



JOB No.: TCS00670/13

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

MONTHLY ENVIRONMENTAL MONITORING AND AUDIT
REPORT (NO.3) – OCTOBER 2013

PREPARED FOR
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
(CEDD)

Date	Reference No.	Prepared By	Certified By
11 November 2013	TCS00670/13/600/R0084v2	 Ben Tam (Environmental Consultant)	 Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	8 November 2013	First Submission
2	11 November 2013	Amended against IEC comments on 8 November 2013

13 November 2013

Our ref: 7076192/L14784/R/AB/AW/rw
Your ref:

AECOM
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N.T.

By Email & Post

Attention: Mr Kelvin LEE

Dear Sirs

Agreement No. CE 42/2012 (EP)
Liantang/Heung Yuen Wai Boundary Control Point and Associated Works
Independent Environmental Checker – Investigation
Monthly EM&A Report (No. 3) – October 2013

With reference to the Monthly EM&A Report No. 3 for October 2013 (Version 2, ref.: TCS00670/13/600/R0084v2) certified by the ET Leader we received on 13 November 2013, 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/A.

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 Ms Winnie MA on tel. 3995 8138 or by email to winnie.ma@smec.com.

Yours faithfully
For and on behalf of
SMEC Asia Limited


Antony WONG
Independent Environmental Checker

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EXECUTIVE SUMMARY

ES01 This is the 3rd monthly EM&A report presenting the monitoring results and inspection findings for the reporting period from **1 to 31 October 2013** (hereinafter ‘the Reporting Period’).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 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	3	63
	24-hour TSP	3	15
Construction Noise	L _{eq(30min)} Daytime	2	12
Water Quality	Water sampling	2	13
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	Contract 5	5

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES03 No exceedances of air quality, construction noise and water quality were registered in the Reporting Period. Furthermore, no noise complaints (i.e. Action Level) were received. No Notifications of Exceedances (NOEs) was issued to the RE, IEC and the Main Contractor. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	0	0	0
	24-hour TSP	0	0	0	0	0
Construction Noise	L _{eq(30min)} Daytime	0	0	0	0	0
Water Quality	DO	0	0	0	0	0
	Turbidity	0	0	0	0	0
	SS	0	0	0	0	0

ENVIRONMENTAL COMPLAINT

ES04 No public complaints were received by either the RE or CEDD or the Main Contractor in the Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES05 No environmental summons or successful prosecutions were recorded in the Reporting Period.

REPORTING CHANGE

ES06 No reporting changes were made in the Reporting Period.

SITE INSPECTION

ES07 Joint site inspection as carried out by the RE, IEC, ET and the Contract 5 main-contractor was dated on **3, 10, 17, 24 and 31 October 2013**. No non-compliance observed during the site inspection.

FUTURE KEY ISSUES

- ES08 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.
- ES09 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.
- ES10 In addition, the potential water quality impact at the nearby rivers should be highly alerted. The Contractor should prevent muddy water and other water pollutants via site surface water runoff get into the Kong Yiu Channel, water quality mitigation measures should be properly implemented.

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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/A issued on 28 October 2013.
- 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 **3rd** monthly EM&A report presenting the monitoring results and inspection findings for reporting period from **1** to **31 October 2013**.

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

<i>Section 7</i>	<i>Waste Management</i>
<i>Section 8</i>	<i>Site Inspections</i>
<i>Section 9</i>	<i>Environmental Complaints and Non-Compliance</i>
<i>Section 10</i>	<i>Implementation Status of Mitigation Measures</i>
<i>Section 11</i>	<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 (TCSS)
- Contract 5 (CV/2013/03)
- Contract 6 (CV/2013/08)

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 The Contract 2 has not yet awarded till end of the Reporting Period. 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. Commencement of construction has scheduled in 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 (Contract number to be assigned)

2.1.5 Contract 4 has not yet awarded. The work of the Contract 4 includes provision and installation of Traffic Control and Surveillance System and the associated electrical and mechanical works for the Project.

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 not yet awarded. Major Scope of Work of the Contract 6 will 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.

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.

Environmental Protection Department (EPD)

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

Engineer or Engineers Representative (ER)

2.2.4 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)

2.2.5 There will be one contractor for each individual works contract. The Contractor(s) should report to the ER. 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)

2.2.6 One ET will be employed for this Project. 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 IEC and Contractor(s) 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)

2.2.7 One IEC will be employed for this Project. The Independent Environmental Checker (IEC) should not be in any way an associated body of the Contractor(s) 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 duty of IEC should be:

- 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
- 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, ET, IEC and the Contractor(s) 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 (Environmental Permit EP-430/2011);
- (b) Building works and road works by contractors of ArchSD (Environmental Permit EP-404/2011);
- (c) Widening of Fanling Highway – Tai Hang to Wo Hop Shek Interchange – Contract No. HY/2012/06;
- (d) Construction of cross-boundary vehicular and pedestrian bridges (total 5 numbers) across the Shenzhen River; and
- (e) 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 Contract 5 and they are summarized in below. Moreover, the master construction program of the Contract 5 is enclosed in *Appendix C*.

Contract 2 (CV/2012/08)

- The contract has not yet awarded.

Contract 3 (CV/2012/09)

- Contract awarded in July 2013. Commencement of construction has scheduled in November 2013.

Contract 4 (Contract number to be assigned)

- The contract has not yet awarded.

Contract 5 (CV/2013/03)

Contract commenced in April 2013, the following activities were conducted in the Reporting Period.

- Construction of Retaining Wall No.1
- Construction of 2nd wheel washing bay
- Piling works at lift shaft, Bridge J & footbridge
- Filling work for ArchSD permanent office

- Construction of jacking pipe/ receiving & jacking pits
- Erection of project sign board
- Setting out the site boundary and structures
- Environmental impact monitoring
- Archaeological survey
- Underground utilities detection
- Temporary widening of LMH Road
- Construction of Road and drainage work at RS1 and RS3
- Construction of footbridge and staircase at RS4
- Geotechnical investigation and monitoring works
- Formation works at BCP Area
- Construction of Depressed Road at BCP3

Contract 6 (CV/2013/08)

- The contract is still yet awarded

2.5 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

- Project Layout Plans of Contracts 3 and 5
- Landscape Plan
- Topsoil Management Plan
- Environmental Monitoring and Audit Programme
- Baseline Monitoring Report (TCS00690/13/600/R0030v3) for the Project
- Waste Management Plan of Contract 5

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	
		Contract 5	Contract 2, 3, 4 & 6
1	Air pollution Control (Construction Dust) Regulation	Ref. No: 359338 Notified EPD on 13 May 2013	--
2	Chemical Waste Producer Registration - Waste Producers Number	No.: 5213-642-S3735-01 Valid form 8 Jun 2013 till the end of Contract	--
3	Water Pollution Control Ordinance - Discharge License	No.: W5/1G44/1 Valid from 8 Jun 13 to 30 Jun 2018	--
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account No. 7017351 Valid form 29 Apr 13 till the end of Contract	--

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

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

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

3.2 MONITORING PARAMETERS

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

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

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

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<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
AM1	Tsung Yuen Ha Village House No. 63	BCP	Contract 5
AM2	Village House near Lin Ma Hang Road	LMH to Frontier Closed Area	Contract 5, Contract 6
AM3	Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village.	LMH to Frontier Closed Area	Contract 5, Contract 6
AM4a	A village house located at about 160m east side of the original point AM4	LMH to Frontier Closed Area	Contract 6

Station ID	Description	Works Area	Related to the Work Contract
AM5	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
AM7a	Another village (nameless) aligns to Sha Tau Kok Road – Wo Hang Section proximity to Tai Tong Wu Village. The location is about 140m away from the original point AM7	Sha Tau Kok Road	Contract 2
AM8	Po Kat Tsai Village No. 4	Po Kat Tsai	Contract 2
AM9a	Nam Wa Po Village House No. 71	Fanling	Contract 3

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	Contract 5
NM2	Village House near Lin Ma Hang Road	Lin Ma Hang to Frontier Closed Area	Contract 5, Contract 6
NM3	Ping Yeung Village House (facade facing northeast)	Ping Yeung to Wo Keng Shan	Contract 6
NM4	Wo Keng Shan Village House	Ping Yeung to Wo Keng Shan	Contract 6
NM5	Village House, Loi Tung	Sha Tau Kok Road	Contract 2, Contract 6
NM6	Tai Tong Wu Village House 2	Sha Tau Kok Rpad	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. 78	Fanling	Contract 3

Table 3-4 Impact Monitoring Stations - Water Quality

Station ID	Description	Designated / Alternative Location		Nature of the location	Related to the Work Contract
		Coordinates			
		Easting	Northing		
WM1	Downstream of Kong Yiu Channel	833679	845421	Alternative location located at upstream 51m of the designated location	Contract 5
WM1-Control	Upstream of Kong Yiu Channel	834185	845917	NA	Contract 5
WM2A	Downstream of River Ganges	834204	844471	Alternative location located at downstream 81m of the designated location	Contract 6
WM2A-Control	Upstream of River Ganges	835270	844243	Alternative location located at upstream 78m of the designated location	Contract 6
WM2B	Downstream of River Ganges	835433	843397	NA	Contract 6
WM2B-Control	Upstream of River Ganges	835835	843351	Alternative location located at downstream 31m of the designated location	Contract 6
WM3	Downstream of River Indus	836324	842407	NA	Contract 6

Station ID	Description	Designated / Alternative Location		Nature of the location	Related to the Work Contract
		Coordinates			
		Easting	Northing		
WM3-Control	Upstream of River Indus	836763	842400	Alternative location located at downstream 26m of the designated location	Contract 6
WM4	Downstream of Ma Wat Channel	833850	838338	Alternative location located at upstream 11m of the designated location	Contract 3
WM4-Control A	Kau Lung Hang Stream	834028	837695	Alternative location located at downstream 28m of the designated location	Contract 3
WM4-Control B	Upstream of Ma Wat Channel	833760	837395	Alternative location located at upstream 15m of the designated location	Contract 3

3.4 MONITORING FREQUENCY AND PERIOD

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

Air Quality Monitoring

3.4.1 Frequency of impact air quality monitoring is as follows:

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

Noise Monitoring

3.4.2 One set of $L_{eq(30min)}$ as 6 consecutive $L_{eq(5min)}$ between 0700-1900 hours on normal weekdays and once every week during course of works. If construction work necessary to carry out at other time periods, i.e. restricted time period (19:00 to 07:00 the next morning and whole day on public holidays) (hereinafter referred as “the restricted hours”), 3 consecutive $L_{eq(5min)}$ measurement will depend on CNP requirements to undertake. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

Water Quality Monitoring

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

3.5 MONITORING EQUIPMENT

Air Quality Monitoring

- 3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*. If the ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to the IEC to approve.
- 3.5.2 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.
- 3.5.3 All equipment to be used for air quality monitoring is listed in **Table 3-5**.

Table 3-5 Air Quality Monitoring Equipment

Equipment	Model
24-Hr TSP	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170

Equipment	Model
Calibration Kit	TISCH Model TE-5025A
<i>1-Hour TSP</i>	
Portable Dust Meter	Sibata LD-3B Laser Dust monitor Particle Mass Profiler & Counter

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⁻¹.

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-14 or Rion NL-31
Calibrator	B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer

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 PRO20 Handheld Dissolved Oxygen Instrument
pH meter	The EcoSense [®] pH10A pen-style instrument
Turbidimeter	Hach 2100Q
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	'Willow' 33-liter plastic cool box with Ice pad

3.6 MONITORING METHODOLOGY

1-hour TSP Monitoring

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

maximum reliability; and

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

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

24-hour TSP Monitoring

3.6.3 The equipment used for 24-hour TSP measurement is Thermo Andersen Model GS2310 TSP high volume air sampling system, which complied with *EPA Code of Federal Regulation, Appendix B to Part 50*. The High Volume Air Sampler (HVS) consists of the following:

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

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

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

Noise Monitoring

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

3.6.7 During the monitoring, all noise measurements would be performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $Leq_{(30min)}$ in six consecutive $Leq_{(5min)}$ measurements will use as the monitoring parameter for the time period between 0700-1900 hours on weekdays; and also $Leq_{(15min)}$ in three consecutive $Leq_{(5min)}$ measurements would be used as monitoring parameter for other time periods (e.g. during restricted hours), if necessary.

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

Water Quality

3.6.9 Water quality monitoring is conducted at the designated locations. The sampling produce 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 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 4⁰C as possible without being frozen. Samples collected are delivered to the laboratory upon collection.

In-situ Measurement

- 3.6.14 YSI PRO20 Handheld Dissolved Oxygen Instrument is used for water in-situ measures, which automates the measurements and data logging of temperature, dissolved oxygen and dissolved oxygen saturation. Before each round of monitoring, the dissolved oxygen probe would be calibrated by the wet bulb method.
- 3.6.15 A portable EcoSense[®] pH10A pen-style instrument 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. Standard buffer solutions of pH 7 and pH 10 are used for calibration of the instrument before and after measurement.
- 3.6.16 A portable Hach 2100Q Turbidimeter is used for in-situ turbidity measurement. The turbidity meter is capable of measuring turbidity in the range of 0 – 1000 NTU. StablCal[®] Standards 10NTU and 100NTU are used for calibration of the instrument before and after measurement.
- 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
AM1	265	143	500	260
AM2	268	149		
AM3	269	145		
AM4a	267	148		
AM5	268	143		
AM6	269	148		
AM7a	275	156		
AM8	269	144		
AM9a	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, NM2, 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	WM2B	WM3	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
	Limit Level	67.6	33.8	12.3	14.0	38.4
SS (mg/L)	Action Level	54.5	14.6	11.8	12.6	39.4
	Limit Level	64.9	17.3	12.4	12.9	45.5

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 properly 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, the construction works under the project is only commenced in Contract 5. Therefore, air quality monitoring was only performed at 3 relevant designated locations as below:

- AM1 - Tsung Yuen Ha Village House No. 63;
- AM2 - Village House near Lin Ma Hang Road; and
- AM3 - Ta Kwu Ling Fire Service Station of Ta Kwu Ling Village

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

4.2 AIR QUALITY MONITORING RESULTS IN REPORTING MONTH

4.2.1 In the Reporting Period, a total of **63** events of 1-hour TSP and **15** events of 24-hours TSP monitoring were carried out at the three designated locations, i.e. AM1, AM2 and AM3 and the monitoring results are summarized in *Tables 4-1 to 4-3*. 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 – AM1

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st Measurement	2 nd Measurement	3 rd Measurement
5-Oct-13	99	2-Oct-13	10:40	237	206	194
11-Oct-13	55	8-Oct-13	11:01	183	161	171
17-Oct-13	95	10-Oct-13	11:24	77	90	108
23-Oct-13	108	15-Oct-13	10:43	79	73	67
29-Oct-13	56	19-Oct-13	14:34	120	116	121
		25-Oct-13	10:42	194	172	147
		31-Oct-13	10:53	99	95	109
Average (Range)	83 (55-108)	Average (Range)		134 (67-237)		

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 Measurement	2 nd Measurement	3 rd Measurement
5-Oct-13	114	2-Oct-13	10:32	253	203	219
11-Oct-13	120	8-Oct-13	10:52	199	160	176
17-Oct-13	147	10-Oct-13	12:15	81	87	90
23-Oct-13	121	15-Oct-13	11:35	67	75	75
29-Oct-13	139	19-Oct-13	14:21	141	132	147
		25-Oct-13	10:27	210	187	156
		31-Oct-13	10:52	119	110	120
Average (Range)	128 (114-147)	Average (Range)		143 (67-253)		

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 Measurement	2 nd Measurement	3 rd Measurement
5-Oct-13	111	2-Oct-13	10:12	265	258	242
11-Oct-13	59	8-Oct-13	10:12	209	156	158
17-Oct-13	108	10-Oct-13	12:59	83	82	93
23-Oct-13	98	15-Oct-13	11:20	86	73	77
29-Oct-13	91	19-Oct-13	14:05	147	141	142

		25-Oct-13	10:03	200	198	168
		31-Oct-13	10:43	121	115	115
Average (Range)	93 (59-111)	Average (Range)		149 (73-265)		

- 4.2.2 As shown in *Tables 4-1 to 4-3*, the 24-hour and 1-hour TSP monitoring results were below the Action/ Limit Level. No Notification of Exceedances (NOE) of air quality criteria or corrective action was therefore required.
- 4.2.3 The meteorological data during the impact monitoring days are summarized in *Appendix K*.

5 CONSTRUCTION NOISE MONITORING

5.1 GENERAL

5.1.1 In the Reporting Period, the construction works under the project is only commenced in Contract 5. Therefore, noise monitoring was only performed at 2 relevant designated locations as below:

- NM1 - Tsung Yuen Ha Village House No. 63; and
- NM2 - Village House near Lin Ma Hang Road

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

5.2 NOISE MONITORING RESULTS IN REPORTING MONTH

5.2.1 In the Reporting Period, a total of **12** event noise measurements were carried out at the two designated locations, i.e. NM1 and NM2. The sound level meter was set in 1m from the exterior of the building façade, and therefore, no façade correction (+3 dB(A) is added according to acoustical principles and EPD guidelines. The noise monitoring results at the designated locations are summarized in *Tables 5-1*. 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

Date	Start Time	NM1 ($L_{eq30min}$)	Start Time	NM2 ($L_{eq30min}$)
2-Oct-13	10:40	67	13:21	58
8-Oct-13	11:02	58	14:40	65
15-Oct-13	10:33	58	11:32	64
19-Oct-13	14:31	54	15:25	62
25-Oct-13	10:54	56	13:02	61
31-Oct-13	10:53	58	15:37	63
Limit Level		75 dB(A)		

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

6 WATER QUALITY MONITORING

6.1 GENERAL

6.1.1 In the Reporting Period, the construction works under the project is only commenced in Contract 5. Therefore, water quality monitoring was only performed at 2 relevant designated locations as below:

- WM1 – Contract 5 working site downstream at Kong Yiu Channel; and
- WM1-Control – Contract 5 working site upstream at Kong Yiu Channel

6.1.2 The water quality monitoring schedule is presented in *Appendix H*. All monitoring results including in-situ measurement and laboratory analysis are summarized in the following sub-sections.

6.2 RESULTS OF WATER QUALITY MONITORING

6.2.1 In the Reporting Period, a total of **13** monitoring days for water quality at the 2 designated locations were conducted. The monitoring results including Dissolved Oxygen, Turbidity, Suspended Solids and pH are summarized in *Table 6-1*. Detailed monitoring results 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 Summary of Water Quality Monitoring Results of WM1 and WM1-Control

Date	Dissolved Oxygen (mg/L)		Turbidity (NTU)		pH (value)		Suspended Solids (mg/L)	
	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control	WM1	WM1-Control
2-Oct-13	9.2	8.9	13.2	8.7	7.8	7.5	10.0	5.0
4-Oct-13	8.3	7.8	14.0	10.3	7.6	7.3	10.0	7.0
8-Oct-13	9.0	9.8	15.9	8.5	8.0	7.5	15.0	5.5
10-Oct-13	8.2	8.2	18.9	7.3	7.5	7.6	19.0	5.0
12-Oct-13	6.9	7.3	13.1	8.6	7.5	7.9	13.0	4.5
15-Oct-13	7.1	7.6	17.7	8.5	8.0	8.0	26.5	5.0
17-Oct-13	8.8	7.0	12.5	5.4	7.4	7.4	10.0	3.0
19-Oct-13	8.6	8.8	25.9	5.9	7.4	7.5	27.0	2.5
21-Oct-13	9.0	9.2	15.1	6.3	7.2	7.1	11.0	2.5
23-Oct-13	8.6	8.6	11.9	6.4	8.0	8.1	16.0	4.0
25-Oct-13	6.2	5.3	11.4	6.1	7.3	7.5	11.0	5.0
29-Oct-13	8.5	10.2	9.6	5.5	7.9	7.9	6.0	2.0
31-Oct-13	11.4	10.7	5.9	5.8	8.0	7.9	4.0	4.0

6.2.2 In view of the monitoring results of Dissolved Oxygen (DO), all the measured results were higher than Action Level exceedance and no exceedances were therefore triggered.

6.2.3 The monitoring results of turbidity and suspended solids were all below the Action/ Limit Level and no exceedances were triggered.

6.2.4 pH values detected in downstream WM1 are between 7.2 and 8.0 whereas the pH values at upstream WM1-Control are between 7.1 and 8.1. The pH values recorded during in the Reporting Period are considered as normal.

7 WASTE MANAGEMENT

7.1 GENERAL WASTE MANAGEMENT

7.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

7.2 RECORDS OF WASTE QUANTITIES

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

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

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

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

Type of Waste	Quantity	Disposal Location
C&D Materials (Inert) (in '000ton)	0	-
Reused in this Project (Inert) (in '000ton)	0	-
Reused in other Projects (Inert) (in '000ton)	0	-
Disposal as Public Fill (Inert) (in '000ton)	0	-

Table 7-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity	Disposal Location
Recycled Metal (kg)	0	-
Recycled Paper / Cardboard Packing (kg)	0	-
Recycled Plastic (kg)	0	-
Chemical Wastes (kg)	0	-
General Refuses (in '000ton)	0.996	NENT

8 SITE INSPECTION

8.1 REQUIREMENTS

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

8.2 FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

The Contract 5

8.2.1 In the Reporting Period, weekly site inspection is performed in Contract 5 only. Joint site inspection to evaluate site environmental performance has been carried out by the RE, IEC, ET and the Contractor on **3, 10, 17, 24 and 31 October 2013**. No non-compliance was noted.

8.2.2 The findings / deficiencies of **Contract 5** that observed during the weekly site inspection are listed in **Table 8-1**.

Table 8-1 Site Observations of Contract 5

Date	Findings / Deficiencies	Follow-Up Status
26 Sep 2013 (last Reporting Period)	<ul style="list-style-type: none"> Uncovered sand stockpiles are observed on site. The Contractor was reminded to provide mitigation measures such as impervious sheeting cover to minimize dust impact. Stagnant water is observed at the drainage channel. The Contractor was reminded to backfill to prevent cummulation of wastewater. 	<ul style="list-style-type: none"> Water spray has provided to suppress dust emission on 3 Oct 2013. Stagnant water in drainage channel and onsite has rectified on 3 Oct 2013. Furthermore, the water treatment facility has modified and no wastewater discharged into Kong Yiu Channel.
3 Oct 2013	<ul style="list-style-type: none"> C&D wastes shall be disposed in accordance with WMP requirements. Diesel contaminant observed on the existing concrete pave. The Contractor was reminded to clean-up and all plants should be well maintenance to prevent land contamination. Dust emission observed during highway truck crossing work area. Remind that dust control mitigation measures such as water spray and speed control should be follow. 	<ul style="list-style-type: none"> Only for reminder. Diesel contaminant was removed on 10 Oct 2013. Water spraying was observed on 10 Oct 2013.
10 Oct 2013	<ul style="list-style-type: none"> Uncovered soil stockpiles are observed on site. The Contractor was reminded to provide mitigation measures such as impervious sheeting cover to minimize dust impact. Dusty construction material Portland cement observed onsite. The Contractor was reminded to provide impervious sheeting cover to minimize dust impact. 	<ul style="list-style-type: none"> Uncovered soil stockpiles have compacted to prevent dust impact on 17 Oct 2013. Dusty construction material were removed on 17 Oct 2013.

Date	Findings / Deficiencies	Follow-Up Status
	<ul style="list-style-type: none"> • Stagnant water is observed on site. The Contractor was reminded backfilling to prevent mosquito breeding on site. • Diesel oil drum observed onsite without drip tray. Remind that the high potential contamination material should be stored at the chemical storage area. 	<ul style="list-style-type: none"> • The area has been backfilled and no more stagnant water was observed on 17 Oct 2013. • Diesel oil drum was removed before site inspection on 17 Oct 2013.
17 Oct 2013	<ul style="list-style-type: none"> • Increase water spray frequency at access road to prevent construction dust emission is reminded. • Chemicals lube and diesel observed without drip tray. Remind that the high potential contamination material should be stored at the chemical storage area or provision drip tray. • The sandbag erection should be extended to prevent surface runoff flow to Kong Yiu Channel • Soil tail was observed at site exit / entrance. Remind that wheel washing should be undertaken for each vehicle prior exit the site to avoid construction dust impacts the surrounding air quality. • Regular cleaning work is reminded at RS1 Working Area exit/entrance. 	<ul style="list-style-type: none"> • Only for reminder. • No chemical materials or chemical wastes were found free dispose on site during inspection on 24 Oct 2013. • Sand bags were observed at the Bridge B to direct the surface runoff to the river body on 31 Oct 2013. • No soil tails were observed during site inspection on 31 Oct 2013. • Only for reminder.
24 Oct 2013	<ul style="list-style-type: none"> • Haul road of water spray frequency should be increased (at least eight times per day) to prevent construction dust emission is remind. • Soil tail was observed at site exit / entrance. Remind that wheel washing should be undertaken for each vehicle prior exit the site to avoid construction dust impacts the surrounding air quality. • As remind that temporary drainage system should be improvement to prevent mosquito breeding on site. 	<ul style="list-style-type: none"> • Only for reminder • No soil tails were observed on 31 Oct 2013. • Only for reminder.
31 Oct 2013	<ul style="list-style-type: none"> • Water spraying for the dry haul road to minimize the dust generated. • Stockpile storage at the stie area should be cover to prevent dust generation. • The Contractor should maintain the public road near the site area clean and tidy. • Proper drainage system is recommended such as sedimentation tank to reduce the SS level before discharge. 	<ul style="list-style-type: none"> • To be followed and reported in November 2013.

Other Contracts

8.2.3 Since the construction works at the Contract 2, Contract 3, Contract 4 and Contract 6 are not yet commenced, no site inspection is performed for these Contracts.

9 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

9.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

The Contract 5

9.1.1 For Contract 5, no environmental complaint, summons and prosecution was received in the Reporting Period. The statistical summary table of environmental complaint is presented in *Tables 9-1, 9-2 and 9-3*.

Table 9-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
16 Aug – 30 Sep 2013	0	0	NA
1 – 31 Oct 2013	0	0	NA

Table 9-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
16 Aug – 30 Sep 2013	0	0	NA
1 – 31 Oct 2013	0	0	NA

Table 9-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
16 Aug – 30 Sep 2013	0	0	NA
1 – 31 Oct 2013	0	0	NA

The Other Contracts

9.1.2 Since the construction works at the Contract 2, Contract 3, Contract 4 and Contract 6 are not yet commenced, no environmental complaint, summons and prosecution are received in the Reporting Period accordingly.

10 IMPLEMENTATION STATUS OF MITIGATION MEASURES

10.1 GENERAL REQUIREMENTS

- 10.1.1 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the approved EM&A Manual covered the issues of dust, noise, water and waste and they are summarized presented in *Appendix M*.
- 10.1.2 All contracts under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual as subject to the site condition. Environmental mitigation measures generally implemented by Contract 5 in this Reporting Period are summarized in *Table 10-1*.

Table 10-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> Wastewater to be treated by filtration system; such as, silt curtain or sedimentation tank before discharge. Replace silt curtain materials if necessary
Air Quality	<ul style="list-style-type: none"> Maintain damp / wet surface on access road Keep slow speed in the sites All vehicles must use wheel washing facility before off site All vehicles must use wheel washing facility before off site Sprayed water during breaking works
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.

10.2 KEY ISSUES FOR THE COMING MONTH

- 10.2.1 Commencement of construction for Contract 3 is scheduled on 5 November 2013. Key issues to be considered in the coming month for Contracts 3 and 5 include:
- Implementation of dust suppression measures at all times;
 - Potential wastewater quality impact due to surface runoff;
 - Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
 - Disposal of empty engine oil containers within site area;
 - Ensure dust suppression measures are implemented properly;
 - Sediment catch-pits and silt removal facilities should be regularly maintained;
 - Management of chemical wastes;
 - Discharge of site effluent to the nearby wetland, stockpiling or disposal of materials, and any dredging or construction area at this area are prohibited;
 - Follow-up of improvement on general waste management issues; and
 - Implementation of construction noise preventative control measures
- 10.2.2 For other Contracts, no environmental issue is considered due to these contracts still yet to commence.

11 CONCLUSIONS AND RECOMMENDATIONS

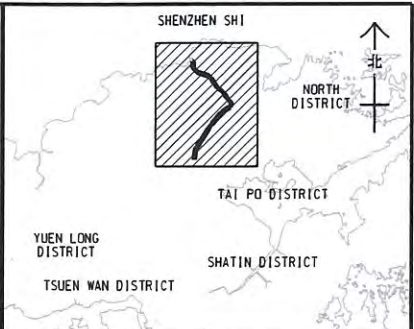
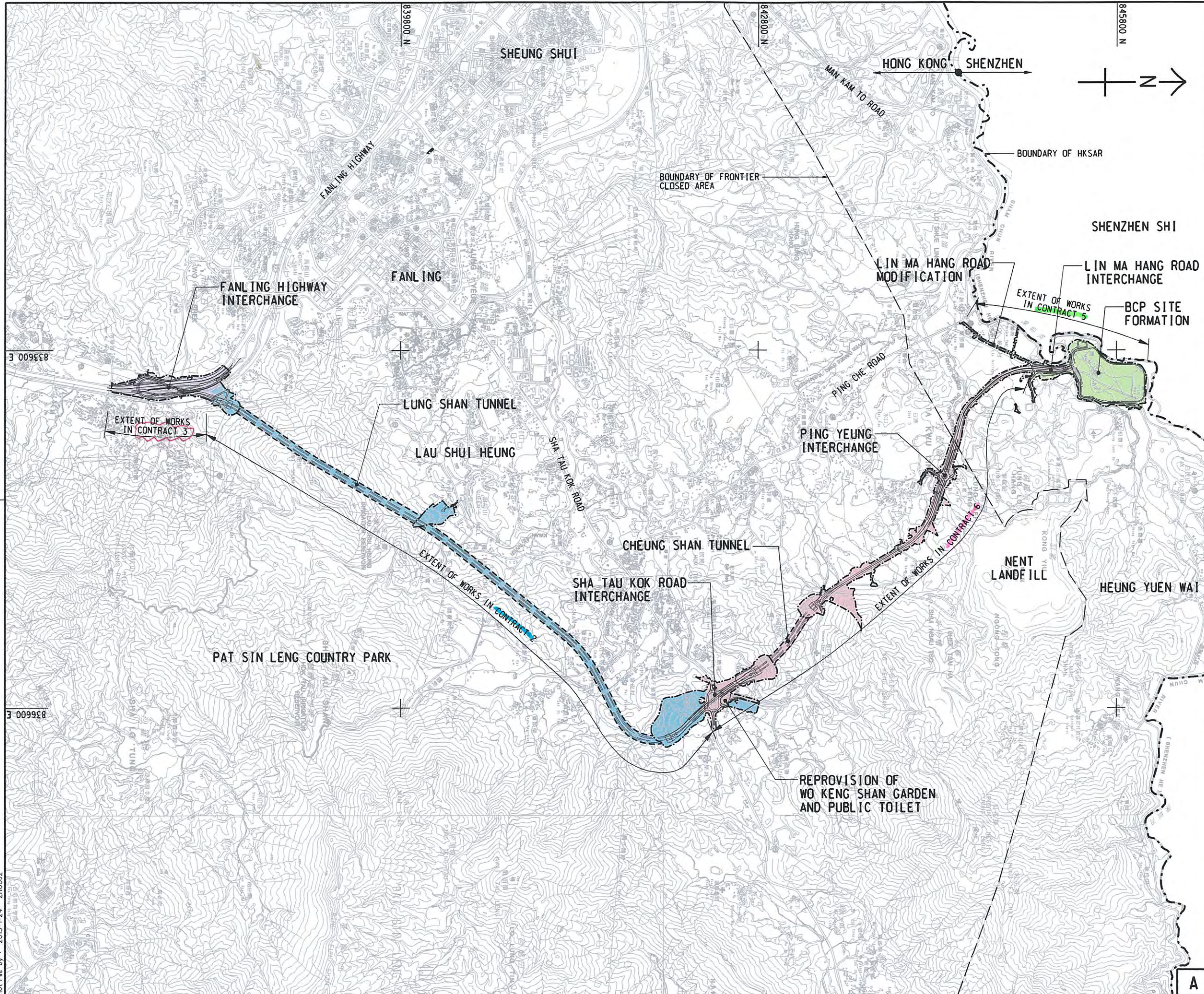
11.1 CONCLUSIONS

- 11.1.1 This is 3rd monthly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from 1 to 31 October 2013.
- 11.1.2 No 24-hour or 1-hour TSP monitoring results that triggered the Action or Limit Levels were recorded. No NOEs or the associated corrective actions were therefore issued.
- 11.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement results that exceeded the Limit Level were recorded in the Reporting Period. No NOEs or the associated corrective actions were therefore issued.
- 11.1.4 For water quality monitoring, no Action/ Limit exceedances were triggered according to the set out water quality criteria. No NOEs or the associated corrective actions were therefore issued.
- 11.1.5 No documented complaint, notification of summons or successful prosecution was received by Contract 5.
- 11.1.6 Joint site inspection by the RE, IEC, ET and the Contract 5 main-contractor had carried out on 3, 10, 17, 24 and 31 October 2013. No non-compliance observed during the site inspection. During dry season, air quality mitigation measures such as increase the water spray frequency (at least eight times per day) in haul road to prevent construction dust emission is reminded. The environmental performance of the Project of Contract 5 was therefore considered as satisfactory.

11.2 RECOMMENDATIONS

- 11.2.1 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.
- 11.2.2 Moreover, muddy water and other water quality pollutants via site surface water runoff get into Kong Yiu Channel or to public areas should be avoided. Mitigation measures for water quality should be properly implemented.
- 11.2.3 Construction noise should be a key environmental impact during the works. The noise mitigation measures such as use of quiet plants or temporary noise barrier installation at the construction noise predominate area should be implemented as accordance with the EM&A requirement.
- 11.2.4 Mosquito control measures should be continued to prevent mosquito breeding on site.

Appendix A
Layout plan of the Project



LOCATION PLAN
SCALE 1 : 3000

LEGEND:
 --- SITE BOUNDARY
 - - - UNDERGROUND WORKS SITE BOUNDARY

REV.	DESCRIPTION	DATE

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

Liantang/Heung Yuen Wai Boundary Control Point and Associated Works (Site Formation and Infrastructures) - Design and Construction

PROJECT LAYOUT PLAN



DRG. NO. 圖紙編號 60212563/PLP/001

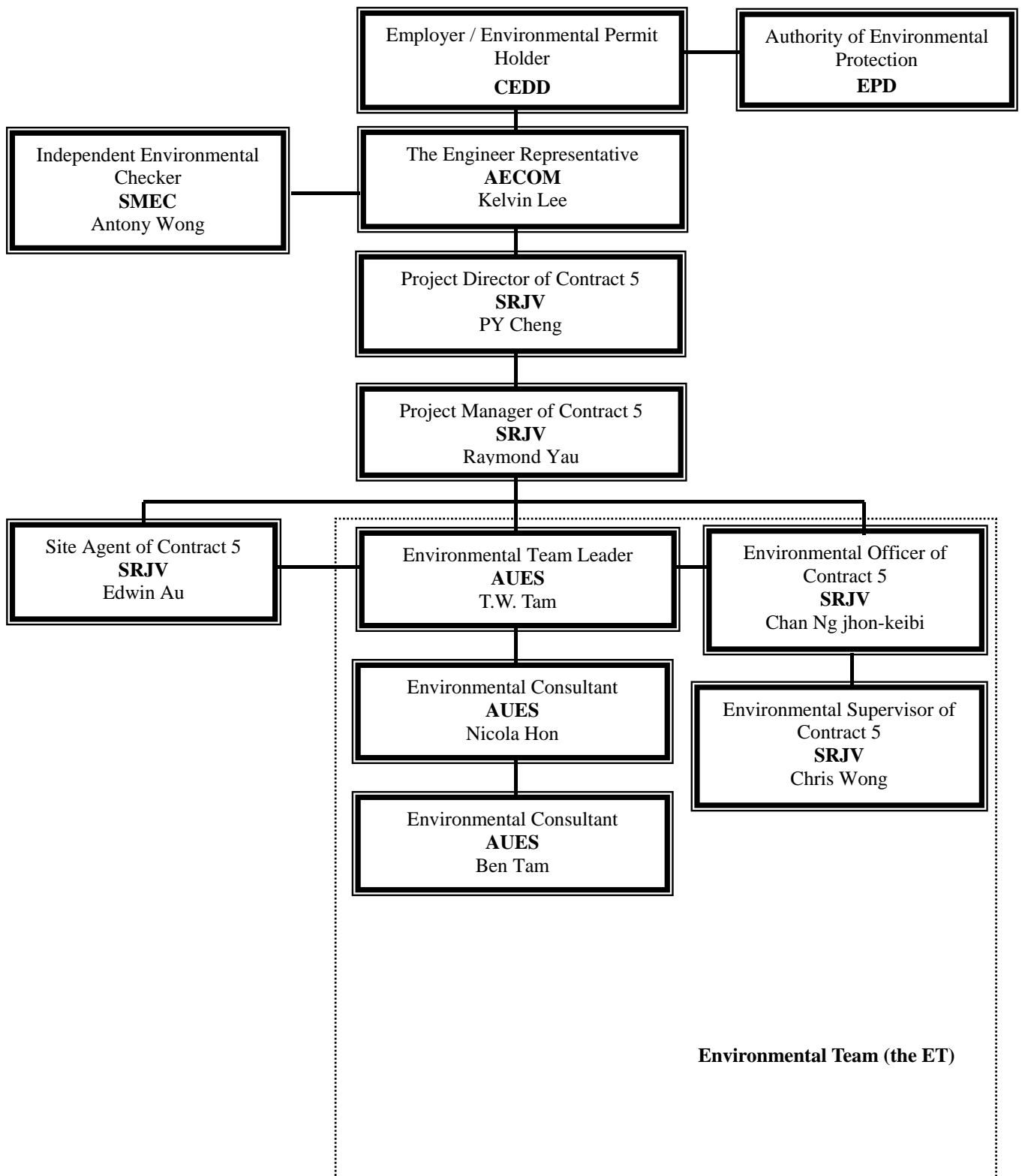
DESIGNED BY 設計人: ZJ
 CHECKED BY 校核人: ZJ
 STATUS 狀態: A1

SCALE 比例尺: A1 1 : 15000
 DIMENSIONS ARE IN 尺寸單位: METRES
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Plot File by : 2013-1-24 ZHOUJ2

Appendix B

Organization Chart



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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
AECOM	Engineer's Representative	Kelvin Lee	2674 2273	3992 9797
SMEC	Independent Environmental Checker	Antony Wong	3995 8120	3995 8101
SRJV	Project Director	PY Cheng	9023 4821	2403 1162
SRJV	Contract Manager	Raymond Yu	9041 1620	2403 1162
SRJV	Project Manager	Aaron Mak	9464 7095	2403 1162
SRJV	Site Agent	Edwin Au	9208 7329	2403 1162
SRJV	Environmental Officer	Chan Ng jhon-keibi	6090 0183	2403 1162
SRJV	Environmental Supervisor	Chris Wong	6387 4683	2403 1162
AUES	Environmental Team Leader	T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Ben Tam	2959 6059	2959 6079

Legend:*CEDD (Employer) – Civil Engineering and Development Department**AECOM (Engineer) – AECOM Asia Co. Ltd.**SRJV (Main Contractor) – Sang Hing Civil – Richwell Machinery JV**SMEC (IEC) – SMEC Asia Limited**AUES (ET) – Action-United Environmental Services & Consulting*

Appendix C

Master Construction Programme for Contract 5

Works Programme (Rev.1)

ID	WBS	Task Name	Duration	Start	Finish	Critical	2013			2014			2015			
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
1	1	Key Dates	1110 days	Thu 28/3/13	Sun 10/4/16	Yes										
2	1.1	Contract Award & Commencement	14 days	Thu 28/3/13	Thu 11/4/13	Yes										
5	1.2	Site Possession Date	542 days	Thu 11/4/13	Sat 4/10/14	No										
28	1.3	Section Completion Date	976 days	Thu 8/8/13	Sun 10/4/16	Yes										
44	1.4	Stage Completion Date	60 days	Thu 8/8/13	Mon 7/10/13	No										
47	2	Preliminaries and Statuary / Contractual Submissions	726 days	Thu 11/4/13	Mon 6/4/15	Yes										
48	2.1	Site Establishment	400 days	Thu 11/4/13	Thu 15/5/14	No										
49	2.1.1	Take over of the Engineer Accommodation	0 days	Thu 11/4/13	Thu 11/4/13	No										
50	2.1.2	Temporary Accommodation for the Contractor	45 days	Thu 11/4/13	Sat 25/5/13	No										
51	2.1.3	Initial Survey	400 days	Thu 11/4/13	Thu 15/5/14	No										
52	2.1.4	Project Signboard	45 days	Wed 2/10/13	Fri 15/11/13	No										
57	2.1.5	Setup and Management of TMLG	60 days	Thu 11/4/13	Sun 9/6/13	No										
58	2.1.6	Setup and Management of ULG	60 days	Thu 11/4/13	Sun 9/6/13	No										
59	2.2	Applications to Government Department	90 days	Thu 11/4/13	Tue 9/7/13	No										
60	2.2.1	Application of excavation permit	90 days	Thu 11/4/13	Tue 9/7/13	No										
61	2.2.2	Application of Waste water discharge license	45 days	Thu 11/4/13	Sat 25/5/13	No										
62	2.2.3	Application of chemical waste producer permit	45 days	Thu 11/4/13	Sat 25/5/13	No										
63	2.2.4	Application of trip ticket system	45 days	Thu 11/4/13	Sat 25/5/13	No										
64	2.3	Temporary Traffic Arrangement (TTA) Scheme for temp. LMH Rd	132 days	Thu 11/4/13	Tue 20/8/13	Yes										
65	2.3.1	Submission / approval of traffic consultant	7 days	Thu 11/4/13	Wed 17/4/13	Yes										
66	2.3.2	Preparation of TTA scheme	45 days	Thu 18/4/13	Sat 1/6/13	Yes										
67	2.3.3	Comment & approval of TTA scheme by TD & RMO	66 days	Sun 2/6/13	Tue 6/8/13	Yes										
68	2.3.4	Obtain roadwork advice from RMO	14 days	Wed 7/8/13	Tue 20/8/13	Yes										
69	2.4	Utility Diversion	726 days	Thu 11/4/13	Mon 6/4/15	No										
70	2.4.1	Obtain most update utility drawings from various utility undertakers	30 days	Thu 11/4/13	Fri 10/5/13	No										
71	2.4.2	Liaise with various utility undertakers	195 days	Thu 11/4/13	Tue 22/10/13	No										
72	2.4.3	Diversion of existing utilities by various UU (if necessary)	531 days	Wed 23/10/13	Mon 6/4/15	No										
73	2.4.3.1	LV cables	200 days	Wed 23/10/13	Sat 10/5/14	No										
77	2.4.3.2	11kV cables	200 days	Wed 23/10/13	Sat 10/5/14	No										
81	2.4.3.3	132kV cables	351 days	Mon 21/4/14	Mon 6/4/15	No										
86	2.4.3.4	PCCW	414 days	Mon 17/2/14	Mon 6/4/15	No										
92	2.4.3.5	WSD water mains	414 days	Mon 17/2/14	Mon 6/4/15	No										
98	2.5	Tree Works	59 days	Thu 11/4/13	Sat 8/6/13	No										
99	2.5.1	Submission / approval of landscape specialist	14 days	Thu 11/4/13	Wed 24/4/13	No										
100	2.5.2	Submission of tree survey report	45 days	Thu 25/4/13	Sat 8/6/13	No										
101	2.6	Environmental Baseline & Impact Monitoring	133 days	Thu 11/4/13	Wed 21/8/13	Yes										
102	2.6.1	Obtain Environmental Permit (EP) -- EP-404/2011	0 days	Thu 11/4/13	Thu 11/4/13	No										
103	2.6.2	Appointment of ET	0 days	Thu 11/4/13	Thu 11/4/13	No										
104	2.6.3	Approval of ET from EPD	7 days	Fri 12/4/13	Thu 18/4/13	No										
105	2.6.4	Preparation of method statement for baseline monitoring by ET	20 days	Fri 19/4/13	Wed 8/5/13	No										
106	2.6.5	Submission of relevant management plans & reports by Others	36 days	Thu 11/4/13	Thu 16/5/13	Yes										
107	2.6.6	Certify the method statement, management plans & reports by ET	15 days	Fri 17/5/13	Fri 31/5/13	No										
108	2.6.7	Verify the EM&A manual, management plans & reports by IEC	20 days	Wed 22/5/13	Mon 10/6/13	No										
109	2.6.8	Management plans & reports submitted to EPD three month before commencement of Construction works	97 days	Fri 17/5/13	Wed 21/8/13	Yes										
110	2.6.9	Cary out the baseline monitoring and preparation of report	35 days	Tue 11/6/13	Mon 15/7/13	No										
111	2.6.10	Baseline monitoring report submitted to EPD one month before commencement of Construction works	36 days	Tue 16/7/13	Tue 20/8/13	No										
112	3	Stage of the Works	180 days	Thu 11/4/13	Mon 7/10/13	Yes										
113	3.1	Stage I of the Works - Temporary vehicular bridge B and temporary Lin Ma Hang Road	180 days	Thu 11/4/13	Mon 7/10/13	Yes										

Revision: 1	Task		Project Summary		Duration-only		Finish-only		Critical Split		
	Split		Inactive Milestone		Manual Summary Rollup		External Tasks		Progress		
	Milestone		Inactive Summary		Manual Summary		External Milestone		Deadline		
	Summary		Manual Task		Start-only		Critical				

Works Programme (Rev.1)

ID	WBS	Task Name	Duration	Start	Finish	Critical	2013			2014			2015		
							Jan	Feb	Mar	Jan	Feb	Mar	Jan	Feb	Mar
114	3.1.1	Submissions	70 days	Thu 11/4/13	Wed 19/6/13	Yes									
115	3.1.2	Approval of Submissions	69 days	Fri 14/6/13	Wed 21/8/13	Yes									
116	3.1.3	Construction of temporary vehicular bridge "B"	47 days	Thu 22/8/13	Mon 7/10/13	Yes									
136	3.1.4	Construction of temporary Lin Ma Hang Road	41 days	Wed 28/8/13	Mon 7/10/13	Yes									
145	3.2	Stage II of the Works - Temporary ArchSD Depot (LMH2)	79 days	Thu 11/4/13	Fri 28/6/13	No									
149	4	Section of the Works	1096 days	Thu 11/4/13	Sun 10/4/16	Yes									
150	4.1	Section I of the Works - Ground Investigation field works (Drg. 7101A-7111A)	244 days	Wed 5/6/13	Mon 3/2/14	No									
196	4.2	Section II of the Works - All laboratory tests for Section I	234 days	Mon 15/7/13	Wed 5/3/14	No									
205	4.3	Section III of the Works - Site formation works for Portions RS1, RS2 & RS3 (seek for certificate of completion in letter ref. SRJV/W47/SO/J5/1308/00416 dated 23/8/2013)	89 days	Sun 12/5/13	Thu 8/8/13	Yes									
243	4.4	Section IV of the Works - Village house within portion RS4 - 8.25m(L) x 7.88m(W) x 10.3m (H)	356 days	Thu 11/4/13	Tue 1/4/14	Yes									
244	4.4.1	Original Planning for Section IV of the Works	270 days	Thu 11/4/13	Sun 5/1/14	Yes									
252	4.4.2	Revised Planning for Section IV of the Works due to late instruction (letter ref. PWKL:rswl:60212563/C5/M15/400-2409 dated 6/8/2013)	239 days	Tue 6/8/13	Tue 1/4/14	Yes									
253	4.4.2.1	Site Instruction from the Engineer	0 days	Tue 6/8/13	Tue 6/8/13	Yes									
254	4.4.2.2	Submissions / Approval of material	45 days	Tue 6/8/13	Thu 19/9/13	Yes									
255	4.4.2.3	Foundation	60 days	Tue 10/9/13	Fri 8/11/13	Yes									
261	4.4.2.4	G/F - Ground beam, slab & BS works	50 days	Sat 26/10/13	Sat 14/12/13	Yes									
266	4.4.2.5	1/F - Beam, wall, slab & BS works	50 days	Sun 1/12/13	Sun 19/1/14	Yes									
271	4.4.2.6	2/F - Beam, wall, slab & BS works	50 days	Mon 6/1/14	Mon 24/2/14	Yes									
276	4.4.2.7	R/F - Beam, wall, slab & BS works	50 days	Tue 11/2/14	Tue 1/4/14	Yes									
281	4.5	Section V of the Works - All works within portion RS4 exclude Section IV	428 days	Thu 11/4/13	Thu 12/6/14	Yes									
282	4.5.1	Submissions and method statement	31 days	Thu 11/4/13	Sat 11/5/13	Yes									
283	4.5.2	Approvals from ER	30 days	Fri 26/4/13	Sat 25/5/13	Yes									
284	4.5.3	Original Plan for Construction of footbridge and staircase with mini-piles 8 nos. x Ø 273 and staircase (Drg. 2201A to 2207B, 6001B)	235 days	Thu 16/5/13	Sun 5/1/14	Yes									
373	4.5.4	Revised Plan upon instructions from Engineer for Construction of footbridge and staircase with mini-piles 8 nos. x Ø 273 and staircase (Drg. 2201A to 2207B, 6001B)	263 days	Mon 23/9/13	Thu 12/6/14	Yes									
374	4.5.4.1	assume receive Instruction from the Engineer	0 days	Mon 23/9/13	Mon 23/9/13	Yes									
375	4.5.4.2	Submissions and method statement	7 days	Mon 23/9/13	Sun 29/9/13	Yes									
376	4.5.4.3	Approvals from ER	21 days	Mon 30/9/13	Sun 20/10/13	Yes									
377	4.5.4.4	Mini-piles	60 days	Mon 21/10/13	Thu 19/12/13	Yes									
387	4.5.4.5	Pile Caps	52 days	Sun 24/11/13	Tue 14/1/14	Yes									
404	4.5.4.6	Abutments	45 days	Wed 18/12/13	Fri 31/1/14	Yes									
415	4.5.4.7	Wing walls	45 days	Sat 4/1/14	Mon 17/2/14	Yes									
426	4.5.4.8	Mass concrete	41 days	Tue 21/1/14	Sun 2/3/14	Yes									
435	4.5.4.9	Remove sheetpiles from abutments	10 days	Mon 3/3/14	Wed 12/3/14	Yes									
436	4.5.4.10	Beams	46 days	Thu 13/3/14	Sun 27/4/14	Yes									
448	4.5.4.11	Deck	34 days	Mon 28/4/14	Sat 31/5/14	Yes									
455	4.5.4.12	Compact fill behind abutments	14 days	Thu 13/3/14	Wed 26/3/14	Yes									
456	4.5.4.13	New footpath	21 days	Thu 27/3/14	Wed 16/4/14	Yes									
459	4.5.4.14	New staircase	36 days	Thu 17/4/14	Thu 22/5/14	Yes									
466	4.5.4.15	Miscellaneous (pedestrian parapet, granite tile etc.)	21 days	Fri 23/5/14	Thu 12/6/14	Yes									
469	4.6	Section VII of the Works - All works within Area CRD	248 days	Mon 9/9/13	Wed 14/5/14	No									

Revision: 1	Task		Project Summary		Duration-only		Finish-only		Critical Split	
	Split		Inactive Milestone		Manual Summary Rollup		External Tasks		Progress	
	Milestone		Inactive Summary		Manual Summary		External Milestone		Deadline	
	Summary		Manual Task		Start-only		Critical			

Contract No. CV/2013/03 - Liantang/ Heung Yuen Wai Boundary Control Point - Site Formation and Infrastructure Works - Contract 5

Works Programme (Rev.1)

ID	WBS	Task Name	Duration	Start	Finish	Critical	2013			2014			2015				
							Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov
470	4.6.1	Submissions	30 days	Mon 9/9/13	Tue 8/10/13	No											
471	4.6.2	Approval of submissions	31 days	Mon 23/9/13	Wed 23/10/13	No											
472	4.6.3	Further Archaeological survey (Section T3)(Drg.6403A)	40 days	Thu 6/3/14	Mon 14/4/14	No											
476	4.6.4	Remaining works at other portions within CRD	165 days	Sun 1/12/13	Wed 14/5/14	No											
477	4.6.4.1	temporary fill slopes & Chain link fence (150m) & Modified CEDD hoarding Type III (130m)(Drg. 1032B)	121 days	Sun 1/12/13	Mon 31/3/14	No											
490	4.6.4.2	waterworks within CRD (Drg.1913B)	56 days	Thu 20/3/14	Wed 14/5/14	No											
495	4.6.4.3	roadwork for end of LMH Rd within CRD	28 days	Tue 15/4/14	Mon 12/5/14	No											
498	4.7	Section VIII of the Works - All works within Area BCPA	485 days	Tue 11/6/13	Wed 8/10/14	No											
499	4.7.1	Submissions	72 days	Tue 11/6/13	Wed 21/8/13	No											
500	4.7.2	Approval of submissions	50 days	Thu 22/8/13	Thu 10/10/13	No											
501	4.7.3	Site formation of land (import fill 103000m3) including slope drainage works	363 days	Fri 11/10/13	Wed 8/10/14	No											
534	4.7.4	Chain link fence (1150m)(Drg/ 1033B)	100 days	Tue 1/7/14	Wed 8/10/14	No											
545	4.8	Section IX of the Works - All works within Area BCPB	669 days	Tue 11/6/13	Fri 10/4/15	No											
546	4.8.1	Submissions	75 days	Tue 11/6/13	Sat 24/8/13	No											
547	4.8.2	Approval of submissions	50 days	Sun 25/8/13	Sun 13/10/13	No											
548	4.8.3	Demolition of existing building structures UPON instruction (Drg. 6152A, 6153A)	240 days	Mon 14/10/13	Tue 10/6/14	No											
570	4.8.4	Site formation works (import fill 90000m3)	544 days	Sun 13/10/13	Thu 9/4/15	No											
619	4.8.5	Utilities diversions (Drg.1405A, 1406A, 1407A)	150 days	Thu 14/8/14	Sat 10/1/15	No											
634	4.8.6	Temp. boundary fence (230m), chain link fence (790m)(Drg.1002C, 1032B, 1033B)	120 days	Fri 12/12/14	Fri 10/4/15	No											
647	4.9	Section X of the Works - All works within Area BCPC	268 days	Mon 9/9/13	Tue 3/6/14	No											
648	4.9.1	Submissions	21 days	Mon 9/9/13	Sun 29/9/13	No											
649	4.9.2	Approval of Submissions	24 days	Sun 15/9/13	Tue 8/10/13	No											
650	4.9.3	Construction of retaining wall RW2-CH840-1025 (length approx. 185m)	248 days	Tue 24/9/13	Thu 29/5/14	No											
746	4.9.4	Site Formation works (import fill 33000m3)	200 days	Sat 16/11/13	Tue 3/6/14	No											
766	4.9.5	Drainage Works & Irrigation System (Drg.1305C, 1975B)	60 days	Sat 5/4/14	Tue 3/6/14	No											
772	4.9.6	Utilities Works (Drg. 1405A)	30 days	Sun 20/4/14	Mon 19/5/14	No											
776	4.10	Section XI of the Works - All works within Area BCPD	597 days	Thu 22/8/13	Fri 10/4/15	No											
777	4.10.1	Submissions	20 days	Thu 22/8/13	Tue 10/9/13	No											
778	4.10.2	Approval of Submissions	27 days	Thu 29/8/13	Tue 24/9/13	No											
779	4.10.3	Construction of retaining wall RW2 - CH0 to 840 (length 840m)	417 days	Sun 20/10/13	Wed 10/12/14	No											
1147	4.10.4	Boundary fence (length 1635m)(Drg.1002C, 1003A)	300 days	Sun 15/6/14	Fri 10/4/15	No											
1175	4.10.5	Site Formation works (import fill 36000m3) including slope drainage works (Drg. 7155B-7159B)	495 days	Mon 2/12/13	Fri 10/4/15	No											
1221	4.10.6	Construction of depressed road & underpass - 9.3m wide x 168m long	406 days	Tue 17/12/13	Mon 26/1/15	No											
1306	4.10.7	Sewerage, Drainage & Water Works (Drg. 1323B,1305C,1308A,1309A,1915B)	365 days	Sat 22/3/14	Sat 21/3/15	No											
1339	4.10.8	Irrigation System near Chuk Yuen (Drg. 1975B)	60 days	Tue 27/1/15	Fri 27/3/15	No											
1345	4.10.9	Utilities Works (Drg. 1405)	60 days	Fri 6/2/15	Mon 6/4/15	No											
1351	4.10.10	Road works and Road lighting works (Drg.1505C)	160 days	Sat 1/11/14	Thu 9/4/15	No											
1366	4.11	Section XII of the Works - All works within Area LMH	535 days	Thu 22/8/13	Sat 7/2/15	Yes											
1367	4.11.1	Submissions	70 days	Thu 22/8/13	Wed 30/10/13	Yes											
1368	4.11.2	Approval of Submissions	69 days	Thu 29/8/13	Tue 5/11/13	Yes											
1369	4.11.3	Construct temporary haul roads	69 days	Thu 29/8/13	Tue 5/11/13	No											
1370	4.11.4	Construction of retaining wall RW1 - CH0 to 561.053m (length approx. 561m)	403 days	Mon 7/10/13	Thu 13/11/14	No											

Revision: 1	Task		Project Summary		Duration-only		Finish-only		Critical Split	
	Split		Inactive Milestone		Manual Summary Rollup		External Tasks		Progress	
	Milestone		Inactive Summary		Manual Summary		External Milestone		Deadline	
	Summary		Manual Task		Start-only		Critical			

Contract No. CV/2013/03 - Liantang/ Heung Yuen Wai Boundary Control Point - Site Formation and Infrastructure Works - Contract 5

Works Programme (Rev.1)

ID	WBS	Task Name	Duration	Start	Finish	Critical	2013			2014			2015																	
							A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M
1635	4.11.5	Construction of retaining wall RW1A-CH561.053 to 612.457m (length approx.. 51.4m)	75 days	Thu 18/9/14	Mon 1/12/14	Yes																								
1660	4.11.6	Site formation works (import fill 15300m3) including slope drainage works (Drg. 7154B, 7159B)	285 days	Mon 17/2/14	Fri 28/11/14	No																								
1686	4.11.7	Drainage works and road lighting works at Lin Ma Hang Road (Drg. 1304B, 1306A, 1307A, 1309A)	160 days	Mon 24/3/14	Sat 30/8/14	No																								
1701	4.11.8	Water works & Irrigation System at Lin Ma Hang Road (Drg/1914B-1917B, 1974B, 1976A, 1977A)	45 days	Wed 2/7/14	Fri 15/8/14	No																								
1706	4.11.9	Roadwork of carriageway (new Lin Ma Hang Road)	92 days	Thu 8/5/14	Thu 7/8/14	No																								
1718	4.11.10	Construction of footpath	90 days	Wed 6/8/14	Mon 3/11/14	No																								
1719	4.11.11	Construction of pedestrian subway & pump room (5m x 4.3m x 31m long)	263 days	Fri 25/10/13	Mon 14/7/14	No																								
1767	4.11.12	Construction of staircase with lift shaft with 4 nos. of mini pile	300 days	Tue 8/10/13	Sun 3/8/14	Yes																								
1804	4.11.13	Ground investigation	31 days	Tue 1/10/13	Thu 31/10/13	No																								
1808	4.11.14	1 no. DN1650 pipe jacking LV009 works (120m in BQ, 50m in Drg.) including jacking & receiving pits	125 days	Wed 6/11/13	Mon 10/3/14	Yes																								
1824	4.11.15	Construction of retaining wall RW9 - CH0 to 75m (length 75m)	93 days	Thu 7/8/14	Fri 7/11/14	No																								
1851	4.11.16	Construction of Bridge J with 6 x Ø 1500 bored pile - 7.9m wide x 30m long	250 days	Tue 11/3/14	Sat 15/11/14	Yes																								
1880	4.11.17	Construction of retaining wall RW5 - CH0 to 60m (length 60m)	84 days	Sun 16/11/14	Sat 7/2/15	Yes																								
1886	4.12	Section XIII of the Works - Works not covered in any other Sections	598 days	Thu 22/8/13	Sat 11/4/15	Yes																								
1887	4.12.1	Submissions	70 days	Thu 22/8/13	Wed 30/10/13	No																								
1888	4.12.2	Approval of Submissions	69 days	Thu 29/8/13	Tue 5/11/13	No																								
1889	4.12.3	Temporary Traffic Arrangement (TTA) Scheme for Works at existing LMH Rd	55 days	Fri 23/8/13	Wed 16/10/13	No																								
1893	4.12.4	Diversions of existing traffic flow	530 days	Thu 17/10/13	Mon 30/3/15	No																								
1948	4.12.5	Archaeological survey (Sections T1 & T2)(Drg. 6403A)	217 days	Mon 21/10/13	Sun 25/5/14	No																								
1969	4.12.6	Drainage & slope drainage works at Lin Ma Hang Road (Drg.1301A-1303C, 7151B)	350 days	Thu 17/10/13	Wed 1/10/14	No																								
2001	4.12.7	Sewerage works at Lin Ma Hang Road (Drg. 1321A)	60 days	Mon 26/5/14	Thu 24/7/14	No																								
2007	4.12.8	Water works & utilities works at Lin Ma Hang Road (Drg. 1911A-1913B, 1401A-1403A)	365 days	Fri 10/1/14	Fri 9/1/15	No																								
2040	4.12.9	Roadwork for existing Lin Ma Hang Road (Drg.1201A-1203B, 1221C-1223A, 1501A-1503A, 1603B)	356 days	Sun 20/4/14	Fri 10/4/15	No																								
2072	4.12.10	Irrigation system (Drg. 1971A-1973B) & footpath construction	350 days	Sun 20/4/14	Sat 4/4/15	No																								
2104	4.12.11	Construction of retaining wall RW8 - CH0 to 22 (3 bays)	90 days	Fri 12/9/14	Wed 10/12/14	No																								
2127	4.12.12	Site Formation works for ArchSD Depot (Drg. 1001B)	60 days	Thu 11/12/14	Sun 8/2/15	No																								
2133	4.12.13	Slope drainage works (Drg. 7151B, 7159B)	60 days	Mon 9/2/15	Thu 9/4/15	No																								
2139	4.12.14	Existing road to be improved & run-in to the site to be constructed at RS1 (Drg.1203A, 1001B)(latest)	180 days	Tue 14/10/14	Sat 11/4/15	Yes																								
2156	4.12.15	Access road to be re-constructed / upgraded at RS3 (Drg/1203B)(latest)	180 days	Tue 14/10/14	Sat 11/4/15	Yes																								
2173	4.12.16	Outstanding Ground Investigation field works for Section I of the Works (due to late handed over for Area BCP4 and installation after construction)	88 days	Sun 16/3/14	Wed 11/6/14	No																								
2181	4.13	Section XIV of the Works - Trees preservation and protection	731 days	Thu 11/4/13	Sat 11/4/15	Yes																								
2182	4.13.1	Submissions	70 days	Thu 11/4/13	Wed 19/6/13	No																								
2183	4.13.2	Approval of Submissions	69 days	Fri 14/6/13	Wed 21/8/13	No																								
2184	4.13.3	Tree felling/removal works and tree transplanting works	500 days	Fri 6/9/13	Sun 18/1/15	No																								
2230	4.13.4	Preservation and Protection of Existing Trees in all Portion of the Site	580 days	Mon 9/9/13	Sat 11/4/15	Yes																								
2283	4.14	Section XV of the Works - Landscape soft works	307 days	Mon 9/6/14	Sat 11/4/15	Yes																								

Revision: 1	Task		Project Summary		Duration-only		Finish-only		Critical Split	
	Split		Inactive Milestone		Manual Summary Rollup		External Tasks		Progress	
	Milestone		Inactive Summary		Manual Summary		External Milestone		Deadline	
	Summary		Manual Task		Start-only		Critical			

Works Programme (Rev.1)

ID	WBS	Task Name	Duration	Start	Finish	Critical	2013			2014			2015													
							A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
2284	4.14.1	Landscape Soft works in all Portions of the Site (including transplant trees to permanent locations)	307 days	Mon 9/6/14	Sat 11/4/15	Yes																				
2285	4.15	Section XVI of the Works - Establishment works for landscape soft works	365 days	Sun 12/4/15	Sun 10/4/16	Yes																				
2286	4.15.1	Establishment works for all Portions of the Site	365 days	Sun 12/4/15	Sun 10/4/16	Yes																				

Revision: 1	Task		Project Summary		Duration-only		Finish-only		Critical Split	
	Split		Inactive Milestone		Manual Summary Rollup		External Tasks		Progress	
	Milestone		Inactive Summary		Manual Summary		External Milestone		Deadline	
	Summary		Manual Task		Start-only		Critical			

3 Month Rolling Programme (Rev. 1) for August 20, 2013 to November 2013

ID	WBS	Task Name	Duration	Start	Finish	Timeline													
						18/8	25/8	1/9	8/9	15/9	22/9	29/9	6/10	13/10	20/10	27/10	3/11	10/11	17/11
312	4.5.3.3	Abutments	45 days	Sat 13/7/13	Mon 26/8/13	[Gantt bar from 13/7 to 26/8]													
323	4.5.3.4	Wing walls	45 days	Tue 30/7/13	Thu 12/9/13	[Gantt bar from 30/7 to 12/9]													
334	4.5.3.5	Mass concrete	41 days	Fri 16/8/13	Wed 25/9/13	[Gantt bar from 16/8 to 25/9]													
343	4.5.3.6	Remove sheetpiles from abutments	10 days	Thu 26/9/13	Sat 5/10/13	[Gantt bar from 26/9 to 5/10]													
344	4.5.3.7	Beams	46 days	Sun 6/10/13	Wed 20/11/13	[Gantt bar from 6/10 to 20/11]													
356	4.5.3.8	Deck	34 days	Thu 21/11/13	Tue 24/12/13	[Gantt bar from 21/11 to 24/12]													
361	4.5.3.9	Compact fill behind abutments	14 days	Sun 6/10/13	Sat 19/10/13	[Gantt bar from 6/10 to 19/10]													
362	4.5.3.10	New footpath	21 days	Sun 20/10/13	Sat 9/11/13	[Gantt bar from 20/10 to 9/11]													
365	4.5.3.11	New staircase	36 days	Sun 10/11/13	Sun 15/12/13	[Gantt bar from 10/11 to 15/12]													
372	4.5.3.12	Miscellaneous (pedestrian parapet, granite tile etc.)	21 days	Mon 16/12/13	Sun 5/1/14	[Gantt bar from 16/12 to 5/1]													
373	4.5.4	Revised Plan upon instructions from Engineer for Construction of footbridge and staircase with mini-piles 8 nos. x Ø273 and staircase (Drg. 2201A to 2207B, 6001B)	263 days	Mon 23/9/13	Thu 12/6/14	[Gantt bar from 23/9 to 12/6]													
374	4.5.4.1	assume receive Instruction from the Engineer	0 days	Mon 23/9/13	Mon 23/9/13	[Gantt bar from 23/9 to 23/9]													
375	4.5.4.2	Submissions and method statement	7 days	Mon 23/9/13	Sun 29/9/13	[Gantt bar from 23/9 to 29/9]													
376	4.5.4.3	Approvals from ER	21 days	Mon 30/9/13	Sun 20/10/13	[Gantt bar from 30/9 to 20/10]													
377	4.5.4.4	Mini-piles	60 days	Mon 21/10/13	Thu 19/12/13	[Gantt bar from 21/10 to 19/12]													
378	4.5.4.4.1	prepare platform for mini-pile	4 days	Mon 21/10/13	Thu 24/10/13	[Gantt bar from 21/10 to 24/10]													
379	4.5.4.4.2	establish mini-pile rig & confirm setting out	4 days	Fri 25/10/13	Mon 28/10/13	[Gantt bar from 25/10 to 28/10]													
380	4.5.4.4.3	drill 1st-4th mini-piles	8 days	Tue 29/10/13	Tue 5/11/13	[Gantt bar from 29/10 to 5/11]													
381	4.5.4.4.4	blow clean 1st-4th mini-piles and fix steel bars	8 days	Wed 6/11/13	Wed 13/11/13	[Gantt bar from 6/11 to 13/11]													
382	4.5.4.4.5	grout 1st-4th mini-piles	8 days	Thu 14/11/13	Thu 21/11/13	[Gantt bar from 14/11 to 21/11]													
383	4.5.4.4.6	establish mini-pile rig & confirm setting out	4 days	Fri 22/11/13	Mon 25/11/13	[Gantt bar from 22/11 to 25/11]													
384	4.5.4.4.7	drill 5th-8th mini-piles	8 days	Tue 26/11/13	Tue 3/12/13	[Gantt bar from 26/11 to 3/12]													
385	4.5.4.4.8	blow clean 5th-8th mini-piles and fix steel bars	8 days	Wed 4/12/13	Wed 11/12/13	[Gantt bar from 4/12 to 11/12]													
386	4.5.4.4.9	grout 5th-8th mini-piles	8 days	Thu 12/12/13	Thu 19/12/13	[Gantt bar from 12/12 to 19/12]													
387	4.5.4.5	Pile Caps	52 days	Sun 24/11/13	Tue 14/1/14	[Gantt bar from 24/11 to 14/1]													
388	4.5.4.5.1	1st pile cap	24 days	Sun 24/11/13	Tue 17/12/13	[Gantt bar from 24/11 to 17/12]													
389	4.5.4.5.1.1	temporary sheetpiles	4 days	Sun 24/11/13	Wed 27/11/13	[Gantt bar from 24/11 to 27/11]													
390	4.5.4.5.1.2	excavation	3 days	Thu 28/11/13	Sat 30/11/13	[Gantt bar from 28/11 to 30/11]													
391	4.5.4.5.1.3	prepare formation and lay blinding layer	2 days	Sun 1/12/13	Mon 2/12/13	[Gantt bar from 1/12 to 2/12]													
392	4.5.4.5.1.4	formwork for pile cap	3 days	Tue 3/12/13	Thu 5/12/13	[Gantt bar from 3/12 to 5/12]													
393	4.5.4.5.1.5	fix reinforcement	3 days	Fri 6/12/13	Sun 8/12/13	[Gantt bar from 6/12 to 8/12]													
394	4.5.4.5.1.6	concrete the pile cap	2 days	Mon 9/12/13	Tue 10/12/13	[Gantt bar from 9/12 to 10/12]													
395	4.5.4.5.1.7	curing and strip formwork	7 days	Wed 11/12/13	Tue 17/12/13	[Gantt bar from 11/12 to 17/12]													
396	4.5.4.5.2	2nd pile cap	24 days	Sun 22/12/13	Tue 14/1/14	[Gantt bar from 22/12 to 14/1]													
404	4.5.4.6	Abutments	45 days	Wed 18/12/13	Fri 31/1/14	[Gantt bar from 18/12 to 31/1]													
415	4.5.4.7	Wing walls	45 days	Sat 4/1/14	Mon 17/2/14	[Gantt bar from 4/1 to 17/2]													
426	4.5.4.8	Mass concrete	41 days	Tue 21/1/14	Sun 2/3/14	[Gantt bar from 21/1 to 2/3]													
435	4.5.4.9	Remove sheetpiles from abutments	10 days	Mon 3/3/14	Wed 12/3/14	[Gantt bar from 3/3 to 12/3]													
436	4.5.4.10	Beams	46 days	Thu 13/3/14	Sun 27/4/14	[Gantt bar from 13/3 to 27/4]													
448	4.5.4.11	Deck	34 days	Mon 28/4/14	Sat 31/5/14	[Gantt bar from 28/4 to 31/5]													
455	4.5.4.12	Compact fill behind abutments	14 days	Thu 13/3/14	Wed 26/3/14	[Gantt bar from 13/3 to 26/3]													
456	4.5.4.13	New footpath	21 days	Thu 27/3/14	Wed 16/4/14	[Gantt bar from 27/3 to 16/4]													
459	4.5.4.14	New staircase	36 days	Thu 17/4/14	Thu 22/5/14	[Gantt bar from 17/4 to 22/5]													
466	4.5.4.15	Miscellaneous (pedestrian parapet, granite tile etc.)	21 days	Fri 23/5/14	Thu 12/6/14	[Gantt bar from 23/5 to 12/6]													
469	4.6	Section VII of the Works - All works within Area CRD	248 days	Mon 9/9/13	Wed 14/5/14	[Gantt bar from 9/9 to 14/5]													
470	4.6.1	Submissions	30 days	Mon 9/9/13	Tue 8/10/13	[Gantt bar from 9/9 to 8/10]													
471	4.6.2	Approval of submissions	31 days	Mon 23/9/13	Wed 23/10/13	[Gantt bar from 23/9 to 23/10]													
472	4.6.3	Further Archaeological survey (Section T3)(Drg.6403A)	40 days	Thu 6/3/14	Mon 14/4/14	[Gantt bar from 6/3 to 14/4]													
476	4.6.4	Remaining works at other portions within CRD	165 days	Sun 1/12/13	Wed 14/5/14	[Gantt bar from 1/12 to 14/5]													
477	4.6.4.1	temporary fill slopes & Chain link fence (150m) & Modified CEDD hoarding Type III (130m)(Drg. 1032B)	121 days	Sun 1/12/13	Mon 31/3/14	[Gantt bar from 1/12 to 31/3]													
490	4.6.4.2	waterworks within CRD (Drg.1913B)	56 days	Thu 20/3/14	Wed 14/5/14	[Gantt bar from 20/3 to 14/5]													
495	4.6.4.3	roadwork for end of LMH Rd within CRD	28 days	Tue 15/4/14	Mon 12/5/14	[Gantt bar from 15/4 to 12/5]													
498	4.7	Section VIII of the Works - All works within Area BCPA	485 days	Tue 11/6/13	Wed 8/10/14	[Gantt bar from 11/6 to 8/10]													
499	4.7.1	Submissions	72 days	Tue 11/6/13	Wed 21/8/13	[Gantt bar from 11/6 to 21/8]													
500	4.7.2	Approval of submissions	50 days	Thu 22/8/13	Thu 10/10/13	[Gantt bar from 22/8 to 10/10]													
501	4.7.3	Site formation of land (import fill 103000m3) including slope drainage works	363 days	Fri 11/10/13	Wed 8/10/14	[Gantt bar from 11/10 to 8/10]													
534	4.7.4	Chain link fence (1150m)(Drg/ 1033B)	100 days	Tue 1/7/14	Wed 8/10/14	[Gantt bar from 1/7 to 8/10]													
545	4.8	Section IX of the Works - All works within Area BCPB	669 days	Tue 11/6/13	Fri 10/4/15	[Gantt bar from 11/6 to 10/4]													
546	4.8.1	Submissions	75 days	Tue 11/6/13	Sat 24/8/13	[Gantt bar from 11/6 to 24/8]													
547	4.8.2	Approval of submissions	50 days	Sun 25/8/13	Sun 13/10/13	[Gantt bar from 25/8 to 13/10]													
548	4.8.3	Demolition of existing building structures UPON instruction (Drg. 6152A, 6153A)	240 days	Mon 14/10/13	Tue 10/6/14	[Gantt bar from 14/10 to 10/6]													

Revision: 1

Task	[Solid Blue Bar]	Summary	[Dashed Line]	Inactive Summary	[Dotted Line]	Manual Summary Rollup	[Blue Diamond]	Finish-only	[Arrow]	Critical	[Red Bar]	Deadline	[Down Arrow]
Split	[Dotted Line]	Project Summary	[Arrow]	Manual Task	[Dotted Line]	Manual Summary	[Blue Diamond]	External Tasks	[Diamond]	Critical Split	[Dotted Line]		
Milestone	[Blue Diamond]	Inactive Milestone	[White Box]	Duration-only	[Dotted Line]	Start-only	[Arrow]	External Milestone	[Blue Bar]	Progress	[Black Bar]		

Contract No. CV/2013/03 - Liantang/ Heung Yuen Wai Boundary Control Point - Site Formation and Infrastructure Works - Contract 5

3 Month Rolling Programme (Rev. 1) for August 20, 2013 to November 2013

ID	WBS	Task Name	Duration	Start	Finish	Schedule											
						18/8	25/8	1/9	September			October			November		
						8/9	15/9	22/9	29/9	6/10	13/10	20/10	27/10	3/11	10/11	17/11	
549	4.8.3.1	demolition of existing building structure (1st quarter)	84 days	Mon 14/10/13	Sun 5/1/14												
550	4.8.3.1.1	demolition of existing building structure (1st fortnight)	14 days	Mon 14/10/13	Sun 27/10/13												
551	4.8.3.1.2	demolition of existing building structure (2nd fortnight)	14 days	Mon 28/10/13	Sun 10/11/13												
552	4.8.3.1.3	demolition of existing building structure (3rd fortnight)	14 days	Mon 11/11/13	Sun 24/11/13												
553	4.8.3.1.4	demolition of existing building structure (4th fortnight)	14 days	Mon 25/11/13	Sun 8/12/13												
554	4.8.3.1.5	demolition of existing building structure (5th fortnight)	14 days	Mon 9/12/13	Sun 22/12/13												
555	4.8.3.1.6	demolition of existing building structure (6th fortnight)	14 days	Mon 23/12/13	Sun 5/1/14												
556	4.8.3.2	demolition of existing building structure (2nd quarter)	84 days	Mon 6/1/14	Sun 30/3/14												
563	4.8.3.3	demolition of existing building structure (3rd quarter)	72 days	Mon 31/3/14	Tue 10/6/14												
570	4.8.4	Site formation works (import fill 90000m3)	544 days	Sun 13/10/13	Thu 9/4/15												
571	4.8.4.1	site formation works (1st quarter)	91 days	Sun 13/10/13	Sat 11/1/14												
572	4.8.4.1.1	site formation works (1st fortnight)	14 days	Sun 13/10/13	Sat 26/10/13												
573	4.8.4.1.2	site formation works (2nd fortnight)	14 days	Sun 27/10/13	Sat 9/11/13												
574	4.8.4.1.3	site formation works (3rd fortnight)	14 days	Sun 10/11/13	Sat 23/11/13												
575	4.8.4.1.4	site formation works (4th fortnight)	14 days	Sun 24/11/13	Sat 7/12/13												
576	4.8.4.1.5	site formation works (5th fortnight)	14 days	Sun 8/12/13	Sat 21/12/13												
577	4.8.4.1.6	site formation works (6th fortnight)	14 days	Sun 22/12/13	Sat 4/1/14												
578	4.8.4.1.7	site formation works (7th fortnight)	7 days	Sun 5/1/14	Sat 11/1/14												
579	4.8.4.2	site formation works (2nd quarter)	91 days	Sun 12/1/14	Sat 12/4/14												
587	4.8.4.3	site formation works (3rd quarter)	91 days	Sun 13/4/14	Sat 12/7/14												
595	4.8.4.4	site formation works (4th quarter)	91 days	Sun 13/7/14	Sat 11/10/14												
603	4.8.4.5	site formation works (5th quarter)	91 days	Sun 12/10/14	Sat 10/1/15												
611	4.8.4.6	site formation works (6th quarter)	89 days	Sun 11/1/15	Thu 9/4/15												
619	4.8.5	Utilities diversions (Drg.1405A, 1406A, 1407A)	150 days	Thu 14/8/14	Sat 10/1/15												
634	4.8.6	Temp. boundary fence (230m), chain link fence (790m)(Drg.1002C, 1032B, 1033B)	120 days	Fri 12/12/14	Fri 10/4/15												
647	4.9	Section X of the Works - All works within Area BCPC	268 days	Mon 9/9/13	Tue 3/6/14												
648	4.9.1	Submissions	21 days	Mon 9/9/13	Sun 29/9/13												
649	4.9.2	Approval of Submissions	24 days	Sun 15/9/13	Tue 8/10/13												
650	4.9.3	Construction of retaining wall RW2-CH840-1025 (length approx. 185m)	248 days	Tue 24/9/13	Thu 29/5/14												
651	4.9.3.1	Bay 2110-2137 (28 bays)	248 days	Tue 24/9/13	Thu 29/5/14												
652	4.9.3.1.1	excavation / sheetpile	32 days	Tue 24/9/13	Fri 25/10/13												
653	4.9.3.1.1.1	excavation / sheetpile first 13 bays	14 days	Tue 24/9/13	Mon 7/10/13												
654	4.9.3.1.1.2	excavation / sheetpile second 13 bays	14 days	Tue 8/10/13	Mon 21/10/13												
655	4.9.3.1.1.3	excavation / sheetpile third 2 bays	4 days	Tue 22/10/13	Fri 25/10/13												
656	4.9.3.1.2	grade 200 rock fill	18 days	Wed 2/10/13	Sat 19/10/13												
657	4.9.3.1.2.1	grade 200 rock fill (14 bays)	9 days	Wed 2/10/13	Thu 10/10/13												
658	4.9.3.1.2.2	grade 200 rock fill (14 bays)	9 days	Fri 11/10/13	Sat 19/10/13												
659	4.9.3.1.3	blinding layer	18 days	Sun 6/10/13	Wed 23/10/13												
660	4.9.3.1.3.1	blinding layer (14 bays)	9 days	Sun 6/10/13	Mon 14/10/13												
661	4.9.3.1.3.2	blinding layer (14 bays)	9 days	Tue 15/10/13	Wed 23/10/13												
662	4.9.3.1.4	Bay 2110 to Bay 2113 (base)	12 days	Thu 10/10/13	Mon 21/10/13												
668	4.9.3.1.5	Bay 2114 to Bay 2117 (base)	12 days	Tue 22/10/13	Sat 2/11/13												
674	4.9.3.1.6	Bay 2118 to Bay 2121 (base)	12 days	Sun 3/11/13	Thu 14/11/13												
680	4.9.3.1.7	Bay 2122 to Bay 2125 (base)	12 days	Fri 15/11/13	Tue 26/11/13												
686	4.9.3.1.8	Bay 2126 to Bay 2129 (base)	12 days	Wed 27/11/13	Sun 8/12/13												
692	4.9.3.1.9	Bay 2130 to Bay 2133 (base)	12 days	Mon 9/12/13	Fri 20/12/13												
698	4.9.3.1.10	Bay 2134 to Bay 2137(base)	12 days	Sat 21/12/13	Wed 1/1/14												
704	4.9.3.1.11	Bay 2110 to Bay 2113 (wall)	20 days	Thu 2/1/14	Tue 21/1/14												
710	4.9.3.1.12	Bay 2114 to Bay 2117 (wall)	20 days	Wed 22/1/14	Mon 10/2/14												
716	4.9.3.1.13	Bay 2118 to Bay 2121 (wall)	20 days	Tue 11/2/14	Sun 2/3/14												
722	4.9.3.1.14	Bay 2122 to Bay 2125 (wall)	22 days	Mon 3/3/14	Mon 24/3/14												
728	4.9.3.1.15	Bay 2126 to Bay 2129 (wall)	22 days	Tue 25/3/14	Tue 15/4/14												
734	4.9.3.1.16	Bay 2130 to Bay 2133 (wall)	22 days	Wed 16/4/14	Wed 7/5/14												
740	4.9.3.1.17	Bay 2134 to Bay 2137 (wall)	22 days	Thu 8/5/14	Thu 29/5/14												
746	4.9.4	Site Formation works (import fill 33000m3)	200 days	Sat 16/11/13	Tue 3/6/14												
747	4.9.4.1	site formation works (1st quarter)	91 days	Sat 16/11/13	Fri 14/2/14												
748	4.9.4.1.1	site formation works (1st fortnight)	14 days	Sat 16/11/13	Fri 29/11/13												
749	4.9.4.1.2	site formation works (2nd fortnight)	14 days	Sat 30/11/13	Fri 13/12/13												
750	4.9.4.1.3	site formation works (3rd fortnight)	14 days	Sat 14/12/13	Fri 27/12/13												
751	4.9.4.1.4	site formation works (4th fortnight)	14 days	Sat 28/12/13	Fri 10/1/14												
752	4.9.4.1.5	site formation works (5th fortnight)	14 days	Sat 11/1/14	Fri 24/1/14												
753	4.9.4.1.6	site formation works (6th fortnight)	14 days	Sat 25/1/14	Fri 7/2/14												
754	4.9.4.1.7	site formation works (7th fortnight)	7 days	Sat 8/2/14	Fri 14/2/14												

Revision: 1	Task		Summary		Inactive Summary		Manual Summary Rollup		Finish-only		Critical		Deadline	
	Split		Project Summary		Manual Task		Manual Summary		External Tasks		Critical Split			
	Milestone		Inactive Milestone		Duration-only		Start-only		External Milestone		Progress			

Contract No. CV/2013/03 - Liantang/ Heung Yuen Wai Boundary Control Point - Site Formation and Infrastructure Works - Contract 5

3 Month Rolling Programme (Rev. 1) for August 20, 2013 to November 2013

ID	WBS	Task Name	Duration	Start	Finish	Timeline																
						18/8	25/8	1/9	September				29/9	6/10	October		November					
						18/8	25/8	1/9	8/9	15/9	22/9	29/9	6/10	13/10	20/10	27/10	3/11	10/11	17/11			
1012	4.10.3.2.21	Bay 2041 to Bay 2038 (wall)	22 days	Fri 3/10/14	Fri 24/10/14																	
1018	4.10.3.3	Bay 2037-2001 (37 bays)	357 days	Thu 19/12/13	Wed 10/12/14																	
1147	4.10.4	Boundary fence (length 1635m)(Drg.1002C, 1003A)	300 days	Sun 15/6/14	Fri 10/4/15																	
1175	4.10.5	Site Formation works (import fill 36000m3) including slope drainage works (Drg. 7155B-7159B)	495 days	Mon 2/12/13	Fri 10/4/15																	
1221	4.10.6	Construction of depressed road & underpass - 9.3m wide x 168m long	406 days	Tue 17/12/13	Mon 26/1/15																	
1306	4.10.7	Sewerage, Drainage & Water Works (Drg. 1323B,1305C,1308A,1309A,1915B)	365 days	Sat 22/3/14	Sat 21/3/15																	
1339	4.10.8	Irrigation System near Chuk Yuen (Drg. 1975B)	60 days	Tue 27/1/15	Fri 27/3/15																	
1345	4.10.9	Utilities Works (Drg. 1405)	60 days	Fri 6/2/15	Mon 6/4/15																	
1351	4.10.10	Road works and Road lighting works (Drg.1505C)	160 days	Sat 1/11/14	Thu 9/4/15																	
1366	4.11	Section XII of the Works - All works within Area LMH	535 days	Thu 22/8/13	Sat 7/2/15																	
1367	4.11.1	Submissions	70 days	Thu 22/8/13	Wed 30/10/13																	
1368	4.11.2	Approval of Submissions	69 days	Thu 29/8/13	Tue 5/11/13																	
1369	4.11.3	Construct temporary haul roads	69 days	Thu 29/8/13	Tue 5/11/13																	
1370	4.11.4	Construction of retaining wall RW1 - CH0 to 561.053m (length approx. 561m)	403 days	Mon 7/10/13	Thu 13/11/14																	
1371	4.11.4.1	Bay 1009-1011 & 1044-1067) (27 bays)	403 days	Mon 7/10/13	Thu 13/11/14																	
1372	4.11.4.1.1	excavation / sheetpile	31 days	Mon 7/10/13	Wed 6/11/13																	
1373	4.11.4.1.1.1	excavation / sheetpile first 12 bays	14 days	Mon 7/10/13	Sun 20/10/13																	
1374	4.11.4.1.1.2	excavation / sheetpile second 12 bays	14 days	Mon 21/10/13	Sun 3/11/13																	
1375	4.11.4.1.1.3	excavation / sheetpile third 3bays	3 days	Mon 4/11/13	Wed 6/11/13																	
1376	4.11.4.1.2	grade 200 rock fill	18 days	Tue 15/10/13	Fri 1/11/13																	
1377	4.11.4.1.2.1	grade 200 rock fill (21 bays)	14 days	Tue 15/10/13	Mon 28/10/13																	
1378	4.11.4.1.2.2	grade 200 rock fill (6 bays)	4 days	Tue 29/10/13	Fri 1/11/13																	
1379	4.11.4.1.3	blinding layer	18 days	Sat 19/10/13	Tue 5/11/13																	
1380	4.11.4.1.3.1	blinding layer (21 bays)	14 days	Sat 19/10/13	Fri 1/11/13																	
1381	4.11.4.1.3.2	blinding layer (6 bays)	4 days	Sat 2/11/13	Tue 5/11/13																	
1382	4.11.4.1.4	Bay 1011 to Bay 1009 (base)	36 days	Wed 23/10/13	Wed 27/11/13																	
1383	4.11.4.1.4.1	base slab 1	6 days	Wed 23/10/13	Mon 28/10/13																	
1387	4.11.4.1.4.2	base slab 2	6 days	Tue 29/10/13	Sun 3/11/13																	
1388	4.11.4.1.4.3	base slab 3	6 days	Mon 4/11/13	Sat 9/11/13																	
1389	4.11.4.1.4.4	wall 1	10 days	Tue 29/10/13	Thu 7/11/13																	
1393	4.11.4.1.4.5	wall 2	10 days	Fri 8/11/13	Sun 17/11/13																	
1394	4.11.4.1.4.6	wall 3	10 days	Mon 18/11/13	Wed 27/11/13																	
1395	4.11.4.1.5	Bay 1011 to Bay 1009 (wall)	32 days	Mon 13/10/14	Thu 13/11/14																	
1396	4.11.4.1.5.1	wall 1	11 days	Mon 13/10/14	Thu 23/10/14																	
1400	4.11.4.1.5.2	wall 2	11 days	Fri 24/10/14	Mon 3/11/14																	
1401	4.11.4.1.5.3	wall 3	10 days	Tue 4/11/14	Thu 13/11/14																	
1402	4.11.4.1.6	Bay 1067 to Bay 1060 (base)	48 days	Thu 28/11/13	Tue 14/1/14																	
1403	4.11.4.1.6.1	base slab 1	6 days	Thu 28/11/13	Tue 3/12/13																	
1407	4.11.4.1.6.2	base slab 2	6 days	Wed 4/12/13	Mon 9/12/13																	
1408	4.11.4.1.6.3	base slab 3	6 days	Tue 10/12/13	Sun 15/12/13																	
1409	4.11.4.1.6.4	base slab 4	6 days	Mon 16/12/13	Sat 21/12/13																	
1410	4.11.4.1.6.5	base slab 5	6 days	Sun 22/12/13	Fri 27/12/13																	
1411	4.11.4.1.6.6	base slab 6	6 days	Sat 28/12/13	Thu 2/1/14																	
1412	4.11.4.1.6.7	base slab 7	6 days	Fri 3/1/14	Wed 8/1/14																	
1413	4.11.4.1.6.8	base slab 8	6 days	Thu 9/1/14	Tue 14/1/14																	
1414	4.11.4.1.7	Bay 1059 to Bay 1052 (base)	48 days	Wed 15/1/14	Mon 3/3/14																	
1426	4.11.4.1.8	Bay 1051 to Bay 1044 (base)	52 days	Tue 4/3/14	Thu 24/4/14																	
1438	4.11.4.1.9	Bay 1044 to Bay 1051 (wall)	88 days	Fri 25/4/14	Mon 21/7/14																	
1450	4.11.4.1.10	Bay 1052 to Bay 1059 (wall)	88 days	Tue 22/7/14	Fri 17/10/14																	
1462	4.11.4.1.11	Bay 1060 to Bay 1067 (wall)	80 days	Wed 15/1/14	Fri 4/4/14																	
1474	4.11.4.2	Bay 1012 - 1043 (32 bays)	301 days	Mon 7/10/13	Sun 3/8/14																	
1475	4.11.4.2.1	excavation / sheetpile	36 days	Mon 7/10/13	Mon 11/11/13																	
1476	4.11.4.2.1.1	excavation / sheetpile (12 bays)	14 days	Mon 7/10/13	Sun 20/10/13																	
1477	4.11.4.2.1.2	excavation / sheetpile (12 bays)	14 days	Mon 21/10/13	Sun 3/11/13																	
1478	4.11.4.2.1.3	excavation / sheetpile (8 bays)	8 days	Mon 4/11/13	Mon 11/11/13																	
1479	4.11.4.2.2	grade 200 rock fill	20 days	Tue 15/10/13	Sun 3/11/13																	
1480	4.11.4.2.2.1	grade 200 rock fill (22 bays)	14 days	Tue 15/10/13	Mon 28/10/13																	
1481	4.11.4.2.2.2	grade 200 rock fill (10 bays)	6 days	Tue 29/10/13	Sun 3/11/13																	
1482	4.11.4.2.3	blinding layer	20 days	Sat 19/10/13	Thu 7/11/13																	
1483	4.11.4.2.3.1	blinding layer (22 bays)	14 days	Sat 19/10/13	Fri 1/11/13																	
1484	4.11.4.2.3.2	blinding layer (10 bays)	6 days	Sat 2/11/13	Thu 7/11/13																	
1485	4.11.4.2.4	Bay 1019 to Bay 1012 (base)	48 days	Wed 23/10/13	Mon 9/12/13																	

Revision: 1	Task		Summary		Inactive Summary		Manual Summary Rollup		Finish-only		Critical		Deadline	
	Split		Project Summary		Manual Task		Manual Summary		External Tasks		Critical Split			
	Milestone		Inactive Milestone		Duration-only		Start-only		External Milestone		Progress			

Contract No. CV/2013/03 - Liantang/ Heung Yuen Wai Boundary Control Point - Site Formation and Infrastructure Works - Contract 5

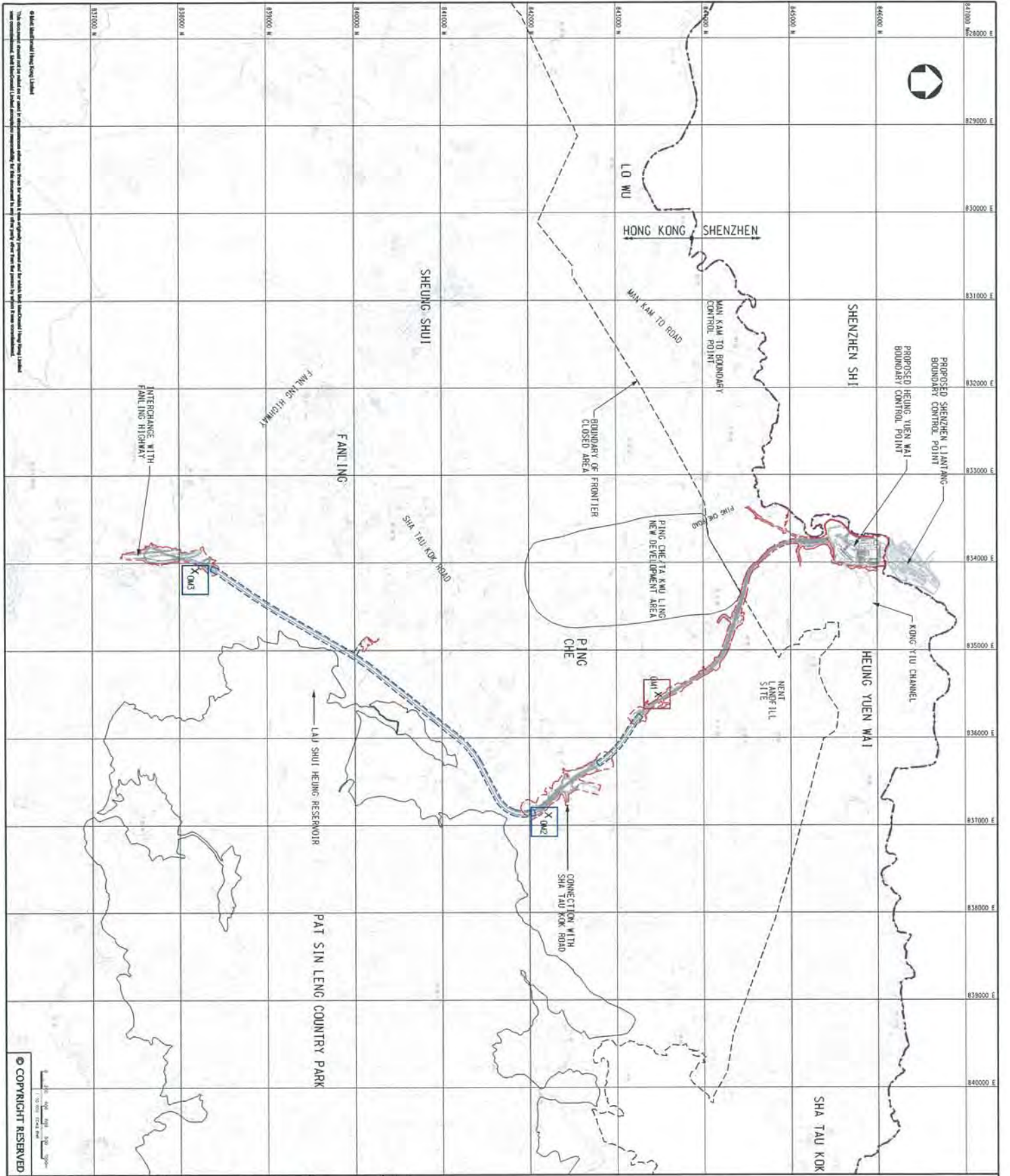
3 Month Rolling Programme (Rev. 1) for August 20, 2013 to November 2013

ID	WBS	Task Name	Duration	Start	Finish	Schedule											
						18/8	25/8	1/9	September			October			November		
						8/9	15/9	22/9	29/9	6/10	13/10	20/10	27/10	3/11	10/11	17/11	
1805	4.11.13.1	Ground investigation (1st fortnight)	14 days	Tue 1/10/13	Mon 14/10/13												
1806	4.11.13.2	Ground investigation (2nd fortnight)	14 days	Tue 15/10/13	Mon 28/10/13												
1807	4.11.13.3	Ground investigation (3rd fortnight)	3 days	Tue 29/10/13	Thu 31/10/13												
1808	4.11.14	1 no. DN1650 pipe jacking LV009 works (120m in BQ, 50m in Drg.) including jacking & receiving pits	125 days	Wed 6/11/13	Mon 10/3/14												
1809	4.11.14.1	utility detection of the area	3 days	Wed 6/11/13	Fri 8/11/13												
1810	4.11.14.2	inspection pits for jacking pit and receiving pit	5 days	Sat 9/11/13	Wed 13/11/13												
1811	4.11.14.3	temporary work & excavation for receiving pit	14 days	Thu 28/11/13	Wed 11/12/13												
1812	4.11.14.4	temporary work & excavation for jacking pit	14 days	Thu 14/11/13	Wed 27/11/13												
1813	4.11.14.5	establishment of jacking equipment	14 days	Thu 12/12/13	Wed 25/12/13												
1814	4.11.14.6	jack pipe and excavate	75 days	Thu 26/12/13	Mon 10/3/14												
1821	4.11.14.7	Lay HDPE pipes	6 days	Wed 6/11/13	Mon 11/11/13												
1822	4.11.14.8	Grout HDPE pipes	6 days	Tue 12/11/13	Sun 17/11/13												
1823	4.11.14.9	Remove temporary works and backfilling	14 days	Mon 18/11/13	Sun 1/12/13												
1824	4.11.15	Construction of retaining wall RW9 - CH0 to 75m (length 75m)	93 days	Thu 7/8/14	Fri 7/11/14												
1851	4.11.16	Construction of Bridge J with 6 x Ø1500 bored pile - 7.9m wide x 30m long	250 days	Tue 11/3/14	Sat 15/11/14												
1880	4.11.17	Construction of retaining wall RW5 - CH0 to 60m (length 60m)	84 days	Sun 16/11/14	Sat 7/2/15												
1886	4.12	Section XIII of the Works - Works not covered in any other Sections	598 days	Thu 22/8/13	Sat 11/4/15												
1887	4.12.1	Submissions	70 days	Thu 22/8/13	Wed 30/10/13												
1888	4.12.2	Approval of Submissions	69 days	Thu 29/8/13	Tue 5/11/13												
1889	4.12.3	Temporary Traffic Arrangement (TTA) Scheme for Works at existing LMH Rd	55 days	Fri 23/8/13	Wed 16/10/13												
1890	4.12.3.1	Preparation of TTA scheme	20 days	Fri 23/8/13	Wed 11/9/13												
1891	4.12.3.2	Comment & approval of TTA scheme by TD & RMO	28 days	Thu 12/9/13	Wed 9/10/13												
1892	4.12.3.3	Obtain roadwork advice from RMO	7 days	Thu 10/10/13	Wed 16/10/13												
1893	4.12.4	Diversions of existing traffic flow	530 days	Thu 17/10/13	Mon 30/3/15												
1894	4.12.4.1	TTA at existing LMH Rd for ch 380 - 580 (1st quarter)	90 days	Thu 17/10/13	Tue 14/1/14												
1895	4.12.4.1.1	TTA for ch 380-580 (1st fortnight)	14 days	Thu 17/10/13	Wed 30/10/13												
1896	4.12.4.1.2	TTA for ch 380-580 (2nd fortnight)	14 days	Thu 31/10/13	Wed 13/11/13												
1897	4.12.4.1.3	TTA for ch 380-580 (3rd fortnight)	14 days	Thu 14/11/13	Wed 27/11/13												
1898	4.12.4.1.4	TTA for ch 380-580 (4th fortnight)	14 days	Thu 28/11/13	Wed 11/12/13												
1899	4.12.4.1.5	TTA for ch 380-580 (5th fortnight)	14 days	Thu 12/12/13	Wed 25/12/13												
1900	4.12.4.1.6	TTA for ch 380-580 (6th fortnight)	14 days	Thu 26/12/13	Wed 8/1/14												
1901	4.12.4.1.7	TTA for ch 380-580 (7th fortnight)	6 days	Thu 9/1/14	Tue 14/1/14												
1902	4.12.4.2	TTA at existing LMH Rd for ch 380 - 580 (2nd quarter)	42 days	Wed 15/1/14	Tue 25/2/14												
1906	4.12.4.3	TTA at existing LMH Rd for ch 580 - 730 (1st quarter)	90 days	Wed 26/2/14	Mon 26/5/14												
1914	4.12.4.4	TTA at existing LMH Rd for ch 580 - 730 (2nd quarter)	14 days	Tue 27/5/14	Mon 9/6/14												
1916	4.12.4.5	TTA at existing LMH Rd for ch 730 - 780 (1st quarter)	70 days	Tue 10/6/14	Mon 18/8/14												
1922	4.12.4.6	TTA at existing LMH Rd for ch 280 - 380 (1st quarter)	42 days	Tue 19/8/14	Mon 29/9/14												
1926	4.12.4.7	TTA at existing LMH Rd for ch 80 - 180 (1st quarter)	42 days	Tue 30/9/14	Mon 10/11/14												
1930	4.12.4.8	TTA at opposite side of LMH Rd for ch 80 - 180 (1st quarter)	42 days	Tue 11/11/14	Mon 22/12/14												
1934	4.12.4.9	TTA at opposite side of LMH Rd for ch 280 - 380 (1st quarter)	42 days	Tue 23/12/14	Mon 2/2/15												
1938	4.12.4.10	TTA at opposite side of LMH Rd for ch 380 - 580 (1st quarter)	42 days	Tue 3/2/15	Mon 16/3/15												
1942	4.12.4.11	TTA at opposite side of LMH Rd for ch 580 - 730 (1st quarter)	42 days	Tue 3/2/15	Mon 16/3/15												
1946	4.12.4.12	TTA at opposite side of LMH Rd for ch 730 - 780 (1st quarter)	14 days	Tue 17/3/15	Mon 30/3/15												
1948	4.12.5	Archaeological survey (Sections T1 & T2)(Drg. 6403A)	217 days	Mon 21/10/13	Sun 25/5/14												
1949	4.12.5.1	archaeological survey (1st quarter)	92 days	Mon 21/10/13	Mon 20/1/14												
1950	4.12.5.1.1	archaeological survey (1st fortnight)	14 days	Mon 21/10/13	Sun 3/11/13												
1951	4.12.5.1.2	archaeological survey (2nd fortnight)	14 days	Mon 4/11/13	Sun 17/11/13												
1952	4.12.5.1.3	archaeological survey (3rd fortnight)	14 days	Mon 18/11/13	Sun 1/12/13												
1953	4.12.5.1.4	archaeological survey (4th fortnight)	14 days	Mon 2/12/13	Sun 15/12/13												
1954	4.12.5.1.5	archaeological survey (5th fortnight)	14 days	Mon 16/12/13	Sun 29/12/13												
1955	4.12.5.1.6	archaeological survey (6th fortnight)	14 days	Mon 30/12/13	Sun 12/1/14												
1956	4.12.5.1.7	archaeological survey (7th fortnight)	8 days	Mon 13/1/14	Mon 20/1/14												
1957	4.12.5.2	archaeological survey (2nd quarter)	90 days	Tue 21/1/14	Sun 20/4/14												
1965	4.12.5.3	archaeological survey (3rd quarter)	35 days	Mon 21/4/14	Sun 25/5/14												
1969	4.12.6	Drainage & slope drainage works at Lin Ma Hang Road (Drg.1301A-1303C, 7151B)	350 days	Thu 17/10/13	Wed 1/10/14												
1970	4.12.6.1	drainage & slope drainage works (1st quarter)	90 days	Thu 17/10/13	Tue 14/1/14												
1971	4.12.6.1.1	drainage & slope drainage works (1st fortnight)	14 days	Thu 17/10/13	Wed 30/10/13												
1972	4.12.6.1.2	drainage & slope drainage works (2nd fortnight)	14 days	Thu 31/10/13	Wed 13/11/13												
1973	4.12.6.1.3	drainage & slope drainage works (3rd fortnight)	14 days	Thu 14/11/13	Wed 27/11/13												
1974	4.12.6.1.4	drainage & slope drainage works (4th fortnight)	14 days	Thu 28/11/13	Wed 11/12/13												
1975	4.12.6.1.5	drainage & slope drainage works (5th fortnight)	14 days	Thu 12/12/13	Wed 25/12/13												
1976	4.12.6.1.6	drainage & slope drainage works (6th fortnight)	14 days	Thu 26/12/13	Wed 8/1/14												

Revision: 1	Task	Summary	Inactive Summary	Manual Summary Rollup	Finish-only	Critical	Deadline
	Split	Project Summary	Manual Task	Manual Summary	External Tasks	Critical Split	
	Milestone	Inactive Milestone	Duration-only	Start-only	External Milestone	Progress	

Appendix D

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



- LEGEND:**
- BOUNDARY OF HKSAR
 - WORKS AREA (ARBOE GROUND)
 - WORKS AREA (TUNNEL)
 - X OPERATIONAL NOISE MONITORING STATIONS

Rev	Date	Drawn	Description	DC	EC	HT
P1	06/10	WING	FIRST ISSUE			



CEDD
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

Project: AGREEMENT NO. CE45/2008(CE)
 LIANTANG/HEUNG YUEN WAI BOUNDARY CONTROL POINT AND ASSOCIATED WORKS
 PROPOSED LOCATION OF OPERATIONAL NOISE MONITORING STATIONS

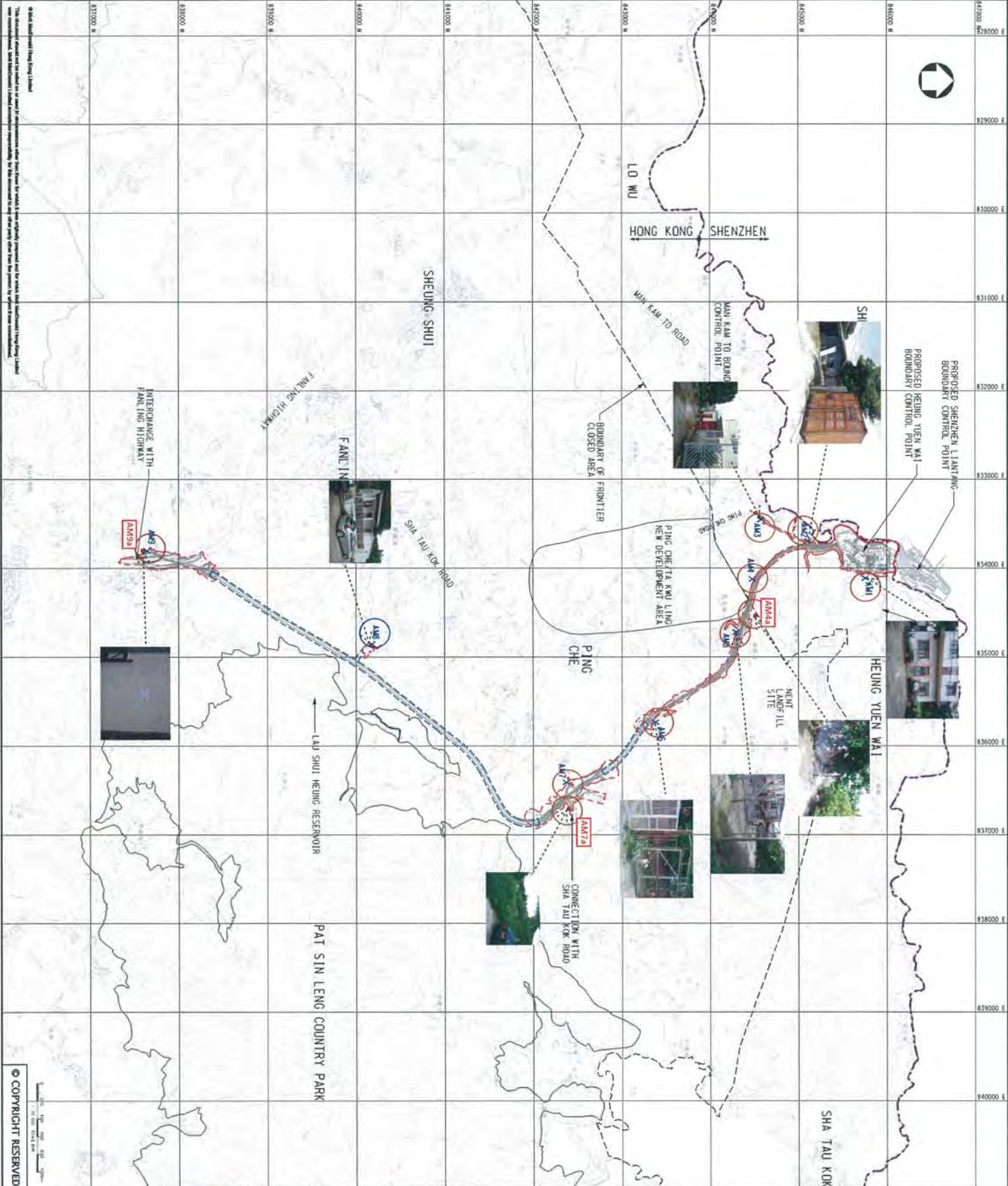
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Scale of A2	1:20000			
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Scale of A4	1:20000			
Scale of A5	1:20000			
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Scale of A7	1:20000			
Scale of A8	1:20000			
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Scale of A16	1:20000			
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Scale of A94	1:20000			
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Scale of A97	1:20000			
Scale of A98	1:20000			
Scale of A99	1:20000			
Scale of A100	1:20000			

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FIGURE 3.2

Appendix E

Monitoring Locations for Impact Monitoring



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

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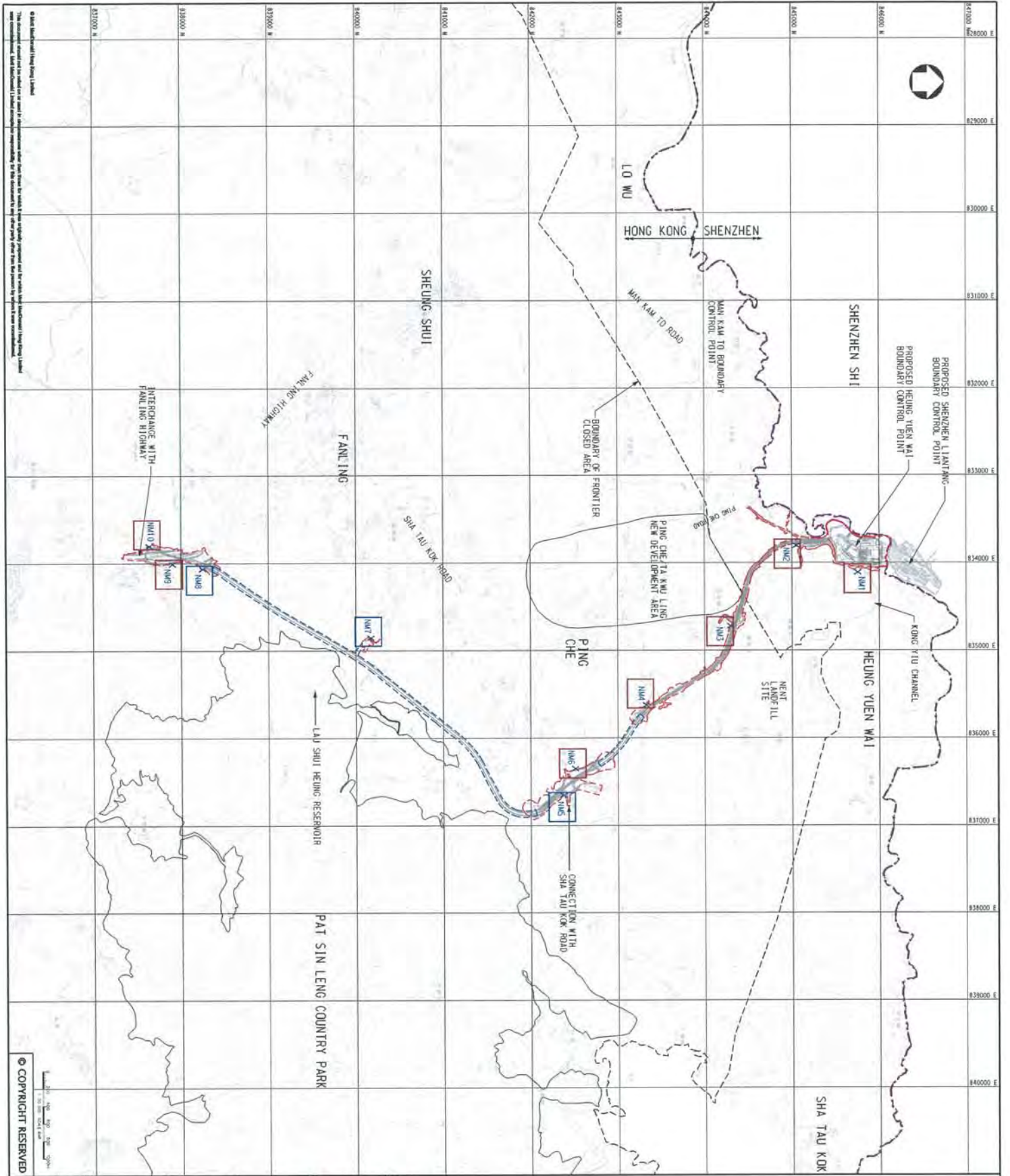
Project: AGREEMENT NO. CE45/2008(CE)
LIANTANG/HUNG YUEN WAI BOUNDARY
CONTROL POINT AND ASSOCIATED WORKS

Scale: 1:20000

Client: CEDD
Civil Engineering and Development Department

PROPOSED LOCATION OF CONSTRUCTION AIR QUALITY MONITORING STATIONS

Station No.	Location	Remarks
AM71	MAI KAM TO BOUNDARY CONTROL POINT	
AM72	PING CHE TA KAU LING NEW DEVELOPMENT AREA	
AM73	HEUNG YUEN WAI	
AM74	SHA TAU KOK	
AM75	LAU SHUI HEUNG RESERVOIR	
AM76	PAT SIN LENG COUNTRY PARK	
AM77	CONNECTION WITH SHA TAU KOK ROAD	
AM78	FANLING HIGHWAY	
AM79	INTERCHANGE WITH FANLING HIGHWAY	



- LEGEND:**
- BOUNDARY OF HK/SAR
 - WORKS AREA (ABOVE GROUND)
 - WORKS AREA (TUNNEL)
 - X CONSTRUCTION NOISE MONITORING STATIONS

PI	REV TO	DATE	FIRST ISSUE	DC	HT
Rev	Issue	Drawn	Description	CHKD	APPRD

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 AND DEVELOPMENT
 DEPARTMENT

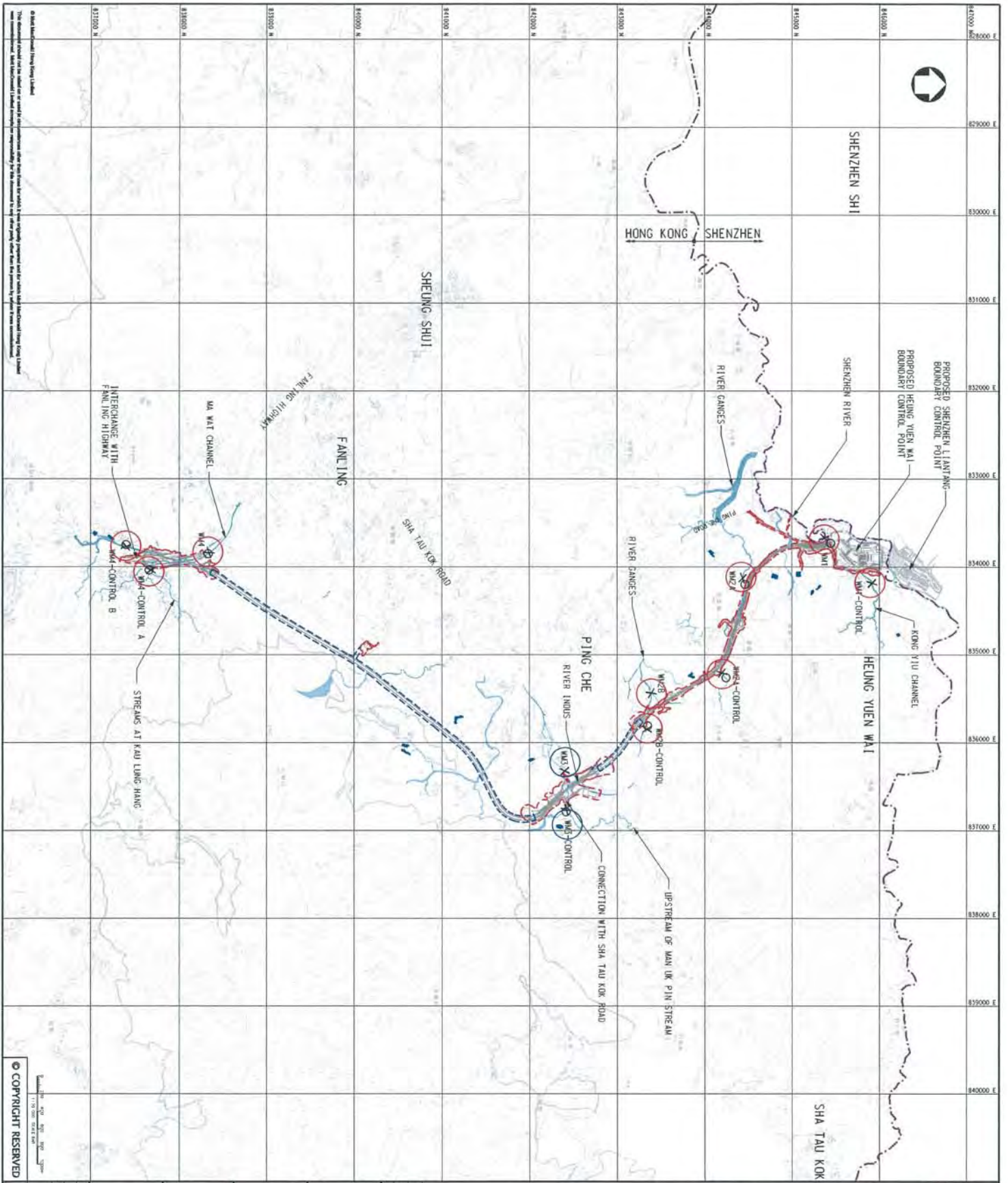
AGREEMENT NO. CE45/2008(CE)
 LIANTANG/HEUNG YUEN WAI BOUNDARY
 CONTROL POINT AND ASSOCIATED WORKS

**PROPOSED LOCATION OF CONSTRUCTION
 NOISE MONITORING STATIONS**

Checked by	DC	DC	DC	DC	DC
Drawn by	DC	DC	DC	DC	DC
Scale	1:20000	1:20000	1:20000	1:20000	1:20000
Project No.	CE45/2008(CE)	CE45/2008(CE)	CE45/2008(CE)	CE45/2008(CE)	CE45/2008(CE)
Sheet No.	1	2	3	4	5
Scale	1:20000	1:20000	1:20000	1:20000	1:20000
Project No.	CE45/2008(CE)	CE45/2008(CE)	CE45/2008(CE)	CE45/2008(CE)	CE45/2008(CE)
Sheet No.	1	2	3	4	5

FIGURE 3.1

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LEGEND:

- BOUNDARY OF HK SAR
- - - LAND REQUIREMENT LIMIT (ABOVE GROUND)
- - - LAND REQUIREMENT LIMIT (TUNNEL)
- X Water Quality Monitoring location Recommended in EMBA Manual
- O Alternative Water Quality Monitoring location for EMBA Programme

Station ID	Coordinate	Coordinate	Coordinate	Coordinate
Easting	Northing	Easting	Northing	Easting
WQ1	83768.633	86373.077	83329	86343
WQ2	83812.320	86433.810	83430	86423
WQ3	83508.320	86200.151	83370	86223
WQ4	83518.146	86178.006	83453	86197
WQ5	83385.878	86134.635	83355	86153
WQ6	83523.625	86258.527	83351	86200
WQ7	83504.281	86344.812	83350	86350
WQ8	83508.937	86348.975	83428	86350
WQ9	83706.937	83706.937	83700	83700

Rev	Date	Drawn	Description	CHKD	APPVD
P2	NOV 10	HLNG	GENERAL REVISION	HC	HT
P1	OCT 10	HLNG	FIRST ISSUE	HC	HT

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 AND DEVELOPMENT
 DEPARTMENT

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

SCALE: 1:20000

DATE: 25/5/2010

DESIGNER: CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

CLIENT: CEDD

Original	ISC	Eng/CHK	App/CHK	EC
Drawn	HTC	HLNG	HLNG	EC
Eng/CHK	HTC	HLNG	HLNG	HT
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Drawing No.	F:\09RE\4.1			Rev
				P2

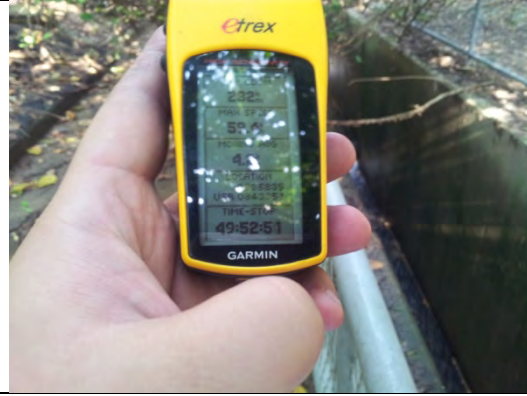
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Photographic Records for Water Quality Monitoring Location

	
<p>Alternative Location of WM1</p>	<p>Co-ordinates of Alternative Location of WM1</p>
	
<p>Alternative Location of WM1 - Control</p>	<p>Co-ordinates of Alternative Location of WM1 - Control</p>
	
<p>Alternative Location of WM2A</p>	<p>Co-ordinates of Alternative Location of WM2A</p>
	
<p>Alternative Location of WM2-Control A</p>	<p>Co-ordinates of Alternative Location of WM2 - Control</p>



Location of WM2B-Control



Co-ordinates of WM2B-Control



Location of WM2B



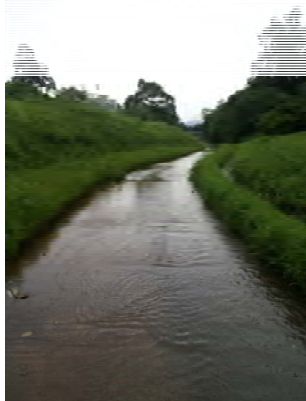
Co-ordinates of WM2B



Location of WM3-Control



Co-ordinates of WM3-Control



Location of WM3



Co-ordinates of WM3



Location of WM4-Control A



Co-ordinates of WM4-Control A



Location of WM4-Control B



Co-ordinates of WM4-Control B



Location of WM4



Co-ordinates of WM4

Appendix F

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Tsung Yuen Ha Village House No. 63
 Location ID : AM1

Date of Calibration: 26/8/2013
 Next Calibration Date: 26/10/2013
 Technician: Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1006.8	Corrected Pressure (mm Hg)	755.1
Temperature (°C)	28.8	Temperature (K)	302

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.11662
Model-> 5025A	Qstd Intercept ->	-0.01714
Serial # -> 1941		

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	6.8	6.8	13.6	1.734	54	53.15	Slope = 44.9590 Intercept = -26.1666 Corr. coeff. = 0.9960		
13	5.7	5.7	11.4	1.588	45	44.29			
10	4.7	4.7	9.4	1.443	38	37.40			
7	3.4	3.4	6.8	1.228	30	29.53			
5	2.5	2.5	5.0	1.054	22	21.65			

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$$

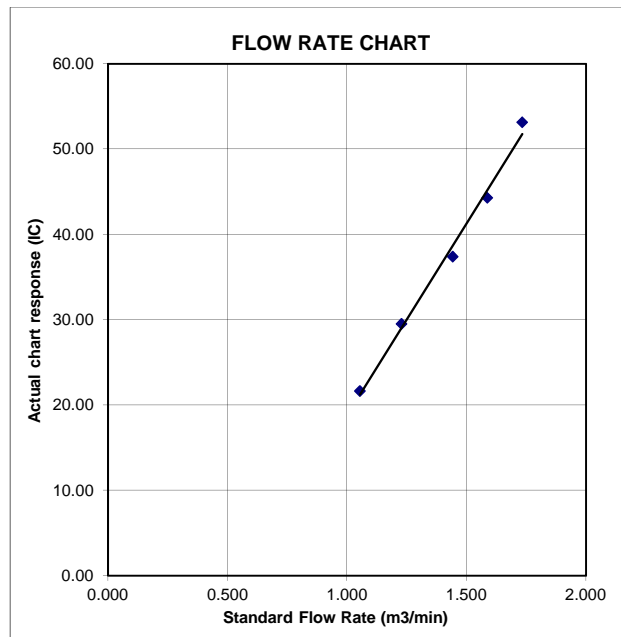
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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
 Location ID : AM2

Date of Calibration: 26/8/2013
 Next Calibration Date: 26/10/2013
 Technician: Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1006.8	Corrected Pressure (mm Hg)	755.1
Temperature (°C)	28.8	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11662
Model->	5025A	Qstd Intercept ->	-0.01714
Serial # ->	1941		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.5	6.5	13.0	1.695	55	54.13	Slope = 27.5878 Intercept = 7.2413 Corr. coeff. = 0.9966
13	5.1	5.1	10.2	1.503	49	48.23	
10	3.6	3.6	7.2	1.264	43	42.32	
7	2	2	4.0	0.944	35	34.45	
5	1.6	1.6	3.2	0.845	30	29.53	

Calculations :

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

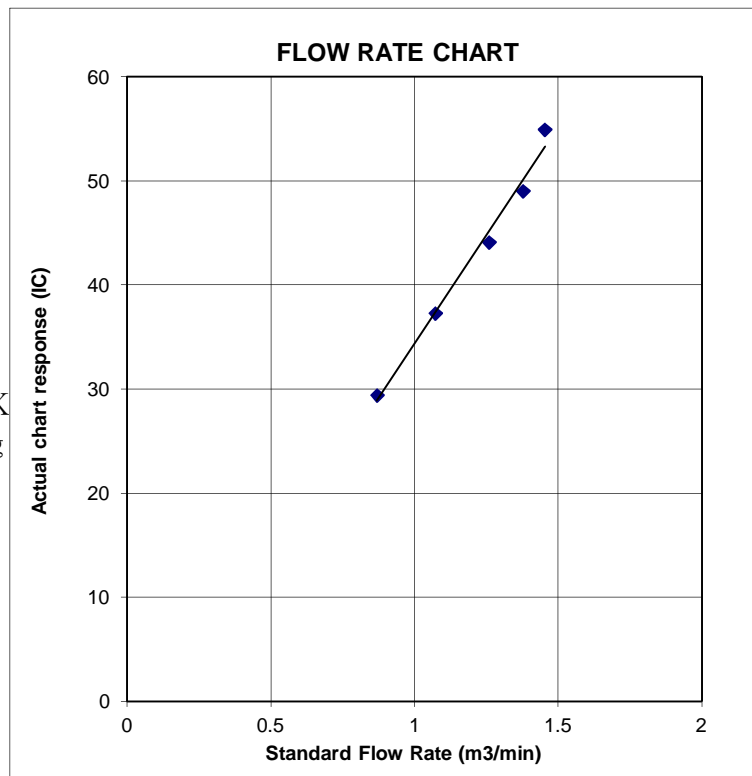
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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: 26/8/2013
 Next Calibration Date: 26/10/2013
 Technician: Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1006.8	Corrected Pressure (mm Hg)	755.1
Temperature (°C)	28.8	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11662
Model->	5025A	Qstd Intercept ->	-0.01714
Serial # ->	1941		

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	1.656	56	55.12	Slope = 33.9727 Intercept = -0.9187 Corr. coeff. = 0.9965
13	5	5	10.0	1.488	51	50.20	
10	3.9	3.9	7.8	1.315	45	44.29	
7	2.8	2.8	5.6	1.115	36	35.43	
5	1.5	1.5	3.0	0.819	28	27.56	

Calculations :

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

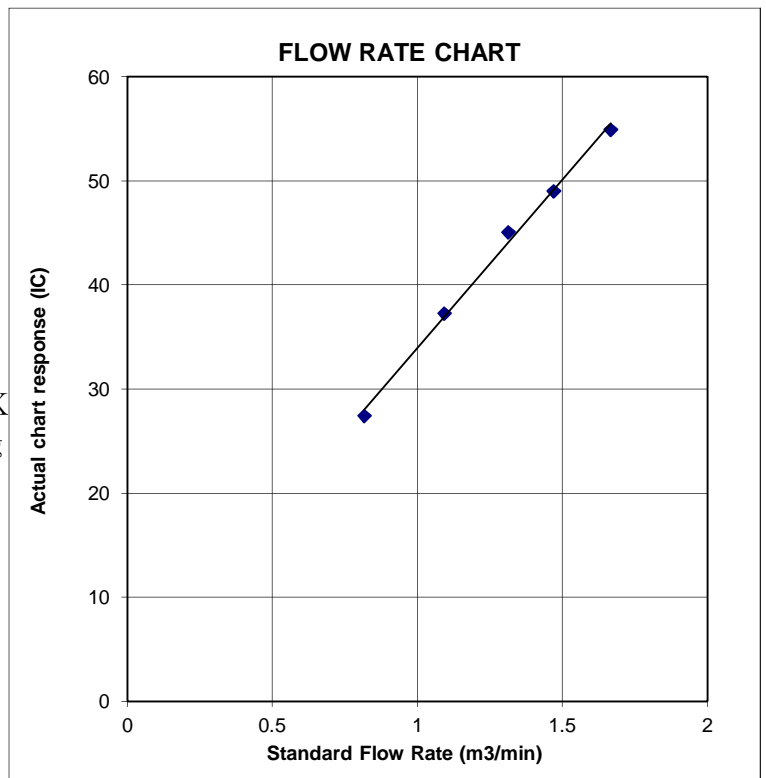
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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 : Tsung Yuen Ha Village House No. 63
 Location ID : AM1

Date of Calibration: 26/10/2013
 Next Calibration Date: 26/12/2013
 Technician: Ben Tam

CONDITIONS

Sea Level Pressure (hPa) 1018.3
 Temperature (°C) 22.0

Corrected Pressure (mm Hg) 763.725
 Temperature (K) 295

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 1941

Qstd Slope -> 2.11662
 Qstd Intercept -> -0.01714

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.7	6.7	13.4	1.751	52	52.39	Slope = 41.6678 Intercept = -21.5030 Corr. coeff. = 0.9978
13	5.7	5.7	11.4	1.615	45	45.34	
10	4.6	4.6	9.2	1.452	38	38.29	
7	3.3	3.3	6.6	1.231	29	29.22	
5	2.3	2.3	4.6	1.029	22	22.17	

Calculations :

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

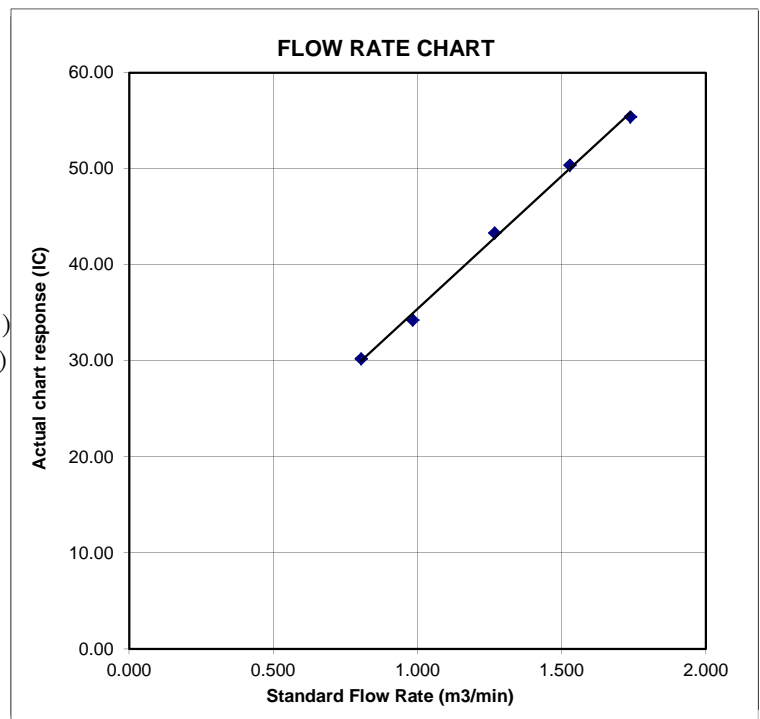
$$IC = I[\sqrt{P_a/P_{std}(T_{std}/T_a)}]$$

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Village House near Lin Ma Hang Road
 Location ID : AM2

Date of Calibration: 26/10/2013
 Next Calibration Date: 26/12/2013
 Technician: Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1018.3	Corrected Pressure (mm Hg)	763.725
Temperature (°C)	22.0	Temperature (K)	295

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->	2.11662
Model-> 5025A	Qstd Intercept ->	-0.01714
Serial # -> 1941		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.6	6.6	13.2	1.738	55	55.41	Slope = 27.6650 Intercept = 7.7418 Corr. coeff. = 0.9988
13	5.1	5.1	10.2	1.528	50	50.38	
10	3.5	3.5	7.0	1.268	43	43.32	
7	2.1	2.1	4.2	0.984	34	34.26	
5	1.4	1.4	2.8	0.805	30	30.23	

Calculations :

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

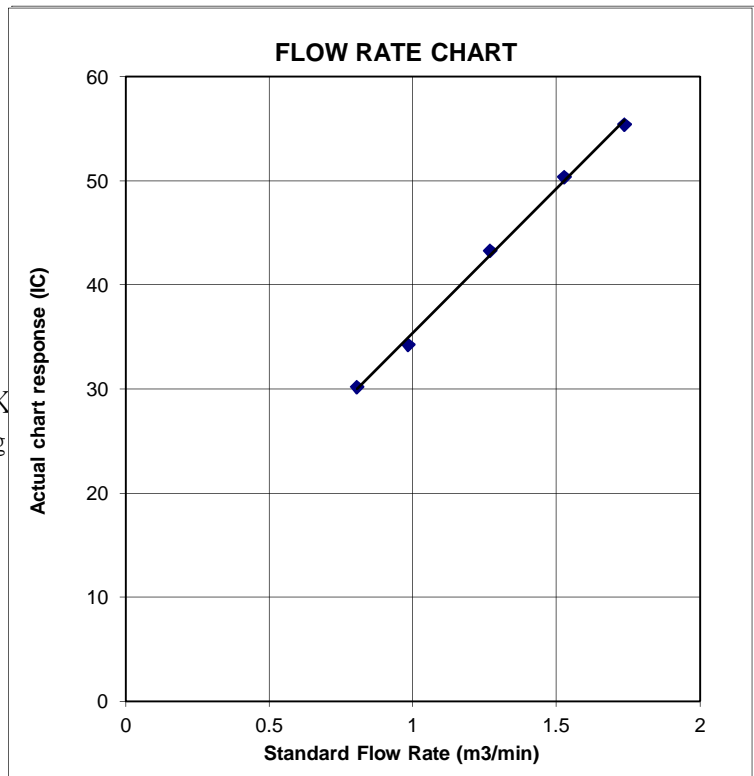
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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: 26/10/2013
 Next Calibration Date: 26/12/2013
 Technician: Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1018.3	Corrected Pressure (mm Hg)	763.725
Temperature (°C)	22.0	Temperature (K)	295

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.11662
Model->	5025A	Qstd Intercept ->	-0.01714
Serial # ->	1941		

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	1.684	56	56.42	Slope = 33.6390 Intercept = -0.6373 Corr. coeff. = 0.9978
13	5	5	10.0	1.513	50	50.38	
10	3.9	3.9	7.8	1.338	44	44.33	
7	2.8	2.8	5.6	1.135	36	36.27	
5	1.4	1.4	2.8	0.805	27	27.20	

Calculations :

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

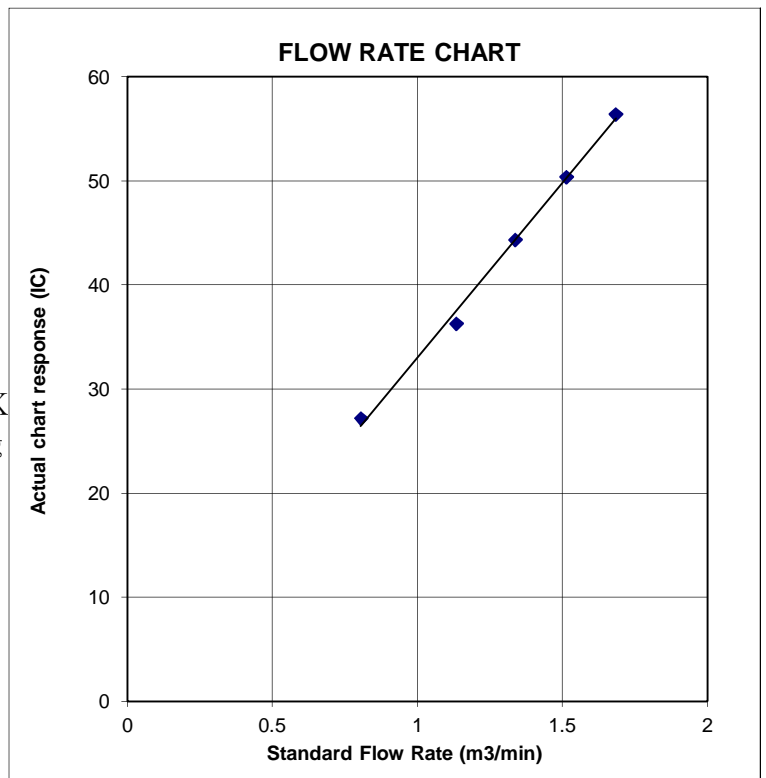
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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





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 513.467.9009 FAX
 WWW.TISCH-ENV.COM

AIR POLLUTION MONITORING EQUIPMENT
 ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Apr 09, 2013 Roots-meter S/N 0438320 Ta (K) - 296
 Operator Tisch Orifice I.D. - 1941 Pa (mm) - 751.84

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORIFICE DIFF H2O (in.)
1	NA	NA	1.00	1.4710	3.3	2.00
2	NA	NA	1.00	1.0370	6.4	4.00
3	NA	NA	1.00	0.9270	7.9	5.00
4	NA	NA	1.00	0.8840	8.8	5.50
5	NA	NA	1.00	0.7300	12.8	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9916	0.6741	1.4113	0.9956	0.6768	0.8874
0.9874	0.9521	1.9959	0.9914	0.9560	1.2549
0.9854	1.0630	2.2315	0.9894	1.0673	1.4030
0.9843	1.1134	2.3405	0.9883	1.1180	1.4715
0.9790	1.3410	2.8227	0.9829	1.3465	1.7747
Qstd slope (m) = 2.11662			Qa slope (m) = 1.32539		
intercept (b) = -0.01714			intercept (b) = -0.01078		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
y axis = $\text{SQRT}[\text{H2O}(\text{Pa}/760)(298/\text{Ta})]$			y axis = $\text{SQRT}[\text{H2O}(\text{Ta}/\text{Pa})]$		

CALCULATIONS

$$\text{Vstd} = \text{Diff. Vol} [(\text{Pa} - \text{Diff. Hg}) / 760] (298 / \text{Ta})$$

$$\text{Qstd} = \text{Vstd} / \text{Time}$$

$$\text{Va} = \text{Diff Vol} [(\text{Pa} - \text{Diff Hg}) / \text{Pa}]$$

$$\text{Qa} = \text{Va} / \text{Time}$$

For subsequent flow rate calculations:

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

$$\text{Qa} = 1/m \{ [\text{SQRT}(\text{H2O}(\text{Ta}/\text{Pa}))] - b \}$$

CALIBRATION CERTIFICATE

Date: June 20, 2013

Equipment Name	:	Laser Dust Monitor, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	366407
Sensitivity	:	0.001 mg/m ³
Sensitivity Adjustment	:	563 CPM
Scale Setting	:	June 17, 2013

We hereby certify that the avobe mentioned instrmt has been calibrated satisfactory.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.

Kentaro Togo

Overseas Sales Division

CALIBRATION CERTIFICATE

Date: June 20, 2013

Equipment Name	:	Laser Dust Monitor, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	366410
Sensitivity	:	0.001 mg/m ³
Sensitivity Adjustment	:	668 CPM
Scale Setting	:	June 17, 2013

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.



Kentaro Togo

Overseas Sales Division

CALIBRATION CERTIFICATE

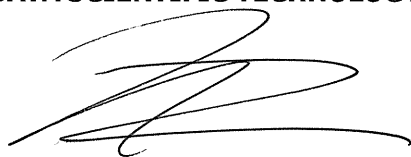
Date: June 20, 2013

Equipment Name	:	Laser Dust Monitor, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	366409
Sensitivity	:	0.001 mg/m ³
Sensitivity Adjustment	:	527 CPM
Scale Setting	:	June 17, 2013

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.



Kentaro Togo

Overseas Sales Division

CALIBRATION CERTIFICATE

Date: June 20, 2013

Equipment Name	:	Laser Dust Monitor, Model LD-3B
Code No.	:	080000-42
Quantity	:	1 unit
Serial No.	:	366418
Sensitivity	:	0.001 mg/m ³
Sensitivity Adjustment	:	664 CPM
Scale Setting	:	June 17, 2013

We hereby certify that the above mentioned instrument has been calibrated satisfactorily.

Sincerely

SIBATA SCIENTIFIC TECHNOLOGY LTD.



Kentaro Togo

Overseas Sales Division



Certificate of Calibration 校正證書

Certificate No. : C132568
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

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

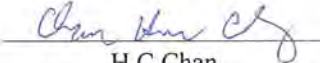
DATE OF TEST / 測試日期 : 27 April 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within 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, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By : 
測試 H C Chan

Certified By : 
核證 K C Lee

Date of Issue : 30 April 2013
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書面批准。

Certificate of Calibration

校正證書

Certificate No. : C132568
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	C130019
CL281	Multifunction Acoustic Calibrator	DC110233

- 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 _{AFF}	A	F	94.00	1	93.6

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 _{AFF}	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 _{AFF}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

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.

本證書所載按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. : C132568
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	104.9	-1.0 ± 1.0
	L _{ASP}	S	Continuous		106.0	Ref.	
	L _{ASMax}		500 ms		101.9	-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	77.8	-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	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. : C132568
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	91.4	-3.0 ± 1.5
					63 Hz	93.3	-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	90.9	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-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
								90	89.8	± 0.5
								80	79.4	± 1.0
								70	69.2	± 1.0

Remarks : - 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。局部複印本證書請先獲本實驗室書面批准。



Certificate of Calibration 校正證書

Certificate No. : C132567
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

Description / 儀器名稱 : Integrating Sound Level Meter (EQ010)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285721
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

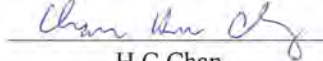
DATE OF TEST / 測試日期 : 27 April 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within 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, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By : 
測試 H C Chan

Certified By : 
核證 K C Lee

Date of Issue : 30 April 2013
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而此准。

Certificate of Calibration

校正證書

Certificate No. : C132567
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	C130019
CL281	Multifunction Acoustic Calibrator	DC110233

- 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 _{AFF}	A	F	94.00	1	94.7

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 _{AFF}	A	F	94.00	1	94.1	± 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 _{AFF}	A	F	94.00	1	94.1 (Ref.)
				104.00		104.1
				114.00		114.0

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。

Certificate of Calibration

校正證書

Certificate No. : C132567
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	94.1	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	54.7	-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	94.1	Ref.
					2 kHz	95.3	+1.2 ± 1.0
					4 kHz	95.1	+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. : C132567
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	93.3	-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	93.3	-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	99.9	± 0.5
			60 sec.					90	90.0	± 0.5
			5 min.					80	79.9	± 1.0
								70	69.7	± 1.0

Remarks : - 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: callba@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C132979
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

Description / 儀器名稱 : Sound Level Meter (EQ068)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-31
Serial No. / 編號 : 00410247
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 : 18 May 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within 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
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By : 
測試 : K C Lee

Certified By : 
核證 : K M Wu

Date of Issue : 20 May 2013
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. : C132979
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 was performed before the test.
- 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	C130019
CL281	Multifunction Acoustic Calibrator	DC110233

- Test procedure : MA101N.

- Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L _A	A	Fast	94.00	1	94.0	± 0.7

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 120	L _A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.0

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

- 6.2 Time Weighting

- 6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 120	L _A	A	Fast	94.00	1	94.0	Ref.
			Slow				

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

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Certificate of Calibration

校正證書

Certificate No. : C132979

證書編號

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
20 -110	L _A	A	Fast	106.00	Continuous	106.0	Ref.
	L _A max				200 ms	105.1	-1.0 ± 1.0
	L _A		Slow		Continuous	106.0	Ref.
	L _A max				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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L _A	A	Fast	94.00	31.5 Hz	54.2	-39.4 ± 1.5
					63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.7	-16.1 ± 1.0
					250 Hz	85.2	-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	95.1	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5; -3.0)
					12.5 kHz	90.0	-4.3 (+3.0; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 120	L _C	C	Fast	94.00	31.5 Hz	90.9	-3.0 ± 1.5
					63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	93.9	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.3	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5; -3.0)
					12.5 kHz	88.2	-6.2 (+3.0; -6.0)

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Certificate of Calibration

校正證書

Certificate No. : C132979

證書編號

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Integrating Time	Freq. (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
20 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	100.0	± 0.5
						1/10 ²		90	90.0	± 0.5
			60 sec.			1/10 ³		80	80.0	± 1.0
			5 min.			1/10 ⁴		70	70.0	± 1.0

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 319841

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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Sun Creation Engineering Limited - Calibration & Testing Laboratory

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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. : C132229
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

Description / 儀器名稱 : Precision Integrating Sound Level Meter (EQ012)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-14
Serial No. / 編號 : 10303225
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
Line Voltage / 電壓 : ---
Relative Humidity / 相對濕度 : (55 ± 20)%

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 15 April 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

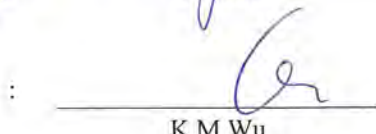
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試


K C Lee

Certified By
核證


K M Wu

Date of Issue : 16 April 2013
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.

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Certificate of Calibration

校正證書

Certificate No. : C132229

證書編號

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

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C130019
CL281	Multifunction Acoustic Calibrator	DC110233

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
40 - 100	L _p	A	Fast	94.00	1	93.8	± 0.7

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
60 - 120	L _p	A	Fast	94.00	1	93.7 (Ref.)
				104.00		103.7
				114.00		113.8

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.

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Sun Creation Engineering Limited - Calibration & Testing Laboratory

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

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

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

Certificate of Calibration

校正證書

Certificate No. : C132229

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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
40 - 100	L _p	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.1
			Imp			93.8	± 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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
50 - 110	L _p	A	Fast	106.0	Continuous	106.0	Ref.
	L _{Amax}				200 ms	105.2	-1.0 ± 1.0
	L _p		Slow		Continuous	106.0	Ref.
	L _{Amax}				500 ms	102.1	-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)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
40 - 100	L _p	A	Fast	94.00	31.5 Hz	54.4	-39.4 ± 1.5
					63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.6	-3.2 ± 1.0
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.0
					4 kHz	94.7	+1.0 ± 1.0
					8 kHz	92.5	-1.1 (+1.5 ; -3.0)
12.5 kHz	89.3	-4.3 (+3.0 ; -6.0)					

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

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Certificate of Calibration

校正證書

Certificate No. : C132229
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
40 - 100	L _p	C	Fast	94.00	31.5 Hz	90.8	-3.0 ± 1.5
					63 Hz	93.0	-0.8 ± 1.5
					125 Hz	93.7	-0.2 ± 1.0
					250 Hz	93.9	0.0 ± 1.0
					500 Hz	93.9	0.0 ± 1.0
					1 kHz	93.9	Ref.
					2 kHz	93.7	-0.2 ± 1.0
					4 kHz	93.0	-0.8 ± 1.0
					8 kHz	90.7	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.5	-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)	Mode	Frequency Weighting	Time Weighting	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
50 - 110	L _{Aeq}	A	10 sec.	4	1		110.0	100	99.8	± 0.5
								90	89.6	± 0.5
								80	79.3	± 1.0
								70	70.0	± 1.0

Remarks : - UUT Microphone Model No. : UC-53A & S/N : 319944

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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Certificate of Calibration 校正證書

Certificate No. : C132565
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-0878)

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

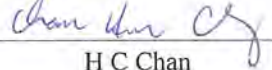
DATE OF TEST / 測試日期 : 27 April 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within 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, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By : 
測試 H C Chan

Certified By : 
核證 K C Lee

Date of Issue : 30 April 2013
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.

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Certificate of Calibration

校正證書

Certificate No. : C132565
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	C123541
CL281	Multifunction Acoustic Calibrator	DC110233
TST150A	Measuring Amplifier	C120886

- 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 :

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輝創工程有限公司 - 校正及檢測實驗室

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Tel/電話: 2927 2606 Fax/傳真: 2744 8986

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Website/網址: www.suncreation.com

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1318872
Date of Issue: 19/07/2013
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Sonde Environmental Monitoring System
Brand Name: YSI
Model No.: PRO 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 12 July, 2013 **Date of next Calibration:** 12 October, 2013

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
4.45	4.52	0.07
6.75	6.66	-0.09
7.91	8.01	0.10
Tolerance Limit (\pm 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 ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
10.0	10.3	0.3
20.0	19.2	-0.8
38.5	38.1	-0.4
Tolerance Limit (\pm $^{\circ}$ 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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1322443
Date of Issue: 23/08/2013
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Multimeter
Brand Name: YSI
Model No.: Professional Plus
Serial No.: 10G101946
Equipment No.: --
Date of Calibration: 23 August, 2013 **Date of next Calibration:** 23 November, 2013

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.49	3.55	0.06
6.56	6.59	0.03
8.66	8.62	-0.04
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	3.98	-0.02
7.0	6.94	-0.06
10.0	9.82	-0.18
Tolerance Limit (±pH unit)		0.20

Salinity

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.0	--
10	9.60	-4.0
20	19.27	-3.7
30	28.27	-5.8
Tolerance Limit (±%)		10.0

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.0	9.8	-0.2
21.5	20.6	-0.9
38.5	37.9	-0.6
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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1328906
Date of Issue: 24/10/2013
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: PRO 20
Serial No.: 12C100570
Equipment No.: --
Date of Calibration: 24 October, 2013 **Date of next Calibration:** 24 January, 2014

Parameters:

Dissolved Oxygen

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.29	3.31	0.02
5.28	5.16	-0.12
8.89	8.85	-0.04
Tolerance Limit (\pm 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 ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
12.0	11.8	-0.2
20.0	19.0	-1.0
38.5	39.4	0.9
Tolerance Limit (\pm $^{\circ}$ 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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK1324522
Date of Issue: 13/09/2013
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: Turbidimeter
Brand Name: HACH
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 12 September, 2013 **Date of next Calibration:** 12 December, 2013

Parameters:

Turbidity

Method Ref: APHA 21st Ed. 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.03	--
4	3.82	-4.5
40	42.1	5.3
80	85.8	7.3
400	380	-5.0
800	832	4.0
	Tolerance Limit (±%)	10.0

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

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1324520
Date of Issue: 13/09/2013
Client: ACTION UNITED ENVIRO SERVICES

Equipment Type: pH meter
Brand Name: Eco Sense
Model No.: pH 10A
Serial No.: JC000488
Equipment No.: --
Date of Calibration: 12 September, 2013 **Date of next Calibration:** 12 December, 2013

Parameters:

pH Value

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

Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.03	0.03
7.0	7.06	0.06
10.0	10.04	0.04
Tolerance Limit (\pm 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 ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
10.0	10.3	0.3
22.0	21.9	-0.1
38.5	39.6	1.1
Tolerance Limit (\pm $^{\circ}$ C)		2.0

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



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



Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街1-3號忠信針織中心11樓

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a
為香港認可處執行機關根據認可諮詢委員會建議而接受的

HOKLAS Accredited Laboratory
「香港實驗所認可計劃」認可實驗所

This laboratory meets the requirements of ISO / IEC 17025 : 2005 – General requirements for the competence of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as listed in the HOKLAS Directory of Accredited Laboratories within the test category of
此實驗所符合ISO / IEC 17025 : 2005 – 《測試及校正實驗所能力的通用規定》所訂的要求，獲認可進行載於香港實驗所認可計劃《認可實驗所名冊》內下述測試類別中的指定
測試或校正工作

Environmental Testing
環境測試

This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué).
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作
(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive
香港認可處根據認可處執行機關的權限在此蓋上通用印章

CHAN Sing Sing, Terence, Executive Administrator
執行幹事 陳成城
Issue Date : 5 May 2009
簽發日期：二零零九年五月五日

Registration Number : **HOKLAS 066**
註冊號碼：

Date of First Registration : 15 September 1995
首次註冊日期：一九九五年九月十五日



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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals. 	
Limit Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Submit further proposal if problem still not under control; 5. Stop the relevant portion of works as instructed by the ER until the exceedance is abated. 	

Event and Action Plan for Water Quality

EVENT				ACTION
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<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 the Reporting Period

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Tue	1-Oct-13				
Wed	2-Oct-13				
Thu	3-Oct-13				
Fri	4-Oct-13				
Sat	5-Oct-13				
Sun	6-Oct-13				
Mon	7-Oct-13				
Tue	8-Oct-13				
Wed	9-Oct-13				
Thu	10-Oct-13				
Fri	11-Oct-13				
Sat	12-Oct-13				
Sun	13-Oct-13				
Mon	14-Oct-13				
Tue	15-Oct-13				
Wed	16-Oct-13				
Thu	17-Oct-13				
Fri	18-Oct-13				
Sat	19-Oct-13				
Sun	20-Oct-13				
Mon	21-Oct-13				
Tue	22-Oct-13				
Wed	23-Oct-13				
Thu	24-Oct-13				
Fri	25-Oct-13				
Sat	26-Oct-13				
Sun	27-Oct-13				
Mon	28-Oct-13				
Tue	29-Oct-13				
Wed	30-Oct-13				
Thu	31-Oct-13				

	Monitoring Day
	Sunday or Public Holiday

Monitoring Locations

Air Quality	AM1, AM2 and AM3
Construction Noise	NM1 and NM2
Water Quality	WM1 and WM1-Control

Impact Monitoring Schedule for next Reporting Period

Date		Dust Monitoring		Noise Monitoring	Water Quality
		1-hour TSP	24-hour TSP		
Fri	1-Nov-13				
Sat	2-Nov-13				
Sun	3-Nov-13				
Mon	4-Nov-13				
Tue	5-Nov-13				
Wed	6-Nov-13				
Thu	7-Nov-13				
Fri	8-Nov-13				
Sat	9-Nov-13				
Sun	10-Nov-13				
Mon	11-Nov-13				
Tue	12-Nov-13				
Wed	13-Nov-13				
Thu	14-Nov-13				
Fri	15-Nov-13				
Sat	16-Nov-13				
Sun	17-Nov-13				
Mon	18-Nov-13				
Tue	19-Nov-13				
Wed	20-Nov-13				
Thu	21-Nov-13				
Fri	22-Nov-13				
Sat	23-Nov-13				
Sun	24-Nov-13				
Mon	25-Nov-13				
Tue	26-Nov-13				
Wed	27-Nov-13				
Thu	28-Nov-13				
Fri	29-Nov-13				
Sat	30-Nov-13				

	Monitoring Day
	Sunday or Public Holiday

Monitoring Locations

Air Quality	AM1, AM2, AM3 and AM9a
Construction Noise	NM1, NM2, NM8, NM9 and NM10
Water Quality	WM1, WM1-Control, WM4, WM4-Control A and WM4 Control B

Appendix I

Database of Monitoring Result

24-hour TSP Monitoring Data for AM1															
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		
5-Oct-13	33743	7552.45	7576.03	1414.80	39	41	40.0	26.6	1012.5	1.47	2078	3.6425	3.8487	0.2062	99
11-Oct-13	33746	7576.03	7599.57	1412.40	39	40	39.5	26.2	1013.7	1.46	2061	3.6575	3.7712	0.1137	55
17-Oct-13	205543	7599.57	7623.13	1413.60	38	39	38.5	25.6	1014.2	1.44	2033	2.8983	3.0907	0.1924	95
23-Oct-13	205548	7623.13	7646.65	1411.20	35	36	35.5	26.8	1012.4	1.37	1932	2.9009	3.1104	0.2095	108
29-Oct-13	42317	7646.65	7670.17	1411.20	38	39	38.5	23.7	1018.6	1.44	2038	2.7259	2.8406	0.1147	56

24-hour TSP Monitoring Data for AM2															
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		
5-Oct-13	33744	3013.87	3037.87	1440.00	39	41	40.0	26.6	1012.5	1.18	1703	3.6484	3.8421	0.1937	114
11-Oct-13	205540	3037.87	3061.04	1390.20	37	39	38.0	26.2	1013.7	1.11	1546	2.9025	3.0879	0.1854	120
17-Oct-13	205544	3061.04	3084.65	1416.60	40	41	40.5	25.6	1014.2	1.20	1707	2.8995	3.1503	0.2508	147
23-Oct-13	205549	3084.65	3108.28	1417.80	37	39	38.0	26.8	1012.4	1.11	1574	2.9470	3.1369	0.1899	121
29-Oct-13	205551	3108.28	3131.94	1419.60	40	42	41.0	23.7	1018.6	1.21	1717	2.9297	3.1679	0.2382	139

24-hour TSP Monitoring Data for AM3															
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		
5-Oct-13	33745	4007.86	4031.69	1429.80	42	43	42.5	26.6	1012.5	1.27	1822	3.6550	3.8579	0.2029	111
11-Oct-13	205541	4031.69	4055.48	1427.40	40	41	40.5	26.2	1013.7	1.22	1737	2.8942	2.9972	0.1030	59
17-Oct-13	205545	4055.48	4079.54	1443.60	43	44	43.5	25.6	1014.2	1.31	1886	2.9179	3.1222	0.2043	108
23-Oct-13	205550	4079.54	4102.83	1397.40	40	42	41.0	26.8	1012.4	1.23	1718	2.9070	3.0747	0.1677	98
29-Oct-13	42316	4102.83	4126.05	1393.20	41	42	41.5	23.7	1018.6	1.26	1753	2.6936	2.8531	0.1595	91

Noise Measurement Results (dB) of NM1																				
Date	Start Time	1 st Leq _{5min}	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
2-Oct-13	10:40	62.9	64.6	59.1	66.6	70.9	56.9	68.9	71.6	64.9	68.8	71.1	65.1	66.4	70.6	56.0	58.0	59.5	53.5	67
8-Oct-13	11:02	60.1	63.0	55.0	58.6	62.0	53.0	57.7	61.0	52.5	56.6	58.5	53.0	58.8	61.5	53.5	56.7	60.0	50.5	58
15-Oct-13	10:33	58.8	60.1	53.8	57.0	59.1	53.0	58.2	60.4	53.4	56.6	59.0	52.8	59.2	61.0	54.6	57.5	60.1	52.1	58
19-Oct-13	14:31	54.3	56.0	50.9	54.1	55.5	51.0	53.5	55.4	50.6	52.9	54.9	50.3	56.2	57.6	51.8	53.2	55.1	50.8	54
25-Oct-13	10:54	54.7	56.4	50.3	54.7	56.8	51.0	55.2	57.5	51.1	54.2	55.9	50.7	56.3	59.0	49.3	57.7	60.5	52.0	56
31-Oct-13	10:53	57.8	60.2	53.1	59.1	61.2	52.1	57.5	60.5	52.6	58.5	61.3	53.5	57.7	60.7	52.1	55.5	58.1	51.0	58

Noise Measurement Results (dB) of NM2																				
Date	Start Time	1 st Leq _{5min}	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
2-Oct-13	13:21	56.9	57.7	47.4	52.9	52.8	46.5	54.4	52.5	45.8	58.7	60.2	43.0	61.2	61.4	43.0	58.2	60.2	44.1	58
8-Oct-13	14:40	67.9	72.0	48.4	60.4	62.3	47.4	68.4	72.4	47.7	64.5	68.1	48.3	62.8	67.2	47.8	59.0	60.0	46.9	65
15-Oct-13	11:32	63.4	65.4	48.9	57.3	62.6	48.7	67.2	67.7	48.7	63.4	65.8	51.9	63.1	66.2	50.9	60.9	64.0	45.9	64
19-Oct-13	15:25	66.3	70.3	53.4	61.6	63.5	52.0	60.0	59.7	51.6	62.4	63.5	51.6	60.8	60.4	51.7	59.1	58.9	51.4	62
25-Oct-13	13:02	60.9	64.1	42.9	60.0	63.9	47.2	60.9	65.0	46.9	59.1	63.0	47.4	62.6	67.3	45.7	61.3	66.3	45.3	61
31-Oct-13	15:37	60.6	64.2	56.6	63.6	66.3	56.8	62.6	65.1	56.7	62.6	66.3	56.5	63.2	66.6	56.6	64.8	67.8	56.9	63

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

AUES

Summary of Water Quality Monitoring Results

Location				DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C				n/a	n/a	n/a	n/a	n/a						
WM1				Action 4.23	Action n/a	Action 51.3	Action n/a	Action 54.5						
				Limit 4.19	Limit n/a	Limit 67.6	Limit n/a	Limit 64.9						
Date	2-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	12:00	0.13	29.7	29.7	8.98	8.9	114.3	113.8	8.8	8.7	7.52	7.5	5	5.0
			29.6		8.88		113.2		8.5		7.51		5	
WM1	11:35	0.20	30.1	30.2	9.08	9.2	118.1	119.2	12.8	13.2	7.80	7.8	10	10.0
			30.2		9.29		120.3		13.6		7.79		10	
Date	4-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	12:34	0.32	28.2	28.2	7.74	7.8	98.5	98.8	10.2	10.3	7.30	7.3	7	7.0
			28.2		7.87		99.0		10.4		7.28		7	
WM1	12:16	0.36	27.7	27.7	8.3	8.3	103.6	104.1	13.6	14.0	7.59	7.6	10	10.0
			27.7		8.39		104.5		14.3		7.59		10	
Date	8-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	11:45	0.31	28.5	28.5	9.73	9.8	122.2	123.4	8.3	8.5	7.51	7.5	6	5.5
			28.4		9.92		124.5		8.6		7.51		5	
WM1	11:18	0.43	27.1	27.1	8.92	9.0	109.8	111.1	15.5	15.9	7.99	8.0	14	15.0
			27		9.13		112.4		16.2		7.96		16	
Date	10-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	11:39	0.37	29.8	29.8	8.2	8.2	106.1	106.4	7.4	7.3	7.57	7.6	5	5.0
			29.8		8.24		106.6		7.2		7.56		5	
WM1	12:07	0.33	29.8	29.8	8.21	8.2	106.8	107.1	18.5	18.9	7.53	7.5	19	19.0
			29.8		8.24		107.3		19.2		7.52		19	
Date	12-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	11:32	0.40	28.1	28.1	7.3	7.3	92.2	92.1	8.5	8.6	7.91	7.9	5	4.5
			28.1		7.29		92.0		8.7		7.9		4	
WM1	11:05	0.31	27.6	27.6	6.86	6.9	86.1	86.6	13.3	13.1	7.45	7.5	13	13.0
			27.6		6.94		87.1		12.8		7.46		13	
Date	15-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	15:05	0.45	29.8	29.8	7.56	7.6	97.4	98.3	8.4	8.5	7.96	8.0	5	5.0
			29.8		7.69		99.1		8.6		7.97		5	
WM1	10:58	0.27	27.6	27.6	7.11	7.1	88.7	89.2	16.9	17.7	8.05	8.0	27	26.5
			27.6		7.18		89.7		18.5		8.04		26	
Date	17-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	10:39	0.38	25.1	25.2	7.05	7.0	83.1	83.1	5.5	5.4	7.38	7.4	3	3.0
			25.2		7.04		83.1		5.2		7.37		3	
WM1	11:20	0.24	25.9	25.9	8.81	8.8	105.6	105.6	11.4	12.5	7.45	7.4	10	10.0
			25.9		8.79		105.6		13.6		7.44		10	
Date	19-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	14:43	0.37	28.8	28.8	8.54	8.8	110.7	114.3	5.8	5.9	7.47	7.5	2	2.5
			28.8		9.09		117.9		5.9		7.45		3	
WM1	15:13	0.18	26.8	26.8	8.54	8.6	106.8	107.8	25.4	25.9	7.42	7.4	28	27.0
			26.8		8.7		108.8		26.3		7.41		26	
Date	21-Oct-13													
Location	Time	Depth (m)	Temp (oC)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	SS(mg/L)						
WM1-C	11:27	0.44	25.2	25.2	9.24	9.2	111.2	110.4	6.4	6.3	7.07	7.1	2	2.5
			25.2		9.16		109.6		6.2		7.06		3	
WM1	11:50	0.27	25.8	25.8	8.98	9.0	112.7	112.6	15.2	15.1	7.18	7.2	10	11.0
			25.8		8.99		112.5		15		7.18		12	

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

AUES

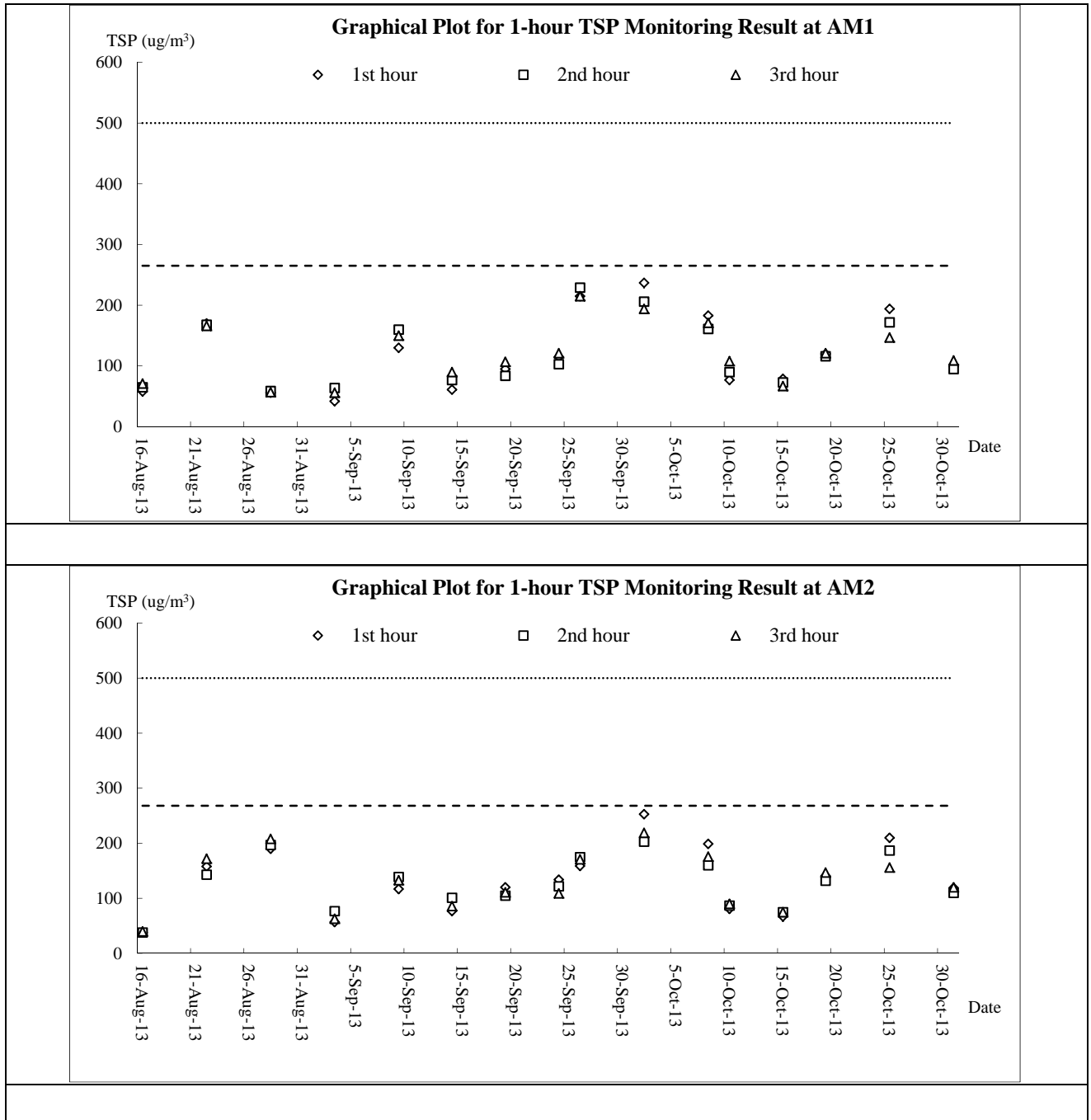
Summary of Water Quality Monitoring Results

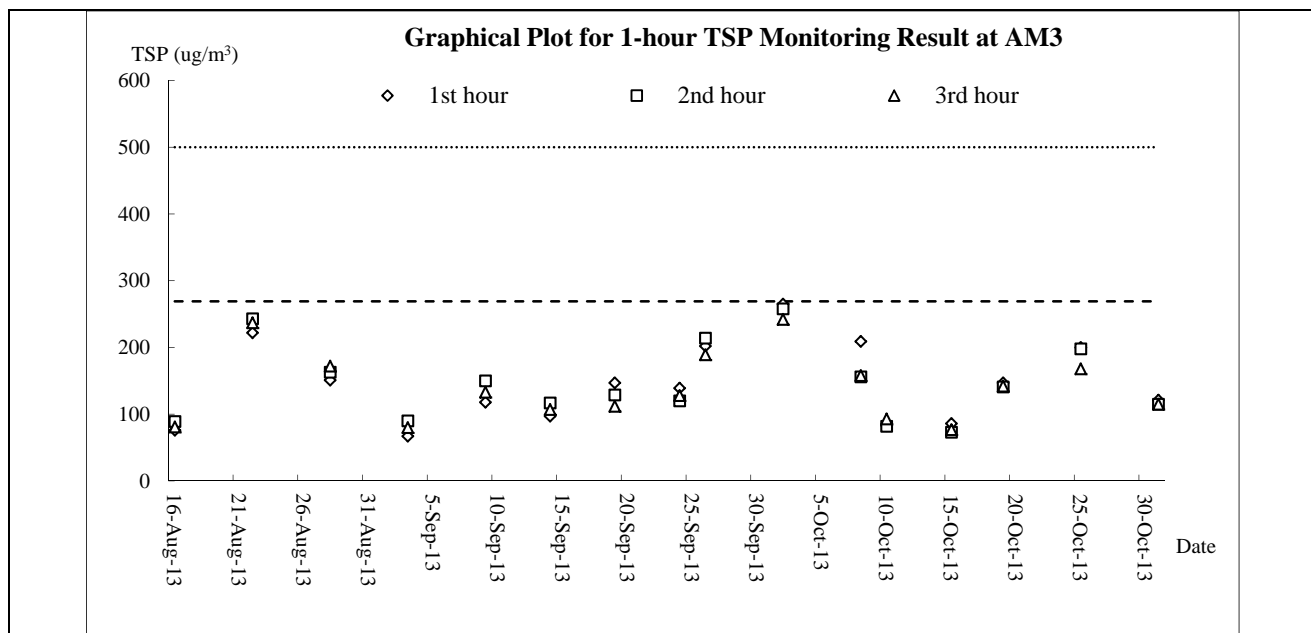
Location			DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)			
WM1-C			n/a		n/a		n/a		n/a		n/a			
WM1			Action	4.23	Action	n/a	Action	51.3	Action	n/a	Action	54.5		
			Limit	4.19	Limit	n/a	Limit	67.6	Limit	n/a	Limit	64.9		
Date	23-Oct-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:10	0.54	26.4	26.4	8.57	8.6	106.7	106.9	6.22	6.4	8.12	8.1	4	4.0
			26.4		8.61		107.1		6.62		8.11		4	
WM1	11:26	0.33	26.7	26.7	8.6	8.6	108.3	108.0	12.7	11.9	8.04	8.0	16	16.0
			26.7		8.55		107.7		11.1		8.04		16	
Date	25-Oct-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:46	0.49	25.3	25.3	5.41	5.3	73.1	72.5	6.13	6.1	7.59	7.5	5	5.0
			25.3		5.22		71.8		6.07		7.42		5	
WM1	12:35	0.34	25.2	25.2	6.26	6.2	76.0	75.6	11.4	11.4	7.34	7.3	10	11.0
			25.1		6.22		75.2		11.3		7.34		12	
Date	29-Oct-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	13:05	0.27	27.2	27.2	10.31	10.2	126.2	125.6	5.01	5.5	7.88	7.9	2	2.0
			27.2		10.16		124.9		6.08		7.89		2	
WM1	13:23	0.39	26.2	26.2	8.52	8.5	103.7	103.1	9.67	9.6	7.91	7.9	6	6.0
			26.2		8.42		102.5		9.58		7.91		6	
Date	31-Oct-13													
Location	Time	Depth (m)	Temp (oC)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		SS(mg/L)	
WM1-C	11:25	0.41	25.5	25.5	10.71	10.7	129.0	129.2	5.99	5.8	7.94	7.9	4	4.0
			25.5		10.72		129.3		5.7		7.93		4	
WM1	11:55	0.35	27	27.0	11.34	11.4	140.1	140.8	5.32	5.9	7.99	8.0	4	4.0
			27		11.45		141.5		6.43		7.99		4	

Appendix J

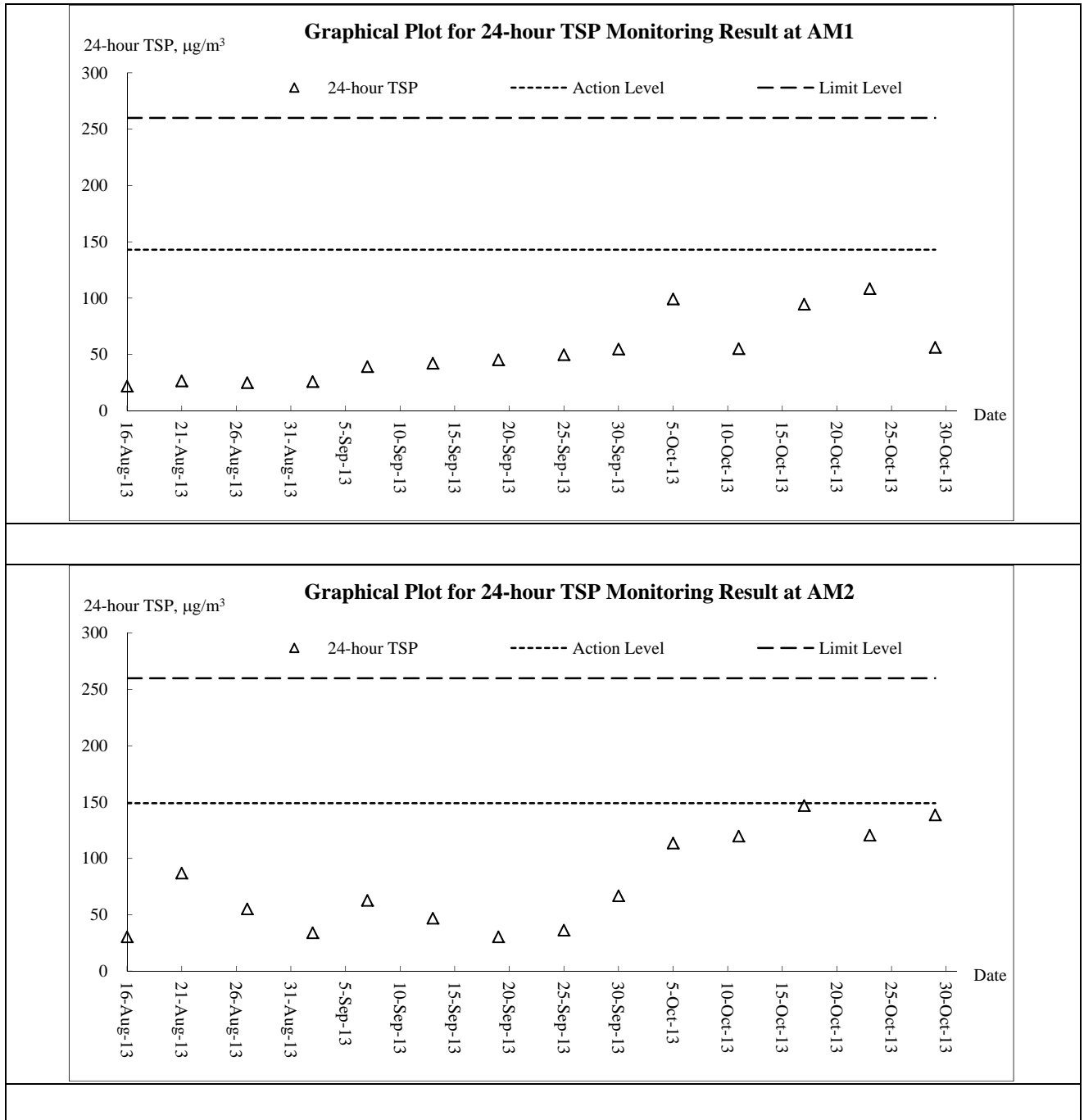
Graphical Plots for Monitoring Result

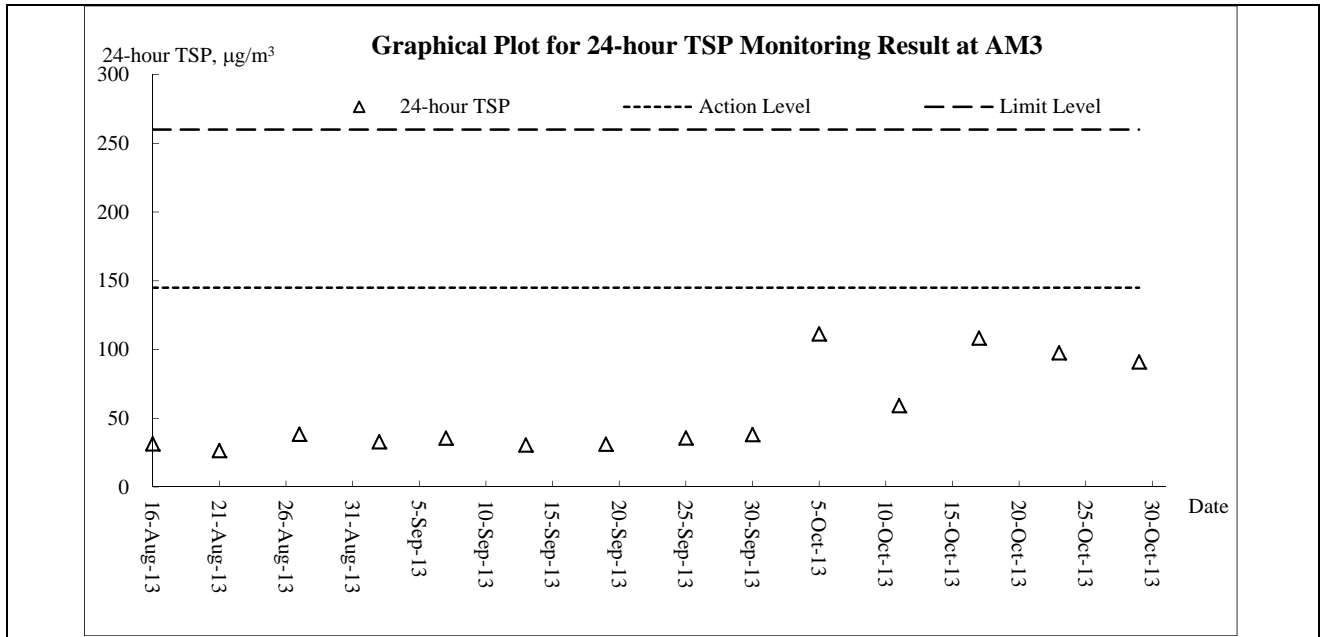
Air Quality – 1-hour TSP



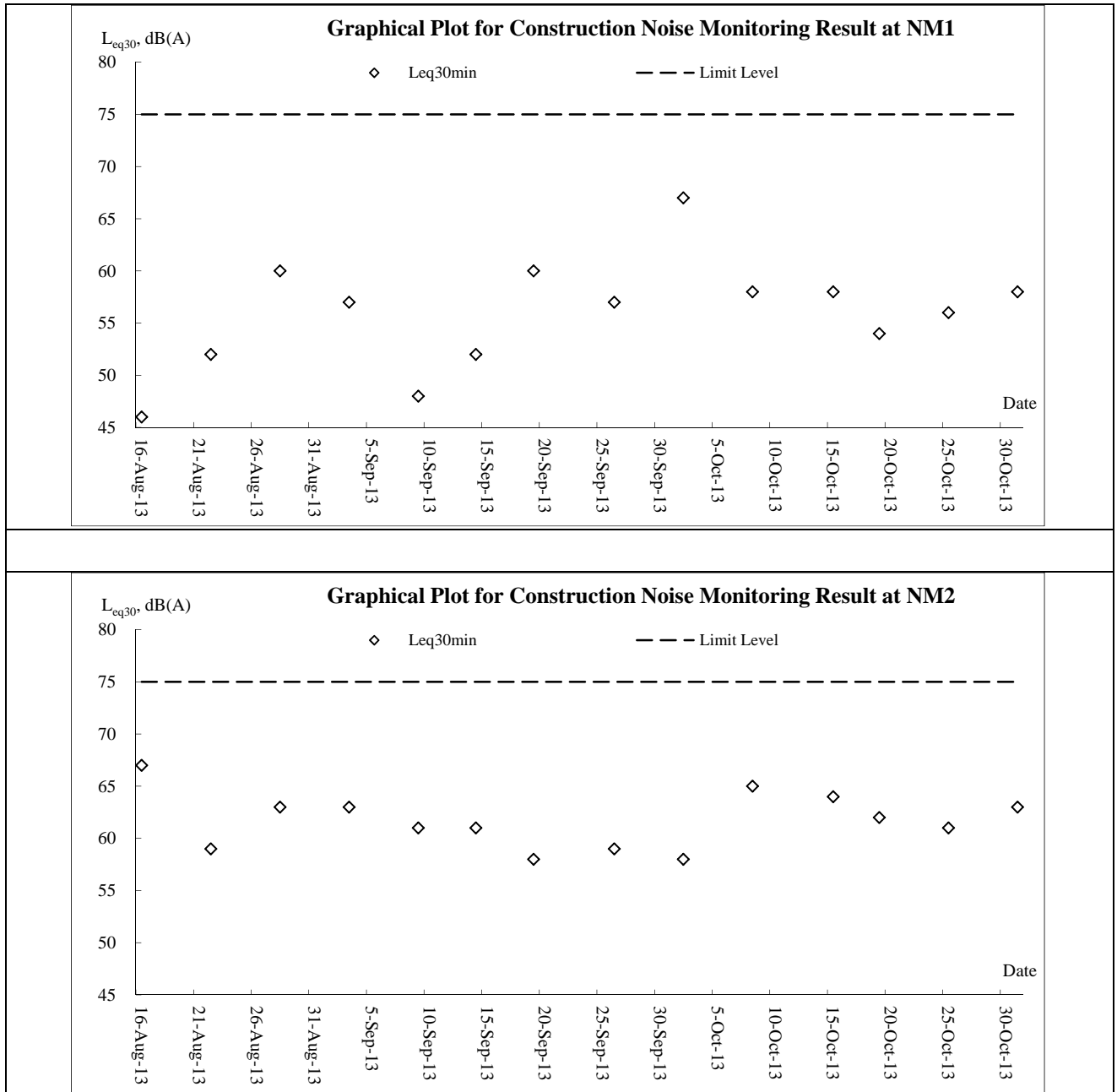


Air Quality – 24-hour TSP

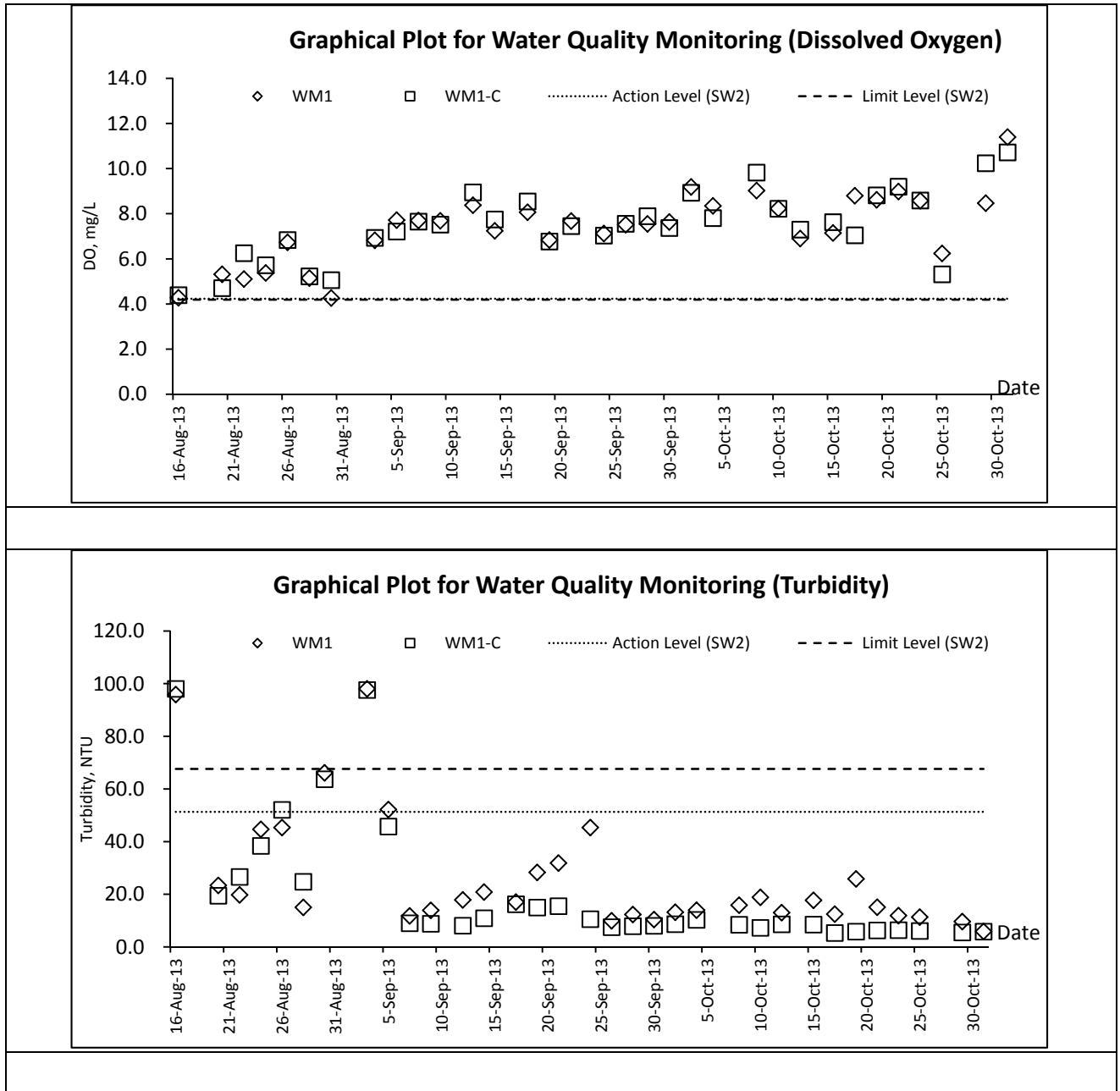


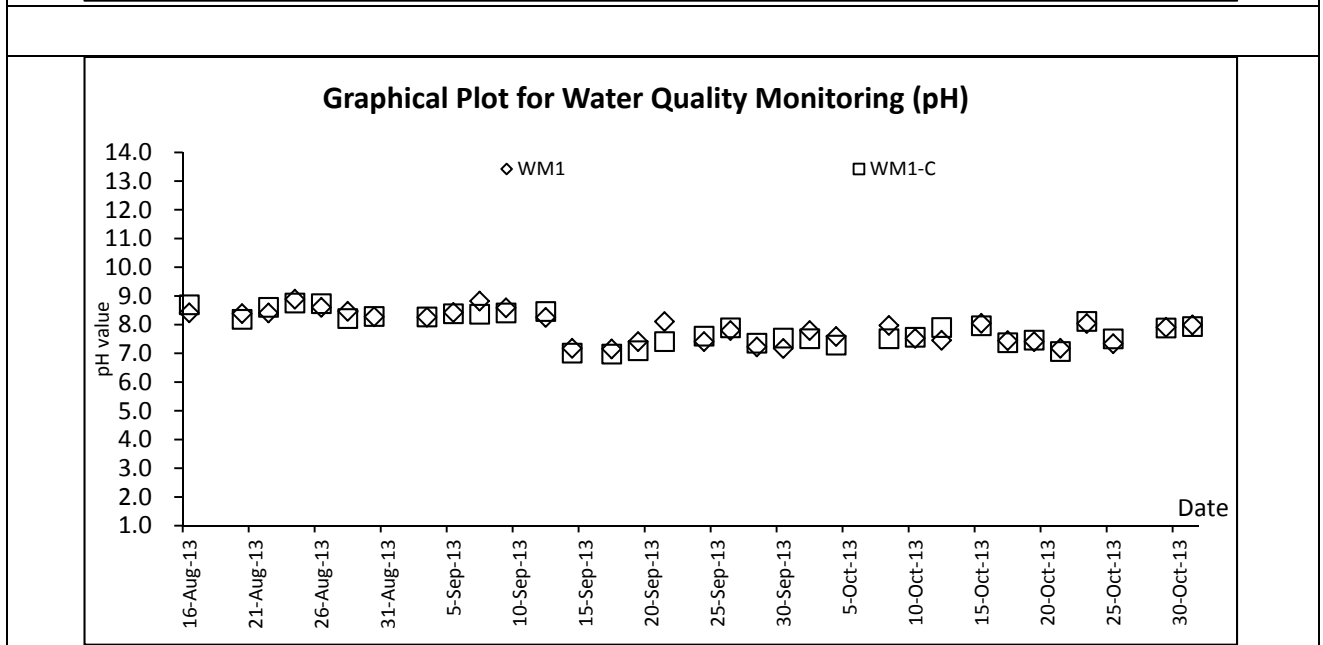
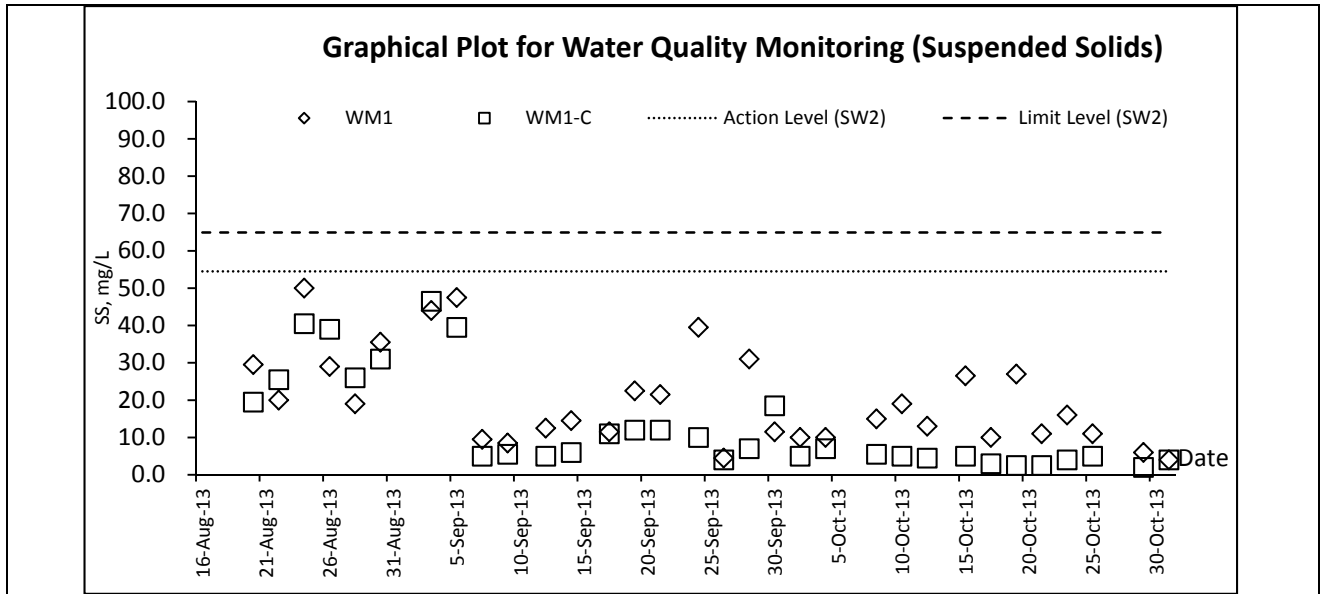


Noise



Water Quality





Appendix K

Meteorological Data

Date	Weather	Total Rainfall (mm)	Ta Kwu Ling Station				
			Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction	
1-Oct-13	Tue	Fine and dry. Moderate east to northeasterly winds.	0	28	5.6	74	E/SE
2-Oct-13	Wed	Fine and dry. Moderate east to northeasterly winds.	0	26.8	7.5	64	N
3-Oct-13	Thu	Fine and dry. Moderate east to northeasterly winds.	0	24.8	6	65.5	N/NW
4-Oct-13	Fri	Mainly fine, rain, dry. Moderate east to northeasterly winds.	0	25.3	7	67.2	N/NW
5-Oct-13	Sat	Mainly fine, rain, dry. Moderate east to northeasterly winds.	0	24.6	6.1	64.2	N
6-Oct-13	Sun	Fine, dry, cloudy, sunny interval. Moderate to fresh north to northwesterly winds.	0	24.7	7.1	***	N/NW
7-Oct-13	Mon	Fine, dry, cloudy, sunny interval. Moderate to fresh north to northwesterly winds.	0	26.2	7.7	***	N/NW
8-Oct-13	Tue	Cloudy, sunny intervals, dry, haze. Moderate to fresh northerly winds.	0	26.2	6.8	65	N/NW
9-Oct-13	Wed	Fine, cloudy. Moderate east to northeasterly winds.	Trace	26.8	6.5	77	E/NE
10-Oct-13	Thu	Sunny periods, cloudy. Moderate east to northeasterly winds.	2.8	27.9	6.1	76.2	E/NE
11-Oct-13	Fri	Mainly fine. Moderate east to northeasterly winds.	0	***	5.4	***	E/SE
12-Oct-13	Sat	Fine, rain. Moderate east to northeasterly winds.	Trace	27.9	6.5	67	E/SE
13-Oct-13	Sun	Fine, rain. Moderate east to northeasterly winds.	0	27.4	8.2	65.5	SE
14-Oct-13	Mon	Fine, cloudy, fresh. Moderate east to northeasterly winds.	Trace	26.6	8.7	74	E/SE
15-Oct-13	Tue	Fine, cloudy, rain. Moderate east to northeasterly winds.	0	27.2	8	70.5	E/SE
16-Oct-13	Wed	Mainly cloudy. Fresh easterly winds, occasionally strong offshore.	Trace	24.8	6.2	67.5	E/SE
17-Oct-13	Thu	Cloudy, dry, fine. Moderate east to northeasterly winds.	Trace	24.2	6	75.5	E/SE
18-Oct-13	Fri	Cloudy, dry, fine. Moderate east to northeasterly winds.	Trace	24.3	6.6	67.5	E/NE
19-Oct-13	Sat	Dry, fine, haze. Moderate northeasterly winds.	0	24	6.2	68.5	E/NE
20-Oct-13	Sun	Dry, fine, haze. Moderate northeasterly winds.	0	23.8	5.7	69.5	E/NE
21-Oct-13	Mon	Dry, fine, haze. Moderate northeasterly winds.	0.1	23.5	5	70	N/NW
22-Oct-13	Tue	Fine, haze, very dry. Moderate north to northeasterly winds.	0	***	8.2	***	N
23-Oct-13	Wed	Very dry, fine, cloudy. Moderate north to northeasterly winds.	0	22.9	8.9	51.2	N
24-Oct-13	Thu	Very dry, fine, cloudy. Moderate north to northeasterly winds.	0	23.1	17.8	45.5	N
25-Oct-13	Fri	Fine and very dry. Moderate to fresh north to northeasterly winds.	0	24	12.8	29.5	N/NE
26-Oct-13	Sat	Fine and very dry. Moderate to fresh north to northeasterly winds.	0	19.6	8.5	55	S/SE
27-Oct-13	Sun	Fine, cloudy. Moderate easterly winds.	0	19.8	5.6	66.2	E
28-Oct-13	Mon	Fine, cloudy. Moderate easterly winds.	0	21.8	7.3	67.5	E
29-Oct-13	Tue	Cloudy, fine. Moderate easterly winds, fresh at times offshore.	0	23.7	6.6	70	E
30-Oct-13	Wed	Mainly fine. Moderate easterly winds, occasionally fresh offshore.	0	24.4	6.6	67	E/NE
31-Oct-13	Thu	Fine. Moderate easterly winds.	Trace	24.4	7	70	N/NE

Remarks: (***) Maintenance

Appendix L

Waste Flow Table

Sang Hing Civil – Richwell Machinery JV

10.0 Monthly Summary Waste Flow Table for 2013

<u>Actual Quantities of Inert C&D Materials Generated Monthly</u>							<u>Actual Quantities of C&D Wastes Generated Monthly</u>				
Month	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 '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)	(in '000ton)
JAN											
FEB											
MAR											
APRIL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
MAY	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
JUN	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
JUL	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.00064
AUG	0.000	0.000	0.000	0.000	0.000	1.465	0.000	0.000	0.000	0.000	0.000
SEP	0.000	0.000	0.000	0.000	0.000	0.788	0.000	0.000	0.000	0.000	0.048
OCT	0.000	0.000	0.000	0.000	0.000	47.063	0.000	0.000	0.000	0.000	0.996
Sub Total	0.000	0.000	0.000	0.000	0.000	49.316	0.000	0.000	0.000	0.000	1.045
NOV											
DEC											
Total	0.000	0.000	0.000	0.000	0.000	49.316	0.000	0.000	0.000	0.000	1.045

Notes :

(1) Note Used.

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

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

(4) The summary table shall be submitted to the Engineer's Representative monthly together with the Waste Flow Table for review and monitoring.

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 seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies. <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	The following odour containment and control measures will be provided for the proposed sewage treatment work at the BCP site: <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	Adoption of Quieter PME Use of the recommended quieter PME such as those given in the BS5228: Part 1:2009 and presented in Table 4.14 , which can be found in Hong Kong.	To minimize the construction air-borne noise impact	Contractors	Construction Work Sites	During Construction	EIA recommendation, EIAO and Noise Control Ordinance (NCO)

EIA Ref.	EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measure & Main Concerns to address	Who to implement the measure?	Location of the measure	When to implement the measure?	What requirements or standards for the measure to achieve?
4.4.1.4	3.1	<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, piling 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 chiller and E/M equipment); • Locate fixed plant/fouler 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. 	<p>To minimize the fixed plant noise impact</p>	<p>Managing Authority of the buildings / Contractor</p>	<p>BCP, Administration Building and all ventilation buildings</p>	<p>Before Operation</p>	<p>EIAO and NCO</p>

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. 	<p>To control site runoff and drainage; prevent high sediment loading from reaching the nearby watercourses</p>	<p>Contractor</p>	<p>Construction Works Sites</p>	<p>Construction Phase</p>	<p>Practice Note for Professional Persons on Construction Site Drainage (ProPECC Note PN 1/94)</p>
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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 					

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		<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 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?
			<p>grounds</p> <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 from 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 				

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 Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby stormwater drain. Stockpiles of cement and other construction materials should be kept covered when not being used. Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby stormwater drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.</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 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 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
<p><u>Water Quality Impact (Operation)</u></p> <p>No mitigation measure is required.</p>							

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Sewage and Sewerage Treatment Impact (Construction)

6.7	5	The sewage generated by the on-site workforce should be collected in chemical toilets and disposed of off-site by a licensed waste collector.	To minimize water quality impacts	Contractor	All construction works sites with on-site sanitary facilities	Construction phase	EIA recommendation and WPCCO
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Sewage and Sewerage Treatment Impact (Operation)

6.6.3	5	Sewage generated by the BCP and Chuk Yuen Village Resite will be collected and treated by the proposed on-site sewage treatment facility using Membrane Bioreactor treatment with a portion of the treated wastewater reused for irrigation and flushing within the BCP.	To minimize water quality impacts	DSD	BCP	Operation phase	EIA recommendation and WPCCO
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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 WPCCO
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Waste Management Implication (Construction)

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
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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

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7.6.1.3	6	<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. 	<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. 	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>	<p>To minimize impacts resulting from collection and transportation of general refuse for off-site disposal</p>	Contractor	Construction works sites (General)	Construction phase	Waste Disposal Ordinance and Public Health and Municipal Services Ordinance - 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>	<p>To minimize impacts resulting from collection and transportation of chemical waste for off-site disposal</p>	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