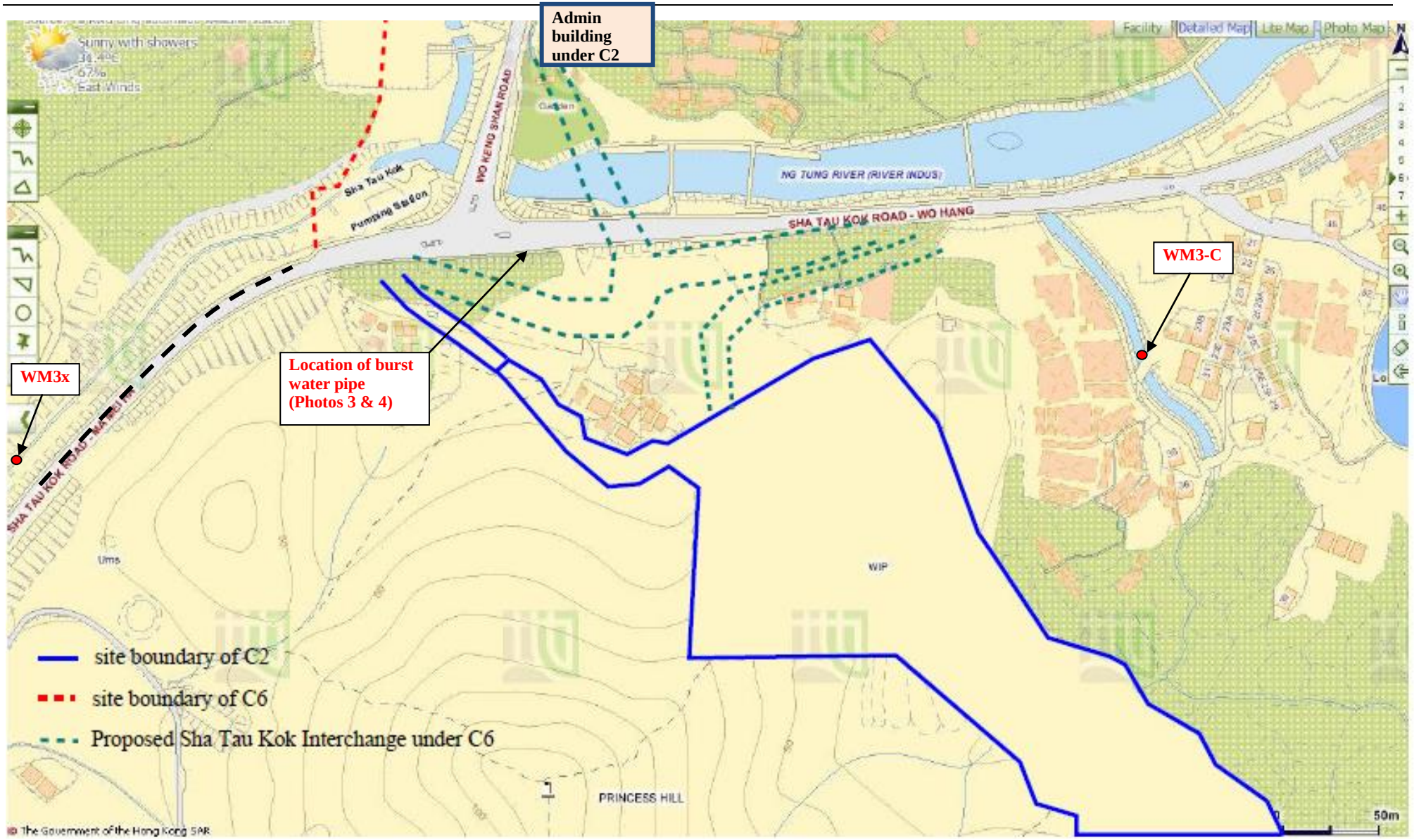

Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

AUES

Fax Cover Sheet

To	**Mr. Alan Kam**	**Fax No**	**2717 3299**
Company	**Dragages Hong Kong Limited**		
cc			
From	**Nicola Hon**	**Date**	**5 December 2018**
Our Ref	TCS00697/13/300/**F1899**	**No of Pages**	6 **(Incl. cover sheet)**
RE	**Agreement No. CE 45/2008** **Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works** **Investigation Report of Exceedance of Water Quality at Location WM3x on 17 November 2018 (Contract 2)**		

Dear Sir,

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

TCS00694/13/300/F1882 dated 19 November 2018
TCS00694/13/300/F1896 dated 27 November 2018

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

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

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

Nicola Hon
Environmental Consultant

Encl.

c.c.	Ms. Clara U (EPD)	Fax:	2685 1133
	Mr. Edwin Ching (CRE, AECOM)	Fax:	2171 3498
	Mr. Antony Wong (IEC, SMEC)		By e-mail

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35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

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

Project		CE 45/2008	
Date		17 November 2018	
Location		WM3x	
Time		10:30	
Parameter		Turbidity (NTU)	Suspended Solids (mg/L)
Action Level		13.4 AND 120% of upstream control station of the same day	12.6 AND 120% of upstream control station of the same day
Limit Level		14.0 AND 130% of upstream control station of the same day	12.9 AND 130% of upstream control station of the same day
Measured Level	**WM3-C**	7.1	10.0
	WM3x	**99.1**	**79.0**
Exceedance		**Limit Level**	**Limit Level**
Investigation Results, Recommendations & Mitigation Measures			

1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 17 November 2018 at North Portal Site included construction permanent drainage and of slip road, cladding installation, E&M work, road paving inside tunnel, fit out and E&M works for the ventilation building as well as landscaping work. Besides, building fit out, permanent drainage and E&M installation and landscaping works were carried out at Admin Building Site Portal. The relevant works area under C2 and the water monitoring locations are illustrated in ***Figure 1***.
2. According to the site photo taken on 17 November 2018, turbid water was observed at WM3x while the water quality at WM3-C was clear. ***(Photos 1 to 2 & Figure 1***)
3. DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on daily basis while there was no discharge made in Admin Building. DHK reported that the quality of treated water in the wastewater treatment facility was clear and there was no adverse comment from AECOM's daily inspection ***(Photo 3***) However, it was observed that earthwork was carried out in Tai Tong Wu Village by other party and ingress of muddy water was from an outfall of Tai Tong Wu was observed. ***(Photo 4 and Figure 1***)
4. Joint site inspections with AECOM, IEC, DHK and ET were carried out on 16 November 2018, the observation and implementation of water quality mitigation measures are summarized below.
   (a) Wastewater treatment facilities were in place at North Portal Site properly, and the water quality outside the discharge point at downstream Loi Tung Stream was visually clear. ***(Photos 5 and 6***)
   (b) At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited. The water quality at the adjacent channel was clear. ***(Photos 7 and 8***)
5. In our investigation, the Contractor had implemented and well maintained the wastewater treatment facilities and no adverse water quality impact was identified at North Portal Site and Admin Building Site during site inspection. It is considered that the exceedances were related to the ingress of muddy water from other party and unlikely caused by the works under Contract 2.
6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were exceedances triggered at WM3x on 19 and 20 November and another investigation will be conducted. Nevertheless, the Contractor should continually fully implement

	the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.
Action to be taken	The Contractor is reminded to fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 5 December 2018

Photo Record

Photo 1
On 17 November 2018, turbid water was observed at WM3x.

Photo 2
During water sampling on 17 November 2018, the water quality flowing at WM3-C was clear.

Photo 3
DHK conducted self-checking on the effluent quality of wastewater treatment facility at North Portal Site on 17 November 2018 and the quality of treated water was clear. No adverse comment from AECOM's daily inspection

Photo 4
During water monitoring on 17 November 2018, it was observed that earthwork was carried out in Tai Tong Wu Village and ingress of muddy water was from an outfall of Tai Tong Wu was observed.

Photo 5
During site inspection on 16 November 2018, wastewater treatment facilities were in place at North Portal Site and the effluent quality was visually clear.

Photo 6
The water quality at Loi Tung steam which located at downstream of North Portal Site was visually clear.

Photo 7
At Admin Building Site, the recent condition of site area was hard paved and wastewater generated from the construction works was limited.

Photo 8
At Admin Building Site, the water quality at the adjacent channel was clear.

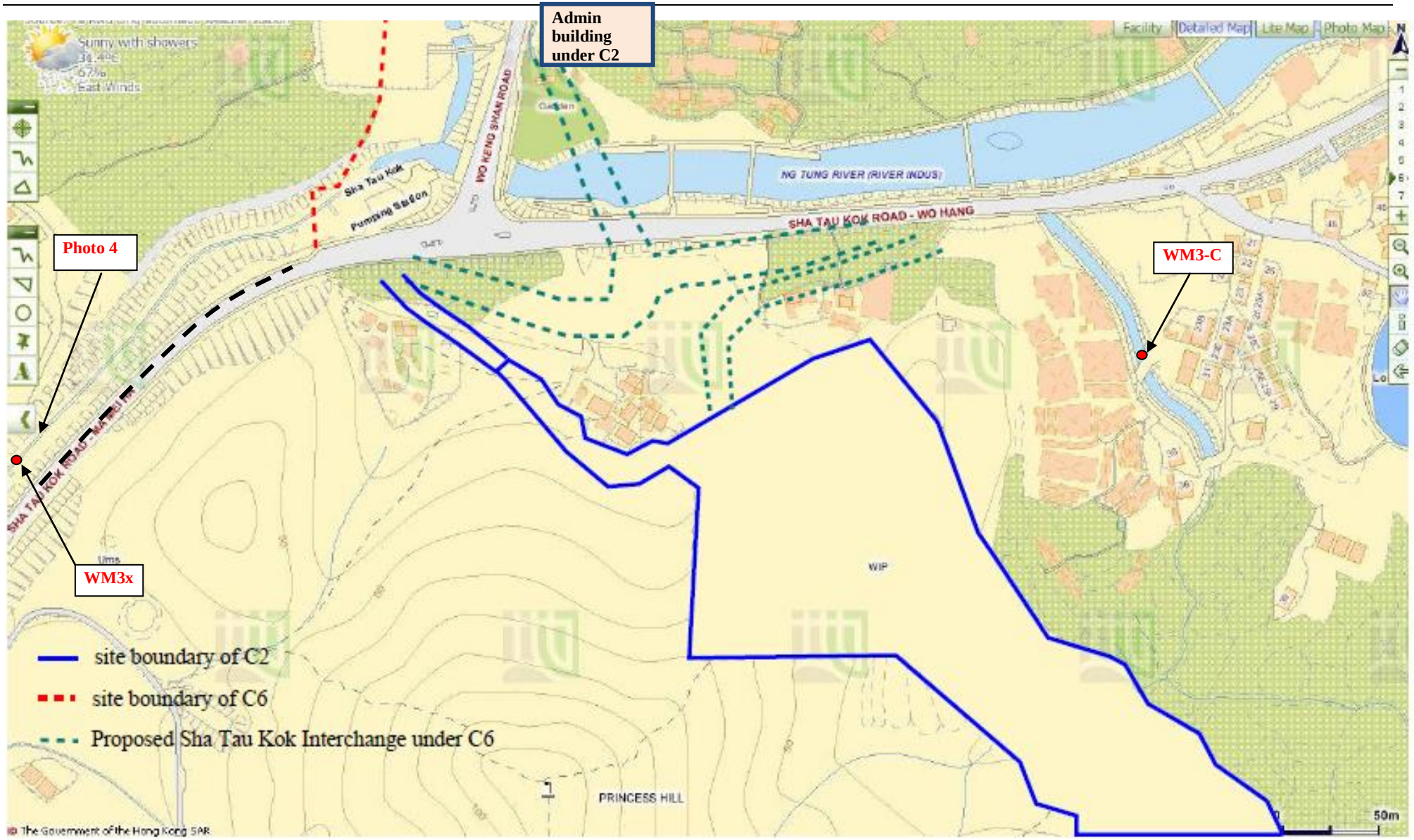

Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

AUES

Fax Cover Sheet

To	**Mr. Vincent Chan**	**Fax No**	**By e-mail**
Company	**CRBC-CEC-Kaden JV**		
cc			
From	**Nicola Hon**	**Date**	**10 December 2018**
Our Ref	TCS00694/13/300/**F1897a**	**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 Air Quality Monitoring (24-hour TSP) at Location AM2 on 12 November 2018**		

Dear Sir,

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

TCS00694/13/300/F1886 dated 21 November 2018

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

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

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

Nicola Hon
Environmental Consultant

Encl.
c.c.

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

安順聯合環境服務及顧問
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35-41, Tai Lin Pai Road,
Kwai Chung, New Territories.
Tel (852) 2959-6059 Fax (852) 2959-6079

Agreement No. CE 45/2008

Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Project	CE 45/2008
Date	**12 November 2018**
Location	**AM2**
Time	00:00
Parameter	24 hour TSP (μg/m^3)
Action Level	149
Limit Level	260
Measured Level	**232**
Exceedance	**Action Level**
Investigation Results, Recommendations & Mitigation Measures	1. According to the site information provided from the Contractor of Contract 6 (CCKJV), the major site activities carried out on 12 November 2018 near works area of Lin Ma Hang were bridge installation, road paving and road division. The closest air monitoring location to the works area was Location AM2. The monitoring location AM2 and related works area are shown in ***Figure 1***. 2. Joint site inspection by the RE, IEC, CCKJV and ET was carried out on 8 and 15 November 2018 to audit the site environmental performance and the implementation of mitigation measures provided by the Contractor. The observations during site inspection are summarized below. (a) Location AM2 was located in a village house on LMH Road and the closest works area was located on the other side of LMH. (***Photo 1***) (b) The works area under Contract 6 and Location AM2 was separated by LMH Road. As advised by CCKJV, the number of site vehicles entering and leaving the site through Lin Ma Hang Road was limited in view of the work progress. As observed during site inspection, the main dust source was dominated by traffic dust from LMH Road. (***Photo 2***) (c) LT/C6 has 3 vehicle site exits on LMH Road. Wheel washing facilities were provided on the hard paved road within the site to avoid carrying of dust and soil to public road by site vehicles. During site inspection on 8 and 15 November 2018, the condition of these site exits and adjoined LMH road were satisfactory without mud and debris. (***Photos 3 to 5***) (d) There were several unknown site exits on LMH Road which all not belong to any Contracts of LT/HYW Project. Fugitive dust was observed when vehicles travelling on the road. The maintenance party/ ownership of these site exits are unknown. ***(Photo 6 to 8)*** Moreover, there were many other heavy

	vehicles apart from the project using LMH Road which causing traffic dust problem especially during dry season. (e) As advised by CCKJV, road bowser for water spraying on LMH Road was carried out in every normal working day as dust suppressive measure. The LMH Road was maintained wet and no fugitive dust was observed during vehicles travelling. ***(Photos 9 & 10)*** Moreover, road sweeper would also deploy on LMH Road in order to remove debris and gravels on road surface and minimize generation of muddy water during rain. The route of water tanker and road sweeper are fully covered the works area of LT/C6 which shown in ***Figure 1***. 3. In our investigation, CCKJV has implemented dust mitigation measures to control the dust generated under the Project and there was no adverse dust impact observed during site inspection. Since there were many other heavy vehicles apart from the project using LMH Road, it is considered that the major dust source leaded to the TSP exceedance was the traffic dust along Lin Ma Hang Road and unlikely due to the works under Contract works. 4. The Contractor should fully implement the dust mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 10 December 2018

Photo Record

Photo 1
Location AM2 was located in a village house on LMH Road and the closest works area was located on the other side of LMH.

Photo 2
The works area under Contract 6 and Location AM2 was separated by LMH Road. As advised by CCKJV, the number of site vehicles entering and leaving the site through Lin Ma Hang Road was limited in view of the work progress. As observed during site inspection, the main dust source was dominated by traffic dust in LMH Road.

Photo 3 (Bridge Y exit under LT/C6)
Wheel washing facilities were provided on a paved road within works area of Bridge Y. The condition of Bridge Y Site Exit and adjoined LMH road was satisfactory without mud and debris.

Photo 4 (Chuk Yuen Road exit under LT/C6)
Wheel washing facilities were provided on a paved road within works area of Chuk Yuen Road. The condition of Chuk Yuen Road Site Exit and adjoined LMH road was satisfactory without mud and debris.

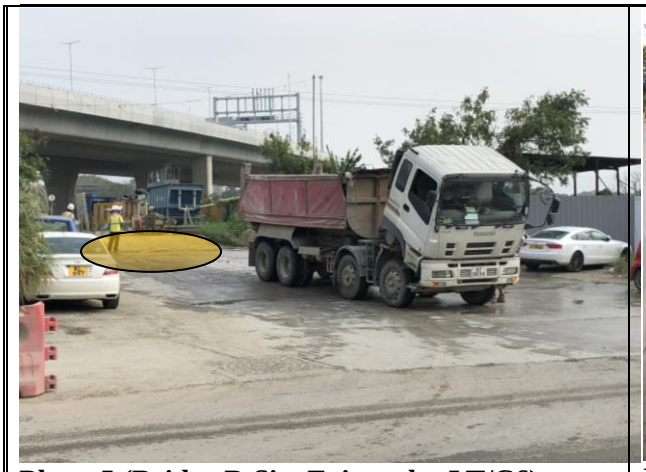

Photo 5 (Bridge D Site Exit under LT/C6)
Wheel washing facilities were provided on a paved road within works area of Bridge D. The condition of Bridge D Site Exit and adjoined LMH road was satisfactory without mud and debris.

Photo 6
There were several site exits along LMH Road and maintenance party/ ownership of these site exits were unknown. Fugitive dust was observed when vehicles travelling on the road.

Photo 7
There were several site exits along LMH Road and maintenance party/ ownership of these site exits were unknown. Fugitive dust was observed when vehicles travelling on the road.

Photo 8
There were several site exits along LMH Road and maintenance party/ ownership of these site exits were unknown. Fugitive dust was observed when vehicles travelling on the road.

 **Photo 9** Road bowser for water spraying on LMH Road was observed as dust suppressive measure. The LMH Road was maintained wet and no fugitive dust was observed during vehicles travelling.	 **Photo 10** Road bowser for water spraying on LMH Road was observed as dust suppressive measure. The LMH Road was maintained wet and no fugitive dust was observed during vehicles travelling.

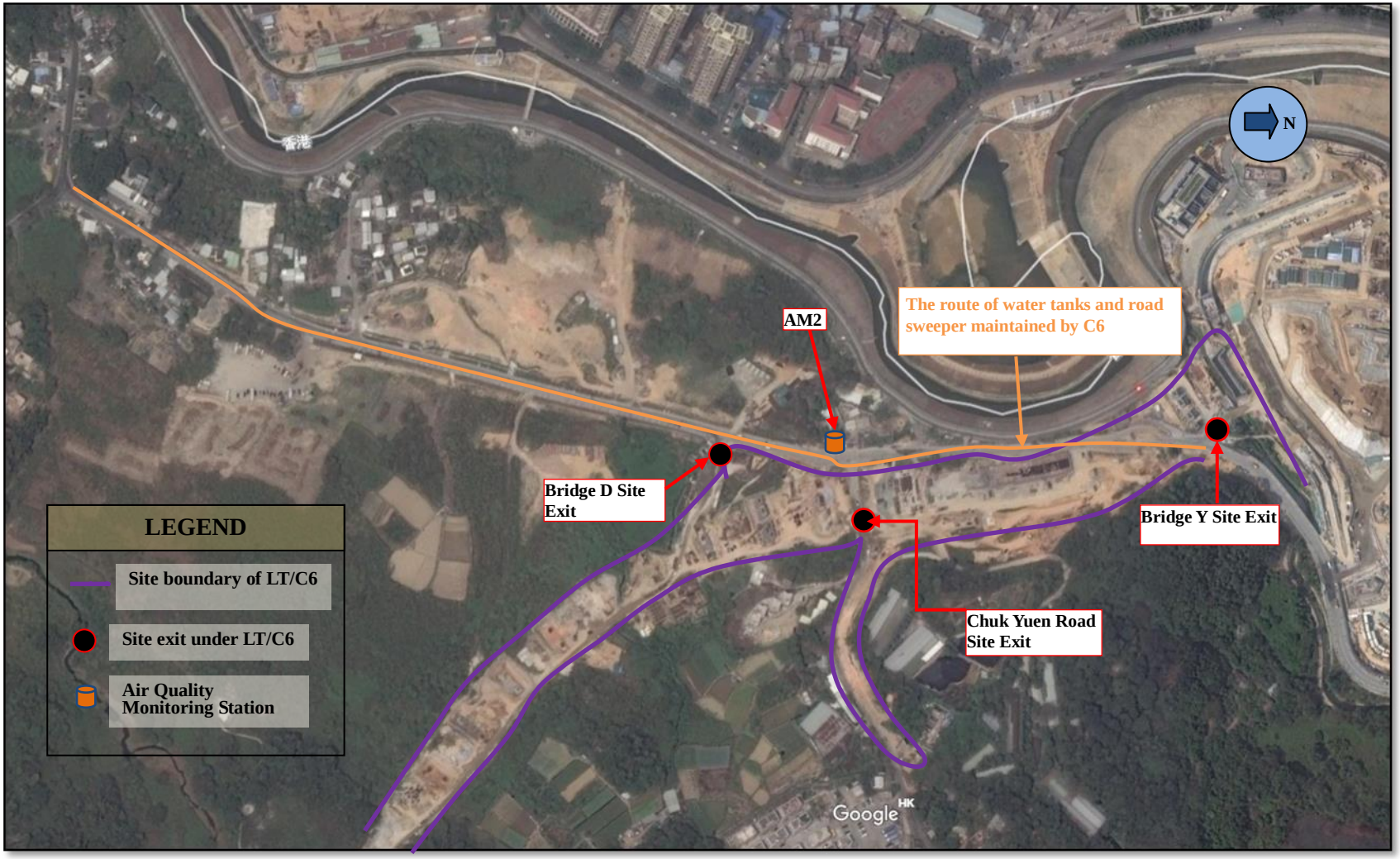

Figure 1 Layout of Air Quality Monitoring Locations AM2

Appendix O

Investigation Report for Complaint

(Not Used)