

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.39) – OCTOBER 2016

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
(CEDD)

Date	Reference No.	Prepared By	Certified By
11 November 2016	TCS00694/13/600/R0714v2	 Nicola Hon (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 November 2016	First Submission
2	11 November 2016	Amended according to the IEC's comments on 10 November 2016



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14 November 2016

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By Email & Post

Attention: Mr Simon LEUNG

Dear Sirs

Agreement No. CE 45/2008 (CE)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Monthly EM&A Report (No. 39) – October 2016

With reference to the Monthly EM&A Report No. 39 for October 2016 (Version 2) certified by the ET Leader, please be noted that we have no adverse comments on the captioned submission. We herewith verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-404/2011/C.

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

Yours faithfully
for and on behalf of
SMEC Asia Limited



Antony WONG
Independent Environmental Checker

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	KRSJV	-	Mr TY LEUNG	by email
	Leighton	-	Mr Jon KITCHING	by email
	AUES	-	Mr TW TAM	by email



EXECUTIVE SUMMARY

ES01 This is the 39th monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 31 October 2016** (hereinafter ‘the Reporting Period’).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

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

ES03 In the Reporting Period, the major construction activities under Contract 5 have been substantially completed. The construction works under Liantang/Heung Yuen Wai Boundary Control Point and Associated Works of the Project included Contract 2, Contract 3, Contract 6, Contract 7 and Contract SS C505. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Locations to undertake	Total Occasions
Air Quality	1-hour TSP	9	135
	24-hour TSP	9	45
Construction Noise	L _{eq(30min)} Daytime	10	40
Water Quality	Water in-situ measurement and/or sampling	WM1 & WM1-C	13 Scheduled & 0 extra
		WM2A(a) & WM2A-Cx	13 Scheduled & 3 extra
		WM2B & WM2B-C	13 Scheduled & 1 extra
		WM3x & WM3-C	13 Scheduled & 2 extra
		WM4, WM4-CA & WM4-CB	13 Scheduled & 3 extra
Ecology	Woodland compensation i) General Health condition of planted species ii) Survival of planted species	9 Quadrats	0
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 2	3 (#)
		Contract 3	5
		Contract 6	4
		Contract 7	4
		Contract SS C505	4

*Note: Extra monitoring day was due to measurement results exceedance
 (#) Site inspection scheduled on 21 October 2016 was cancelled due to typhoon signal no. 8*

ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

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

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
Air Quality	1-hour TSP	0	0	0	--	--	--
	24-hour TSP	0	0	0	--	--	--

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action			
				NOE Issued	Investigation Result	Project related exceedance	Corrective Actions
Construction Noise	L _{eq} (30min) Daytime	0	0	0	--	--	--
Water Quality	DO	0	0	0	-	--	--
	Turbidity	0	17	17	All exceedances on 4 to 18 Oct were not project related, except for exceedances at WM2A(a) on 4 Oct were due to damage pipe under C6	1 (#)	The Contractors were reminded to implement water quality mitigation measures in accordance with ISEMM of the EM&A Manual requirements
	SS	0	20	20	Exceedances on 19 to 31 Oct at WM2A are under investigation.	1 (*)	

(#) 6 number of NUT exceedances at WM2A(a) are under investigated by ET.

(*) 7 number of SS exceedances at WM2A(a) are under investigated by ET.

ENVIRONMENTAL COMPLAINT

ES05 In this Reporting Period, two (2) documented environmental complaints were received. One of the complaints was about transportation of dusty construction waste material under Contract 6 and another complaint was about wastewater discharge from construction site near the works areas of Contracts 2 and 6. The summary of complaint received in the Reporting Period is shown below.

Reporting Period	Contract No	Environmental Complaint		
		Frequency	Complaint Nature	Project related complaint
1 – 31 Oct 2016	Contract 2	1	• Wastewater (1)	0
	Contract 3	0	NA	0
	Contract 6	2	• Wastewater (1) • Dust (1)	1 (Dust)
	Contract 7	0	NA	0
	SS C505	0	NA	0

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

REPORTING CHANGE

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

SITE INSPECTION

ES08 In this Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 2** has been carried out by the RE, IEC, ET and the Contractor on **7, 14 and 28 October 2016** in which the site inspection scheduled on 21 October 2016 was cancelled due to typhoon signal no. 8. No non-compliance was noted during the site inspection.

ES09 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 3** has been carried out by the RE, IEC, ET and the Contractor on **3, 11, 19, 24 and 31 October 2016**. No non-compliance was noted during the site inspection.

- ES10 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 6** has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 20 and 27 October 2016**. No non-compliance was noted during the site inspection.
- ES11 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract SS C505** has been carried out by the RE, IEC, ET and the Contractor on **4, 12, 19 and 26 October 2016**. No non-compliance was noted during the site inspection.
- ES12 In the Reporting Period, joint site inspection to evaluate the site environmental performance at **Contract 7** has been carried out by the RE, IEC, ET and the Contractor on **4, 11, 18 and 25 October 2016**. No non-compliance was noted during the site inspection.

FUTURE KEY ISSUES

- ES13 During dry season, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures.
- ES14 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River. Moreover, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.
- ES15 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.

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1 INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department is the Project Proponent and the Permit Holder of *Agreement No. CE 45/2008 (CE) Liantang / Heung Yuen Wai Boundary Control Point and Associated Works*, which is a Designated Project to be implemented under Environmental Permit number EP-404/2011/C granted on 12 March 2015.
- 1.1.2 The Project consists of two main components: Construction of a Boundary Control Point (hereinafter referred as “BCP”); and Construction of a connecting road alignment. Layout plan of the Project is shown in *Appendix A*.
- 1.1.3 The proposed BCP is located at the boundary with Shenzhen near the existing Chuk Yuen Village, comprising a main passenger building with passenger and cargo processing facilities and the associated customs, transport and ancillary facilities. The connecting road alignment consists of six main sections:
- 1) Lin Ma Hang to Frontier Closed Area (FCA) Boundary – this section comprises at-grade and viaducts and includes the improvement works at Lin Ma Hang Road;
 - 2) Ping Yeung to Wo Keng Shan – this section stretches from the Frontier Closed Area Boundary to the tunnel portal at Cheung Shan and comprises at-grade and viaducts including an interchange at Ping Yeung;
 - 3) North Tunnel – this section comprises the tunnel segment at Cheung Shan and includes a ventilation building at the portals on either end of the tunnel;
 - 4) Sha Tau Kok Road – this section stretches from the tunnel portal at Wo Keng Shan to the tunnel portal south of Loi Tung and comprises at-grade and viaducts including an interchange at Sha Tau Kok and an administration building;
 - 5) South Tunnel – this section comprises a tunnel segment that stretches from Loi Tung to Fanling and includes a ventilation building at the portals on either end of the tunnel as well as a ventilation building in the middle of the tunnel near Lau Shui Heung;
 - 6) Fanling – this section comprises the at-grade, viaducts and interchange connection to the existing Fanling Highway.
- 1.1.4 Action-United Environmental Services & Consulting has been commissioned as an Independent ET to implement the relevant EM&A program in accordance with the approved EM&A Manual, as well as the associated duties. As part of the EM&A program, the baseline monitoring has carried out between **13 June 2013** and **12 July 2013** for all parameters including air quality, noise and water quality before construction work commencement. The Baseline Monitoring Report summarized the key findings and the rationale behind determining a set of Action and Limit Levels (A/L Levels) from the baseline data. Also, the Project baseline monitoring report which verified by the IEC has been submitted to EPD on **16 July 2013** for endorsement. The major construction works of the Project was commenced on **16 August 2013** in accordance with the EP Section 5.3 stipulation.
- 1.1.5 This is **39th** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1 to 31 October 2016**.

1.2 REPORT STRUCTURE

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

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

2 PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

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

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

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

Contract 4 (NE/2014/02)

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

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

Contract 5 (CV/2013/03)

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

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

Contract 6 (CV/2013/08)

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

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

Contract 7 (NE/2014/03)

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

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

ArchSD Contract No. SS C505

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

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

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

2.2 PROJECT ORGANIZATION

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

Civil Engineering and Development Department (CEDD)

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

Architectural Services Department (ArchSD)

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

Environmental Protection Department (EPD)

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

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

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

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

Engineer or Engineers Representative (ER)

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

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

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

The Contractor(s)

- 2.2.7 There will be one contractor for each individual works contract. Once the contractors are appointed, EPD, ET and IEC will be notified the details of the contractor.
- 2.2.8 The Contractor for Contracts under CEDD should report to the ER. For ArchSD Contract, the Contractor should report to the Architect or Architect's Representative (AR). The duties and responsibilities of the Contractor are:
- Comply with the relevant contract conditions and specifications on environmental protection
 - Employ an Environmental Team (ET) to undertake monitoring, laboratory analysis and reporting of EM & A Facilitate ET's monitoring and site inspection activities
 - Participate in the site inspections by the ET and IEC, and undertake any corrective actions
 - Provide information / advice to the ET regarding works programme and activities which may contribute to the generation of adverse environmental impacts
 - Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans
 - Implement measures to reduce impact where Action and Limit levels are exceeded
 - Adhere to the procedures for carrying out complaint investigation

Environmental Team (ET)

- 2.2.9 Once the ET is appointed, the EPD, CEDD, ER, Architect and IEC will be notified the details of the ET.
- 2.2.10 The ET shall not be in any way an associated body of the Contractor(s), and shall be employed by the Project Proponent/Contractor to conduct the EM&A programme. The ET should be managed by the ET Leader. The ET Leader shall be a person who has at least 7 years' experience in EM&A and has relevant professional qualifications. Suitably qualified staff should be included in the ET, and resources for the implementation of the EM&A programme should be allocated in time under the Contract(s), to enable fulfillment of the Project's EM&A requirements as specified in the EM&A Manual during construction of the Project. The ET shall report to the Project Proponent and the duties shall include:
- Monitor and audit various environmental parameters as required in this EM&A Manual
 - Analyse the environmental monitoring and audit data, review the success of EM&A programme and the adequacy of mitigation measures implemented, confirm the validity of the EIA predictions and identify any adverse environmental impacts arising
 - Carry out regular site inspection to investigate and audit the Contractors' site practice, equipment/plant and work methodologies with respect to pollution control and environmental mitigation, and effect proactive action to pre-empt problems
 - Monitor compliance with conditions in the EP, environmental protection, pollution prevention and control regulations and contract specifications
 - Audit environmental conditions on site
 - Report on the environmental monitoring and audit results to EPD, the ER, the Architect, the IEC and Contractor or their delegated representatives
 - Recommend suitable mitigation measures to the Contractor in the case of exceedance of Action and Limit levels in accordance with the Event and Action Plans
 - Liaise with the IEC on all environmental performance matters and timely submit all relevant EM&A proforma for approval by IEC
 - Advise the Contractor(s) on environmental improvement, awareness, enhancement measures etc., on site
 - Adhere to the procedures for carrying out complaint investigation

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

Independent Environmental Checker (IEC)

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

2.3 CONCURRENT PROJECTS

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

2.4 CONSTRUCTION PROGRESS

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

Contract 2 (CV/2012/08)

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

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

Contract 3 (CV/2012/09)

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

- Boundary wall for pumping station
- Cable detection and trial trenches
- Construction of remaining slab of Box Culvert ID05
- Demolition of Valve Control House
- Footbridge construction
- Gabion wall construction
- Re-provisioning of Kiu Tau Footbridge
- Storm drains laying
- Noise barrier construction
- Pier / pier table construction
- Pile cap works
- Portal beam construction
- Retaining wall construction
- Road works
- Sewer works
- Slope reinstatement works near Bridge E
- Utilities Duct Laying
- Water Main Laying
- Viaduct segment erection

Contract 4 (Contract number to be assigned)

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

Contract 5 (CV/2013/03)

2.4.5 As advised by the ER, the construction works under Contract 5 was substantially completed on 31 August 2016.

Contract 6 (CV/2013/08)

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

- Slope Works
- Bored Piling

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

Contract 7 (NE/2014/03)

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

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

Contract SS C505

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

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

2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

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

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

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

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
Contract 2				
1	Air pollution Control (Construction Dust) Regulation	Ref No.: 368864	31 Dec 2013	Till Contract ends
2	Chemical Waste Producer Registration	<i>North Portal</i> Waste Producers Number: No.5213-652-D2523-01	25 Mar 2014	Till Contract ends
		<i>Mid-Vent Portal</i> Waste Producers Number: No.5213-634-D2524-01	25 Mar 2014	Till Contract ends
		<i>South Portal</i> Waste Producers Number: No.5213-634-D2526-01	9 Apr 2014	Till Contract ends
3	Water Pollution Control Ordinance - Discharge License	No.WT00018374-2014	8 Oct 2014	30 Sep 2019
		No.: W5/11389	28 Mar 2014	31 Mar 2019
		No. WT00023063-2015	18 Dec 2015	31 Mar 2019
		No.: W5/11392	28 Mar 2014	31 Mar 2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7019105	8 Jan 2014	Till Contract ends
5	Construction Noise Permit	GW-RN0457-16	22 Jun 2016	14 Dec 2016
		GW-RN0435-16	27 Jun 2016	26 Dec 2016
		GW-RN0519-16	1 Aug 2016	30 Oct 2016
		GW-RN0543-16	18 Jul 2016	13 Jan 2017
		GW-RN0582-16	09 Aug 2016	08 Nov 2016
		GW-RN0590-16	09 Aug 2016	08 Nov 2016
		GW-RN0579-16	11 Aug 2016	07 Jan 2017
		GW-RN0604-16	11 Aug 2016	07 Jan 2017
		GW-RN0695-16	18 Sep 2016	17 Mar 2017
		GW-RN0700-16	20 Sep 2016	19 Feb 2017
		GW-RN0759-16	12 Oct 2016	11 Apr 2017
		GW-RN0780-16	27 Oct 2016	26 Dec 2016
GW-RN0788-16	27 Oct 2016	26 Dec 2016		
6	Specified Process License (Mortar Plant Operation)	L-3-251(1)	12-Apr-2016	11-Apr-2021
Contract 3				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 362101	17 Jul 2013	Till Contract ends
2	Chemical Waste Producer Registration	Waste Producers Number: No.:5113-634-C3817-01	7 Oct 2013	Till Contract ends
3	Water Pollution	No.:WT00016832 – 2013	28 Aug 13	31 Aug 2018

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
	Control Ordinance - Discharge License			
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017914	2 Aug 13	Till Contract ends
5	Construction Noise Permit	GW-RN0233-16	11 Apr 2016	10 Oct 2016
		GW-RN0309-16	30 Apr 2016	29 Oct 2016
		GW-RN0414-16	18 Jun 2016	17 Dec 2016
		GW-RN0434-16	22 Jun 2016	21 Dec 2016
		GW-RN0514-16	16 Jul 2016	15 Oct 2016
		GW-RN0525-16	20 Jul 2016	7 Jan 2017
		GW-RN0541-16	5 Aug 2016	4 Nov 2016
		GW-RN0549-16	30 Jul 2016	9 Jan 2017
		GW-RN0557-16	8 Aug 2016	30 Sep 2016
		GW-RN0561-16	16 Aug 2016	11 Feb 2017
		GW-RN0580-16	25 Aug 2016	24 Feb 2017
		GW-RN0581-16	25 Aug 2016	24 Feb 2017
		GW-RN0596-16	17 Aug 2016	15 Feb 2017
		GW-RN0606-16	27 Aug 2016	2 Oct 2016
		GW-RN0619-16	22 Aug 2016	14 Feb 2017
		GW-RN0646-16	10 Sep 2016	9 Mar 2017
		GW-RN0649-16	3 Sep 2016	7 Jan 2017
		GW-RN0653-16	11 Sep 2016	10 Mar 2017
		GW-RN0654-16	15 Sep 2016	14 Mar 2017
		GW-RN0708-16	8 Oct 2016	28 Jan 2017
GW-RN0711-16	1 Oct 2016	13 Jan 2017		
GW-RN0720-16	4 Oct 2016	31 Mar 2017		
GW-RN0729-16	5 Oct 2016	31 Mar 2017		
GW-RN0756-16	18 Oct 2016	13 Apr 2017		
Contract 5				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 359338	13 May 2013	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-642-S3735-01	8 Jun 2013	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: W5/1G44/1	8 Jun 13	30 Jun 2018
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017351	29 Apr 13	Till the end of Contract

Item	Description	License/Permit Status		
		Ref. no.	Effective Date	Expiry Date
Contract 6				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390614	29 Jun 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producers Number No.: 5213-652-C3969-01	31 Aug 2015	Till the end of Contract
3	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022707	9 Jul 2015	Till the end of Contract
4	Water Pollution Control Ordinance - Discharge License	No.: WT00024574-2016	31 May 2016	31 May 2021
		No.: WT00024576-2016	31 May 2016	31 May 2021
		No.: WT00024742-2016	14 June 2016	30 June 2021
		No.: WT00024746-2016	14 June 2016	30 June 2021
5	Construction Noise Permit	GW-RW0588-16	19 Oct 2016	18 Apr 2017
		GW-RN0766-16	21 Oct 2016	20 Jan 2017
Contract SS C505				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 390974	13 Jul 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5213-642-L1048-07	16 Sep 2015	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024865-2016	8 Jul 2016	30 Nov 2020
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7022831	23 Jul 2015	Till the end of Contract
5	Construction Noise Permit	GW-RN0396-16	5 June 2016	4 Nov 2016
		PP-RN0020-16	16 Jul 2016	14 Jan 2017
		GW-RN0520-16	23 Jul 2016	22 Jan 2017
Contract 7				
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 397015	21 Dec 2015	Till the end of Contract
2	Chemical Waste Producer Registration	Waste Producer No.: 5214-641-K3202-01	24 Mar 2016	Till the end of Contract
3	Water Pollution Control Ordinance - Discharge License	No.: WT00024422-2016	10 May 2016	31 May 2021
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7024129	21 Jan 2016	Till the end of Contract

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

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

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

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

3.2 MONITORING PARAMETERS

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

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

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

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP by Real-Time Portable Dust Meter; and • 24-hour TSP by High Volume Air Sampler.
Noise	<ul style="list-style-type: none"> • $L_{eq(30min)}$ in normal working days (Monday to Saturday) 07:00-19:00 except public holiday; and • 3 sets of consecutive $L_{eq(5min)}$ on restricted hours i.e. 19:00 to 07:00 next day, and whole day of public holiday or Sunday • Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.
Water Quality	In-situ Measurements <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L); • Dissolved Oxygen Saturation (%); • Turbidity (NTU); • pH unit; • Water depth (m); and • Temperature (°C).
	Laboratory Analysis <ul style="list-style-type: none"> • Suspended Solids (mg/L)

3.3 MONITORING LOCATIONS

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

Table 3-2 Impact Monitoring Stations - Air Quality

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

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

Proposal for the change of air quality monitoring location from AM9a to AM9b was submitted to EPD on 4 Nov 2013 after verified by the IEC and it was approved by EPD (EPD's ref.: (15) in EP 2/N7/A/52 Pt.10 dated 8 Nov 2013).

** Proposal for the change of air quality monitoring location from AM1 to AM1a was submitted to EPD on 24 March 2014 after verified by the IEC. It was approved by EPD (EPD's ref.: (6) in EP 2/N7/A/52 Pt.12 dated 9 Jun 2014).*

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

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

Table 3-3 Impact Monitoring Stations - Construction Noise

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

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

Table 3-4 Impact Monitoring Stations - Water Quality

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

Note: EPD has approved the revised EM&A Programme on 29th March 2016. If the measured water depth of the monitoring station is lower than 150 mm, alternative location (WM3x and WM2A-Controlx) based on the criteria were selected to perform water monitoring in accordance with the updated EM&A Programme (Rev. 05) (Section 4.1.4)

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

3.4 MONITORING FREQUENCY AND PERIOD

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

Air Quality Monitoring

3.4.1 Frequency of impact air quality monitoring is as follows:

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

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

Noise Monitoring

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

Water Quality Monitoring

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

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

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

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

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

Table 3-5 Air Quality Monitoring Equipment

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

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

Wind Data Monitoring Equipment

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

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

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

3.5.6 Under this situation, the ET proposed alternative methods to obtain representative wind data. Meteorological information as extracted from “the Hong Kong Observatory Ta Kwu Ling Station” is alternative method to obtain representative wind data. For Ta Kwu Ling Station, it is located nearby the Project site. Moreover, this station is located at 15m above mean sea level while its anemometer is located at 13m above the existing ground which in compliance with the general setting up requirement. Furthermore, this station also can be to provide the humidity, rainfall, and air pressure and temperature etc. meteorological information. In Hong Kong of a lot development projects, weather information extracted from Hong Kong Observatory is common alternative method if weather station installation not allowed.

Noise Monitoring

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

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

Table 3-6 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238* or Rion NL-31 or Rion NL-52*
Calibrator	B&K Type 4231* or Cesva CB-5 or Rion NC-74*
Portable Wind Speed Indicator	Testo Anemometer

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

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

Water Quality Monitoring

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

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

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

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

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

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

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

Table 3-7 Water Quality Monitoring Equipment

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

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

3.6 MONITORING METHODOLOGY

1-hour TSP Monitoring

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

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

24-hour TSP Monitoring

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

- (e.) A motor speed-voltage control/elapsed time indicator;
- (f.) A 7-day mechanical timer, and
- (g.) A power supply of 220v/50 Hz

- 3.6.4 The HVS is operated and calibrated on a regular basis in accordance with the manufacturer's instruction using Tisch Calibration Kit Model TE-5025A. Calibration would carry out in two month interval.
- 3.6.5 24-hour TSP is collected by the ET on filters of HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET keep all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% RH (Relative Humidity) and 25°C, for six months prior to disposal.

Noise Monitoring

- 3.6.6 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels dB(A). Supplementary statistical results (L_{10} and L_{90}) were also obtained for reference.
- 3.6.7 During the monitoring, all noise measurements would be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30min)}$ in six consecutive $L_{eq(5min)}$ measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays; $L_{eq(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.
- 3.6.8 Prior of noise measurement, the accuracy of the sound level meter is checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The checking is performed before and after the noise measurement.

Water Quality

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

Sampling Procedure

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

In-situ Measurement

- 3.6.14 YSI 550A Handheld Dissolved Oxygen Instrument is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation.

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

Laboratory Analysis

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

3.7 EQUIPMENT CALIBRATION

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

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

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

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

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

Table 3-9 Action and Limit Levels for Construction Noise

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

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

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

Table 3-10 Action and Limit Levels for Water Quality

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

Remarks:

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

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

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

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

3.9 DATA MANAGEMENT AND DATA QA/QC CONTROL

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

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

4 AIR QUALITY MONITORING**4.1 GENERAL**

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

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

4.2 AIR QUALITY MONITORING RESULTS

4.2.1 In the Reporting Period, a total of **135** 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 – AM1b

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
3-Oct-16	40	5-Oct-16	9:10	80	83	73
8-Oct-16	78	11-Oct-16	9:20	73	64	59
14-Oct-16	60	17-Oct-16	9:40	140	108	103
20-Oct-16	70	22-Oct-16	13:01	39	39	39
26-Oct-16	43	28-Oct-16	9:40	26	25	32
Average (Range)	58 (40 – 78)	Average (Range)		66 (25 – 140)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
3-Oct-16	104	5-Oct-16	9:05	87	85	87
8-Oct-16	144	11-Oct-16	9:25	84	74	62
14-Oct-16	120	17-Oct-16	9:29	170	135	119
20-Oct-16	60	22-Oct-16	13:03	43	44	46
26-Oct-16	106	28-Oct-16	9:46	57	60	55
Average (Range)	107 (60 – 144)	Average (Range)		81 (43 – 170)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
3-Oct-16	108	5-Oct-16	9:00	89	88	91
8-Oct-16	137	11-Oct-16	9:29	93	91	70
14-Oct-16	104	17-Oct-16	8:56	178	153	119
20-Oct-16	49	22-Oct-16	13:07	45	46	44
26-Oct-16	101	28-Oct-16	9:52	65	65	54
Average (Range)	100 (49 – 137)	Average (Range)		86 (44 – 178)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
5-Oct-16	42	6-Oct-16	9:42	67	74	75
11-Oct-16	30	12-Oct-16	9:45	85	86	82
17-Oct-16	59	18-Oct-16	13:03	31	24	28
22-Oct-16	35	24-Oct-16	9:47	61	62	60
28-Oct-16	54	29-Oct-16	9:11	74	73	68
Average (Range)	44 (30 – 59)	Average (Range)		63 (24 – 86)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
5-Oct-16	80	6-Oct-16	9:51	77	73	81
11-Oct-16	51	12-Oct-16	9:40	89	87	84
17-Oct-16	35	18-Oct-16	13:14	33	26	26
22-Oct-16	35	24-Oct-16	9:51	58	66	64
28-Oct-16	27	29-Oct-16	9:17	69	68	64
Average (Range)	46 (27 – 80)	Average (Range)		64 (26 – 89)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
5-Oct-16	138	6-Oct-16	9:30	87	79	82
11-Oct-16	97	12-Oct-16	9:30	95	98	93
17-Oct-16	60	18-Oct-16	12:50	35	33	27
22-Oct-16	63	24-Oct-16	9:37	56	64	62
28-Oct-16	97	29-Oct-16	9:19	76	77	75
Average (Range)	91 (60 – 138)	Average (Range)		69 (27 – 98)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
5-Oct-16	86	6-Oct-16	13:03	68	73	71
11-Oct-16	39	12-Oct-16	9:12	72	68	68
17-Oct-16	75	18-Oct-16	9:41	25	27	26
22-Oct-16	54	24-Oct-16	9:19	81	88	67
28-Oct-16	64	29-Oct-16	9:29	142	184	200
Average (Range)	63 (39 – 86)	Average (Range)		84 (25 – 200)		

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

Date	24-hour TSP (µg/m ³)	1-hour TSP (µg/m ³)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
5-Oct-16	59	6-Oct-16	13:11	84	74	75
11-Oct-16	49	12-Oct-16	13:09	59	61	52
17-Oct-16	47	18-Oct-16	9:35	31	29	31
22-Oct-16	37	24-Oct-16	13:02	64	77	53
28-Oct-16	36	29-Oct-16	13:10	128	95	93
Average (Range)	46 (36 – 59)	Average (Range)		67 (29 -128)		

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

Date	24-hour TSP (µg/m ³)	1-hour TSP (µg/m ³)				
		Date	Start Time	1 st reading	2 nd reading	3 rd reading
3-Oct-16	34	5-Oct-16	12:52	106	117	111
8-Oct-16	57	11-Oct-16	13:05	59	60	56
14-Oct-16	43	17-Oct-16	13:08	100	69	54
20-Oct-16	31	22-Oct-16	13:21	47	49	46
26-Oct-16	27	28-Oct-16	12:52	38	32	35
Average (Range)	38 (27 – 57)	Average (Range)		65 (32 – 117)		

- 4.2.1 As shown in *Tables 4-1 to 4-9*, all the 1-hour TSP and 24-hour TSP monitoring results were below the Action/Limit Levels. No Notification of Exceedance (NOE) was issued in this Reporting Period.
- 4.2.2 The meteorological data during the impact monitoring days are summarized in *Appendix K*.
- 4.2.3 For the outstanding investigation result for 24-hour TSP exceedances at AM2 and AM3 on 27 September 2016, the investigation report (IR) conducted by the ET was completed and submitted to relevant parties. The IR revealed that the exceedances were not project related and therefore no remedial measures were proposed. The detail IR is presented *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, 6, 7 and Contract SS C505 and noise monitoring was performed at all designated locations.
- 5.1.2 The noise monitoring schedule is presented in *Appendix H* and the monitoring results are summarized in the following sub-sections.

5.2 NOISE MONITORING RESULTS (NORMAL DAYTIME)

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

Table 5-1 Summary of Construction Noise Monitoring Results

Construction Noise Level ($L_{eq30min}$), dB(A)					
Date	NM1	NM2a ^(*)	NM8	NM9	NM10 ^(*)
5-Oct-16	52	75	56	64	67
11-Oct-16	62	73	59	63	67
17-Oct-16	52	63	59	62	65
28-Oct-16	58	64	56	62	65
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-Oct-16	66	59	60	56	60
12-Oct-16	60	68	56	58	69
18-Oct-16	64	74	62	63	63
24-Oct-16	59	62	56	57	69
Limit Level	75 dB(A)				

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

5.3 NOISE MONITORING RESULTS (RESTRICTED HOURS)

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

results are summarized in *Tables 5-3 and 5-4*.

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

Construction Noise Level (L_{eq5min}), dB(A)										
Date	NM5		NM7		NM8		NM9		NM10 ^(*)	
	Start Time	L_{eq5min}	Start Time	L_{eq5min}	Start Time	L_{eq5min}	Start Time	L_{eq5min}	Start Time	L_{eq5min}
13-Oct-16	22:47	46.9	22:31	48.5	21:57	58.8	--	--	--	--
23-Oct-16	22:47	47.8	22:16	47.2	20:57	58.4	21:25	66.3	21:36	59.0
28-Oct-16	22:09	44.9	21:55	52.0	21:26	62.8	--	--	--	--
Observation/ other noise source	NA		NA		Traffic noise from trains as NM8 close to train tracks		Traffic noise from trains as NM9 close to train tracks		Very serious dog barking in the village	

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

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

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

Construction Noise Level (L_{eq5min}), dB(A)										
Date (#)	NM5		NM7		NM8		NM9		NM10 ^(*)	
	Start Time	L_{eq5min}	Start Time	L_{eq5min}	Start Time	L_{eq5min}	Start Time	L_{eq5min}	Start Time	L_{eq5min}
13-Oct-16	23:00	46.8	23:15	49.1	23:40	56.0	0:00	63.8	0:11	58.3
23-Oct-16	23:01	46.1	23:27	49.6	23:49	59.6	0:06	61.6	0:19	59.3
28-Oct-16	23:00	45.7	23:14	50.8	23:34	64.2	0:00	59.7	0:09	56.0
Observation/ other noise source	NA		NA		Traffic noise from trains as NM8 close to train tracks		Traffic noise from trains as NM9 close to train tracks		Very serious dogs barking in the village	

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

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

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

5.3.3

According to the site records by the monitoring team, no construction noise from the construction was noted during the course of monitoring at all locations. On the other hand, traffic noise was dominated at NM8 and NM9 since the monitoring locations were closed to the train tracks and very serious dogs barking were recorded at NM10. Therefore, it is considered that the measurement results were likely to be the background noise.

6 WATER QUALITY MONITORING

6.1 GENERAL

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

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of thirteen (13) sampling days was scheduled to carry out for all designated locations with their control stations. Since exceedances were recorded at WM2A(a), WM2B, WM3x and WM4, according to “*Event and Action Plan*” stipulation, three (3) additional water quality monitoring day was conducted for WM2A(a) and WM4 and its control stations. Also, one (1) and two (2) additional water quality monitoring days were conducted for WM2B and WM3x respectively and its control stations in the reporting period.

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

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

Date	Dissolved Oxygen (mg/L)			Turbidity (NTU)			Suspended Solids (mg/L)		
	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB	WM4	WM4-CA	WM4-CB
4-Oct-16	6.7	7.2	7.0	15.1	7.7	7.5	13.0	7.5	8.0
6-Oct-16	6.7	7.0	7.0	15.7	4.9	9.6	13.5	4.0	13.0
8-Oct-16	6.3	6.8	5.8	34.9	11.7	11.2	13.5	7.5	9.5
11-Oct-16	6.8	7.6	6.9	250.0	12.2	21.4	153.5	6.0	34.5
12-Oct-16	0.0	0.0	0.0	179.0	6.4	4.8	122.0	5.0	28.0
13-Oct-16	6.2	7.2	5.4	369.5	5.7	11.8	240.5	9.0	22.5
14-Oct-16#	--	--	--	13.3	3.3	4.7	15.0	6.0	17.0
15-Oct-16	6.2	6.9	6.0	16.6	29.3	11.4	11.0	20.5	10.0
18-Oct-16	7.0	7.3	6.8	156.0	95.7	94.3	108.0	69.0	59.0
19-Oct-16#	--	--	--	561.5	522.5	281.0	536.0	539.0	220.0
20-Oct-16	6.4	6.0	5.0	162.5	19.1	47.3	118.5	5.0	27.5
22-Oct-16	6.8	6.3	5.7	25.8	11.6	11.8	19.0	6.5	7.5
24-Oct-16	6.6	6.1	6.0	33.7	8.2	26.9	25.5	3.5	19.5
26-Oct-16	6.2	6.5	5.6	30.1	19.6	16.8	34.0	<2	8.5
28-Oct-16	7.3	7.7	6.4	25.5	11.1	15.6	27.5	3.0	6.0
31-Oct-16	6.9	7.0	6.7	19.7	5.6	9.9	19.0	3.0	11.5

Remarks: bold with underline indicated Limit Level exceedance

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

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
4-Oct-16	6.5	6.6	23.8	12.4	17.5	5.5
6-Oct-16	7.2	7.3	46.3	12.0	47.0	6.5
8-Oct-16	7.3	6.5	49.7	9.6	36.5	5.0
11-Oct-16	7.7	7.5	11.3	8.5	9.5	5.0
13-Oct-16	6.8	6.8	15.6	7.4	18.0	6.5
15-Oct-16	6.8	6.1	10.3	8.1	10.0	4.0
18-Oct-16	7.3	7.2	Over range	Over range	1055.0	919.5
20-Oct-16	6.1	6.0	99.3	87.5	75.5	98.0
22-Oct-16	5.4	5.6	21.8	32.9	10.0	21.5

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM1	WM1-C	WM1	WM1-C	WM1	WM1-C
24-Oct-16	6.0	6.2	16.2	26.3	12.5	8.0
26-Oct-16	6.6	6.7	15.6	15.9	15.5	10.0
28-Oct-16	7.4	7.5	49.5	16.4	48.5	7.5
31-Oct-16	6.7	7.0	44.9	11.8	51.0	3.0

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

Date	Dissolved Oxygen (mg/L)				Turbidity (NTU)				Suspended Solids (mg/L)			
	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C	WM2A(a)	WM2A-Cx	WM2B	WM2B-C
4-Oct-16	5.8	5.6	6.9	4.6	<u>124.5</u>	7.6	--	--	<u>102.0</u>	4.0	--	--
5-Oct-16#	--	--	--	--	24.1	4.6	--	--	<u>19.0</u>	<2	--	--
6-Oct-16	7.2	7.1	6.8	4.9	18.6	8.8	2.9	1.8	12.5	6.0	4.5	4.5
8-Oct-16	6.9	6.1	7.6	5.5	23.7	9.7	4.7	2.1	14.5	2.5	7.0	2.0
11-Oct-16	7.7	7.3	6.5	7.5	24.4	9.9	4.8	3.1	<u>19.0</u>	2.0	<2	5.5
13-Oct-16	6.6	6.1	7.2	5.0	14.5	10.6	2.8	1.6	11.5	<2	6.5	3.5
15-Oct-16	6.8	6.9	8.2	5.8	23.4	7.8	3.7	1.8	14.0	<2	6.5	<2
18-Oct-16	7.8	7.5	7.5	6.2	389.5	351.0	<u>641.0</u>	40.6	317.0	330.5	<u>669.0</u>	26.0
19-Oct-16#	--	--	--	--	--	--	<u>240.5</u>	91.2	--	--	<u>261.0</u>	96.0
20-Oct-16	6.3	6.7	6.7	5.1	<u>329.5</u>	32.1	<u>26.8</u>	4.8	<u>156.0</u>	5.0	<u>24.0</u>	<2
22-Oct-16	6.6	6.3	6.4	5.0	<u>261.0</u>	6.3	9.2	4.5	<u>183.0</u>	4.0	7.5	<2
24-Oct-16	6.2	6.6	6.3	5.0	<u>128.0</u>	8.8	9.8	3.7	<u>120.0</u>	4.0	11.0	<2
25-Oct-16#	--	--	--	--	24.5	10.5	--	--	<u>18.0</u>	7.0	--	--
26-Oct-16	7.0	7.1	6.9	4.5	22.4	8.6	10.1	3.4	14.5	6.5	10.5	<2
28-Oct-16	7.1	7.6	7.7	6.4	<u>53.0</u>	8.6	4.4	3.0	<u>48.0</u>	5.0	5.5	<2
29-Oct-16#	--	--	--	--	<u>45.4</u>	9.1	--	--	<u>88.0</u>	8.0	--	--
31-Oct-16	7.4	7.6	6.8	6.2	<u>69.3</u>	23.5	10.9	3.9	<u>111.5</u>	7.5	5.5	<2

Remarks: *bold with underline indicated Limit Level exceedance*
bold with italic indicated Action Level exceedance
 # Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance.

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

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		Suspended Solids (mg/L)	
	WM3x	WM3-C	WM3x	WM3-C	WM3x	WM3-C
4-Oct-16	6.6	6.4	12.3	9.1	12.0	5.0
6-Oct-16	6.4	6.8	12.9	8.4	10.5	6.0
8-Oct-16	6.3	7.3	<u>89.3</u>	3.0	<u>77.0</u>	4.5
11-Oct-16	6.5	6.5	9.9	5.2	8.5	3.0
12-Oct-16#	--	--	7.0	3.1	9.0	3.0
13-Oct-16	6.4	5.4	13.2	1.8	12.0	6.0
15-Oct-16	5.5	5.8	13.1	2.2	12.5	<2
18-Oct-16	6.9	6.6	<u>267.0</u>	129.5	<u>395.0</u>	87.0
19-Oct-16#	--	--	318.5	723.5	445.0	635.0
20-Oct-16	5.9	6.5	12.9	7.0	12.0	4.0
22-Oct-16	6.5	5.9	12.8	8.2	9.5	4.0
24-Oct-16	6.2	5.9	8.6	9.2	6.5	4.0
26-Oct-16	6.1	5.1	12.2	5.1	12.0	<2
28-Oct-16	6.9	6.7	12.7	5.0	10.5	4.0
31-Oct-16	6.6	7.3	7.1	4.7	10.5	7.5

Remarks: *bold with underline indicated Limit Level exceedance*
 # Additional water quality monitoring at the exceeded location(s) due to two consecutive monitoring days indicated Limit Level exceedance.

Table 6-5 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	7	0	10	0	17	0	2 (#)
WM2B	0	0	0	3	0	3	0	6	0	0
WM3x	0	0	0	2	0	2	0	4	0	0
WM4	0	0	0	5	0	5	0	10	0	0
No of Exceedance	0	0	0	17	0	20	0	37	1	1

(#) 13 number of exceedances at WM2A(a) are under investigated by ET.

6.2.3 In this Reporting Period, a total of thirty-seven (37) Limit Level (LL) exceedances, namely seventeen (17) LL exceedance of turbidity and twenty (20) LL exceedances of Suspended Solids were recorded for the Project and they are summarized in **Table 6-5**.

6.2.4 NOE was issued to relevant parties upon confirmation of the monitoring result. The 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
28 and 30 Sep 2016 (last reporting month)	WM2A(a) (C6)	SS	Inspection was carried out align the existing river course of upstream of WM3x and it was observed that the river water adjacent the construction site was clear and no muddy discharge from the site was observed. The monitored drainage channel also collected the rain water from the Sha Tau Kok road surface via open drain and communal channel and it is believed that the water quality at monitored channel was affected by rain. In our investigation, it is considered that <i>the exceedances were unlikely caused by the works under the Project.</i>
4, 5 and 11 Oct 2016	WM2A(a) (C6)	NTU &SS	As reported by CCKJV, a fresh water pipe at Ping Yeung Interchange was damaged in the morning of 4 October 2016. CCKJV was promptly repaired the pipe which completed by noon of 4 October 2016. However, some muddy runoff was generated due to the damaged pipe and it was accidentally got into the adjacent Ping Yuen River. It is considered that the exceedances on 4 October 2016 were related to the pipe damage incident. During weekly site inspection, water quality mitigation measures implemented on site was in order and no adverse water impact was identified. It is considered <i>the exceedances were due to natural variation and unlikely caused by the works under the project.</i>
8 Oct 2016	WM3x (C2 and C6)	NTU &SS	Inspection was carried out align the existing river course of upstream of WM3x and it was observed that the river water adjacent the construction site was clear and no muddy discharge from the site was observed. Since there were no source of muddy water found from construction site and the wastewater treatment facilities and mitigation measures were properly maintained as observed during regularly site inspection. It is considered that <i>the exceedances were due to natural variation and unlikely caused by the works under the Project.</i>
11, 12, 13, 18	WM4 (C2)	NTU &SS	Inspection was carried out at upstream area of impact station

Date of Exceedance	Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
and 20 Oct 2016	and C3)		<p>WM4 to investigate the source of muddy water. Muddy water was found flowing from the river branch near Kiu Tau Road. There was active construction site of other Contractor near Kiu Tak Road and muddy water was observed outside their site area and the underpass drain near that construction site.</p> <p>During weekly site inspection, the condition was generally in order and no adverse water quality impacts under the Contract were identified. In our investigation, it is considered that <u><i>exceedances were due to the muddy water from the outside of site boundary and not likely related to the works under the Project.</i></u></p>
18 Oct 2016	WM3x (C2 and C6)	NTU &SS	<p>In our investigation, it is considered that the water quality in the channel on 18 October 2016 was deteriorated by heavy rain due to vigorous water flow and stir up sediment. Moreover, the monitored drainage channel near WM3x would be collected the rain water from the Sha Tau Kok road surface via open drain and communal channel. It is concluded that <u><i>the exceedances were likely due to rain and not caused by the works under the Project.</i></u></p>
20, 22 and 24 Oct 2016	WM2A(a) (C6)	NTU &SS	To be reported in next reporting period.
18, 19 and 20 Oct 2016	WM2B (C6)	NTU &SS	<p>On 18 and 19 October 2016, the water flow in the channel was very vigorous due to heavy rain and turbid water was observed throughout the channel. Moreover, there were trails of muddy runoff getting into the existing river channel from the adjacent public road due to rainstorm.</p> <p>On 20 October 2016, there were no muddy water discharged from the site, it is considered that the exceedances were due to the disturbance of silt and sediment at the channel bed during sampling at shallow water.</p> <p>It is considered that the <u><i>exceedances were not likely caused by the Project.</i></u></p>
25, 28, 29 and 31 Oct 2016	WM2A(a) (C6)	NTU &SS	To be reported in next reporting period.

7 ECOLOGY MONITORING

7.1 GENERAL

7.1.1 In the Reporting Period, no ecology monitoring for woodland compensation was conducted.

8 WASTE MANAGEMENT

8.1 GENERAL WASTE MANAGEMENT

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

8.2 RECORDS OF WASTE QUANTITIES

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

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

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

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

Type of Waste	Contract 2		Contract 3		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
C&D Materials (Inert) (in '000m ³)	92.8467	--	1.115	--	36.479	--	0	--	1.164	--	131.6047
Reused in this Contract (Inert) (in '000 m ³)	0.8666	--	0.177	--	5.359	--	0	--	0	--	6.4026
Reused in other Contracts/ Projects (Inert) (in '000 m ³)	39.8733	C6/ NENT# & other projects approved by the ER	0	--	9.743	C5 & other projects approved by the ER	0	--	0	--	49.6163
Disposal as Public Fill (Inert) (in '000 m ³)	52.1068	Tuen Mun 38	0.453	Tuen Mun 38	21.377	Tuen Mun 38	0	Tuen Mun 38	1.164	TKO 137	75.1008

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

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

Type of Waste	Contract 2		Contract 3		Contract 6		Contract 7		Contract SS C505		Total Quantity
	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	Qty.	Disposal location	
Recycled Metal ('000kg) #	0	-	0	-	0	--	0.2	Licensed collector	988.585	Licensed collector	988.785
Recycled Paper / Cardboard Packing ('000kg) #	0	-	0	-	0	--	0.04	Licensed collector	0.36	Licensed collector	0.4
Recycled Plastic ('000kg) #	0	--	0.002	Licensed collector	0	--	0.001	Licensed collector	0.098	Licensed collector	0.002#+0.099
Chemical Wastes ('000kg) #	0	--	0.800	Licensed collector	1.475	Licensed collector	0	--	0	--	0.8#+1.475
General Refuses ('000m ³)	0.1852	NENT	0.120	NENT	0.075	NENT	0	--	0.189	NENT	0.5692

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

9 SITE INSPECTION

9.1 REQUIREMENTS

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

9.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

Contract 2

9.2.1 In the Reporting Period, joint site inspection for Contract 2 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **7, 14 and 28 October 2016** in which the site inspection scheduled on 21 October 2016 was cancelled due to typhoon signal no. 8. 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
30 September 2016 (last reporting period)	<ul style="list-style-type: none"> Free standing oil drums without drip tray storage on site was observed. Drip tray should be provided for all chemical storage on site. (North Portal) 	<ul style="list-style-type: none"> Oil drums were removed.
7 October 2016	<ul style="list-style-type: none"> Truck without NRMM label was observed. Proper NRMM label should be displayed. (South Portal) Oil drums without drip tray and waste oil spillage on ground was observed. Drip tray should be provided for all chemical storage on site and the spillage oil should be cleaned ASAP. (North Portal) Stagnant water cumulated inside the drip tray should be cleaned after the rainstorm. (South Portal) 	<ul style="list-style-type: none"> NRMM label attached. Oil drums were removed and the spillage oil was cleaned. Not required for reminder.
14 October 2016	<ul style="list-style-type: none"> Proper maintenance should be provided for the broken water barriers to prevent stagnant water accumulation. (South Portal) 	<ul style="list-style-type: none"> All openings of water barriers have been sealed to avoid mosquito breeding.
21 October 2016	<ul style="list-style-type: none"> Joint site inspection was cancelled due to typhoon signal no. 8 	
28 October 2016	<ul style="list-style-type: none"> As a reminder, waste oil cumulated inside the drip tray should be cleaned. Also, waste oil spillage at workshop area should be cleaned up regularly. (South Portal) 	<ul style="list-style-type: none"> Not required for reminder.

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 **3, 11, 19, 24 and 31 October 2016**. No non-compliance was noted.

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

Table 9-2 Site Observations for Contract 3

Date	Findings / Deficiencies	Follow-Up Status
3 October 2016	<ul style="list-style-type: none"> Stagnant water was observed at the lifting eyes of concrete block at AC1. The Contractor should remove the stagnant water and fill sand to the lifting eyes to avoid accumulation of stagnant water. 	<ul style="list-style-type: none"> The stagnant water has been removed from the lifting eyes and the lifting eyes were sealed up.
11 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
19 October 2016	<ul style="list-style-type: none"> The Contractor was reminded to dispose of the general refuse on regular basis and maintain the site tidiness. The Contractor was reminded to remove the stagnant water after rain. 	<ul style="list-style-type: none"> Not required for reminder. Not required for reminder.
24 October 2016	<ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water within the site to prevent mosquito breeding. 	<ul style="list-style-type: none"> Not required for reminder.
31 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA

Contract 6

9.2.5 In the Reporting Period, joint site inspection for Contract 6 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **6, 13, 20 and 27 October 2016**. No non-compliance was noted.

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

Table 9-4 Site Observations for Contract 6

Date	Findings / Deficiencies	Follow-Up Status
6 October 2016	<ul style="list-style-type: none"> It was reminded that the mosquito control measures should be maintained. 	<ul style="list-style-type: none"> Not required for reminder.
13 October 2016	<ul style="list-style-type: none"> It was reminded that the earth bund should be maintained to avoid surface run-off for the construction area where is near Nylon Dam 	<ul style="list-style-type: none"> Not required for reminder.
20 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
27 October 2016	<ul style="list-style-type: none"> Stagnant water was observed at the roof of the subway in BCP, the Contractor should provide mitigation measures to prevent mosquito breeding. 	<ul style="list-style-type: none"> To be followed

Contract SS C505

9.2.7 In the Reporting Period, joint site inspection for Contract SS C505 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **4, 12, 19 and 26 October 2016**. No non-compliance was noted.

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

Table 9-5 Site Observations for Contract SS C505

Date	Findings / Deficiencies	Follow-Up Status
4 October 2016	<ul style="list-style-type: none"> Stagnant water was observed at drainage channel near training center. The Contractor should remove the stagnant water to prevent mosquito breeding. The Contractor was reminded to ensure the caps of the water-filled road barriers on site were provided. 	<ul style="list-style-type: none"> Water pump was used to remove the stagnant water. Not required for reminder.
12 October 2016	<ul style="list-style-type: none"> Obstacles were observed at drainage channel near PTB. The Contractor should remove the obstacles and ensure the drainage channel function properly. Stagnant water was observed at drainage channel near Building 1-3. The Contractor should ensure the channel function properly to avoid accumulation of stagnant water. 	<ul style="list-style-type: none"> No obstacles was observed at the drainage channel near PTB. No stagnant water was observed at the drainage channel near Building 1-3.
19 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
26 October 2016	<ul style="list-style-type: none"> Temporary drainage blocked by mud and silt was observed. Mud and silt cumulated inside the drainage should be cleaned to maintain the drainage is functional. (Whole site area) Stagnant water cumulated inside the drip tray was observed. Stagnant water inside the drip tray should be removed. (Near Gate 2) Ponding water cumulated after rainstorm should be removed to prevent mosquito breeding. 	<ul style="list-style-type: none"> Mud and silt removal work was carried out to maintain the temporary drainage. The drip tray and the generator were removed from site and no stagnant water was observed. Not required for reminder.

Contract 7

9.2.9 In the Reporting Period, joint site inspection for Contract 7 to evaluate the site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **4, 11, 18 and 25 October 2016**. No non-compliance was noted.

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

Table 9-6 Site Observations for Contract 7

Date	Findings / Deficiencies	Follow-Up Status
4 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
11 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
18 October 2016	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
25 October 2016	<ul style="list-style-type: none"> Open stockpile was found in Bridge A, the Contractor should cover the stockpile to avoid surface runoff and dust impact. It was reminded that stagnant water should be cleaned up to prevent mosquito breeding. 	<ul style="list-style-type: none"> The open stockpile was removed. Not required for reminder.

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

Other Contracts

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

10 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

10.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

10.1.1 In the Reporting Period, no summons and prosecution under the EM&A Programme was lodged for Contracts 2, 3, 6, 7 and Contract SS C505. However, two (2) documented environmental complaints were received. In brief, one of the complaints was about transportation of dusty construction waste material which related to Contract 6 and another complaint was about wastewater discharge from construction site which related to Contracts 2 and 6. Investigation reports have been completed by the ET and the detail of the complaints and the investigation results are presented below.

Investigation Result for the Documented Complaints received by EPD on 20 October 2016 (Contracts 6)

10.1.2 A warning letter (ref.: EP560/G1/1(VII)) was issued from EPD to CCKJV on 25 October 2016 regarding a dump truck vehicle (vehicle registration mark: RX2229) carrying dusty construction waste materials arisen under the subject account travelling to the North East New Territories (NENT) Landfill on 20 October 2016 without proper cover.

10.1.3 Joint site inspection was carried out by the RE, IEC, CCKJV and ET on 27 October 2016 for the complaint investigation. The aim of the inspection was to spot check whether the skip of the dump truck under the Contract were properly covered before leaving the site until it reached the check point at NENT. The inspection area included the subject site exit, Wo Keng Shan Road as well as NENT Landfill. The observations during the site inspection are summarized in below.

- (a) At the subject site exit (Ng Chow Road), all vehicles were thoroughly washed in the wheel washing facilities implemented at the site exit.
- (b) There were two stationary frontline staff deployed at the site exit to check whether the skip of the dump truck was properly covered and carry out cleaning for all vehicles. After final checking, trip ticket was given to the dump truck driver after before it leaving the site.
- (c) All dump trucks left the site were properly covered without leakage of dusty materials and wastewater. The concerned dump truck vehicle (vehicle registration mark: RX2229) was spotted in the inspection and it was noted that the skip this dump truck was well covered.
- (d) The dump trucks travelling on Wo Keng Shan Road were properly covered.
- (e) Inspection inside NENT Landfill was unable to carry out as it was restricted to public access. At the entrance of NENT Landfill, there was queue of dump truck vehicles with properly covered and some of them were belong to the Contract. However, it was observed that one of the dump truck flipped over the skip cover when queueing outside NENT and this dump truck was not belong to the Contract after checking.

10.1.4 CCKJV has conducted an interview with the caught dump truck drivers after receipt of the warning letter. According to the incident report prepared by CCKJV, the dump truck driver had covered the dump skip before leaving the site. However, the driver unintentionally pressed the open button and triggered one side of the mechanical cover when he travelling to NENT Landfill.

10.1.5 In our investigation, no dump trucks vehicles under the Contract violated the legal requirement. As a preventive measures for ensuring covering of skip and cleaning of vehicle leaving works area, the driver would check whether dump skip was properly covered according to rear mirror of the truck and two stationary frontline staff would conduct final checking at the checking point of the site exit. The trip ticket will only be given to the driver if vehicle is thoroughly cleaned and skip is properly covered before leaving the site. It is considered that the complaint was a single incident which resulted of careless mistake of the dump truck driver.

10.1.6 As additional measures, CCKJV agreed to erect signage at the site exit to aware all vehicles drivers to check the vehicles were washed and well covered before leaving the construction. Moreover, CCKJV was advised to conduct surprise check for the dump truck on regular basis

(such as twice per month) to ensure the dump trucks driver strictly follow all the procedure when carrying dusty materials from the construction site to the disposal locations.

- 10.1.7 In response to the complaint, CCKJV has arranged a specified training on topic of “proper cover of dump trucks, wheel washing and responsibility” to all sub-constructor representative of dump truck on 2 November 2016. The aim of the training is to ensure all responsible parties are fully understand the requirements and their duties, in particular, to ensure all dump trucks are covered and checked when they leave the site. An incident report for uncovered dump trucks was prepared by CCKJV and issued to EPD 2 November 2016 which included the investigation result for the incident, interview record for RX2229 dump truck driver and the specified training record.

Investigation Result for the Documented Complaints received by 1823 on 28 October 2016 (Contracts 2 and 6)

- 10.1.8 A complaint was received from 1823 on 28 October 2016 regard to muddy water discharged out of the construction sites near the traffic light post at the junction of Sha Tau Kok Road and Wo Keng Shan Road. The cumulated muddy water splashed on the pedestrian when vehicles passing by the road which causing inconvenience to the pedestrian and public.
- 10.1.9 Joint site inspection was carried out by RE, IEC, CCKJV and ET on 3 November 2016 at the suspected four (4) site exits along the Sha Tau Kok Road and Wo Keng Shan Road for the complaint investigation. The aim of the inspection was to check condition of the site exit and the implementation the wheel washing facilities and to assess the possibility of muddy water discharge out of the construction site to the public road. The observations during the site inspection are summarized in below.

North Portal under Contract 2

- 10.1.10 The site exit of North Portal under Contract 2 is located on Sha Tau Kok Road. As observed during weekly site inspection, wheel washing facilities were provided within the construction site. The vehicles after wheel washing were pass through a hard paved haul road and reached the main site exit before leaving construction site. A cut-off drain was accompanied at the exit to divert the runoff from the construction area. As advised by the Contractor, manual water spraying was provided at the entrance of North Portal, it is not a wheel washing facilities but to clean and tidy the site entrance as needed. The condition of the site exit was clean and satisfactory and no trails of mud and muddy water were observed on the adjacent Sha Tau Kok Road.

Proposed Sha Tau Kok Interchange under Contract 6

- 10.1.11 The site exit of proposed Sha Tau Kok Interchange under Contract 6 was located at the junction of Sha Tau Kok Road and Wo Keng Shan Road. Wheel washing facilities was properly implemented at the site exit and the area between the wheel washing bay and site exit was hard paved. No trails of mud and muddy water were observed on the adjacent Sha Tau Kok Road and Wo Keng Shan Road.

Wo Keng Shan Park under Contract 6

- 10.1.12 The site exit of Wo Keng Shan Park under Contract 6 was located on Wo Keng Shan Road. Wheel washing facilities was properly implemented at the site exit and the area between the wheel washing bay and site exit was hard paved. No trails of mud and muddy water were observed on the adjacent Wo Keng Shan Road.

10.1.13

South Portal and Site Office under Contract 6

- 10.1.14 The site exit of South Portal and Site Office under Contract 6 was located on Wo Keng Shan Road. Wheel washing facilities was properly implemented at the site exit and the area between the wheel washing bay and site exit was hard paved. No trails of mud and muddy water were observed on the adjacent Wo Keng Shan Road.

- 10.1.15 In our investigation, the site exits near the complaint location under the project were satisfactory and muddy water discharge out of the construction site to the public roads was unlikely to occur.

It is considered that the suspected muddy water discharge from the works area out to Sha Tau Kok Road and Wo Keng Shan Road was unlikely due to the project.

10.1.16 As advised by both contractors, road washing/ cleaning by water bowsers was provided along Wo Keng Shan Road to Sha Tau Kok Road in every normal working day (Mon-Sat), except for rainy day. Moreover, road sweeping would be provided for the concerned roads twice a week. To address the complainant’s concern, the ET will keep closely inspection on the cleanliness situation on both roads during weekly site inspection.

Table 10-1 Statistical Summary of Environmental Complaints

Reporting Period	Contract No	Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
19 May 2014 – 30 Sep 2016	Contract 2	0	20	<ul style="list-style-type: none"> • (9) Water Quality • (8) Dust • (3) Noise
06 Nov 2013 – 30 Sep 2016	Contract 3	0	4	<ul style="list-style-type: none"> • (1) Dust • (2) Water quality • (1) Noise
16 Aug 2013 – 30 Sep 2016	Contract 5	0	4	<ul style="list-style-type: none"> • (3) Dust • (1) Noise
16 Aug 2013 – 30 Sep 2016	Contract 6	0	24	<ul style="list-style-type: none"> • (18) Water Quality • (5) Dust • (1) Noise
15 Feb 2016 – 30 Sep 2016	Contract 7	0	0	N/A
16 Aug 2013 – 30 Sep 2016	SS C505	0	1	(1) Noise
1 – 31 Oct 2016	Contract 2	1	21	<ul style="list-style-type: none"> • (10) Water Quality • (8) Dust • (3) Noise
	Contract 3	0	4	<ul style="list-style-type: none"> • (1) Dust • (2) Water quality • (1) Noise
	Contract 6	2	26	<ul style="list-style-type: none"> • (19) Water Quality • (6) Dust • (1) Noise
	Contract 7	0	0	N/A
	SS C505	0	0	N/A

Table 10-2 Statistical Summary of Environmental Summons

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

	Contract 3	0	0	NA
	Contract 6	0	0	NA
	Contract 7	0	0	NA
	SS C505	0	0	NA

Table 10-3 Statistical Summary of Environmental Prosecution

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

The Other Contracts

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

11 IMPLEMENTATION STATUS OF MITIGATION MEASURES

11.1 GENERAL REQUIREMENTS

- 11.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in *Appendix M*.
- 11.1.2 All contracts under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by Contracts 2, 3, 5, 6, 7 and Contract SS C505 in this Reporting Period are summarized in *Table 11-1*.

Table 11-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> Wastewater to be treated by the wastewater treatment facilities i.e. sedimentation tank or similar facility before discharge.
Air Quality	<ul style="list-style-type: none"> Maintain damp / wet surface on access road Low vehicular speed within the works areas. All vehicles must use wheel washing facility before off site Sprayed water during breaking works A cleaning truck was regularly performed on the public road to prevent fugitive dust emission
Noise	<ul style="list-style-type: none"> Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. Keep good maintenance of plants Place noisy plants away from residence or school Provide noise barriers or hoarding to enclose the noisy plants or works Shut down the plants when not in used.
Waste and Chemical Management	<ul style="list-style-type: none"> On-site sorting prior to disposal Follow requirements and procedures of the “Trip-ticket System” Predict required quantity of concrete accurately Collect the unused fresh concrete at designated locations in the sites for subsequent disposal
General	<ul style="list-style-type: none"> The site was generally kept tidy and clean.

11.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

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

Contract 2

- | | |
|-----------------|--|
| Mid-Vent Portal | <ul style="list-style-type: none"> Stud tunnel and cavern excavation Adit invert slab, water proofing and lining Ventilation building superstructure and backfilling |
| North Portal | <ul style="list-style-type: none"> Slope stabilization & retaining wall Southbound TBM excavation Northbound bench excavation Tunnel enlargement and construction of cross passage Tunnel internal structure and cross passage Ventilation building foundation |
| South Portal | <ul style="list-style-type: none"> Southbound and Northbound D&B excavation South ventilation building superstructure Tunnel invert, waterproofing and lining |
| Admin Building | <ul style="list-style-type: none"> Building superstructure and external wall |

Contract 3

- Cable detection and trial trenches

- Demolition of existing vehicular bridge
- Footbridge construction
- Storm drains laying
- Noise barrier construction
- Pier / Pier Table construction
- Pile cap works
- Portal beam construction
- Retaining Wall construction
- Road works
- Sewer works
- Utilities duct laying
- Viaduct segment erection
- Water Main Laying

Contract 6

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

Contract 7

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

Contract SS C505

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

11.3 KEY ISSUES FOR THE COMING MONTH

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

- Implementation of control measures for rainstorm;
- Regular clearance of stagnant water during wet season;
- Implementation of dust suppression measures at all times;
- Potential wastewater quality impact due to surface runoff;

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

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

12 CONCLUSIONS AND RECOMMENDATIONS

12.1 CONCLUSIONS

- 12.1.1 This is the 39th monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 31 October 2016.
- 12.1.2 For air quality monitoring, no 1-hour and 24-hour TSP monitoring results triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.
- 12.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in the Reporting Period. No NOEs or the associated corrective actions were therefore issued.
- 12.1.4 For water quality monitoring, thirty-seven (37) LL exceedances, namely seventeen (17) LL exceedance of turbidity and twenty (20) LL exceedances of Suspended Solids were recorded for the Project. Investigations reports revealed that all exceedances on 4 to 18 October 2016 were not project related, except for exceedances at WM2A(a) on 4 Oct were due to damage pipe under C6. Exceedances on 18 to 31 October 2016 at WM2A(a) are under investigated by ET. The completed IRs had submitted to relevant parties.
- 12.1.5 No environmental summons or successful prosecutions were recorded in the Reporting Period.
- 12.1.6 In this Reporting Period, two (2) documented environmental complaints were received. One of the complaints was about transportation of dusty construction waste material and investigation result revealed that the complaint was related to works under Contract 6. Another complaint was about wastewater discharge from construction site near the works areas of Contracts 2 and 6 and investigation result revealed that the complaint was not related to works under Contracts.
- 12.1.7 During the Reporting Period, weekly joint site inspection by the RE, IEC, ET with the relevant Main-contractor were carried out for Contracts 2, 3, 6, 7 and SS C505 in accordance with the EM&A Manual stipulation. No non-compliance observed during the site inspection.

12.2 RECOMMENDATIONS

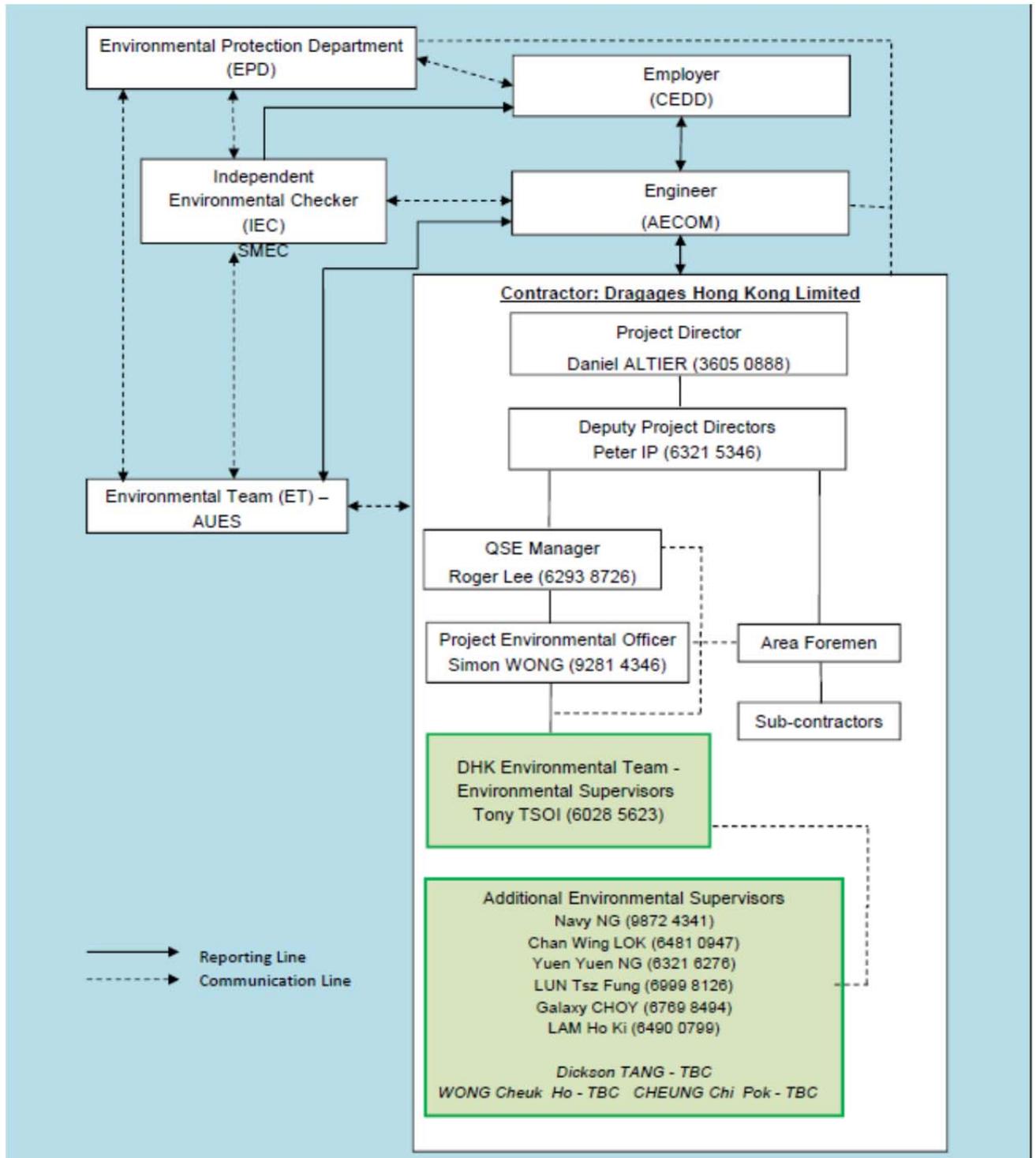
- 12.2.1 During dry season, special attention should be paid on the potential construction dust impact since most of the construction sites are adjacent to villages. The Contractor should fully implement the construction dust mitigation measures properly.
- 12.2.2 Preventive measures for muddy water or other water pollutants from site surface flow to local stream such as Kong Yiu Channel, Ma Wat Channel, Ping Yuen River or public area should be properly maintained. The Contractors should paid special attention on water quality mitigation measures and fully implement according ISEMM of the EM&A Manual, in particular for working areas near Ma Wat Channel and Ping Yuen River. Moreover, all effluent discharge shall be ensure to fulfill Technical Memorandum of Effluent Discharged into Drainage and Sewerage Systems, inland and Coastal Waters criteria or discharge permits stipulation.
- 12.2.3 Construction noise would be a key environmental issue during construction work of the Project. Noise mitigation measures such as using quiet plants should be implemented in accordance with the EM&A requirement.
- 12.2.4 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be kept to prevent mosquito breeding on site.

Appendix A

Layout plan of the Project

Appendix B

Organization Chart



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

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Gregory Lo	2171 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
DHK	Project Director	Daniel Altier	2171 3004	2171 3299
DHK	Deputy Project Manager	Peter Ip	6321 5346	2171 3299
DHK	QSE Manager	Roger Lee	6293 8726	2171 3299
DHK	Environmental Officer	Simon Wong	2171 3004	2171 3299
DHK	Environmental Supervisor	Tony Tsoi	6028 5623	2171 3299
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

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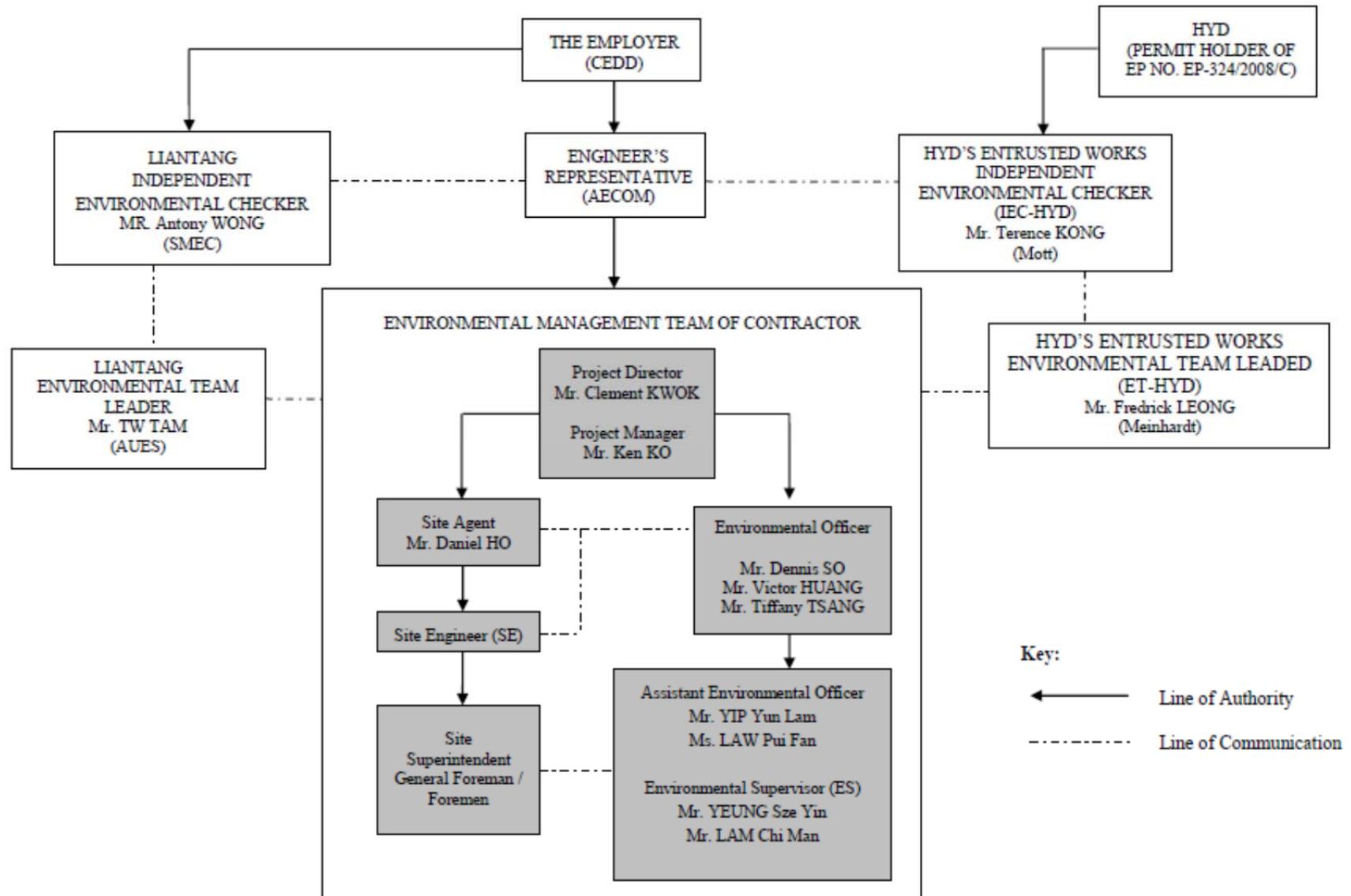
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

DHK(Main Contractor) –Dragages Hong Kong Ltd.

SMEC (IEC) – SMEC Asia Limited

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



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

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

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
AECOM	Engineer's Representative	Bobby Hung	2171 3300	2171 3498
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
Chun Wo	Project Director	Clement Kwok	3758 8735	2638 7077
Chun Wo	Project Manager	Ken Ko	2638 6136	2638 7077
Chun Wo	Site Agent	Daniel Ho	2638 6144	2638 7077
Chun Wo	Environmental Officer	Victor Huang Tiffany Tsang Dennis So	2638 6115	2638 7077
Chun Wo	Assistant Environmental Officer	Yip Yun Lam Law Pui Fan	2638 6125	2638 7077
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

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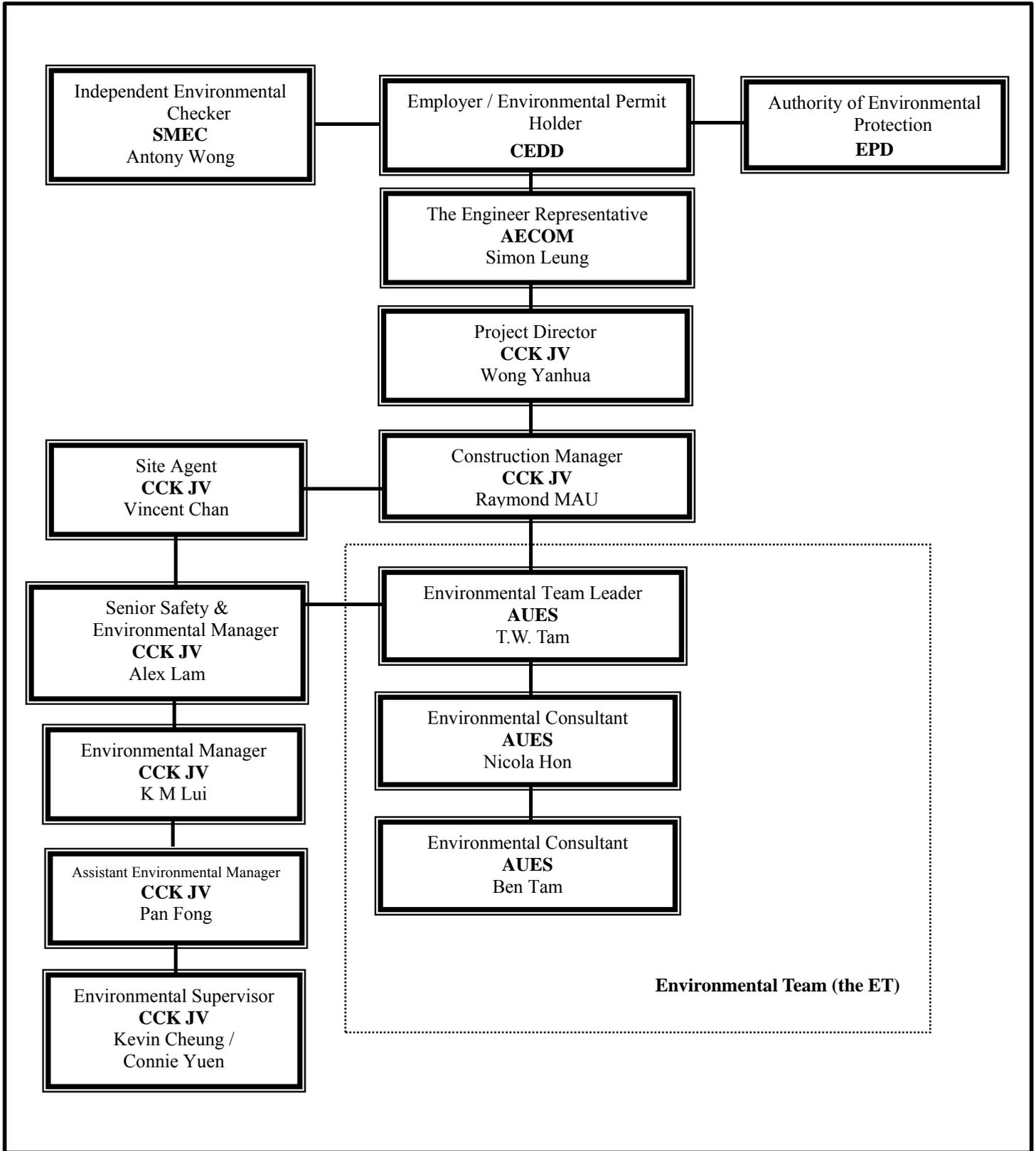
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization – CV/2013/08

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

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

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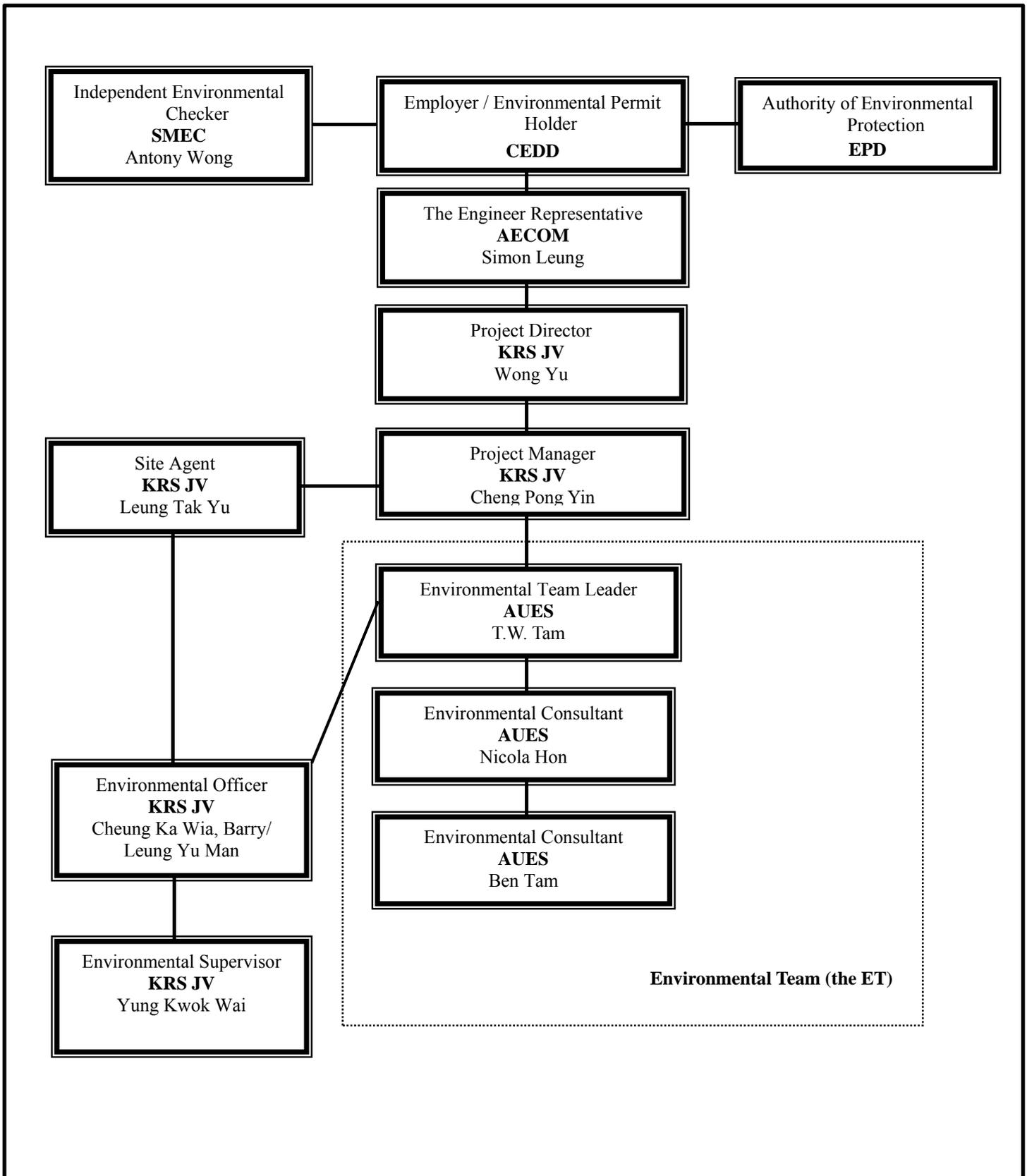
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organization –NE/2014/03

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

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

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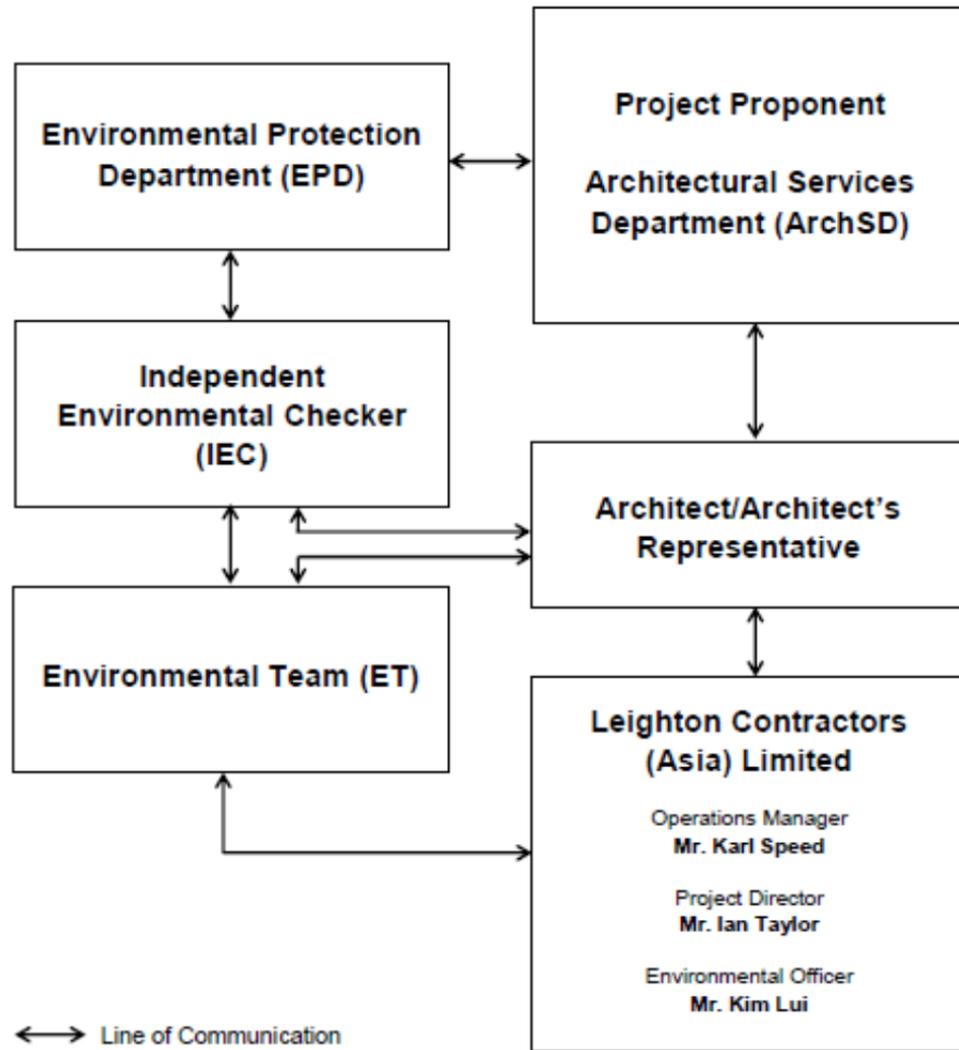
CEDD (Employer) – Civil Engineering and Development Department

AECOM (Engineer) – AECOM Asia Co. Ltd.

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

SMEC (IEC) – SMEC Asia Limited

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



Environmental Management Organigram

Environmental Management Organization for Contract SS C505

Contact Details of Key Personnel for Contract SS C505

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

Legend:

ArchSD (Project Proponent) – Architectural Services Department

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

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

SMEC (IEC) – SMEC Asia Limited

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

Appendix C

3-month rolling construction program

Contract 2

Contract 3

Contract 6

Contract 7

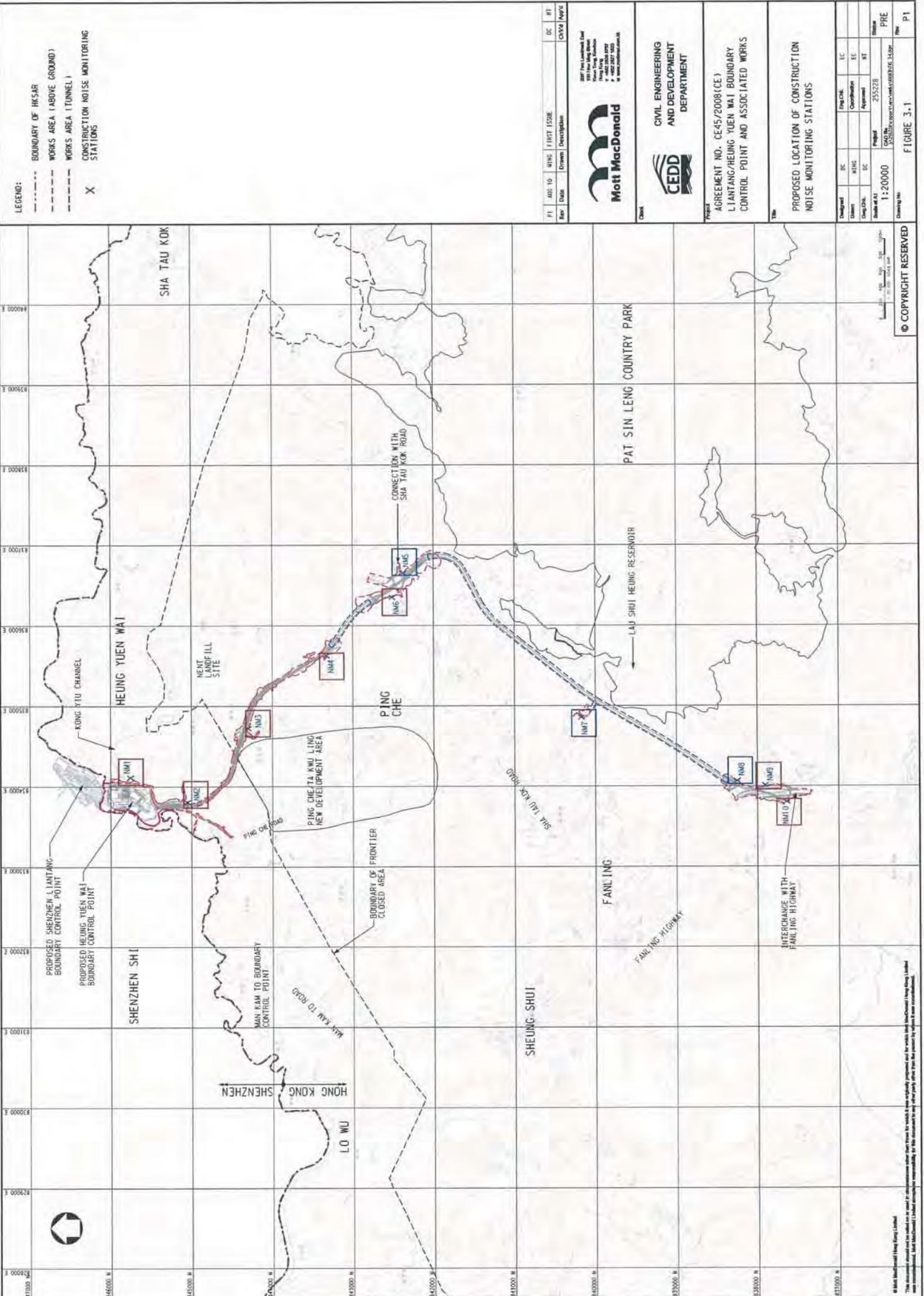
Contract SS C505

Tentative Three Months (October, November and December 2016) Construction Rolling Program

Item	Construction Activities
1	Establishment Mobilisation & Advance Works
2	Passenger Terminal Building - Substructure Works
3	Passenger Terminal Building - Superstructure Works
4	Passenger Terminal Building - ABWF Works
5	C&ED Detector Dog Base - Substructure and RC structures
6	HKPF Building - Substructure, RC structures, Integrated ABWF and BS Works
7	Fire Station and Drill Tower - Pilecap Construction, substructures, structures, Integrated ABWF and MEP Works
8	Cargo Examination Building (Inbound) - Substructures, RC Structure and ABWF & MEP
9	Cargo Examination Building (Outbound) - Substructures and RC Structure, ABWF & MEP
10	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Inbound) - Substructures, RC Structures and ABWF & MEP
11	Fixed X-ray Vehicle Inspection System (FXRVIS) Buildings (Outbound) - Pile Cap Construction, Structural Works and ABWF & MEP
12	GV Kiosk (Inbound) - Earthworks and RC structures
13	MXRVSS (Outbound) - Structures works
14	Fire Hydrant Tank & Pump Room - Structural Works, ABWF & MEP works
15	Elevated Walkway - Foundation Works
16	Vehicular bridges - Foundation works, Pilecaps / Piers / abutment / retaining walls / portal, Bridge Decks
17	External Works in Portion 1 - laying utilities & pile ducts & CLP cable ducts
18	External Works in Portion 2 - Site formation, laying utilities & pipe ducts & CLP cable ducts

Appendix D

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



LEGEND:

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

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



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CIVIL ENGINEERING
AND DEVELOPMENT
DEPARTMENT

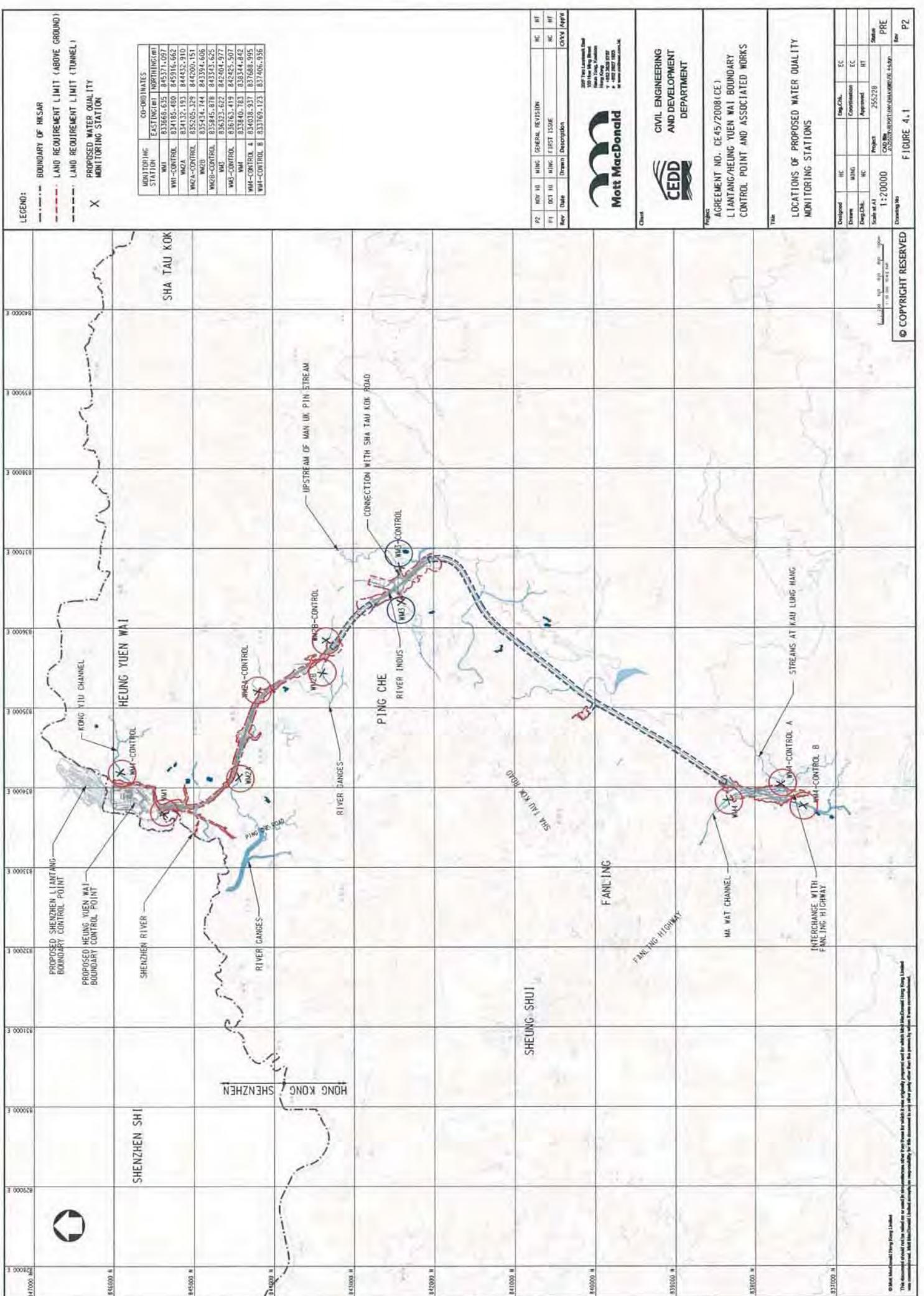
Project
AGREEMENT NO. CE-45/2008(CE)
LIANTANG/HEUNG YUEN WAI BOUNDARY
CONTROL POINT AND ASSOCIATED WORKS

Proposed
LOCATION OF CONSTRUCTION
NOISE MONITORING STATIONS

Designated	IC	Pre-Check	EC
Station	N/INC	Description	EC
Designation	DC	Approval	BT
Scale at A1	1:20000	Project	255228
Scale at A2		CD/ID No.	CE45/2008(CE)001/001/016.1-019
Drawing No.		Sheet	PRE
		Rev	P1

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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)
WMA	837668.635	845371.097
WMA-COMB	834185.460	845916.662
WMA-A	834132.193	844832.910
WMA-COMB-A	835205.329	844200.151
WMA-B	835334.744	843384.606
WMA-COMB-B	835845.878	843323.625
WMA-COMB-C	836323.622	842404.977
WMA-COMB-D	836163.419	842425.507
WMA-COMB-E	833940.763	838344.842
WMA-COMB-F	834038.937	837688.995
WMA-COMB-G	833769.123	837406.936

REV	NOY	DATE	BY	CHK	DESCRIPTION
P2	01	10/10/20	MC	MC	GENERAL REVISION
P1	01	10/10/20	MC	MC	FIRST ISSUE

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CEDD

CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Title: LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

Scale: 1:20000

Project No.: 255278

Drawn by: PRE

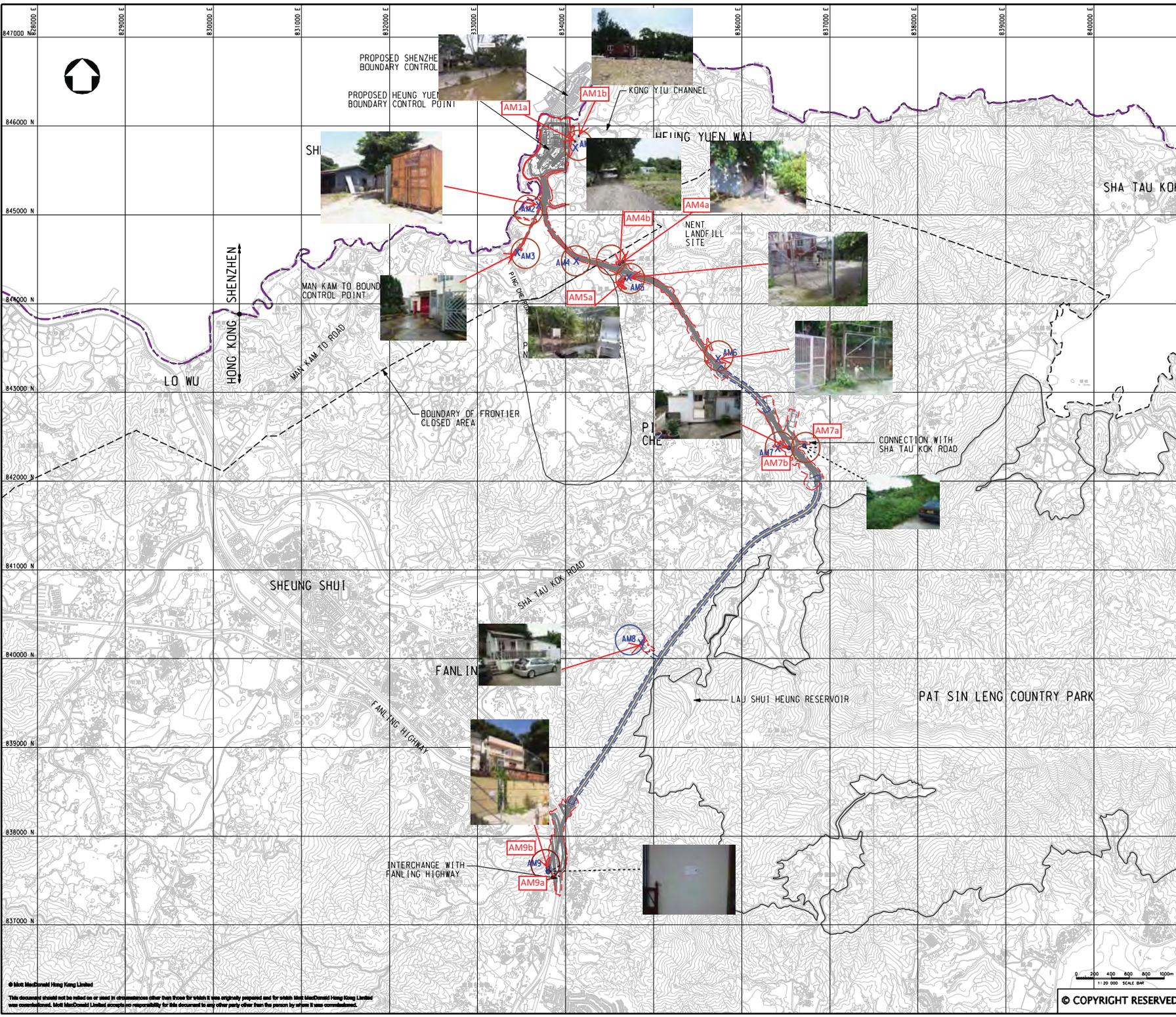
Checked by: P2

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Appendix E

Monitoring Locations for Impact Monitoring



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

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



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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

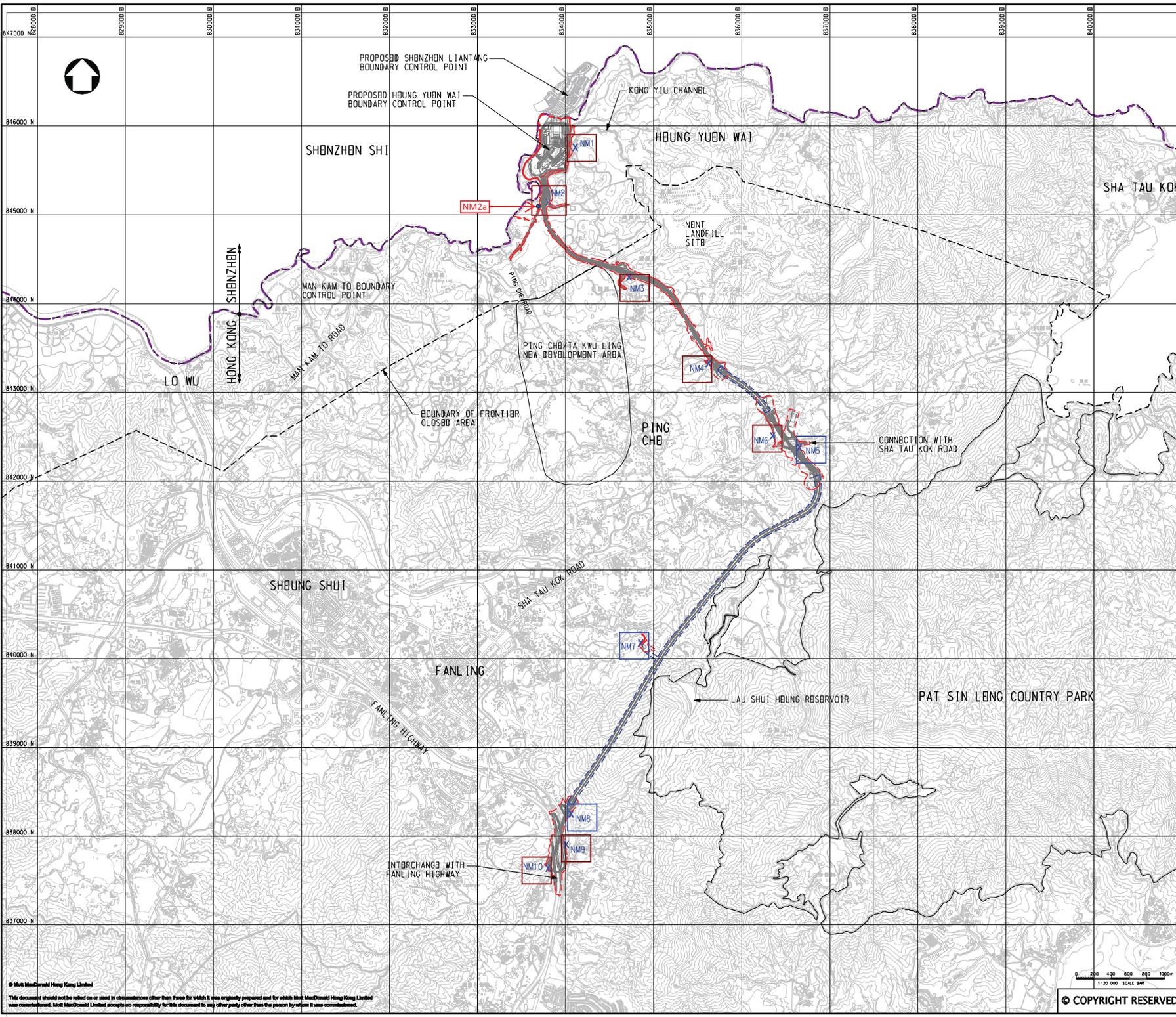
Title
 PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

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

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 1:20 000 SCALE BM
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FIGURE 2.1



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

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



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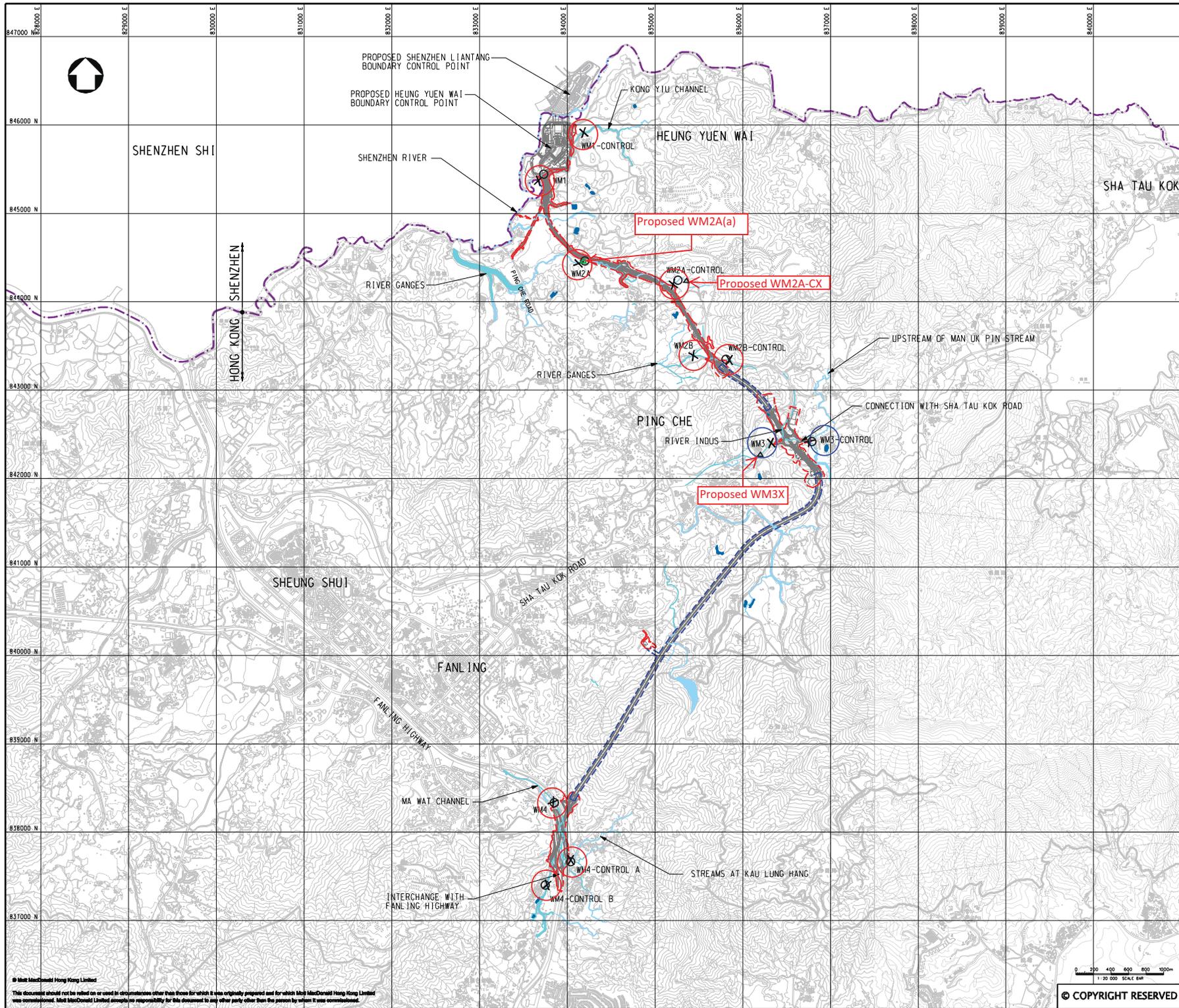
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Title
 PROPOSED LOCATION OF CONSTRUCTION NOISE MONITORING STATIONS

Designed	DC	Eng.Chk.	BC	
Drawn	MING	Coordination	BC	
Dep.Chk.	DC	Approved	HT	
Scale of A1	1:20000	Project	255228	Status
		CAD file	3\255228\report\env\env\ca\0083\116_31.dgn	PRB
Drawing No				Rev
				P1

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- LEGEND:**
- BOUNDARY OF HKSAR
 - - - LAND REQUIREMENT LIMIT (ABOVE GROUND)
 - . - . LAND REQUIREMENT LIMIT (TUNNEL)
 - X** Water Quality Monitoring Location Recommended in EM&A Manual
 - 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	833658.833	845171.017	833670	845171
WM1-Control	834185.480	845916.667	834185	845917
WM2A	834132.319	844432.910	834204	844513
WM2A-Control	835705.329	844200.151	835270	844245
WM2B	835434.744	843394.606	835435	843397
WM2B-Control	835845.878	843343.625	835835	843351
WM3	836123.622	842403.377	836324	842407
WM3-Control	836763.419	842423.507	836763	842400
WM4	835840.783	838344.842	835850	838358
WM4-Control A	834518.937	837648.995	834028	837695
WM4-Control B	833769.123	837406.916	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	CHK'd	App'd
P2	NOV 10	MING	GENERAL REVISION	HC	HT
P1	OCT 10	MING	FIRST ISSUE	HC	HT

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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

Title:
LOCATIONS OF PROPOSED WATER QUALITY MONITORING STATIONS

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

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Appendix F

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Garden Farm, Tsung Yuen Ha Village	Date of Calibration: 25/8/2016
Location ID : AM1b	Next Calibration Date: 25/10/2016
	Technician: Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

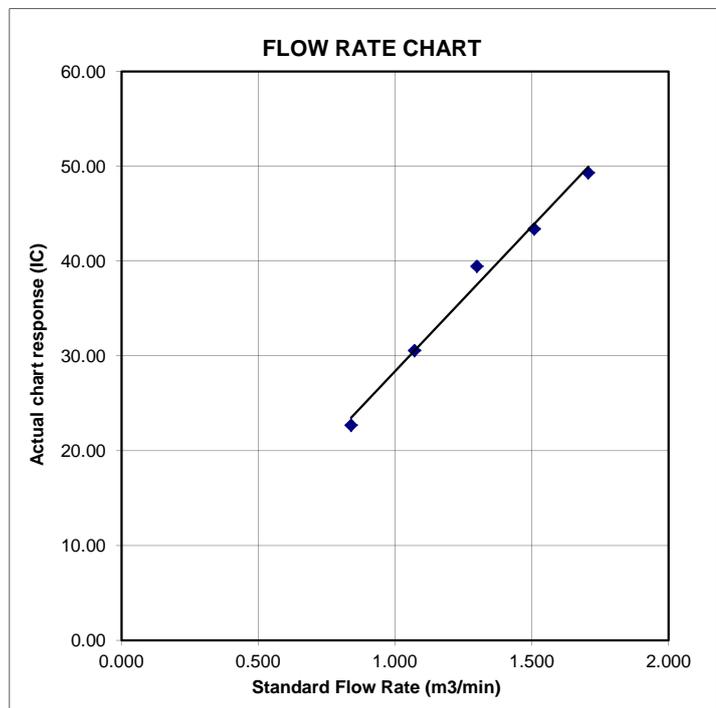
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road	Date of Calibration:	25/8/2016
Location ID : AM2	Next Calibration Date:	25/10/2016
	Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

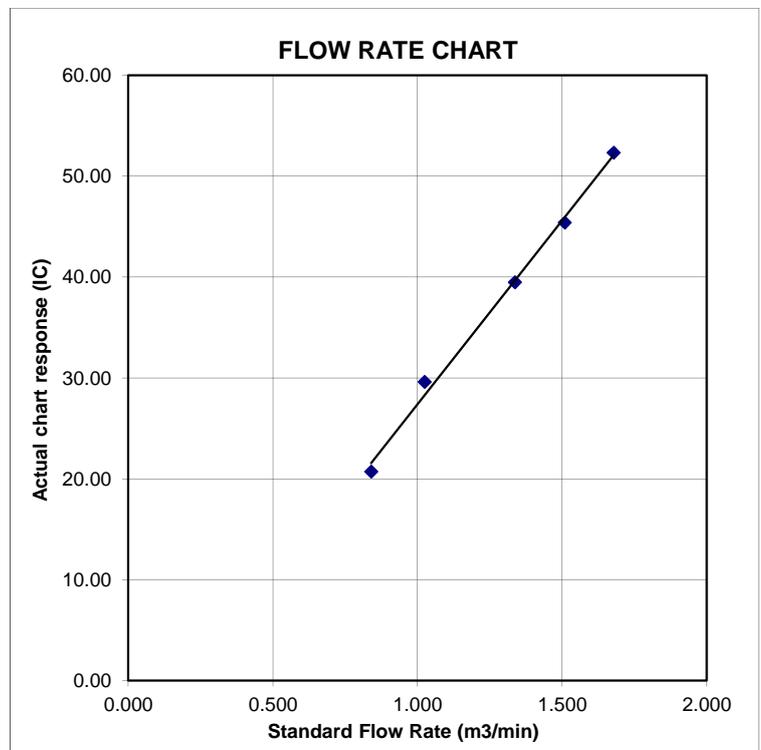
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

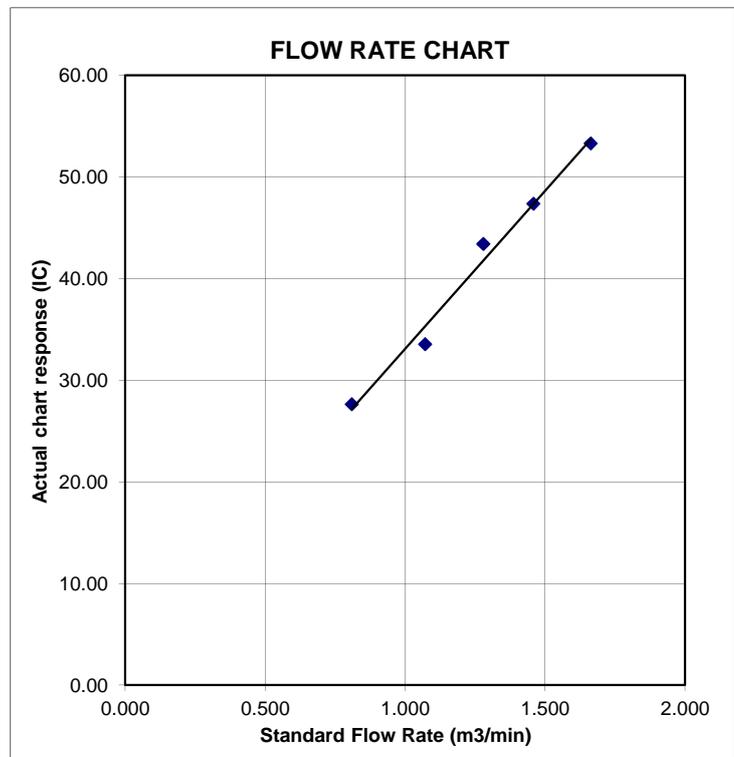
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House
 Location ID : AM4b

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

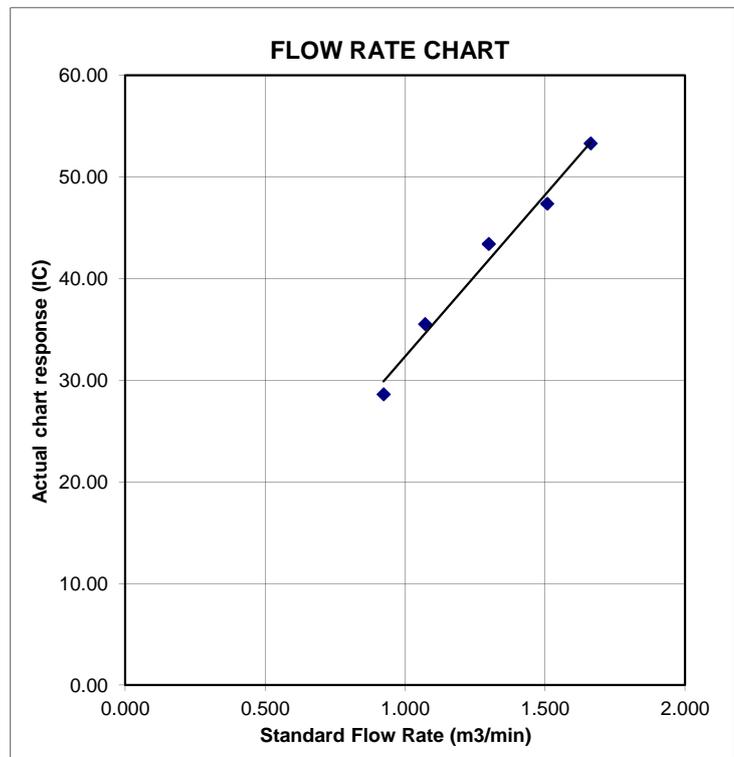
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Ping Yeung Village House	Date of Calibration:	25/8/2016
Location ID : AM5a	Next Calibration Date:	25/10/2016
	Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

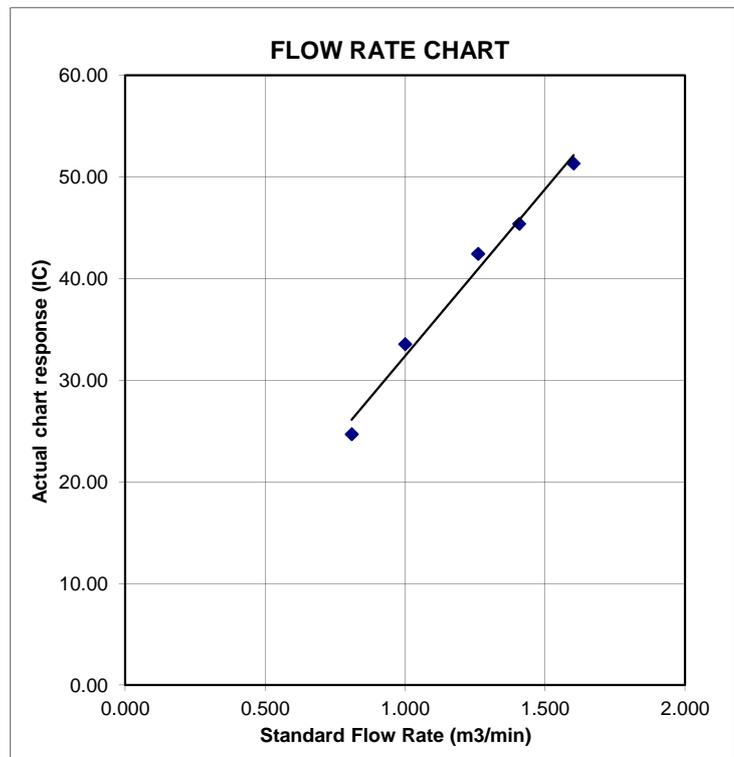
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Wo Keng Shan Village House	Date of Calibration:	25/8/2016
Location ID : AM6	Next Calibration Date:	25/10/2016
	Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

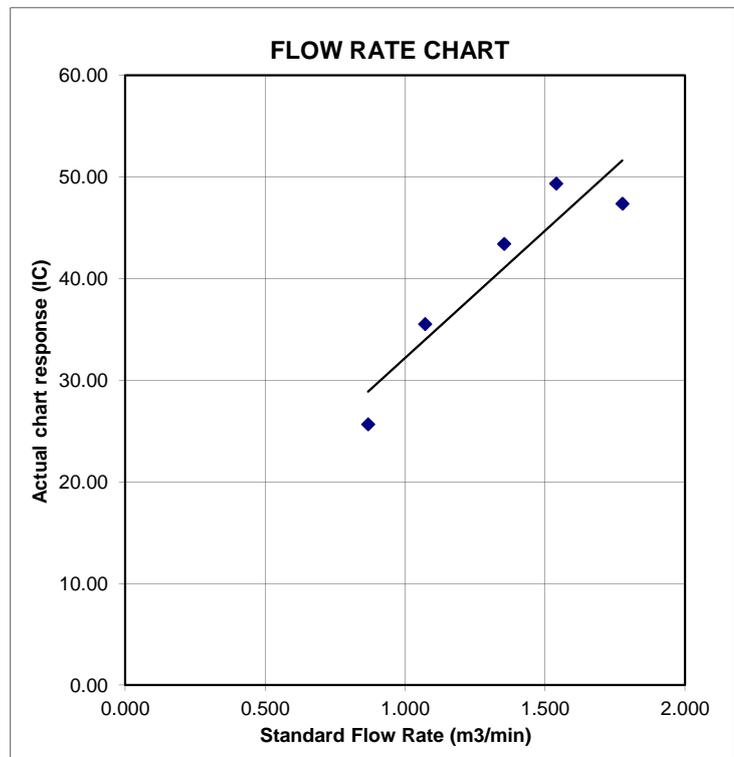
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village

Date of Calibration: 25/8/2016

Location ID : AM7b

Next Calibration Date: 25/10/2016

Technician: Fai So

CONDITIONS

Sea Level Pressure (hPa) 1004.2
 Temperature (°C) 30.4

Corrected Pressure (mm Hg) 753.15
 Temperature (K) 303

CALIBRATION ORIFICE

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

Qstd Slope -> 2.00411
 Qstd Intercept -> -0.03059

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

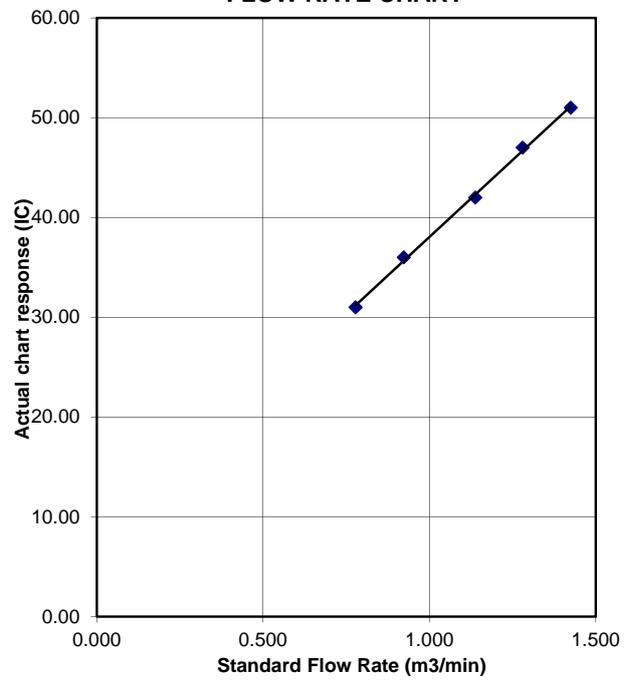
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

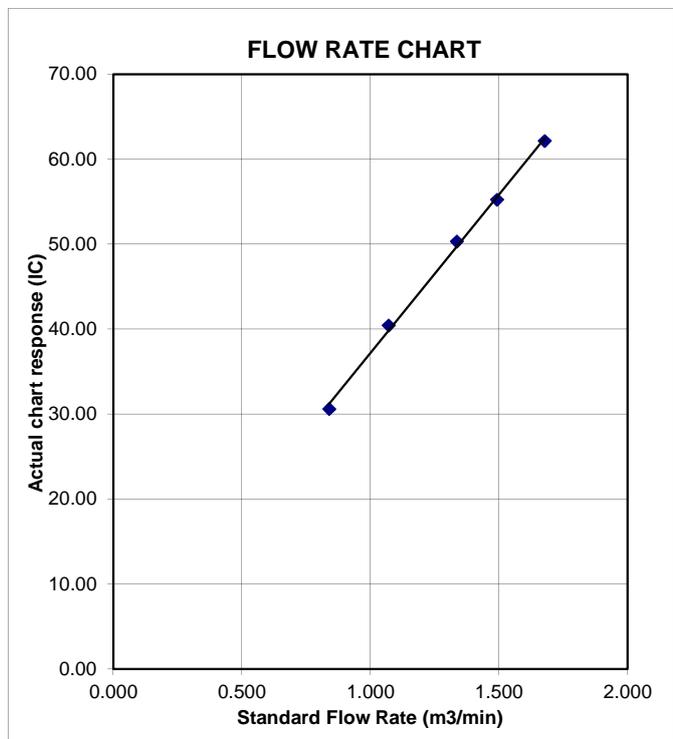
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

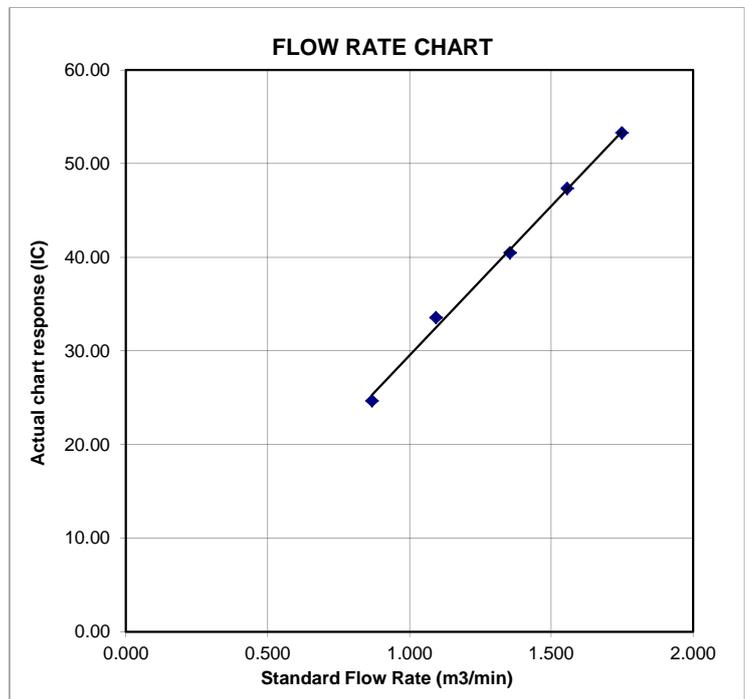
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Open area at Tsung Yuen Ha Village	Date of Calibration:	24/10/2016
Location ID : AM1b	Next Calibration Date:	24/12/2016
	Technician:	Fai So

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

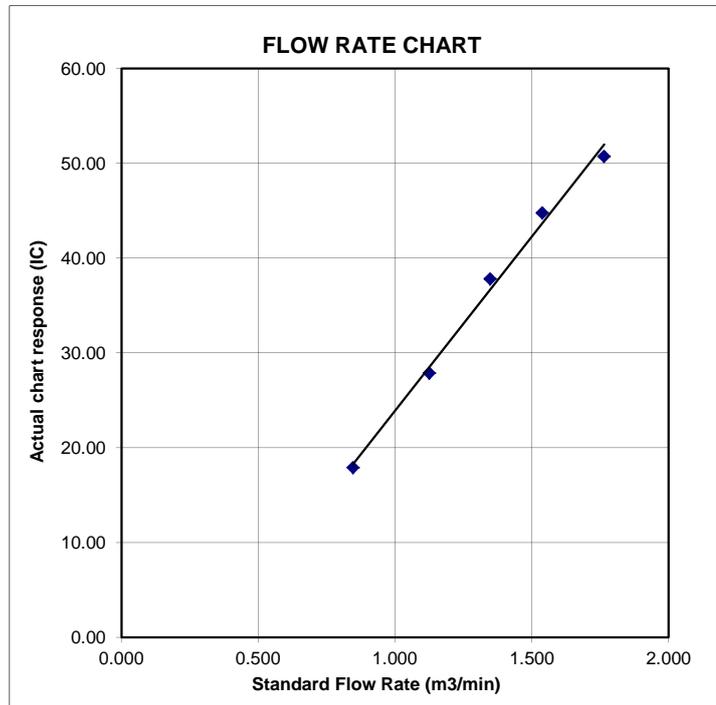
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

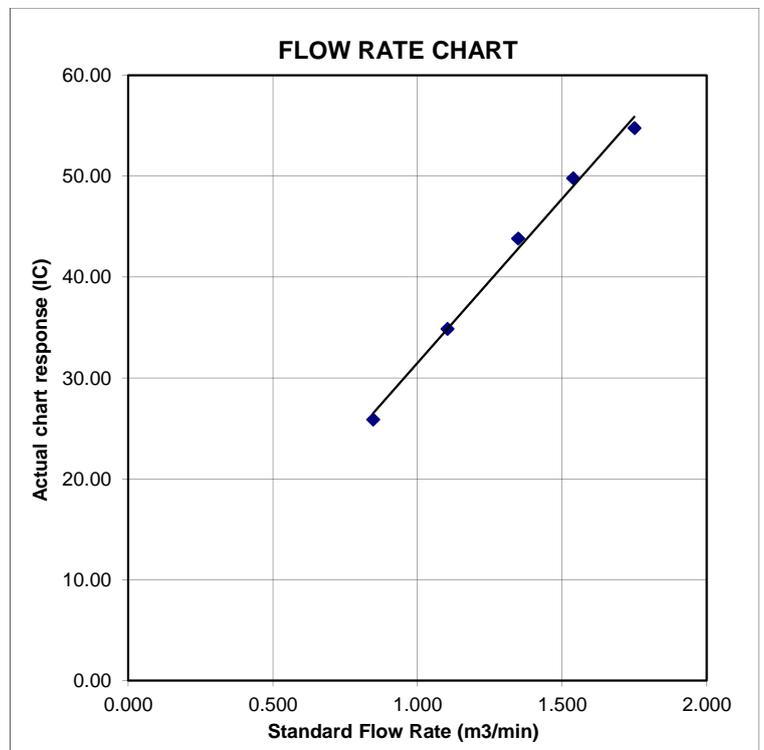
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

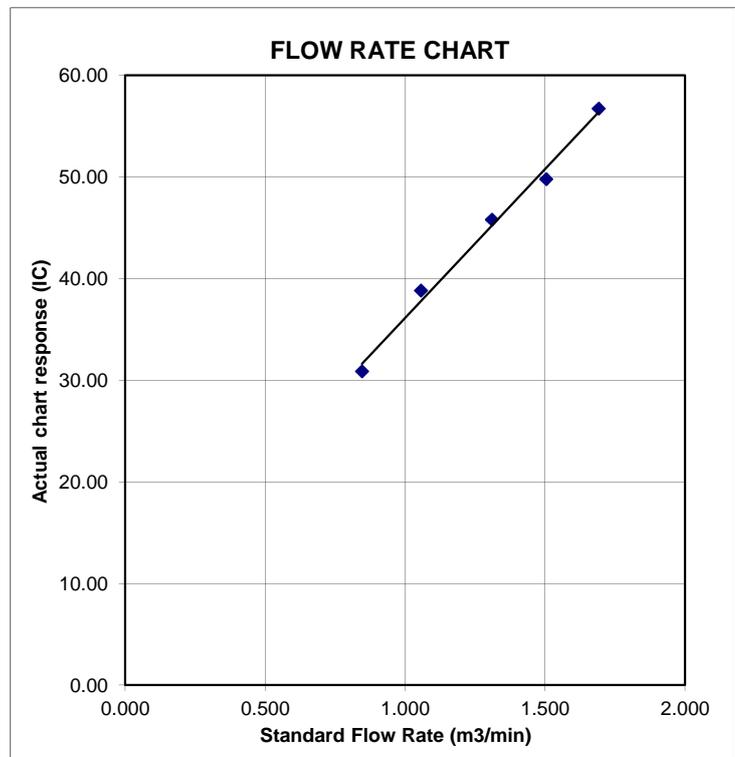
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

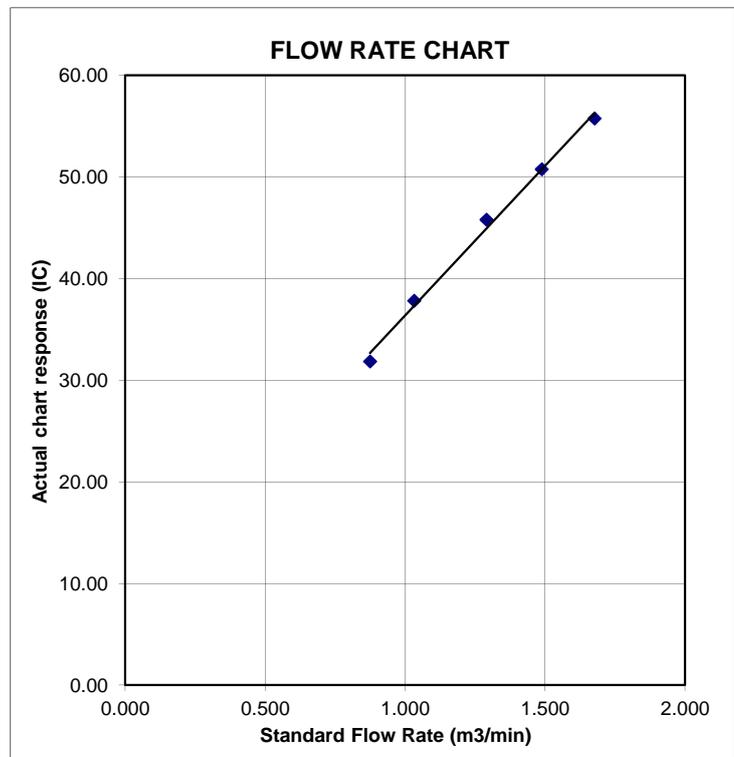
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

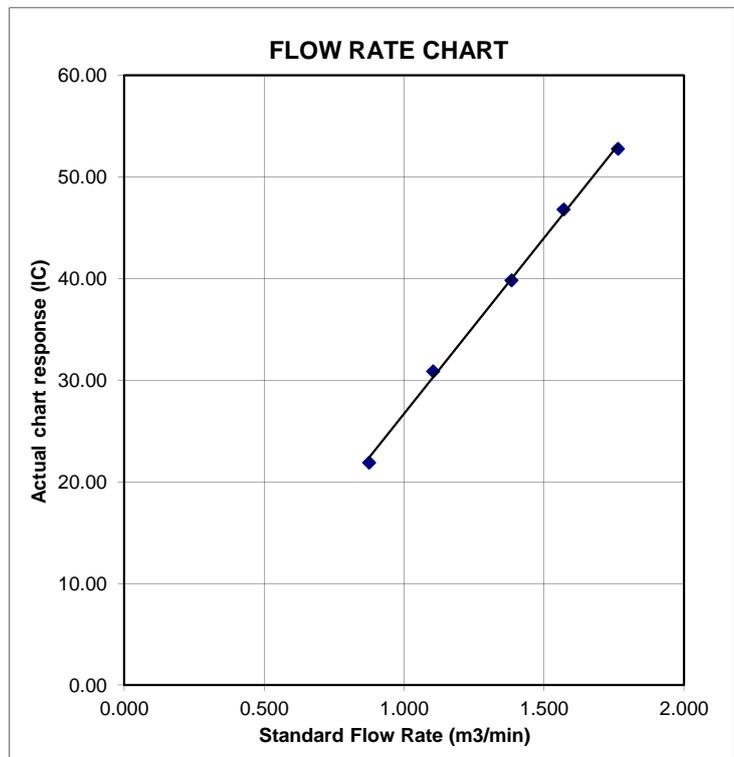
$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

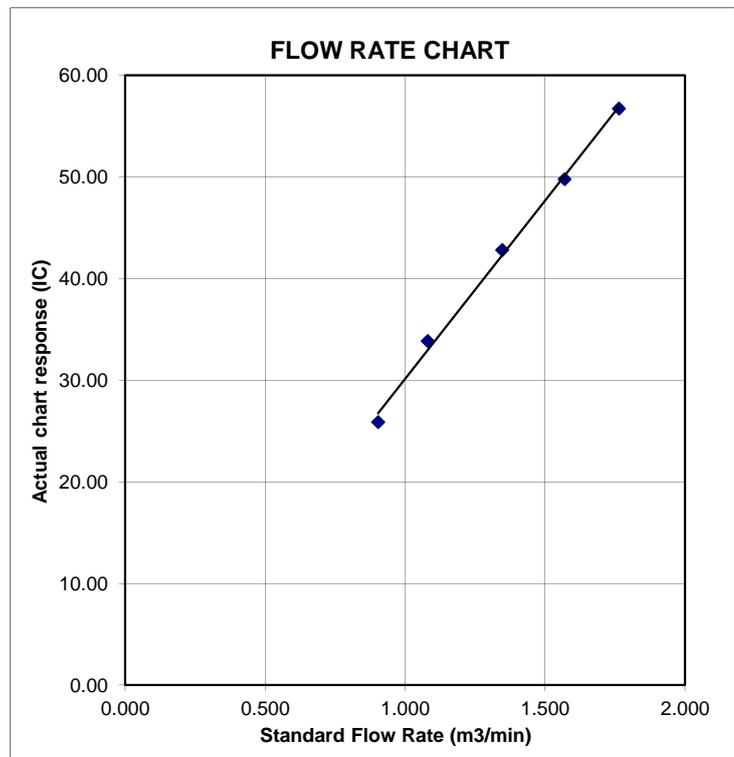
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House of Loi Tung Village

Date of Calibration: 24/10/2016

Location ID : AM7b

Next Calibration Date: 24/12/2016

Technician: Fai So

CONDITIONS

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

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

CALIBRATION ORIFICE

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

Qstd Slope -> 2.00411
 Qstd Intercept -> -0.03059

CALIBRATION

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

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

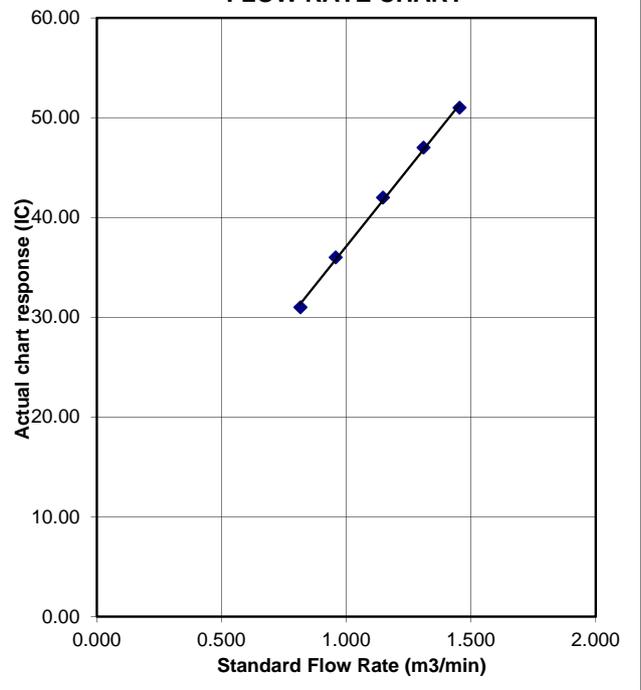
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

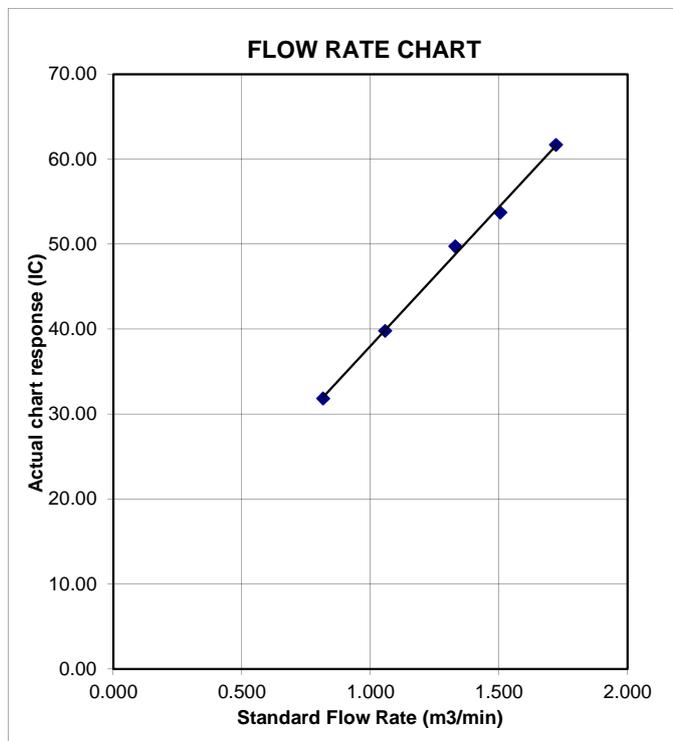
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

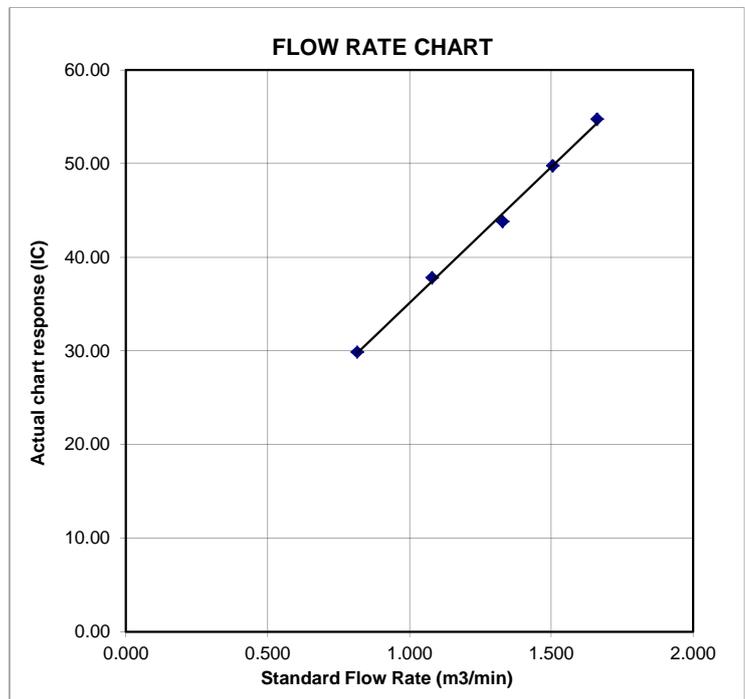
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





TISCH ENVIRONMENTAL, INC.
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 VILLAGE OF CLEVELAND, OH
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 877.263.7610 TOLL FREE
 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

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

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

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9866	0.7165	1.4078	0.9957	0.7231	0.8896
0.9824	1.0117	1.9909	0.9914	1.0210	1.2581
0.9804	1.1256	2.2259	0.9894	1.1360	1.4066
0.9793	1.1785	2.3345	0.9883	1.1893	1.4753
0.9741	1.4200	2.8155	0.9830	1.4330	1.7792
Qstd slope (m) = 2.00411			Qa slope (m) = 1.25494		
intercept (b) = -0.03059			intercept (b) = -0.01933		
coefficient (r) = 0.99995			coefficient (r) = 0.99995		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

For subsequent flow rate calculations:

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

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

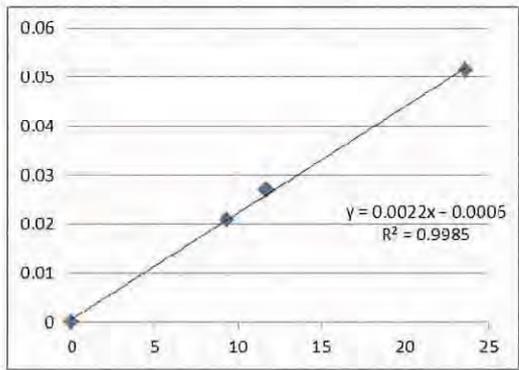
Testing Date: 4 to 6 January 2016

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

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

Linear Regression of Y or X

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



Remarks:

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

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

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

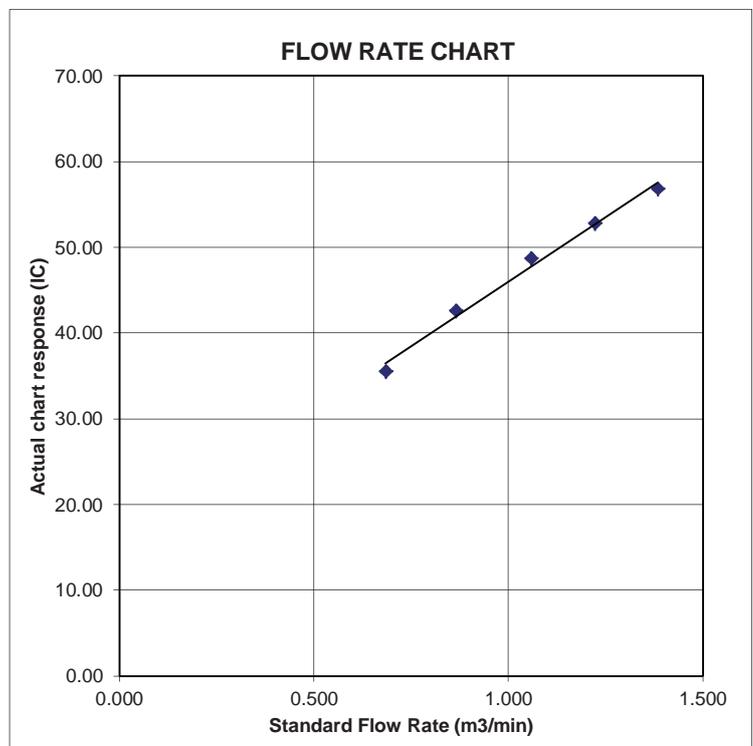
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

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

For subsequent calculation of sampler flow:

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

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



Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

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

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

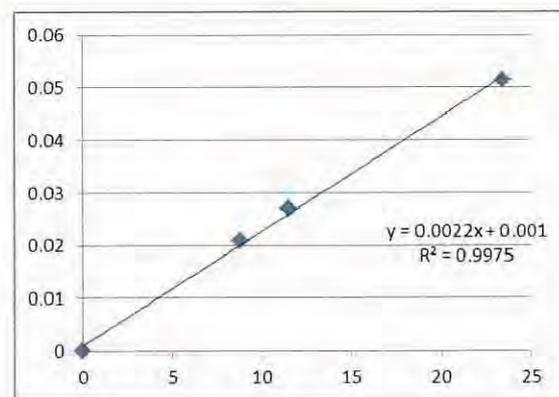
Sensitivity Adjustment Scale Setting (After Calibration) 540 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9975

Date of Issue 11 January 2016



Remarks:

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

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

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

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

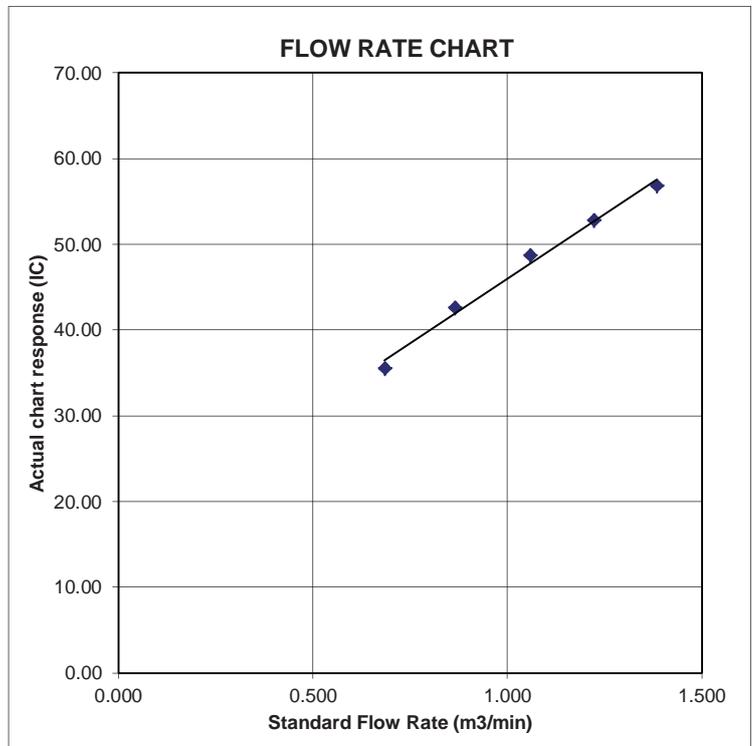
$$IC = I[\sqrt{P_a/P_{std}(T_{std}/T_a)}]$$

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

For subsequent calculation of sampler flow:

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

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



Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

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

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

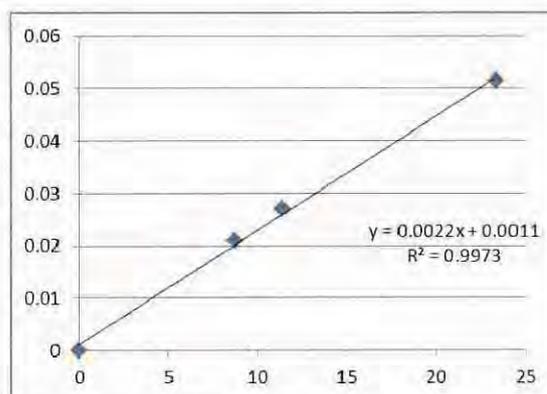
Sensitivity Adjustment Scale Setting (After Calibration) 661 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9973

Date of Issue 11 January 2016



Remarks:

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

Operator: Donald Kwok Signature:  Date: 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

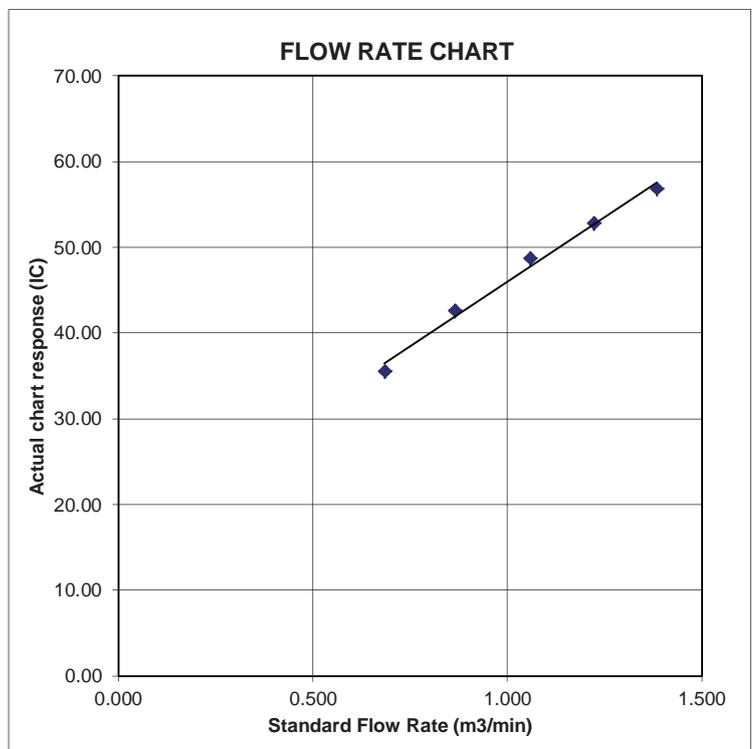
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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



Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

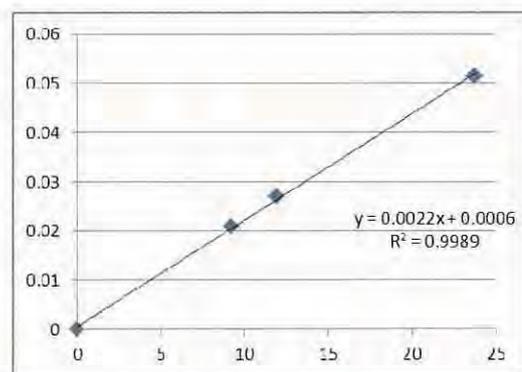
Testing Date: 4 to 6 January 2016

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

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

Linear Regression of Y or X

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



Remarks:

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

Operator: Donald Kwok Signature:  Date: 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

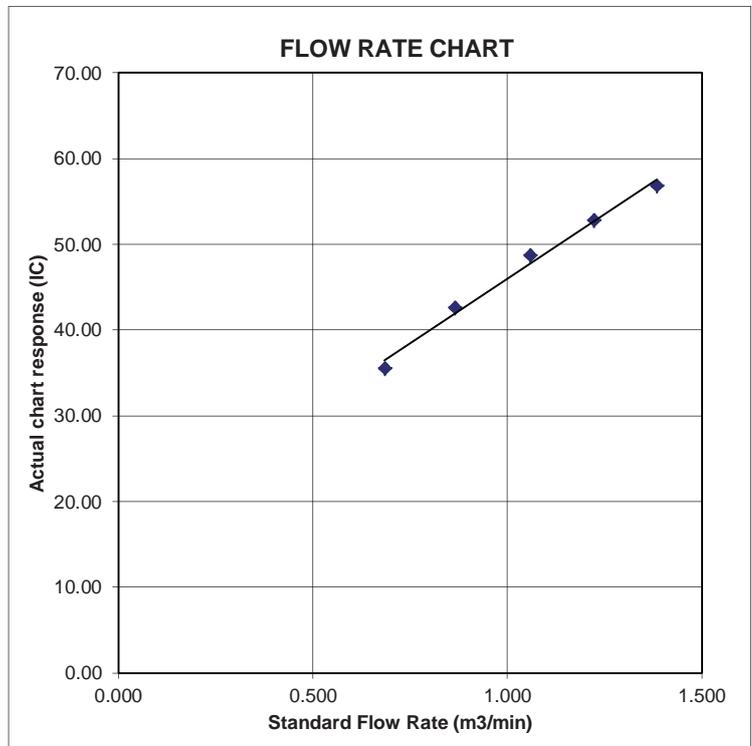
$$IC = I[\sqrt{P_a/P_{std}}(T_{std}/T_a)]$$

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

For subsequent calculation of sampler flow:

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

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



Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

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

Equipment Verification Results:

Testing Date: 4 to 6 January 2016

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

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

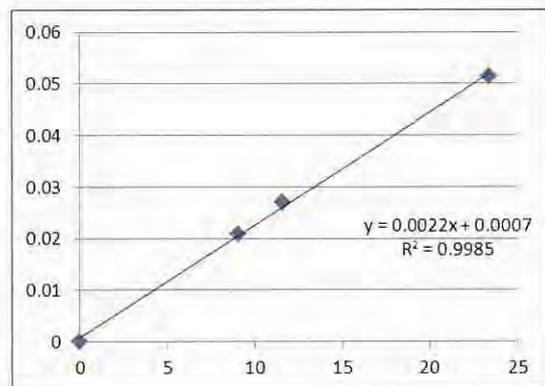
Sensitivity Adjustment Scale Setting (After Calibration) 585 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9985

Date of Issue 11 January 2016



Remarks:

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

Operator : Donald Kwok Signature :  Date : 12 January 2016

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

CONDITIONS

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

CALIBRATION ORIFICE

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

CALIBRATION

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

Calculations :

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

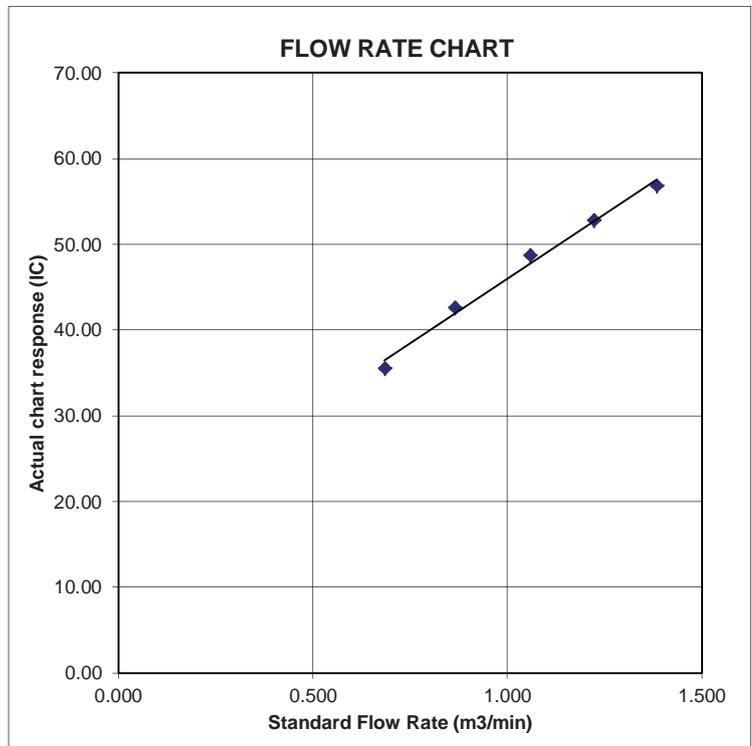
$$IC = I[\sqrt{P_a/P_{std})(T_{std}/T_a)}]$$

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

For subsequent calculation of sampler flow:

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

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



Certificate of Calibration

校正證書

Certificate No. : C162996
證書編號

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

Date of Receipt / 收件日期 : 26 May 2016

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

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C

Relative Humidity / 相對濕度 : (55 ± 20)%

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016

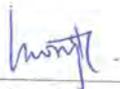
TEST RESULTS / 測試結果

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

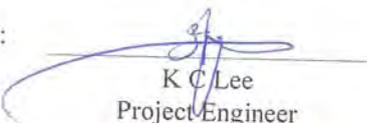
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

6 June 2016

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

Certificate of Calibration

校正證書

Certificate No. : C162996

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

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

6.2.2 Tone Burst Signal (2 kHz)

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

6.3 Frequency Weighting

6.3.1 A-Weighting

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

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

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

Certificate of Calibration

校正證書

Certificate No. : C162996
證書編號

6.3.2 C-Weighting

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

6.4 Time Averaging

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

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

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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

Sun Creation Engineering Limited - Calibration & Testing Laboratory

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

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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



Certificate of Calibration

校正證書

Certificate No. : C162991
證書編號

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

Date of Receipt / 收件日期 : 24 May 2016

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

TEST CONDITIONS / 測試條件

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

Line Voltage / 電壓 : ---

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 June 2016

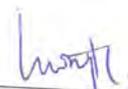
TEST RESULTS / 測試結果

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

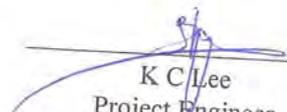
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

3 June 2016

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

Certificate of Calibration

校正證書

Certificate No. : C162991
證書編號

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

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

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

Note :

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



Certificate of Calibration 校正證書

Certificate No. : C161797
證書編號

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

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 6 April 2016

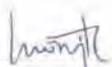
TEST RESULTS / 測試結果

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

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

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

7 April 2016

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

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

Certificate of Calibration

校正證書

Certificate No. : C161797

證書編號

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

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

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Adjustment

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

* Out of IEC 61672 Class 1 Spec.

- 6.1.1.2 After Adjustment

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

- 6.1.2 Linearity

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

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

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

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

Certificate of Calibration

校正證書

Certificate No. : C161797
證書編號

6.2 Time Weighting

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

6.3 Frequency Weighting

6.3.1 A-Weighting

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

6.3.2 C-Weighting

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

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

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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



Certificate of Calibration

校正證書

Certificate No. : C161797
證書編號

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

Note :

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

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

輝創工程有限公司 – 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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



Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

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

Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285762
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 25 April 2016

TEST RESULTS / 測試結果

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

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

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

Tested By
測試



H T Wong
Technical Officer

Certified By
核證



K C Lee
Project Engineer

Date of Issue : 27 April 2016
簽發日期

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

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

Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

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

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

- Test procedure : MA101N.

- Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

- 6.1.1.1 Before Self-calibration

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

- 6.1.1.2 After Self-calibration

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

- 6.1.2 Linearity

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

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

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

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

Sun Creation Engineering Limited - Calibration & Testing Laboratory

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

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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

Certificate of Calibration

校正證書

Certificate No. : C162177

證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

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

6.2.2 Tone Burst Signal (2 kHz)

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

6.3 Frequency Weighting

6.3.1 A-Weighting

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

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

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

Certificate of Calibration

校正證書

Certificate No. : C162177
證書編號

6.3.2 C-Weighting

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

6.4 Time Averaging

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

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

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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



Certificate of Calibration 校正證書

Certificate No. : C162438
證書編號

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

Date of Receipt / 收件日期 : 5 May 2016

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

TEST CONDITIONS / 測試條件

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

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 10 May 2016

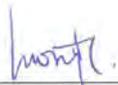
TEST RESULTS / 測試結果

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

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

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

Tested By
測試


H T Wong
Technical Officer

Certified By
核證


K C Lee
Project Engineer

Date of Issue
簽發日期

11 May 2016

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

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

Certificate of Calibration

校正證書

Certificate No. : C162438
證書編號

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

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

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

Note :

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



Certificate of Calibration 校正證書

Certificate No. : C162125
證書編號

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

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

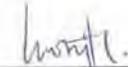
DATE OF TEST / 測試日期 : 22 April 2016

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : H T Wong
Technical Officer

Certified By : 
核證 : K C Lee
Project Engineer

Date of Issue : 25 April 2016
簽發日期

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

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



Certificate of Calibration

校正證書

Certificate No. : C162125
證書編號

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

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

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

Note :

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

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

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



REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

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

WORK ORDER: HK1638606
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 22/09/2016
DATE OF ISSUE: 29/09/2016

COMMENTS

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

Scope of Test: Dissolved Oxygen and Temperature
Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: --
Date of Calibration: 26 September, 2016

NOTES

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


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

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1638606
Sub-Batch: 0
Date of Issue: 29/09/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: --
Date of Calibration: 26 September, 2016 **Date of next Calibration:** 26 December, 2016

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.14	3.02	-0.12
5.54	5.36	-0.18
8.60	8.51	-0.09
Tolerance Limit (mg/L)		±0.20

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
7	7.2	+0.2
25	24.7	-0.3
42	41.9	-0.1
Tolerance Limit (°C)		±2.0

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



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



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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

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

WORK ORDER: HK1638998
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 26/09/2016
DATE OF ISSUE: 04/10/2016

COMMENTS

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

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

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

Scope of Test: pH and Temperature
Description: pH Meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1127748
Equipment No.: --
Date of Calibration: 03 October, 2016

NOTES

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

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

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

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1638998
Sub-batch: 0
Date of Issue: 04/10/2016
Client: ACTION UNITED ENVIRO SERVICES

Description: pH Meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1127748
Equipment No.: --

Date of Calibration: 03 October, 2016 **Date of next Calibration:** 03 January, 2017

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.1	+0.10
7.0	6.9	-0.10
10.0	9.9	-0.10
Tolerance Limit (pH Unit)		±0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
8.5	9.0	+0.5
26.0	25.5	-0.5
41.0	40.5	-0.5
Tolerance Limit (°C)		±2.0

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


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



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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

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

WORK ORDER: HK1629461
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 21/07/2016
DATE OF ISSUE: 27/07/2016

COMMENTS

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

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

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

Scope of Test: Turbidity
Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 22 July, 2016

NOTES

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

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


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

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1629461
Sub-batch: 0
Date of Issue: 27/07/2016
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 12060C018266
Equipment No.: --
Date of Calibration: 22 July, 2016 Date of next Calibration: 22 October, 2016

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.15	--
4	3.75	-6.3
40	43.0	+7.5
80	86.3	+7.9
400	390	-2.5
800	860	+7.5
	Tolerance Limit (%)	±10.0

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

A handwritten signature in blue ink, appearing to read 'Richard Fung Lim Chee'.

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



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REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

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

WORK ORDER: HK1632472
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 10/08/2016
DATE OF ISSUE: 15/08/2016

COMMENTS

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

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

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

Scope of Test: Conductivity, Dissolved Oxygen, pH, Salinity, Temperature and Turbidity
Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional DSS
Serial No.: 15H102620 / 15H103928
Equipment No.: EQW018
Date of Calibration: 12 August, 2016

NOTES

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

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


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

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Page 1 of 3

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1632472
Sub-Batch: 0
Date of Issue: 15/08/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional DSS
Serial No.: 15H102620 / 15H103928
Equipment No.: EQW018
Date of Calibration: 12 August, 2016

Date of next Calibration: 12 November, 2016

Parameters:

Conductivity

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

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	147.0	+0.1
6667	6517	-2.2
12890	12903	+0.1
58670	57534	-1.9
Tolerance Limit (%)		±10.0

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.51	3.63	+0.12
5.06	5.10	+0.04
7.71	7.63	-0.08
Tolerance Limit (mg/L)		±0.20

pH Value

Method Ref: APHA 21st Ed. 4500H:B

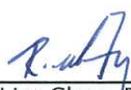
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.10	+0.10
7.0	7.03	+0.03
10.0	10.14	+0.14
Tolerance Limit (pH unit)		±0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.08	--
10	10.04	+0.4
20	19.82	-0.9
30	28.89	-3.7
Tolerance Limit (%)		±10.0

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


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

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION

Work Order: HK1632472
Sub-Batch: 0
Date of Issue: 15/08/2016
Client: ACTION UNITED ENVIRO SERVICES



Equipment Type: Multifunctional Meter
Brand Name: YSI
Model No.: Professional DSS
Serial No.: 15H102620 / 15H103928
Equipment No.: EQW018
Date of Calibration: 12 August, 2016 Date of next Calibration: 12 November, 2016

Parameters:

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	10.8	+0.8
24.0	24.3	+0.3
40.0	39.5	-0.5
	Tolerance Limit (°C)	±2.0

Turbidity

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.3	--
4	3.8	-5.0
40	40.2	+0.5
80	77.2	-3.5
400	390.0	-2.5
800	781.3	-2.3
	Tolerance Limit (%)	±10.0

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


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

Appendix G

Event and Action Plan

Event and Action Plan for Air Quality

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

Event and Action Plan for Construction Noise

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

Event and Action Plan for Water Quality

EVENT	ACTION CONTRACTOR			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER; Implement the agreed mitigation measures.
Action Level being exceeded by more than two consecutive sampling days	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC and Contractor; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC and Contractor; Ensure mitigation measures are implemented; Prepare to increase the monitoring frequency to daily; Repeat measurement on next day of exceedance. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET and IEC and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures.
Limit Level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit Level. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures.
Limit level being exceeded by more than one consecutive sampling days	<ol style="list-style-type: none"> Repeat in-situ measurement to confirm findings; Identify reasons for non-compliance and sources of impact; Inform IEC, Contractor and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, ER and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Limit Level for two consecutive days. 	<ol style="list-style-type: none"> Discuss with ET and Contractor on the mitigation measures; Review proposals on mitigation measures submitted by Contractor and advise the ER accordingly; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Assess the effectiveness of the implemented mitigation measures; Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit Level. 	<ol style="list-style-type: none"> Inform the ER and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment; Consider changes of working methods; Discuss with ET, IEC and ER and propose mitigation measures to IEC and ER within 3 working days; Implement the agreed mitigation measures; 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 –October 2016

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

	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for next Reporting Period – November 2016

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

	Monitoring Day
	Sunday or Public Holiday

Appendix I

Database of Monitoring Result

24-hour TSP Monitoring Data

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
AM1b – Open Area, Tsung Yuen Ha Village															
3-Oct-16	29992	12119.68	12143.82	1448.40	45	45	45.0	27.5	1007.8	1.53	2221	2.8120	2.9008	0.0888	40
8-Oct-16	20020	12143.82	12167.99	1450.20	51	51	51.0	28.1	1006.8	1.73	2504	2.8072	3.0014	0.1942	78
14-Oct-16	20077	12167.99	12192.16	1450.20	50	50	50.0	26.7	1013.2	1.70	2469	2.8575	3.0048	0.1473	60
20-Oct-16	20070	12192.16	12216.30	1448.40	50	50	50.0	27.3	1004.6	1.69	2454	2.8587	3.0300	0.1713	70
26-Oct-16	20062	12216.30	12240.47	1450.20	49	50	49.5	25.7	1015.6	1.70	2459	2.8683	2.9730	0.1047	43
AM2 - Village House near Lin Ma Hang Road															
3-Oct-16	29991	7642.64	7666.44	1428.00	36	36	36.0	27.5	1007.8	1.23	1755	2.8144	2.9970	0.1826	104
8-Oct-16	20019	7666.44	7690.25	1428.60	42	42	42.0	28.1	1006.8	1.39	1988	2.8152	3.1015	0.2863	144
14-Oct-16	20078	7690.25	7714.07	1429.20	35	35	35.0	26.7	1013.2	1.21	1723	2.8778	3.0847	0.2069	120
20-Oct-16	20071	7714.07	7737.80	1423.80	33	33	33.0	27.3	1004.6	1.15	1632	2.8591	2.9567	0.0976	60
26-Oct-16	20063	7737.80	7761.55	1425.00	28	28	28.0	25.7	1015.6	0.89	1272	2.8672	3.0017	0.1345	106
AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village															
3-Oct-16	29993	8766.26	8790.26	1440.00	50	50	50.0	27.5	1007.8	1.53	2209	2.8164	3.0547	0.2383	108
8-Oct-16	20021	8790.26	8814.26	1440.00	52	52	52.0	28.1	1006.8	1.60	2297	2.8209	3.1367	0.3158	137
14-Oct-16	20080	8814.26	8838.26	1440.00	54	54	54.0	26.7	1013.2	1.59	2287	2.8677	3.1050	0.2373	104
20-Oct-16	20072	8838.26	8862.26	1440.00	54	54	54.0	27.3	1004.6	1.66	2390	2.8707	2.9878	0.1171	49
26-Oct-16	20116	8876.10	8900.10	1440.00	54	54	54.0	25.7	1015.6	1.61	2319	2.8593	3.0943	0.2350	101
AM4 - House no. 10B1 Nga Yiu Ha Village															
5-Oct-16	29998	10770.53	10794.54	1440.60	43	43	43.0	28.6	1008.9	1.32	1909	2.8137	2.8935	0.0798	42
11-Oct-16	20025	10794.54	10818.53	1439.40	40	40	40.0	24.5	1010.7	1.24	1786	2.8235	2.8763	0.0528	30
17-Oct-16	20076	10818.53	10842.53	1440.00	42	42	42.0	26.6	1009.1	1.30	1869	2.8686	2.9780	0.1094	59
22-Oct-16	20067	10842.53	10866.53	1440.00	40	40	40.0	27.5	1007.8	1.23	1775	2.8668	2.9287	0.0619	35
28-Oct-16	20055	10881.39	10905.39	1440.00	40	40	40.0	28.2	1014.9	1.12	1610	2.8940	2.9807	0.0867	54
AM5a - Ping Yeung Village House															
5-Oct-16	20018	8632.43	8656.43	1440.00	32	32	32.0	28.6	1008.9	0.98	1412	2.8073	2.9198	0.1125	80
11-Oct-16	20026	8656.43	8680.45	1441.20	34	34	34.0	24.5	1010.7	1.05	1512	2.8176	2.8952	0.0776	51
17-Oct-16	20083	8680.45	8704.46	1440.60	50	50	50.0	26.6	1009.1	1.53	2204	2.8592	2.9355	0.0763	35
22-Oct-16	20068	8704.46	8728.47	1440.60	40	40	40.0	27.5	1007.8	1.22	1763	2.8580	2.9199	0.0619	35
28-Oct-16	20059	8728.47	8752.47	1440.00	32	32	32.0	28.2	1014.9	1.15	1656	2.8764	2.9213	0.0449	27
AM6 - Wo Keng Shan Village House															
5-Oct-16	29997	7214.38	7238.38	1440.00	38	38	38.0	28.6	1008.9	1.22	1756	2.8020	3.0441	0.2421	138

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-HR TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
11-Oct-16	20027	7238.38	7262.39	1440.60	32	32	32.0	24.5	1010.7	0.99	1429	2.8064	2.9449	0.1385	97
17-Oct-16	20074	7262.39	7286.39	1440.00	32	32	32.0	26.6	1009.1	0.99	1420	2.8599	2.9449	0.0850	60
22-Oct-16	20069	7286.39	7310.39	1440.00	28	28	28.0	27.5	1007.8	0.83	1188	2.8405	2.9151	0.0746	63
28-Oct-16	20060	7310.39	7334.39	1440.00	28	28	28.0	28.2	1014.9	0.94	1347	2.8770	3.0072	0.1302	97
AM7b - Loi Tung Village House															
5-Oct-16	20023	16250.58	16274.59	1440.60	38	38	38.0	28.6	1008.9	0.99	1424	2.8230	2.9460	0.1230	86
11-Oct-16	20079	16274.59	16298.60	1440.60	32	32	32.0	24.5	1010.7	0.80	1158	2.8686	2.9135	0.0449	39
17-Oct-16	20082	16298.60	16322.61	1440.60	38	38	38.0	26.6	1009.1	0.99	1430	2.8720	2.9790	0.1070	75
22-Oct-16	20065	16322.61	16346.60	1439.40	40	40	40.0	27.5	1007.8	1.05	1518	2.8556	2.9374	0.0818	54
28-Oct-16	20057	16346.60	16370.61	1440.60	38	38	38.0	28.2	1014.9	1.02	1474	2.8789	2.9731	0.0942	64
AM8 - Po Kat Tsai Village No. 4															
5-Oct-16	20022	10157.15	10181.15	1440.00	43	43	43.0	28.6	1008.9	1.15	1651	2.8221	2.9192	0.0971	59
11-Oct-16	20081	10181.15	10205.15	1440.00	44	44	44.0	24.5	1010.7	1.18	1702	2.8898	2.9733	0.0835	49
17-Oct-16	20075	10205.15	10229.16	1440.60	44	44	44.0	26.6	1009.1	1.18	1695	2.8738	2.9533	0.0795	47
22-Oct-16	20066	10229.16	10253.16	1440.00	43	43	43.0	27.5	1007.8	1.15	1653	2.8705	2.9311	0.0606	37
28-Oct-16	20056	10253.16	10277.16	1440.00	42	42	42.0	28.2	1014.9	1.12	1606	2.8749	2.9333	0.0584	36
AM9b - Nam Wa Po Village House No. 80															
3-Oct-16	29990	17536.35	17560.34	1439.40	32	32	32.0	27.5	1007.8	1.07	1542	2.8242	2.8766	0.0524	34
8-Oct-16	20024	17560.34	17584.35	1440.60	38	38	38.0	28.1	1006.8	1.26	1809	2.8177	2.9207	0.1030	57
14-Oct-16	20084	17584.35	17608.36	1440.60	39	39	39.0	26.7	1013.2	1.29	1864	2.8710	2.9513	0.0803	43
20-Oct-16	20073	17608.36	17632.36	1440.00	36	36	36.0	27.3	1004.6	1.19	1720	2.8734	2.9263	0.0529	31
26-Oct-16	20064	17632.36	17656.37	1440.60	42	42	42.0	25.7	1015.6	1.24	1783	2.8581	2.9065	0.0484	27

Construction Noise Monitoring Results, dB(A)

Date	Start Time	1 st Leq _{5min} n	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq30	façade correction
NM1 - Tsung Yuen Ha Village House No. 63																					
5-Oct-16	11:25	52.0	53.6	50.3	52.8	54.7	50.1	52.8	54.8	48.2	52.8	55.2	47.9	51.8	53.5	47.3	48.7	51.0	46.4	52	NA
11-Oct-16	10:14	55.5	57.0	47.0	53.0	53.5	47.5	68.8	59.5	48.0	56.5	51.0	47.5	51.5	52.5	47.5	50.8	51.5	48.0	62	NA
17-Oct-16	11:27	51.5	52.7	49.2	50.4	52.0	48.7	51.8	53.9	49.2	52.5	55.3	48.5	54.1	57.9	48.8	52.1	54.7	47.5	52	NA
28-Oct-16	9:33	56.4	59.0	49.5	55.5	55.5	48.5	60.3	62.0	50.0	60.9	63.0	50.5	56.8	58.5	50.0	56.3	57.5	49.0	58	NA
NM2a - Village House near Lin Ma Hang Road																					
5-Oct-16	10:30	73.3	75.1	60.9	72.5	74.7	57.7	71.3	74.0	61.1	73.6	75.7	60.8	71.0	74.2	61.1	72.1	74.9	61.3	72	75
11-Oct-16	9:38	59.9	62.0	53.0	64.2	67.5	59.5	62.6	65.0	57.0	70.8	74.5	56.5	72.9	75.5	67.0	72.5	75.0	65.5	70	73
17-Oct-16	9:46	57.6	58.9	48.4	64.3	62.6	48.4	54.8	57.2	49.2	55.8	59.1	50.3	54.5	57.1	50.2	61.5	61.4	51.3	60	63
28-Oct-16	10:16	59.7	62.0	50.0	60.9	63.5	50.0	60.6	62.5	49.0	56.2	55.5	47.5	64.7	63.0	59.5	60.6	61.0	52.5	61	64
NM3 - Ping Yeung Village House																					
6-Oct-16	10:23	68.8	71.0	58.0	66.2	69.0	56.5	61.0	60.0	53.0	60.8	61.5	54.0	65.6	64.5	54.5	65.9	68.5	60.0	66	NA
12-Oct-16	10:15	65.9	65.5	49.4	59.5	55.3	49.6	54.5	52.9	49.8	55.7	56.1	50.0	51.1	52.2	49.9	60.6	55.1	49.7	60	NA
18-Oct-16	13:48	67.3	70.0	59.5	62.7	65.0	59.0	63.0	65.0	59.0	62.9	65.0	59.0	63.1	65.5	58.0	61.9	63.5	57.0	64	NA
24-Oct-16	10:35	61.1	63.4	51.3	58.8	63.3	53.0	59.5	57.7	51.6	58.9	61.8	51.5	56.8	57.5	51.3	60.3	60.0	50.7	59	NA
NM4 - Wo Keng Shan Village House																					
6-Oct-16	9:40	60.4	60.5	52.5	61.1	59.5	51.0	59.6	59.5	50.5	56.5	58.5	50.0	60.3	61.5	49.0	47.7	48.0	46.5	59	NA
12-Oct-16	9:30	69.1	70.3	66.8	68.6	69.4	67.0	68.4	70.0	63.6	66.1	68.0	67.2	68.6	70.0	65.1	69.1	70.2	67.3	68	NA
18-Oct-16	13:00	75.5	78.0	68.5	72.0	73.5	64.0	73.6	76.5	64.5	73.0	76.0	63.5	71.2	74.0	62.0	75.3	78.0	64.5	74	NA
24-Oct-16	9:47	59.5	60.3	52.2	63.8	62.2	53.8	60.5	59.9	52.4	62.6	63.3	52.9	62.1	63.7	52.7	61.5	63.1	53.1	62	NA
NM5- Ping Yeung Village House																					
6-Oct-16	13:00	55.6	58.5	51.5	55.5	57.5	52.5	66.6	58.0	52.0	55.4	57.5	51.5	57.3	59.0	54.0	56.5	58.5	53.5	60	NA
12-Oct-16	9:23	56.3	59.0	50.5	56.0	59.0	51.0	56.1	58.5	51.5	56.0	59.0	51.5	56.2	59.0	50.0	57.7	60.0	50.5	56	NA
18-Oct-16	10:15	63.4	65.0	57.5	62.9	65.5	57.0	62.6	65.0	55.5	60.7	63.5	56.0	59.6	61.5	55.5	57.7	59.5	54.0	62	NA
24-Oct-16	9:29	54.7	56.5	51.0	56.1	57.5	51.5	54.8	56.5	52.0	56.2	58.5	51.0	58.4	59.0	51.0	55.7	58.0	51.0	56	NA
NM6 – Tai Tong Wu Village House 2																					
6-Oct-16	13:41	55.6	55.5	49.5	53.0	55.0	49.5	55.4	57.5	52.0	56.6	59.0	52.5	58.3	61.5	52.5	56.4	60.5	44.0	56	NA
12-Oct-16	10:14	61.7	64.5	52.0	55.2	57.0	51.5	55.9	58.5	51.5	57.4	59.0	50.5	56.1	59.0	51.0	55.0	57.5	50.0	58	NA
18-Oct-16	10:51	60.4	62.5	53.0	61.7	63.5	54.0	57.4	59.5	53.0	67.3	66.0	54.5	62.9	62.5	53.5	56.9	58.0	52.0	63	NA
24-Oct-16	10:17	57.5	62.0	48.5	56.6	60.5	49.0	55.4	59.0	47.5	57.4	60.0	49.0	55.5	58.5	49.0	58.0	61.5	49.5	57	NA
NM7 – Po Kat Tsai Village																					
6-Oct-16	11:12	56.4	60.5	51.5	57.6	59.5	52.5	63.6	66.5	52.5	63.2	66.5	54.0	54.9	55.5	51.5	55.4	57.0	51.0	60	NA

Date	Start Time	1 st Leq _{5mi} n	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq30	façade correction
12-Oct-16	13:15	56.9	59.0	52.0	61.6	63.0	53.0	76.5	73.0	55.5	61.4	63.0	54.0	60.0	62.5	52.5	58.4	61.5	52.0	69	NA
18-Oct-16	9:31	62.2	65.0	56.5	62.5	65.0	57.0	62.1	65.0	58.0	62.6	65.0	57.0	64.5	67.0	58.5	63.9	64.0	57.0	63	NA
24-Oct-16	13:10	56.9	59.0	52.0	61.6	63.0	53.0	76.5	73.0	55.5	61.4	63.0	54.0	60.0	62.5	52.5	58.4	61.5	52.0	69	NA
NM8 - Village House, Tong Hang																					
5-Oct-16	9:55	56.7	56.7	51.5	54.5	56.5	51.7	55.6	57.7	52.5	56.7	58.8	52.7	57.7	61	51.5	55.8	60.2	51.2	56	NA
11-Oct-16	9:44	59.6	64.6	51.1	58.7	64	51.7	58.7	64.1	51.5	57.5	63.7	50	58.9	63.5	50.5	57.3	62.7	50.7	59	NA
17-Oct-16	10:11	59.5	64.2	48.5	58.9	63.4	47.9	56.4	62.2	47.7	58.2	62.1	48	59.7	63	48	60.5	64.4	49.4	59	NA
28-Oct-16	9:42	55.6	57.2	52.2	53.7	55.7	51	56.4	56.2	51.2	54.9	56.1	51.6	55.7	57.4	52.4	56.9	58.4	52	56	NA
NM9 - Village House, Kiu Tau Village																					
5-Oct-16	10:39	68.5	67.5	58.2	61.7	63.7	57.1	62.0	66.5	57.7	62.4	65.9	57.1	60.0	62.5	57.2	61.6	64.3	57.5	64	NA
11-Oct-16	10:28	64.1	67.3	59.0	63.8	66.5	59.7	64.4	66.6	60.5	62.5	64.9	58.1	60.2	63.4	57.5	61.3	63.5	57.1	63	NA
17-Oct-16	10:53	61.7	64.6	58.2	60.7	63.5	58.0	62.2	65.7	58.5	60.8	63.5	58.5	61.6	64.5	58.7	62.6	65.7	59.0	62	NA
28-Oct-16	10:27	61.2	64.7	58.0	60.4	63.6	58.7	62.6	65.9	58.6	62.6	65.0	58.0	63.7	66.4	59.1	61.2	65.7	58.1	62	NA
NM10 - Nam Wa Po Village House No. 80																					
5-Oct-16	15:05	65.4	68.8	61.3	63.9	65.7	60.2	62.8	65.2	59.4	62.8	65.1	60.4	63.6	65.8	60.1	63.7	64.7	59.7	64	67
11-Oct-16	15:11	64.5	65.5	62.4	65.5	66.7	62.8	64.7	65.7	62.4	63.9	64.9	61.4	62.5	63.8	60.8	62.0	62.2	59.1	64	67
17-Oct-16	15:31	61.8	62.2	59.2	60.4	61.5	59.4	59.7	61.9	58.0	60.2	62.0	59.5	62.7	64.2	60.9	63.5	65.6	61.1	62	65
28-Oct-16	15:15	63.6	64.7	60.3	61.4	62.8	59.1	60.5	61.4	59.9	62.2	63.7	60.0	60.3	61.2	59.0	61.9	62.4	59.7	62	65

Noise Monitoring Results for Restricted Hour, dB(A)

Evening Time						Night Time					
Date	Start Time	Leq _{5min}	L10	L90	façade correction Leq _{5min}	Date	Start Time	Leq _{5min}	L10	L90	façade correction Leq _{5min}
NM5– Ping Yeung Village House											
13-Oct-16	22:47	46.9	49.5	43.5	NA	13-Oct-16	23:00	46.8	50.6	40.5	NA
23-Oct-16	22:47	47.8	50.3	44.1	NA	23-Oct-16	23:01	46.1	49.3	43.8	NA
28-Oct-16	22:09	44.9	47	42.7	NA	28-Oct-16	23:00	45.7	48.3	42.7	NA
NM7 – Po Kat Tsai Village											
13-Oct-16	22:31	48.5	49.1	47.6	NA	13-Oct-16	23:15	49.1	49.8	47.8	NA
23-Oct-16	22:16	47.2	48.6	46.3	NA	23-Oct-16	23:27	49.6	50.2	46.9	NA
28-Oct-16	21:55	52.0	52.8	50.9	NA	28-Oct-16	23:14	50.8	51.5	49.8	NA
NM8 - Village House, Tong Hang											
13-Oct-16	21:57	58.8	64.6	47.0	NA	13-Oct-16	23:40	56.0	56.7	46.4	NA
23-Oct-16	20:57	58.4	64.2	47.7	NA	23-Oct-16	23:49	59.6	63.2	47.5	NA
28-Oct-16	21:26	62.8	64.6	55.5	NA	28-Oct-16	23:34	64.2	58.1	46.1	NA
NM9 - Village House, Kiu Tau Village											
13-Oct-16	--	--	--	--	NA	14-Oct-16	0:00	63.8	68.3	54.2	NA
23-Oct-16	21:25	66.3	71.3	56.9	NA	24-Oct-16	0:06	61.6	65.6	55.5	NA
28-Oct-16	--	--	--	--	NA	29-Oct-16	0:00	59.7	62.4	52.3	NA
NM10 - Nam Wa Po Village House No. 80											
13-Oct-16	--	--	--	--	--	14-Oct-16	0:11	58.3	62.6	57.5	61.3
23-Oct-16	21:36	59	62	63.4	62	24-Oct-16	0:19	59.3	63.6	60.8	62.3
28-Oct-16	--	--	--	--	--	29-Oct-16	0:09	56	60.9	56.4	59

Water Quality Monitoring Data for Contract 6 and SS C505

Date	4-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:15	0.34	28.9	28.9	6.69	6.6	86.2	85.9	12.1	12.4	6.8	6.8	5	5.5
			28.9		6.6		85.5		12.6		6.8		6	
WM1	11:00	0.26	28	28.0	6.55	6.5	84.3	83.8	23.5	23.8	6.8	6.8	18	17.5
			28		6.46		83.3		24.0		6.8		17	

Date	6-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:15	0.34	27.2	27.2	7.31	7.3	92.0	92.1	11.9	12.0	7	7.0	6	6.5
			27.2		7.32		92.1		12.1		7		7	
WM1	11:25	0.26	27.7	27.7	7.2	7.2	91.3	90.9	45.7	46.3	6.8	6.8	48	47.0
			27.7		7.14		90.5		46.8		6.8		46	

Date	8-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	9:07	0.34	27.7	27.7	6.45	6.5	82.0	82.5	9.6	9.6	9.3	9.3	6	5.0
			27.6		6.49		82.9		9.7		9.3		4	
WM1	9:19	0.16	28.4	28.4	7.27	7.3	93.5	94.2	49.3	49.7	8.9	8.9	35	36.5
			28.4		7.34		94.8		50.0		8.9		38	

Date	11-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.34	23	23.0	7.5	7.5	87.2	87.0	8.4	8.5	9.6	9.6	5	5.0
			23		7.46		86.8		8.6		9.6		5	
WM1	10:15	0.26	23.3	23.3	7.65	7.7	89.6	89.7	11.1	11.3	9	9.0	9	9.5
			23.3		7.66		89.7		11.4		9		10	

Date	13-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:35	0.34	25.8	25.8	6.84	6.8	83.6	83.8	7.6	7.4	6.9	6.9	7	6.5
			25.8		6.84		83.8		7.2		6.9		6	
WM1	11:25	0.26	25.7	25.7	6.85	6.8	84.0	84.2	15.6	15.6	7.1	7.1	18	18.0
			25.7		6.84		84.3		15.5		7.1		18	

Date	15-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:15	0.34	26.6	26.6	6.09	6.1	75.5	75.8	8.3	8.1	9.1	9.1	4	4.0
			26.6		6.13		76.0		7.9		9.1		4	
WM1	10:00	0.26	27.2	27.2	6.74	6.8	84.1	84.4	10.6	10.3	9.6	9.6	9	10.0
			27.2		6.8		84.6		10.0		9.6		11	

Date	18-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:30	0.36	25	25.0	7.18	7.2	87.0	86.8	over	over range	6.9	6.9	941	919.5
			25		7.14		86.5		range		6.9		898	
WM1	11:15	0.28	24.5	24.5	7.25	7.3	87.0	87.2	over	over range	7.1	7.1	1050	1055.0
			24.5		7.27		87.3		range		7.1		1060	

Date	20-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	10:00	0.36	28.6	28.6	5.98	6.0	77.1	77.1	85.3	87.5	6.6	6.6	96	98.0
			28.6		5.99		77.1		89.7		6.6		100	
WM1	10:15	0.28	28.1	28.1	6.12	6.1	78.2	78.2	101.0	99.3	6.6	6.6	72	75.5
			28.1		6.09		78.1		97.5		6.6		79	

Date	22-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:46	0.29	28.3	28.3	5.59	5.6	71.6	71.4	32.0	32.9	6.6	6.6	21	21.5
			28.3		5.58		71.1		33.7		6.6		22	
WM1	12:00	0.20	28.4	28.4	5.35	5.4	68.6	69.2	21.5	21.8	6.4	6.4	9	10.0
			28.4		5.4		69.8		22.1		6.4		11	

Date	24-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:09	0.34	27.9	27.9	6.15	6.2	79.2	80.0	26.0	26.3	6.9	6.9	7	8.0
			27.9		6.21		80.7		26.5		6.9		9	
WM1	10:51	0.17	27.9	27.9	6	6.0	77.2	77.7	15.9	16.2	6.8	6.8	13	12.5
			27.9		6.07		78.1		16.4		6.8		12	

Date		26-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:45	0.34	27.9	27.9	6.75	6.7	86.4	85.4	15.8	15.9	6.5	6.5	9	10.0
			27.9		6.55		84.4		15.9		6.5		11	
WM1	11:20	0.26	28.4	28.4	6.56	6.6	84.4	84.4	16.7	15.6	6.6	6.6	16	15.5
			28.4		6.55		84.4		14.5		6.6		15	

Date		28-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:30	0.34	26.7	26.7	7.49	7.5	93.6	93.9	16.9	16.4	6.7	6.7	7	7.5
			26.7		7.54		94.1		15.9		6.7		8	
WM1	11:15	0.26	26.7	26.7	7.44	7.4	92.7	92.3	47.7	49.5	6.6	6.6	49	48.5
			26.7		7.36		91.8		51.2		6.6		48	

Date		31-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	8:57	0.31	27.1	27.1	7	7.0	87.8	88.4	11.5	11.8	7.5	7.5	3	3.0
			27		7.07		88.9		12.1		7.5		3	
WM1	9:11	0.18	26.9	26.9	6.63	6.7	83.0	83.8	44.4	44.9	7.3	7.3	48	51.0
			26.9		6.71		84.5		45.3		7.3		54	

Water Quality Monitoring Data for Contract 2 and 3

Date	4-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:45	0.18	28.5	28.5	7.2	7.2	92.4	92.7	7.9	7.7	6.7	6.7	8	7.5
			28.5		7.26		93.0		7.5		6.7		7	
WM4-CB	13:00	0.31	29.8	29.8	7.05	7.0	92.7	92.7	7.7	7.5	6.6	6.6	8	8.0
			29.8		7.02		92.6		7.3		6.6		8	
WM4	12:30	0.14	29.1	29.1	6.74	6.7	87.9	87.7	15.2	15.1	6.8	6.8	12	13.0
			29.1		6.7		87.5		14.9		6.8		14	

Date	6-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	30.1	30.1	7.04	7.0	92.9	92.9	4.9	4.9	8.3	8.3	3	4.0
			30.1		7.03		92.8		4.9		8.3		5	
WM4-CB	13:30	0.31	30.5	30.5	6.99	7.0	93.0	93.7	10.3	9.6	7.6	7.6	12	13.0
			30.5		7.01		94.3		8.9		7.6		14	
WM4	13:00	0.14	29.8	29.8	6.73	6.7	88.6	88.8	16.5	15.7	8.5	8.5	13	13.5
			29.8		6.75		89.0		14.8		8.5		14	

Date	8-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:34	0.10	28.2	28.3	6.72	6.8	85.9	86.1	11.6	11.7	7.2	7.2	8	7.5
			28.3		6.79		86.3		11.8		7.2		7	
WM4-CB	11:56	0.29	27.8	27.8	5.78	5.8	73.6	74.0	11.0	11.2	6.7	6.7	9	9.5
			27.8		5.83		74.3		11.3		6.7		10	
WM4	11:19	0.37	27	27.0	6.3	6.3	79.1	79.0	34.7	34.9	7.1	7.1	13	13.5
			27		6.26		78.9		35.0		7.1		14	

Date	11-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	24.5	24.5	7.54	7.6	90.4	90.5	12.5	12.2	8.9	8.9	5	6.0
			24.5		7.56		90.6		11.8		8.9		7	
WM4-CB	13:30	0.31	25.6	25.6	6.91	6.9	84.6	84.6	21.1	21.4	8	8.0	33	34.5
			25.6		6.9		84.5		21.6		8		36	
WM4	13:00	0.14	24.7	24.7	6.77	6.8	81.3	81.4	253.0	250.0	9.2	9.2	160	153.5
			24.7		6.79		81.5		247.0		9.2		147	

Date	12-Oct-16 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18							6.6	6.4			5	5.0
									6.3					
WM4-CB	13:30	0.31							5.3	4.8			28	28.0
									4.4					
WM4	13:00	0.14							181.0	179.0			122	122.0
									177.0					

Date	13-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	25.3	25.3	7.17	7.2	87.3	87.1	5.5	5.7	6.8	6.8	9	9.0
			25.3		7.14		7.2		86.9		5.8		6.8	
WM4-CB	13:30	0.31	27	27.0	5.4	5.4	67.1	67.3	12.0	11.8	6.6	6.6	22	22.5
			27		5.41		5.4		67.4		11.6		6.6	
WM4	13:00	0.14	26.6	26.6	6.19	6.2	77.0	76.9	365.0	369.5	6.7	6.8	243	240.5
			26.6		6.18		6.2		76.8		374.0		6.8	

Date	14-Oct-16 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18							3.4	3.3			6	6.0
									3.2					
WM4-CB	13:30	0.31							4.8	4.7			17	17.0
									4.6					
WM4	13:00	0.14							13.1	13.3			15	15.0
									13.5					

Date	15-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	27.7	27.7	6.95	6.9	87.9	87.8	29.3	29.3	6.8	6.8	21	20.5
			27.7		6.93		6.9		87.7		29.2		6.8	
WM4-CB	13:30	0.31	28.5	28.5	6.02	6.0	77.1	77.0	11.4	11.4	6.6	6.6	11	10.0
			28.5		6.01		6.0		76.9		11.4		6.6	
WM4	13:00	0.14	27.5	27.5	6.17	6.2	78.0	78.7	17.2	16.6	6.8	6.8	12	11.0
			27.5		6.3		6.2		79.3		16.0		6.8	

Date	18-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.20	24.5	24.5	7.27	7.3	87.2	87.2	94.3	95.7	6.6	6.6	69	69.0
			24.5		7.26		87.1		97.0		6.6		69	
WM4-CB	13:30	0.35	24.8	24.8	6.7	6.8	82.1	82.4	92.1	94.3	6.6	6.6	58	59.0
			24.8		6.85		82.7		96.5		6.6		60	
WM4	13:00	0.18	24.9	24.9	7.03	7.0	84.8	84.8	152.0	156.0	6.8	6.8	110	108.0
			24.9		7.02		84.7		160.0		6.8		106	

Date	19-Oct-16 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:45	0.25							518.0	522.5			539	539.0
							527.0							
WM4-CB	12:00	0.45							276.0	281.0			220	220.0
							286.0							
WM4	11:30	0.05							569.0	561.5			536	536.0
							554.0							

Date	20-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.20	28.6	28.6	6	6.0	77.4	77.4	19.3	19.1	6.3	6.3	4	5.0
			28.6		6.01		77.4		18.8		6.3		6	
WM4-CB	13:30	0.33	28.1	28.1	5.03	5.0	64.4	64.4	48.3	47.3	6.2	6.2	28	27.5
			28.1		5.01		64.3		46.2		6.2		27	
WM4	13:00	0.17	28.2	28.2	6.42	6.4	82.0	82.3	160.0	162.5	6.4	6.4	114	118.5
			28.2		6.45		82.5		165.0		6.4		123	

Date	22-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	9:26	0.31	27.5	27.5	6.33	6.3	80.1	79.6	11.3	11.6	8.4	8.4	6	6.5
			27.5		6.26		79.1		11.9		8.4		7	
WM4-CB	9:45	0.35	27.2	27.2	5.77	5.7	72.5	72.2	11.8	11.8	7.6	7.6	8	7.5
			27.2		5.71		71.8		11.8		7.6		7	
WM4	9:01	0.57	27.5	27.5	6.73	6.8	85.1	85.7	25.5	25.8	8.4	8.4	18	19.0
			27.5		6.79		86.3		26.1		8.4		20	

Date	24-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	12:25	0.21	29.4	29.4	6.09	6.1	79.5	80.0	8.1	8.2	6.8	6.8	3	3.5
			29.4		6.14		80.5		8.2		6.8		4	
WM4-CB	12:41	0.36	28.6	28.6	5.95	6.0	76.6	76.8	26.2	26.9	6.6	6.6	19	19.5
			28.6		5.97		77.0		27.5		6.6		20	
WM4	12:11	0.19	29	29.0	6.52	6.6	84.9	85.3	33.3	33.7	6.8	6.8	26	25.5
			29		6.6		85.7		34.1		6.8		25	

Date	26-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.19	27.4	27.4	6.5	6.5	82.5	82.1	19.2	19.6	8.8	8.8	<2	<2
			27.4		6.42		81.6		19.9		8.8		<2	
WM4-CB	13:30	0.32	29.6	29.6	5.65	5.6	74.1	73.8	17.3	16.8	8.1	8.1	8	8.5
			29.6		5.59		73.5		16.3		8.1		9	
WM4	13:00	0.14	28.7	28.7	6.25	6.2	80.7	80.4	30.0	30.1	8.7	8.7	33	34.0
			28.7		6.19		80.0		30.1		8.7		35	

Date	28-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	13:15	0.18	25.7	25.7	7.69	7.7	94.3	93.8	11.2	11.1	8.2	8.2	3	3.0
			25.7		7.61		93.3		10.9		8.2		<2	
WM4-CB	13:30	0.31	27	27.0	6.4	6.4	81.0	81.1	16.3	15.6	7.6	7.6	5	6.0
			27		6.44		81.2		14.9		7.6		7	
WM4	13:00	0.14	25.9	25.9	7.28	7.3	89.7	89.6	24.8	25.5	8.6	8.6	27	27.5
			25.9		7.26		89.5		26.1		8.6		28	

Date	31-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM4-CA	11:48	0.18	25.7	25.7	6.95	7.0	85.3	86.1	5.9	5.6	8.7	8.7	2	3.0
			25.7		7.11		86.9		5.3		8.7		4	
WM4-CB	12:09	0.31	25.6	25.6	6.69	6.7	82.0	82.3	9.6	9.9	7.8	7.8	12	11.5
			25.6		6.72		82.5		10.1		7.8		11	
WM4	11:34	0.14	26.4	26.4	6.95	6.9	85.5	85.2	19.2	19.7	8.4	8.4	18	19.0
			26.4		6.91		84.9		20.1		8.4		20	

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

Water Quality Monitoring Data for Contract 6

Date	4-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:30	0.28	29.1	29.1	5.54	5.6	72.2	72.3	7.7	7.6	7.80	7.8	5	4.0
			29.1		5.56		72.4		7.5		7.80		3	
WM2A	10:45	0.17	30.1	30.1	5.81	5.8	77.0	77.1	126.0	124.5	7.30	7.3	101	102.0
			30.1		5.83		77.2		123.0		7.30		103	

Date	5-Oct-16 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:20	0.28							4.7	4.6			<2	<2
							4.4							
WM2A	11:10	0.17							24.4	24.1			19	19.0
							23.8							

Date	6-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:30	0.28	25.2	25.2	7.16	7.1	86.8	86.6	9.0	8.8	8.10	8.1	7	6.0
			25.2		7.11		86.3		8.6		8.10		5	
WM2A	11:00	0.17	27.8	27.8	7.11	7.2	90.7	91.2	18.9	18.6	7.30	7.3	12	12.5
			27.8		7.19		91.6		18.2		7.30		13	

Date	8-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:47	0.37	27.4	27.5	6.06	6.1	76.5	76.9	9.6	9.7	8.00	8.0	2	2.5
			27.5		6.13		77.3		9.7		8.00		3	
WM2A	9:33	0.20	26.8	26.8	6.87	6.9	86.0	86.5	23.4	23.7	8.10	8.1	15	14.5
			26.7		6.91		87.0		24.0		8.10		14	

Date	11-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.28	23	23.0	7.33	7.3	85.6	85.7	9.9	9.9	8.00	8.0	2	2.0
			23		7.34		85.8		10.0		8.00		2	
WM2A	10:30	0.17	24.5	24.5	7.42	7.7	88.9	91.0	24.3	24.4	8.50	8.5	20	19.0
			24.5		7.91		93.1		24.5		8.50		18	

Date		13-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	11:00	0.28	26.4	26.4	6.1	6.1	75.7	75.6	10.8	10.6	8.10	8.1	<2	<2	
			26.4		6.09		75.5		10.4		8.10				
WM2A	11:15	0.17	26.5	26.5	6.57	6.6	81.5	81.4	15.0	14.5	7.50	7.5	11	11.5	
			26.5		6.58		81.3		14.5		7.50				

Date		15-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	10:45	0.28	25.1	25.1	6.85	6.9	82.9	83.0	7.8	7.8	8.30	8.3	<2	<2	
			25.1		6.87		83.1		7.8		8.30				
WM2A	10:30	0.17	26.5	26.5	6.83	6.8	83.7	83.8	22.4	23.4	8.50	8.5	14	14.0	
			26.5		6.85		83.9		24.4		8.50				

Date		18-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	10:45	0.30	24.7	24.7	7.46	7.5	89.8	90.1	352.0	351.0	8.20	8.2	321	330.5	
			24.7		7.51		90.3		350.0		8.20				
WM2A	11:00	0.20	24	24.0	7.81	7.8	92.9	92.4	383.0	389.5	6.80	6.8	314	317.0	
			24		7.72		91.9		396.0		6.80				

Date		20-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	10:45	0.30	26.9	26.9	6.63	6.7	82.9	83.3	33.1	32.1	6.60	6.6	4	5.0	
			26.9		6.7		83.6		31.0		6.60				
WM2A	10:30	0.20	27.5	27.5	6.36	6.3	80.4	80.2	325.0	329.5	6.70	6.7	155	156.0	
			27.5		6.33		79.9		334.0		6.70				

Date		22-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2A-C	11:17	0.34	27.5	27.5	6.34	6.3	80.3	79.8	6.3	6.3	6.70	6.7	5	4.0	
			27.5		6.29		79.2		6.3		6.70				
WM2A	11:29	0.17	25.9	25.9	6.69	6.6	83.1	82.8	255.0	261.0	6.70	6.7	180	183.0	
			25.9		6.6		82.4		267.0		6.70				

Date		24-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:31	0.34	27	27.0	6.58	6.6	82.6	82.9	8.9	8.8	7.60	7.6	4	4.0
			27		6.63		83.1		8.8		7.60		4	
WM2A	10:47	0.17	29	29.0	6.15	6.2	79.5	79.8	126.0	128.0	7.30	7.3	122	120.0
			28.9		6.2		80.1		130.0		7.30		118	

Date		25-Oct-16 #												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:40	0.29							10.8	10.5			7	7.0
								10.2						
WM2A	10:30	0.19							24.8	24.5			18	18.0
								24.2						

Date		26-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:55	0.28	25.2	25.2	7.11	7.1	87.3	87.1	8.6	8.6	6.80	6.8	6	6.5
			25.2		7.06		86.8		8.7		6.80		7	
WM2A	11:10	0.17	28.5	28.5	7	7.0	90.5	90.6	21.4	22.4	6.70	6.7	14	14.5
			28.5		7.01		90.6		23.3		6.70		15	

Date		28-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	10:45	0.28	24.6	24.6	7.57	7.6	90.7	90.8	8.7	8.6	6.90	6.9	5	5.0
			24.6		7.58		90.8		8.5		6.90		5	
WM2A	11:00	0.17	25.5	25.5	7.14	7.1	87.1	86.8	52.3	53.0	6.80	6.8	49	48.0
			25.5		7.09		86.5		53.7		6.80		47	

Date		29-Oct-16 #												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	11:21	0.34							9.1	9.1			8	8.0
								9.1						
WM2A	11:37	0.17							45.7	45.4			88	88.0
								45.0						

Date	31-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM2A-C	9:40	0.34	23.4	23.4	7.57	7.6	89.1	89.5	23.8	23.5	6.80	6.8	7	7.5
			23.4		7.63		89.8		23.1		6.80		8	
WM2A	9:57	0.17	24.3	24.3	7.37	7.4	88.2	88.6	69.9	69.3	6.90	6.9	115	111.5
			24.3		7.43		89.0		68.7		6.90		108	

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

Date		4-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:15	0.02	30.3	30.3	4.63	4.6	61.3	61.5	2.0	2.0	9.10	9.1	3	2.5	
			30.3		4.66		61.7		1.9		9.10		2		
WM2B	10:05	0.02	30.8	30.8	6.88	6.9	92.4	92.3	4.2	4.5	9.20	9.2	8	7.0	
			30.8		6.86		92.1		4.7		9.20		6		

Date		6-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:15	0.02	29.7	29.7	4.83	4.9	63.4	63.7	1.8	1.8	9.20	9.2	5	4.5	
			29.7		4.88		64.0		1.7		9.20		4		
WM2B	10:00	0.02	31.2	31.2	6.77	6.8	91.3	91.4	3.1	2.9	8.80	8.8	5	4.5	
			31.2		6.8		91.4		2.7		8.80		4		

Date		8-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:17	0.02	7.5	17.6	5.43	5.5	68.8	69.1	2.1	2.1	7.80	7.8	2	2.0	
			27.7		5.57		69.3		2.2		7.80		2		
WM2B	9:59	0.02	26.7	26.7	7.53	7.6	94.3	95.0	4.6	4.7	7.50	7.5	8	7.0	
			26.7		7.6		95.7		4.7		7.50		6		

Date		11-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	11:15	0.02	24.2	24.2	7.48	7.5	89.6	89.9	3.1	3.1	6.90	6.9	5	5.5	
			24.2		7.55		90.1		3.1		6.90		6		
WM2B	11:00	0.02	24.1	24.1	6.47	6.5	77.2	77.2	4.9	4.8	7.60	7.6	<2	<2	
			24.1		6.46		77.1		4.6		7.60		<2		

Date		13-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:15	0.02	28.4	28.4	5.02	5.0	64.4	64.5	1.8	1.6	9.60	9.6	4	3.5	
			28.4		5.03		64.6		1.5		9.60		3		
WM2B	10:00	0.02	29	29.0	7.16	7.2	92.8	92.9	3.1	2.8	9.50	9.5	7	6.5	
			29		7.15		93.0		2.5		9.50		6		

Date		15-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	11:15	0.02	26.8	26.8	5.77	5.8	71.8	72.4	1.7	1.8	7.90	7.9	<2	<2	
			26.8		5.88		73.0		1.8		7.90				
WM2B	11:00	0.02	26.6	26.6	8.33	8.2	103.6	102.3	3.9	3.7	8.00	8.0	6	6.5	
			26.6		8.06		100.9		3.5		8.00		7		

Date		18-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:30	0.04	24.3	24.3	6.25	6.2	75.4	75.4	42.2	40.6	9.10	9.1	25	26.0	
			24.3		6.24		75.4		39.0		9.10		27		
WM2B	10:15	0.04	25.2	25.2	7.44	7.5	90.5	90.7	637.0	641.0	9.00	9.0	647	669.0	
			25.2		7.46		90.8		645.0		9.00		691		

Date		19-Oct-16 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	11:15	0.05							92.8	91.2			96	96.0	
							89.5								
WM2B	11:00	0.05							239.0	240.5			261	261.0	
							242.0								

Date		20-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	11:05	0.03	26.3	26.3	5.13	5.1	63.6	63.4	4.8	4.8	6.50	6.5	<2	<2	
			26.3		5.07		63.1		4.7		6.50		<2		
WM2B	11:00	0.04	26.9	26.9	6.67	6.7	84.0	84.3	27.1	26.8	6.50	6.5	24	24.0	
			26.9		6.72		84.6		26.4		6.50		24		

Date		22-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:47	0.03	27.8	27.8	4.93	5.0	62.8	63.3	4.5	4.5	7.20	7.2	<2	<2	
			27.8		4.99		63.7		4.5		7.20		<2		
WM2B	10:57	0.04	28.3	28.3	6.36	6.4	81.4	81.7	9.2	9.2	6.80	6.8	8	7.5	
			28.3		6.41		82.0		9.2		6.80		7		

Date		24-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:14	0.02	29.2	29.2	4.95	5.0	64.5	65.1	3.7	3.7	8.60	8.6	<2	<2	
			29.2		5.04		65.7		3.7		8.60				
WM2B	9:57	0.02	29.2	29.2	6.28	6.3	81.3	82.0	9.8	9.8	8.20	8.2	11	11.0	
			29.2		6.31		82.7		9.9		8.20		11		

Date		26-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:35	0.02	30.3	30.3	4.49	4.5	59.6	59.6	3.5	3.4	7.00	7.0	<2	<2	
			30.3		4.48		59.6		3.3		7.00				
WM2B	10:45	0.02	28	28.0	6.92	6.9	88.3	88.5	10.2	10.1	6.80	6.8	10	10.5	
			28		6.94		88.6		10.0		6.80		11		

Date		28-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:35	0.02	24.9	24.9	6.41	6.4	77.1	77.1	3.0	3.0	7.70	7.7	<2	<2	
			24.9		6.39		77.0		2.9		7.70				
WM2B	10:20	0.02	25.9	25.9	7.66	7.7	94.3	94.2	4.6	4.4	7.00	7.0	5	5.5	
			25.9		7.65		94.1		4.3		7.00		6		

Date		31-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)		
WM2B-C	10:23	0.02	24.9	24.9	6.14	6.2	74.2	74.8	3.9	3.9	6.80	6.8	<2	<2	
			24.9		6.19		75.3		3.9		6.80				
WM2B	10:11	0.02	24.7	24.7	6.76	6.8	81.4	82.0	10.8	10.9	6.80	6.8	6	5.5	
			24.7		6.81		82.5		11.0		6.80		5		

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

Water Quality Monitoring Data for Contract 2 and 6

Date	4-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:55	0.03	29.5	29.5	6.43	6.4	84.4	84.4	9.0	9.1	6.60	6.6	5	5.0
			29.5		6.42		84.3		9.1		6.60		5	
WM3	11:40	0.15	29.6	29.6	6.62	6.6	87.0	86.9	12.2	12.3	6.60	6.6	12	12.0
			29.6		6.6		86.8		12.3		6.60		12	

Date	6-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:45	0.03	28.3	28.3	6.79	6.8	87.0	87.1	8.5	8.4	10.20	10.2	6	6.0
			28.3		6.8		87.2		8.3		10.20		6	
WM3	12:00	0.15	30.4	30.4	6.35	6.4	85.0	85.1	13.2	12.9	9.40	9.4	10	10.5
			30.4		6.36		85.2		12.6		9.40		11	

Date	8-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:34	0.23	27.6	27.6	7.25	7.3	92.0	92.7	2.9	3.0	6.80	6.8	5	4.5
			27.6		7.31		93.3		3.0		6.80		4	
WM3	10:49	0.17	27.5	27.6	6.27	6.3	79.5	80.0	88.1	89.3	6.90	6.9	80	77.0
			27.6		6.31		80.4		90.4		6.90		74	

Date	11-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:30	0.03	25.6	25.6	6.47	6.5	78.8	79.1	5.1	5.2	10.90	10.9	4	3.0
			25.6		6.53		79.3		5.4		10.90		2	
WM3	11:45	0.15	25.2	25.2	6.5	6.5	79.0	79.1	10.1	9.9	9.90	9.9	8	8.5
			25.2		6.52		79.2		9.7		9.90		9	

Date	12-Oct-16 #													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:15	0.03							3.2	3.1			3	3.0
							3.0							
WM3	11:25	0.15							6.8	7.0			9	9.0

									7.3				
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Date		13-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:30	0.03	27.7	27.7	5.41	5.4	68.9	69.0	2.1	1.8	8.10	8.1	5	6.0
			27.7		5.39		69.1		1.8		8.10		7	
WM3	10:40	0.15	26.4	26.4	6.41	6.4	79.3	79.4	13.0	13.2	8.10	8.1	12	12.0
			26.4		6.42		79.5		13.3		8.10		12	

Date		15-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:30	0.03	27.4	27.4	5.75	5.8	72.7	72.9	2.3	2.2	6.80	6.8	<2	<2
			27.4		5.78		73.1		2.0		6.80		<2	
WM3	11:45	0.15	30.4	30.4	5.48	5.5	72.7	73.2	13.0	13.1	6.80	6.8	12	12.5
			30.4		5.56		73.7		13.2		6.80		13	

Date		18-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	12:00	0.05	24.9	24.9	6.64	6.6	80.3	80.0	136.0	129.5	6.80	6.8	89	87.0
			24.9		6.5		79.7		123.0		6.80		85	
WM3	11:45	0.20	24.6	24.6	6.93	6.9	83.2	83.2	268.0	267.0	6.90	38.0	379	395.0
			24.6		6.92		83.1		266.0		69.00		411	

Date		19-Oct-16#												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:45	0.10							727.0	723.5			635	635.0
							720.0							
WM3	10:30	0.25							330.0	318.5			445	445.0
							307.0							

Date		20-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:15	0.04	26.9	26.9	6.48	6.5	81.5	81.5	7.0	7.0	6.20	6.2	4	4.0
			26.9		6.48		81.4		7.1		6.20		4	
WM3	11:30	0.18	28.8	28.8	5.9	5.9	76.5	76.6	13.0	12.9	6.40	6.4	12	12.0
			28.8		5.91		76.7		12.8		6.40		12	

Date		22-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:29	0.18	28.1	28.1	5.91	5.9	75.7	74.9	8.2	8.2	6.70	6.7	4	4.0
			28.1		5.86		74.1		8.2		6.70		4	
WM3	10:11	0.19	27.3	27.3	6.48	6.5	81.7	82.1	12.9	12.8	7.10	7.1	10	9.5
			27.3		6.51		82.4		12.7		7.10		9	

Date		24-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	11:24	0.17	29.5	29.5	5.93	5.9	77.7	77.1	9.1	9.2	6.90	6.9	3	4.0
			29.5		5.87		76.4		9.2		6.90		5	
WM3	11:33	0.18	29.4	29.4	6.17	6.2	80.6	81.1	8.6	8.6	7.30	7.3	7	6.5
			29.4		6.21		81.5		8.7		7.30		6	

Date		26-Oct-16												
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:15	0.03	30.6	30.6	5.11	5.1	68.2	68.3	5.4	5.1	6.80	6.8	<2	<2
			30.6		5.12		68.4		4.8		6.80		<2	
WM3	10:00	0.15	30.6	30.6	6.09	6.1	81.7	81.8	12.6	12.2	7.60	7.6	12	12.0
			30.6		6.11		81.9		11.7		7.60		12	

Date	28-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:10	0.03	27.4	27.4	6.74	6.7	85.1	84.3	5.0	5.0	6.80	6.8	4	4.0
			27.4		6.59		83.5		5.1		6.80		4	
WM3	10:00	0.15	28	28.0	6.91	6.9	84.6	84.7	12.8	12.7	7.20	7.2	11	10.5
			28		6.93		84.8		12.6		7.20		10	

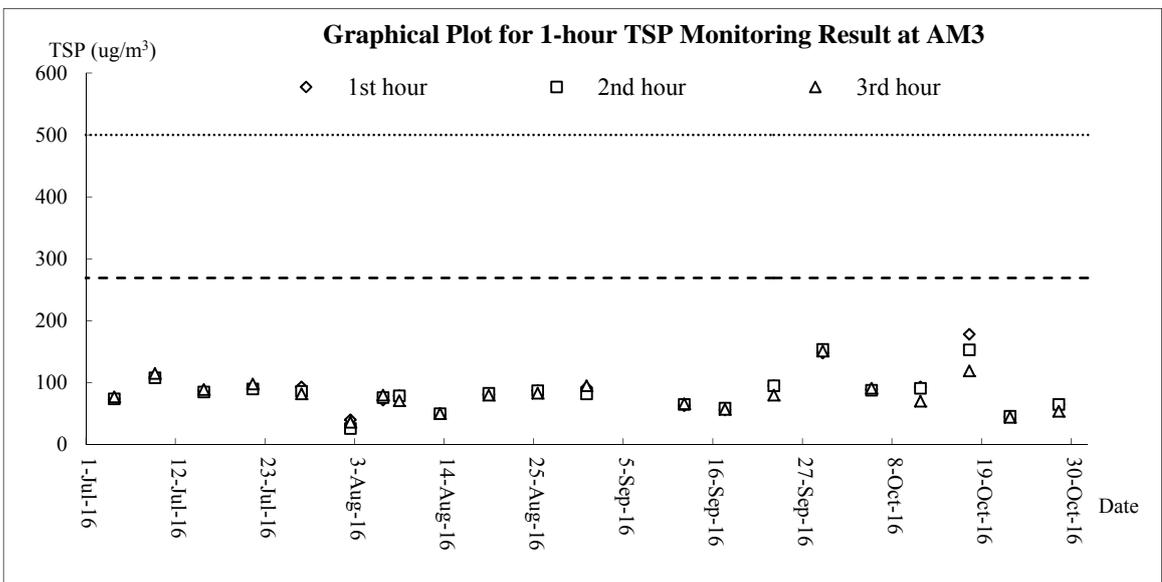
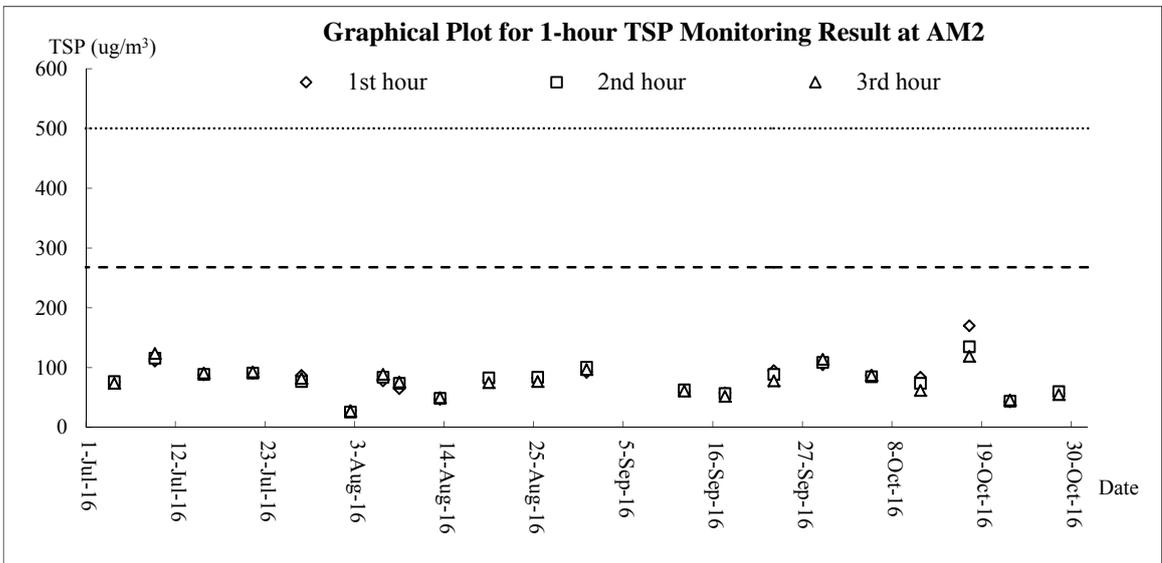
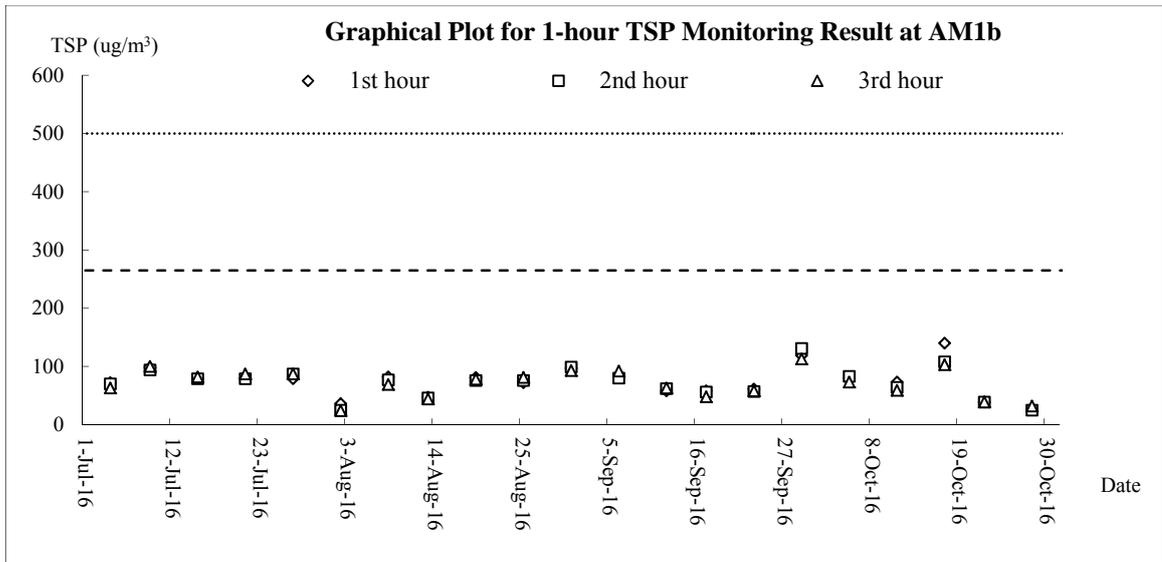
Date	31-Oct-16													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM3-C	10:40	0.18	25.9	25.9	7.23	7.3	88.9	89.4	4.7	4.7	6.40	6.4	8	7.5
			25.9		7.3		89.9		4.7		6.40		7	
WM3	10:57	0.17	27.5	27.5	6.56	6.6	83.1	83.7	7.1	7.1	6.60	6.6	10	10.5
			27.5		6.61		84.3		7.2		6.60		11	

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

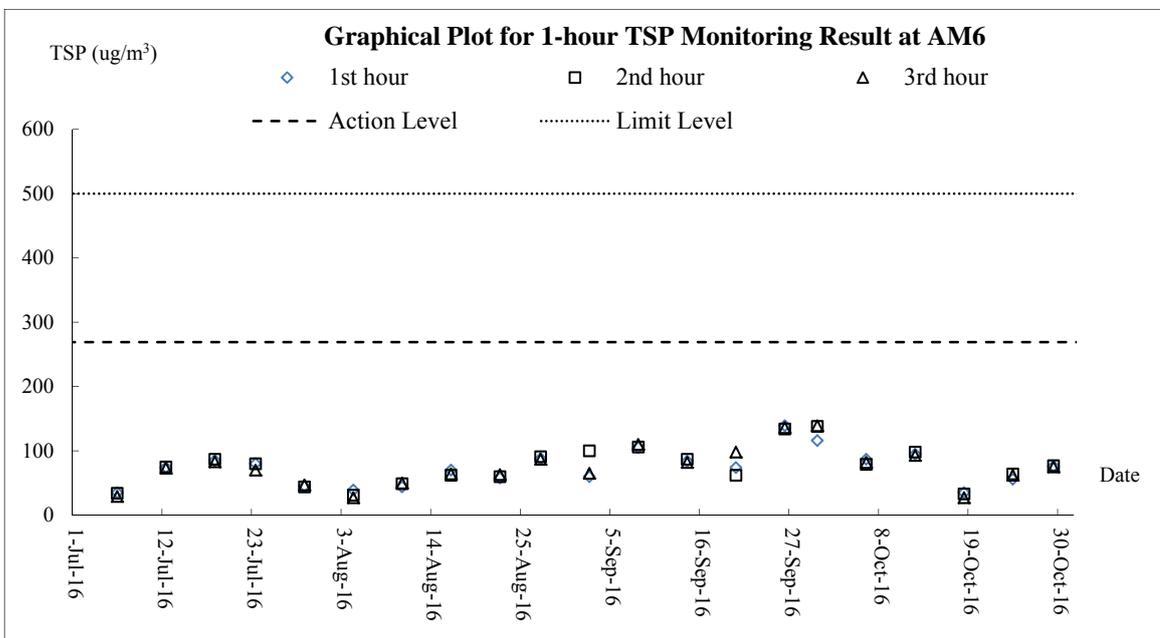
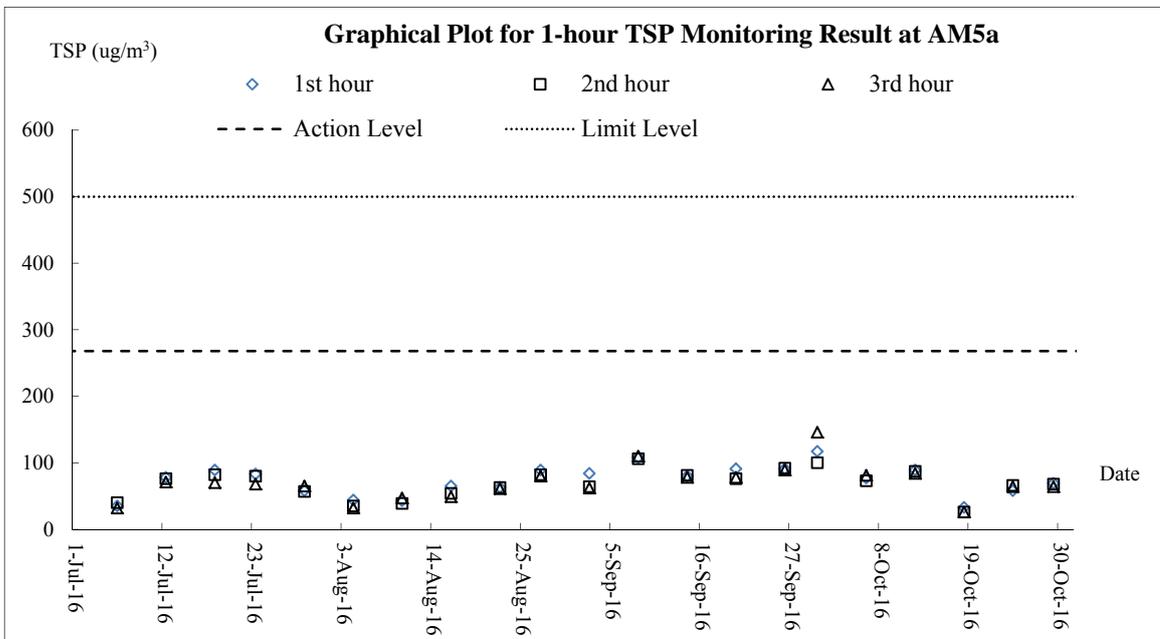
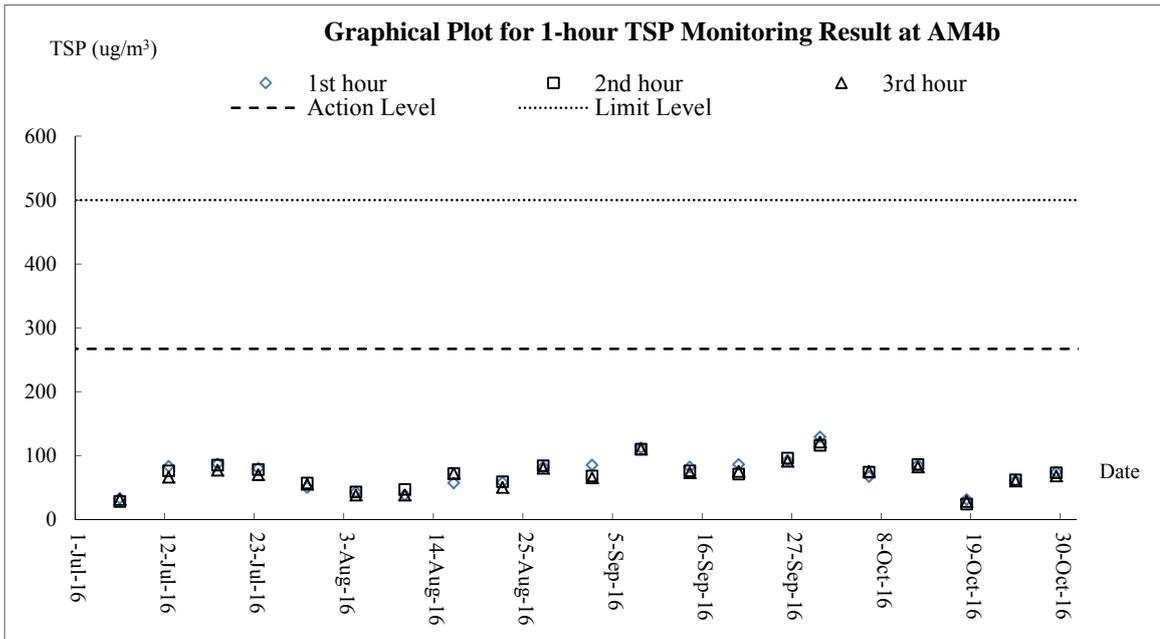
Appendix J

Graphical Plots for Monitoring Result

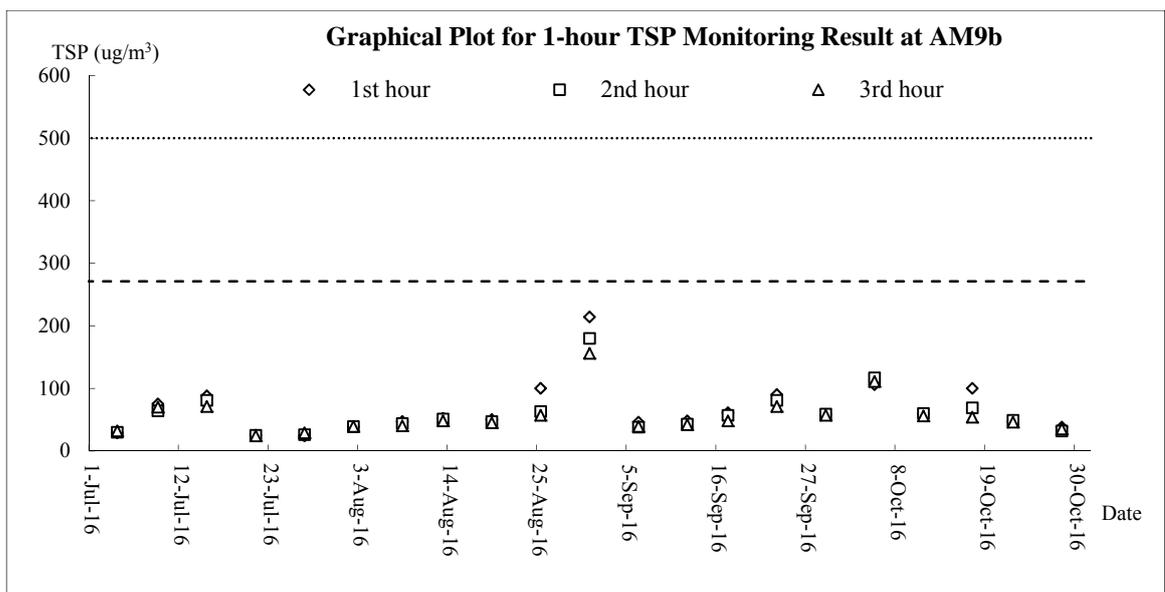
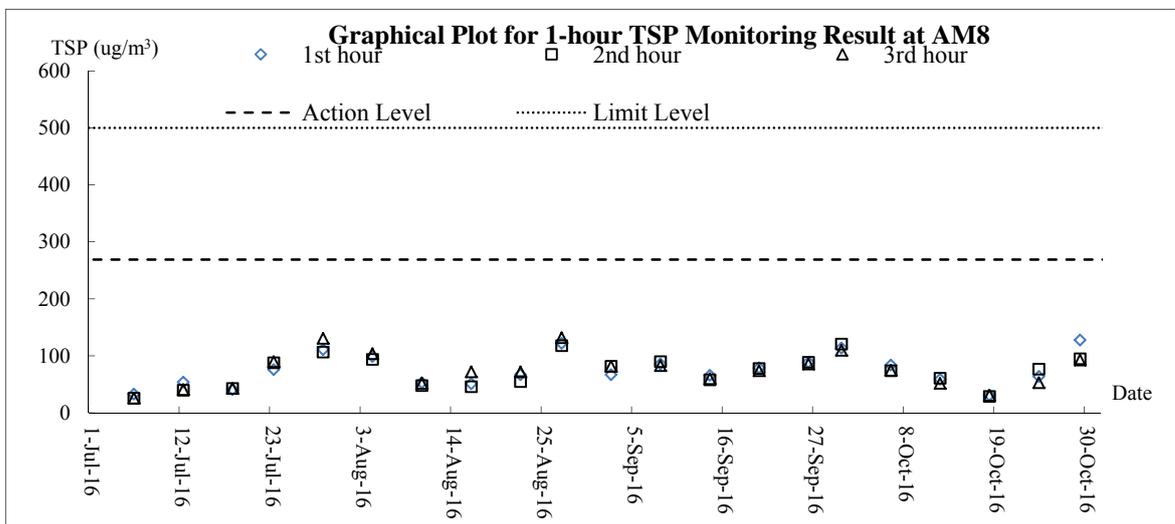
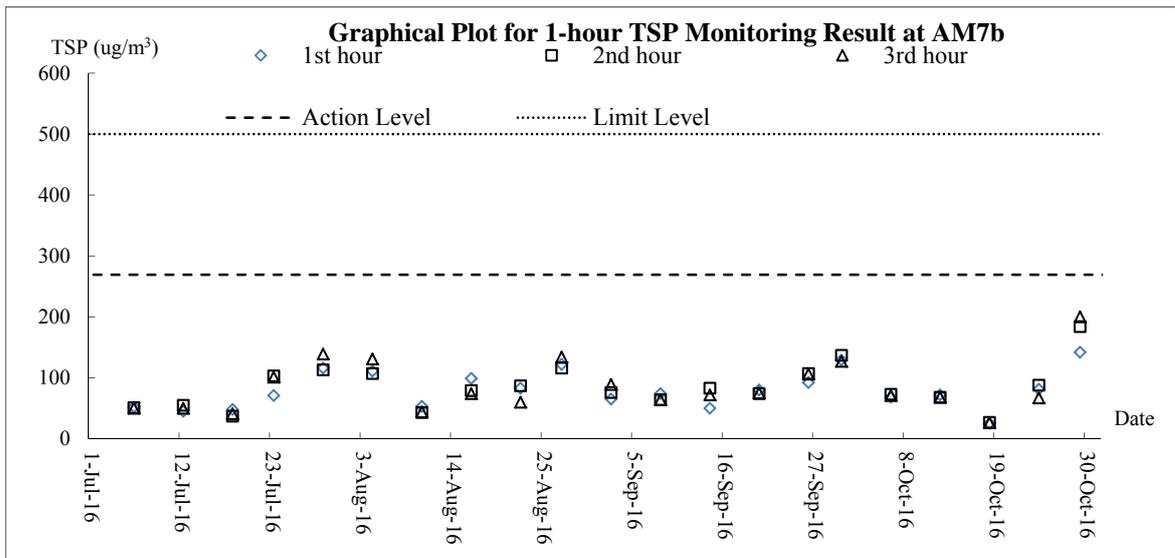
Air Quality – 1-hour TSP



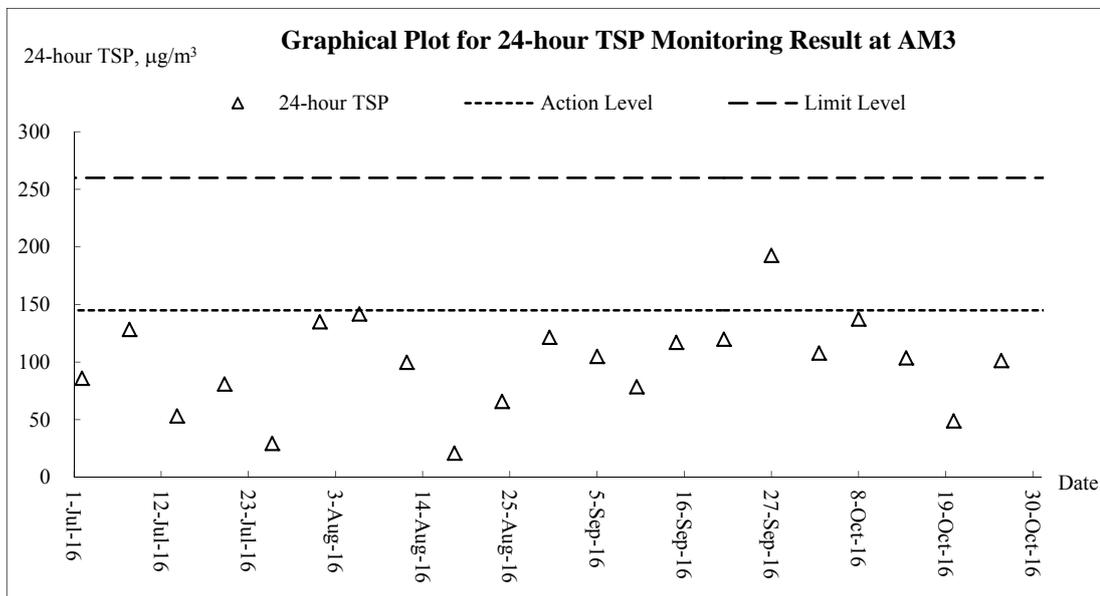
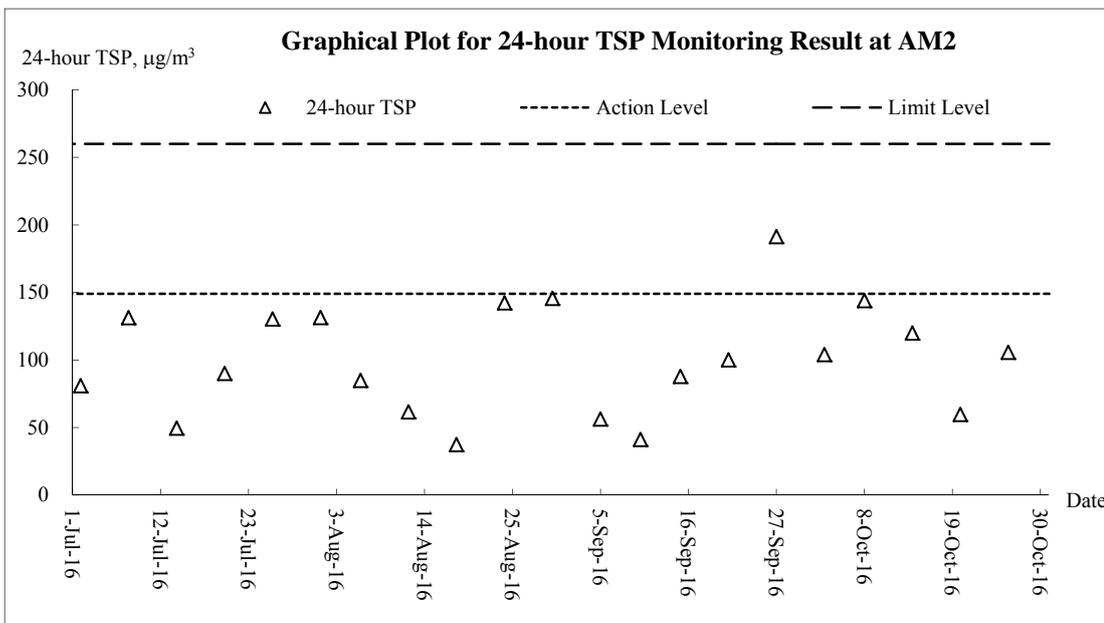
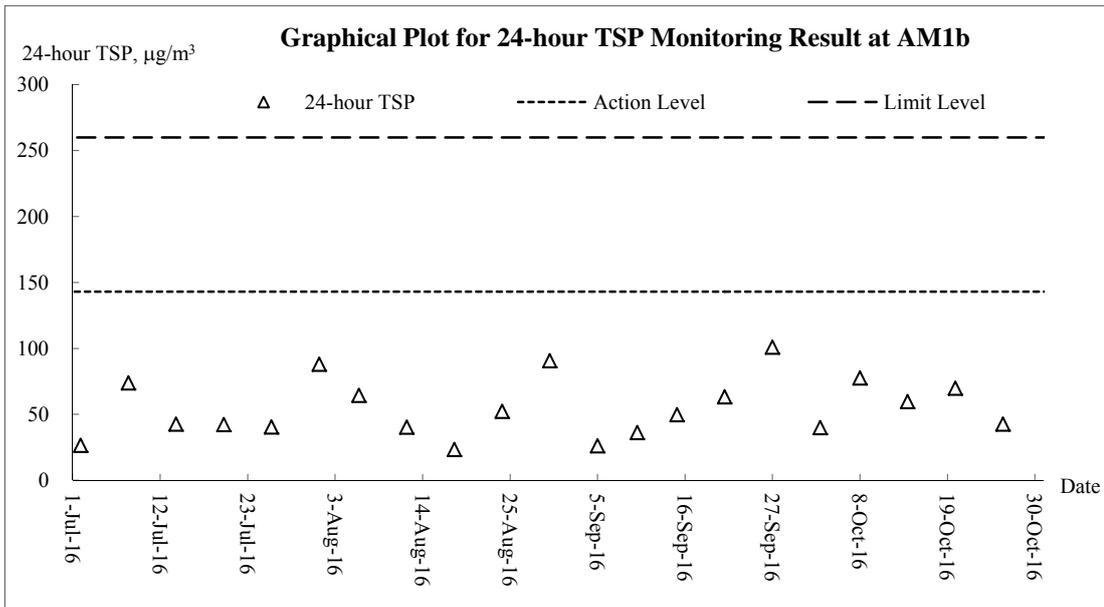
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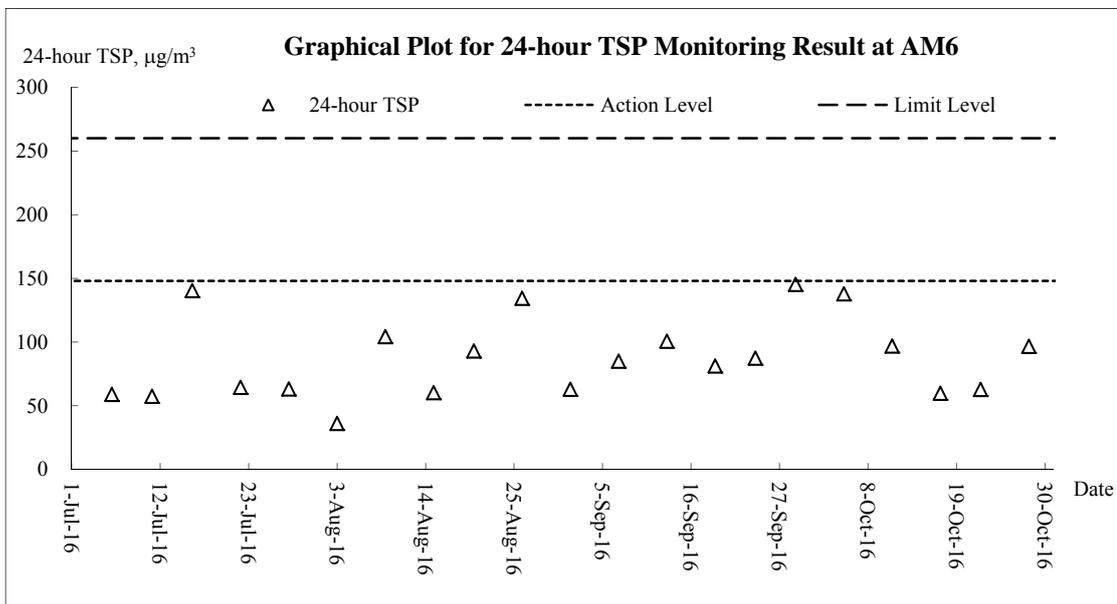
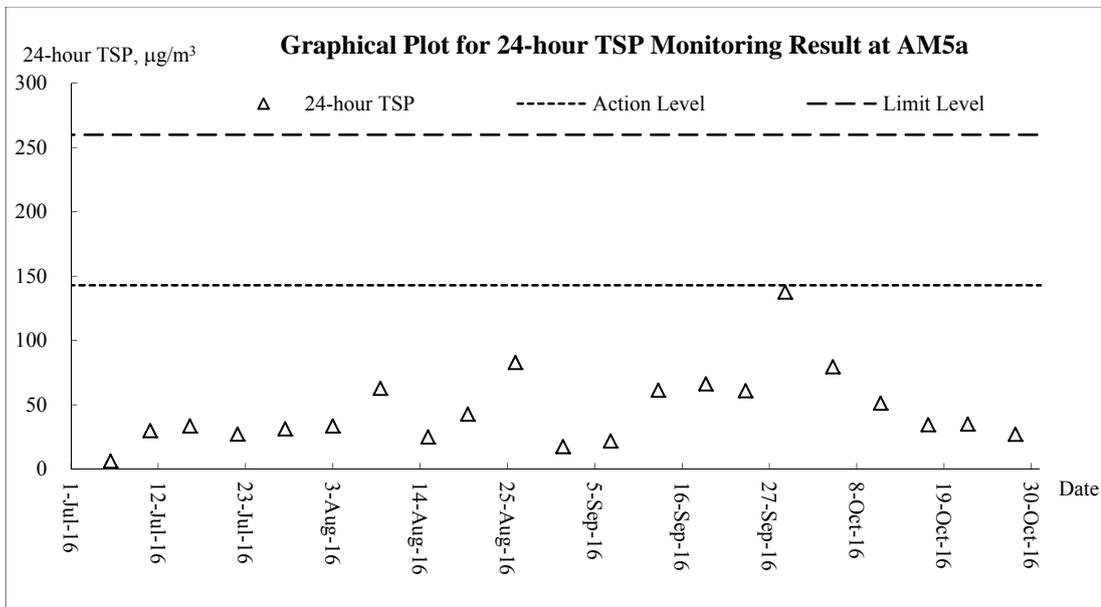
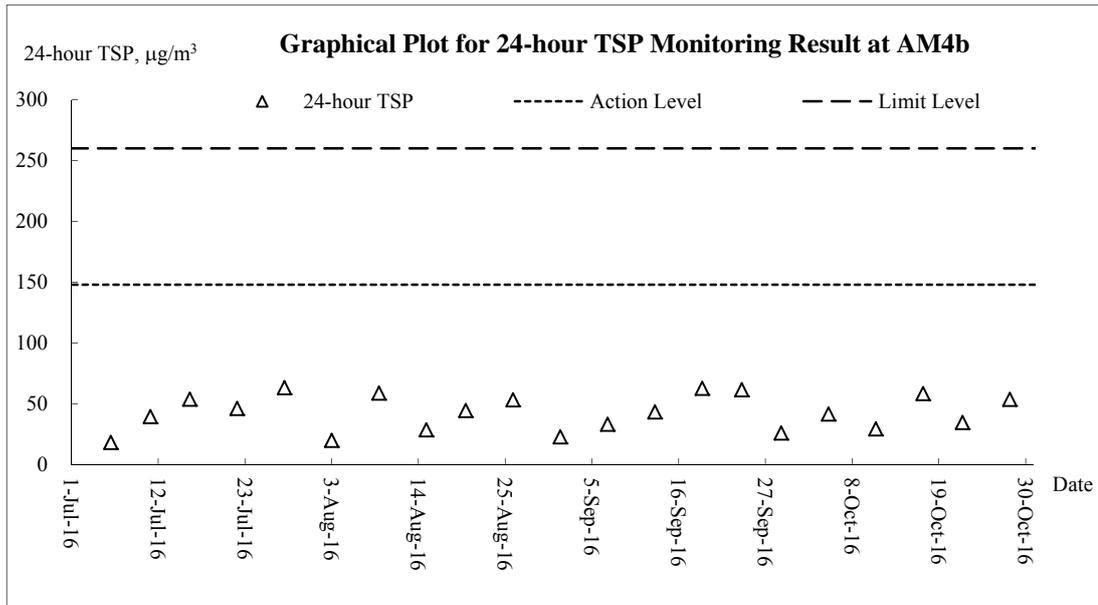
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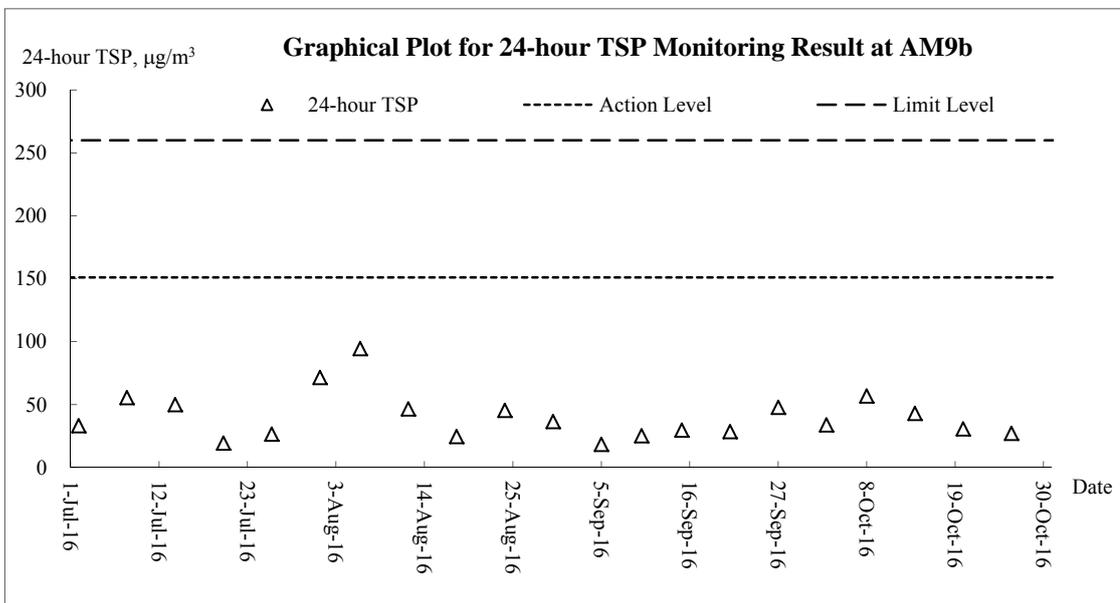
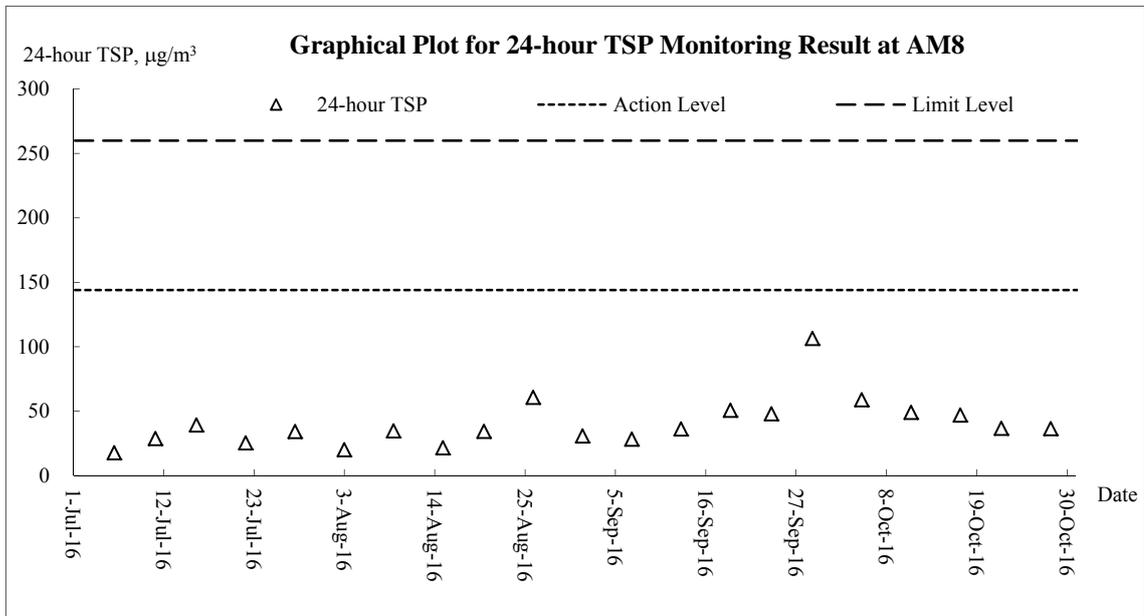
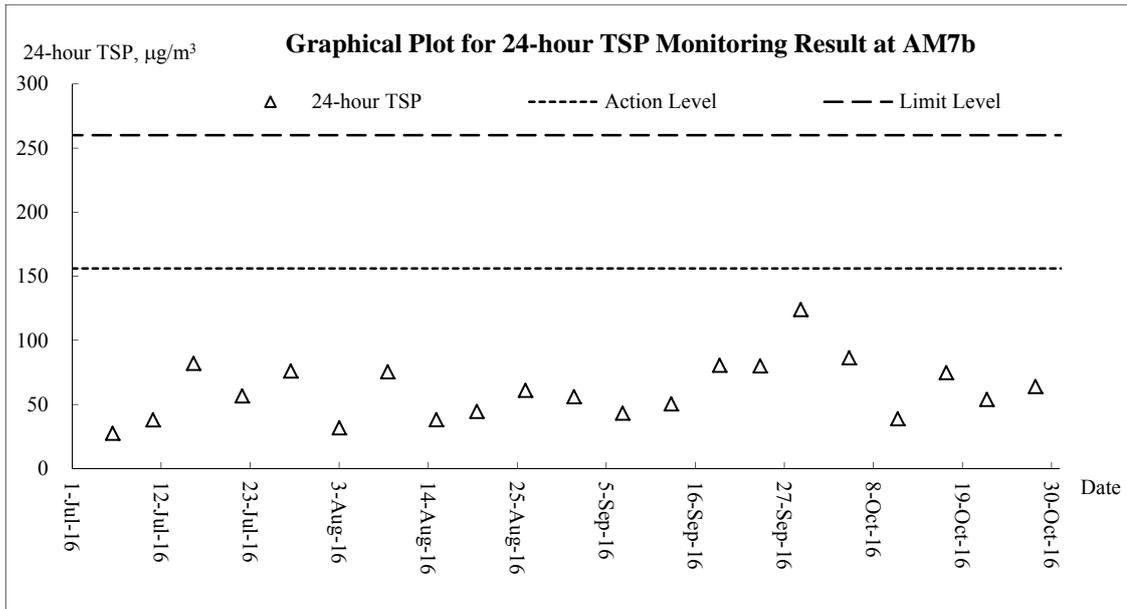


Air Quality – 24-hour TSP

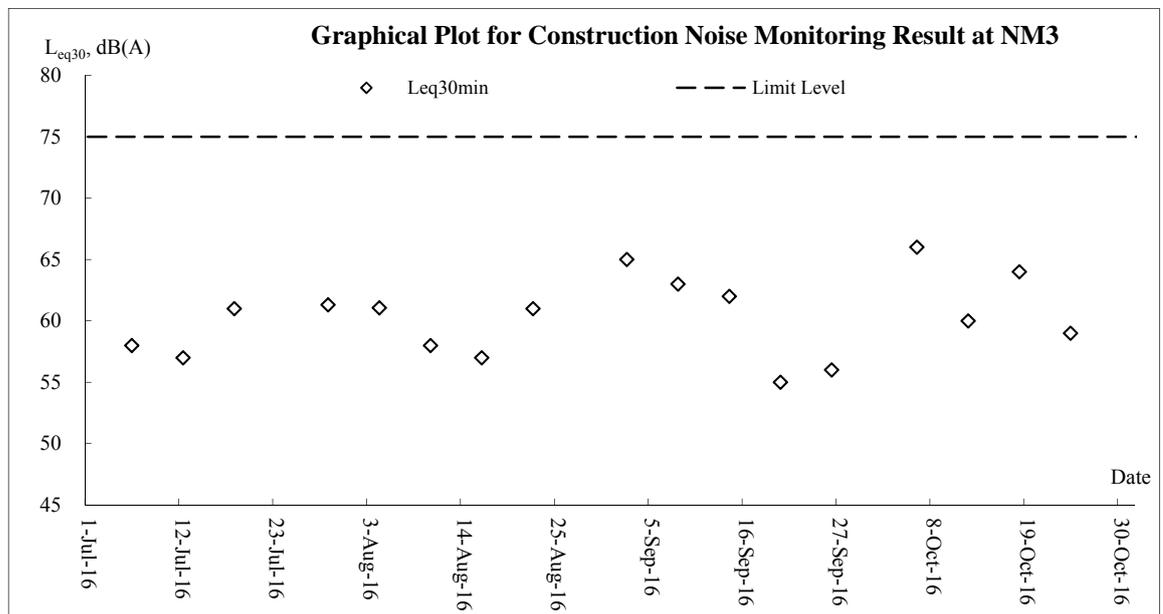
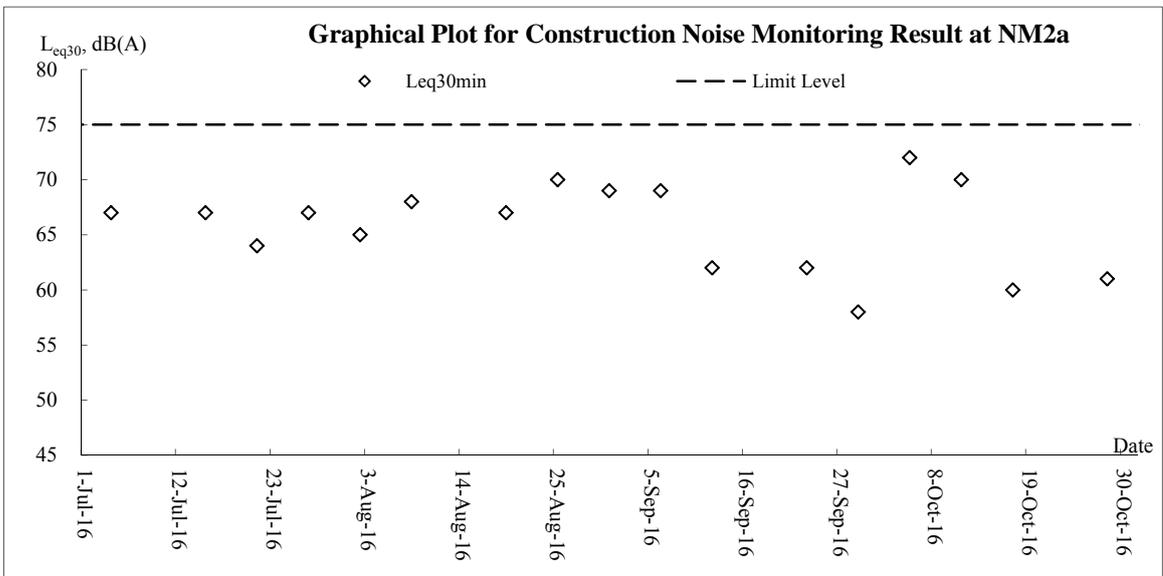
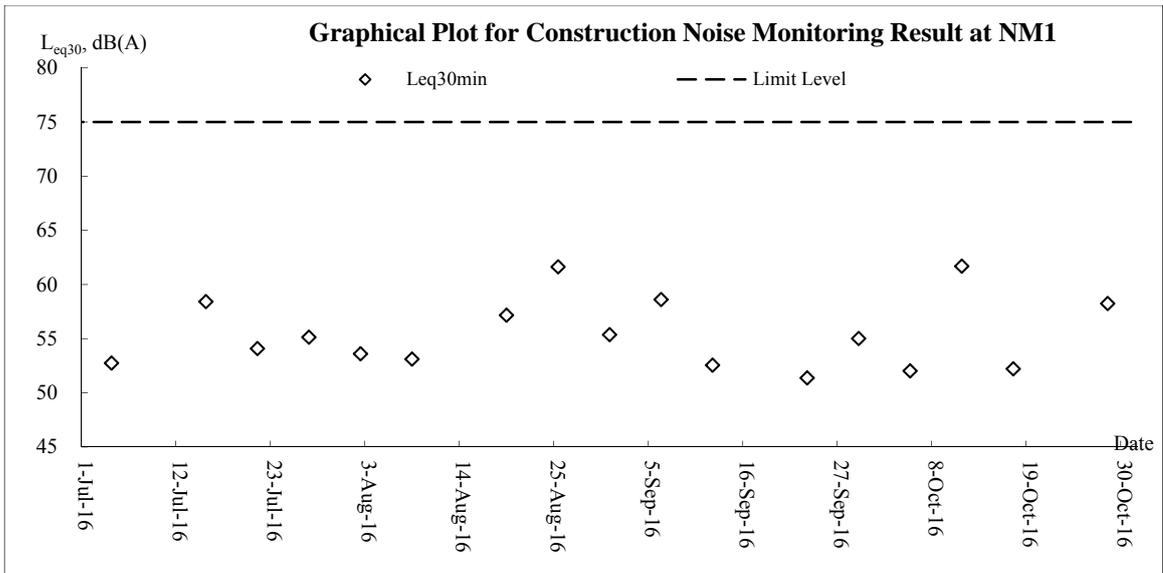


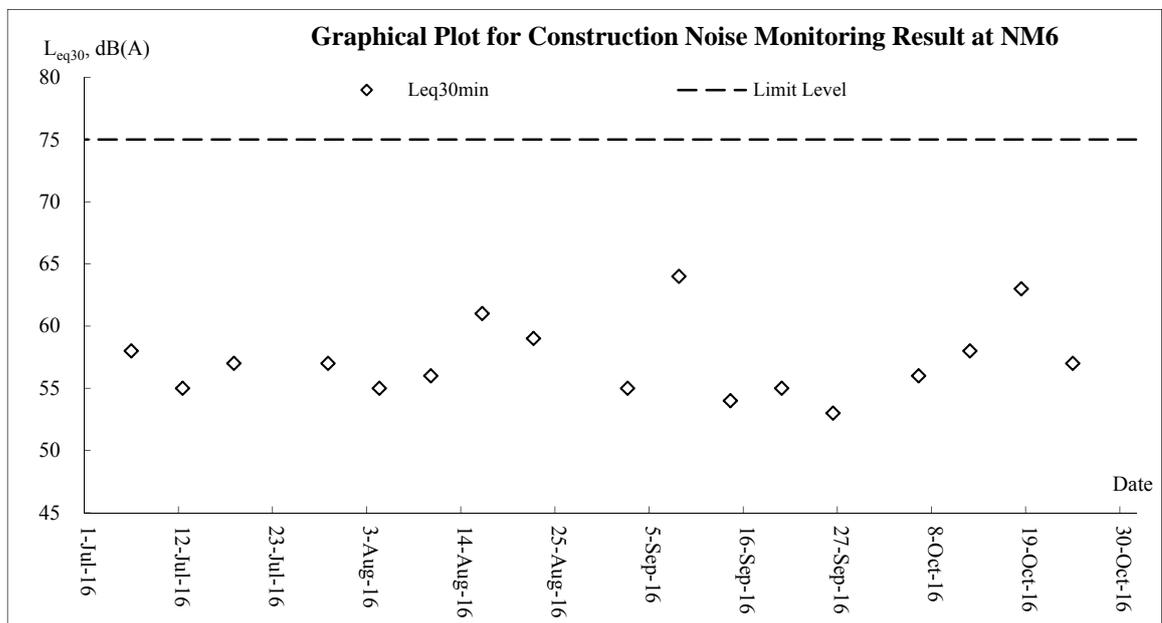
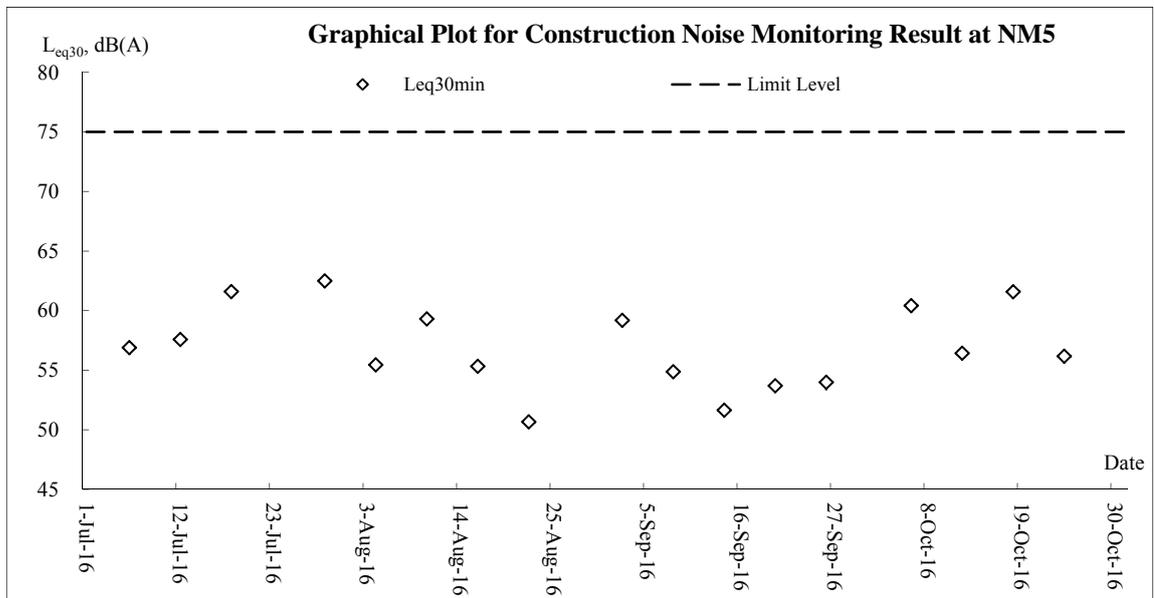
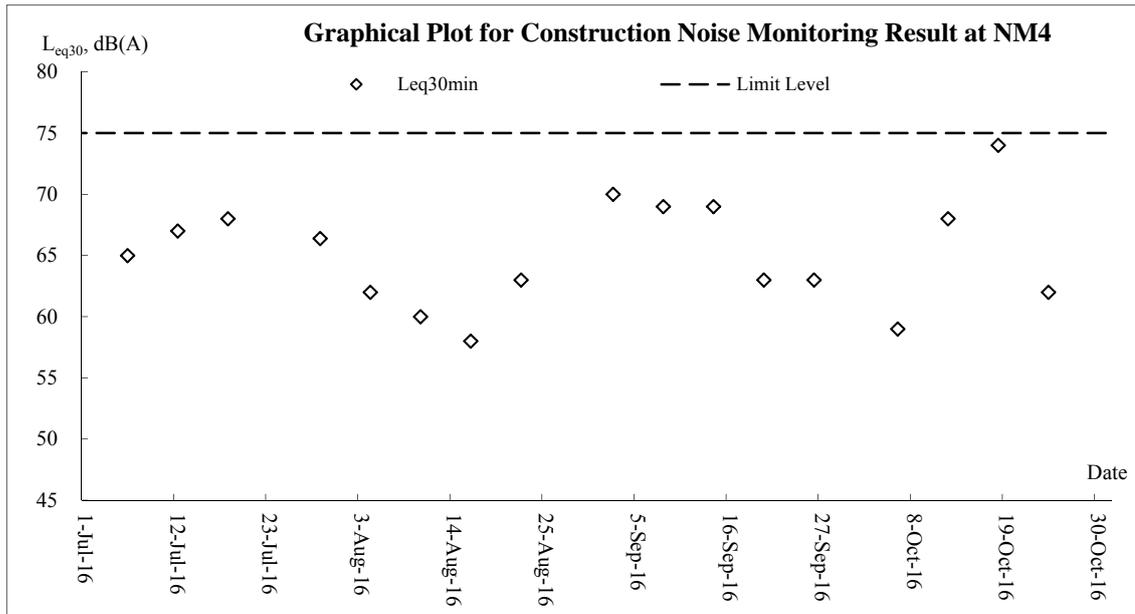
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 Monthly Environmental Monitoring & Audit Report (No.39) – October 2016

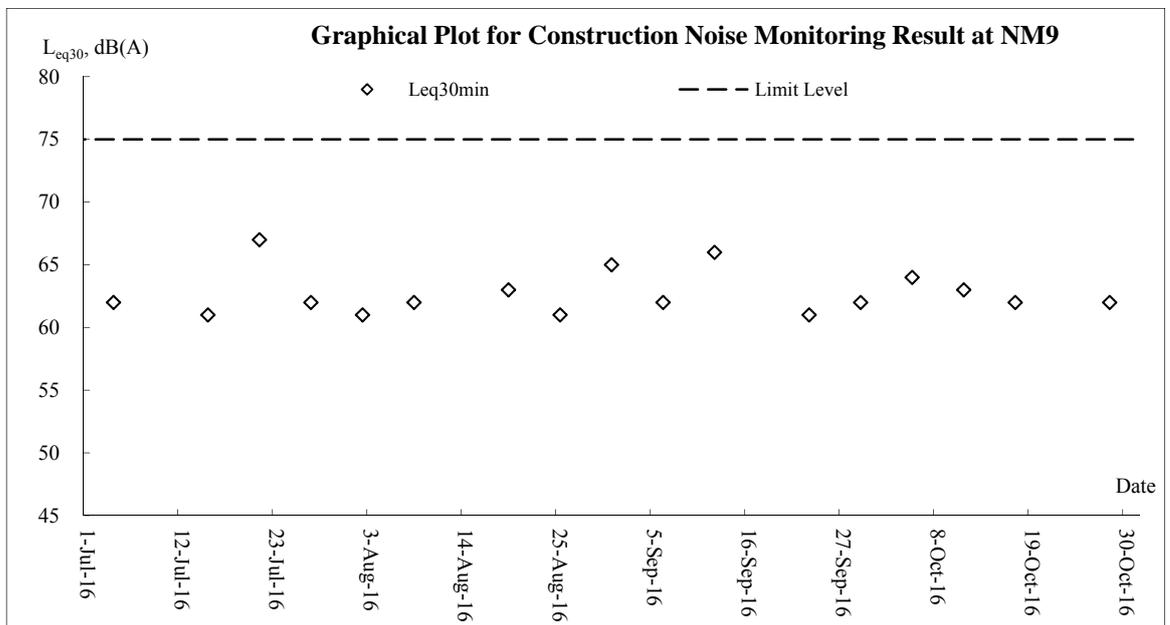
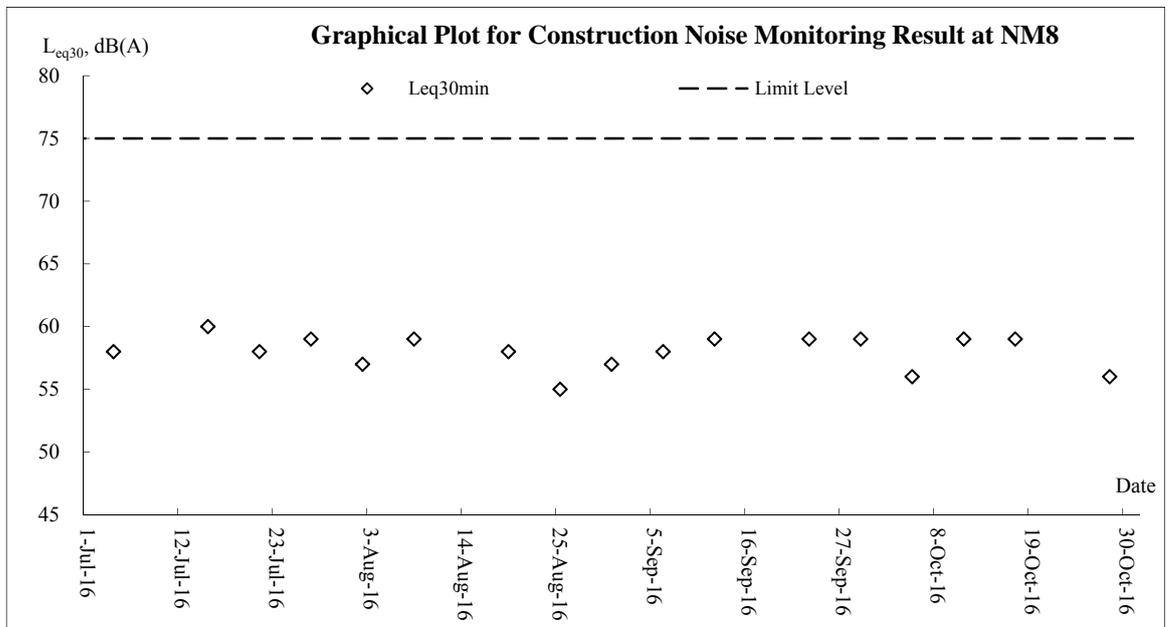
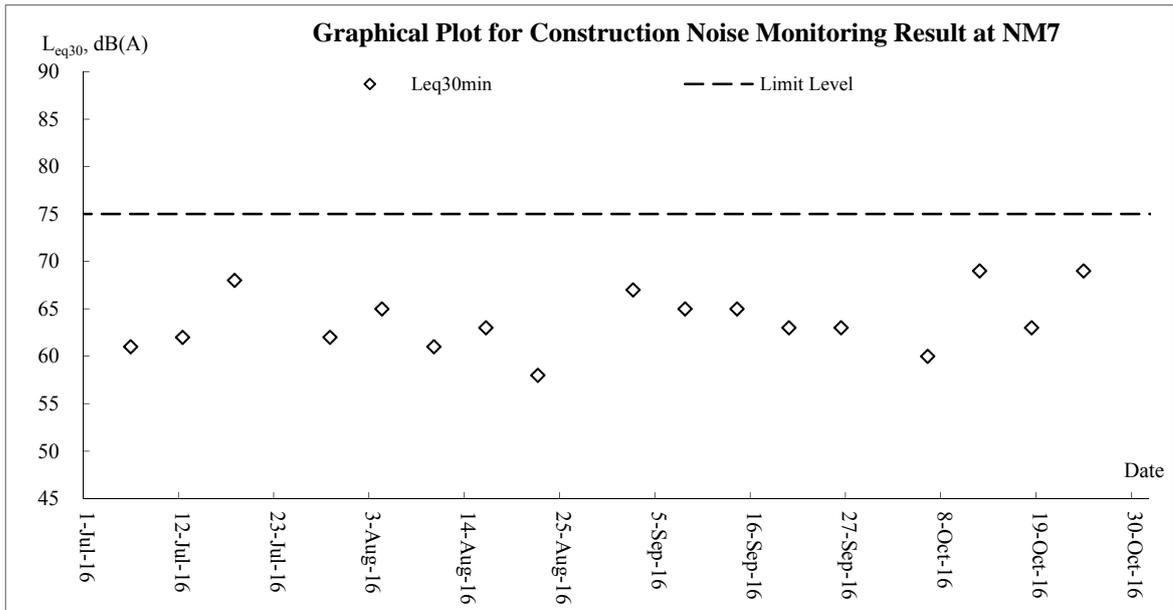




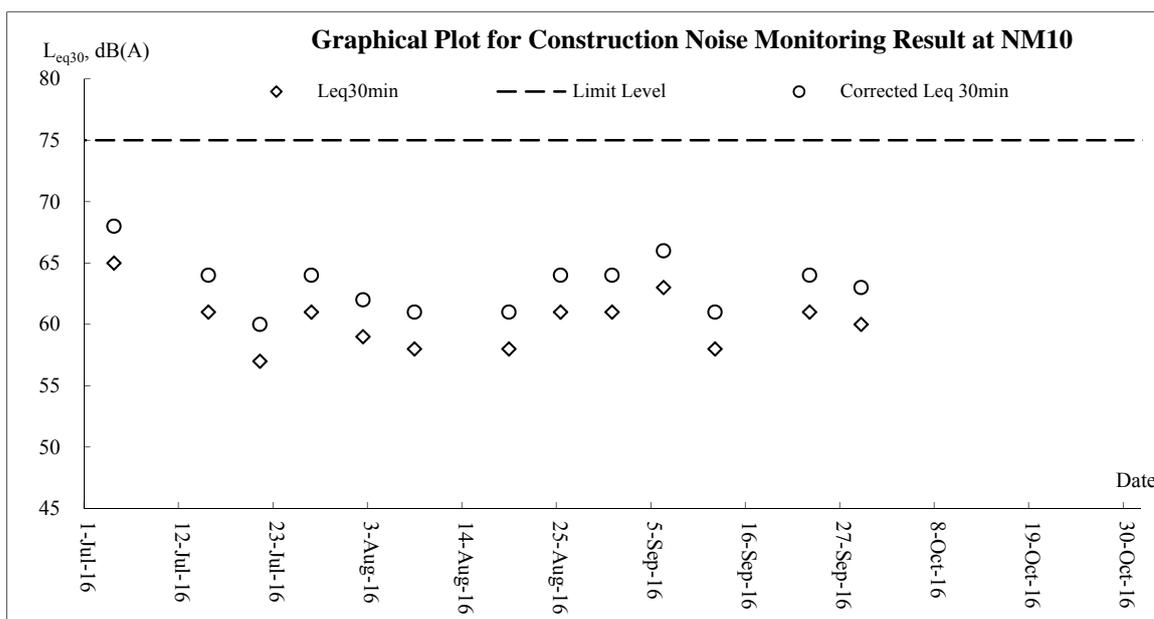
Noise



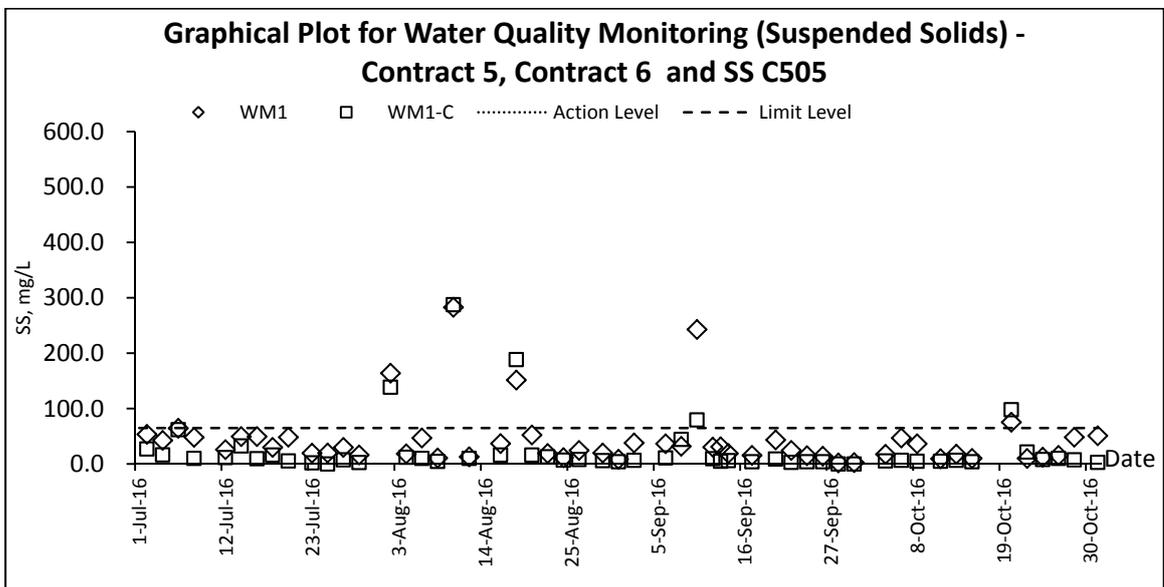
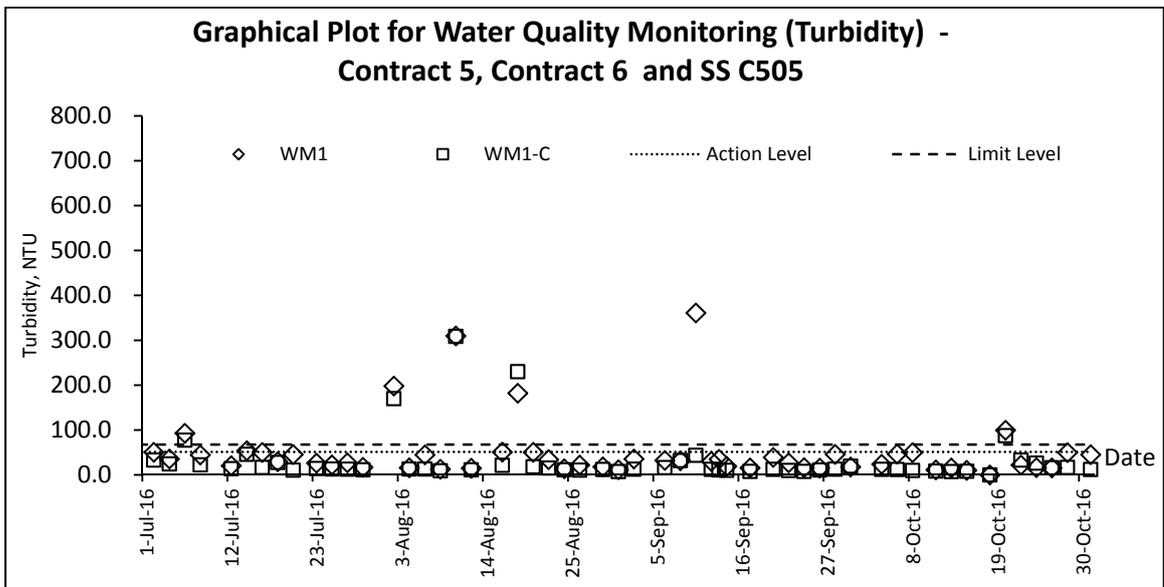
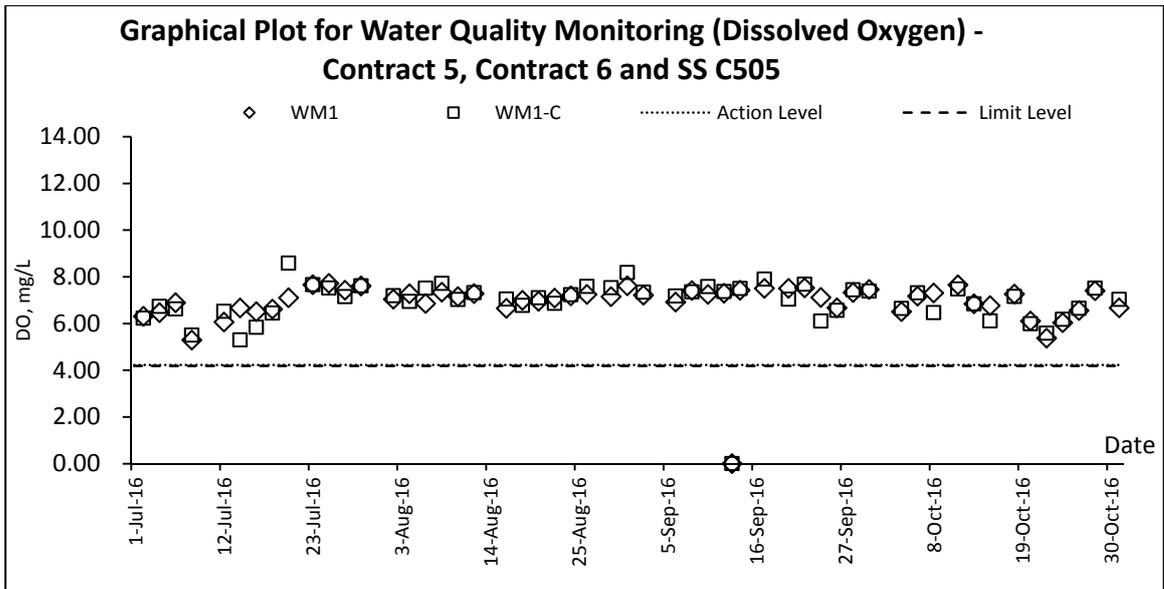


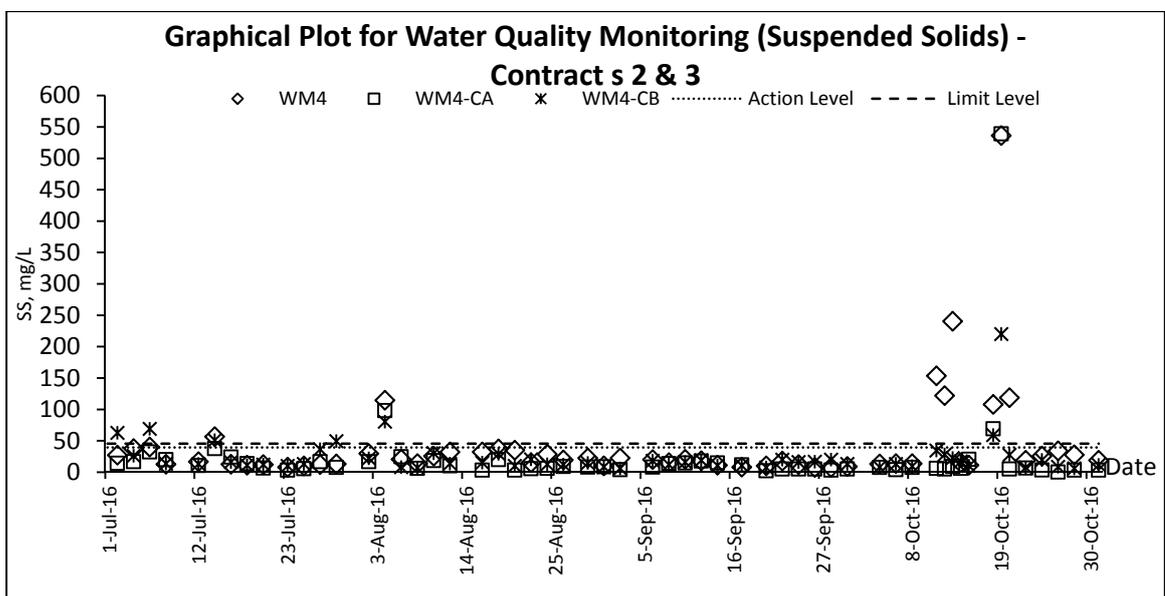
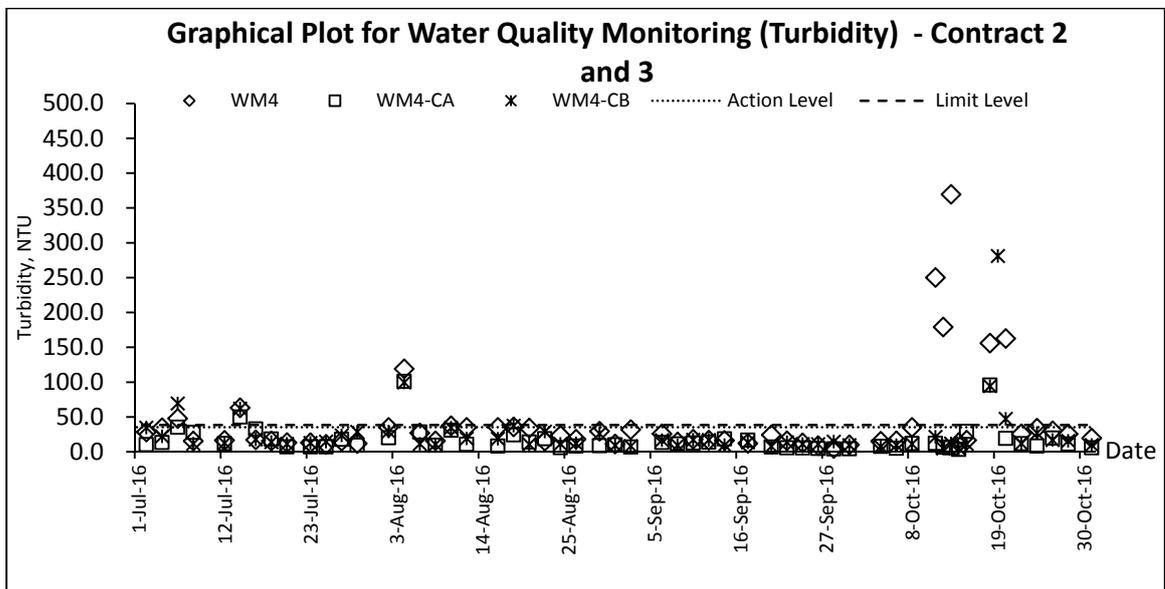
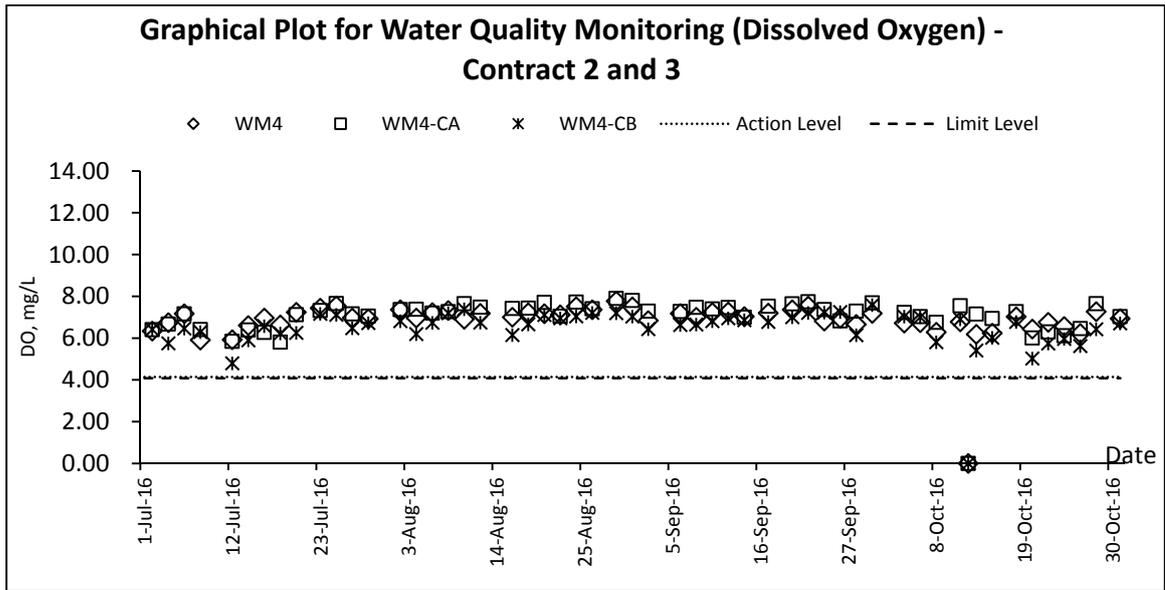


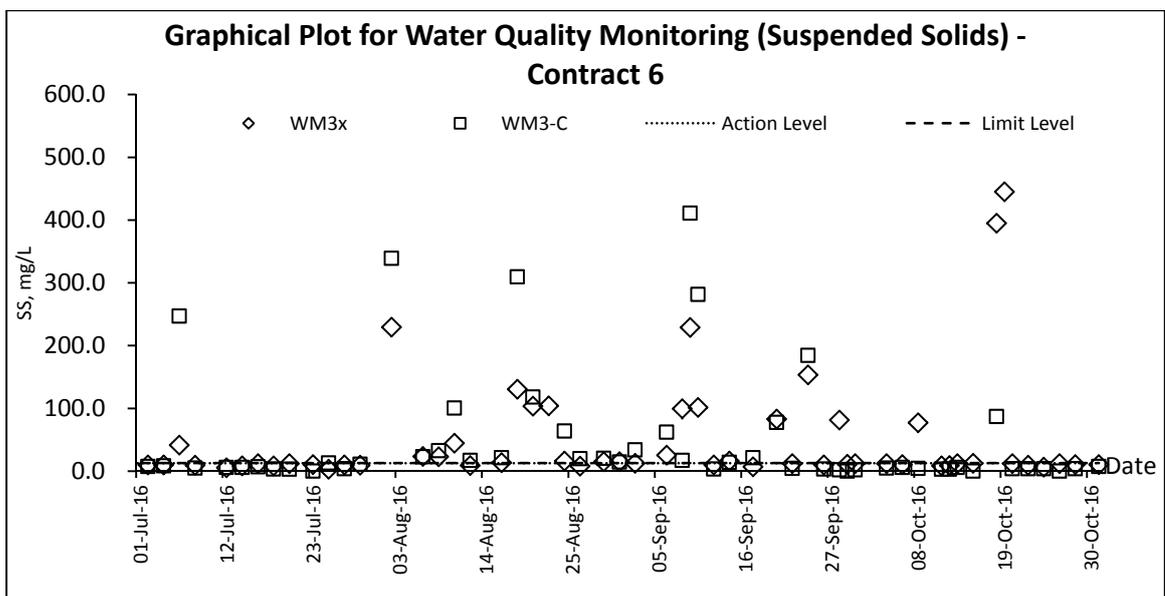
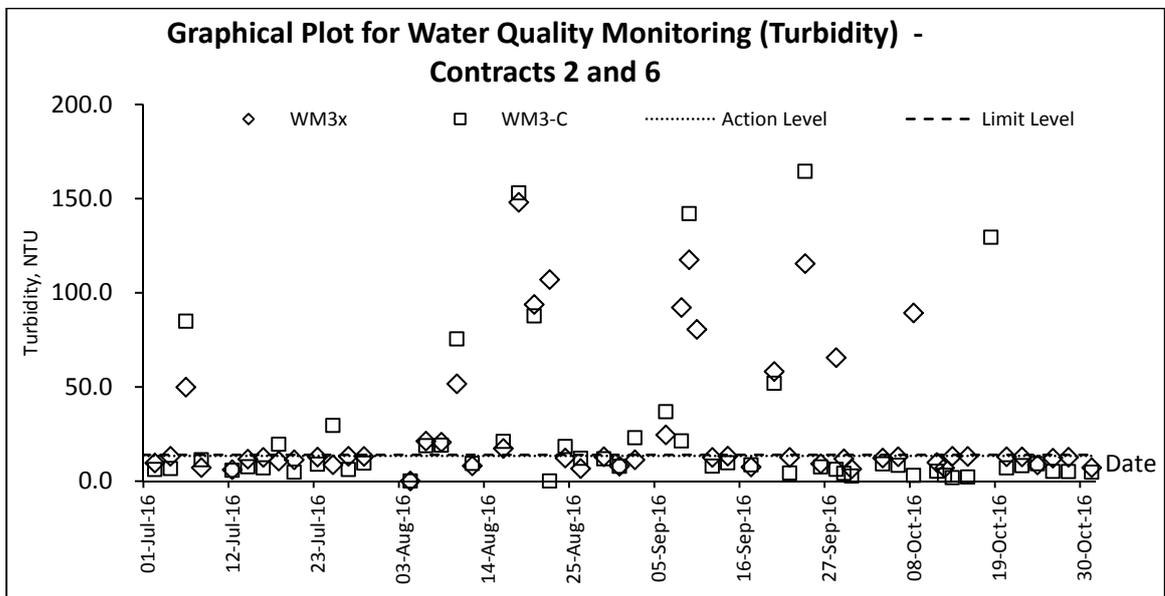
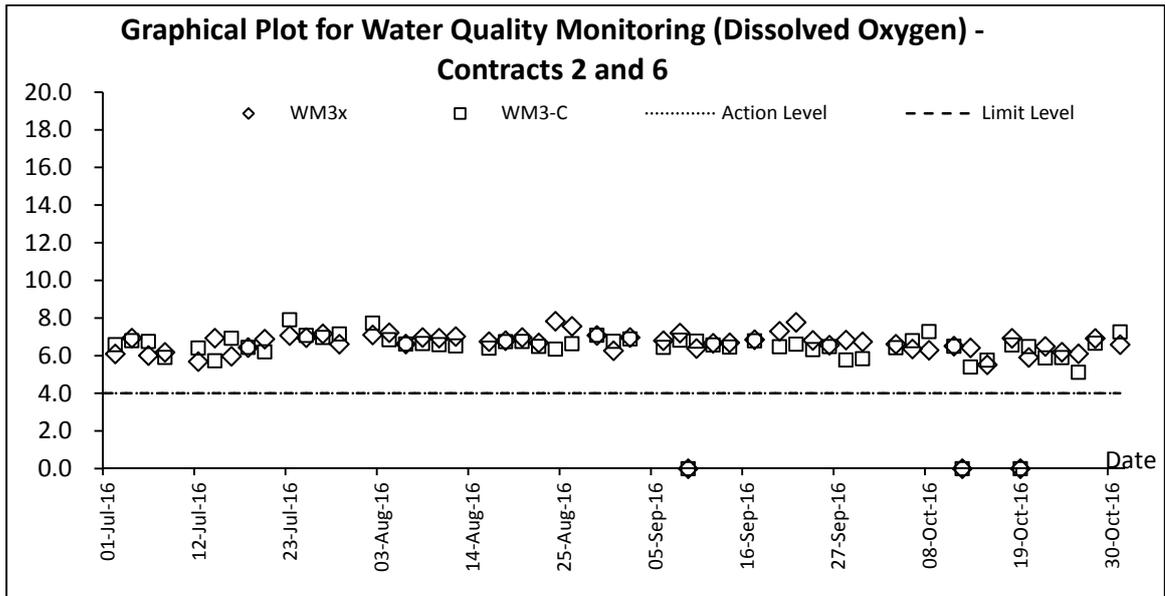
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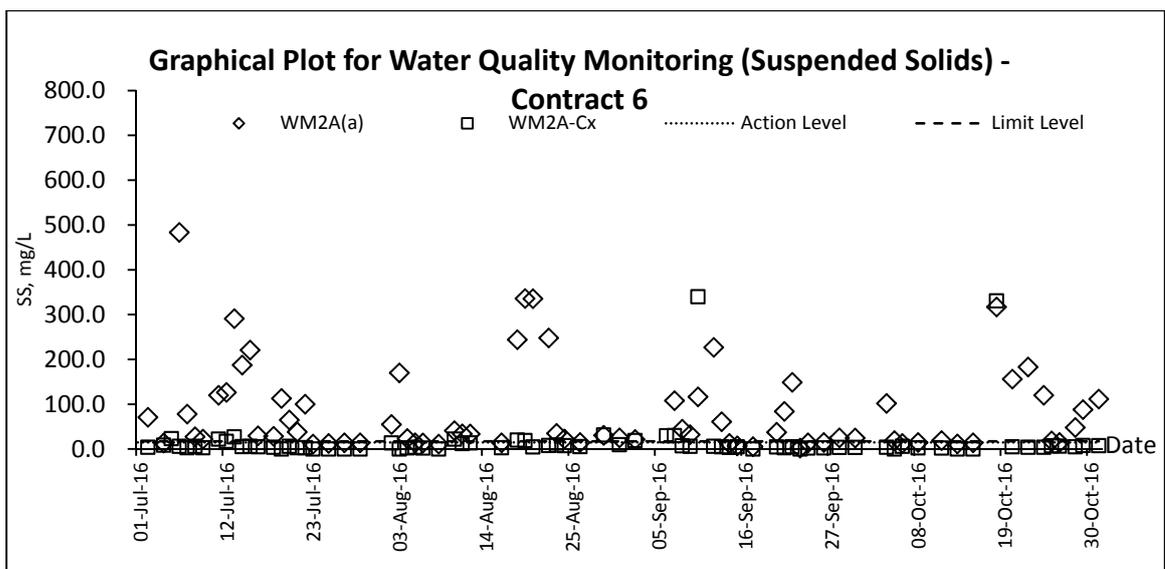
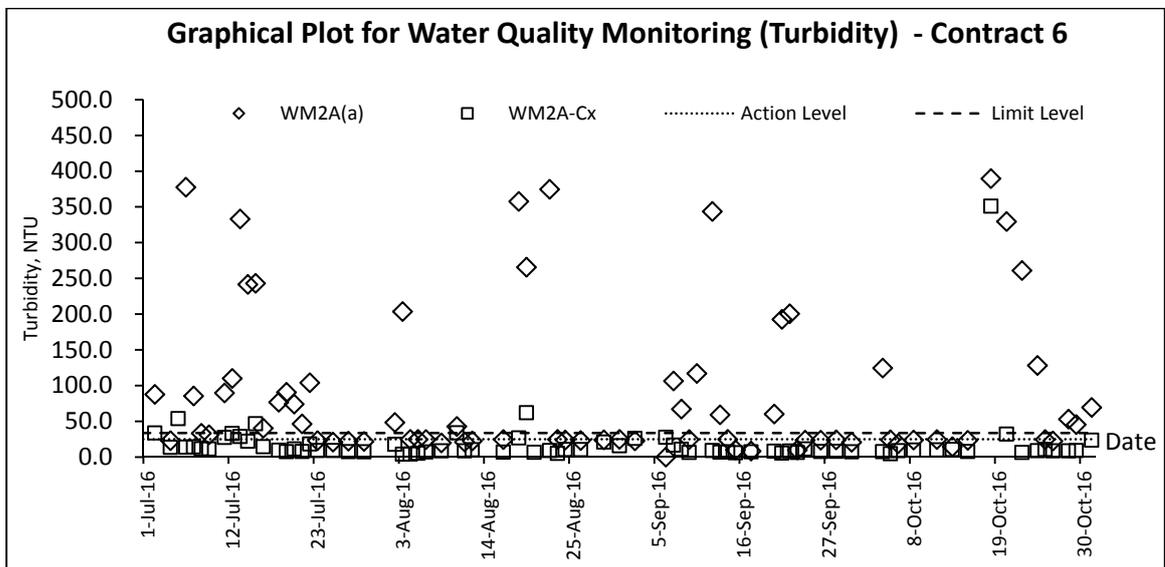
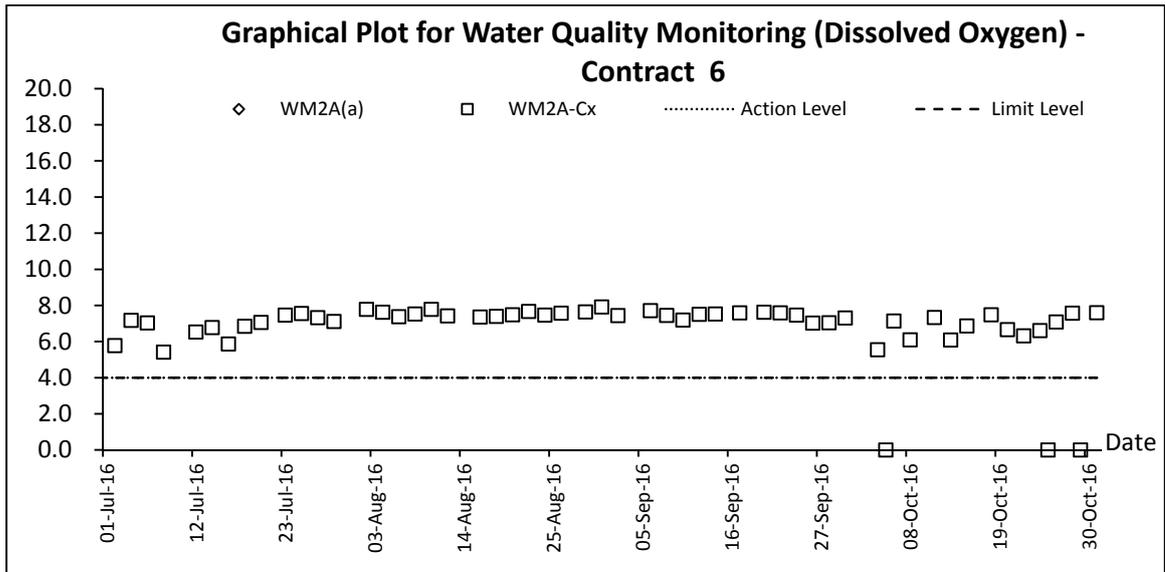


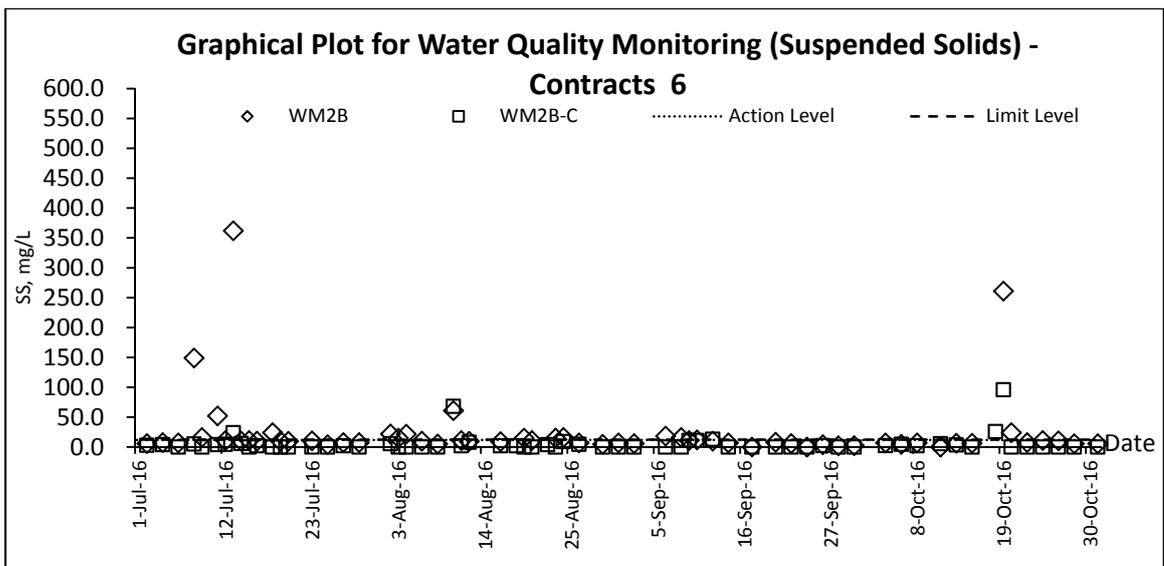
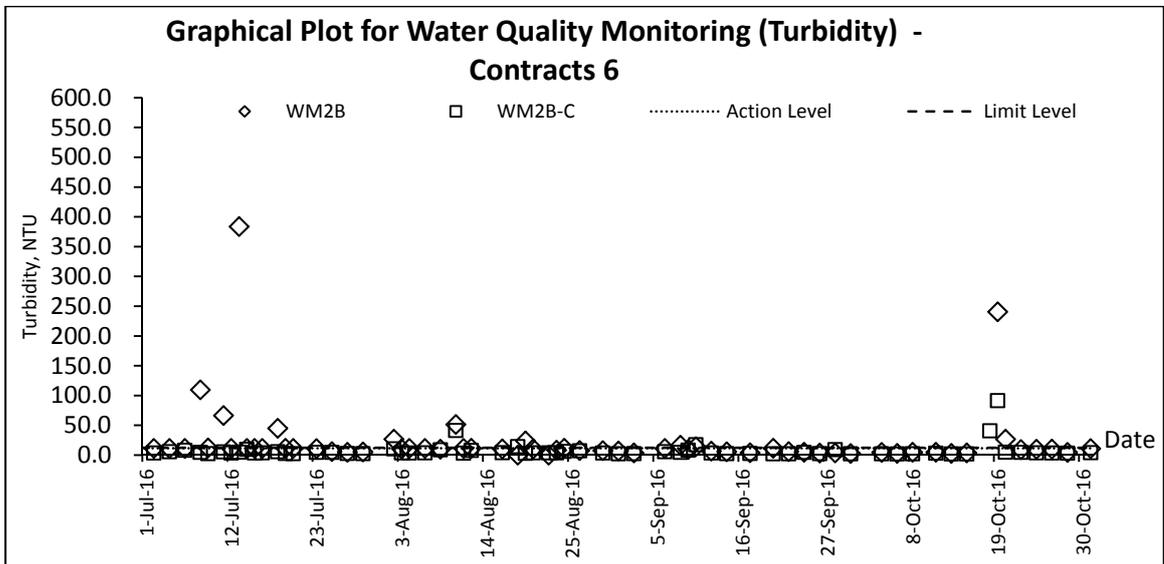
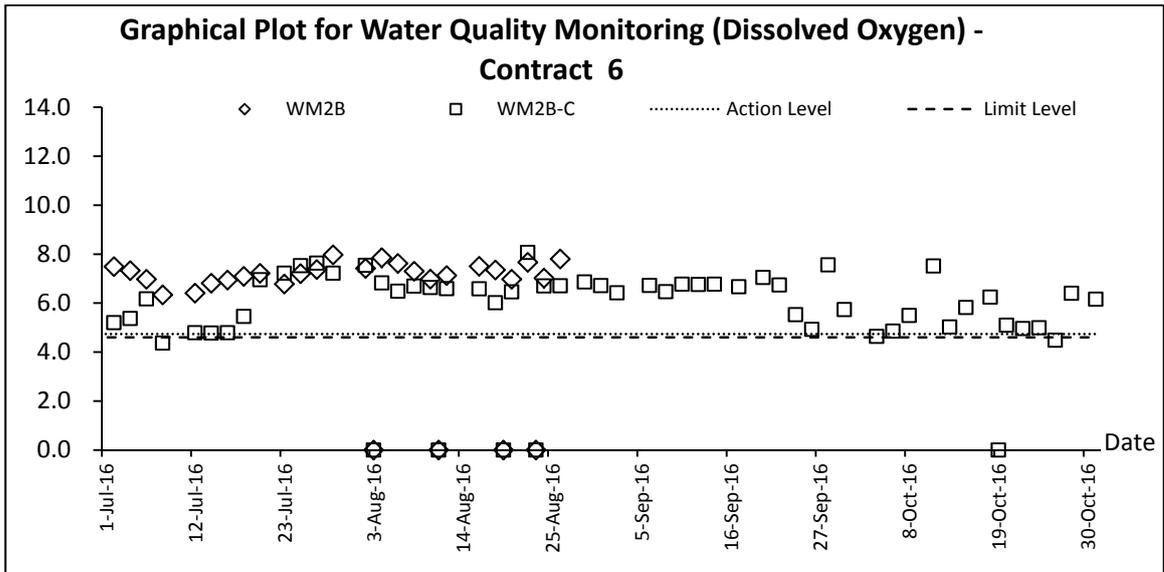
Water Quality











Appendix K

Meteorological Data

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Oct-16	Sat	Moderate easterly winds, fresh overnight.	95.5	27.1	#	89	#
2-Oct-16	Sun	Moderate easterly winds, fresh overnight.	Trace	28	5.5	77.5	N/NW
3-Oct-16	Mon	Mainly cloudy with a few showers.	0.2	27.1	6.5	82.2	E/NE
4-Oct-16	Tue	Mainly cloudy with a few showers.	0	28.2	6.6	77	E/NE
5-Oct-16	Wed	Mainly cloudy with a few showers.	Trace	28.9	5.5	77	N/NW
6-Oct-16	Thu	Sunny periods. Moderate to fresh northerly winds.	16.7	28.6	7.5	74	N/NW
7-Oct-16	Fri	Sunny periods. Moderate to fresh northerly winds.	17.3	27.2	7.5	79.2	N/NW
8-Oct-16	Sat	Mainly cloudy with a few showers.	Trace	27.7	#	69	#
9-Oct-16	Sun	Mainly cloudy with a few showers.	0	26	#	70	#
10-Oct-16	Mon	Cloudy. Occasional rain tomorrow. Rain will ease off later	0	25.5	99	63.2	N
11-Oct-16	Tue	Cloudy. Occasional rain tomorrow. Rain will ease off later	0.1	23.2	12.1	76.5	N/NW
12-Oct-16	Wed	Mainly cloudy with a few showers.	0.9	22.9	5.6	85.5	N/NW
13-Oct-16	Thu	Mainly cloudy with a few showers.	Trace	26.1	5.7	71.5	N/NW
14-Oct-16	Fri	Mainly cloudy with a few showers.	Trace	26.9	6	69	N/NW
15-Oct-16	Sat	Mainly cloudy with a few showers.	0	25.5			
16-Oct-16	Sun	Mainly cloudy with a few showers.	0	26.9	9	76.5	E/NE
17-Oct-16	Mon	Cloudy. Rain	16.7	27.4	8.1	74.2	E/NE
18-Oct-16	Tue	Cloudy. Rain	178.7	24.4	15.4	92.5	E/NE
19-Oct-16	Wed	Cloudy. Rain	223.4	25.2	13.2	92.5	E/NE
20-Oct-16	Thu	Sunny periods. Moderate to fresh northerly winds.	0	26.9	7.1	80.7	N/NW
21-Oct-16	Fri	Sunny periods. Moderate to fresh northerly winds.	16.7	27.4	#	86	#
22-Oct-16	Sat	Mainly fine. Moderate easterly winds.	1.9	28.3		84	
23-Oct-16	Sun	Mainly fine. Moderate easterly winds.	0	26.6	5	83.5	E/NE
24-Oct-16	Mon	Mainly fine. Moderate easterly winds.	Trace	27.9	6.5	82.2	E/NE
25-Oct-16	Tue	Mainly fine. Moderate easterly winds.	Trace	27.1	7.8	83	E/NE
26-Oct-16	Wed	Mainly fine. Moderate easterly winds.	0	27.3	5.4	81	E/NE
27-Oct-16	Thu	Mainly fine. Light to moderate easterly winds.	0	27.3	5.5	77.2	E/SE
28-Oct-16	Fri	Mainly fine. Moderate easterly winds.	0	27.5	4.8	73.5	E
29-Oct-16	Sat	It will be fine. Dry in the afternoon.	0.5	26	#	79	#
30-Oct-16	Sun	Mainly fine. Moderate easterly winds.	0	23.7	4.6	73	N/NW
31-Oct-16	Mon	Light to moderate northeasterly winds.	0	21.6	6.5	70	N/NW

Maintenance

Appendix L

Waste Flow Table

Name of Department : CEDD

Contract No./ Work Order No. : CV/2012/08

Appendix I - Monthly Summary Waste Flow Table for 2016

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

Month	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated [a+b+c+d]	Broken Concrete (including rock for recycling into aggregates) (a)	Reused in the Contract (b)	Reused in Other Projects (c)	Disposed as Public Fill (d)	Imported C&D Material	Metal (in '000kg)	Paper/ Cardboard Packaging (in '000kg)	Plastic (bottles/containers, plastic sheets/ foams from package material) (in '000kg)	Chemical Waste (in '000kg)	Others (e.g. General Refuse etc.) (in '000m3)
January	72.2029	0.0000	0.6482	31.8061	39.7486	0.9345	26.2000	0.0000	0.7600	1.2320	0.1247
February	55.6715	0.0000	1.0145	38.3484	16.3085	1.3108	8.3800	0.9800	0.4000	1.4080	0.1089
March	34.1757	0.0000	0.3241	29.3514	4.5003	1.0325	44.1700	0.0000	1.0700	11.9680	0.0732
April	86.9048	0.0000	0.7045	32.8811	53.3191	1.3786	31.8220	0.4000	1.0900	1.6456	0.1306
May	77.5386	0.0000	0.1268	38.9050	38.5068	6.3690	44.8000	0.3500	1.1400	2.7280	0.1246
June	62.4192	0.0000	0.5848	45.2952	16.5392	2.4119	35.7300	0.3700	1.8200	1.7600	0.0916
Half-year total	388.9127	0.0000	3.4030	216.5873	168.9224	13.4373	191.1020	2.1000	6.2800	20.7416	0.6536
July	65.3701	0.0000	0.4227	25.0255	39.9219	2.4087	11.3820	0.3500	1.5510	2.9920	0.1794
August	88.4708	0.0000	0.1283	27.0545	61.2879	2.0077	23.0010	0.3300	2.0110	5.2800	0.1482
September	97.0232	0.0000	1.5359	50.8682	44.6191	1.8765	4.6810	0.3000	1.9410	3.8720	0.2018
October	92.8467	0.0000	0.8666	39.8733	52.1068	0	0	0	0	0.0000	0.1852
November	0.0000										
December	0.0000										
Yearly Total	732.6234	0.0000	6.3565	359.4088	366.8582	19.7302	230.1660	3.0800	11.7830	32.8856	1.3682

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

Year	Actual Quantities of Inert C&D Materials Generated / Imported (in '000 m3)						Actual Quantities of Other C&D Materials / Wastes Generated				
	Total Quantities Generated [a+b+c+d]	Broken Concrete (including rock for recycling into aggregates) (a)	Reused in the Contract (b)	Reused in Other Projects (c)	Disposed as Public Fill (d)	Imported C&D Material	Metal (in '000kg)	Paper/ Cardboard Packaging (in '000kg)	Plastic (bottles/containers, plastic sheets/ foams from package material) (in '000kg)	Chemical Waste (in '000kg)	Others (e.g. General Refuse etc.) (in '000m3)
2013	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
2014	425.4406	0.0000	2.7362	376.3945	46.3099	5.6245	3.2100	0.4390	0.0070	10.8800	2.2609
2015	570.9459	0.0000	20.8159	543.2162	6.9138	4.5492	14.1300	3.9220	11.9700	16.1920	1.1696
2016	732.6234	0.0000	6.3565	359.4088	366.8582	19.7302	230.1660	3.0800	11.7830	32.8856	1.3682
2017											
2018											
Total	1729.0099	0.0000	29.9086	1279.0195	420.0819	29.9038	247.5060	7.4410	23.7600	59.9576	4.7987

Remark:

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

3) Density of Spent Oil to be 0.88 metric ton/m3

Monthly Summary Waste Flow Table for 2016 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in m ³)	(in '000m ³)
Jan	2.683	0.253	0.030	0.000	2.400	0.799	0.001	0.000	0.000	0.000	0.115
Feb	1.877	0.651	0.020	0.000	1.205	1.141	0.000	0.000	0.000	0.000	0.110
Mar	1.501	0.417	0.000	0.000	1.084	0.831	0.000	0.000	0.001	0.000	0.090
Apr	0.472	0.046	0.018	0.000	0.408	0.647	0.000	0.000	0.000	0.000	0.135
May	0.488	0.013	0.000	0.000	0.475	2.479	0.000	0.000	0.000	0.000	0.105
Jun	0.523	0.103	0.000	0.000	0.420	0.716	0.000	0.000	0.001	0.000	0.135
Sub-total	7.544	1.483	0.068	0.000	5.993	6.613	0.001	0.000	0.002	0.000	0.690
Jul	0.565	0.019	0.000	0.000	0.546	1.407	0.000	0.001	0.004	1.000	0.085
Aug	0.582	0.088	0.000	0.000	0.494	0.715	0.000	0.000	0.001	0.000	0.105
Sep	1.797	0.604	0.258	0.000	0.935	0.038	0.001	0.000	0.002	0.000	0.090
Oct	1.115	0.485	0.177	0.000	0.453	0.395	0.000	0.000	0.002	0.800	0.120
Nov											
Dec											
Total	11.602	2.679	0.503	0.000	8.420	9.168	0.002	0.001	0.011	1.800	1.090

- Note:**
1. Assume the density of soil fill is 2 ton/m³.
 2. Assume the density of rock and broken concrete is 2.5 ton/m³.
 3. Assume each truck of C&D wastes is 5m³.
 4. The inert C&D materials except slurry and bentonite are disposed at Tuen Mun 38.
 5. The slurry and bentonite are disposed at Tseung Kwun O 137.
 6. The non-inert C&D wastes are disposed at NENT.
 7. Assume the density of metal is 7,850 kg/m³.
 8. Assume the density of plastic is 941 kg/m³.

Monthly Summary Waste Flow Table for 2016 (year)

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

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

Contract No.: CV/2013/08

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m ³)
Jan	58.943	0	3.811	12.131	43.001	31.248	0	0	0	0	0.695
Feb	74.418	0	8.785	39.85	25.783	6.552	0	0.097	0	0	0.339
Mar	43.764	0	6.438	12.034	25.292	3.288	0	0.206	0.007	0	0.042
Apr	33.767	0	1.933	5.759	26.075	0	0	0.221	0	0	0.070
May	51.115	0	3.229	17.469	30.417	0.928	0	0.211	0	0	0.079
Jun	61.126	0	6.921	23.286	30.919	3.693	0	0.166	0	0	0.043
Sub-total	323.133	0	31.117	110.529	181.487	45.709	0	0.901	0.007	0	1.268
Jul	73.407	0	0.951	32.858	39.598	0.827	0	0.271	0	0	0.094
Aug	45.652	0	6.653	5.933	33.066	0	0	0.323	0	0	0.110
Sep	31.086	0	2.089	11.529	17.468	0.048	0	0.231	0	0	0.049
Oct	36.479	0	5.359	9.743	21.377	0.01	0	0	0	1.475	0.075
Nov											
Dec											
Total	678.98	0	64.703	187.376	426.901	53.843	0	2.02	0.007	33.755	4.672

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

MONTHLY SUMMARY WASTE FLOW TABLE

Name of Department: CEDD

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

Contract No.: NE/2014/03

Monthly Summary Waste Flow Table for 2016 (year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Inert C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/cardboard packaging	Plastic (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	0	0	0	0	0	0	0	0	0	0	0
Feb	0.16	0	0	0	0.16	0	0	0	0	0	0
Mar	0.135	0	0	0	0.135	0	0	0	0	0	0.005
Apr	0.313	0	0	0	0.313	0	0	0	0	0	0.005
May	0.505	0	0	0	0.505	0	0	0	0	0	0
June	0.613	0	0	0	0.613	0	0	0.005	0.001	0	0
Sub-total	1.726	0	0	0	1.726	0	0	0.005	0.001	0	0.01
July	0.207	0	0	0	0.207	0	0	0.047	0.001	0	0
Aug	0.464	0	0	0	0.464	0	0	0.03	0.001	0	0
Sept	0.207	0	0	0	0.207	0	0.1	0.05	0.001	0	0
Oct	0	0	0	0	0	0	0.2	0.04	0.001	0	0
Nov											
Dec											
Total	2.604	0	0	0	2.604	0	0.3	0.172	0.005	0	0.01

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

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

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

Month	Actual Quantities of Inert Construction Waste Generated Monthly				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Broken Concrete (see Note 4)	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)
Jan	0.800	0	0	0	0.800
Feb	0.858	0	0	0	0.858
Mar	0.793	0	0	0	0.793
Apr	0.111	0	0	0	0.111
May	1.087	0	1.074	0	0.013
Jun	8.645	0	8.541	0	0.104
Sub-total	12.293	0	9.615	0	2.678
Jul	2.942	0	2.884	0	0.059
Aug	4.247	0	4.182	0	0.065
Sep	2.963	0	2.911	0	0.052
Oct	1.164	0	0.000	0	1.164
Nov					
Dec					
Total	23.608	0	19.591	0	4.017

Month	Actual Quantities of Non-inert Construction Waste Generated Monthly												
	Timber		Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Other Recyclable Materials (see Page 3)		General Refuse disposed of at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000m ³)
	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated	recycled	generated
Jan	0.000	0.000	4.73	4.73	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.072
Feb	0.000	0.000	0.0004	0.0004	0.0186	0.0186	0.000	0.000	0.000	0.000	0.021	0.021	0.065
Mar	0	0	52.752	52.752	0.044	0.044	0	0	0	0	0.05	0.05	0.059
Apr	0	0	1465.5906	1465.5906	0.09	0.09	0	0	0	0	0.084	0.084	0.091
May	0	0	1587.5818	1587.5818	0	0	0.004	0.004	0	0	0.153	0.153	0.156
Jun	0	0	725.0582	725.0582	0.33	0.33	0.0045	0.0045	0	0	0.067	0.067	0.117
Sub-total	0	0	3818.7330	3818.7330	0.4826	0.4826	0.0085	0.0085	0	0	0.375	0.375	0.559
Jul	0	0	265.690	265.690	0.430	0.430	0.020	0.020	0.000	0.000	0.194	0.194	0.189
Aug	0	0	298.260	298.260	0.360	0.360	0.025	0.025	0.000	0.000	0.069	0.069	0.228
Sep	0	0	572.15	572.15	0.370	0.370	0.048	0.048	0.000	0.000	0.088	0.088	0.241
Oct	0	0	988.585	988.585	0.36	0.36	0.098	0.098	0.000	0.000	0.112	0.112	0.189
Nov													
Dec													
Total	0	0	5943.418	5943.418	2.003	2.003	0.199	0.199	0.000	0.000	0.837	0.837	1.404

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					
15kg of cans were sent to Kong Han for recycling.	360kg of paper were sent to Environment Protection Trading Ltd for recycling.	98kg of plastic bottles and 97kg of glass bottles were sent to Action Health for recycling.	988.585 tons of scrap metals from LCAL were sent for recycling.		

- Notes:
- (1) The performance targets are given in the Particular Specification on Environmental Management Plan.
 - (2) The waste flow table shall also include construction waste that are specified in the Contract to be imported for use at the site.
 - (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
 - (4) Broken concrete for recycling into aggregates.
 - (5) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 6.5 m³ by volume.

Appendix M

**Implementation Schedule for
Environmental Mitigation Measures**

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
Air Quality Impact (Construction)							
3.6.1.1	2.1	<p>General Dust Control Measures</p> <p>The following dust suppression measures should be implemented:</p> <ul style="list-style-type: none"> ■ Frequent water spraying for active construction areas (4 times per day for active areas in Po Kak Tsai and 8 times per day for all other active areas), including areas with heavy construction and slope cutting activities ■ 80% of stockpile areas should be covered by impervious sheets ■ Speed of trucks within the site should be controlled to about 10 km/hr ■ All haul roads within the site should be paved to avoid dust emission due to vehicular movement 	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation
3.6.1.2	2.1	<p>Best Practice for Dust Control</p> <p>The relevant best practices for dust control as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted to further reduce the construction dust impacts of the Project. These best practices include:</p> <p><i>Good site management</i></p> <ul style="list-style-type: none"> ■ The Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. ■ Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimize the release of visible dust emission. ■ Any piles of materials accumulated on or around the work areas should be cleaned up regularly. ■ Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimizing generation of fugitive dust emissions. ■ The material should be handled properly to prevent fugitive dust emission before cleaning. <p><i>Disturbed Parts of the Roads</i></p> <ul style="list-style-type: none"> ■ Each and every main temporary access should be paved with 	To minimize adverse dust emission generated from various construction activities of the works sites	Contractor	Construction Works Sites	During Construction	EIA Recommendation and Air Pollution Control (Construction Dust) Regulation

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or</p> <ul style="list-style-type: none"> Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet. <p><i>Exposed Earth</i></p> <ul style="list-style-type: none"> Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seeding with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. <p><i>Loading, Unloading or Transfer of Dusty Materials</i></p> <ul style="list-style-type: none"> All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet. <p><i>Debris Handling</i></p> <ul style="list-style-type: none"> Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides. Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped. <p><i>Transport of Dusty Materials</i></p> <ul style="list-style-type: none"> Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards. <p><i>Wheel washing</i></p> <ul style="list-style-type: none"> Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. <p><i>Use of vehicles</i></p> <ul style="list-style-type: none"> Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels. Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle. 					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p><i>Site hoarding</i></p> <ul style="list-style-type: none"> Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit. <p><i>Blasting</i></p> <ul style="list-style-type: none"> The areas within 30m from the blasting area should be wetted with water prior to blasting. 					
<u>Air Quality Impact (Operation)</u>							
3.5.2.2	2.2	<p>The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site:</p> <ul style="list-style-type: none"> The treatment work will be totally enclosed. Negative pressure ventilation will be provided within the enclosure to avoid any fugitive odorous emission from the treatment work. Further odour containment will be achieved by covering or confining the sewage channels, sewage tanks, and equipment with potential odour emission. Proper mixing will be provided at the equalization and sludge holding tanks to prevent sewage septicity. Chemical or biological deodorisation facilities with a minimum odour removal efficiency of 90% will be provided to treat potential odorous emissions from the treatment plant including sewage channels / tanks, filter press and screening facilities so as to minimize any potential odour impact to the nearby ASRs. 	To minimize potential odour impact from operation of the proposed sewage treatment work at BCP	DSD	BCP	Operation Phase	EIA recommendation
<u>Noise Impact (Construction)</u>							
4.4.1.4	3.1	<p>Adoption of Quieter PME</p> <p>Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in Table 4.14, which can be found in Hong Kong.</p>	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

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

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<p>Good Site Practice</p> <p>The good site practices listed below should be followed during each phase of construction:</p> <ul style="list-style-type: none"> • Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • Silencers or mufflers on construction equipment should be utilized and should be properly maintained during the construction programme; • Mobile plant, if any, should be sited as far from NSRs as possible; • Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. 	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and NCO
Noise Impact (Operation)							
<u>Road Traffic Noise</u>							
Table 4.42 and Figure 4.20.1 to 4.20.4	3.2	Erection of noise barrier/ enclosure along the viaduct section.	To minimize the road traffic noise along the connecting road of BCP	Contractor	Loi Tung and Fanling Highway Interchange	Before Operation	EIAO and NCO
<u>Fixed Plant Noise</u>							
Table 4.46	3.2	Specification of the maximum allowable sound power levels of the proposed fixed plants during daytime and night-time.	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIA recommendation, EIAO and NCO

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.5.2.4	3.2	<p>The following noise reduction measures shall be considered as far as practicable during operation:</p> <ul style="list-style-type: none"> Choose quieter plant such as those which have been effectively silenced; Include noise levels specification when ordering new plant (including chillier and E/M equipment); Locate fixed plant/louver away from any NSRs as far as practicable; Locate fixed plant in walled plant rooms or in specially designed enclosures; Locate noisy machines in a basement or a completely separate building; Install direct noise mitigation measures including silencers, acoustic louvers and acoustic enclosure where necessary; and Develop and implement a regularly scheduled plant maintenance programme so that equipment is properly operated and serviced in order to maintain a controlled level of noise. 	To minimize the fixed plant noise impact	Managing Authority of the buildings / Contractor	BCP, Administration Building and all ventilation buildings	Before Operation	EIAO and NCO
Water Quality Impact (Construction)							
5.6.1.1	4.1	<p>Construction site runoff and drainage</p> <p>The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended to protect water quality and when properly implemented should be sufficient to adequately control site discharges so as to avoid water quality impacts:</p> <ul style="list-style-type: none"> At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractor prior to the commencement of construction. The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. 	To control site runoff and drainage; prevent high sediment loading from reaching the nearby watercourses	Contractor	Construction Works Sites	Construction Phase	Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Temporary ditches should be provided to facilitate the runoff discharge into stormwater drainage system through a sediment/silt trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates, if practical.</p> <ul style="list-style-type: none"> ▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove sand/silt particles from runoff to meet the requirements of the TM standards under the WPCO. The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractor prior to the commencement of construction. ▪ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly at all times. ▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities. ▪ If surface excavation works cannot be avoided during the wet season (April to September), temporarily exposed slope/soil surfaces should be covered by tarpaulin or other means, as far as practicable, and temporary access roads should be protected by crushed stone or gravel, as excavation proceeds. Interception channels should be provided (e.g. along the crest/edge of the excavation) to prevent storm runoff from washing across exposed soil surfaces. Arrangements should always be in place to ensure that adequate surface protection measures can be safely carried out well before the arrival of a rainstorm. Other measures that need to be implemented before, during and after rainstorms are summarized in ProPECC Note PN 1/94. ▪ The overall slope of the site should be kept to a minimum to reduce 					

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>the erosive potential of surface water flows.</p> <ul style="list-style-type: none"> ▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exit where practicable. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. ▪ Open stockpiles of construction materials or construction wastes on-site should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system. ▪ Manholes (including newly constructed ones) should be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and stormwater runoff being directed into foul sewers. ▪ Precautions should be taken at any time of the year when rainstorms are likely. Actions should be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarized in Appendix A2 of ProPECC Note PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes. ▪ Bentonite slurries used in piling or slurry walling should be reconditioned and reused wherever practicable. Temporary enclosed storage locations should be provided on-site for any unused bentonite that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries. 					
5.6.1.1	4.1	<p>Good site practices for works within water gathering grounds</p> <p>The following conditions should be complied, if there is any works to be carried out within the water gathering grounds:</p>	To minimize water quality impacts to the water gathering grounds	Contractor	Construction Works Sites within the water gathering	Construction Phase	ProPECC Note PN 1/94

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<ul style="list-style-type: none"> ▪ Adequate measures should be implemented to ensure no pollution or siltation occurs to the catchwaters and catchments. ▪ No earth, building materials, oil or fuel, soil, toxic materials or any materials that may possibly cause contamination to water gathering grounds are allowed to be stockpiled on site. ▪ All surplus spoil should be removed from water gathering grounds as soon as possible. ▪ Temporary drains with silt traps should be constructed at the site boundary before the commencement of any earthworks. ▪ Regular cleaning of silt traps should be carried out to ensure proper operation at all time. ▪ All excavated or filled surfaces which have the risk of erosion should always be protected form erosion. ▪ Facilities for washing the wheels of vehicles before leaving the site should be provided. ▪ Any construction plant which causes pollution to catchwaters or catchments due to the leakage of oil or fuel should be removed off site immediately. ▪ No maintenance activities which may generate chemical wastes should be undertaken in the water gathering grounds. Vehicle maintenance should be confined to designated paved areas only and any spillages should be cleared up immediately using absorbents and waste oils should be collected in designated tanks prior to disposal off site. All storm water run-off from these areas should be discharged via oil/petrol separators and sand/silt removal traps. ▪ Any soil contaminated with fuel leaked from plant should be removed off site and the voids arising from removal of contaminated soil should be replaced by suitable material approved by the Director of Water Supplies. ▪ Provision of temporary toilet facilities and use of chemicals or insecticide of any kind are subject to the approval of the Director of Water Supplies. ▪ Drainage plans should be submitted for approval by the Director of 			grounds		

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>Water Supplies.</p> <ul style="list-style-type: none"> ▪ An unimpeded access through the waterworks access road should always be maintained. ▪ Earthworks near catchwaters or streamcourses should only be carried out in dry season between October and March, ▪ Advance notice must be given before the commencement of works on site quoting WSD's approval letter reference. 					
5.6.1.2	4.1	<p>Good site practices of general construction activities</p> <p>Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used.</p> <p>Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</p>	To minimize water quality impacts	Contractor	All construction works sites	Construction phase	EIA Recommendation
5.6.1.3	4.1	<p>Sewage effluent from construction workforce</p> <p>Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.</p>	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA Recommendation and Water Pollution Control Ordinance (WPCO)
5.6.1.4	4.1	<p>Hydrogeological Impact</p> <p>Grout injection works would be conducted before blasting, for sealing a limited area around the tunnel with a grout of a suitable strength for controlling the potential groundwater inflows. The pre-injection grouting method would be supplemented by post-injection grouting where necessary to further enhance the groundwater inflow control. On-site treatment for the groundwater ingress pumped out would be required to remove any contamination by grouting materials before discharge off-site.</p>	To minimize water quality impacts	Contractor	Construction works sites of the drill and blast tunnel	Construction phase	EIA Recommendation and WPCO
<u>Water Quality Impact (Operation)</u>							
No mitigation measure is required.							

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
<u>Sewage and Sewerage Treatment Impact (Construction)</u>							
6.7	5	The sewage generated by the on-site workforce should be collected in chemical toilets and disposed of off-site by a licensed waste collector.	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA recommendation and WPCO
<u>Sewage and Sewerage Treatment Impact (Operation)</u>							
6.6.3	5	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.	To minimize water quality impacts	DSD	BCP	Operation phase	EIA recommendation and WPCO
6.5.3	5	Sewage generated from the Administration Building will be discharged to the existing local sewerage system.	To minimize water quality impacts	DSD	Administration Building	Operation phase	EIA recommendation and WPCO
<u>Waste Management Implication (Construction)</u>							
7.6.1.1	6	<p>Good Site Practices</p> <p>Adverse impacts related to waste management such as potential hazard, air, odour, noise, wastewater discharge and public transport as mentioned in section 3.4.7.2 (ii)(c) of the Study Brief are not expected to arise, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> ▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site ▪ Training of site personnel in proper waste management and chemical handling procedures ▪ Provision of sufficient waste disposal points and regular collection of waste ▪ Dust suppression measures as required under the Air Pollution Control (Construction Dust) Regulation should be followed as far as practicable. Appropriate measures to minimise windblown litter and dust/odour during transportation of waste by covering trucks or in enclosed containers ▪ General refuse shall be removed away immediately for disposal. As 	To minimize adverse environmental impact	Contractor	Construction works sites (general)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; Waste Disposal (Chemical Wastes) (General) Regulation; and ETWB TC(W) No. 19/2005, Environmental Management on Construction Site

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>such odour is not anticipated to be an issue to distant sensitive receivers</p> <ul style="list-style-type: none"> ▪ Provision of wheel washing facilities before the trucks leaving the works area so as to minimise dust introduction from public road ▪ Covers and water spraying system should be provided for the stockpiled C&D material to prevent dust impact or being washed away ▪ Designate different locations for storage of C&D material to enhance reuse ▪ Well planned programme for transportation of C&D material to lessen the off-site traffic impact. Well planned delivery programme for offsite disposal and imported filling material such that adverse noise impact from transporting of C&D material is not anticipated ▪ Site practices outlined in ProPECC PN 1/94 “Construction Site Drainage” should be adopted as far as practicable, such as cleaning and maintenance of drainage systems regularly ▪ Provision of cover for the stockpile material, sand bag or earth bund as barrier to prevent material from washing away and entering the drains 					
7.6.1.2	6	<p>Waste Reduction Measures</p> <p>Good management and control can prevent the generation of a significant amount of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal ▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the work force ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials ▪ Plan and stock construction materials carefully to minimise amount 	To reduce the quantity of wastes	Contractor	Construction works sites (General)	Construction Phase	EIA recommendation and Waste Disposal Ordinance

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
		<p>of waste generated and avoid unnecessary generation of waste</p> <ul style="list-style-type: none"> In addition to the above measures, specific mitigation measures are recommended below for the identified waste arising to minimise environmental impacts during handling, transportation and disposal of these wastes. 					
7.6.1.3	6	<p>C&D Materials</p> <p>In order to minimise impacts resulting from collection and transportation of C&D material for off-site disposal, the excavated materials should be reused on-site as backfilling material as far as practicable. The surplus rock and other inert C&D material would be disposed of at the Government's Public Fill Reception Facilities (PFRFs) at Tuen Mun Area 38 for beneficial use by other projects in the HKSAR as the last resort. C&D waste generated from general site clearance and tree felling works would require disposal to the designated landfill site. Other mitigation requirements are listed below:</p> <ul style="list-style-type: none"> A Waste Management Plan should be prepared and implemented in accordance with ETWB TC(W) No. 19/2005 Environmental Management on Construction Site; and In order to monitor the disposal of C&D material and solid wastes at public filling facilities and landfills, and to control fly-tipping, a trip-ticket system (e.g. ETWB TCW No. 31/2004) should be included. 	To minimize impacts resulting from C&D material	Contractor	Construction Works Sites (General)	Construction Phase	EIA recommendation; Waste Disposal Ordinance; and ETWB TCW No. 31/2004
7.6.1.4	6	<p>General refuse</p> <p>General refuse should be stored in enclosed bins or compaction units separated from other C&D material. A reputable waste collector is to be employed by the Contractor to remove general refuse from the site separately. Preferably an enclosed and covered area should be provided to reduce the occurrence of 'wind blown' litter.</p>	To minimize impacts resulting from collection and transportation of general refuse for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - Public Cleansing and Prevention of Nuisances Regulation
7.6.1.5	6	<p>Chemical waste</p> <p>If chemical wastes are produced at the construction site, the Contractor will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the <i>Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes</i>. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical</p>	To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal	Contractor	Construction works sites (General)	Construction phase	Waste Disposal (Chemical Waste) (General) Regulation and Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

Appendix N

Investigation Report for Exceedance

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 Sep 2016	27 Sep 2016
Location	AM2	AM3
Time	00:00	00:00
Parameter	24 hour TSP ($\mu\text{g}/\text{m}^3$)	24 hour TSP ($\mu\text{g}/\text{m}^3$)
Action Level	148	145
Limit Level	260	260
Measured Level	191	193
Exceedance	Action Level	Action Level
Investigation Results, Recommendations & Mitigation Measures	<ol style="list-style-type: none"> 1. According to the site information provided from the CCKJV, construction activities carried out Bridge D – Lin Ma Hang which near air monitoring location AM2 on 27 September 2016 was bored piling and steel bar fixing. There was no site activities carried out close to air monitoring location AM3 as it is located far from the boundary of Contract 6. The monitoring location AM2 and AM3 and its related works area are shown in Figures 1 and 2. 2. Joint site inspection by RE, IEC, CCKJV and ET was conducted on 6 October 2016 for investigation. The observations during site inspection are summarized below. <ol style="list-style-type: none"> (a) AM2 is located at a village house in Lin Ma Hang Road and close to Works Area Bridge D – Lin Ma Hang of Contract 6. (Photo 1) (b) It was observed the active construction activities at Bridge D and AM2 was separated by Lin Ma Hang Road. The main dust impact pose to AM2 should be dominated by traffic dust in Lin Ma Hang Road. (Photo 2) (c) Wheel washing facilities was provided at site exit of Bridge D and all vehicles were thoroughly washed and before leaving the site. (Photo 3) (d) The road surface after the wheel washing facilities was paved with concrete and water spraying was provided on the road surface regularly as dust suppressive measures. (Photo 4) (e) No dusty material was observed on the existing Lin Ma Hang Road. (Photo 5) (f) No dusty work and stockpile of dusty material was observed within the works area of C6. (g) There were no site activities carried out by CCKJV in the portion of Lin Ma Hang Road adjacent to AM3. No adverse dust impact causing exceedance to AM3 was observed. (Photo 	

	<p style="text-align: center;">6)</p> <p>3. As advised by CCKJV, though CCKJV is not the only user of Lin Ma Hang Road, regularly water spraying on Lin Ma Hang Road by water truck is provided daily to suppress fugitive dust along the road. Moreover, there was no dust related complaint received in September 2016.</p> <p>4. There were no exceedance recorded in the subsequent 1-hr and 24-hr TSP monitoring in October 2016. In our investigation, it is considered that the 24-hr TSP exceedances at AM2 and AM3 on 27 September 2016 were a short term impact and unlikely caused by the works under the project.</p> <p>5. The Contractor should continually implement the dust mitigation measures in full gear as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.</p>
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Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 25 October 2016

Photo Record



Photo 1

AM2 is located at a village house in Lin Ma Hang Road and close to Works Area Bridge D – Lin Ma Hang of Contract 6.



Photo 2

The active construction activities at Bridge D and AM2 was separated by Lin Ma Hang Road. The main dust impact pose to AM2 should be dominated by traffic dust in Lin Ma Hang Road.



Photo 3

Wheel washing facilities was provided at site exit of Bridge D and all vehicles were thoroughly washed and before leaving the site.



Photo 4

The road surface after the wheel washing facilities was paved with concrete and water spraying was provided on the road surface regularly as dust suppressive measures.



Photo 5

No dusty material was observed on the existing Lin Ma Hang Road.



Photo 6

There were no site activities carried out by CCKJV in the portion of Lin Ma Hang Road adjacent to AM3. No adverse dust impact causing exceedance to AM3 was observed.

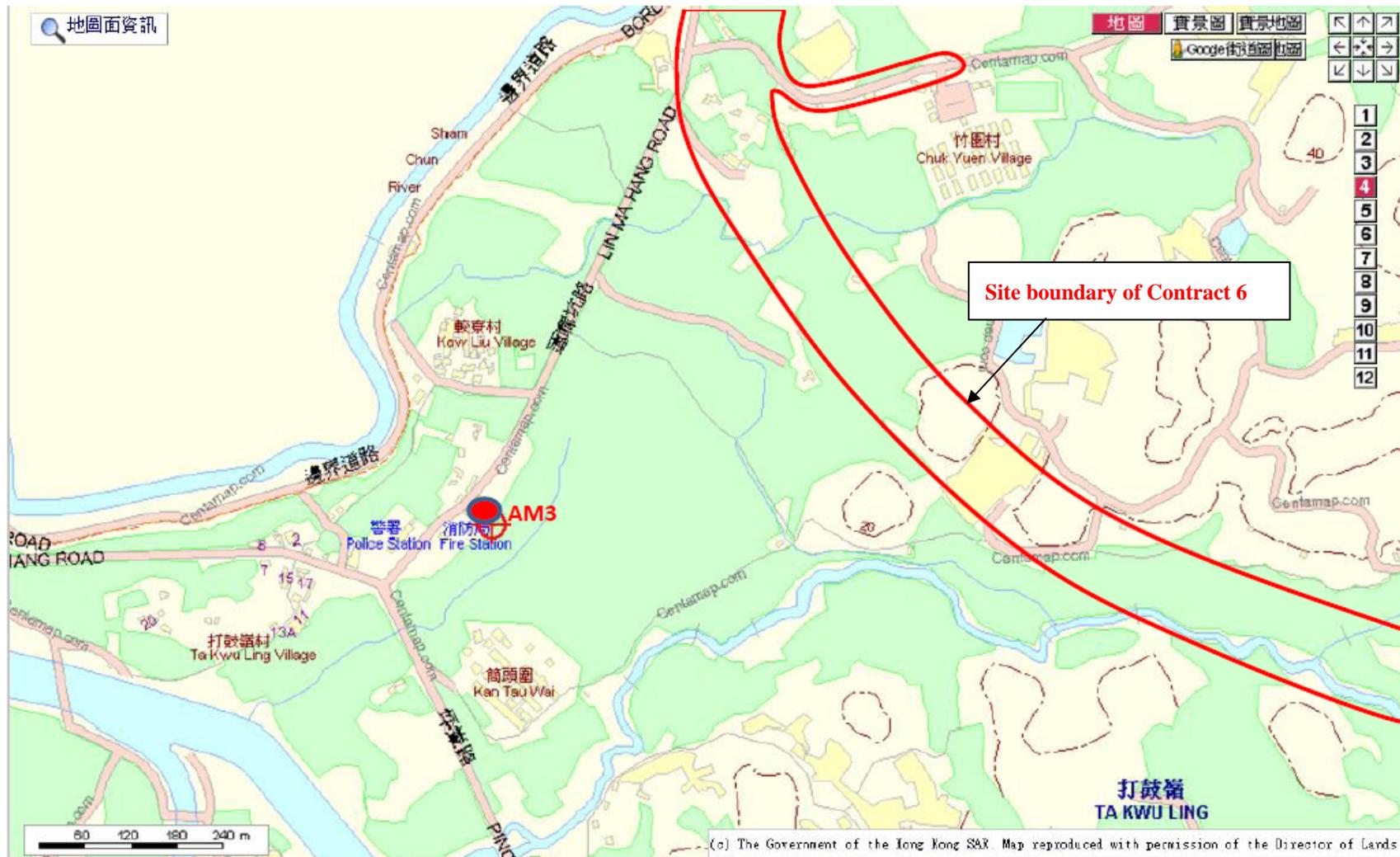


Figure 2 Location Map for Air Monitoring Location AM3 and works area under Contract 6

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		28 Sep 2016	30 Sep 2016
Location		WM2A(a)	
Time		11:55	11:00
Parameter		Suspended Solids (mg/L)	
Action Level		14.6 AND 120% of upstream control station of the same day	
Limit Level		17.3 AND 130% of upstream control station of the same day	
Measured Levels	WM2A-C	3.5	3.5
	WM2A(a)	25.0	24.5
Exceedance		Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the CCKJV, construction activities carried out on 28 and 30 September 2016 at Bridge D (upstream of WM2A) were mainly pile cap works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team on 28 and 30 September 2016, the water quality observed at both WM2A(a) and WM2-C were visually clear and there was no discharge made on the river course on 28 and 30 September 2016. However, loose soil and sediment cumulated at the river bed was observed at WM2A(a) and the loose soil would be easily stirred up during water sampling. (Photo 1 to 4) 3. During weekly joint site inspection by RE, IEC, CCKJV and ET was conducted in September 2016, the implemented water mitigation measures observed during the site inspection is summarized below. <ol style="list-style-type: none"> (a) Wastewater treatment facilities were provided for Bridge D and it was observed that the treated water in the AquaSed was clear. (Photo 5 and 6) (b) To minimize the muddy runoff from the site, the Contractor has covered the exposed slopes as far as practicable. Moreover, the edges of the slope top were bund up to minimize surface runoff. (Photo 7 and 8) (c) Concrete block as temporary bund was provided align the river course and no turbid runoff was observed from the site. (Photo 9) (d) Sump pit was constructed at the lowest point of the site to collect the site runoff for primary sedimentation and then diverted to the wastewater treatment facility for chemical treatment. (Photo 10) 4. In our investigation, the water mitigation measures implemented on site was in order and no adverse water quality impact was identified. It is considered that the exceedances on 28 and 30 September 2016 	

	<p>were due partially related to the loose soil at the river bed and unlikely caused by the works under the project.</p> <p>5. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. There were exceedances of SS and NTU on 3 October 2016. The Contractor should continually implement the water mitigation measures in full gear as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.</p>
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Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 26 October 2016

Photo Record



Photo 1

On 28 Sep 2016, visually clear water was observed WM2A(a).



Photo 2

On 28 Sep 2016, visually clear water was observed at WM2A-C.



Photo 3

On 30 Sep 2016, visually clear water was observed WM2A(a).



Photo 4

On 30 Sep 2016, visually clear water was observed at WM2A-C.



Photo 5

Wastewater treatment facilities were provided for Bridge D.



Photo 6

The treated water in the AquaSed in Bridge was clear.

AUES



Photo 7

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



Photo 8

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



Photo 9

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



Photo 10

Sump pit was constructed to collect the runoff of the site before diverted to the wastewater treatment facility.



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

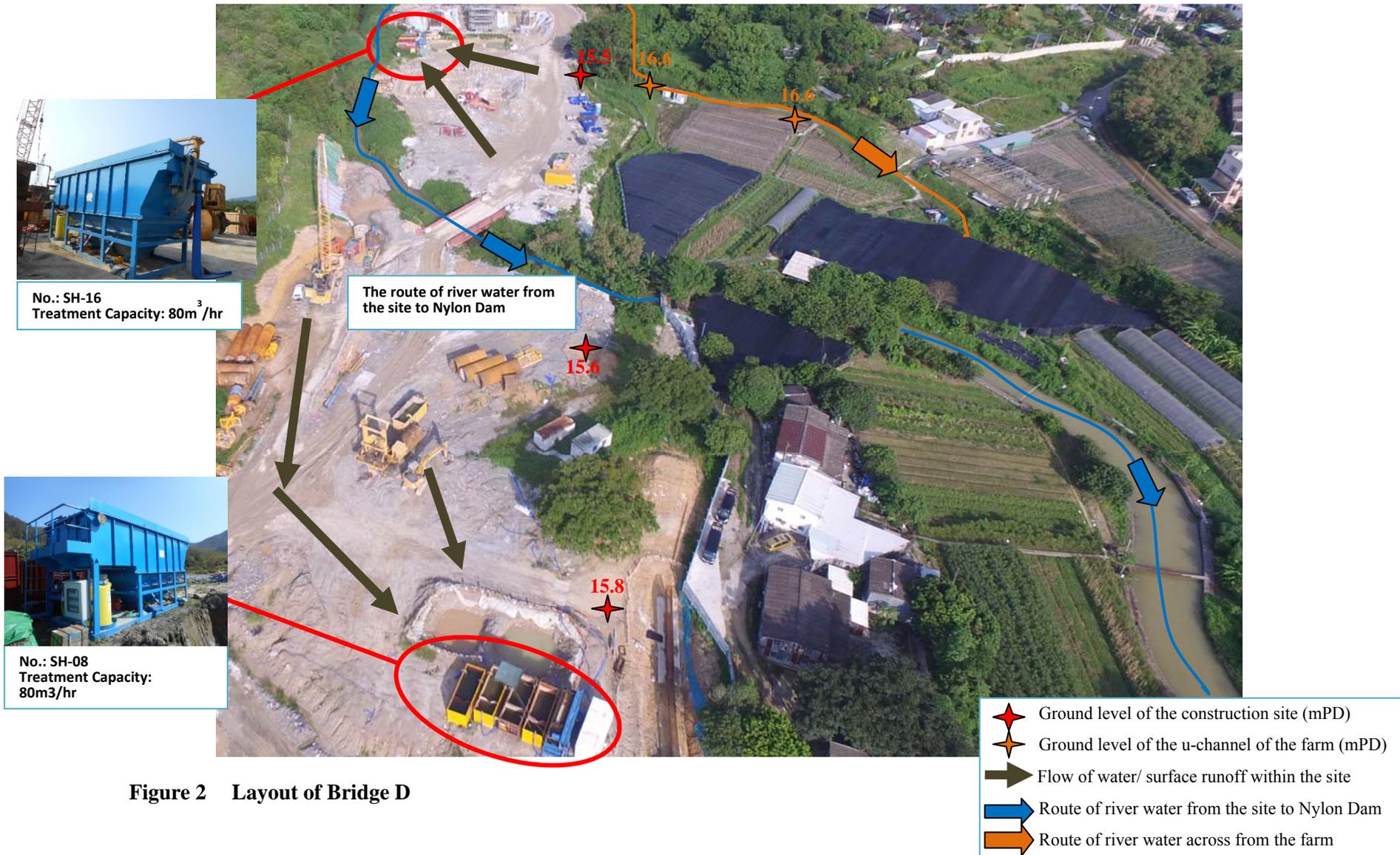


Figure 2 Layout of Bridge D

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		4 Oct	4 Oct	5 Oct	11 Oct
Location		WM2A(a)			
Time		10:45	10:45	11:10	10:30
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	7.6	4.0	<2	2
	WM2A(a)	124.5	102.0	19.0	19.0
Exceedance		Limit level	Limit level	Limit level	Limit level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the CCKJV, construction activities carried out on 4, 5 and 11 October 2016 at Bridge D (upstream of WM2A) were mainly bored piling and pile cap works. The monitoring locations and works area are shown in Figure 1. 2. According to the site record from the monitoring team on 4 October 2016, it was observed that the water quality at WM2A(a) was turbid and the water at WM2A-C was clear. On 5 and 11 October 2016, the water quality at WM2A(a) was slightly turbid and at WM2A-C was clear. There was no discharge made from the AquaSed into the river course on 4, 5 and 11 October 2016. (Photo 1 to 6) 3. As reported by CCKJV, a fresh water pipe at Ping Yeung Interchange was damaged in the morning of 4 October 2016. CCKJV was promptly repaired the pipe which completed by noon of 4 October 2016. (Photo 7) However, some muddy runoff was generated due to the damaged pipe and it was accidentally got into the adjacent Ping Yuen River. (Photo 8) It is considered that the exceedances on 4 October 2016 were related to the pipe damage incident. 4. Weekly joint site inspection by RE, IEC, CCKJV and ET was conducted on 6 and 13 October 2016 at Bridge D. The observation during the site inspection is summarized below. <ol style="list-style-type: none"> (a) Wastewater treatment facilities (3 nos. of AquaSed) were provided for Bridge D (Figures 2 and 3) According to the daily record of wastewater treatment systems provided by the Contractor of Contract 6, the wastewater discharge from the site was compliance with the Discharge Licences requirements. (b) A sump pit was constructed to preliminary settled the suspended particulars in the water before diverted to the AquaSed for proper treatment. (Photo 9) The treated water in the final tank 			

	<p>was clear.</p> <p>(c) It was observed that the water quality at WM2A(a) was clear. (Photo 10)</p> <p>(d) Concrete block as temporary bund was provided align the river course and no turbid runoff and discharge was made from the site. (Photo 11)</p> <p>(e) To minimize the muddy runoff from the site, the Contractor has covered the exposed slopes as far as practicable. (Photo 12)</p> <p>5. In our investigation, the water mitigation measures implemented on site was in order and no adverse water impact was identified. It is considered the exceedances on 5 and 11 October 2016 were due to natural variation and unlikely caused by the works under the project.</p> <p>6. According to the Event and Action Plan, the frequency of water monitoring is increase to daily. Since the SS result required 5 working days to process, the need for repeated measurement could only rely on the result of turbidity which is in-situ measurement. Therefore, there were no repeated monitoring carried out on 6 and 12 October 2016 as no exceedance of turbidity recorded on those days. Nevertheless, there were exceedances of SS and NTU on 6 and 13 October 2016. The Contractor should continually implement the water mitigation measures in full gear as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual.</p>
--	--

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 26 October 2016

Photo Record



Photo 1

On 4 October 2016, turbid water was observed in the existing river course and WM2A(a).



Photo 2

On 4 October 2016, the water quality observed at WM2A-C was clear.



Photo 3

On 5 October 2016, the quality water observed in the existing river course and WM2A(a) was slightly turbid.



Photo 4

On 5 October 2016, the water quality observed at WM2A-C was clear.



Photo 5

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



Photo 6

On 11 October 2016, the water quality observed at WM2A-C was clear.



Photo 7

On 4 October 2016, a fresh water pipe at Ping Yeung Interchange was damaged in the morning of 4 October 2016. CCKJV was promptly repaired the pipe which completed by noon.



Photo 8

On 4 October 2016, some muddy runoff was generated due to the damaged pipe and it was accidentally got into the adjacent Ping Yuen River.



Photo 9

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



Photo 10

During site inspection on 6 October 2016, the water quality at WM2A(a) was clear.



Photo 11

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

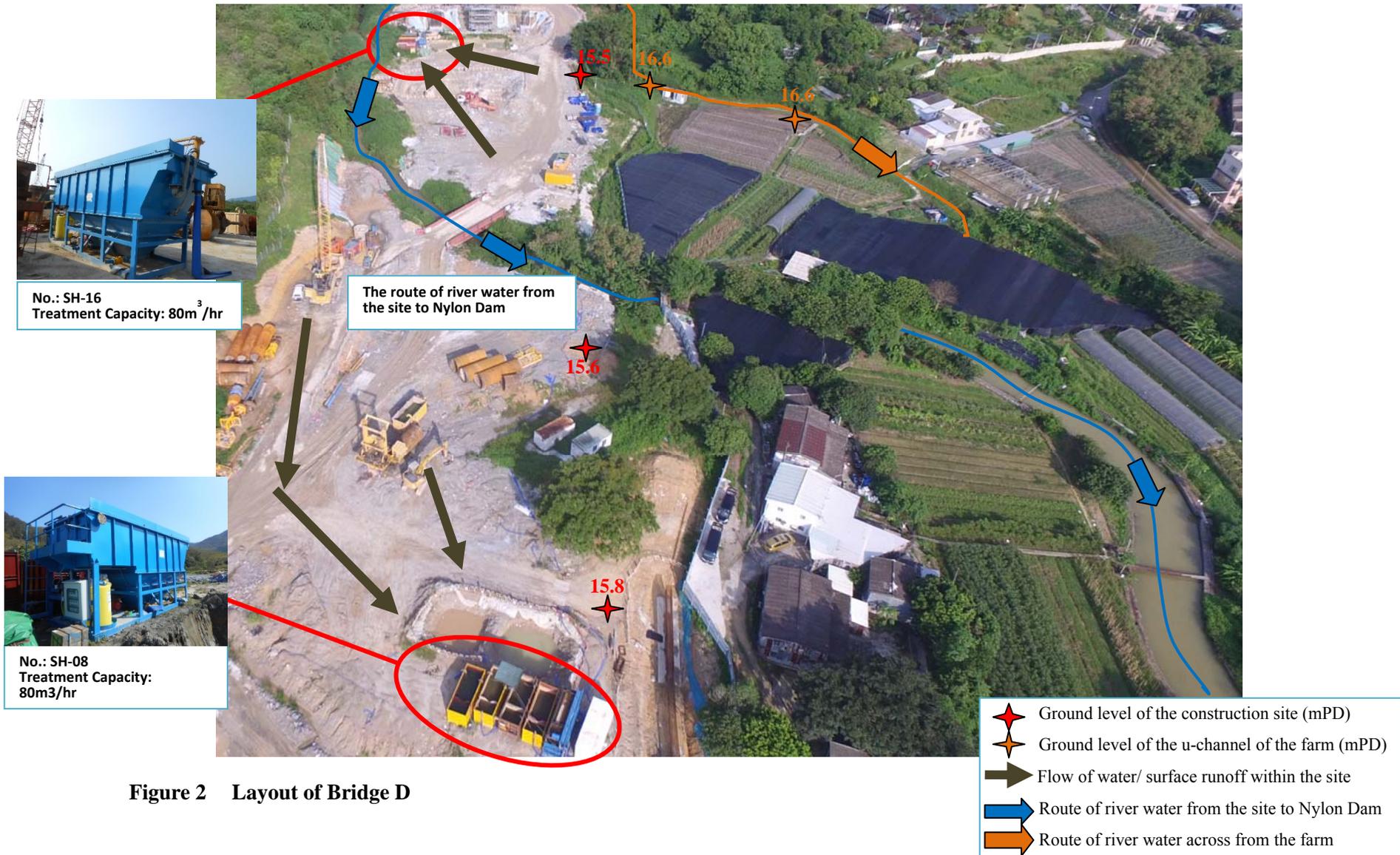


Photo 12

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



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



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		8 October 2016	
Location		WM3x	
Time		10:49	
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	3.0	4.5
	WM3x	89.3	77.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the Contractor of C6 (CCKJV), the main construction activities at South Portal (upstream of WM3) carried out on 8 October 2016 was mainly pre-bored socketed steel H-pile and bored pile works. The monitoring locations and works areas are shown in Figure 1. 2. According to the site record from the monitoring team on 8 October 2016, turbid water was observed at WM3x while the water quality at WM3-C was clear. <i>(Photo 1 and 2)</i> 3. In order to trace the source of turbid water, inspection was subsequently carried out aligned the existing river course of upstream of WM3x. It was observed that the river water adjacent the construction site was clear and no muddy discharge from the site was observed. <i>(Photo 3 and 4)</i> 4. Weekly joint site inspection by RE, IEC, CCKJV and ET was conducted on 13 October 2016 at South Portal. It was observed that wastewater treatment facilities were maintained properly and the effluent was visually clear. <i>(Photo 5 and 6)</i> No adverse water impact and muddy discharge was observed and the condition of water in the existing river branch connecting to Ng Tung River which adjacent to the site was visually clear. Moreover, to minimize surface runoff, temporary bunds were in place for the wheel washing facilities and align the river course. 5. Since there were no source of muddy water found from construction site and the wastewater treatment facilities and mitigation measures were properly maintained as observed during regularly site inspection. It is considered that the exceedances were due to natural variation and unlikely caused by the works under the Project. 6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered in the monitoring result on 11 and 12 October 2016. 	

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.
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Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 2 November 2016

Photo Record



Photo 1
Turbid water was observed at WM3x on 8 October 2016.



Photo 2
During water sampling on 8 October 2016, the water quality at WM3-C was clear.



Photo 3
On 8 October 2016, the river water adjacent the construction site was clear and no muddy discharge from the site was observed.



Photo 4
On 8 October 2016, the river water adjacent the construction site was clear and no muddy discharge from the site was observed.



Photo 5
Wastewater treatment facilities was properly maintained and the effluent from the wastewater treatment facilities was visually clear.



Photo 6
During site inspection on 13 October 2016, the effluent from the wastewater treatment facilities was visually clear.

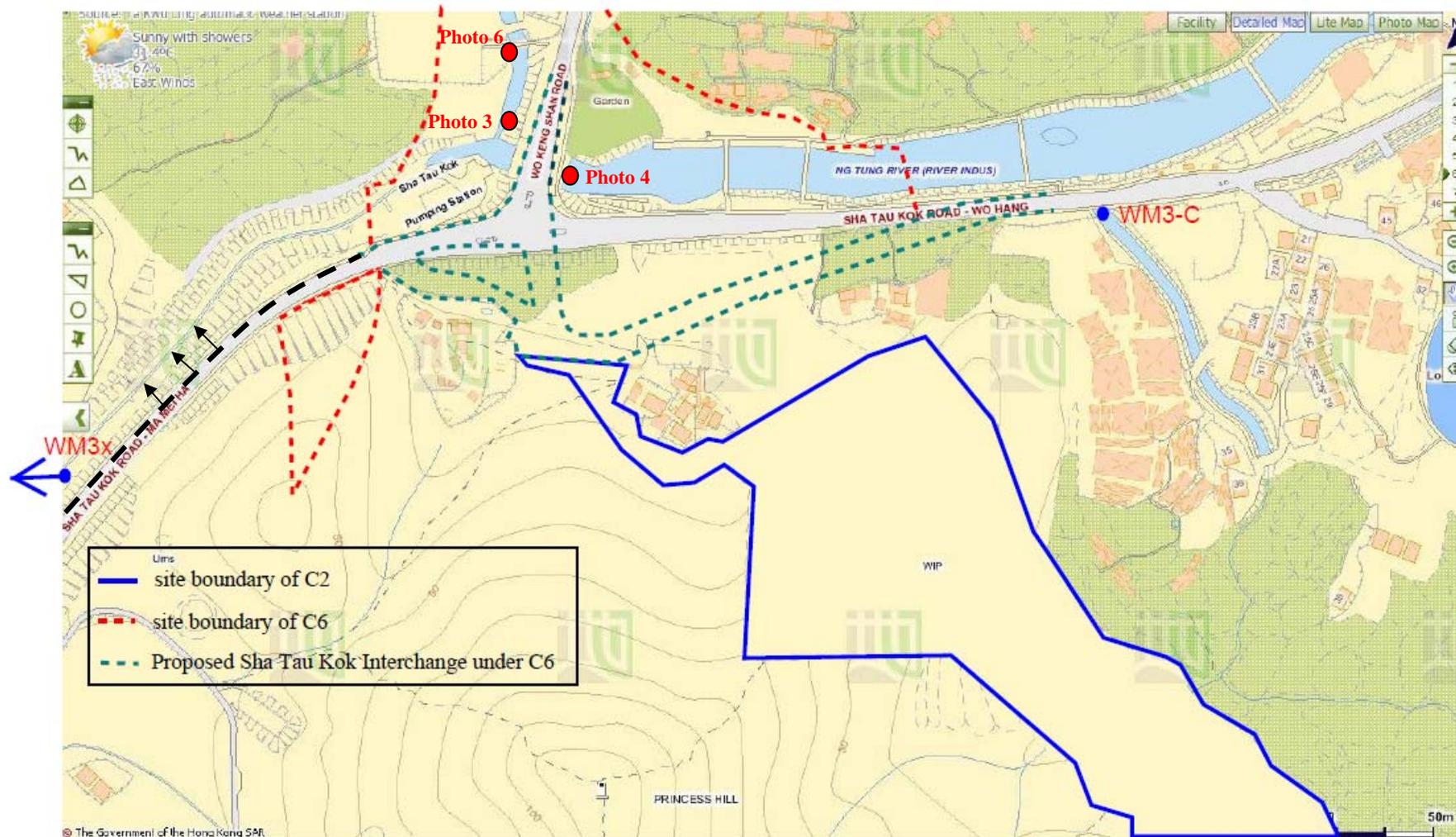


Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location

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		8 October 2016	
Location		WM3x	
Time		10:49	
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	3.0	4.5
	WM3x	89.3	77.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 8 October 2016 at upstream of WM3 was superstructure work at Admin Building. The relevant works area under C2 and the water monitoring location WM3C and WM3 are shown in Figure 1. 2. According to the site record from the monitoring team on 8 October 2016, turbid water was observed at WM3x while the water quality at WM3-C was clear. <i>(Photo 1 and 2)</i> 3. In order to trace the source of turbid water, inspection was subsequently carried out aligned the existing river course of upstream of WM3x. It was observed that the river water adjacent the construction site was clear and no muddy discharge from the site was observed. <i>(Photo 3 and 4)</i> 4. During routine weekly site inspection in October 2016, superstructure works for Admin Building was carried out at Admin Building and the site area was mostly hard paved and no adverse water impact was observed. <i>(Photo5)</i> Moreover, it was observed that the river channel next to the construction site was clear. <i>(Photo6)</i> 5. Since there were no sources of muddy water found from construction site and no adverse impact was observed during regularly site inspection. It is considered that the exceedances were due to natural variation and unlikely caused by the works under the Project. 6. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered in the monitoring result on 11 and 12 October 2016. 	

Prepared By : _____ Nicola Hon _____

Designation : _____ Environmental Consultant _____

Signature : _____  _____

Date : _____ 2 November 2016 _____

Photo Record



Photo 1
Turbid water was observed at WM3x on 8 October 2016.



Photo 2
During water sampling on 8 October 2016, the water quality at WM3-C was clear.



Photo 3
On 8 October 2016, the river water adjacent the construction site was clear and no muddy discharge from the site was observed.



Photo 4
On 8 October 2016, the river water adjacent the construction site was clear and no muddy discharge from the site was observed.



Photo 5
Superstructure works for Admin Building was carried out at Admin Building and the site area was mostly hard paved and no adverse water impact was observed.



Photo 6
During weekly site inspection, it was observed that the river channel next to the construction site was clear.

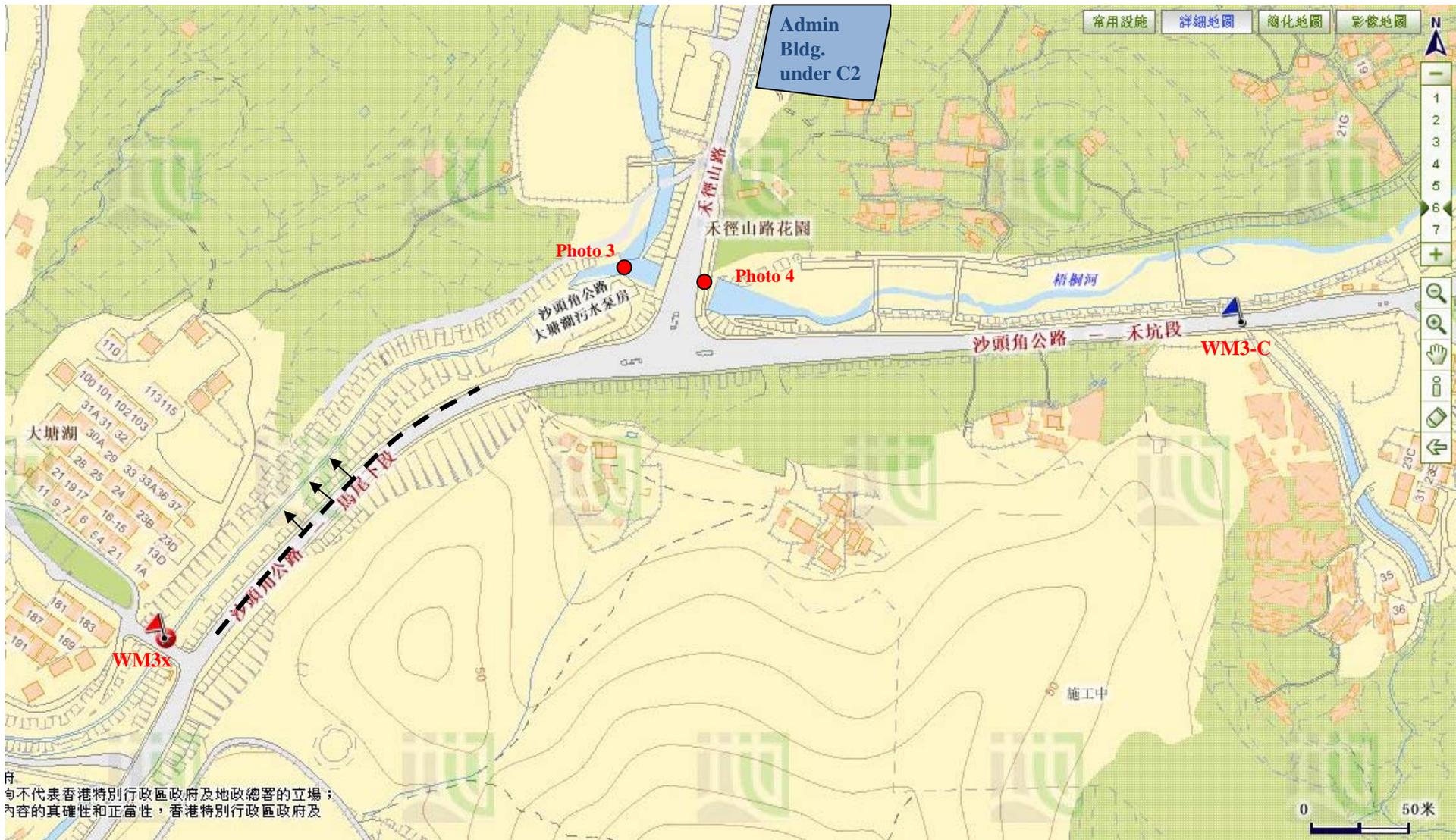


Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

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

Company Chun Wo Construction Ltd

cc

From Nicola Hon **Date** 27 October 2016

Our Ref TCS00670/13/300/F0692 **No of Pages** 7 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM4 on 11, 12 and
13 October 2016 (Contract 3)

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Dear Mr. Ho,

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

TCS00670/13/300/F0658 dated 12 October 2016
TCS00670/13/300/F0665 dated 14 October 2016.
TCS00670/13/300/F0675 dated 20 October 2016.

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

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

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



Nicola Hon
Environmental Consultant

Encl.

c.c. Mr. David Chan (EPD) Fax: 2685 1155
Mr. Bobby Hung (ER of C3, AECOM) Fax: 2171 3498
Mr. Antony Wong (IEC, SMEC) By e-mail

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

Project		CE 45/2008					
Date		11 Oct	12 Oct	13 Oct	11 Oct	12 Oct	13 Oct
Location		WM4					
Time		13:00	13:00	13:00	13:00	13:00	13:00
Parameter		Turbidity (NTU)			Suspended Solids (mg/L)		
Action Level		35.2 AND 120% of upstream control station of the same day			39.4 AND 120% of upstream control station of the same day		
Limit Level		38.4 AND 130% of upstream control station of the same day			45.5 AND 130% of upstream control station of the same day		
Measured Level	WM4-CA	12.2	6.4	5.7	6.0	5.0	9.0
	WM4-CB	21.4	4.8	11.8	34.5	28.0	22.5
	WM4	250.0	179.0	369.5	153.5	122.0	240.5
Exceedance		Limit Level	Limit Level	Limit Level	Limit Level	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor of C3 (Chun Wo), the construction activities carried out during 11 to 13 October 2016 were mainly general site works such as excavation, breaking work, erection of formwork and backfilling which as same as the previous months and these activities would not generated excessive wastewater. 2. According to the site record from the monitoring team on 11 to 13 October 2016, muddy water was observed at WM4 while the water quality at WM4-CA and WM4-CB were visually clear except for some silt and sandy particulars observed at the channel bed at WM4-CB. <i>(Photo 1 to 9 and Figure 1)</i> 3. Ad-hoc inspection was carried out by the monitoring team and Chun Wo at the upstream area of impact station WM4 to investigate the source of muddy water. During the inspection, muddy water was found flowing from the river branch near Kiu Tau Road. <i>(Photo 10 to 12)</i> There was active construction site of other Contractor near Kiu Tak Road and muddy water was observed outside their site area and the underpass drain near that construction site. <i>(Photo 13 to 15)</i> 4. During weekly site inspection by ET in October 2016, the condition was generally in order and no adverse water quality impacts under the Contract were identified. In our investigation, it is considered that exceedances were due to the muddy water from the outside of site boundary and not likely related to the works under the Contract. 5. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. In view of the subsequent monitoring result, no exceedances were triggered at WM4 on 14 and 15 October 2016. However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual. 					

Prepared By : Nicola Hon
Designation : Environmental Consultant
Signature : 
Date : 27 October 2016

Photo Record



Photo 1

Turbid water was observed at WM4 on 11 October 2016.



Photo 2

The water quality at WM4-CA was visually clear on 11 October 2016.



Photo 3

On 11 October 2016, the water quality at WM4-CB was generally clear but some silt and sandy particulars were observed at the channel bed.



Photo 4

Turbid water was observed at WM4 on 12 October 2016.



Photo 5

The water quality at WM4-CA was visually clear on 12 October 2016



Photo 6

On 12 October 2016, the water quality at WM4-CB was generally clear but some silt and sandy particulars were observed at the channel bed.



Photo 7
Turbid water was observed at WM4 on 13 October 2016.



Photo 8
The water quality at WM4-CA was visually clear on 13 October 2016.



Photo 9
On 13 October 2016, the water quality at WM4-CB was generally clear but some silt and sandy particulars were observed at the channel bed.



Photo 10
On 11 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 11
On 12 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 12
On 13 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 13

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed outside the site area.



Photo 14

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed outside the site area.



Photo 15

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed at the underpass drain near that construction site.

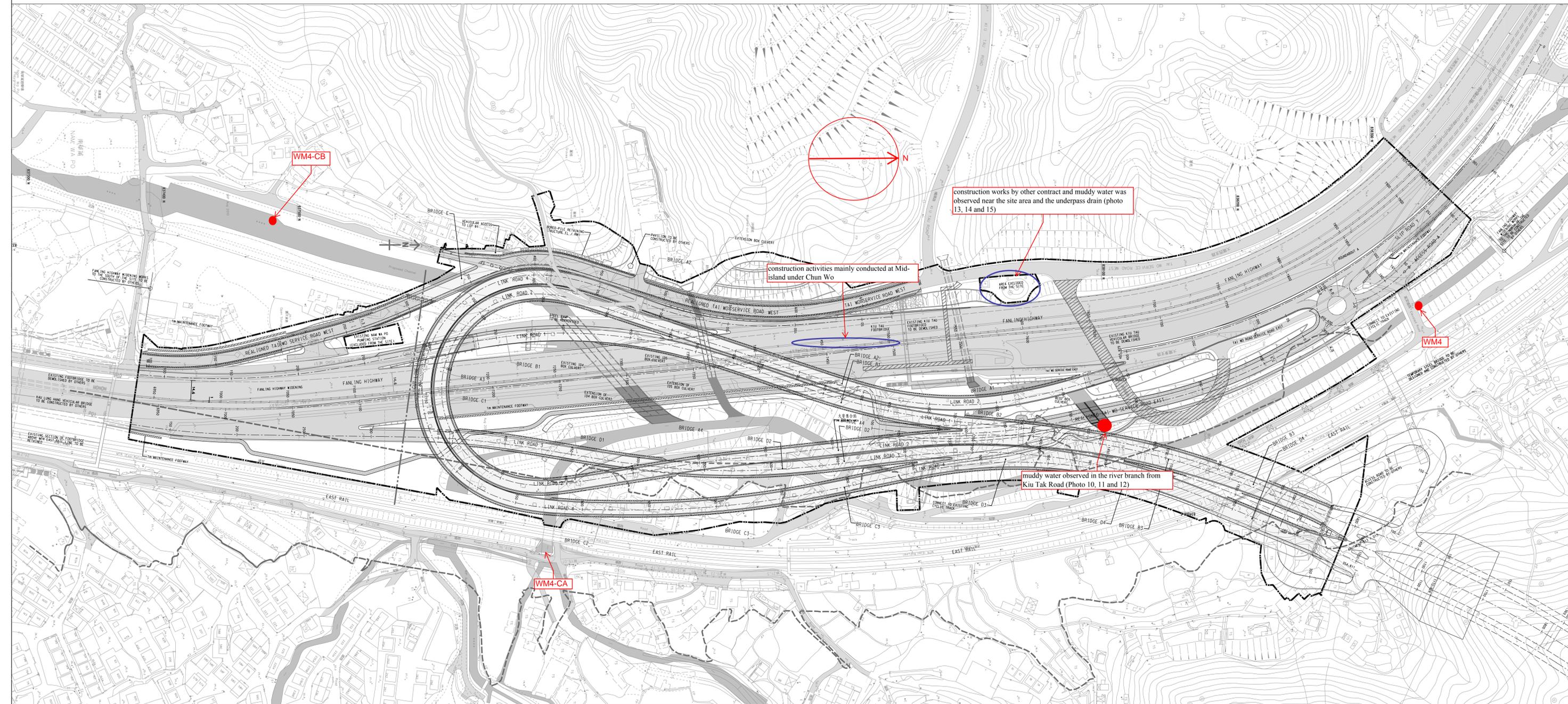


Figure 1. Location of Water Quality Monitoring Location

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		11 Oct	12 Oct	13 Oct	11 Oct	12 Oct	13 Oct
Location		WM4					
Time		13:00	13:00	13:00	13:00	13:00	13:00
Parameter		Turbidity (NTU)			Suspended Solids (mg/L)		
Action Level		35.2 AND 120% of upstream control station of the same day			39.4 AND 120% of upstream control station of the same day		
Limit Level		38.4 AND 130% of upstream control station of the same day			45.5 AND 130% of upstream control station of the same day		
Measured Level	WM4-CA	12.2	6.4	5.7	6.0	5.0	9.0
	WM4-CB	21.4	4.8	11.8	34.5	28.0	22.5
	WM4	250.0	179.0	369.5	153.5	122.0	240.5
Exceedance		Limit Level	Limit Level	Limit Level	Limit Level	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor of Contract 2 (DHK), construction activities carried out at South Portal during 11 to 13 October 2016 included tunnel excavation and ventilation building superstructure. 2. According to the site record from the monitoring team on 11 to 13 October 2016, muddy water was observed at WM4 while the water quality at WM4-CA and WM4-CB were visually clear except for some silt and sandy particulars observed at the channel bed at WM4-CB. <i>(Photo 1 to 9 and Figure 1)</i> 3. Ad-hoc inspection was carried out by the monitoring team at the upstream area of impact station WM4 to investigate the source of muddy water. During the inspection, muddy water was found flowing from the river branch near Kiu Tau Road. <i>(Photo 10 to 12)</i> There was active construction site of other Contractor near Kiu Tak Road and muddy water was observed outside their site area and the underpass drain near that construction site. <i>(Photo 13 to 15)</i> 4. During weekly site inspection by ET in October 2016, the condition was generally in order and no adverse water quality impacts under the Contract were identified. In our investigation, it is considered that exceedances were due to the muddy water from the outside of site boundary and not likely related to the works under the Contract. 5. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. In view of the subsequent monitoring result, no exceedances were triggered at WM4 on 14 and 15 October 2016. However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual. 					

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 27 October 2016

Photo Record



Photo 1

Turbid water was observed at WM4 on 11 October 2016.



Photo 2

The water quality at WM4-CA was visually clear on 11 October 2016.



Photo 3

On 11 October 2016, the water quality at WM4-CB was generally clear but some silt and sandy particulars were observed at the channel bed.



Photo 4

Turbid water was observed at WM4 on 12 October 2016.



Photo 5

The water quality at WM4-CA was visually clear on 12 October 2016



Photo 6

On 12 October 2016, the water quality at WM4-CB was generally clear but some silt and sandy particulars were observed at the channel bed.



Photo 7
Turbid water was observed at WM4 on 13 October 2016.



Photo 8
The water quality at WM4-CA was visually clear on 13 October 2016.



Photo 9
On 13 October 2016, the water quality at WM4-CB was generally clear but some silt and sandy particulars were observed at the channel bed.



Photo 10
On 11 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 11
On 12 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 12
On 13 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 13

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed outside the site area.



Photo 14

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed outside the site area.



Photo 15

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed at the underpass drain near that construction site.

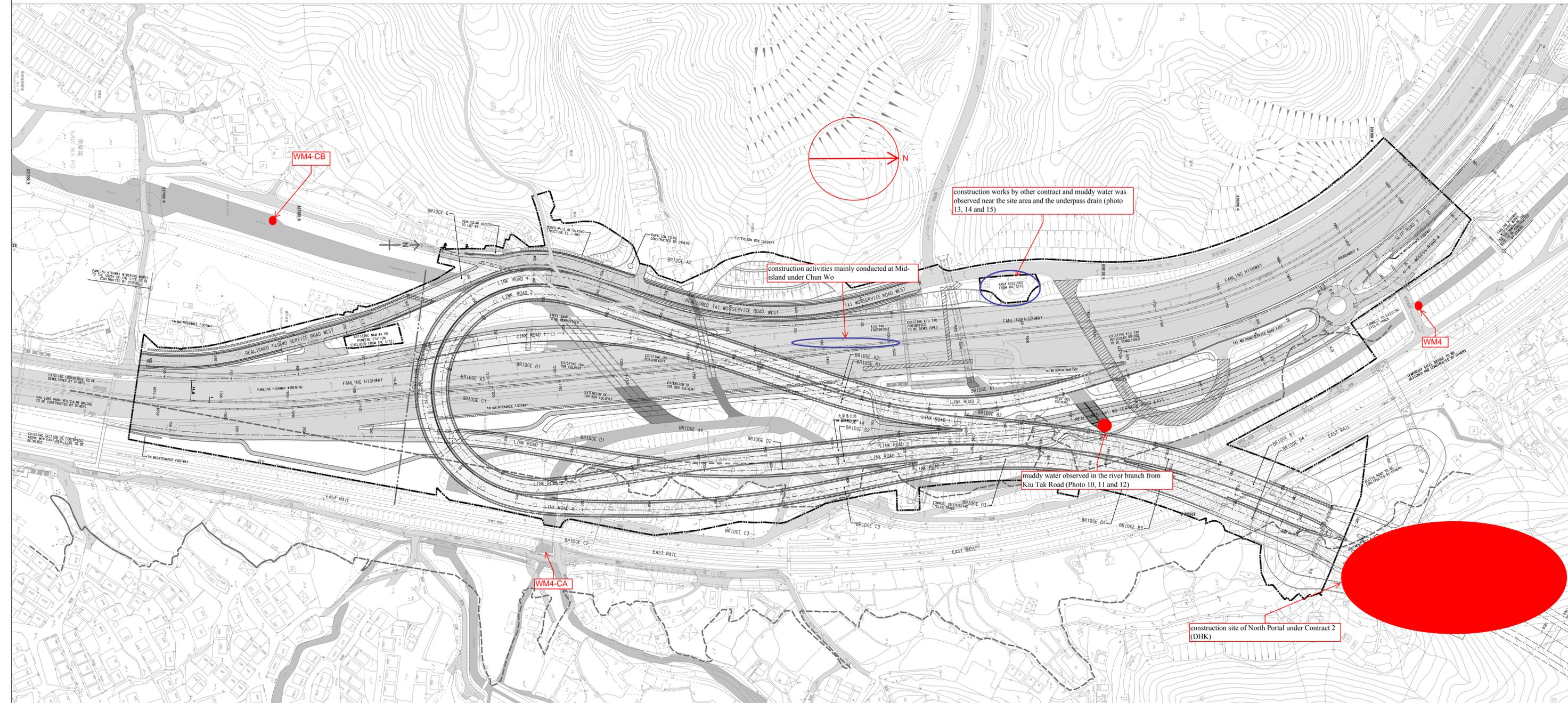


Figure 1. Location of Water Quality Monitoring Location

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		18 October 2016	
Location		WM3x	
Time		11:45	
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	129.5	87.0
	WM3x	267.0	395.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the Contractor of C6 (CCKJV), the main construction activities at South Portal (upstream of WM3) carried out on 18 October 2016 was mainly pre-bored socketed steel H-pile and bored pile works. The monitoring locations and works areas are shown in Figure 1. 2. According to the site record from the monitoring team on 18 October 2016, there was heavy rainstorm during the course of sampling and muddy water was observed throughout the channel including WM3x and WM3-C. (<i>Photo 1 and 2</i>) 3. Weekly joint site inspection by RE, IEC, CCKJV and ET was conducted on 20 October 2016 at South Portal. It was observed that wastewater treatment facilities were maintained properly and the effluent was visually clear. (<i>Photo 3</i>) No adverse water impact and muddy discharge was observed and the condition of water in the existing river branch connecting to Ng Tung River which adjacent to the site was visually clear. (<i>Photo 4</i>) Moreover, to minimize surface runoff, temporary bunds were in place for the wheel washing facilities and align the river course. 4. In our investigation, it is considered that the water quality in the channel on 18 October 2016 was deteriorated by heavy rain due to vigorous water flow and stir up sediment. Moreover, the monitored drainage channel near WM3x would be collected the rain water from the Sha Tau Kok road surface via open drain and communal channel. It is concluded that the exceedances were likely due to rain and not caused by the works under the Project. 5. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered in the monitoring result on 19 and 20 October 2016. 	

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 : 8 November 2016

Photo Record



Photo 1
Muddy water was observed at WM3x on 18 October 2016.



Photo 2
During water sampling on 18 October 2016, muddy water was observed at WM3-C.



Photo 3
During site inspection on 20 October 2016, the effluent from the wastewater treatment facilities was visually clear.



Photo 4
During site inspection on 20 October 2016, no muddy discharge from the site was observed and the condition of water in the existing river branch connecting to Ng Tung River which adjacent to the site was visually clear.

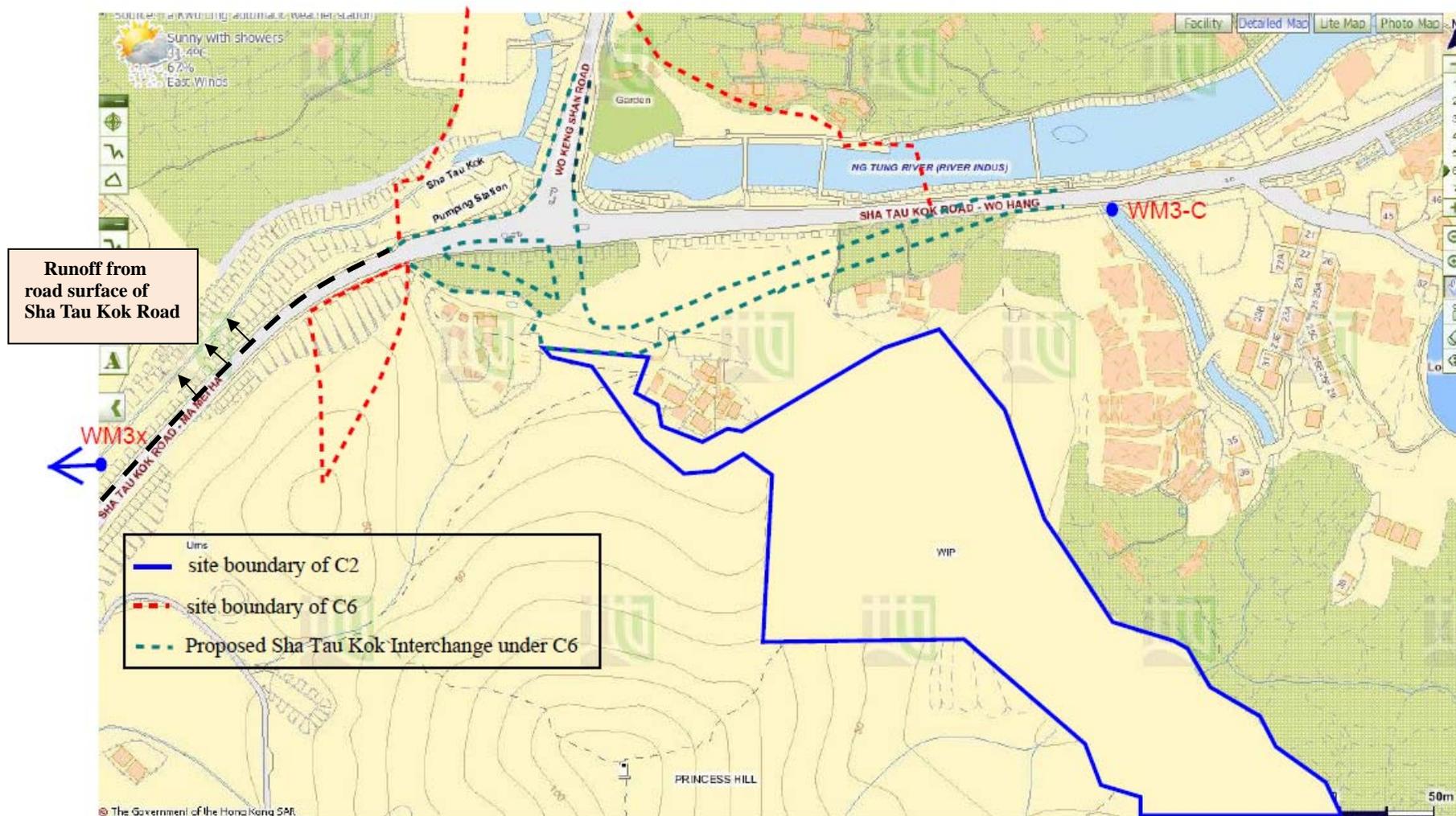


Figure 1 Location Map for Works Area under Contract 6 and Water Quality Monitoring Location

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		18 October 2016	
Location		WM3x	
Time		11:45	
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	129.5	87.0
	WM3x	267.0	395.0
Exceedance		Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from the Contractor of C2 (DHK), the construction activities carried out on 8 October 2016 at upstream of WM3 was superstructure work at Admin Building. The relevant works area under C2 and the water monitoring locations are shown in Figure 1. 2. According to the site record from the monitoring team on 18 October 2016, there was heavy rainstorm during the course of sampling and muddy water was observed throughout the channel including WM3x and WM3-C. <i>(Photo 1 and 2)</i> 3. During routine weekly site inspection in October 2016, superstructure works for Admin Building was carried out at Admin Building and the site area was mostly hard paved and no adverse water impact was observed. <i>(Photo3)</i> Moreover, it was observed that the river channel next to the construction site was clear. <i>(Photo 4)</i> 4. In our investigation, it is considered that the water quality in the channel on 18 October 2016 was deteriorated by heavy rain due to vigorous water flow and stir up sediment. Moreover, the monitored drainage channel near WM3x would be collected the rain water from the Sha Tau Kok road surface via open drain and communal channel. It is concluded that the exceedances were likely due to rain and not caused by the works under the Project. 5. According to Event and Action, the monitoring frequency at WM3x has been increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. There were no exceedances triggered in the monitoring result on 19 and 20 October 2016. 	

Prepared By : _____ Nicola Hon _____

Designation : _____ Environmental Consultant _____

Signature : _____  _____

Date : _____ 8 November 2016 _____

Photo Record



Photo 1
Muddy water was observed at WM3x on 18 October 2016.



Photo 2
During water sampling on 18 October 2016, muddy water was observed at WM3-C.



Photo 3
Superstructure works for Admin Building was carried out at Admin Building and the site area was mostly hard paved and no adverse water impact was observed.



Photo 4
During weekly site inspection, it was observed that the river channel next to the construction site was clear.

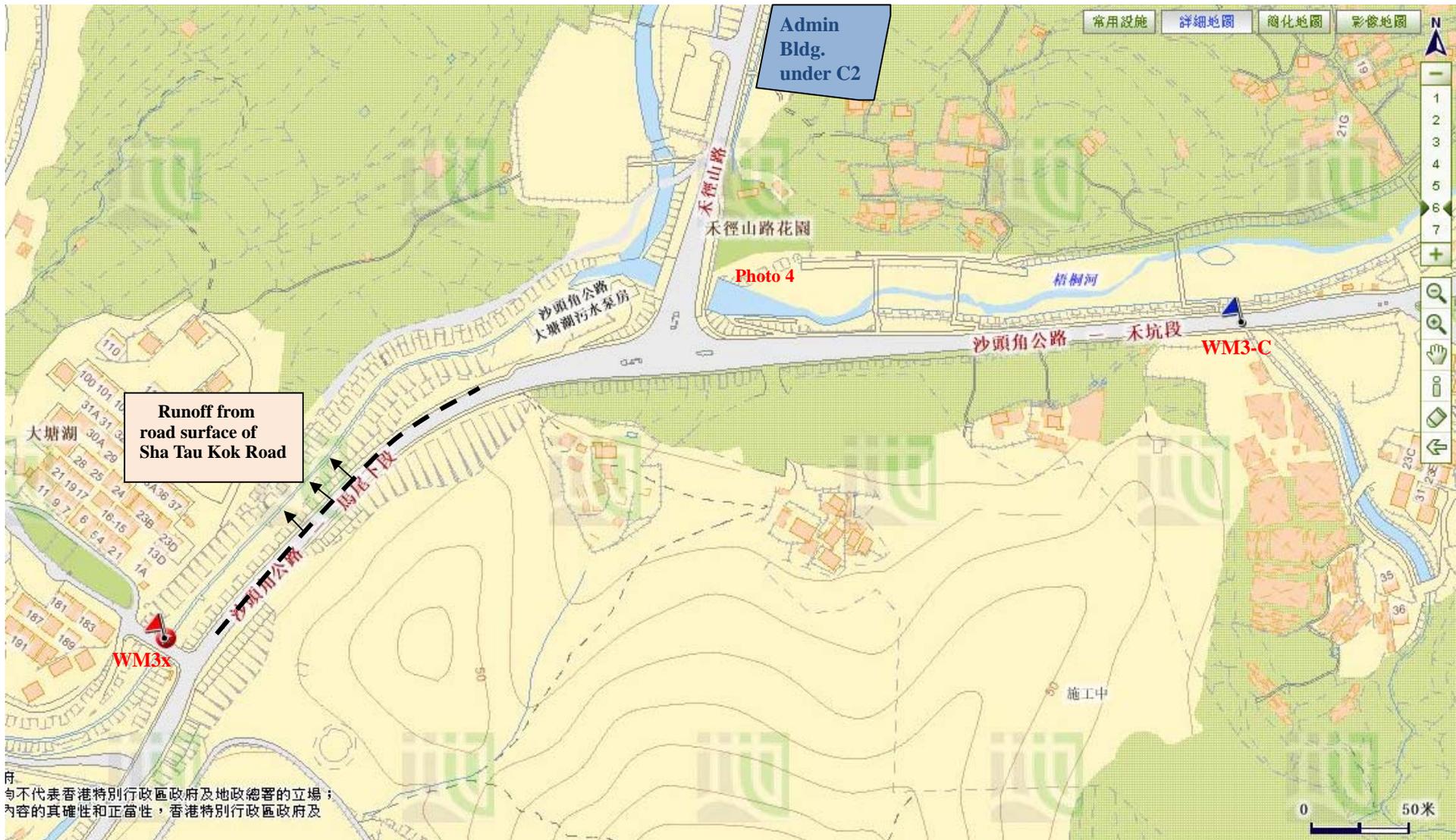


Figure 1 Location Map for Works Area under Contract 2 and Water Quality Monitoring Location

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

Company Chun Wo Construction Ltd

cc

From Nicola Hon **Date** 4 November 2016

Our Ref TCS00670/13/300/F0708 **No of Pages** 6 (Incl. cover sheet)

RE Agreement No. CE 45/2008
Liantang/ Heung Yuen Wai Boundary Control Point and Associated Works
Investigation Report of Exceedance of Water Quality at Location WM4 on 18 and 20
October 2016 (Contract 3)

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Dear Mr. Ho,

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

TCS00670/13/300/F0680 dated 20 October 2016
TCS00670/13/300/F0686 dated 25 October 2016.
TCS00670/13/300/F0700 dated 1 November 2016.

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

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

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



Nicola Hon
Environmental Consultant

Encl.

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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		18 Oct 2016	20 Oct 2016	18 Oct 2016	20 Oct 2016
Location		WM4			
Time		13:00	13:00	13:00	13:00
Parameter		Turbidity (NTU)		Suspended Solids (mg/L)	
Action Level		35.2 AND 120% of upstream control station of the same day		39.4 AND 120% of upstream control station of the same day	
Limit Level		38.4 AND 130% of upstream control station of the same day		45.5 AND 130% of upstream control station of the same day	
Measured Level	WM4-CA	95.7	19.1	69.0	5.0
	WM4-CB	94.3	59.0	47.3	27.5
	WM4	156.0	162.5	108.0	118.5
Exceedance		Limit Level	Limit Level	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures	<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor of C3 (Chun Wo), the construction activities carried out during 18 and 20 October 2016 were mainly general site works such as excavation, breaking work, erection of formwork and backfilling which as same as the previous months and these activities would not generated excessive wastewater. 2. According to the site record from the monitoring team on 18 October 2016, muddy water was observed throughout the channel including WM4, WM4-CA and WM4-CB. <i>(Photo 1 to 3)</i> According to the rainfall recorded from the HKO, there was heavy rain (rainfall 178.7mm) on 18 October 2016. It is considered that the water quality in the channel was deteriorated by the sediment that stirred up due to vigorous water flow under rain. 3. On 20 October 2016, turbid water was observed at WM4 and WM4-CB. The water quality at WM-CA was visually clear but some silt and sandy particulars observed at the channel bed. <i>(Photo 4 to 6)</i> Ad-hoc inspection was carried out by the monitoring team and Chun Wo at the upstream area of impact station WM4 to investigate the source of muddy water. It was observed that muddy water flowing from the river branch near Kiu Tau Road. <i>(Photo 7)</i> There was active construction site of other Contractor near Kiu Tak Road and muddy water was observed outside their site area. <i>(Photo 8)</i> 4. During weekly site inspection by ET in October 2016, the condition was generally in order and no adverse water quality impacts under the Contract were identified. In our investigation, it is considered that exceedances were due to heavy rain and muddy water from the outside of site boundary and not likely related to the works under the Contract. 5. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. In view of the subsequent monitoring result, no exceedances were triggered at WM4 on 22 and 24 				

	October 2016 (no monitoring on 21 October 2016 due to typhoon signal no. 8). However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual.
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Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 4 November 2016

Photo Record



Photo 1

Turbid water was observed at WM4 on 18 October 2016.



Photo 2

Turbid water was observed at WM4-CA on 18 October 2016.



Photo 3

Turbid water was observed at WM4-CB on 18 October 2016.



Photo 4

Turbid water was observed at WM4 on 20 October 2016.



Photo 5

On 20 October 2016, the water quality at WM-CA was visually clear but some silt and sandy particulars observed at the channel bed.



Photo 6

Turbid water was observed at WM4 on 20 October 2016.



Photo 7

On 20 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 8

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed outside the site area.

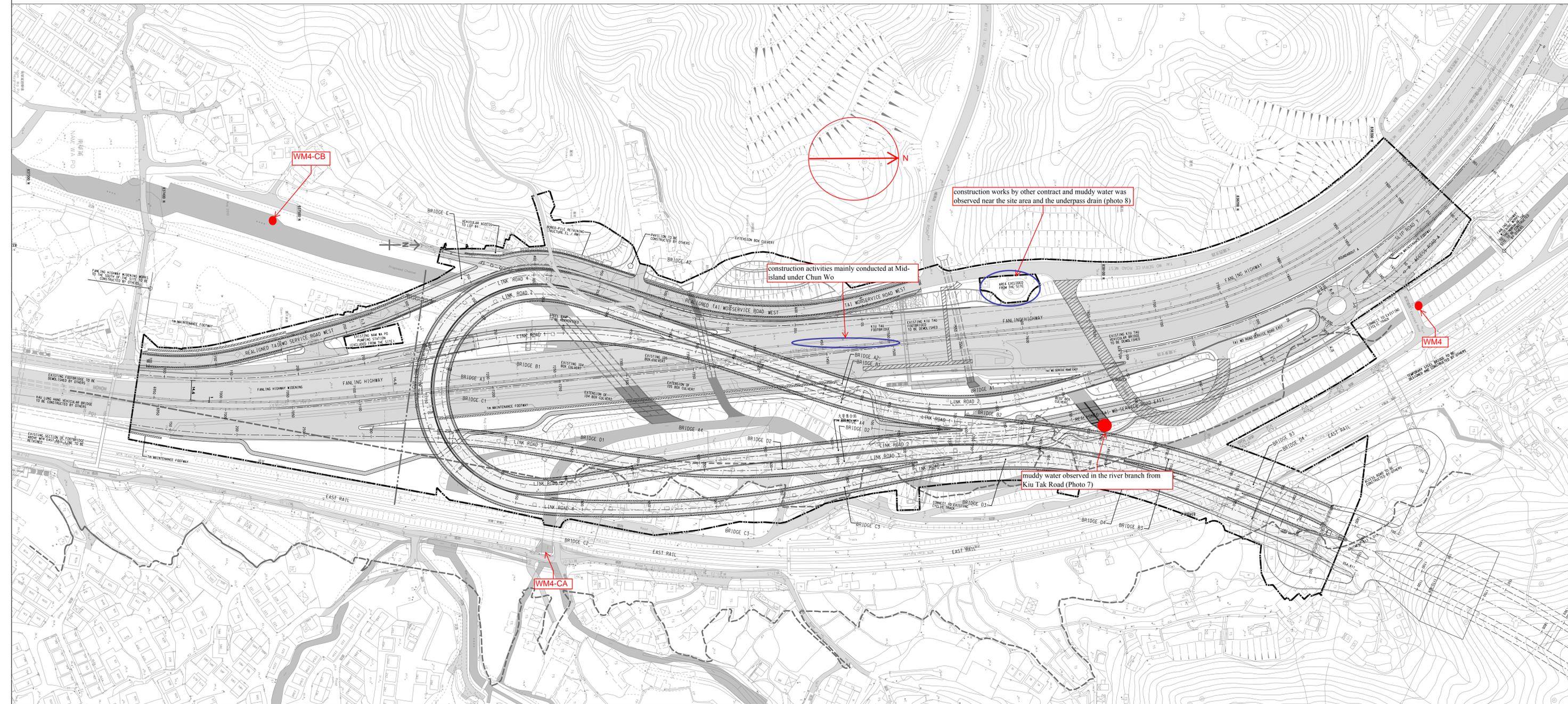


Figure 1. Location of Water Quality Monitoring Location

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		18 Oct 2016	20 Oct 2016	18 Oct 2016	20 Oct 2016
Location		WM4			
Time		13:00	13:00	13:00	13:00
Parameter		Turbidity (NTU)		Suspended Solids (mg/L)	
Action Level		35.2 AND 120% of upstream control station of the same day		39.4 AND 120% of upstream control station of the same day	
Limit Level		38.4 AND 130% of upstream control station of the same day		45.5 AND 130% of upstream control station of the same day	
Measured Level	WM4-CA	95.7	19.1	69.0	5.0
	WM4-CB	94.3	59.0	47.3	27.5
	WM4	156.0	162.5	108.0	118.5
Exceedance		Limit Level	Limit Level	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided by the Contractor of Contract 2 (DHK), construction activities carried out at South Portal during 18 and 20 October 2016 included tunnel excavation and ventilation building superstructure. 2. According to the site record from the monitoring team on 18 October 2016, muddy water was observed throughout the channel including WM4, WM4-CA and WM4-CB. <i>(Photo 1 to 3)</i> According to the rainfall recorded from the HKO, there was heavy rain (rainfall 178.7mm) on 18 October 2016. It is considered that the water quality in the channel was deteriorated by the sediment that stirred up due to vigorous water flow under rain. 3. On 20 October 2016, turbid water was observed at WM4 and WM4-CB. The water quality at WM-CA was visually clear but some silt and sandy particulars observed at the channel bed. <i>(Photo 4 to 6)</i> Ad-hoc inspection was carried out by the monitoring team and Chun Wo at the upstream area of impact station WM4 to investigate the source of muddy water. It was observed that muddy water flowing from the river branch near Kiu Tau Road. <i>(Photo 7)</i> There was active construction site of other Contractor near Kiu Tak Road and muddy water was observed outside their site area. <i>(Photo 8)</i> 4. During weekly site inspection by ET in October 2016, it was observed the condition was generally in order and no adverse water quality impacts under the Contract were identified. <i>(Photo 9 and 10)</i> In our investigation, it is considered that exceedances were due to the muddy water from the outside of site boundary and not likely related to the works under the Contract. 5. According to the Event and Action, the monitoring frequency at exceed station shall be increased to daily due to the limit level exceedance recorded until no exceedances were triggered in consecutive days. In view of the subsequent monitoring result, no exceedances were triggered at WM4 on 22 and 24 October 2016 (no monitoring on 21 October 2016 due to typhoon signal no. 8). However, the Contractor should continue to implement the environmental mitigation measures recommended in implementation schedule in the EM&A Manual. 			

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 4 November 2016

Photo Record



Photo 1

Turbid water was observed at WM4 on 18 October 2016.



Photo 2

Turbid water was observed at WM4-CA on 18 October 2016.



Photo 3

Turbid water was observed at WM4-CB on 18 October 2016.



Photo 4

Turbid water was observed at WM4 on 20 October 2016.



Photo 5

On 20 October 2016, the water quality at WM-CA was visually clear but some silt and sandy particulars observed at the channel bed.



Photo 6

Turbid water was observed at WM4 on 20 October 2016.



Photo 7

On 20 October 2016, muddy water was found flowing from the river branch near Kiu Tau Road.



Photo 8

There was construction activities carried by other Contractor near Kiu Tak Road and muddy water was observed outside the site area.



Photo 9

The site exit was paved and gets rid of muddy materials.



Photo 10

No muddy water was observed at the discharge point from the site.

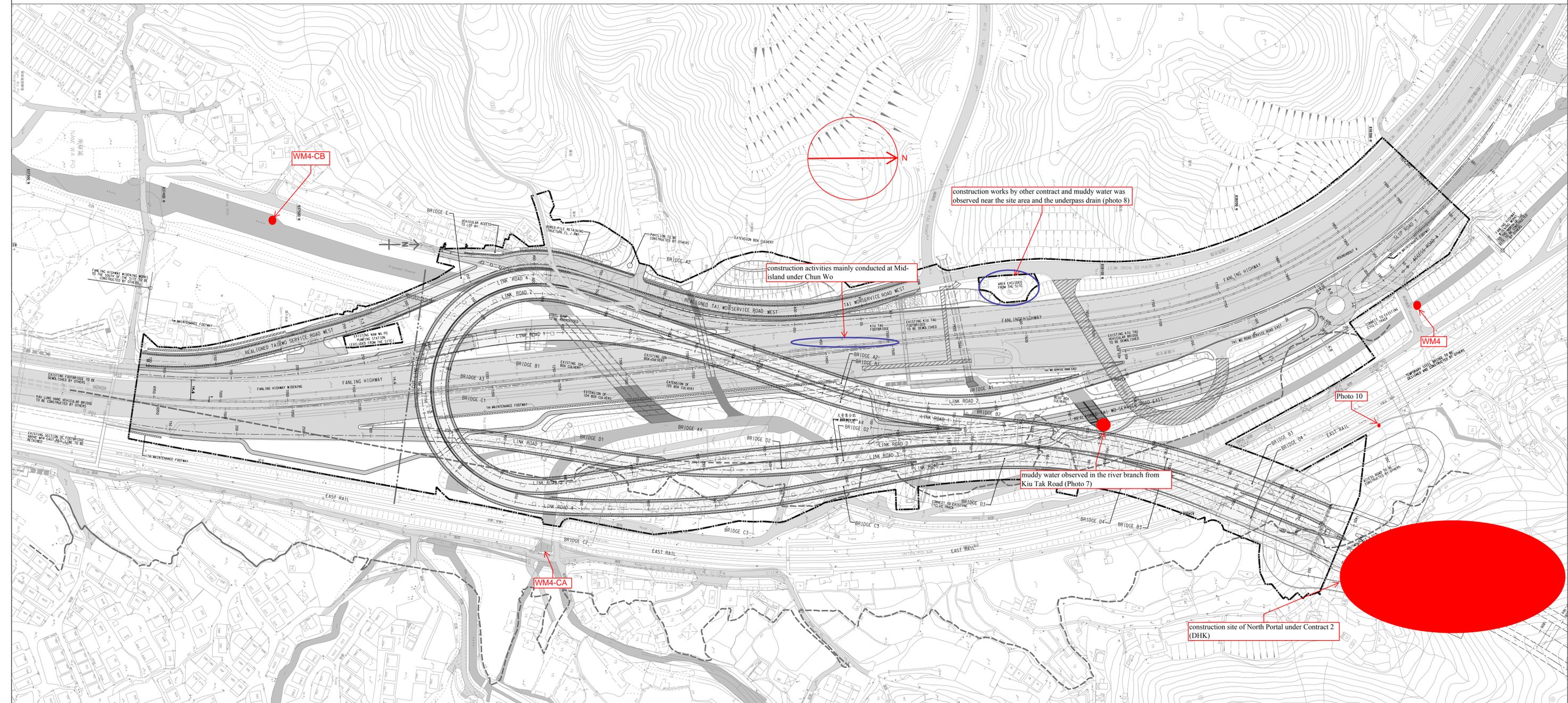


Figure 1. Location of Water Quality Monitoring Location

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		18 Oct 2016	19 Oct 2016	20 Oct 2016	18 Oct 2016	19 Oct 2016	20 Oct 2016
Location		WM2B					
Time		10:15	11:00	11:00	10:15	11:00	
Parameter		Turbidity (NTU)			Suspended Solids (mg/L)		
Action Level		11.4 AND 120% of upstream control station of the same day			11.8 AND 120% of upstream control station of the same day		
Limit Level		12.3 AND 130% of upstream control station of the same day			12.4 AND 130% of upstream control station of the same day		
Measured Levels	WM2B-C	40.6	91.2	4.8	26.0	96.0	<2
	WM2B	641.0	240.5	26.8	699.0	261.0	24.0
Exceedance		Limit Level	Limit Level	Limit Level	Limit Level	Limit Level	Limit Level
Investigation Results, Recommendations & Mitigation Measures		<ol style="list-style-type: none"> 1. According to the site information provided from CCKJV, construction activities carried out from 18 to 20 October 2016 at North Portal (upstream of WM2B) were bored piling and slope work. The monitoring locations and works area are shown in Figure 1. 2. According to the site record and photograph taken from the monitoring team on 18 and 19 October 2016, muddy water was observed throughout the channel including Locations WM2B and WM2B-C. It was noted that the water flow in the channel was very vigorous due to heavy rain. <i>(Photo 1 to 4)</i> 3. According to the site observations from the monitoring team on 18 and 19 October 2016, the water flow in the channel of WM2B and WM2B-C was very vigorous due to heavy rain and turbid water was observed throughout the channel. Moreover, there were trails of muddy runoff getting into the existing river channel from the adjacent public road due to rainstorm. <i>(Photo 5 & 6 and Figure 1)</i> In our investigation, it is considered that the exceedances on 18 and 19 October 2016 were due to rainstorm and runoff from road and not likely caused by the Project. 4. According to the site record and photograph taken from the monitoring team on 20 October 2016, the water quality at the channel of WM2B and WM2B-C was clear, but some silt and sediment was observed at the channel bed of WM2B. <i>(Photo 7 & 8)</i> Since there were no muddy water discharged from the site, it is considered that the exceedances were due to the disturbance of silt and sediment at the channel bed during sampling at shallow water. 5. There was no exceedance recorded in the subsequent monitoring day on 22 and 24 October 2016 in which no sampling was carried out on 21 October due to typhoon No.8. Nevertheless, CCKJV should fully implement the water mitigation measures as recommended in the implementation schedule for environmental mitigation measures in the EM&A Manual. 					

Prepared By : Nicola Hon

Designation : Environmental Consultant

Signature : 

Date : 10 November 2016

Photo Record



Photo 1

On 18 October 2016, turbid water was observed throughout the channel of WM2B. Monitoring was carried out during heavy rain.



Photo 2

On 18 October 2016, turbid water was observed at the channel of WM2B-C. Monitoring was carried out during heavy rain.



Photo 3

On 19 October 2016, turbid water was observed throughout the channel and WM2B. Monitoring was carried out during heavy rain and vigorous water flow was observed.



Photo 4

On 19 October 2016, turbid water was observed at the channel of WM2B-C. Monitoring was carried out during heavy rain. Runoff into the channel was observed at channel of WM2B-C.



Photo 5

On 18 October 2016, muddy runoff from the public road into the channel of WM2B was observed during heavy rainstorm.



Photo 6

On 19 October 2016, muddy runoff from the public road into the channel of WM2B-C was observed during heavy rainstorm.



Photo 7

On 20 October 2016, the water at the channel of WM2B was clear, but some silt and sediment was observed at the channel bed.



Photo 8

On 20 October 2016, the water at the channel of WM2B-C was clear,

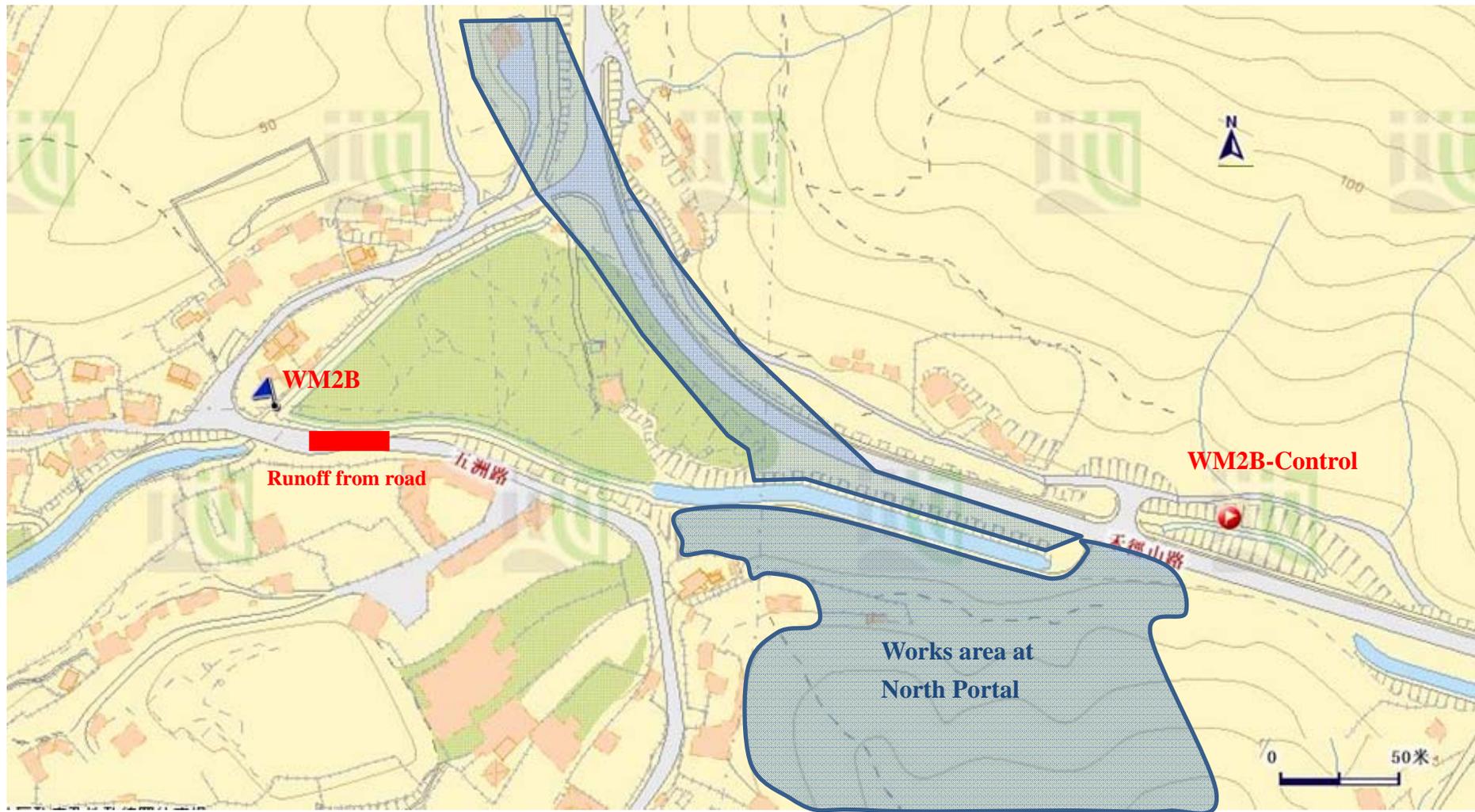


Figure 1 Location Map for Water Quality Monitoring Locations WM2B and WM2B-Control