



JOB No.: TCS00881/18 & TCS00944/18

**SITE FORMATION AND ASSOCIATED INFRASTRUCTURAL
WORKS FOR DEVELOPMENT OF COLUMBARIUM,
CREMATORIUM AND RELATED FACILITIES AT SANDY
RIDGE CEMETERY**

**MONTHLY ENVIRONMENTAL MONITORING AND AUDIT
REPORT (No.12) – JULY 2019**

**PREPARED FOR
HSIN CHONG TSUN YIP JOINT VENTURE &
SANG HING CIVIL CONTRACTORS CO., LTD**

Date	Reference No.	Prepared By	Certified By
13 August 2019	TCS00881/18/600/R0303v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	7 August 2019	First Submission
2	13 August 2019	Amended according to the IEC's comments on 13 August 2019

Our Ref: TCS00881/18/300/L0312

Civil Engineering and Development Department
2/F, Civil Engineering and Development Building,
101 Princess Margaret Rd,
Homantin, Kowloon

Attn: Mr. SHUM Ngai Hung, Steven

14 August 2019
By e-mail

Dear Sirs,

**Re: Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery
Monthly Environmental Monitoring & Audit Report (No.12) – July 2019**

We confirmed that the captioned report has complied with the requirement set out in the EM&A Manual, we hereby certify the captioned report pursuant to Specific Condition 3.4 of the Environmental Permit No. FEP-01/534/2017/A and EP-534/2017/A.

Should you have any queries, please feel free to contact the undersigned at Tel: 2959-6059 or Fax: 2959-6079 or Email: twtam@fordbusiness.com.

Yours sincerely,

For and on Behalf of

Action-United Environmental Services & Consulting (AUES)



T. W. Tam
Environmental Team Leader
TW/nh

cc	ARUP (RE of Contract 1)	Mr. Steven Tang	by e-mail
	ARUP (RE of Contract 2)	Mr. Anthony Lau	by e-mail
	HCTY-JV (Contractor of Contract 1)	Mr. Ho Man To	by e-mail
	Sang Hing (Contractor of Contract 2)	Mr. Elvin Lam	by e-mail
	Acuity (IEC)	Mr. Jacky Leung	by e-mail



ACUITY
SUSTAINABILITY
CONSULTING LIMITED



Website: www.acuityhk.com



Unit 1908, iPlace,
Nos. 301-305 Castle Peak Road,
Kwai Chung, New Territories



Tel. : (852) 2698 6833
Fax.: (852) 2698 9383

Our ref: CJO4068

Hsin Chong Tsun Yip Joint Venture (CV/2016/10)
Hsin Chong Centre
107-109 Wai Yip Street
Kwun Tong, Kowloon
Hong Kong

Attention: Mr. HO Man-to

13 August 2019

Dear Sir,

**Site formation and Associated Infrastructural Works for Development of Columbarium at
Sandy Ridge Cemetery
Monthly Environmental Monitoring and Audit Report (No.12) July 2019**

I refer to the email of ET regarding the captioned Monthly Report. We have no adverse comment on the Monthly Environmental Monitoring and Audit Report (No.12) July 2019 (Version 2) dated 13 August 2019 with reference No. TCS00881/18/600/R0303v2 after verification.

Yours faithfully,

CH Leung

Ir Leung CH Jacky
Independent Environmental Checker

cc. CEDD-DPTL/Land Works – Mr. SHUM Steven
ARUP – Mr. LEE Davis
ET Leader – Mr. TAM

EXECUTIVE SUMMARY

- ES.01. This is the 12th Monthly Environmental Monitoring and Audit Report summarizing the monitoring results and inspection findings under the Project for the period from 1 to 31 July 2019 (the Reporting Month).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

- ES.02. In the Reporting Month, the major construction works under the Project included CV/2016/10 (Contract 1) and CV/2017/02 (Contract 2). Environmental monitoring activities under the EM&A programme in this Reporting Month are summarized in the following table.

Table ES-1 Breach of Action and Limit (A/L) Levels in the Reporting Month

Issues	Environmental Monitoring Parameters / Inspection	Monitoring Locations		Total Occasions
		CV/2016/10	CV/2017/02	
Air Quality	1-hour TSP	ASR-1	ASR-2	54
	24-hour TSP		ASR-3	15
Construction Noise	Leq (30min) Daytime	CN-1 CN-2	CN-3 CN-4	20
Water Quality	In-situ measurement and Water sampling	M3	M1, M2 and M4	14
Ecology	Monthly Monitoring	Transect within site area of CV/2016/10	Transect within site area of CV/2017/02	1
Landscape & Visual	Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	1
Inspection & Audit	ET Regular Environmental Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	5
	IEC Monthly Environmental Site Audit			1

BREACH OF ACTION AND LIMIT (A/L) LEVELS

- ES.03. In the Reporting Month, no exceedances of air quality, noise and water quality monitoring were recorded. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Table ES-2 Breach of Action and Limit (A/L) Levels in the Reporting Month

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

Note: NOE – Notification of Exceedance

ENVIRONMENTAL COMPLAINT

- ES.04. No environmental complaint was recorded or received in this Reporting Month. The statistics of environmental complaint are summarized in the following table.

Table ES-3 Environmental Complaint Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 July 2019	Contract 1	0	0	NA
1 – 31 July 2019	Contract 2	0	0	NA

- ES.05. In addition, no complaints and emergency events relating to violation of environmental legislation for illegal dumping and landfilling was received.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES.06. No environmental summons or successful prosecution was recorded in this Reporting Month. The statistics of summons or successful prosecutions are summarized in the following tables.

Table ES-4 Environmental Summons Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Summons Nature
1 – 31 July 2019	Contract 1	0	0	NA
1 – 31 July 2019	Contract 2	0	0	NA

Table ES-5 Environmental Prosecution Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Prosecution Nature
1 – 31 July 2019	Contract 1	0	0	NA
1 – 31 July 2019	Contract 2	0	0	NA

REPORTING CHANGE

- ES.07. No reporting change was made in the Reporting Month.

SITE INSPECTION

- ES.08. In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on *4th, 11th, 18th, 25th and 31th July 2019* and IEC attended joint site inspection on *25th July 2019*. No non-compliance was noted.
- ES.09. Joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on *4th, 11th, 19th, 25th and 31th July 2019* and IEC attended joint site inspection on *25th July 2019*. No non-compliance was noted.

FUTURE KEY ISSUES

- ES.010. The Contractors were further reminded to pay special attention on water quality mitigation measures and should fully implement according to the ISEMM of the EM&A Manual, in particular to prevent surface runoff with high SS content and other pollutants from flowing to local stream and Conservation Area (CA).
- ES.011. Moreover, air quality and construction noise are the major environmental issues as under the Project Works. Air quality mitigation measures such as wheel wash facilities, watering of haul roads and covering of dusty materials with tarpaulin sheet should be implemented as far as practicable. Construction noise mitigation measures such as use of movable noise barriers and Quality Powered Mechanical Equipment (QPME) should be properly provided to reduce construction noise impact.
- ES.012. Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be performed to prevent mosquito breeding on site.

Table of Contents

1	INTRODUCTION	1
1.1	PROJECT BACKGROUND	1
1.2	REPORT STRUCTURE	2
2	PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS	4
2.1	CONSTRUCTION CONTRACT PACKAGING	4
2.2	CONSTRUCTION PROGRESS	4
2.3	SUMMARY OF ENVIRONMENTAL SUBMISSIONS	4
2.4	SUMMARY OF SUBMISSION UNDER THE ENVIRONMENTAL PERMIT REQUIREMENTS	5
3	SUMMARY OF IMPACT MONITORING REQUIREMENT	7
3.1	GENERAL	7
3.2	MONITORING PARAMETERS	7
3.3	MONITORING LOCATIONS	7
3.4	MONITORING FREQUENCY AND PERIOD	9
3.5	MONITORING EQUIPMENT	9
3.6	EQUIPMENT CALIBRATION	12
3.7	DATA MANAGEMENT AND DATA QA/QC CONTROL	13
3.8	DETERMINATION OF ACTION/LIMIT (A/L) LEVELS	13
4	AIR QUALITY	15
4.1	MONITORING RESULTS	15
4.2	AIR MONITORING EXCEEDANCE	16
5	CONSTRUCTION NOISE	17
5.1	MONITORING RESULTS	17
5.2	NOISE MONITORING EXCEEDANCE	17
6	WATER QUALITY	18
6.1	MONITORING RESULTS	18
6.2	WATER QUALITY MONITORING EXCEEDANCE	19
7	ECOLOGY MONITORING	20
7.1	REQUIREMENT	20
7.2	METHODOLOGY	20
7.3	ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 1)	21
7.4	ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 2)	24
8	LANDSCAPE AND VISUAL	26
8.1	REQUIREMENT	26
8.2	FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH	26
9	WASTE MANAGEMENT	28
9.1	GENERAL WASTE MANAGEMENT	28
9.2	RECORDS OF WASTE QUANTITIES	28
10	SITE INSPECTION	29
10.1	REQUIREMENT	29
10.2	FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH	29
11	ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE	31
11.1	ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION	31
12	IMPLEMENTATION STATUS OF MITIGATION MEASURES	32
12.1	GENERAL REQUIREMENTS	32
12.2	TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH	32
12.3	KEY ISSUES FOR THE COMING MONTH	33
13	CONCLUSIONS AND RECOMMENDATIONS	34
13.1	CONCLUSIONS	34
13.2	RECOMMENDATIONS	34

LIST OF TABLES

TABLE 2-1	STATUS OF ENVIRONMENTAL LICENSES AND PERMITS FOR CONTRACT 1
TABLE 2-2	STATUS OF ENVIRONMENTAL LICENSES AND PERMITS FOR CONTRACT 2
TABLE 2-3	STATUS OF SUBMISSION AS UNDER FEP FOR CONTRACT 1
TABLE 2-4	STATUS OF SUBMISSION AS UNDER FEP FOR CONTRACT 2
TABLE 3-1	SUMMARY OF EM&A REQUIREMENTS
TABLE 3-2	DESIGNATED AIR QUALITY MONITORING LOCATION UNDER THE PROJECT
TABLE 3-3	DESIGNATED CONSTRUCTION NOISE MONITORING LOCATION UNDER THE PROJECT
TABLE 3-4	DESIGNATED WATER QUALITY MONITORING STATIONS UNDER THE PROJECT
TABLE 3-5	AIR QUALITY MONITORING EQUIPMENT
TABLE 3-6	NOISE MONITORING EQUIPMENT
TABLE 3-7	WATER QUALITY MONITORING EQUIPMENT
TABLE 3-8	ACTION AND LIMIT LEVELS FOR AIR QUALITY MONITORING
TABLE 3-9	ACTION AND LIMIT LEVELS FOR CONSTRUCTION NOISE
TABLE 3-10	ACTION AND LIMIT LEVELS FOR WATER QUALITY
TABLE 4-1	SUMMARY OF AIR QUALITY MONITORING RESULTS AT ASR-1 UNDER CONTRACT 1
TABLE 4-2	SUMMARY OF AIR QUALITY MONITORING RESULTS AT ASR-2 UNDER CONTRACT 2
TABLE 4-3	SUMMARY OF AIR QUALITY MONITORING RESULTS AT ASR-3A UNDER CONTRACT 2
TABLE 5-1	SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS UNDER CONTRACT 1
TABLE 5-2	SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS UNDER CONTRACT 2
TABLE 6-1	SUMMARY OF WATER QUALITY MONITORING RESULTS – M3 UNDER CONTRACT 1
TABLE 6-2	SUMMARY OF WATER QUALITY MONITORING RESULTS (M1, M2 AND M4) UNDER CONTRACT 2
TABLE 6-3	SUMMARY OF FIELD MEASUREMENTS FOR WATER QUALITY
TABLE 6-4	ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE RECORD
TABLE 6-5	SUMMARY OF INVESTIGATION OF WATER QUALITY EXCEEDANCE IN THE REPORTING MONTH
TABLE 7-1	ACTION AND LIMIT LEVELS FOR WET WOODLAND HABITATS MONITORING
TABLE 7-2	ACTION AND LIMIT LEVELS FOR NON-WET WOODLAND HABITATS MONITORING
TABLE 7-3	SCHEDULE OF FAUNAL SURVEYS IN EACH YEAR DURING CONSTRUCTION PHASE
TABLE 7-4	RESULT OF MAMMAL SURVEY UNDER CONTRACT 1
TABLE 7-5	RESULT OF AVIFAUNA SURVEY UNDER CONTRACT 1
TABLE 7-6	RESULT OF REPTILE SURVEY UNDER CONTRACT 1
TABLE 7-7	RESULT OF AMPHIBIAN SURVEY UNDER CONTRACT 1
TABLE 7-8	RESULT OF BUTTERFLY SURVEY UNDER CONTRACT 1
TABLE 7-9	RESULT OF ODONATE SURVEY UNDER CONTRACT 1
TABLE 7-10	RESULT OF FRESHWATER COMMUNITIES SURVEY UNDER CONTRACT 1
TABLE 7-11	RESULT OF MAMMAL SURVEY UNDER CONTRACT 2
TABLE 7-12	RESULT OF AVIFAUNA SURVEY UNDER CONTRACT 2
TABLE 7-13	RESULT OF REPTILE SURVEY UNDER CONTRACT 2
TABLE 7-14	RESULT OF AMPHIBIAN SURVEY UNDER CONTRACT 2
TABLE 7-15	RESULT OF BUTTERFLY SURVEY UNDER CONTRACT 2
TABLE 7-16	RESULT OF ODONATE SURVEY UNDER CONTRACT 2
TABLE 7-17	RESULT OF FRESHWATER COMMUNITIES SURVEY UNDER CONTRACT 2
TABLE 8-1	LANDSCAPE & VISUAL INSPECTION FINDING FOR CONTRACT 1
TABLE 8-2	LANDSCAPE & VISUAL INSPECTION FINDING FOR CONTRACT 2

TABLE 9-1	SUMMARY OF QUANTITIES OF INERT C&D MATERIALS
TABLE 9-2	SUMMARY OF QUANTITIES OF C&D WASTES
TABLE 10-1	SITE OBSERVATIONS FOR THE WORKS OF CONTRACT-1
TABLE 11-1	STATISTICAL SUMMARY OF ENVIRONMENTAL COMPLAINTS
TABLE 11-2	STATISTICAL SUMMARY OF ENVIRONMENTAL SUMMONS
TABLE 11-3	STATISTICAL SUMMARY OF ENVIRONMENTAL PROSECUTION
TABLE 12-1	ENVIRONMENTAL MITIGATION MEASURES

LIST OF APPENDICES

APPENDIX A	LAYOUT PLAN OF THE PROJECT
APPENDIX B	ORGANIZATION STRUCTURE AND CONTACT DETAILS OF RELEVANT PARTIES
APPENDIX C	THREE MONTHS ROLLING PROGRAMME
APPENDIX D	DESIGNATED MONITORING LOCATIONS
APPENDIX E	CALIBRATION CERTIFICATES OF MONITORING EQUIPMENT AND LABORATORY CERTIFICATE
APPENDIX F	EVENT AND ACTION PLAN OF AIR QUALITY, NOISE AND WATER QUALITY
APPENDIX G	MONITORING SCHEDULES OF THE REPORTING MONTH AND COMING MONTH
APPENDIX H	MONITORING DATA OF 24-HOUR TSP AIR QUALITY, NOISE AND WATER QUALITY
APPENDIX I	GRAPHICAL PLOTS OF AIR QUALITY, NOISE AND WATER QUALITY
APPENDIX J	METEOROLOGICAL DATA OF THE REPORTING MONTH
APPENDIX K	ECOLOGY SURVEY REPORT
APPENDIX L	LANDSCAPE & VISUAL INSPECTION CHECKLIST
APPENDIX M	MONTHLY SUMMARY WASTE FLOW TABLE
APPENDIX N	IMPLEMENTATION SCHEDULE FOR ENVIRONMENTAL MITIGATION MEASURES (ISEMM)
APPENDIX O	IMPLEMENTATION OF WATER QUALITY MITIGATION MEASURES

1. INTRODUCTION

1.1 PROJECT BACKGROUND

- 1.1.1 Civil Engineering and Development Department is the Project Proponent for the Project “*Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery*”. The Project is a Designated Project to be implemented under Environmental Permit No. EP-534/2017/A and FEP-01/534/2017/A. The layout plan of the Project is shown in [Appendix A](#). Major works to be executed under the Project shall include to the following:

A Designated Works under EP-534/2017/A

- (i) Site formation of about 8 hectares of land and associated drainage, sewerage and landscape works for development of Columbarium and Crematorium facilities at the Sandy Ridge Cemetery;
- (ii) Construction of a new road (about 600m) including a section of viaduct connecting the platform for Crematorium and Man Kam To Road and the pick-up/drop-off point at Man Kam To Road.;
- (iii) Widening of about 900m of the existing Sha Ling Road;
- (iv) Widening of about 1.4km of the existing Lin Ma Hang Road; and
- (v) Improvement works to the existing barging point at Siu Lam

Non-Designated Works

- (i) Construction of a sewage detention tank complete with odour and septicity control mechanism;
- (ii) Construction of noise barriers along Sha Ling Road;
- (iii) Construction of a new Refuse Collection Point (RCP) near the junction between Man Kam To Road and Sha Ling Road;
- (iv) Landscaping works (including both hard and soft landscape works);
- (v) Associated tree felling, transplanting and compensatory planting works;
- (vi) Associated street lighting, street furniture and road marking, etc.; and
- (vii) Other works which are specified in PS of the Contract.

- 1.1.2 To facilitate the Project management, the Project works were separated into three different Contracts which are described below sub-sections.

- 1.1.3 *Contract No. CV/2016/10 – Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery:-*

- Site formation of about 1.77 ha of land for the proposed pick-up and drop-off area for shuttle bus operation;
- Upgrading of a section of 900m existing Sha Ling Road from 3m wide carriageway to 7.3m wide carriageway with footpath at both sides;
- Construction of one EVA with a total length of about 160m;
- Construction of noise barriers along Sha Ling Road;
- Modification of junction between Man Kam To Road and Sha Ling Road;
- Construction of a new pick up / drop off point at Man Kam To Road;
- Relocation and construction of a new refuse collection point near junction between Man Kam To Road and Sha Ling Road;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures;
- Associated drainage, sewerage and waterworks along Sha Ling Road; and
- Associated landscaping works.

- 1.1.4 *Contract No. CV/2017/02 – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road for Development of Columbarium at Sandy Ridge Cemetery:-*

- Construction of a new road connecting Columbarium site to Crematorium site;

- Construction of one EVA with a total length of about 300m;
- Widening of a section of 1.4 km long Lin Ma Hang Road (between Man Kam To Road and Ping Yuen River) from 6m wide carriageway to 7.3m with 2m width footpath on both sides;
- Provision of a pair of lay-by at Lin Ma Hang Road;
- Construction of a new vehicular access connecting the Sheung Shui Landmark North PTI and Lung Sum Avenue;
- Construction of covered walkway along Fanling Station Road;
- Removal of planters and central divider along Fanling Station Road and San Wan Road;
- Associated drainage, sewerage, waterworks and utility works along Man Kam To Road and Lin Ma Hang Road;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures; and
- Associated landscaping works.

1.1.5 *CEDD Contract No. (to be advised):-*

- Site Formation for the platform of the columbarium site;
- Construction of two 2 at-grade access roads;
- Construction of road junction between Man Kam To Road and the new access road;
- Associated drainage, sewerage and waterworks along the two new access roads;
- Associated geotechnical works including cut and fill slopes, soil nailing works and retaining structures; and
- Associated landscaping works

1.1.6 Hsin Chong Tsun Yip Joint Venture (hereafter referred as “HCTYJV”) has been awarded Contract 1 on 5 December 2017. According to the Contract requirement, HCTYJV shall take over the responsibility for part of the Environmental Permit No. EP-534/2017 for ease of management, therefore application for Further Environmental Permit was submitted by HCTYJV to EPD on 26 January 2018 and Further Environmental Permit No. FEP-01/534/2017 was granted to HCTYJV by EPD on 23 February 2018. Furthermore, EPD issued Environmental Permit No. FEP-01/534/2017/A on 24 December 2018.

1.1.7 Sang Hing Civil Contractors Company Limited (hereinafter referred as “Sang Hing”) was awarded Contract 2 on 23 May 2018. The Contract Works is a Designated Project as under Environmental Permit (EP) No. EP-534/2017. Furthermore, EPD issued Environmental Permit No. EP-534/2017/A on 24 December 2018.

1.1.8 Action-United Environmental Services & Consulting has been commissioned by the Contractors as an Environmental Team to implement the EM&A programme in accordance with the approved EM&A Manual as well as the associated duties. As part of the EM&A programme, baseline monitoring to determine the ambient environmental conditions was completed before construction work commencement. The Baseline Monitoring Report (air, noise and water) certified by ET Leader (ETL) and verified by Independent Environmental Checker (IEC) was submitted to Environmental Protection Department (EPD) and it was approved by EPD on 25 October 2018.

1.1.9 This is the 12th Monthly Environmental Monitoring and Audit Report summarizing the monitoring results and inspection findings for the period from 1 to 31 July 2019.

1.2 REPORT STRUCTURE

1.2.1 The Monthly Environmental Monitoring and Audit Report is structured into the following sections:-

- Section 1** *Introduction*
- Section 2** *Project Organization and Construction Progress*
- Section 3** *Summary of Monitoring Requirements*
- Section 4** *Air Quality Monitoring Results*

Section 5	<i>Noise Monitoring Results</i>
Section 6	<i>Water Quality Monitoring Results</i>
Section 7	<i>Ecology Monitoring Results</i>
Section 8	<i>Landscape & Visual</i>
Section 9	<i>Waste Management</i>
Section 10	<i>Site Inspections</i>
Section 11	<i>Environmental Complaints and Non-Compliance</i>
Section 12	<i>Implementation Status of Mitigation Measures</i>
Section 13	<i>Conclusions and Recommendation</i>

2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

- Contract 1 (Contract No. CV/2016/10)
- Contract 2 (Contract No. CV/2017/02)
- Contract 3 (Contract No. TBA)

2.1.2 Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in [Appendix B](#).

2.2 CONSTRUCTION PROGRESS

2.2.1 The three-month rolling construction programme for Contract 1 and Contract 2 are enclosed in [Appendix C](#). The construction activities undertaken in this Reporting Month are listed below:-

Contract 1 (CV/2016/10)

2.2.2 Contract 1 was awarded in December 2017 and major construction work was commenced on 16 August 2018. The construction activities undertaken in this Reporting Month is listed below:

- General site clearance
- Bulk Excavation
- Construction of Cut Slope, installation of soil nailing and construction of surface channel.
- Filling work at retaining wall
- Construction of fill slope and surface channel

Contract 2 (CV/2017/02)

2.2.3 Contract 2 was awarded in May 2018 and construction work was tentatively commenced on 5 November 2018. The construction activities undertaken in this Reporting Month is listed below:

- Initial Tree Survey Report for Man Kam To Road
- Monthly Tree Survey Report for Lin Ma Hang Road, Sha Ling
- Site Patrol and daily cleaning within the site boundary including the anti-mosquito measures.
- Liaison with Contract 1 Contractor regarding the access road
- Construction of Manhole, gullies, drainage pipe at Lin Ma Hang Road between CH170-240 Northbound & CH960-1015 Northbound.
- Filling Works for slope FS18 (Part A1) and Retaining Wall 14 Pre-drilling works and Temporary Soil Nail Works for Retaining Wall 13

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 Summary of the relevant permits, licenses, and/or notifications on environmental protection for this Project in this Reporting Month is presented in [Tables 2-1 and 2-2](#).

Table 2-1 Status of Environmental Licenses and Permits for Contract 1

Item	Description	License/ Permit ref no.	License/ Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Ref. no. 428909 Acknowledged by EPD on 20/12/2017	Valid
2	Chemical waste Producer Registration	WPN: 5231-641-H3937-01 Issued by EPD on 27/03/2018	Valid
3	Water Pollution Control Ordinance	License no. WT00030795-2018 Issued date: 9/5/2018 Expire Date: 31/5/2023	Valid

Item	Description	License/ Permit ref no.	License/ Permit Status
4	Billing Account for Disposal of Construction Waste	Account no.: 7029769	Valid

Table 2-2 Status of Environmental Licenses and Permits for Contract 2

Item	Description	License/ Permit ref no.		License/ Permit Status
1	Air Pollution Control (Construction Dust) Regulation	Ref. no. 440406 Acknowledged by EPD on 14/12/2018	Man Kam To Road (near Sha Ling Road to Kong Nga Po Road)	Valid
		Ref. no. 440405 Acknowledged by EPD on 14/12/2018	Fanling Station Road	Valid
		Ref. no. 440404 Acknowledged by EPD on 14/12/2018	Sa Ling Road (Sandy Ridge Cemetery)	Valid
		Ref. no. 440401 Acknowledged by EPD on 14/12/2018	Lin Ma Hang Road (San Uk Ling – Muk Wu Nga Yiu)	Valid
		Ref. no. 440402 Acknowledged by EPD on 14/12/2018	Lung Sum Avenue (near Landmark North)	Valid
2	Chemical waste Producer Registration	WPN: 5213-641-S4151-01 Issued by EPD on 04/02/2019		Valid
3	Water Pollution Control Ordinance	License no: WT00032936-2018 Issued date: 16/01/2019 Expire Date: 31/01/2024	Man Kam To Road & Lin Ma Hang Road, Man Kam To, N.T.	Valid
		License no: WT00033335-2019 Issued date: 29/03/2019 Expire Date: 31/03/2024	Columbarium at Sandy Ridge Cemetery	Valid
4	Billing Account for Disposal of Construction Waste	Account no.: 7031098		Valid

2.4 SUMMARY OF SUBMISSION UNDER THE ENVIRONMENTAL PERMIT REQUIREMENTS

2.4.1 *Tables 2-3 to 2-4* summarized the submission status under the EP and/or FEP stipulation in the Reporting Month.

Table 2-3 Status of Submission as under FEP for Contract 1

Item	EP and / or FEP Stipulation	Description	Status
1	Condition 2.10 of FEP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted on 11 April 2018
2	Condition 2.11 of FEP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted on 12 April 2018
3	Condition 2.12 of FEP	Contamination Assessment Plan (CAP)	Approved by EPD on 27 May 2019
4	Condition 2.13 of FEP	Grassland Reinstatement Plan	Re-submitted on 31 May 2019

Item	EP and / or FEP Stipulation	Description	Status
5	Condition 2.14 of FEP	Vegetation Survey Report for Contract 1	Approved by EPD on 12 October 2018
6	Condition 2.15 of FEP	Vegetation Transplantation Proposal Contract 1	Approved by EPD on 12 October 2018
7	Condition 2.17 of FEP	Woodland Compensation Plan	Re-submitted on 18 Jan 2019
8	Condition 2.18 of FEP	Monitoring and Survey Plan for Golden-headed Cisticola Contract 1	Re-submitted on 31 Jan 2019
9	Condition 2.20 of FEP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 1	Re-submitted on 25 Mar 2019
10	Condition 2.22 of FEP	Traffic Noise Mitigation Plan Contract 1	Re-submitted on 27 Mar 2019
11	Condition 3.3 of the FEP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018
12	Condition 4.2 of the FEP	The Contract Internet website	Internet website address has notified EPD on 15 Jun 2018

Table 2-3 Status of Submission as under EP for Contract 2

Item	EP and / or FEP Stipulation	Description	Status
1a	Condition 2.10 of EP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted on 24 September 2018
2a	Condition 2.11 of EP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted on 26 September 2018
3	Condition 2.13 of EP	Contamination Assessment Plan (CAP)	Submitted on 11 October 2018
4	Condition 2.14 of EP	Grassland Reinstatement Plan	Submitted on 28 May 2018
5	Condition 2.15 of EP and	Vegetation Survey Report Contract 2	Re-submitted on 17 Dec 2018
6	Condition 2.16 of EP	Vegetation Transplantation Proposal Contract 2	Re-submitted on 17 Dec 2018
7	Condition 2.18 of EP	Woodland Compensation Plan	Submitted on 15 May 2018
8	Condition 2.19 of EP	Monitoring and Survey Plan for Golden-headed Cisticola Contract 2	Re-submitted on 25 Apr 2019
9	Condition 2.22 of EP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 2	Re-submitted on 25 Mar 2019
10	Condition 2.24 of EP	Traffic Noise Mitigation Plan Contract 2	Re-submitted on 12 Aug 2019
11	Condition 3.3 of the EP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018
12	Condition 4.2 of the EP	The Contract Internet website	Internet website address has notified EPD on 15 June 2018

3. SUMMARY OF IMPACT MONITORING REQUIREMENT

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, water quality and ecology 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 impact monitoring shall cover the following environmental aspect:
- Air quality;
 - Construction noise;
 - Water quality; and
 - Ecology
- 3.2.2 A summary of the monitoring parameters is presented in *Table 3-1* below

Table 3-1 Summary of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 1-hour TSP; • 24-hour TSP
Noise	<ul style="list-style-type: none"> • $Leq_{(30min)}$ during normal working hours.; and • $Leq_{(15min)}$ during the construction works is undertaken in Restricted Hours
Water Quality	In-situ Measurements <ul style="list-style-type: none"> • Dissolved Oxygen Concentration (mg/L) & Saturation (%) ; • Temperature (°C); • Turbidity (NTU); • Salinity (ppm) • pH unit; • Water depth (m); and • Stream Flow Velocity (m/sec).
	Laboratory Analysis <ul style="list-style-type: none"> • Suspended Solids (mg/L)
Ecology	Ecologically sensitive habitats (wetland habitats and non-wetland habitats)

3.3 MONITORING LOCATIONS

- 3.3.1 According to the Approved EM&A Manual of the Project – *Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery*, the designated monitoring locations for air quality, noise, water quality and ecology under the monitoring programme, is shown in [Appendix D](#).
- 3.3.2 Since the Project was divided into three Works Contracts and all Contracts will be commenced at different time, the construction phase impact monitoring will only be performed at the Contract-related monitoring stations upon commencement of each Contract Works.

Air Quality

- 3.3.3 There were three (3) designated air quality monitoring stations recommended in the Approved EM&A Manual Section 5.6.1.1. There was proposed relocation of air quality monitoring location ASR-3 in October 2018 since the landlord refused to set up the HVS at his premises and nearby area due to noise nuisance and Muk Wu Nga Yiu House No. 2A was proposed as alternative location

ASR-3a. The proposal dated on 9 November 2018 which verified by IEC was submitted to EPD for approval. Based on rationale in Section 3.3.2, the Contract-related air quality monitoring location for construction phase were summarized in **Table 3-2** and illustrated in [Appendix D](#).

Table 3-2 Designated Air Quality Monitoring Location under the Project

Location ID	Description in EM&A Manual	Location	Related Work Contract
ASR-1	Village House along Man Kam To Road	Sha Ling Village House No.6	Contract 1
ASR-2	Village House at San Uk Ling	San Uk Ling Village House No.1	Contract 2
ASR-3	Village House at Muk Wu Nga Yiu	Muk Wu Nga Yiu House No.28	Contract 2
ASR-3a (#)	Village House at Muk Wu Nga Yiu	Muk Wu Nga Yiu House No.2A	Contract 2

Remark: (#)

There was proposed relocation of air quality monitoring location ASR-3 in October 2018. The proposal dated on 9 November 2018 after verified by IEC was submitted to EPD for approval.

3.3.4 If the designated monitoring location is required to relocate, alternative monitoring location shall agree with IEC and seek for EPD approval which shall meet the following criteria:

- i) Be at the site boundary or such locations close to the major dust emission source;
- ii) Close to the sensitive receptors;
- iii) Take into account the prevailing meteorological conditions;
- iv) For monitoring location located in the vicinity of the ASRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.
- v) When positioning the HVS, the following points shall be noted:
 - a. a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
 - b. no two samplers shall be placed less than 2m apart;
 - c. the distance between the HVS and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the HVS;
 - d. a minimum of 2 m separation from walls, parapets and penthouses is required for HVS at the rooftop;
 - e. a minimum of 2 m separation from any supporting structure, measures horizontally is required;
 - f. no furnace or incinerator flue is nearby;
 - g. airflow around the sampler is unrestricted;
 - h. the HVS is more than 20 m from the dripline;
 - i. any wire fence and gate to protect the HVS, shall not cause any obstruction during monitoring;
 - j. permission must be obtained to set up the HVS and to obtain access to the monitoring stations; and
 - k. a secured supply of electricity is needed to operate the HVS.

Construction Noise

3.3.5 There were four (4) designated noise monitoring locations recommended in the Approved EM&A Manual Section 6.5.1.1. Based on rationale in Section 3.3.2, the Contract-related noise quality monitoring location for construction phase were summarized in **Table 3-3** and illustrated in [Appendix D](#).

Table 3-3 Designated Construction Noise Monitoring Location under the Project

Location ID	Description in EM&A Manual	Location	Related Work Contract
CN-1	Village house to the west of Sha Ling Road	Village house to the west of Sha Ling Road (free field condition)	Contract 1
CN-2	Village house to the north of Man Kam To Road	Sha Ling Village House No. 25 (free field condition)	Contract 1 & 3
CN-3	Village house near San Uk Ling	San Uk Ling Village House No. 18 (free field condition)	Contract 2
CN-4	Village house of Muk Wu	Muk Wu Village House No. 267 (1m façade from the building)	Contract 2

Water Quality

- 3.3.6 There were four (4) water quality monitoring locations recommended in the Approved EM&A Manual Section 7.6.1.2. The locations and coordinates of water quality monitoring were listed in **Table 3-4**. Based on rationale in Section 3.3.2, the Contract-related water quality monitoring location for construction phase were summarized in **Table 3-4** and illustrated in [Appendix D](#).

Table 3-4 Designated Water Quality Monitoring Stations under the Project

Proposed Location ID	Co-ordinates		Description	Related Work Contract
	North	East		
M1	843 431	831 308	Midstream of Nam Hang Stream	Contract 2
M2	843 840	831 101	Downstream of Nam Hang Stream	Contract 2
M3	843 509	830 040	Wetland in the Conservation Area (CA) near Yuen Leng Chai	Contract 1
M4	843 997	831 783	Watercourse across Lin Ma Hang Road, running from east of San Uk Ling to Man Kam To Boundary Control Point	Contract 2

3.4 MONITORING FREQUENCY AND PERIOD

- 3.4.1 The requirements of impact monitoring were stipulated in *Sections 5.8.1.1, 6.7.1.1 and 7.8.1.4* of the approved *EM&A Manual* and presented as follows.

Air Quality Monitoring

- 3.4.2 Monitoring frequency for air quality impact monitoring is as follows:
- 1-Hour TSP 3 sets of 1-hour TSP monitoring shall be carried out once every six days during construction periods
 - 24-Hour TSP 24-hour TSP monitoring shall be carried out every six days during construction periods

Noise Monitoring

- 3.4.3 Noise impact monitoring shall be carried out once per week during construction periods. The noise measurement for the time period between 0700 and 1900 hours shall be measured in terms of L_{eq} (30 minutes) or 6 sets of L_{eq} (5mins).

Water Quality Monitoring

- 3.4.4 The monitoring frequency shall be 3 days per week during construction phase and the interval between two sets of monitoring shall not be less than 36 hours.

3.5 MONITORING EQUIPMENT

- 3.5.1 The monitoring equipment using for the EM&A program as proposed by the ET shall be verified by the IEC.

Air Quality Monitoring

- 3.5.2 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 ET proposes to use a direct reading dust meter to measure 1-hour TSP levels, it shall submit sufficient information to IEC for approval.
- 3.5.3 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.
- 3.5.4 All equipment used by ET for air quality monitoring is listed in **Table 3-5**.

Table 3-5 Air Quality Monitoring Equipment

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

Wind Data Monitoring Equipment

- 3.5.5 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.
- 3.5.6 ET has liaised with the premises owners/ landlords to grant the permission for the HVS installation. However, they rejected to set up wind data monitoring equipment installation in their premises.
- 3.5.7 Under this situation, the ET proposed to obtain representative wind data from the Hong Kong Observatory Ta Kwu Ling Weather Station. Ta Kwu Ling Station is located near the Project site which situated at the sea level above 15mPD and the wind data monitoring equipment is installed 10 m above the existing ground.

Noise Monitoring

- 3.5.8 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 ms^{-1} before each noise monitoring event. Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m s^{-1} or wind with gusts exceeding 10 m s^{-1} .
- 3.5.9 Noise monitoring equipment used for impact monitoring is listed in **Table 3-6**.

Table 3-6 Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238
Calibrator	B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer

- 3.5.10 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.

Water Quality Monitoring

- 3.5.11 Water quality parameters include dissolved oxygen, water temperature & depth, turbidity, salinity, pH and stream flow velocity shall be measured *in-situ*, and suspended solids shall be analyzed by a HOKLAS-accredited testing laboratory.

Dissolved Oxygen and Temperature Measurement

- 3.5.12 The dissolved oxygen (DO) measuring instruments should be portable and weatherproof. The equipment should also complete with cable and sensor, and DC power source. It should be capable of measuring:
- A DO level in the range of 0 – 20 mg/L and 0 – 200% saturation; and
 - A temperature of 0 – 45 degree Celsius.
- 3.5.13 The equipment should have a membrane electrode with automatic temperature compensation complete with a cable.
- 3.5.14 Should salinity compensation not be built-in to the DO equipment, in-situ salinity should be measured to calibrate the DO measuring instruments prior to each measurement.

Turbidity Measurement

- 3.5.15 The turbidity measuring instruments should be a portable and weatherproof with DC power source. It should have a photoelectric sensor capable of measuring turbidity level between 0–1000 NTU (for example, Hach model 2100Q or an approved similar instrument).

Salinity Measurement

- 3.5.16 YSI Professional Plus Multifunctional Meter or a portable salinometer capable of measuring salinity in the range of 0–40 parts per thousand (ppt) should be provided for measuring salinity of the water at each monitoring location.

pH Measurement

- 3.5.17 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.

Water Depth Measurement

- 3.5.18 A portable, battery-operated echo sounder or an approved similar instrument should be used for water depths determination at each designated monitoring station.

Stream Flow Velocity Equipment

- 3.5.19 Since the EM&A Manuals do not specified instrument to use stream flow velocity measurement, the monitoring of stream flow velocity is therefore proposed to be conducted by using a flow probe which is a digital water velocity meter.

Water Sampling Equipment

- 3.5.20 A water sampler is required for suspended solid (SS) monitoring. 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.
- 3.5.21 For sampling from very shallow water depths e.g. <0.5 m, water sample will be collected from water surface below 100mm using 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.

Sample Containers and Storage

- 3.5.22 Water samples for suspended solid should be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory within 24 hours of collection and be analyzed as soon as possible after collection.
- 3.5.23 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.
- 3.5.24 Details of the equipment used for water quality monitoring are listed in **Table 3-7** below.

Table 3-7 Water Quality Monitoring Equipment

Equipment	Model
Water Depth Detector	Tape measures
Water Sampler	A 2-litre transparent PVC cylinder with latex cups at both ends or eflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI 550A
pH meter	AZ8685 pH meter
Turbidimeter	Hach 2100Q
Salinometer	Atago refractometer Atago S Salinity Meter / YSI Professional Plus Multifunctional Meter
Stream Flow Velocity	FP211 Global Flow Probe
Sample Container	High density polythene bottles (provided by laboratory)
Storage Container	‘Willow’ 33-litter plastic cool box with Ice pad

- 3.5.25 Furthermore, Suspended solids (SS) analysis was carried out by *ALS Technichem (HK) Pty Ltd.* Which is one a local HOKLAS-accredited laboratory

3.6 EQUIPMENT CALIBRATION

- 3.6.1 The HVAS 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 at fortnightly interval. The calibration data are properly documented and the records are maintained by ET for future reference. Furthermore, Tisch Calibration Kit will be calibrated by the manufacturer in yearly basis.
- 3.6.2 The 1-hour TSP meter calibrated by a local HOKLAS-accredited laboratory would be undertaken in yearly basis. Zero response of the equipment was checked before and after each monitoring event.
- 3.6.3 The sound level meter and acoustic calibrator are calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.

3.6.4 The multi-parameter Water Quality Monitoring System is calibrated by HOKLAS accredited laboratory of three month intervals.

3.6.5 All updated calibration certificates of the monitoring equipment used for the impact monitoring program in this Reporting Month are attached in [Appendix E](#).

3.7 DATA MANAGEMENT AND DATA QA/QC CONTROL

3.7.1 The impact monitoring data are handled by the ET's systematic data recording and management, which complies with in-house Quality Management System. Standard Field Data Sheets (FDS) are used in the impact monitoring program.

3.7.2 The monitoring data recorded in the equipment e.g. 1-hour TSP meter, noise meter and Multi-parameter Water Quality Monitoring System are downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data are input into a computerized database properly maintained by the ET. The laboratory results are input directly into the computerized database and QA/QC checked by personnel other than those who input the data. For monitoring activities require laboratory analysis, the local laboratory follows the QA/QC requirements as set out under the HOKLAS scheme for all laboratory testing.

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

3.8.1 The baseline monitoring results form the basis for determining the environmental acceptance criteria for the impact monitoring. The air quality, construction noise and water quality criteria, namely Action and Limit levels were established according to Approved EM&A Manual, and they are listed in **Tables 3-8, 3-9 and 3-10** below.

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
ASR-1	331	181	500	260
ASR-2	316	165	500	260
ASR-3	307	160	500	260

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	
CN-1,CN-2, CN-3, CN-4	When one or more documented complaints are received	75 dB(A)

Note: * Reduces to 70 dB(A) for schools and 65 dB(A) during the school examination periods.

Table 3-10 Action and Limit Levels for Water Quality

Parameter	Performance criteria	Monitoring Location			
		M1	M2	M3	M4
DO (mg/L)	Action Level	3.03	4.99	4.58	3.62
	Limit Level	2.97	4.90	4.49	3.52
Turbidity (NTU)	Action Level	7.1	39.7	5.6	5.4
	Limit Level	7.6	42.2	5.9	5.9
SS (mg/L)	Action Level	8.5	29.0	9.3	4.8

	Limit Level	10.1	31.0	9.5	5.0
<i>Notes:</i> <ul style="list-style-type: none">• For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits• For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.					

- 3.8.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan enclosed in [Appendix F](#).

4. AIR QUALITY

4.1 MONITORING RESULTS

- 4.1.1 In the Reporting Month, construction works under the project have been commenced in Contract 1 and Contract 2. Air quality monitoring was performed at all designated locations. Air quality impact monitoring schedule was submitted to all relevant parties which shown in [Appendix G](#).
- 4.1.2 In this Reporting Month, **15** occasions of 24-hour TSP and **54** occasions of 1-hour TSP were undertaken for air quality monitoring. The air quality monitoring results including 24-hour and 1-hour TSP are summarized in **Tables 4-1** to **4-3**. The database of 24-hour TSP is shown in [Appendix H](#) and the graphical plots of 24-hour and 1-hour TSP result are shown in [Appendix I](#).

Table 4-1 Summary of Air Quality Monitoring Results at ASR-1 under Contract 1

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
3-Jul-19	13	2-Jul-19	9:33	45	40	42
9-Jul-19	30	8-Jul-19	9:36	54	45	49
15-Jul-19	47	13-Jul-19	9:42	61	65	72
20-Jul-19	41	19-Jul-19	9:43	67	70	75
26-Jul-19	30	25-Jul-19	14:37	64	69	74
		31-Jul-19	9:46	47	46	43
Average (Range)	32 (13 – 47)	Average (Range)		57 (40 – 75)		

Table 4-2 Summary of Air Quality Monitoring Results at ASR-2 under Contract 2

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
3-Jul-19	40	2-Jul-19	9:29	37	42	38
9-Jul-19	51	8-Jul-19	9:31	46	38	43
15-Jul-19	73	13-Jul-19	9:54	57	64	66
20-Jul-19	41	19-Jul-19	9:39	58	65	68
26-Jul-19	41	25-Jul-19	13:53	61	64	67
		31-Jul-19	9:39	53	49	46
Average (Range)	49 (40 – 73)	Average (Range)		53 (37 – 68)		

Table 4-3 Summary of Air Quality Monitoring Results at ASR-3a under Contract 2

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
3-Jul-19	14	2-Jul-19	9:26	35	39	42
9-Jul-19	32	8-Jul-19	9:28	40	43	45
15-Jul-19	30	13-Jul-19	13:32	61	64	69
20-Jul-19	29	19-Jul-19	9:36	63	65	68
26-Jul-19	28	25-Jul-19	14:08	58	60	65
		31-Jul-19	9:36	39	37	39
Average (Range)	27 (14 – 32)	Average (Range)		52 (35 – 69)		

4.2 AIR MONITORING EXCEEDANCE

- 4.2.1 As shown in [Tables 4-1 to 4-3](#), the monitoring results of 24-hour and 1-hour TSP monitoring in the Reporting Month were well below the Action Level. No Notification of Exceedance (NOE) of air quality monitoring criteria was issued and therefore corrective action was not required. The meteorological data during the impact monitoring days are summarized in [Appendix J](#).

5. CONSTRUCTION NOISE

5.1 MONITORING RESULTS

- 5.1.1 In the Reporting Month, construction works under the project have been commenced in Contract 1 and Contract 2. Noise quality monitoring was performed at all designated locations. Noise impact monitoring schedule was submitted to all relevant parties which shown in [Appendix G](#).
- 5.1.2 In this Reporting Month, **20** occasions of noise monitoring were undertaken at designated noise monitoring location. The sound level were set in a free field situation for CN1, CN2 and CN3 and therefore a façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines. The monitoring result of noise monitoring is show in **Tables 5-1 and 5-2** and the graphical plots are shown in [Appendix I](#).

Table 5-1 Summary of Construction Noise Monitoring Results under Contract 1

Construction Noise Level ($L_{eq30min}$), dB(A)				
Date	Start Time	CN1(*)	Start Time	CN2(*)
2-Jul-19	9:21	66	9:57	68
8-Jul-19	9:37	67	10:14	68
19-Jul-19	9:36	66	10:12	67
25-Jul-19	14:34	64	15:10	65
31-Jul-19	9:05	63	9:45	61
Limit Level	75 dB(A)			

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Table 5-2 Summary of Construction Noise Monitoring Results under Contract 2

Construction Noise Level ($L_{eq30min}$), dB(A)				
Date	Start Time	CN3(*)	Start Time	CN4
2-Jul-19	10:37	59	11:13	60
8-Jul-19	10:54	61	11:30	60
19-Jul-19	10:52	58	11:28	58
25-Jul-19	15:41	57	16:17	58
31-Jul-19	10:26	57	11:02	57
Limit Level	75 dB(A)			

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

- 5.1.3 Prior and after noise monitoring, the accuracy of the sound level meter has been checked by an acoustic calibrator to ensure the measurement within acceptance range of ± 0.5 dB. Moreover, wind speed checked by portable wind speed meter has been performed before noise monitoring. No noise measurement was performed in fog, rain, wind with a steady speed exceeding 5 m s^{-1} or wind with gusts exceeding 10 m s^{-1} .
- 5.1.4 In the Reporting Period, there were rainy days on 2 and 19 July 2019. ET had paid special attention on the weather condition and the noise monitoring was avoided to be carried under heavy rain during the morning period.

5.2 NOISE MONITORING EXCEEDANCE

- 5.2.1 As shown in **Tables 5-1 and 5-2**, no noise monitoring results exceeded the Limit Level in the Reporting Month. No Notification of Exceedance (NOE) of construction noise criterion was issued and no corrective action was therefore required.

6. WATER QUALITY

6.1 MONITORING RESULTS

6.1.1 Water quality impact monitoring schedule was submitted to all relevant parties which shown in [Appendix G](#).

6.1.2 In the Reporting Month, a total of **14** monitoring days were carried out for water quality impact monitoring. The monitoring result of key parameters including Dissolved Oxygen, Turbidity and Suspended Solids are summarized in [Tables 6-1](#) and [6-2](#). Detailed monitoring results including in-situ measurements and laboratory analysis data are shown in [Appendix H](#) and graphical plots for monitoring result are shown in [Appendix I](#).

Table 6-1 Summary of Water Quality Monitoring Results – M3 under Contract 1

Date	Parameters		
	DO (Averaged) (mg/L)	Turbidity (Averaged) (NTU)	Suspended Solids (Averaged) (mg/L)
2-Jul-19	6.25	2.6	7.5
4-Jul-19	5.65	5.2	7.0
6-Jul-19	6.27	5.2	3.5
8-Jul-19	5.14	4.7	4.0
10-Jul-19	7.60	5.3	4.0
12-Jul-19	4.83	3.2	3.0
15-Jul-19	7.49	5.4	5.0
17-Jul-19	6.29	4.8	5.5
19-Jul-19	4.65	5.1	5.5
22-Jul-19	5.41	4.6	4.0
24-Jul-19	6.29	3.7	4.0
26-Jul-19	5.45	4.9	4.5
29-Jul-19	5.73	5.0	5.0
31-Jul-19	6.69	4.3	5.0

Table 6-2 Summary of Water Quality Monitoring Results (M1, M2 and M4) under Contract 2

Date	Parameters								
	DO (Averaged) (mg/L)			Turbidity (Averaged) (NTU)			Suspended Solids (Averaged) (mg/L)		
	M1	M2	M4	M1	M2	M4	M1	M2	M4
2-Jul-19	6.85	6.13	6.90	3.6	28.6	3.1	4.0	22.5	<2
4-Jul-19	7.56	6.61	7.68	3.6	30.0	5.4	7.5	28.5	3.0
6-Jul-19	8.70	8.11	8.04	3.2	23.6	4.6	4.0	21.5	3.5
8-Jul-19	7.12	5.23	7.53	4.6	31.9	4.6	5.5	12.5	<2
10-Jul-19	8.63	7.19	7.58	3.2	21.2	4.7	6.5	25.5	<2
12-Jul-19	6.03	5.60	6.46	2.9	11.0	3.7	2.5	2.0	2.0
15-Jul-19	8.14	7.28	7.35	3.5	24.8	3.5	5.5	21.5	2.5
17-Jul-19	6.92	6.17	6.38	6.1	12.5	4.3	8.0	14.5	3.0
19-Jul-19	6.50	5.48	6.79	2.8	35.5	2.5	5.0	10.5	3.0
22-Jul-19	3.96	5.01	6.67	2.3	16.7	2.2	5.0	25.0	<2
24-Jul-19	6.21	5.01	6.25	1.9	16.2	2.7	3.0	17.0	<2
26-Jul-19	6.33	#	6.77	1.8	#	4.8	2.0	#	3.0
29-Jul-19	6.60	#	6.59	2.3	#	3.2	2.0	#	<2
31-Jul-19	6.31	5.02	6.47	3.3	3.9	3.3	2.0	7.0	3.5

Remarks: (#) During the water monitoring, the channel of M2 was observed dried up and water sampling was unable be carried out; Bold and underlined indicated Limit Level exceedance
Bold and underlined indicated Limit Level exceedance

- 6.1.3 During the Reporting Month, field measurements including temperature of stream water, salinity concentrations, pH values and the stream flow velocity for all monitoring locations are summarized in [Table 6-3](#).

Table 6-3 Summary of Field Measurements for Water Quality

Monitoring Location	Parameters of field measurements							
	pH (Averaged) (unit)		Salinity (Averaged) (ppt)		Temp (Averaged) (°C)		Water Flow (Averaged) (m/s)	
	min	max	min	max	min	max	min	max
M1	6.0	7.0	0.03	0.04	26.2	31.6	0	<0.1
M2	6.1	7.1	0.03	0.16	27.5	33.9	0	<0.1
M3	6.0	6.5	0	0.01	26.8	32.4	<0.1	0.1
M4	6.0	6.9	0.02	0.05	26.5	30.8	<0.1	<0.1

6.2 WATER QUALITY MONITORING EXCEEDANCE

- 6.2.1 In this Reporting Month, no water quality exceedances were recorded. The non-compliance of water quality performance is summarized in [Table 6-4](#).

Table 6-4 Action and Limit (A/L) Levels Exceedance Record

Station	DO		Turbidity		SS		Total Exceedance		Project Related exceedance	
	Action	Limit	Action	Limit	Action	Limit	Action	Limit	Action	Limit
M1	0	0	0	0	0	0	0	0	0	0
M2	0	0	0	0	0	0	0	0	0	0
M3	0	0	0	0	0	0	0	0	0	0
M4	0	0	0	0	0	0	0	0	0	0

- 6.2.2 No Notifications of Exceedance (NOE) were issued and no corrective action is required. The investigation of exceedance is summarized in [Table 6-5](#).

Table 6-5 Summary of Investigation of Water Quality Exceedance in the Reporting Month

Date of Exceedance	Exceeded Location	Exceeded Parameter	Cause of Water Quality Exceedance In Brief
--	--	--	--

7. ECOLOGY MONITORING

7.1 REQUIREMENT

- 7.1.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.
- 7.1.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution. In order to monitor the effectiveness of the measures to the minimize impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland habitats (*wet woodland and watercourse*) and non-wetland habitats (*upland grassland and woodland*).

7.2 METHODOLOGY

- 7.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardized quantitative methodology will conduct at fixed points. For seasonal watercourse, the survey will be conducted whenever the habitat appears. Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and Action/Limit levels to trigger these measures are detailed in **Table 7-1**.

Table 7-1 Action and Limit Levels for Wet Woodland Habitats Monitoring

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Remarks: Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

- 7.2.2 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts. Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and Action/Limit levels to trigger these measures are detailed in **Table 7-2**.

Table 7-2 Action and Limit Levels for Non-Wet Woodland Habitats Monitoring

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Remarks: Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

- 7.2.3 The ecological survey includes all taxa being investigated in accordance with EIA report. Schedule of faunal surveys in each year during construction phase is presented in **Table 7-3**.

Table 7-3 Schedule of Faunal Surveys in each year During Construction Phase

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Mammal Survey

- 7.2.4 Mammal surveys will be conducted along the proposed transects (shown in Appendix D of the survey report) during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

Bird Survey

- 7.2.5 Bird surveys will be conducted along the transects (shown in Appendix D of the survey report) during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilizing.

Herpetofauna Survey

- 7.2.6 Reptile and amphibian surveys will be conducted along transects (shown in Appendix D of the survey report) during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

Dragonfly and Butterfly Survey

- 7.2.7 Dragonfly and Butterfly surveys will be conducted along transects (shown in Appendix D of the survey report) during surveys all dragonflies and Butterflies seen will be identified and counted as accurately as possible.

Aquatic Fauna Survey

- 7.2.8 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.
- 7.2.9 After each ecological monitoring survey, a monthly report of the survey result and data collected will be provided with reference to EM&A Manual. An annual analysis of data will be carried out in order to study if there is any significant reduction in taxa diversity and abundance.

7.3 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 1)

- 7.3.1 In the Reporting Month, ecological monitoring was undertaken on **9th July 2019** at work area of Contract 1. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen will be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 1

Mammal

- 7.3.2 There was an unknown bat recorded in the monitoring area

Birds

- 7.3.3 There were total of 21 bird individuals from 8 species recorded in the monitoring area. One species of conservation interests was recorded in the monitoring area: *Egretta garzetta*, Little Egret(小白鷺).

Herpetofauna

- 7.3.4 There was no reptile recorded in the monitoring area. There was one amphibian species recorded in the monitoring area.

Dragonfly

- 7.3.5 There were 28 odonate individuals from 10 species recorded in the monitoring area. Two species of conservation interests were recorded in the monitoring area: *Rhyothemis triangularis*, Sapphire Flutterer(三角麗翅蜻) and *Urothemis signata*, Scarlet Basker (赤斑曲鈎脈蜻).

Butterfly

- 7.3.6 There were 10 butterfly individuals from 6 species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

- 7.3.7 There was no freshwater community recorded in the monitoring area.
- 7.3.8 The summaries of faunal survey result are shown in [Tables 7-4, 7-5, 7-6, 7-7, 7-8, 7-9 and 7-10](#).

Table 7-4 Result of Mammal Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Unknown Bat					1

Table 7-5 Result of Avifauna Survey under Contract 1

Scientific Name	English Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Egretta garzetta</i>	Little Egret	小白鷺	Fellowes et al. (2002): RC		1
<i>Lanius schach</i>	Long-tailed Shriker	棕背伯勞			1
<i>Dicrurus hottentottus</i>	Hair-crested Drongo	髮冠卷尾			7
<i>Pycnonotus aurigaster</i>	Sooty-headed Bulbul	白喉紅臀鵯			2
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯			1
<i>Garrulax perspicillatus</i>	Masked Laughingthrush	黑臉噪鵲			5
<i>Garrulax chinensis</i>	Black-throated Laughingthrush	黑喉噪鵲			2
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領棕鳥		2	

Table 7-6 Result of Reptile Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Non-wetland	Wetland
--	--	--	--	--

Table 7-7 Result of Amphibian Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Bufo melanostictus</i>	Asian Common Toad	黑眶蟾蜍			+

+: Species appeared but uncountable.

Table 7-8 Result of Butterfly Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Non-wetland	Wetland
<i>Parnara guttata</i>	Common Straight Swift	直紋稻弄蝶		1
<i>Pelopidas conjunctus</i>	Conjoined Swift	古銅穀弄蝶		1
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛺蝶		5
<i>Hestina assimilis</i>	Red Ring Skirt	黑脈蛺蝶	1	
<i>Hypolimnas bolina</i>	Great Egg-fly	幻紫斑蛺蝶	1	
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶		1

Table 7-9 Result of Odonate Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Brachydiplax chalybea</i>	Blue Dasher	藍額疏脈蜻			4
<i>Ceriagrion auranticum</i>	Orange-tailed Sprite	琉球橘黃蟬			1
<i>Neurothemis tullia</i>	Pied Percher	截斑脈蜻			2
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻		1	
<i>Pantala flavescens</i>	Wandering Glider	黃蜻			10
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原蟬			1
<i>Pseudagrion rubriceps</i>	Orange-faced Sprite	丹頂斑蟬			1
<i>Rhyothemis triangularis</i>	Sapphire Flutterer	三角麗翅蜻	Fellowes et al. (2002): LC	1	1
<i>Rhyothemis variegata</i>	Variegated Flutterer	斑麗翅蜻		1	
<i>Urothemis signata</i>	Scarlet Basker	赤斑曲鈎脈蜻	Fellowes et al. (2002): LC	2	3

Table 7-10 Result of Freshwater Communities Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-19	
				Non-	Wetland

				wetland	
--	--	--	--	--	--

7.4 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 2)

- 7.4.1 In the Reporting Month, ecological monitoring was undertaken on **9th July 2019** at work area of Contract 2. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen will be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 2

Mammal

- 7.4.2 There was one unknown bat recorded in the monitoring area

Birds

- 7.4.3 There were total of 5 bird individuals from 4 species recorded in the monitoring area.

Herpetofauna

- 7.4.4 There was no reptile recorded in the monitoring area. There was one amphibian recorded in the monitoring area.

Dragonfly

- 7.4.5 There were 7 odonate individuals from 5 species recorded in the monitoring area.

Butterfly

- 7.4.6 There were 8 butterfly individuals from 7 species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

- 7.4.7 There were two species of freshwater fish were recorded in the monitoring area.
- 7.4.8 The summaries of faunal survey result are shown in **Tables 7-11, 7-12, 7-13, 7-14, 7-15, 7-16** and **7-17**.

Table 7-11 Result of Mammal Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
Unknown Bat					1

Table 7-12 Result of Avifauna Survey under Contract 2

Scientific Name	English Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩			1
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鵲			2
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯			1
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯			1

Table 7-13 Result of Reptile Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Non-wetland	Wetland
--	--	--	--	--

Table 7-14 Result of Amphibian Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Bufo melanostictus</i>	Asian Common Toad	黑眶蟾蜍			+

+: Species appeared but uncountable.

Table 7-15 Result of Butterfly Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Jamides alecto</i>	Metallic Cerulean	素雅灰蝶			1
<i>Pseudozizeeria maha</i>	Pale Grass Blue	酢漿灰蝶		1	
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶		2	
<i>Chilasa clytia</i>	Common Mime	斑鳳蝶		1	
<i>Papilio paris</i>	Paris Peacock	巴黎翠鳳蝶		1	
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶			1
<i>Catopsilia pomona</i>	Lemon Emigrant	遷粉蝶		1	

Table 7-16 Result of Odonate Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Copera marginipes</i>	Yellow Featherlegs	黃狹扇螳			2
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻			1
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻			1
<i>Pantala flavescens</i>	Wandering Glider	黃蜻			2
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑螳			1

Table 7-17 Result of Freshwater Communities Survey under Contract 2

Scientific Name	Common Name	Chinese Name	Conservation Status	9-July-2019
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚		+
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮		+

+: Species appeared but uncountable.

7.4.9 The detailed survey report is attached in [Appendix K](#).

7.4.10 The tentative ecology inspection and monitoring in the next Reporting Month (August 2019) is scheduled on 9th August 2019.

8. LANDSCAPE AND VISUAL

8.1 REQUIREMENT

- 8.1.1 The EIA has recommended EM&A for landscape and visual resources to be undertaken during the design, construction and operational stages of the project. The design, implementation and maintenance of landscape mitigation measures is a key aspect of this and should be checked to ensure that they are fully realized and that potential conflicts between the proposed landscape measures and any other project works let its are resolved at the earliest possible date and without compromise to the intention of the mitigation measures. In addition, implementation of the mitigation measures recommended by the EIA will be monitored through the site audit programme.
- 8.1.2 A number of mitigation measures to ameliorate the landscape and visual impacts of the Project implementation is summarized in the EMIS of **Appendix 13.1** of the EIA Report.
- 8.1.3 The landscape and visual mitigation measures proposed should be incorporated in the landscape and engineering design. Mitigation measures to be implemented during construction should be adopted from the start of construction and be in place throughout the entire construction period. Mitigation measures to be implemented during operation should be integrated into the detailed design and built as part of the construction works so that they are in place on commissioning of the Project. Tree transplantation and compensatory planting should be carried out as early as possible in the Project with transplantation carried out prior to construction starting in any particular area.
- 8.1.4 During construction phase, Landscape & Visual Monitoring of the contractor's operations should be conducted monthly and reported by ET, and countersigned by IEC.

8.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

- 8.2.1 In the Reporting Month, landscape & Visual inspection was carried out by the Registered Landscape Architect (RLA) for works area of Contract 1 and Contract 2 on **25th July 2019**. The findings / reminders recorded during the inspection are presented in **Tables 8-1 and 8-2**.

Table 8-1 Landscape & Visual Inspection Finding for Contract 1

Date	Findings and Reminder	Follow-Up Status
25 th July 2019	<ol style="list-style-type: none"> T2928 was in fair health condition with normal foliage color and density. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone (TPZ) and ensure no works is allowed within the TPZ. The Contractor was reminded to provide proper maintenance for transplanted tree (T2465, T2468 and T2928) according to the approved method statement. 	<ul style="list-style-type: none"> The Contractor keep closely monitor on the health condition of T2928. Reminder was noted by the Contractor. Reminder was noted by the Contractor.

Table 8-2 Landscape & Visual Inspection Finding for Contract 2

Date	Findings and Reminder	Follow-Up Status
25 th July 2019	<ol style="list-style-type: none"> 1. Construction works near retained trees was observed. 2. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone (TPZ) and ensure no work is allowed within the TPZ. 	<ul style="list-style-type: none"> • Tree protection were provided for the retained trees before commencement of works. • Reminder was noted by the Contractor.

8.2.2 Inspection checklist of Landscape & Visual signed by RLA is attached in [Appendix L](#).

9. WASTE MANAGEMENT

9.1 GENERAL WASTE MANAGEMENT

- 9.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time in accordance with the Waste Management Plan (WMP).

9.2 RECORDS OF WASTE QUANTITIES

- 9.2.1 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.
- 9.2.2 The quantities of waste for disposal in this Reporting Month are summarized in [Table 9-1](#) and [9-2](#) and the Monthly Summary Waste Flow Table is shown in [Appendix M](#). Whenever possible, materials were reused on-site as far as practicable.

Table 9-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Contract 1		Contract 2	
	Quantity	Disposal Location	Quantity	Disposal Location
C&D Materials (Inert) ('000m ³)	0	--	695.540	--
Reused in this Contract (Inert) ('000m ³)	12.253	Within Contract area	0	--
Reused in other Projects (Inert) ('000m ³)	0	--	0	--
Disposal as Public Fill (Inert) ('000m ³)	10.804	Tuen Mun Area 38	695.540	Tuen Mun Area 38

Table 9-2 Summary of Quantities of C&D Wastes

Type of Waste	Contract 1		Contract 2	
	Quantity	Disposal Location	Quantity	Disposal Location
Recycled Metal ('000kg)	0	--	0	--
Recycled Paper / Cardboard Packing ('000kg)	0	--	0	--
Recycled Plastic ('000kg)	0	--	0	--
Chemical Wastes ('000kg)	0	--	0	--
General Refuses ('000m ³)	0.071	NENT Landfill	3.430	NENT Landfill

- 9.2.3 Since canteen and/or kitchen are not allowed setting on the Project site, no domestic wastewater was generated from the Project.

10. SITE INSPECTION

10.1 REQUIREMENT

- 10.1.1 According to the approved Environmental Monitoring and Audit Manual, environmental site inspection should be led by RE and attended by the Contractor and ET at least once per week. Regular environmental site inspections shall be carried out to assess the environmental performance.

10.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

Contract 1

- 10.2.1 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on **4th, 11th, 18th, 25th and 31th July 2019** and IEC attended joint site inspection on **25th July 2019**. No non-compliance was noted.
- 10.2.2 The findings / deficiencies that observed during the weekly site inspection are listed in **Table 10-1**.

Table 10-1 Site Observations for the Works of Contract-1

Date	Findings / Deficiencies	Follow-Up Status
4 th July 2019	<ul style="list-style-type: none"> The Contractor was reminded to remove ant stagnant water on site after rainy days. 	<ul style="list-style-type: none"> Reminder only.
11 th July 2019	<ul style="list-style-type: none"> Full waste skip was observed near site entrance. The Contractor should clean the waste skip regularly. 	<ul style="list-style-type: none"> Waste skip was cleaned.
18 th July 2019	<ul style="list-style-type: none"> The Contractor was reminded to provide water spraying at haul road regularly. The Contractor was reminded to dispose the general refuse accumulated on site regularly. 	<ul style="list-style-type: none"> Reminder only. Reminder only.
25 th July 2019	<ul style="list-style-type: none"> The Contractor should remove the general refuse and stagnant water at the temporary drainage at CS 12. Oil-water mixture should be removed at CS 15 and treated as chemical waste. Free-standing chemical container at CS 15 should be placed into drip tray. NRMM Label should be displayed properly for the generator at CS15. Accumulated sediment at temporary drainage should be removed to ensure all the muddy runoff is diverted to the desilting facilities. (Near Site Entrance) The Contractor was reminded to maintain the mitigation measures for opened slope to reduce dust generation. 	<ul style="list-style-type: none"> General refuse and stagnant water at the temporary drainage at CS12 was removed. Oil-water mixture was removed at CS15 and treated as chemical waste. Free-standing chemical container was removed from site. NRMM label was displayed properly for the generator. The sediment removal work at the temporary drainage was in progress and to be follow up in next inspection. Reminder only.
31 th July 2019	<ul style="list-style-type: none"> The Contractor was reminded to maintain the desilting facilities at RTW1 in good condition especially during rainy days. 	<ul style="list-style-type: none"> Reminder only.

Contract 2

10.2.3 In the Reporting Month, joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on **4th, 11th, 19th, 25th and 31th July 2019** and IEC attended joint site inspection on **25th July 2019**.

10.2.4 The findings / deficiencies that observed during the weekly site inspection are listed in **Table 10-2**.

Table 10-2 Site Observations for the Works of Contract-2

Date	Findings / Deficiencies	Follow-Up Status
4 th July 2019	<ul style="list-style-type: none"> Retained tree should be fenced off properly at RW13. The Contractor should improve the earth bund and increase the capacity of the temporary soakaway pit at RW13 to avoid any leakage of site runoff during rainy days. The Contractor was reminded to maintain water quality mitigation measures properly especially during rainy days. 	<ul style="list-style-type: none"> Retained trees at RW13 were fenced off. Earth bund at RW13 was improved. Reminder only.
11 th July 2019	<ul style="list-style-type: none"> The Contractor was reminded to maintain water quality mitigation measures properly during rainy days. 	<ul style="list-style-type: none"> Reminder only.
19 th July 2019	<ul style="list-style-type: none"> The Contractor was reminded to avoid any leakage of grout residue during grouting work at RW13. 	<ul style="list-style-type: none"> Reminder only
25 th July 2019	<ul style="list-style-type: none"> Earth bund should be provided at the platform near RW13 to avoid overflow of site runoff. Earth bund and dyke should be improved at RW13 to avoid overflow of site runoff. The Contractor was reminded to maintain the tree protection zone at RW13 in good condition. 	<ul style="list-style-type: none"> Earth bund was provided at the platform near RW13. Earth bund was improved at RW13. Reminder only.
31 th July 2019	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA.

11. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

- 11.1.1 In the Reporting Month, no environmental complaint was received for the Project. No summons and prosecution was lodged for the Contract. The statistical summary table of the environmental complaint, summons and prosecution are presented in [Tables 11-1, 11-2](#) and [11-3](#).

Table 11-1 Statistical Summary of Environmental Complaints

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 July 2019	Contract 1	0	0	NA
1 – 31 July 2019	Contract 2	0	0	NA

Table 11-2 Statistical Summary of Environmental Summons

Reporting Month		Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 July 2019	Contract 1	0	0	NA
1 – 31 July 2019	Contract 2	0	0	NA

Table 11-3 Statistical Summary of Environmental Prosecution

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 31 July 2019	Contract 1	0	0	NA
1 – 31 July 2019	Contract 2	0	0	NA

- 11.1.2 In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.

12. IMPLEMENTATION STATUS OF MITIGATION MEASURES

12.1 GENERAL REQUIREMENTS

- 12.1.1 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 N](#).
- 12.1.2 The Works of Contract 1 and Contract 2 under the Project shall be implementing the required environmental mitigation measures according to the approved EM&A Manual subject to the site condition. Environmental mitigation measures implemented in this Reporting Month is summarized in **Table 12-1**.

Table 12-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Provided efficient silt removal facilities to reduce SS level before effluent discharge. • Provided ditches, earth bunds or sand bag barriers to minimize polluted runoff. • Temporary drainage was provided to prevent runoff going through site surface and minimize polluted runoff. • Provided perimeter cut-off drains at site boundaries to intercept storm runoff from crossing the site. • Exposed slopes surface were compacted and covered with tarpaulin or similar means. • Provided portable chemical toilets on site.
Air Quality	<ul style="list-style-type: none"> • Maintain damp / wet surface on access road. • Maintain low vehicular speed within the works areas. • Provided vehicle wheel washing facilities at each construction site exit; • Provided water spraying for all active works area. • Stockpiles of dusty material were covered with impervious sheeting. • Provided workers to clear dusty materials at the vehicle entrance or exit regularly. • Stockpile more than 20 bags of cement or dry pulverized fuel ash (PFA) has been covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.
Noise	<ul style="list-style-type: none"> • Restricted 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 • Placed noisy plants away from residence and school • Provided 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"> • Provided on-site sorting prior to disposal • Followed requirements and procedures of the “Trip-ticket System” • Predicted required quantity of concrete accurately • Collected 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.

12.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

- 12.2.1 According to the information provided by HCTYJV, the forthcoming construction activities for Contract 1 are listed below:
- General Site Clearance
 - Bulk Excavation
 - Construction of Cut Slope, installation of soil nailing and construction of surface channel.

- (iv) Construction of retaining wall on fill slope
- (v) Construction of fill slope and surface channel
- (vi) Site investigation for Part G1 under Contamination Assessment Plan (postponed from July 2019 to August 2019 due to inclement weather)

12.2.2 According to the information provided by Sang Hing, the forthcoming construction activities for Contract 2 are listed below:

- Utilities Detection and trial pit excavation for Fanling Cover Walkway
- Liaison with Contract 1 Contractor regarding the access road
- Construction of Manhole, gullies, drainage pipe at Lin Ma Hang Road between CH170-240 Southbound & CH960-1015 Southbound.
- Filling works for slope FS18 (Part A1) & construction of Retaining Wall 13 and Retaining Wall 14
- Implement of Trial Run TTA at Man Kam To Road
- Construction of Manhole & Sewerage pipe at Man Kam To Road

12.3 KEY ISSUES FOR THE COMING MONTH

12.3.1 Key issues to be considered in the coming month for the works of Contract 1 include:

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

12.3.2 During rainy season, the Contractors should pay special attention on water quality mitigation measures and fully implement according to the ISEMM of the EM&A Manual, in particular to prevent surface runoff with high SS content and other pollutants from flowing to local stream and Conservation Area (CA). The implementation of water quality mitigation measures conducted by the Contractors is shown in [Appendix O](#).

13. CONCLUSIONS AND RECOMMENTATIONS

13.1 CONCLUSIONS

- 13.1.1 This is the **12th** Monthly Environmental Monitoring and Audit Report presenting the monitoring results and inspection findings for the period of **1** to **31 July 2019**.
- 13.1.2 No 24-hour or 1-hour TSP monitoring result that triggered the Action or Limit Levels was recorded. No NOEs or the associated corrective action was therefore required.
- 13.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement result that exceeded the Limit Level was recorded in this Reporting Month. No NOEs or the associated corrective actions were therefore issued.
- 13.1.4 In the Reporting Period, no exceedances for water quality monitoring were recorded. No NOEs or the associated corrective actions were therefore issued.
- 13.1.5 Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on **9th July 2019**. Moreover, Landscape and visual inspection at both Contracts were undertaken by the RLA on **25th July 2019**.
- 13.1.6 In the Reporting Month, no environmental complaint, summons and prosecution was received. In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.
- 13.1.7 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the RE, ET and the Contractor on **4th, 11th, 18th, 25th and 31st July 2019** and IEC attended joint site inspection on **25th July 2019**. No non-compliance was noted.
- 13.1.8 Joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on **4th, 11th, 19th, 25th and 31th July 2019** and IEC attended joint site inspection on **25th July 2019**. No non-compliance was noted.

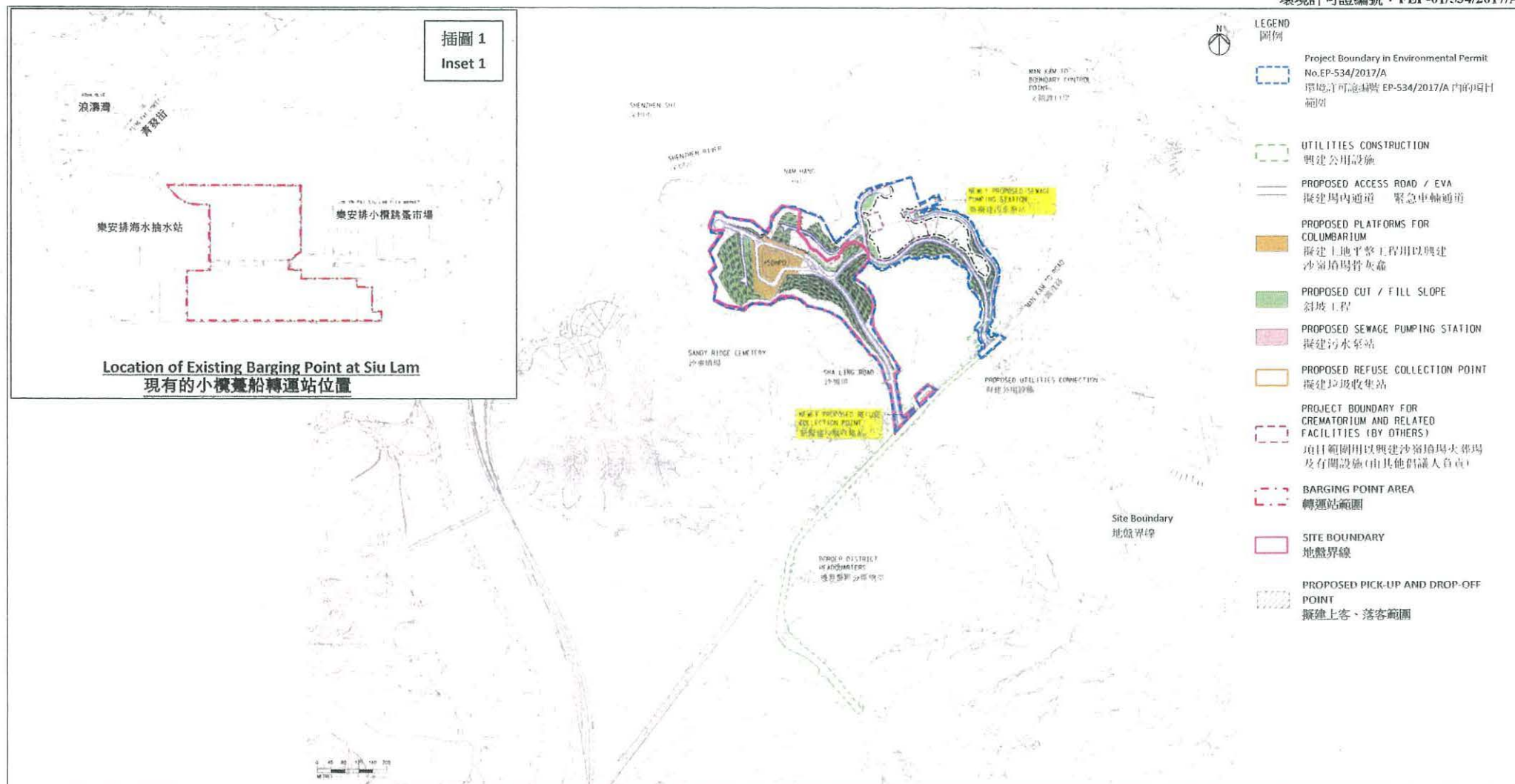
13.2 RECOMMENDATIONS

- 13.2.1 The Contractors should pay special attention on water quality mitigation measures and fully implement according to the ISEMM of the EM&A Manual, in particular to prevent surface runoff with high SS content and other pollutants from flowing to local stream and Conservation Area (CA).
- 13.2.2 Construction noise would be a key environmental issue during construction phase of the Project. Noise mitigation measures such as using quiet plants and mobile noise barriers should be implemented in accordance with the EM&A requirement.
- 13.2.3 Since some of the construction site under the Project is located near villages, both Contractors should fully implement air quality mitigation measures to reduce construction dust emission.
- 13.2.4 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be performed to prevent mosquito breeding on site.

Appendix A

Layout Plan of the Project

Layout Plan of Contract CV/2016/10



Project Title: Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
工程名稱: 沙嶺墳場興建骨灰龕的工地平整及相關基建工程

Figure 1: Project Location Plan

圖 1: 項目位置圖

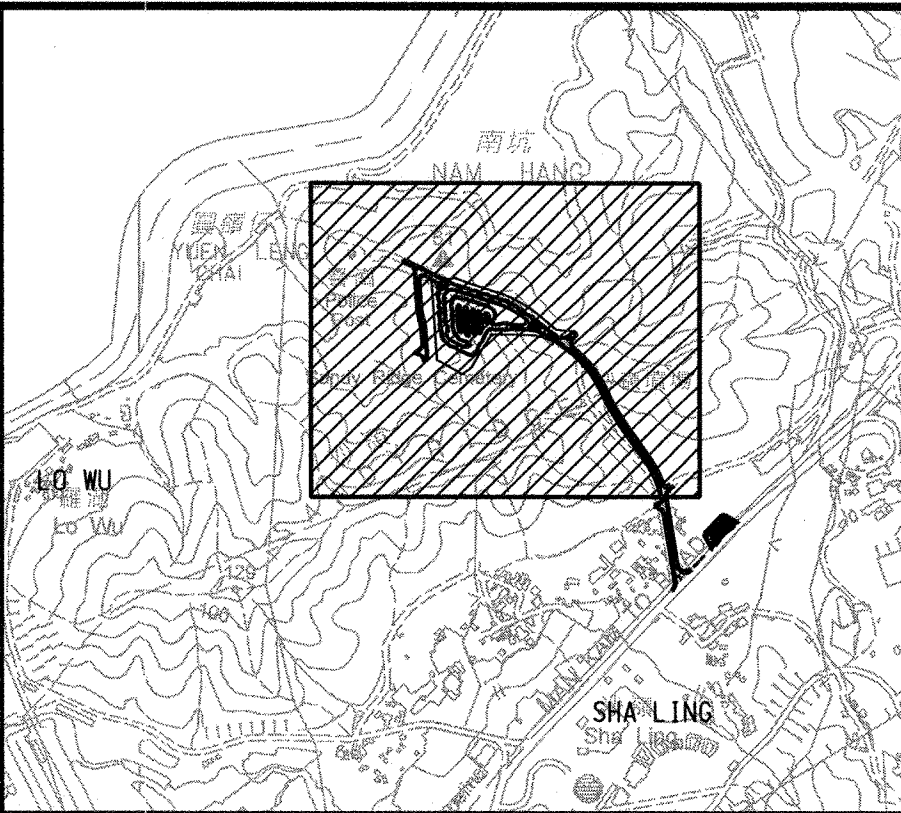
(This figure was prepared based on Figure 1 attached to the VEP Application No. VEP-555/2018 and Figures 1.3 of the Approved EIA Report No. AEIAR-198/2016)

(本圖是根據更改環境許可證申請文件編號: VEP-555/2018 所隨附的圖 1 和環境影響評估報告編號 AEIAR-198/2016 圖 1.3 編制)

Environmental Permit No.: FEP-01/534/2017/A
環境許可證編號: FEP-01/534/2017/A



Printed by : 11/27/2017
Filename : j:\231448\record\contract\contract 1\civil\231448_C1_G_1001.dgn



KEY PLAN			
LEGEND:			
-----	PROPOSED WORKS SITE		
+50mPD	SITE FORMATION LEVEL		

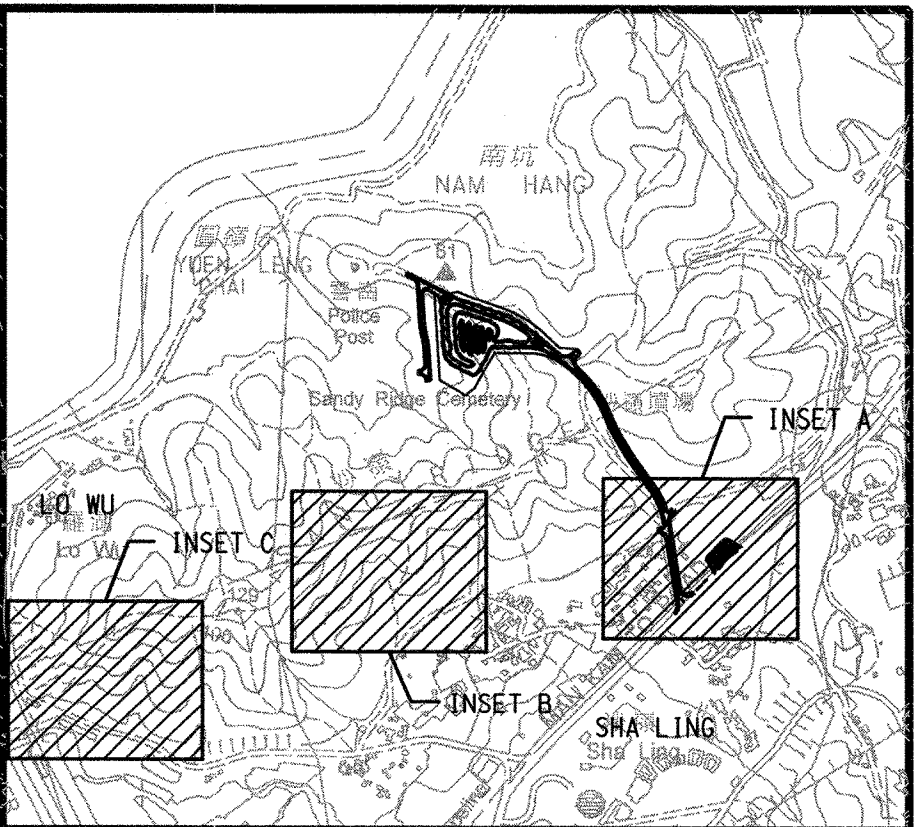
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title:			
Contract No. CV/2016/10			
Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery			
Drawing title			
GENERAL LAYOUT (SHEET 1 OF 3)			
Drawing no.		Rev.	
231448/C1/G/1001		-	
Drawn	Date	Checked	Approved
WM	12/16	AW	DL
Scale	Status		
1:1000 @A1	CONTRACT		

COPYRIGHT RESERVED



土木工程拓展署
Civil Engineering and Development Department

MATCH LINE
FOR CONTINUATION
SEE DRG 231448/C1/G/1002
INSET A



LEGEND:

----- PROPOSED WORKS SITE

Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title:

Contract No. CV/2016/10

Site Formation and Associated
Infrastructural Works for
Development of Columbarium at
Sandy Ridge Cemetery

Drawing title

GENERAL LAYOUT
(SHEET 2 OF 3)

Drawing no.	231448/C1/G/1002	Rev.	-
Drawn	WM	Date	12/16
Checked	AW	Approved	DL
Scale	1:1000 @A1	Status	CONTRACT

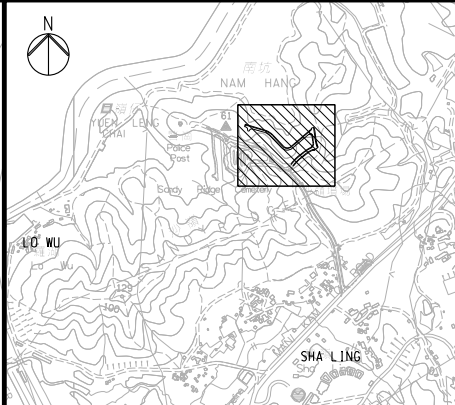
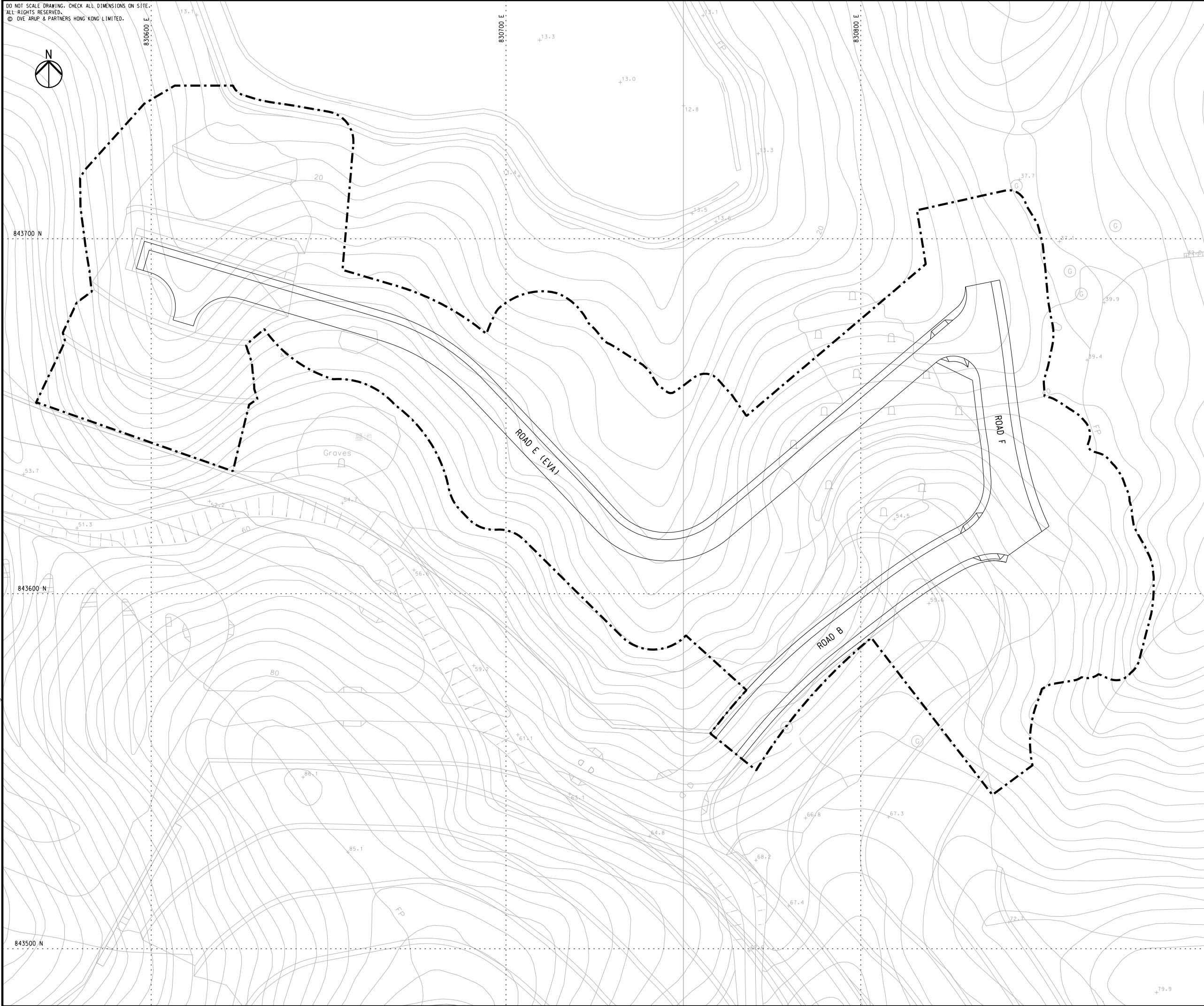
COPYRIGHT RESERVED

CEDD

土木工程拓展署
Civil Engineering and
Development Department

Layout Plan of Contract CV/2017/02

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© OVE ARUP & PARTNERS HONG KONG LIMITED.



KEY PLAN

LEGEND:

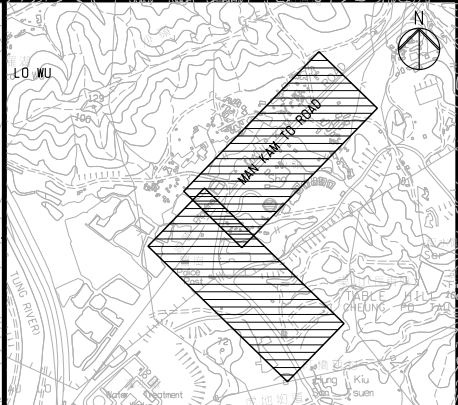
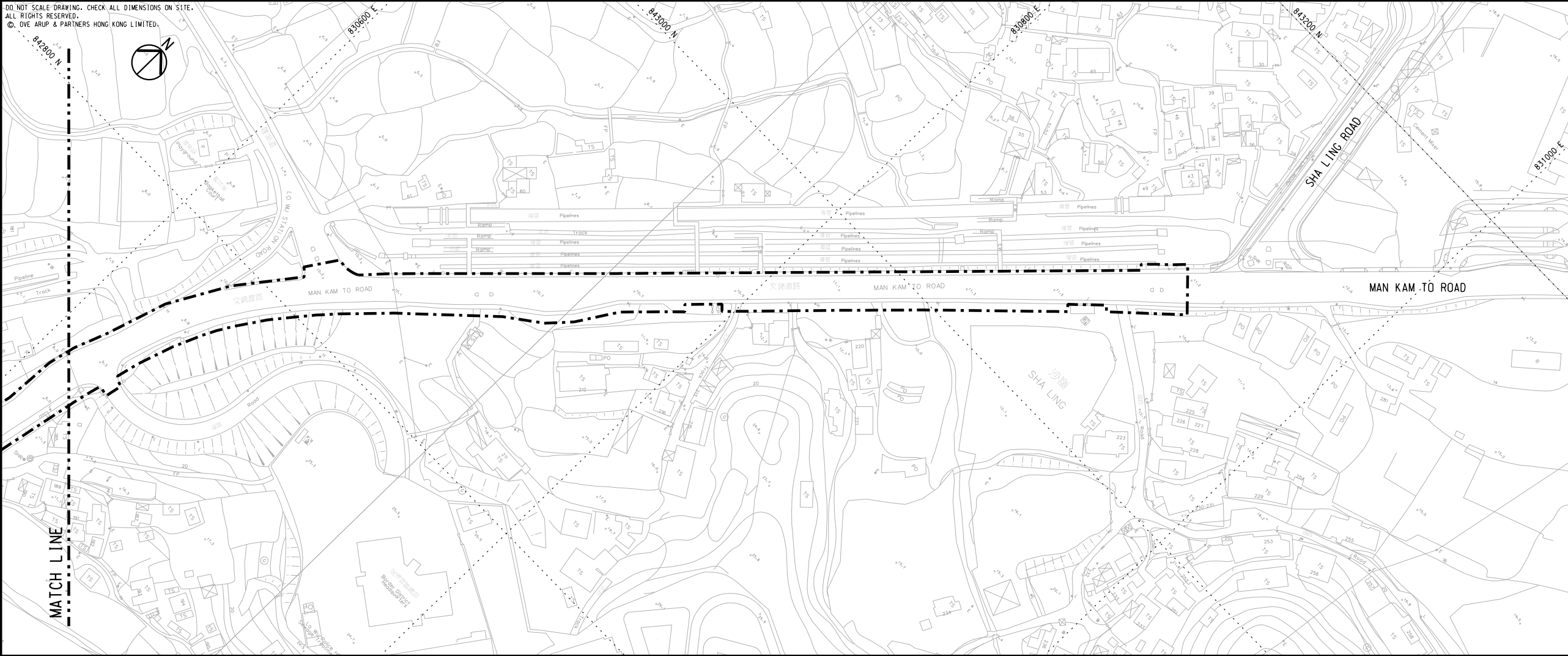
--- SITE BOUNDARY

-	TENDER DRAWING	AW	11/17
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title:			
Contract No. CV/2017/02			
Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road			
Drawing title			
GENERAL LAYOUT (SHEET 1 OF 5)			
Drawing no.			Rev.
231448/C2/G/1001			-
Drawn	Date	Checked	Approved
WM	07/17	AW	DL
Scale	Status		
1:500 @A1	TENDER		

COPYRIGHT RESERVED



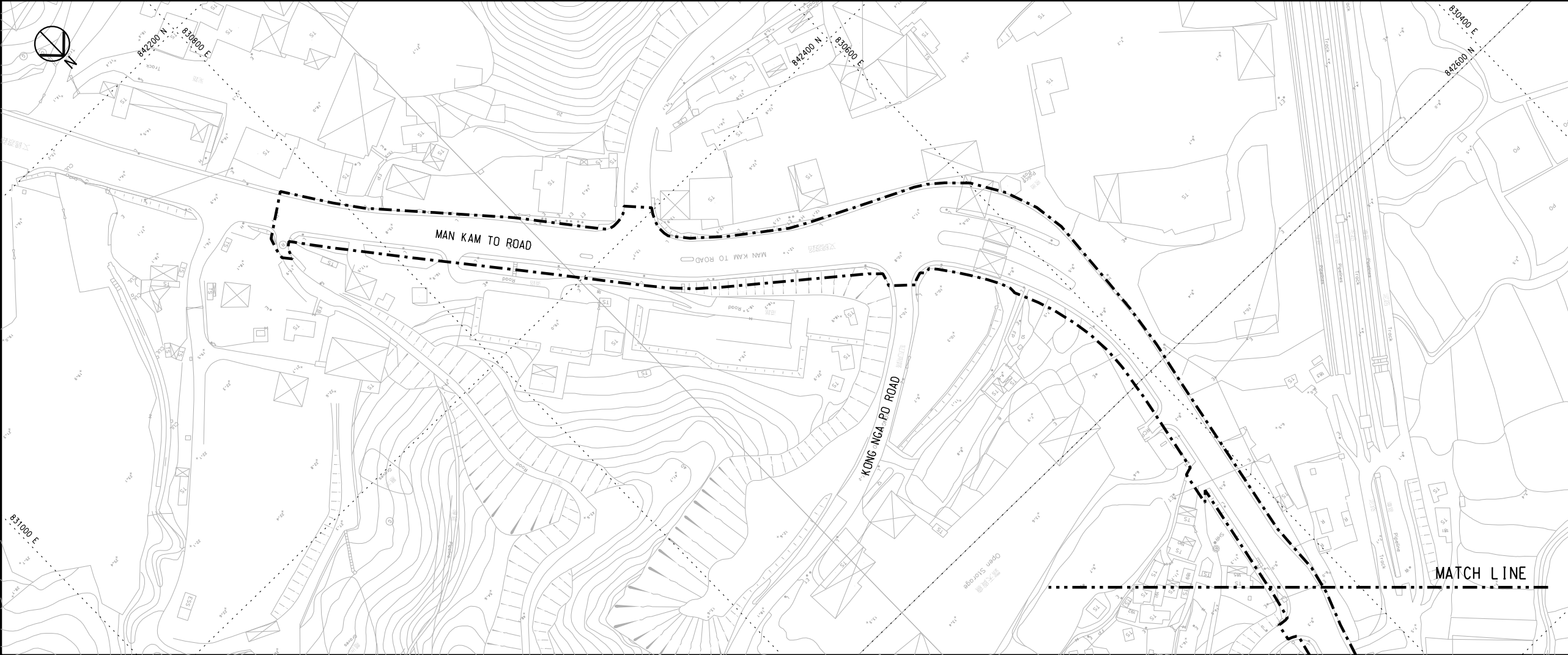
土木工程拓展署
Civil Engineering and
Development Department



KEY PLAN

LEGEND:

--- SITE BOUNDARY



-	TENDER DRAWING	AW	11/17
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title:			
Contract No. CV/2017/02			
Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road			
Drawing title			
GENERAL LAYOUT (SHEET 2 OF 5)			
Drawing no.			Rev.
231448/C2/G/1002			-
Drawn	Date	Checked	Approved
WM	07/17	AW	DL
Scale	1:1000 @A1		Status
			TENDER

COPYRIGHT RESERVED



土木工程拓展署
Civil Engineering and
Development Department

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© OVE ARUP & PARTNERS HONG KONG LIMITED.

844000 N



844200 N

844000 N

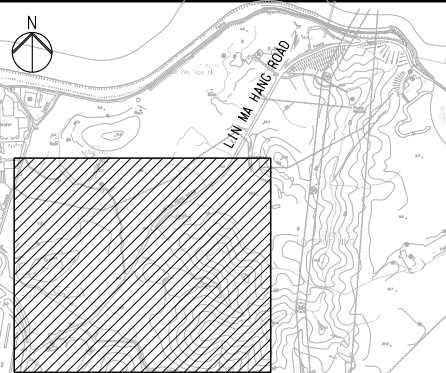
832800 E

832000 E

832200 E

MATCH LINE
FOR CONTINUATION SEE
DRG 231448/C2/G/1004

LIN MA HANG ROAD



KEY PLAN

LEGEND:

--- SITE BOUNDARY

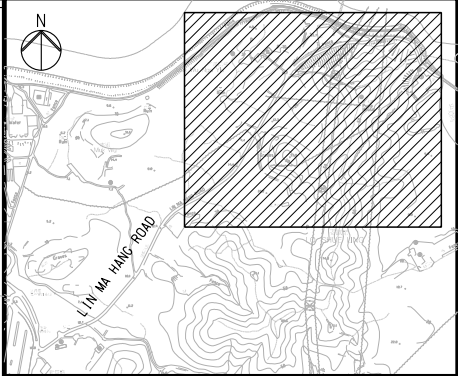
-	TENDER DRAWING	AW	11/17
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title:			
Contract No. CV/2017/02			
Development of Columbarium - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road			
Drawing title			
GENERAL LAYOUT (SHEET 3 OF 5)			
Drawing no.			Rev.
231448/C2/G/1003			-
Drawn	Date	Checked	Approved
WM	07/17	AW	DL
Scale	1:1000 @A1		Status
			TENDER

COPYRIGHT RESERVED



土木工程拓展署
Civil Engineering and
Development Department

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© OVE ARUP & PARTNERS HONG KONG LIMITED.



KEY PLAN

LEGEND:

--- SITE BOUNDARY

Rev	Description	By	Date
-	TENDER DRAWING	AW	11/17

Consultant
ARUP

Contract No. and Title:
Contract No. CV/2017/02
Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Drawing title
**GENERAL LAYOUT
(SHEET 4 OF 5)**

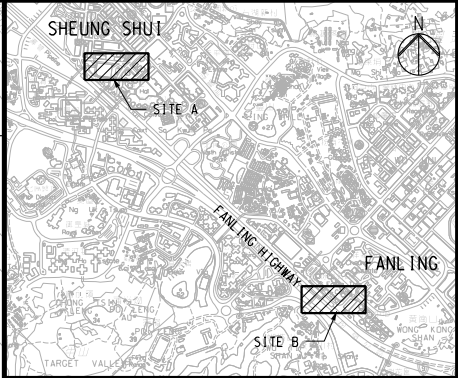
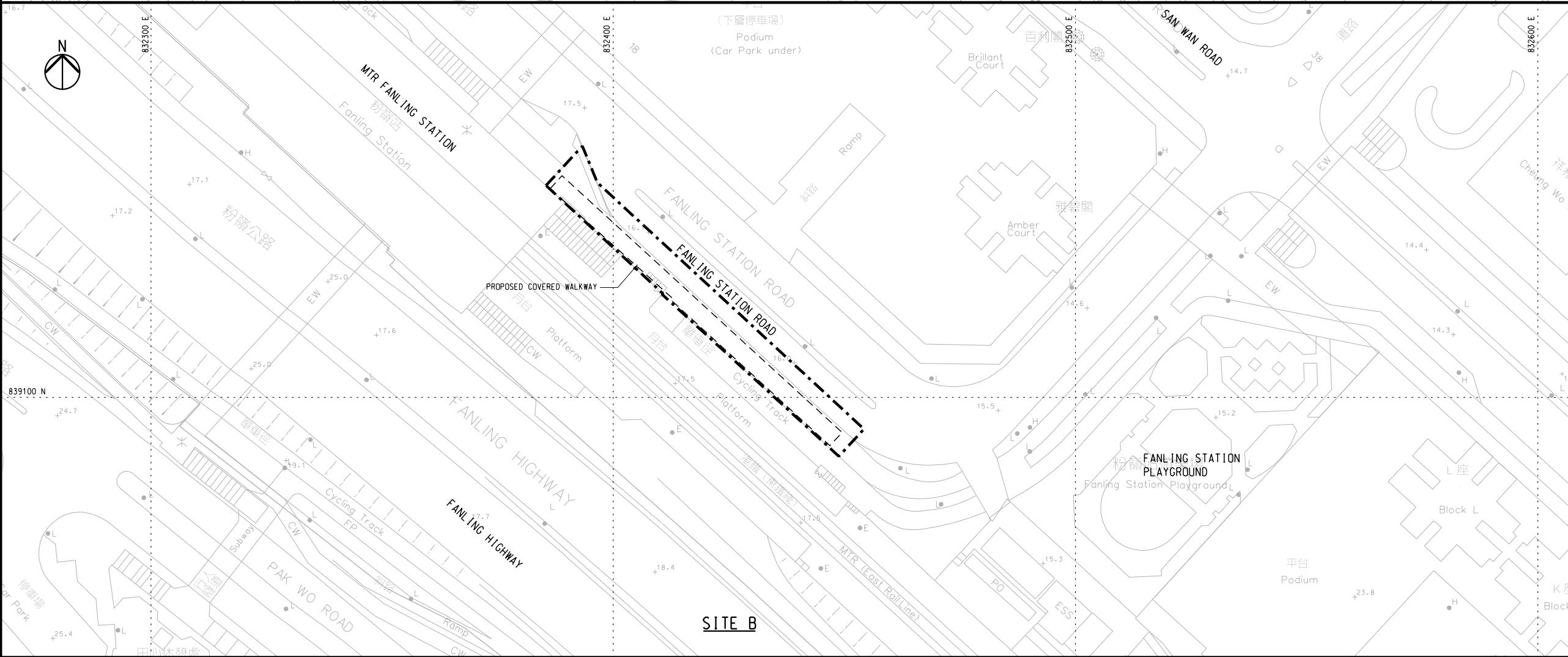
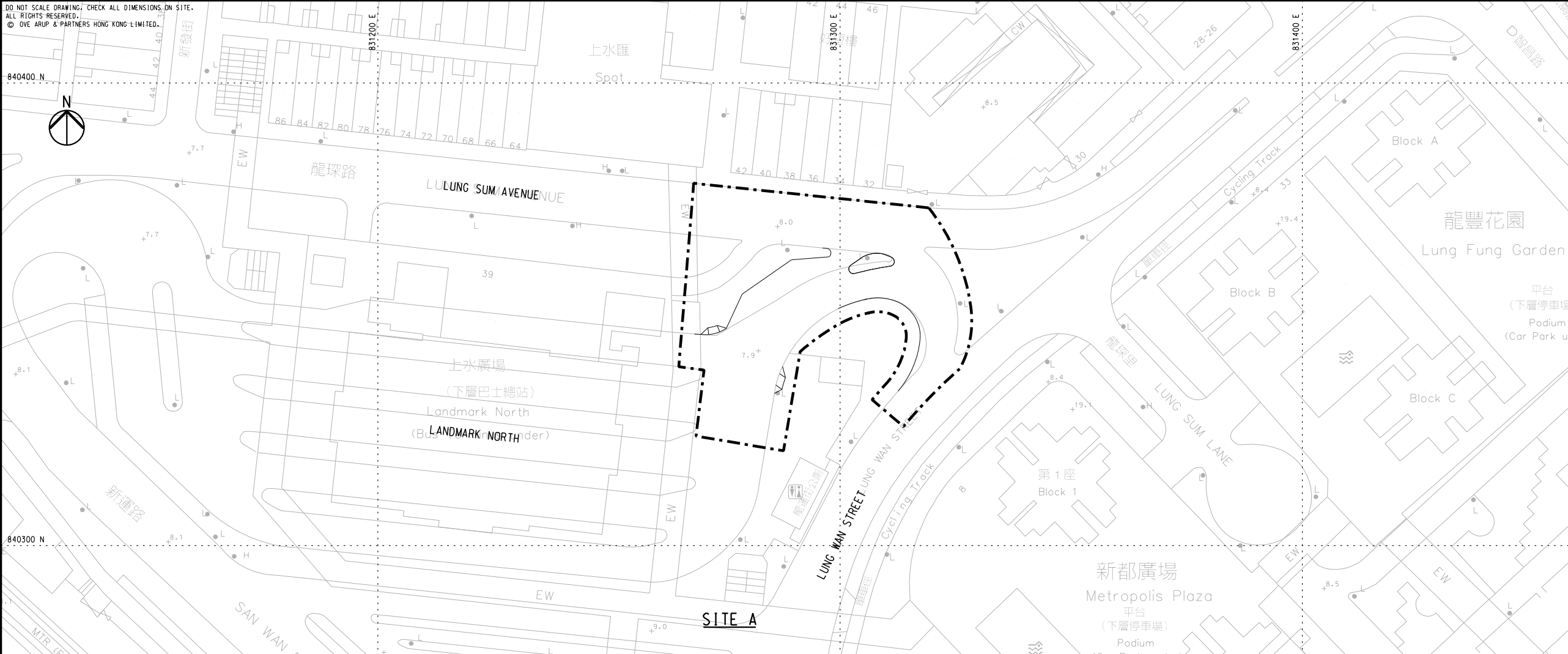
Drawing no. 231448/C2/G/1004		Rev. -	
Drawn WM	Date 07/17	Checked AW	Approved DL
Scale 1:1000 @A1		Status TENDER	

COPYRIGHT RESERVED




土木工程拓展署
Civil Engineering and
Development Department

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© OVE ARUP & PARTNERS HONG KONG LIMITED.



KEY PLAN

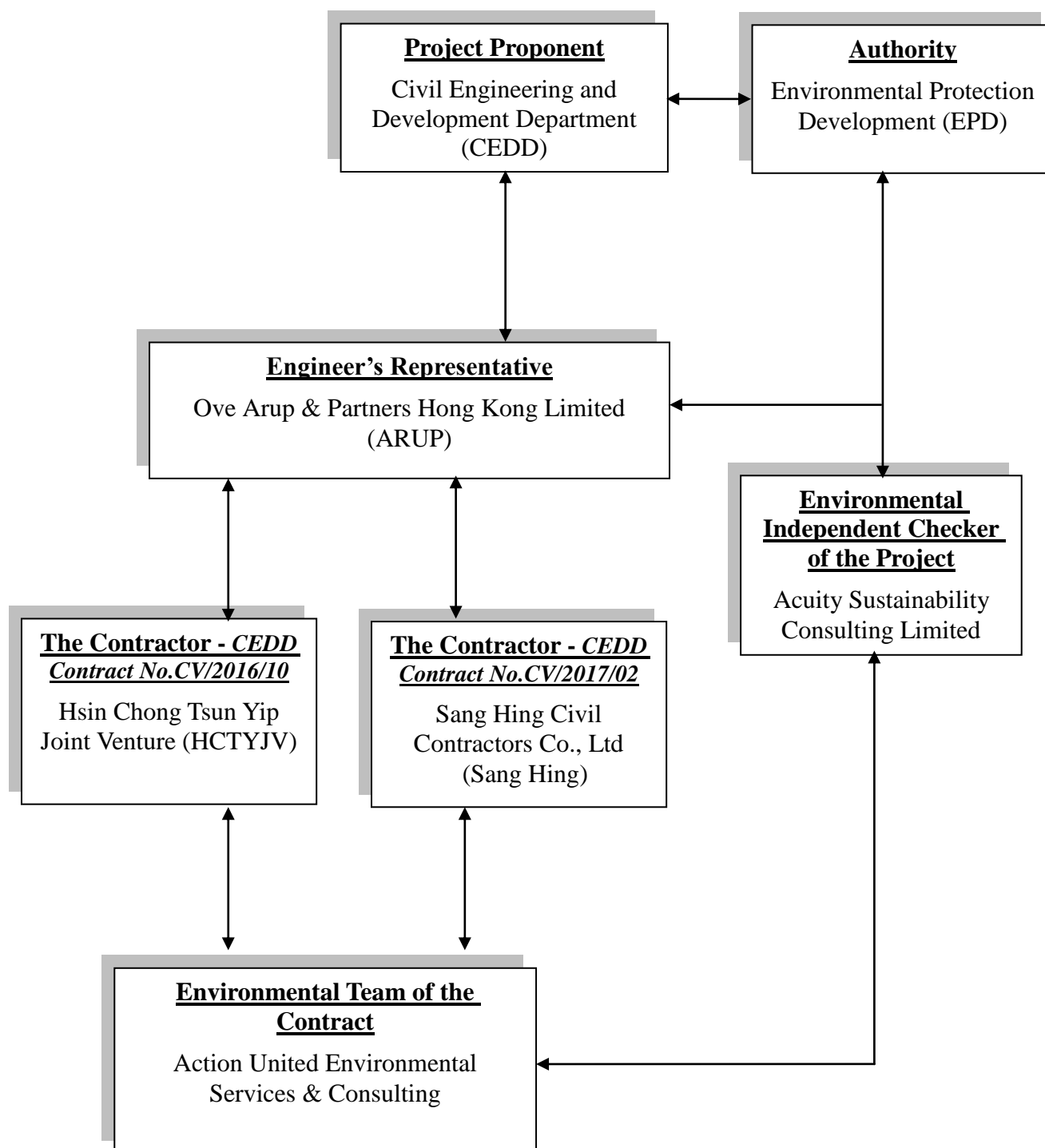
LEGEND:
- - - - - SITE BOUNDARY

-	TENDER DRAWING	AW	11/17
Rev	Description	By	Date
Consultant			
ARUP			
Contract No. and Title:			
Contract No. CV/2017/02			
Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road			
Drawing title			
GENERAL LAYOUT (SHEET 5 OF 5)			
Drawing no. 231448/C2/G/1005			Rev. -
Drawn WM	Date 07/17	Checked AW	Approved DL
Scale 1:500 @A1		Status TENDER	
COPYRIGHT RESERVED			
 土木工程拓展署 Civil Engineering and Development Department			

Appendix B

Organization Structure and Contact Details of Relevant Parties

The Contract's Environmental Management Organization



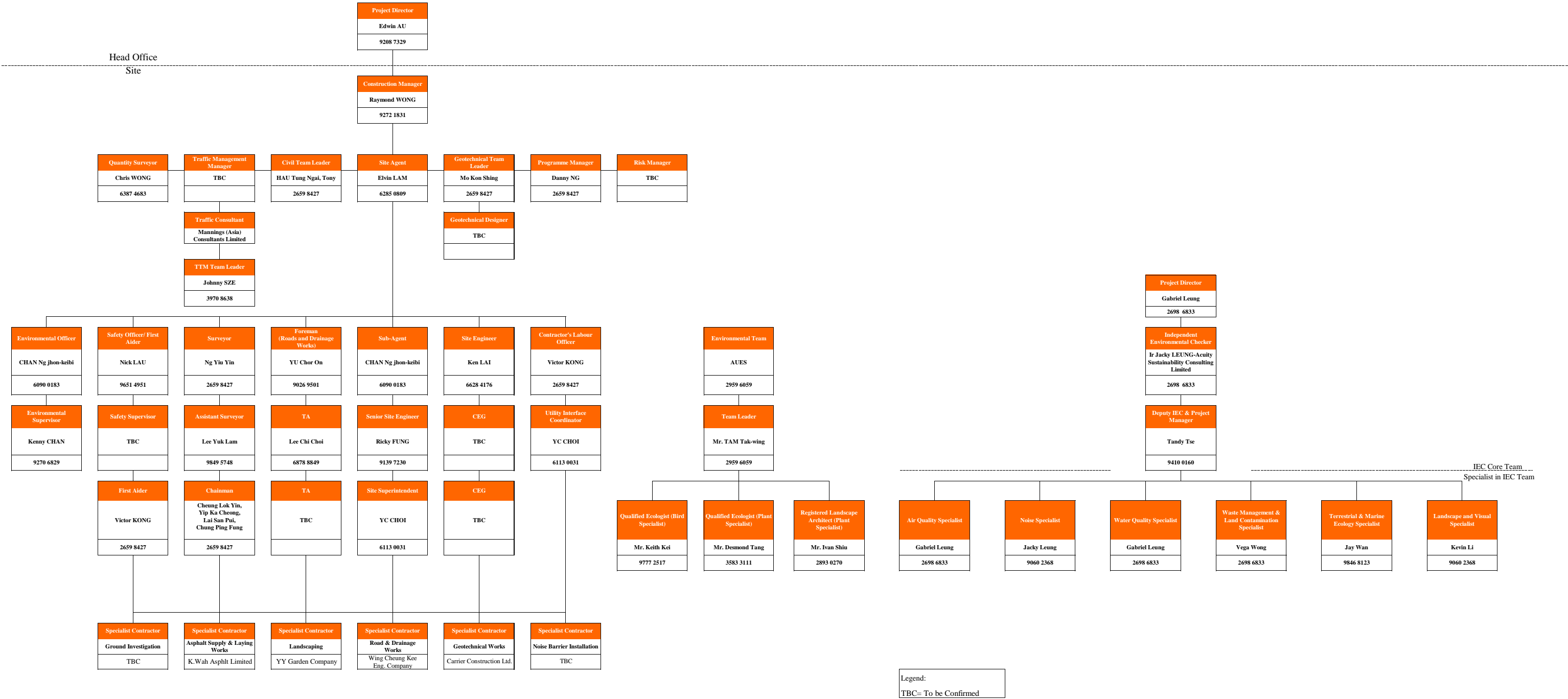
SANG HING CIVIL CONTRACTORS CO., LTD.

CONTRACT NO. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery -Infrastructural Works
at Man Kam To Road and Lin Ma Hang Road

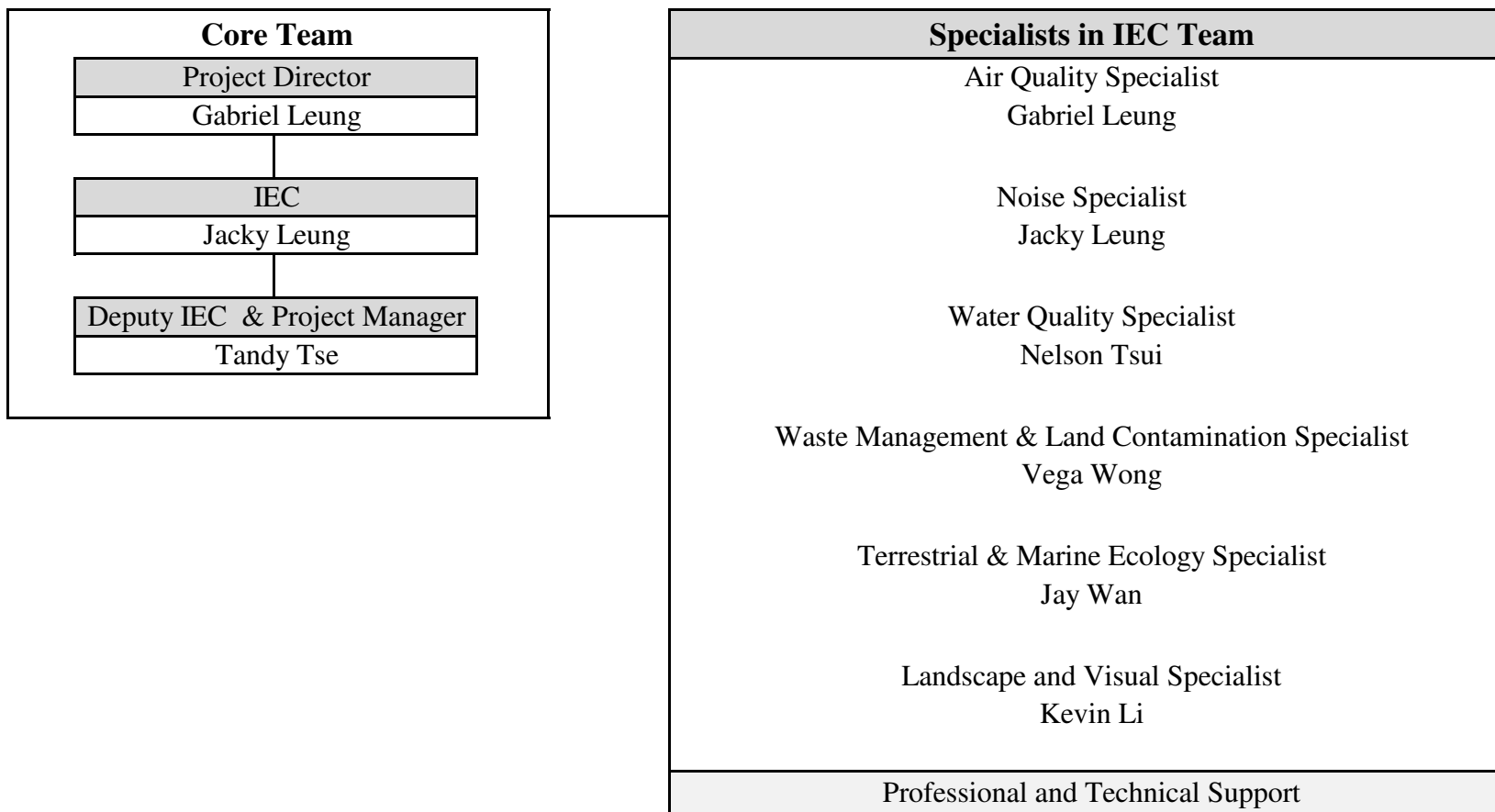
PROJECT ORGANIZATION CHART

(Revision Date : 5 Mar 2019)





Organisation Chart of IEC Team

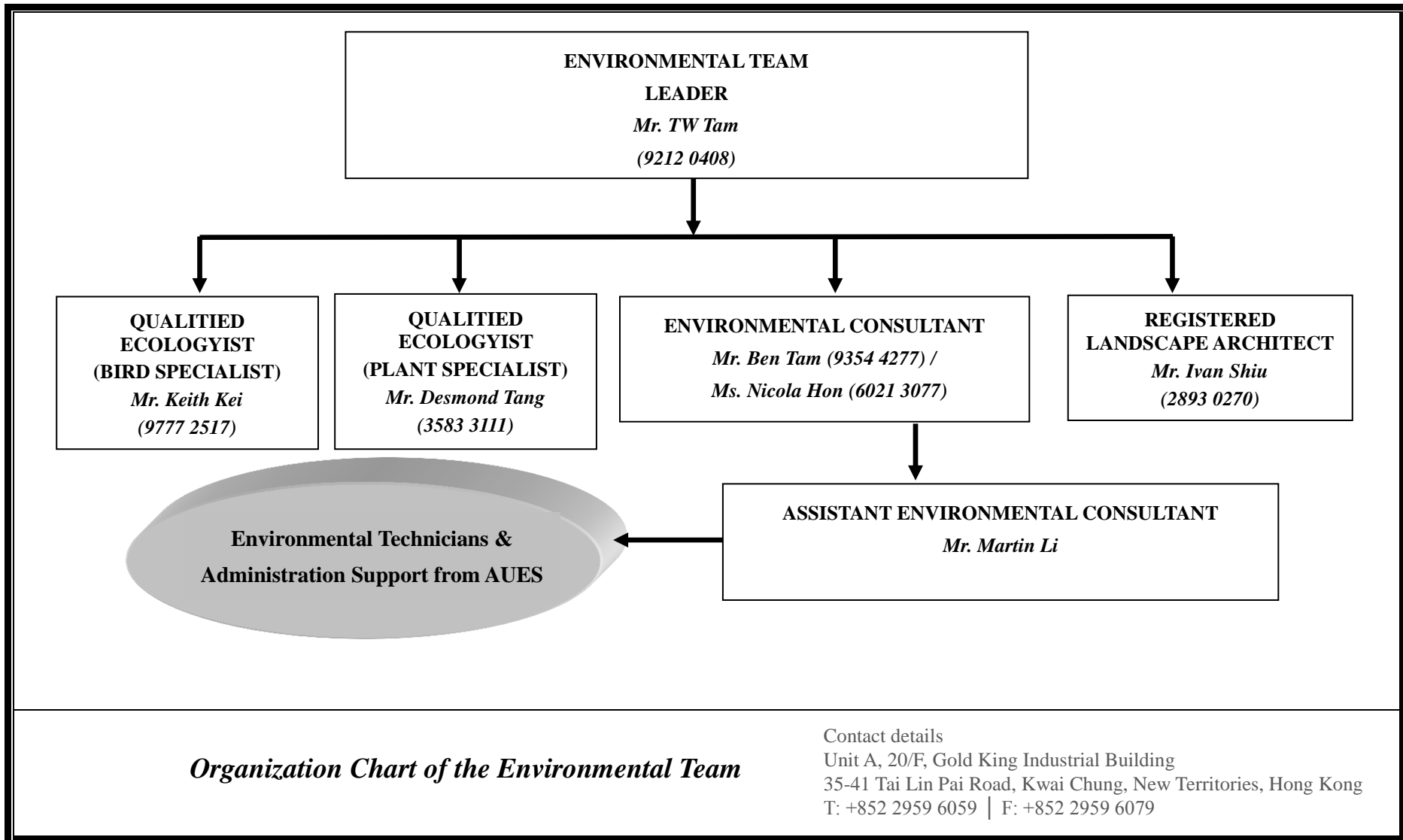


Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of
Columbarium at Sandy Ridge Cemetery

Organization Chart of the Environmental Team

AUES



Contact Details of Key Personnel for CV/2016/10 (Contract 1)

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	CHOI Wing-hing	2762-5620	2714-0695
ARUP	Engineer's Representative	Steve Tang	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Ir. Leung CH Jacky	2698-6833	2698-9383
HCTYJV	Project Director	Mr. Kan Kwok Cheung	9495-2408	2633-4691
HCTYJV	Construction Manager	Mr. Keniel Kwong	9863-0020	2633-4691
HCTYJV	Site Agent	Mr. Ho Man To	9507-9634	2633-4691
HCTYJV	Environmental Officer	Mr. Frankie Lam	6159-1140	2633-4691
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

ARUP (Engineer) – Ove Arup & Partners Hong Kong Limited

HCTYJV (Main Contractor) – Hsin Chong Tsun Yip Joint Venture

ACUITY (IEC) – Acuity Sustainability Consulting Limited

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

Contact Details of Key Personnel for CV/2017/02 (Contract 2)

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	CHOI Wing-hing	2762-5620	2714-0695
ARUP	Engineer's Representative	Anthony Lau	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Ir. Leung CH Jacky	2698-6833	2698-9383
SANG HING	Project Director	Edwin Au	9208-7329	2403-1162
SANG HING	Construction Manager	Raymond Wong	9272-1831	2403-1162
SANG HING	Site Agent	Elvin Lam	6285-0803	2403-1162
SANG HING	Environmental Officer	Chan Ng jhon-keibi	6090-0183	2403-1162
SANG HING	Environmental Supervisor	Kenny Chan	6115-0120	2403-1162
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

ARUP (Engineer) – Ove Arup & Partners Hong Kong Limited

Sang Hing (Main Contractor) – Sang Hing Civil Contractors Co., Ltd

ACUITY (IEC) – Acuity Sustainability Consulting Limited

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
















Appendix C

Three Months rolling Programme

**Three Months rolling Programme of
Contract CV/2016/10**

ID	Task Name	Duration	Start	Finish	tr 3, 2019	Jul	Aug	Sep	Oct
1	Key Dates	2199 days	Fri 15/12/17	Fri 22/12/23					
5	Contract Completion Date for Section 3	0 days	Wed 17/7/19	Wed 17/7/19					
10	Access Dates	580 days	Fri 15/12/17	Wed 17/7/19					
19	Part G1	0 days	Wed 17/7/19	Wed 17/7/19					
20	Part G2	0 days	Wed 17/7/19	Wed 17/7/19					
21	Section Completion Date	1619 days	Wed 17/7/19	Fri 22/12/23					
24	Section 3 (Part E)	0 days	Wed 17/7/19	Wed 17/7/19					
41	Preliminary Works	606 days	Fri 15/12/17	Mon 12/8/19					
82	Contractor's Design and Major Temporary Works Design	431 days	Fri 8/6/18	Mon 12/8/19					
85	Design of Noise Barrier Superstructure, and Liasion with WSD for Construction of Noise Barrier	365 days	Mon 23/7/18	Mon 22/7/19					
86	Approval of Noise Barrier Superstructure Design	21 days	Tue 23/7/19	Mon 12/8/19					
105	Section 1 of the Works (Parts A1, A2 & A3)	940 days	Fri 15/12/17	Sat 11/7/20					
122	Retaining Wall RW1	317 days	Thu 16/8/18	Fri 13/9/19					
135	Drainage and Maintenance Access on top of RW1	120 days	Tue 23/4/19	Fri 13/9/19					
136	Fill Slope FS1	503 days	Thu 11/10/18	Fri 3/7/20					
137	Fill Slope FS1 South (Section 12 at Drawing C1/GE/1030)	453 days	Wed 14/11/18	Wed 3/6/20					
140	FS1 South Backfilling Stage 3 (~7.5m height, Section 12 up to ~+35mPD), (27.5mPD to 30mPD filter blanket x2, on temp cut and 3m below slope surface)	91 days	Mon 24/6/19	Mon 14/10/19					
143	Drainage and Maintenance Access	300 days	Tue 28/5/19	Wed 3/6/20					
144	Geotechnical Instrumentation Works	220 days	Wed 14/8/19	Sat 16/5/20					
145	Fill Slope FS1 North (Section 14 at Drawing C1/GE/1030)	503 days	Thu 11/10/18	Fri 3/7/20					
147	FS1 North Backfilling Stage 2 (~7.5m height, Section 14 up to ~+27.5 mPD),(Filter Blanket 20 to 27.5mPD(rare) + 20 to 22.5mPD(front))	133 days	Sat 2/2/19	Mon 22/7/19					
148	FS1 North Backfilling Stage 3 (~7.5m height, Section 14 up to ~+35 mPD), (Filter Blanket 27.5 to 30mPD(rare) + 27.5 to 30mPD(front))	91 days	Tue 23/7/19	Mon 11/11/19					
152	Drainage and Maintenance Access	300 days	Wed 26/6/19	Fri 3/7/20					
153	Geotechnical Instrumentation Works	220 days	Wed 11/9/19	Sat 13/6/20					
154	Road D and Pickup/Drop-Off Area	577 days	Mon 23/7/18	Sat 11/7/20					
162	Carriageway and Footway	577 days	Mon 23/7/18	Sat 11/7/20					
170	Landscape Works	337 days	Tue 21/5/19	Sat 11/7/20					
172	Shrubs Planting at RW1	34 days	Tue 2/7/19	Fri 9/8/19					
173	Woodland Planting at Fill Slope	300 days	Wed 26/6/19	Fri 3/7/20					
174	Hydroseeding at Fill Slope	300 days	Tue 2/7/19	Wed 8/7/20					
179	Section 2 of the Works (Parts B1, B2, C, D, F, G1 & G2)	1292 days	Fri 15/12/17	Mon 28/6/21					
186	Part B1	1034 days	Fri 15/12/17	Mon 28/6/21					
187	Utilities Diversion/Protection Works	820 days	Fri 15/12/17	Wed 30/9/20					
188	HKT	820 days	Fri 15/12/17	Wed 30/9/20					
191	Supporting / Diversion of Existing HKT Cable	700 days	Thu 17/5/18	Wed 30/9/20					
213	Temporary Excavation to Proposed Platform at Future PDA	434 days	Sat 1/9/18	Wed 26/2/20					
216	Excavate to +64 mPD	116 days	Mon 11/2/19	Sat 6/7/19					
217	Excavate to +56 mPD	110 days	Mon 8/7/19	Mon 18/11/19					
219	Cut Slopes CS11 & CS12	759 days	Sat 1/9/18	Thu 8/4/21					
224	Excavate to +72mPD, Pull Out Test, Soil Nails and Raking Drains (99 Nos. of Soil Nail)	79 days	Wed 12/6/19	Thu 12/9/19					
225	Excavate to +64.5 mPD, Pull Out Test, Soil Nails and Raking Drains (124 Nos. of Soil Nail)	53 days	Sat 28/9/19	Tue 3/12/19					
230	Drainage and Maintenance Access up to +72 mPD	235 days	Wed 2/1/19	Wed 23/10/19					
232	Geotechnical Instrumentation Works	450 days	Wed 27/2/19	Tue 8/9/20					

3-month Rolling Programme (July 2019 to September 2019)	Task		Milestone		Project Summary		External Milestone		Critical		Progress	
	Split		Summary		External Tasks		Deadline		Critical Split			

ID	Task Name	Duration	Start	Finish	tr 3, 2019				tr 4, 2019
					Jul	Aug	Sep	Oct	
533	 Drainage and Maintenance Access	35 days	Sat 3/8/19	Thu 12/9/19					
534	 Geotechnical Instrumentation Works	12 days	Tue 13/8/19	Mon 26/8/19					
535	 Cut Slope CS19	204 days	Thu 3/1/19	Thu 12/9/19					
538	 Excavate to +4.1mPD, Soil Nails, Raking Drains and Excavate to Toe Level (4 Nos. of Soil Nail, 7 Nos. of Raking Drain)	44 days	Fri 28/6/19	Mon 19/8/19					
539	 Drainage and Maintenance Access	196 days	Sat 12/1/19	Thu 12/9/19					
540	 Geotechnical Instrumentation Works	6 days	Tue 20/8/19	Mon 26/8/19					
541	 Landscape Works at Cut Slopes C18, CS19	24 days	Tue 20/8/19	Tue 17/9/19					
542	 Planter W2 Construction	17 days	Tue 20/8/19	Sat 7/9/19					
543	 Shrubs Planting at Planter W2	18 days	Tue 27/8/19	Tue 17/9/19					

**Three Months rolling Programme of
Contract CV/2017/02**

3 month rolling programme 20190625(end July 19)

ID	WBS	Task Name	Duration	Start Date	Completion Date																																				
						M				B				E				M				B				E				M											
						20 Mar	10 Jun	1 Jul	1 Jul	22 Jul	12 Aug	2 Sep	23 Sep	14 Oct	4 Nov	25 Nov	16 Dec	6 Jan	27 Jan	17 Feb	10 Mar	31 Mar	21 Apr	12 May	2 Jun	23 Jun	14 Jul	4 Aug	25 Aug	15 Sep											
						T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S		
118	14.1.7.17	falsework and formwork of alternative second two walls	3 days	Wed 21/8/19	Fri 23/8/19																																				
119	14.1.7.18	steel fixing for two walls	6 days	Fri 23/8/19	Thu 29/8/19																																				
120	14.1.7.19	close formwork for two walls	2 days	Thu 29/8/19	Fri 30/8/19																																				
121	14.1.7.20	concrete and curing for two walls	4 days	Sat 31/8/19	Wed 4/9/19																																				
122	14.1.7.21	remove falsework & formwork	2 days	Wed 4/9/19	Thu 5/9/19																																				
123	14.1.7.22	after completion of RW13 (bay 1 to 5) , backfilling & compaction behind wall to formation (A1) (Drg GE/1101)	66 days	Fri 6/9/19	Mon 2/12/19																																				
125	14.1.8	Site Formation works for Fill Slope FS18	231 days	Mon 15/4/19	Mon 3/2/20																																				
129	14.1.8.4	backilling from top of filter blanket to formation level (including SRT tests)	126 days	Thu 16/5/19	Mon 21/10/19																																				
130	14.1.8.5	construction of 1.5m width maintenance berm	2 days	Fri 18/10/19	Mon 21/10/19																																				
131	14.1.8.6	construction of U channel/ stepped channel and catchpits	37 days	Fri 18/10/19	Mon 2/12/19																																				
228	14.3	Parts B - refer Appendix MKTR01A & Appendix MKTR01B	979 days	Thu 31/5/18	Wed 3/2/21																																				
236	14.3.5	Construction of Fresh Water Mains (DN400)-refer to Drawings No. MKTR Programme/W/001 & 002	352 days	Sat 10/11/18	Fri 17/1/20																																				
345	14.3.5.13	Phase 5: TTA5s	42 days	Wed 19/6/19	Wed 7/8/19																																				
352	14.3.5.13.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 24/7/19	Sat 3/8/19																																				
353	14.3.5.13.8	reinstate trench & curing	3 days	Mon 5/8/19	Wed 7/8/19																																				
354	14.3.5.14	Phase 5: TTA12s	45 days	Sat 15/6/19	Wed 7/8/19																																				
361	14.3.5.14.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 24/7/19	Sat 3/8/19																																				
362	14.3.5.14.8	reinstate trench & curing	3 days	Mon 5/8/19	Wed 7/8/19																																				
363	14.3.5.15	Phase 5: TTA19s	45 days	Sat 15/6/19	Wed 7/8/19																																				

ID	WBS	Task Name	Duration	Start Date	Completion Date																																		
						M				B				E				M				B				E				M									
						20 May	10 Jun	1 Jul	12 Jul	22 Jul	12 Aug	2 Sep	23 Sep	14 Oct	4 Nov	25 Nov	16 Dec	6 Jan	27 Jan	17 Feb	10 Mar	31 Mar	21 Apr	12 May	2 Jun	23 Jun	14 Jul	4 Aug	25 Aug	15 Sep									
						T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
370	14.3.5.15.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 24/7/19	Sat 3/8/19																																		
371	14.3.5.15.8	reinstate trench & curing	3 days	Mon 5/8/19	Wed 7/8/19																																		
372	14.3.5.16	Phase 6: TTA6s	46 days	Fri 9/8/19	Thu 3/10/19																																		
373	14.3.5.16.1	mobilisation & set up TTA	2 days	Fri 9/8/19	Sat 10/8/19																																		
374	14.3.5.16.2	saw cut existing pavement and removal	4 days	Mon 12/8/19	Thu 15/8/19																																		
375	14.3.5.16.3	trial pits	4 days	Fri 16/8/19	Tue 20/8/19																																		
376	14.3.5.16.4	trench sheetpiling	7 days	Wed 21/8/19	Wed 28/8/19																																		
377	14.3.5.16.5	excavate trench & shoring	8 days	Thu 29/8/19	Fri 6/9/19																																		
378	14.3.5.16.6	pipe laying & a washout pump pit	6 days	Sat 7/9/19	Fri 13/9/19																																		
379	14.3.5.16.7	backfill trench & remove sheetpile, rail & strut	12 days	Mon 16/9/19	Sat 28/9/19																																		
380	14.3.5.16.8	reinstate trench & curing	3 days	Mon 30/9/19	Thu 3/10/19																																		
381	14.3.5.17	Phase 6: TTA13s	42 days	Wed 14/8/19	Thu 3/10/19																																		
382	14.3.5.17.1	mobilisation & set up TTA	2 days	Wed 14/8/19	Thu 15/8/19																																		
383	14.3.5.17.2	saw cut existing pavement and removal	4 days	Fri 16/8/19	Tue 20/8/19																																		
384	14.3.5.17.3	trial pits	4 days	Wed 21/8/19	Sat 24/8/19																																		
385	14.3.5.17.4	trench sheetpiling	7 days	Mon 26/8/19	Mon 2/9/19																																		
386	14.3.5.17.5	excavate trench & shoring	7 days	Tue 3/9/19	Tue 10/9/19																																		
387	14.3.5.17.6	pipe laying	5 days	Wed 11/9/19	Tue 17/9/19																																		
388	14.3.5.17.7	backfill trench & remove sheetpile, rail & strut	10 days	Wed 18/9/19	Sat 28/9/19																																		
389	14.3.5.17.8	reinstate trench & curing	3 days	Mon 30/9/19	Thu 3/10/19																																		
390	14.3.5.18	Phase 6: TTA20s	47 days	Thu 8/8/19	Thu 3/10/19																																		
391	14.3.5.18.1	mobilisation & set up TTA	2 days	Thu 8/8/19	Fri 9/8/19																																		

Contract No. CV/2017/02 Development of Columbarium at Sandy Ridge Cemetery - Infrastructural Works at Man Kam To Road and Lin Ma Hang Road	3 Month Rolling Programme (from 26/7/2019 to 25/10/2019)	Accepted Initial Works Programme (06)
--	---	---------------------------------------

[illegible]

3 month rolling programme 20190625(end July 19)

ID	WBS	Task Name	Duration	Start Date	Completion Date																																		
						M				B				E				M				B				E				M									
						20 Mar	10 Jun	1 Jul	12 Jul	22 Jul	12 Aug	2 Sep	23 Sep	14 Oct	4 Nov	25 Nov	16 Dec	6 Jan	27 Jan	17 Feb	10 Mar	31 Mar	21 Apr	12 May	2 Jun	23 Jun	14 Jul	4 Aug	25 Aug	15 Sep									
						T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S
695	17.3.11.26	backfill formation & SRT test	12 days	Fri 20/9/19	Fri 4/10/19																																		
696	17.3.11.27	excavate pipe trench and manhole(s)	2 days	Fri 4/10/19	Sat 5/10/19																																		
697	17.3.11.28	lay pipes & construct manhole(s)	6 days	Sat 5/10/19	Sat 12/10/19																																		
698	17.3.11.29	backfill pipe trench & SRT test	3 days	Sat 12/10/19	Tue 15/10/19																																		
699	17.3.11.30	lay kerb, sub-base	2 days	Wed 16/10/19	Thu 17/10/19																																		
700	17.3.11.31	sub-base SRT test	3 days	Fri 18/10/19	Mon 21/10/19																																		
701	17.3.11.32	DBM (Roadbase)	2 days	Tue 22/10/19	Wed 23/10/19																																		
702	17.3.11.33	base course and wearing course	2 days	Thu 24/10/19	Fri 25/10/19																																		
703	17.3.12	Phase II (stage 2)-north lane (chainage 32-85)-Noise Barrier MM9 (bays 1-4)	84 days	Sat 26/10/19	Fri 7/2/20																																		
704	17.3.12.1	TTA, UU detection	2 days	Sat 26/10/19	Mon 28/10/19																																		
988	17.3.32	Phase Ia (stage 110)-north lane (chainage 840-890)	18 days	Thu 18/7/19	Wed 7/8/19																																		
993	17.3.32.5	lay& connect gully pipes& construct gully pot(s)	3 days	Thu 25/7/19	Sat 27/7/19																																		
994	17.3.32.6	lay kerb, sub-base	2 days	Mon 29/7/19	Tue 30/7/19																																		
995	17.3.32.7	sub-base SRT test	3 days	Wed 31/7/19	Fri 2/8/19																																		
996	17.3.32.8	DBM (Roadbase)	2 days	Sat 3/8/19	Mon 5/8/19																																		
997	17.3.32.9	base course and wearing course	2 days	Tue 6/8/19	Wed 7/8/19																																		
998	17.3.33	Phase III (stage 1)-south lane (chainage 435-490)	20 days	Thu 8/8/19	Fri 30/8/19																																		
999	17.3.33.1	TTA & UU detection	2 days	Thu 8/8/19	Fri 9/8/19																																		
1000	17.3.33.2	tree felling	3 days	Sat 10/8/19	Tue 13/8/19																																		
1001	17.3.33.3	saw cut & remove existing pavement	2 days	Mon 12/8/19	Tue 13/8/19																																		
1002	17.3.33.4	excavate pipe trench and manhole(s)	2 days	Wed 14/8/19	Thu 15/8/19																																		

ID	WBS	Task Name	Duration	Start Date	Completion Date																												
						M				B				E				M				B				E				M			
						20 Mar	10 Jun	1 Jul	12 Jul	22 Jul	12 Aug	2 Sep	23 Sep	14 Oct	4 Nov	25 Nov	16 Dec	6 Jan	27 Jan	17 Feb	10 Mar	31 Mar	21 Apr	12 May	2 Jun	23 Jun	14 Jul	4 Aug	25 Aug	15 Sep			
						T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	
1293	17.4.15	completion of concrete curing of substructure of Nosie Barriers	463 days	Mon 14/10/19	Tue 19/1/21																												
1295	17.4.15.2	MM6	0 days	Mon 14/10/19	Mon 14/10/19																												
1296	17.4.15.3	MM7	0 days	Mon 14/10/19	Mon 14/10/19																												
1325	17.7	Slope Upgrading works (section 2 Part C2)	578 days	Mon 25/2/19	Wed 3/2/21																												
1330	17.7.5	baseline monitoring for 3NW-C/C230 (DH15 & 16) & C225 (DH3 & 17) on existing drillholes & 3NW-C/C470 (existing D-DH7), C224 (existing D-DH11) & C225 proposed verification drillholes DHA1,A2 & A3	30 days	Fri 12/7/19	Thu 15/8/19																												
1331	17.7.6	submit 4 sets of initial readings of baseline monitoring and preliminary logs to the Project Manager to the Project Manager	0 days	Thu 15/8/19	Thu 15/8/19																												
1332	17.7.7	Slopeworks: 3NW-C/C470 (ch490-540S/B)	59 days	Fri 16/8/19	Sat 26/10/19																												
1333	17.7.7.1	removal of existing trees	10 days	Fri 16/8/19	Tue 27/8/19																												
1334	17.7.7.2	hoarding & fencing	6 days	Wed 28/8/19	Tue 3/9/19																												
1335	17.7.7.3	slope excavation works	1 day	Wed 4/9/19	Wed 4/9/19																												
1336	17.7.7.4	temporary scaffolding	5 days	Thu 5/9/19	Tue 10/9/19																												
1337	17.7.7.5	proposed slope stripping for mapping or rock and relict discontinuities (AS5-A,B, AS6-A,B)	8 days	Wed 11/9/19	Fri 20/9/19																												
1338	17.7.7.6	Phase I	8 days	Sat 21/9/19	Mon 30/9/19																												
1339	17.7.7.6.1	install test nail PN02 & pull out test	6 days	Sat 21/9/19	Fri 27/9/19																												
1340	17.7.7.6.2	drill, install steel bars and grout soil nails (B01-12)	2 days	Sat 28/9/19	Mon 30/9/19																												
1341	17.7.7.7	Phase II	8 days	Wed 2/10/19	Fri 11/10/19																												

ID	WBS	Task Name	Duration	Start Date	Completion Date																																			
						M				B				E				M				B				E				M										
						20 May	10 Jun	1 Jul	12 Jul	22 Jul	12 Aug	2 Sep	23 Sep	14 Oct	4 Nov	25 Nov	16 Dec	6 Jan	27 Jan	17 Feb	10 Mar	31 Mar	21 Apr	12 May	2 Jun	23 Jun	14 Jul	4 Aug	25 Aug	15 Sep										
						T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	
1342	17.7.7.7.1	install test nail PN01 & pull out test	6 days	Wed 2/10/19	Wed 9/10/19																																			
1343	17.7.7.7.2	drill, install steel bars and grout soil nails (A01-17)	2 days	Thu 10/10/19	Fri 11/10/19																																			
1344	17.7.7.8	raking drains	1 day	Sat 12/10/19	Sat 12/10/19																																			
1345	17.7.7.9	TDR Test (including test & wait issue result)	2 days	Mon 14/10/19	Tue 15/10/19																																			
1346	17.7.7.10	soil nail head works	3 days	Wed 16/10/19	Fri 18/10/19																																			
1347	17.7.7.11	UC & catchpit (38m & 1 nr)	5 days	Sat 19/10/19	Thu 24/10/19																																			
1348	17.7.7.12	biodegradable erosion control mat with hydroseeding	2 days	Fri 25/10/19	Sat 26/10/19																																			
1438	17.7.11	Slopeworks: - 3NW-C/C231 (ch1220-1240N/B)	415 days	Thu 12/9/19	Wed 3/2/21																																			
1439	17.7.11.1	hoarding & fencing	12 days	Thu 12/9/19	Thu 26/9/19																																			
1440	17.7.11.2	temporary scaffolding	14 days	Fri 27/9/19	Tue 15/10/19																																			
1441	17.7.11.3	proposed slope stripping for mapping or rock and relict discontinuities (AS1-A,B, AS2-A,B)	10 days	Wed 16/10/19	Sat 26/10/19																																			
1507	20	section 3 of the works - Completion of all works within Parts D and E of the Site	797 days	Thu 31/5/18	Wed 3/2/21																																			
1508	20.1	Parts D	800 days	Mon 26/11/18	Wed 3/2/21																																			
1514	20.1.6	acceptance of lighting system for the covered walkway	0 days	Sun 4/8/19	Sun 4/8/19																																			
1515	20.1.7	Coordination with CLP to obtain the electricity supply for the street lighting system (Design for Road B, Road E, Road F(part), Lin Ma Hang Road and Sheung Shui Landmark PTI & Lighting system for the covered walkway)	168 days	Mon 5/8/19	Sun 19/1/20																																			
1518	20.1.10	acceptance of glazing system and fall arrest system by Project Manager	0 days	Sun 4/8/19	Sun 4/8/19																																			

ID	WBS	Task Name	Duration	Start Date	Completion Date																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																
						M				B				E				M				B				E				M																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
						20 Mar	10 Jun	1 Jul	12 Jul	12 Aug	2 Sep	23 Sep	14 Oct	4 Nov	25 Nov	16 Dec	6 Jan	27 Jan	17 Feb	10 Mar	31 Mar	21 Apr	12 May	2 Jun	23 Jun	14 Jul	4 Aug	25 Aug	15 Sep																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
						T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S	S	M	T	W	T	F	S

Appendix D

Monitoring Locations

Air Quality Monitoring Location

Printed by : 2/26/2016
Filename : G:\env\project\231448\13_Drawing Deliverables\Reports\018_EI&A Manual\20160226 Revised Final\Figure 5.12 - Locations of Construction Dust Monitoring (Sheet 2 of 4).dgn



Legend

- Project Boundary
- Utilities Construction
- Proposed Air Monitoring Stations

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

COPYRIGHT RESERVED

Location ID	Description
ASR-1	Village House along Man Kam To Road

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© THE ARUP & PARTNERS HONG KONG LIMITED.

Man Kam To Boundary
Control Point



HVS shifted to outside premises of San Uk Ling Village House No.1 for impact air quality monitoring



HVS placed inside premises of San Uk Ling Village House No.1 during baseline air quality monitoring

Lin Ma Hang Road

ASR-2

San Uk Ling

Legend

- Project Boundary
- Existing Air Monitoring Stations

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date
Consultant			

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

Drawing title
Figure 1
Air Quality Monitoring
Location (ASR-2)

COPYRIGHT RESERVED

Location ID	Description
ASR-2	Village House at San Uk Ling

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© DVE ARUP & PARTNERS HONG KONG LIMITED.



Location ASR-3 at Muk Wu Nga Yiu House No. 28 during baseline monitoring



Proposed Location ASR-3a at Muk Wu Nga Yiu House No. 2A for impact monitoring

- Legend
- Project Boundary
 - Existing Air Monitoring Station
 - Proposed Air Monitoring Station

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date

Consultant

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title
Figure 2
Air Quality Monitoring Location (ASR-3)

COPYRIGHT RESERVED

Location ID	Description
ASR-3	Village House at Muk Wu Nga Yiu

Noise Monitoring Location

Printed by : 2/29/2016
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EMB4 Manual\20160226 Revised Final.vlaFigure 6.2.2 - Locations of Proposed Construction Noise Monitoring (Sheet 2 of 4).dgn

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© THE AMP & PARTNERS HONG KONG LIMITED.



- Legend
- Project Boundary
 - Utilities Construction
 - 300m Assessment Area
 - Proposed Construction Noise Monitoring Locations

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date

Consultant

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

Drawing title

COPYRIGHT RESERVED

Location ID	Description
CN-1	Village house to the west of Sha Ling Road

Printed by : 2/29/2016
Filename : G:\env\project\231448\13_Drawing_Deliverables\Reports\018_EWA Manual\20160226 Revised Final.vla
Figure 6.2.3 - Locations of Proposed Construction Noise Monitoring (Sheet 3 of 4).dgn

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
NO PART OF THIS DRAWING IS TO BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, WITHOUT PERMISSION IN WRITING FROM THE ENGINEERING OFFICE OF THE HONG KONG SAR.



- Legend
- Project Boundary
 - Utilities Construction
 - 300m Assessment Area
 - Proposed Construction Noise Monitoring Locations

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date

Consultant

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

Drawing title

COPYRIGHT RESERVED

Location ID	Description
CN-2	Village house to the north of Man Kam To Road

Printed by : 2/29/2016
Filename : G:\env\project\231448\13 Drawing Deliverables\Reports\018 EWA Manual\20160226 Revised Final.v1\Figure 6.2.4 - Locations of Proposed Construction Noise Monitoring (Sheet 4 of 4).dgn

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© DYE NIP & PARTNERS HONG KONG LIMITED.



Legend

- Project Boundary
- 300m Assessment Area
- Proposed Construction Noise Monitoring Locations

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date

Consultant

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

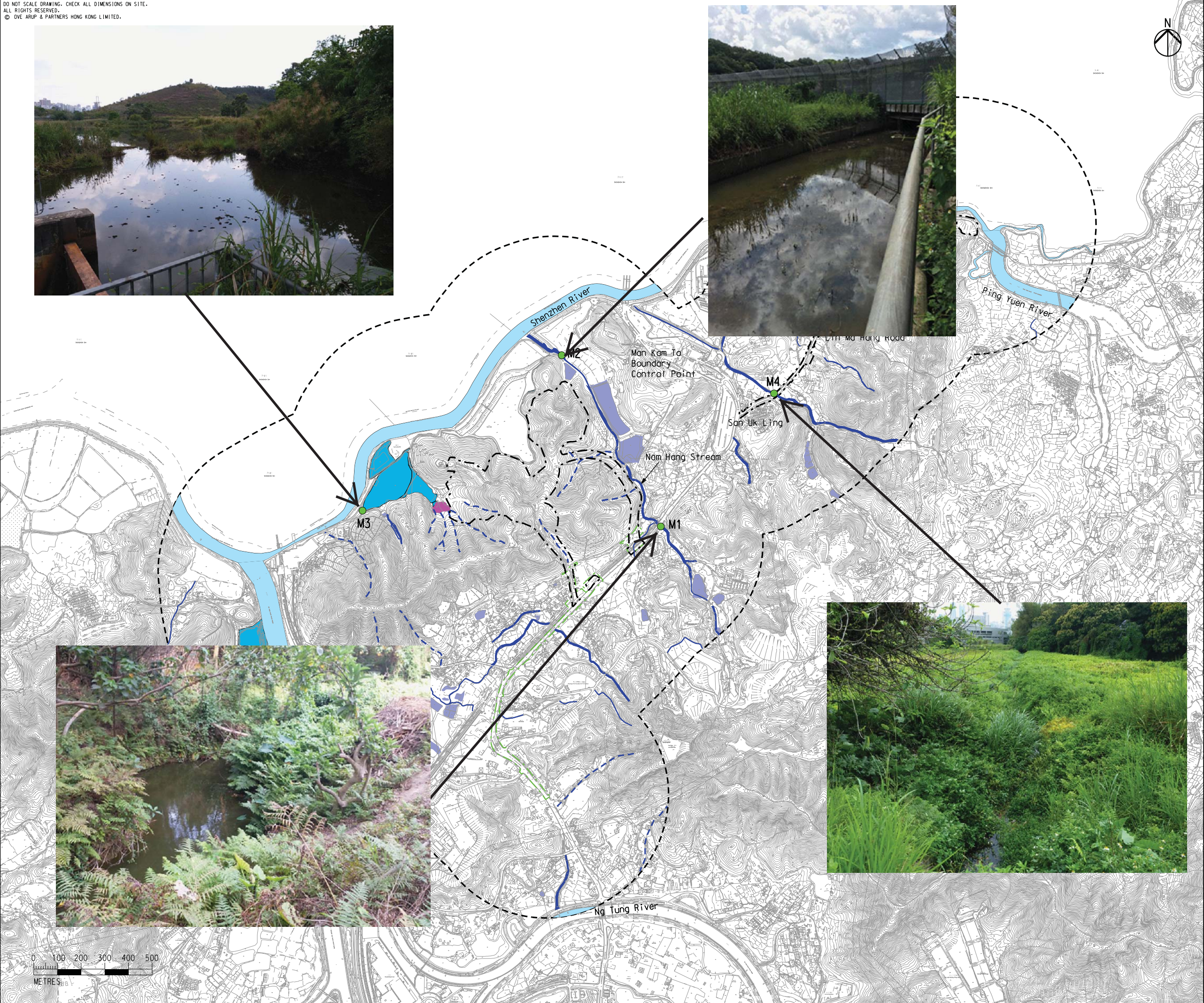
Drawing title

COPYRIGHT RESERVED

Location ID	Description
CN-3	Village house near San Uk Ling
CN-4	Village house of Muk Wu

Water Quality Monitoring Station

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© DVE ARUP & PARTNERS HONG KONG LIMITED.



- Legend
- Project Boundary
 - Utilities Construction
 - 500m Assessment Area
 - Channelized River
 - Pond
 - Watercourse
 - Conservation Area (CA)
 - Wet Woodland
 - Seasonal Watercourse
 - Water Quality Monitoring Stations in EM&A Manual

E	FIFTH ISSUE	GL	02/16
D	FOURTH ISSUE	GL	12/15
C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
Rev	Description	By	Date

Consultant

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated
Infrastructural Works for Development
of Columbarium, Crematorium and
Related Facilities at Sandy Ridge
Cemetery - Design and Construction

Drawing title

COPYRIGHT RESERVED

Appendix E

Calibration Certificate of Monitoring Equipment and Laboratory Certificate

CALIBRATION CERTIFICATES FOR MONITORING EQUIPMENT USED IN THE REPORTING MONTH

Items	Aspect	Description of Equipment	Date of Calibration	Date of Next Calibration
1	Air	TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	4 July 19	18 July 19
1a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	19 July 19	2 Aug 19
2		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	4 July 19	18 July 19
2a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	19 July 19	2 Aug 19
3		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	4 July 19	18 July 19
3a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	19 July 19	2 Aug 19
4		Calibration Kit TISCH Model TE-5025A Orifice ID 1941 and Rootsmeter S/N 438320	5 Feb 19	5 Feb 20
5		Laser Dust Monitor, Model LD-3B (Serial No. 366409) – EQ109	14 Jan 19	13 Jan 20
6		Laser Dust Monitor, Model LD-3B (Serial No. 366410) – EQ110	14 Jan 19	13 Jan 20
7		Laser Dust Monitor, Model LD-3B (Serial No. 3Y6502) – EQ113	15 Mar 19	14 Mar 20
8	Noise	Brüel & Kjær 2238 Sound Level Meter (Serial No. 3012330) – EQ017	12 Jun 19	12 Jun 20
9		Brüel & Kjær 2238 Sound Level Meter (Serial No. 2285690) – EQ008	29 Jun 18	28 Jun 19
10		Brüel & Kjær 4231 Acoustical Calibrator (Serial No. 2713428) – EQ082	12 Jun 19	12 Jun 20
11	Water	YSI 550A (Serial No. 16A104433)	14 Jun 19	14 Sep 19
13		HACH 2100Q Turbidimeter (Serial No. 11030C008499)	14 Jun 19	14 Sep 19
14		AZ 8685 pH Meter (Serial No. 1118396)	5 May 19	6 Aug 19
15		AZ8371 Salinity Meter (Serial No. 1219381)	14 Jun 19	14 Sep 19
16		Global Water FP211 Flow Meter (Serial No. 1449006330)	18 Oct 18	18 Oct 19

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 4-Jul-19

Location ID : ASR-1

Next Calibration Date: 18-Jul-19

Name and Model: TISCH HVS Model TE-5170

Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)

1006.3

Temperature (°C)

29.1

Corrected Pressure (mm Hg)

754.725

Temperature (K)

302

CALIBRATION ORIFICE

Make-> TISCH

Model-> 5025A

Serial # -> 1941

Qstd Slope ->

2.0968

Qstd Intercept ->

-0.00065

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.20	6.20	12.4	1.662	52	51.12	Slope = 35.3559
13	4.70	4.70	9.4	1.448	44	43.25	Intercept = -7.9994
10	3.70	3.70	7.4	1.284	37	36.37	Corr. coeff. = 0.9983
7	2.10	2.20	4.3	0.979	28	27.52	
5	1.40	1.40	2.8	0.790	20	19.66	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

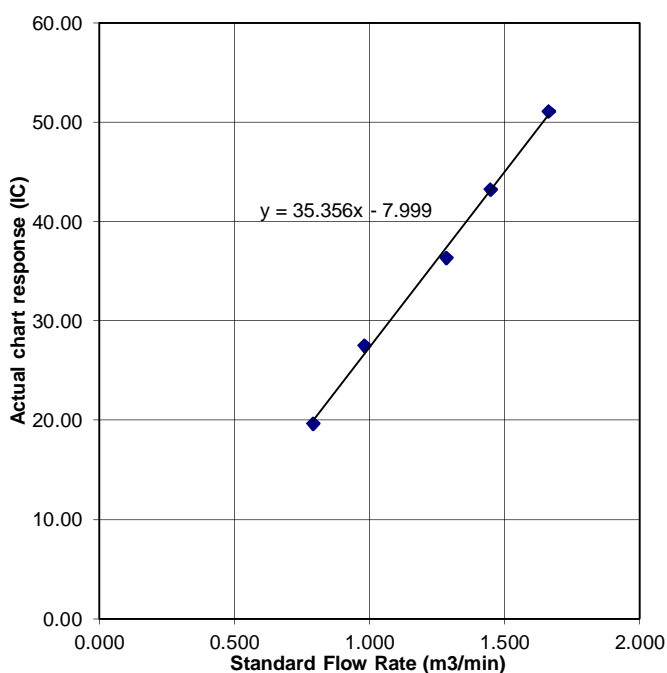
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1
 Location ID : ASR-2
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 4-Jul-19
 Next Calibration Date: 18-Jul-19
 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1006.3	Corrected Pressure (mm Hg)	754.725
Temperature (°C)	29.1	Temperature (K)	302

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.10	6.10	12.2	1.649	52	51.12	Slope = 37.6008 Intercept = -11.6881 Corr. coeff. = 0.9977
13	4.80	4.80	9.6	1.463	43	42.27	
10	3.60	3.60	7.2	1.267	37	36.37	
7	2.30	2.30	4.6	1.013	26	25.56	
5	1.40	1.40	2.8	0.790	19	18.68	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

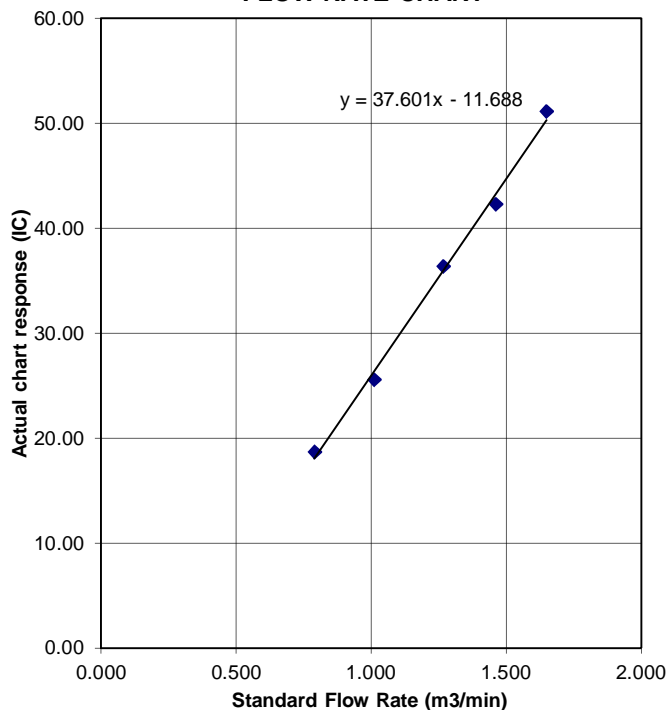
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A
 Location ID : ASR-3a
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 4-Jul-19
 Next Calibration Date: 18-Jul-19
 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1006.3
 29.1

Corrected Pressure (mm Hg)
 Temperature (K)

754.725
 302

CALIBRATION ORIFICE

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

Qstd Slope -> 2.0968
 Qstd Intercept -> -0.00065

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.30	6.30	12.6	1.676	52	51.12	Slope = 39.9502 Intercept = -15.9496 Corr. coeff. = 0.9969
13	5.10	5.10	10.2	1.508	44	43.25	
10	3.70	3.70	7.4	1.284	37	36.37	
7	2.30	2.30	4.6	1.013	26	25.56	
5	1.70	1.70	3.4	0.871	18	17.69	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

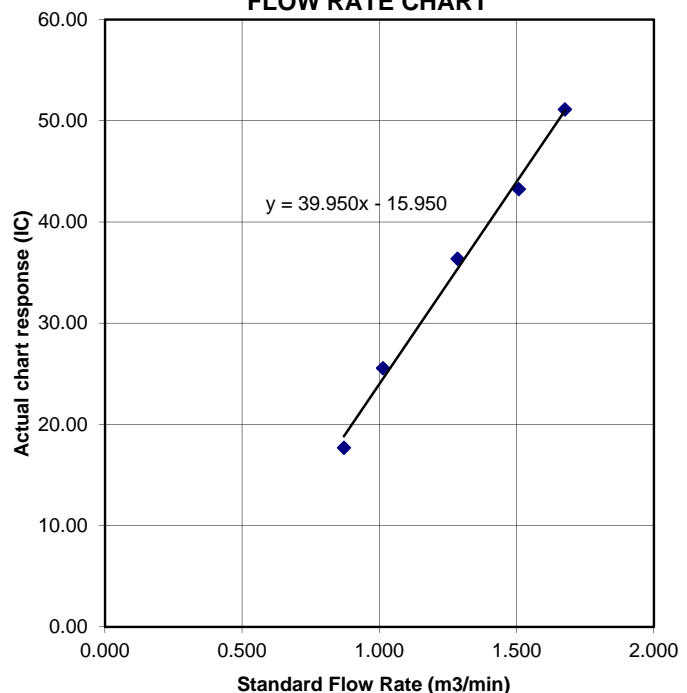
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 19-Jul-19

Location ID : ASR-1

Next Calibration Date: 2-Aug-19

Name and Model: TISCH HVS Model TE-5170

Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)

1001.2

Corrected Pressure (mm Hg)

750.9

Temperature (°C)

29.5

Temperature (K)

303

CALIBRATION ORIFICE

Make-> TISCH

Qstd Slope ->

2.0968

Model-> 5025A

Qstd Intercept ->

-0.00065

Serial # -> 1941

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.30	6.30	12.6	1.670	52	50.92	Slope = 35.7147
13	4.70	4.70	9.4	1.443	44	43.09	Intercept = -8.7922
10	3.75	3.75	7.5	1.289	37	36.23	Corr. coeff. = 0.9971
7	2.10	2.20	4.3	0.976	28	27.42	
5	1.50	1.50	3.0	0.815	20	19.58	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

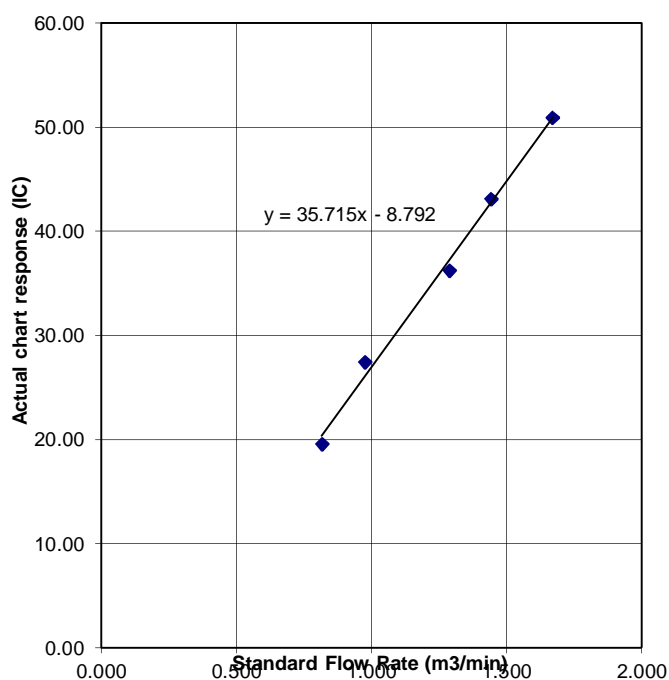
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : San Uk Ling Village House No.1
 Location ID : ASR-2
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 19-Jul-19
 Next Calibration Date: 2-Aug-19
 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1001.2	Corrected Pressure (mm Hg)	750.9
Temperature (°C)	29.5	Temperature (K)	303

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.0968
Model->	5025A	Qstd Intercept ->	-0.00065
Serial # ->	1941		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.20	6.20	12.4	1.657	52	50.92	Slope = 38.1162 Intercept = -12.3216 Corr. coeff. = 0.9994
13	4.80	4.80	9.6	1.458	44	43.09	
10	3.60	3.60	7.2	1.263	37	36.23	
7	2.30	2.30	4.6	1.009	26	25.46	
5	1.45	1.45	2.9	0.802	19	18.60	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

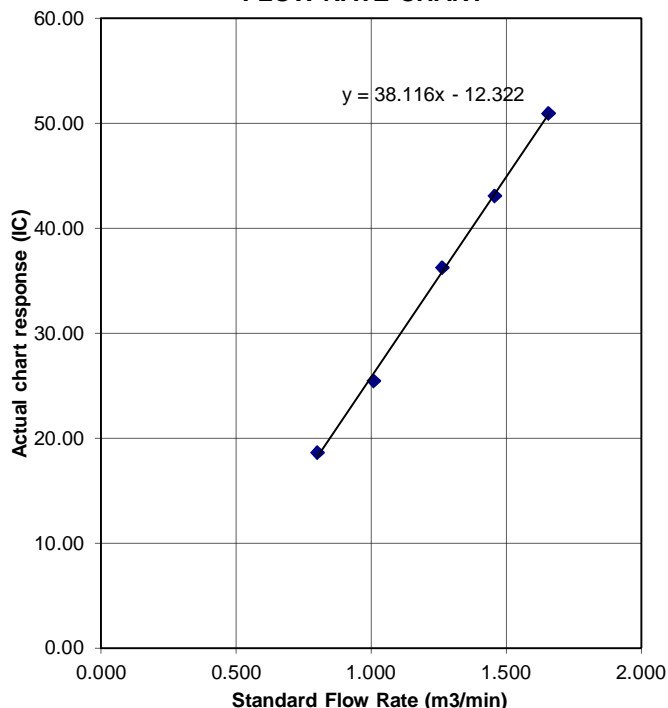
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A
 Location ID : ASR-3a
 Name and Model: TISCH HVS Model TE-5170

Date of Calibration: 19-Jul-19
 Next Calibration Date: 2-Aug-19
 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1001.2
 29.5

Corrected Pressure (mm Hg)
 Temperature (K)

750.9
 303

CALIBRATION ORIFICE

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

Qstd Slope -> 2.0968
 Qstd Intercept -> -0.00065

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.30	6.30	12.6	1.670	53	51.90	Slope = 39.9078 Intercept = -15.4535 Corr. coeff. = 0.9973
13	5.10	5.10	10.2	1.503	44	43.09	
10	3.70	3.70	7.4	1.280	37	36.23	
7	2.40	2.40	4.8	1.031	27	26.44	
5	1.70	1.70	3.4	0.868	19	18.60	

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:

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

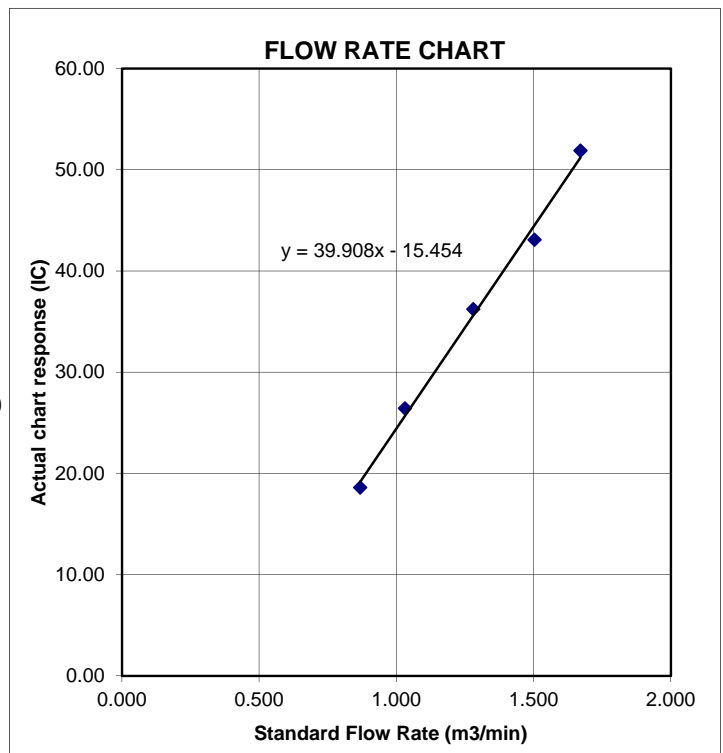
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Certificate of Calibration

Calibration Certification Information

Cal. Date: February 5, 2019 Rootsmeter S/N: 438320 Ta: 293 °K
Operator: Jim Tisch Pa: 753.1 mm Hg
Calibration Model #: TE-5025A Calibrator S/N: 1941

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4830	3.2	2.00
2	3	4	1	1.0430	6.4	4.00
3	5	6	1	0.9300	7.9	5.00
4	7	8	1	0.8870	8.7	5.50
5	9	10	1	0.7320	12.7	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
1.0036	0.6767	1.4197	0.9958	0.6714	0.8821
0.9993	0.9581	2.0078	0.9915	0.9506	1.2475
0.9973	1.0723	2.2448	0.9895	1.0640	1.3947
0.9962	1.1231	2.3544	0.9884	1.1144	1.4628
0.9908	1.3536	2.8395	0.9831	1.3431	1.7642
QSTD	m=	2.09680	QA	m=	1.31298
	b=	-0.00065		b=	-0.00040
	r=	0.99999		r=	0.99999

Calculations

Vstd = $\Delta Vol / ((Pa - \Delta P) / Pstd) (Tstd / Ta)$	Va = $\Delta Vol / ((Pa - \Delta P) / Pa)$
Qstd = $Vstd / \Delta Time$	Qa = $Va / \Delta Time$
For subsequent flow rate calculations:	
Qstd = $1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa = $1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions

Tstd: 298.15 °K
Pstd: 760 mm Hg

Key

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

RECALIBRATION

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1908928
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 25-FEB-2019
		DATE OF ISSUE	: 4-MAR-2019
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

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

Signatories

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

Signatories

Position

Richard Fung

General Manager

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

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

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1908928
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1908928-001	S/N: 366409	AIR	25-Feb-2019	S/N: 366409

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366409
Equipment Ref: EQ109
Job Order HK1908928

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 21 December 2018

Equipment Verification Results:

Testing Date: 7 January 2019

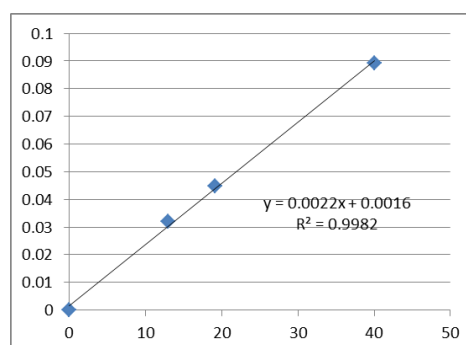
Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	09:01 ~ 11:08	18.5	1021.4	0.045	2419	19.1
2hr11min	11:13 ~ 13:24	18.5	1021.4	0.032	1698	13.0
2hr07min	13:30 ~ 15:37	18.5	1021.4	0.089	5066	40.0

Sensitivity Adjustment Scale Setting (Before Calibration) 517 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 517 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022
Correlation Coefficient 0.9991
Date of Issue 14 January 2019



Remarks:

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

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

Operator : Martin Li Signature :  Date : 14 January 2019

QC Reviewer : Ben Tam Signature :  Date : 14 January 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 21-Dec-18
Location ID :	Calibration Room	Next Calibration Date: 21-Mar-19

CONDITIONS

Sea Level Pressure (hPa)	1016.1	Corrected Pressure (mm Hg)	762.075
Temperature (°C)	22.4	Temperature (K)	295

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.699	56	56.32	Slope = 34.0074 Intercept = -0.4093 Corr. coeff. = 0.9972
13	4.4	4.4	8.8	1.495	51	51.29	
10	3.4	3.4	6.8	1.317	45	45.26	
8	2.3	2.3	4.6	1.086	36	36.21	
5	1.4	1.4	2.8	0.851	28	28.16	

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:

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

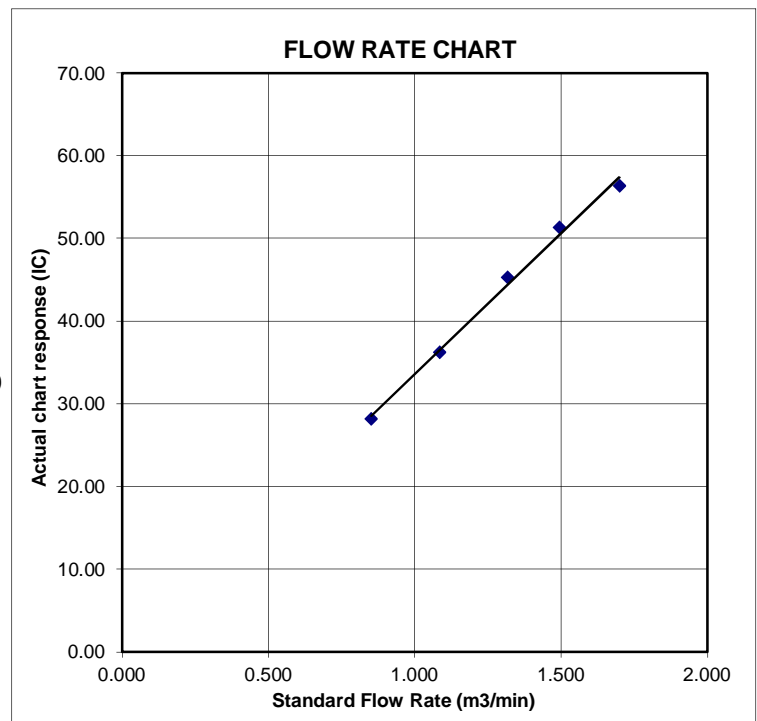
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Certificate of Calibration

Calibration Certification Information

Cal. Date: February 13, 2018

Rootsmeter S/N: 438320

Ta: 293

°K

Operator: Jim Tisch

Pa: 763.3

mm Hg

Calibration Model #: TE-5025A

Calibrator S/N: 1612

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

Data Tabulation

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

Calculations

$$Vstd = \Delta Vol / ((Pa - \Delta P) / Pstd) (Tstd / Ta)$$

$$Va = \Delta Vol / ((Pa - \Delta P) / Pa)$$

$$Qstd = Vstd / \Delta Time$$

$$Qa = Va / \Delta Time$$

For subsequent flow rate calculations:

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

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

Standard Conditions

Tstd: 298.15 °K

Pstd: 760 mm Hg

Key

ΔH: calibrator manometer reading (in H2O)

ΔP: rootsmeter manometer reading (mm Hg)

Ta: actual absolute temperature (°K)

Pa: actual barometric pressure (mm Hg)

b: intercept

m: slope

RECALIBRATION

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1908929
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 25-FEB-2019
		DATE OF ISSUE	: 4-MAR-2019
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

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

Signatories

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

Signatories

Position

Richard Fung

General Manager

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

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

ALS Technichem (HK) Pty Ltd
Part of the **ALS Laboratory Group**

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1908929
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1908929-001	S/N: 366410	AIR	25-Feb-2019	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366410
Equipment Ref: EQ110
Job Order HK1908929

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 21 December 2018

Equipment Verification Results:

Testing Date: 7 January 2019

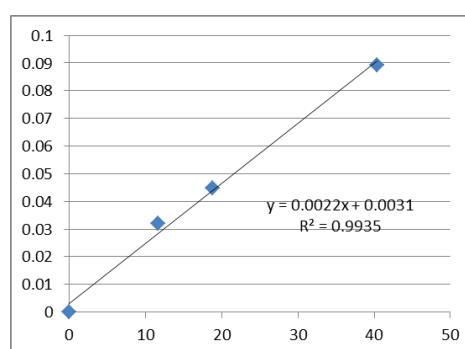
Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr07min	09:01 ~ 11:08	18.5	1021.4	0.045	2377	18.8
2hr11min	11:13 ~ 13:24	18.5	1021.4	0.032	1522	11.6
2hr07min	13:30 ~ 15:37	18.5	1021.4	0.089	5117	40.4

Sensitivity Adjustment Scale Setting (Before Calibration) 674 (CPM)

Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022
Correlation Coefficient 0.9967
Date of Issue 14 January 2019



Remarks:

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

Operator : Martin Li Signature :  Date : 14 January 2019

QC Reviewer : Ben Tam Signature :  Date : 14 January 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 21-Dec-18
Location ID :	Calibration Room	Next Calibration Date: 21-Mar-19

CONDITIONS

Sea Level Pressure (hPa)	1016.1	Corrected Pressure (mm Hg)	762.075
Temperature (°C)	22.4	Temperature (K)	295

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.7	5.7	11.4	1.699	56	56.32	Slope = 34.0074 Intercept = -0.4093 Corr. coeff. = 0.9972
13	4.4	4.4	8.8	1.495	51	51.29	
10	3.4	3.4	6.8	1.317	45	45.26	
8	2.3	2.3	4.6	1.086	36	36.21	
5	1.4	1.4	2.8	0.851	28	28.16	

Calculations :

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

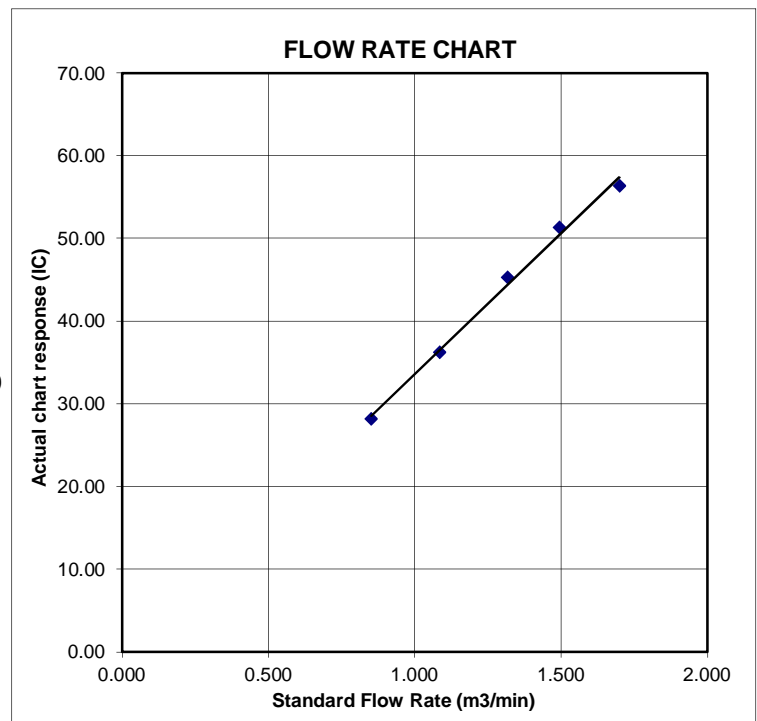
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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



Certificate of Calibration

Calibration Certification Information

Cal. Date: February 13, 2018

Rootsmeter S/N: 438320

Ta: 293

°K

Operator: Jim Tisch

Pa: 763.3

mm Hg

Calibration Model #: TE-5025A

Calibrator S/N: 1612

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

Data Tabulation

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

Calculations

Vstd =	$\Delta Vol / ((Pa - \Delta P) / Pstd) (Tstd / Ta)$	Va =	$\Delta Vol / ((Pa - \Delta P) / Pa)$
Qstd =	$Vstd / \Delta Time$	Qa =	$Va / \Delta Time$
For subsequent flow rate calculations:			
Qstd =	$1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$	Qa =	$1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$

Standard Conditions

Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH: calibrator manometer reading (in H2O)	
ΔP: rootsmeter manometer reading (mm Hg)	
Ta: actual absolute temperature (°K)	
Pa: actual barometric pressure (mm Hg)	
b: intercept	
m: slope	

RECALIBRATION

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK1912134
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 20-MAR-2019
		DATE OF ISSUE	: 22-MAR-2019
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

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

Signatories

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

Signatories

Position

Richard Fung

General Manager

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

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

ALS Technichem (HK) Pty Ltd
Part of the ALS Laboratory Group

11/F. Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK1912134
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1912134-001	S/N: 3Y6502	AIR	20-Mar-2019	3Y6502

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 3Y6502
Equipment Ref: EQ113
Job Order HK1912134

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 12 February 2019

Equipment Verification Results:

Calibration Date: 11 March 2019

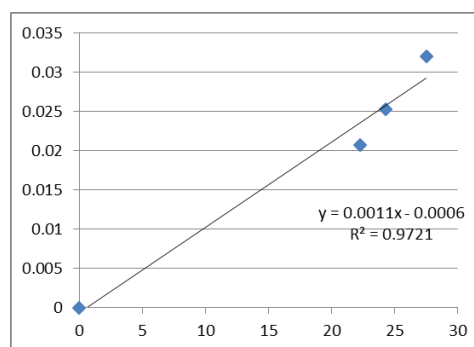
Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr00min	09:21 ~ 11:21	18.4	1014.9	0.021	2670	22.3
2hr00min	11:30 ~ 13:30	18.4	1014.9	0.025	2917	24.3
2hr00min	13:40 ~ 15:40	18.4	1014.9	0.032	3301	27.5

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

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

Linear Regression of Y or X

Slope (K-factor): 0.0011
Correlation Coefficient (R) 0.9860
Date of Issue 15 March 2019



Remarks:

1. **Strong** Correlation ($R > 0.8$)
 2. Factor 0.0011 should be apply for TSP monitoring
- *If $R < 0.5$, repair or re-verification is required for the equipment

Operator : Fai So Signature :  Date : 15 March 2019

QC Reviewer : Ben Tam Signature :  Date : 15 March 2019

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 12-Feb-19
Location ID :	Calibration Room	Next Calibration Date: 12-May-19

CONDITIONS

Sea Level Pressure (hPa)	1024.2	Corrected Pressure (mm Hg)	768.15
Temperature (°C)	19.0	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.02017
Model->	5025A	Qstd Intercept ->	-0.03691
Calibration Date->	13-Feb-18	Expiry Date->	13-Feb-19

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	4	7.7	11.7	1.738	60	60.94	Slope = 35.5369 Intercept = -1.8924 Corr. coeff. = 0.9951
13	2.8	6.9	9.7	1.584	52	52.81	
10	1.9	5.4	7.3	1.377	46	46.72	
8	0.6	4	4.6	1.097	38	38.59	
5	-0.4	3.1	2.7	0.844	27	27.42	

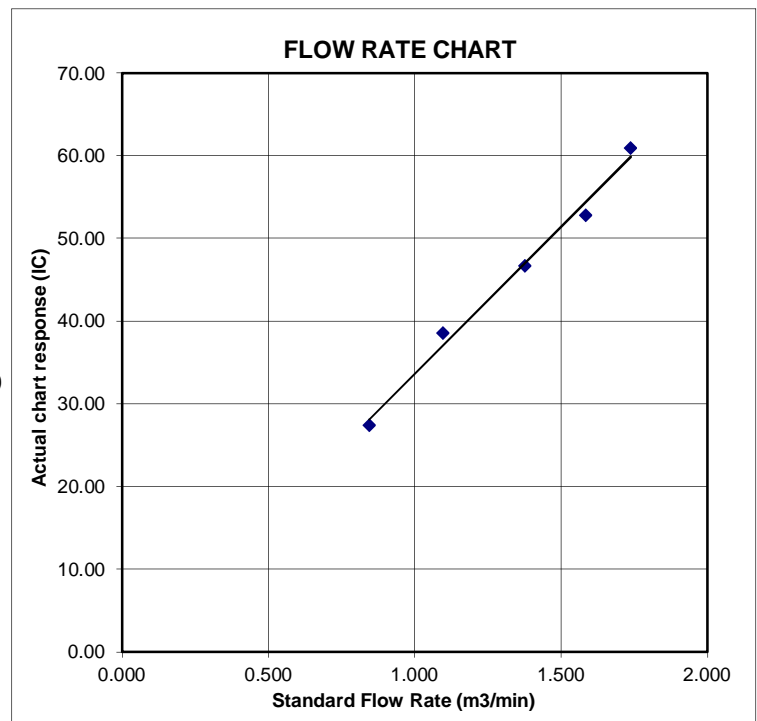
Calculations :

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

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



Certificate of Calibration

Calibration Certification Information

Cal. Date: February 13, 2018

Rootsmeter S/N: 438320

Ta: 293

°K

Operator: Jim Tisch

Pa: 763.3

mm Hg

Calibration Model #: TE-5025A

Calibrator S/N: 1612

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

Data Tabulation

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

Calculations

Vstd =	$\Delta Vol / ((Pa - \Delta P) / Pstd) (Tstd / Ta)$	Va =	$\Delta Vol / ((Pa - \Delta P) / Pa)$
Qstd =	$Vstd / \Delta Time$	Qa =	$Va / \Delta Time$
For subsequent flow rate calculations:			
Qstd = $1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$		Qa = $1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$	

Standard Conditions

Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH: calibrator manometer reading (in H2O)	
ΔP: rootsmeter manometer reading (mm Hg)	
Ta: actual absolute temperature (°K)	
Pa: actual barometric pressure (mm Hg)	
b: intercept	
m: slope	

RECALIBRATION

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

Certificate of Calibration

校正證書

Certificate No. : C192957

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098)

Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound Level Meter (EQ017)

Manufacturer / 製造商 : Brüel & Kjær

Model No. / 型號 : 2250

Serial No. / 編號 : 3012330

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 : $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.

The results do not exceed manufacturer's specification.

The results are detailed in the subsequent page(s).

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By
測試

H T Wong
Technical Officer

Certified By
核證

K C Lee
Engineer

Date of Issue : 12 June 2019
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。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C192957

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 6.1.1.2 to 6.3.2.
- 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	C190176
CL281	Multifunction Acoustic Calibrator	CDK1806821

- Test procedure : MA101N.

- Results :

- Sound Pressure Level

- Reference Sound Pressure Level

- Before Self-calibration

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.1

- After Self-calibration

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)	Spec. (dB)
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

- Linearity

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C192957

證書編號

6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq. (kHz)		
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.8	-16.1 ± 1.5
			250 Hz	85.3	-8.6 ± 1.4
			500 Hz	90.7	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	$+1.2 \pm 1.6$
			4 kHz	95.0	$+1.0 \pm 1.6$
			8 kHz	92.9	$-1.1(+2.1 ; -3.1)$
			12.5 kHz	89.3	$-4.3(+3.0 ; -6.0)$

6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Main	Level (dB)	Freq.		
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.8	-0.2 ± 1.5
			250 Hz	94.0	0.0 ± 1.4
			500 Hz	94.0	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.8	-0.2 ± 1.6
			4 kHz	93.2	-0.8 ± 1.6
			8 kHz	91.0	$-3.0(+2.1 ; -3.1)$
			12.5 kHz	87.4	$-6.2(+3.0 ; -6.0)$

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 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四樓

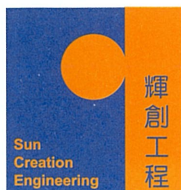
Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Page 3 of 4



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C192957

證書編號

Remarks : - UUT Microphone Model No. : 4189 & S/N : 3130396

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value : 94 dB

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

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

Note :

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

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 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四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C183441

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867)

Date of Receipt / 收件日期 : 13 June 2018

Description / 儀器名稱 : Integrating Sound Level Meter (EQ008)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285690
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 : $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 23 June 2018

TEST RESULTS / 測試結果

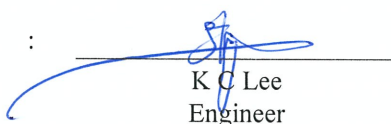
The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

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

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

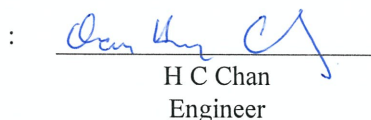
Tested By

測試


K C Lee
Engineer

Certified By

核證


H C Chan
Engineer

Date of Issue

簽發日期

29 June 2018

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. : C183441

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	C180024
CL281	Multifunction Acoustic Calibrator	PA160023

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

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

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading	IEC 60651 Type 1 Spec.
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
50 - 130	L _{AFP}	A	F	94.00	1	94.1	± 0.7

6.1.2 Linearity

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C183441

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			94.2	± 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	54.8	-39.4 ± 1.5
					63 Hz	68.0	-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	93.0	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.9	-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。

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 — 校正及檢測實驗室

c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C183441

證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT	IEC 60651
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Type 1 Spec. (dB)
50 - 130	L _{CFF}	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	91.1	-3.0 (+1.5 ; -3.0)
					12.5 kHz	88.0	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT	IEC 60804
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)	Reading (dB)	Type 1 Spec. (dB)
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
			1/10 ²			90		89.7	± 0.5	
			1/10 ³			80		79.7	± 1.0	
			1/10 ⁴			70		69.7	± 1.0	

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

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

- Uncertainties of Applied Value :

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

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

Note :

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

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 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四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Page 4 of 4

Certificate of Calibration

校正證書

Certificate No. : C183082
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC18-0867)

Date of Receipt / 收件日期 : 28 May 2018

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

TEST CONDITIONS / 測試條件

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

Relative Humidity / 相對濕度 : $(50 \pm 25)\%$

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 9 June 2018

TEST RESULTS / 測試結果

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

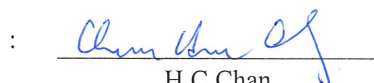
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試


K C Lee
Engineer

Certified By
核證


H C Chan
Engineer

Date of Issue
簽發日期

11 June 2018

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. : C183082

證書編號

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

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

- 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 :

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

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 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四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C192956

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC19-1098)

Date of Receipt / 收件日期 : 30 May 2019

Description / 儀器名稱 : Sound 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 : $(50 \pm 25)\%$

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 June 2019

TEST RESULTS / 測試結果

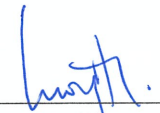
The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

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

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA


Tested By
測試

:


H T Wong
Technical Officer

Certified By
核證

:


K C Lee
Engineer

Date of Issue
簽發日期

:

12 June 2019

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

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

Certificate of Calibration

校正證書

Certificate No. : C192956
證書編號

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

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C183775
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C181288

- Test procedure : MA100N.

- Results :

5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

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

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

Note :

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

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

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

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 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四樓

Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1924786
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11-Jun-2019
DATE OF ISSUE: 17-Jun-2019

COMMENTS

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

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

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

Scope of Test: Dissolved Oxygen and Temperature
Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: --
Date of Calibration: 14-Jun-2019

NOTES

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

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1924786
SUB-BATCH: 0
DATE OF ISSUE: 17-Jun-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Dissolved Oxygen Meter
Brand Name: YSI
Model No.: 550A
Serial No.: 16A104433
Equipment No.: --
Date of Calibration: 14-Jun-2019

Date of Next Calibration: 14-Sep-2019

PARAMETERS:

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.46	2.50	+0.04
5.46	5.40	-0.06
7.56	7.49	-0.07
Tolerance Limit (mg/L)		±0.20

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
11.5	11.8	+0.3
23.0	23.2	+0.2
40.0	39.9	-0.1
Tolerance Limit (°C)		±2.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1924750
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11-Jun-2019
DATE OF ISSUE: 17-Jun-2019

COMMENTS

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

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

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

Scope of Test: Turbidity
Equipment Type: Turbidimeter
Brand Name: Hach
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 14-Jun-2019

NOTES

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

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1924750
SUB-BATCH: 0
DATE OF ISSUE: 17-Jun-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Turbidimeter
Brand Name: Hach
Model No.: 2100Q
Serial No.: 11030C008499
Equipment No.: --
Date of Calibration: 14-Jun-2019

Date of Next Calibration: 14-Sep-2019

PARAMETERS:

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.27	--
4	3.77	-5.8
40	36.2	-9.5
80	74.0	-7.5
400	361	-9.8
800	722	-9.8
	Tolerance Limit (%)	±10.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1918009
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 30-Apr-2019
DATE OF ISSUE: 08-May-2019

COMMENTS

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

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

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

Scope of Test: pH Value and Temperature
Equipment Type: pH meter
Brand Name: AZ
Model No.: 8685
Serial No.: 1118396
Equipment No.: --
Date of Calibration: 06-May-2019

NOTES

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

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

Ms. Lin Wai Yu
Assistant Manager - Inorganic

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1918009
 SUB-BATCH: 0
 DATE OF ISSUE: 08-May-2019
 CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: pH meter
 Brand Name: AZ
 Model No.: 8685
 Serial No.: 1118396
 Equipment No.: --
 Date of Calibration: 06-May-2019 Date of Next Calibration: 06-Aug-2019

PARAMETERS:

pH Value

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

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.2	+0.20
7.0	6.8	-0.20
10.0	10.0	+0.00
	Tolerance Limit (pH unit)	±0.20

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.5	10.1	+0.6
19.0	19.8	+0.8
38.5	39.2	+0.7
	Tolerance Limit (°C)	±2.0

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

Ms. Lin Wai Yu
 Assistant Manager - Inorganic



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK1924766
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 11-Jun-2019
DATE OF ISSUE: 17-Jun-2019

COMMENTS

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

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

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

Scope of Test: Salinity
Equipment Type: Salinity Meter
Brand Name: AZ
Model No.: 8371
Serial No.: 1219381
Equipment No.: --
Date of Calibration: 14-Jun-2019

NOTES

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

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK1924766
SUB-BATCH: 0
DATE OF ISSUE: 17-Jun-2019
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Salinity Meter
Brand Name: AZ
Model No.: 8371
Serial No.: 1219381
Equipment No.: --
Date of Calibration: 14-Jun-2019

Date of Next Calibration: 14-Sep-2019

PARAMETERS:

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	9.26	-7.4
20	18.4	-8.0
30	29.1	-3.0
	Tolerance Limit (%)	±10.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganic



ALS Technichem (HK) Pty Ltd
11/F, Chung Shun Knitting Centre
1-3 Wing Yip Street, Kwai Chung
N.T., Hong Kong
T: +852 2610 1044 | F: +852 2610 2021

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR IVAN LEUNG
CLIENT: ALS TECHNICHEM (HK) PTY LTD
ADDRESS: 11/F, CHUNG SHUN KNITTING CENTRE,
1-3 WING YIP STREET,
KWAI CHUNG,
N.T., HONG KONG

WORK ORDER: HK1858535
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 08-Nov-2018
DATE OF ISSUE: 09-Nov-2018

COMMENTS

The calibration of flow rate performed by AUES staff on 18 October 2018.

Scope of Test: Flow rate
Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 1449006330
Equipment No.: --
Calibration Factor: 314
Date of Calibration: 18 October, 2018

NOTES

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

17p

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

This report may not be reproduced except with prior written approval from ALS Technichem (HK) Pty Ltd.

Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK / CALIBRATION



Work Order: HK1858535
Sub-batch: 0
Date of Issue: 09-Nov-2018
Client: ALS TECHNICHEM (HK) PTY LTD

Reference Equipment:

Model: SonTek IQ Standard
Serial Number : IQ1217004

Equipment to be calibrated:

Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 1449006330
Equipment No.: --
Calibration Factor: 314

Date of Calibration: 18 October, 2018

Parameters: The calibration of flow meter is verified with standard flow meter on site by AUES Staff.

Flow rate

Trial	Reading of Reference Equipment (m/s) SonTek IQ Standard Serial No: IQ1217004	Reading of Equipment to be calibrated (m/s) Global Water FP211 Serial No. 1449006330
1	0.09	0.1
2	0.17	0.2
3	0.19	0.2
4	0.38	0.4
5	0.46	0.5
6	0.72	0.7

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

Event and Action Plan of Air Quality, Noise and Water Quality

Event and Action Plan for air quality

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

Note: ET – Environmental Team IEC – Independent Environmental Checker ER – Engineer's Representative

Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level Exceedance	<ol style="list-style-type: none"> 1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analyzed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals
Limit Level Exceedance	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 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 Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

Event and Action Plan for Water Quality

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

Note: ET – Environmental Team IEC – Independent Environmental Checker ER – Engineer's Representative
Each step of actions required shall be implemented within 1 working day unless otherwise specified or agreed with EPD.

Appendix G

Monitoring Schedules of the Reporting Month and Coming Month

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – July 2019

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

✓	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – August 2019

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

✓	Monitoring Day
	Sunday or Public Holiday

Appendix H

Monitoring Data

- **24-hour TSP Air Quality**
- **Noise**
- **Water Quality**

Air Quality (24-hour TSP)

24-Hour TSP Monitoring Data for ASR-1

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
3-Jul-19	24389	21152.25	21176.25	1440.00	20	20	20.0	26.6	1004	0.79	1141	2.6172	2.6320	0.0148	13
9-Jul-19	24497	21176.25	21200.25	1440.00	21	22	21.5	28.9	1005.7	0.85	1217	2.6896	2.7259	0.0363	30
15-Jul-19	24474	21200.25	21224.25	1440.00	20	21	20.5	30.4	1004.8	0.82	1175	2.6950	2.7497	0.0547	47
20-Jul-19	24448	21224.25	21248.24	1439.40	21	22	21.5	28.8	1006	0.84	1212	2.6766	2.7264	0.0498	41
26-Jul-19	24429	21248.24	21272.24	1440.00	21	22	21.5	30.7	1006.9	0.84	1210	2.6973	2.7335	0.0362	30

24-Hour TSP Monitoring Data for ASR-2

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
3-Jul-19	24491	18555.81	18579.81	1440.00	31	32	31.5	26.6	1004	1.14	1646	2.6775	2.7440	0.0665	40
9-Jul-19	24499	18579.81	18603.81	1440.00	31	31	31.0	30	1003.4	1.12	1612	2.7000	2.7817	0.0817	51
15-Jul-19	24472	18603.81	18627.81	1440.00	30	31	30.5	30.4	1004.8	1.11	1593	2.6769	2.7931	0.1162	73
20-Jul-19	24181	18627.81	18651.81	1440.00	30	31	30.5	28.8	1006	1.12	1606	2.7022	2.7687	0.0665	41
26-Jul-19	24430	18651.81	18675.81	1440.00	30	31	30.5	30.7	1006.9	1.11	1603	2.6989	2.7652	0.0663	41

24-Hour TSP Monitoring Data for ASR-3a

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
3-Jul-19	24390	12361.56	12385.85	1457.40	29	30	29.5	26.6	1004	1.14	1666	2.6105	2.6331	0.0226	14
9-Jul-19	24496	12385.85	12410.20	1461.00	29	30	29.5	28.9	1005.7	1.11	1618	2.7047	2.7571	0.0524	32
15-Jul-19	24473	12410.20	12434.52	1459.20	29	30	29.5	30.4	1004.8	1.11	1613	2.6827	2.7308	0.0481	30
20-Jul-19	24447	12434.52	12458.81	1457.40	30	31	30.5	28.8	1006	1.14	1667	2.6827	2.7308	0.0481	29
26-Jul-19	24431	12458.81	12483.02	1452.60	31	31	31.0	30.7	1006.9	1.15	1677	2.7083	2.7557	0.0474	28

Noise

Noise Measurement Results (dB(A)) of CN-1																					
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	Leq _{30min}	Façade Collection (*)
2-Jul-19	9:21	63.7	65.9	55.6	61.1	64.9	55.3	64.0	66.4	55.2	66.0	67.5	55.6	61.2	64.5	55.9	62.4	65.2	55.3	63	66
8-Jul-19	9:37	64.8	67.3	57.6	63.2	65.0	57.6	64.3	64.2	58.8	65.5	66.7	57.9	63.5	64.5	58.9	62.7	63.1	57.4	64	67
19-Jul-19	9:36	61.8	61.8	57.6	65.2	60.9	57.9	62.5	63.7	59.2	62.1	62.8	58.5	60.0	62.6	58.2	66.0	65.4	57.2	63	66
25-Jul-19	14:34	62.4	62.2	56.6	59.2	60.5	56.1	62.2	65.3	57.1	62.9	64.4	56.6	60.3	63.8	56.9	59.3	62.0	55.1	61	64
31-Jul-19	9:05	59.8	61.5	57.1	60.8	62.5	58.5	60.6	62.0	58.5	60.5	61.5	58.5	60.4	62.0	56.0	60.6	62.0	59.0	60	63

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-2																					
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	Leq _{30min}	Façade Collection (*)
2-Jul-19	9:57	64.3	67.3	55.7	65.3	68.1	56.9	65.2	69.2	56.8	63.7	68.6	58.9	64.5	68.8	59.5	65.5	67.9	57.4	65	68
8-Jul-19	10:14	67.9	70.6	62.5	65.5	68.6	57.9	63.1	68.6	55.5	64.7	69.8	58.5	65.2	69.5	59.4	64.2	68.3	56.1	65	68
19-Jul-19	10:12	63.5	67.2	50.2	64.6	67.6	55.5	66.2	69.5	55.6	64.5	67.4	49.3	62.5	66.5	50.6	63.6	67.5	51.6	64	67
25-Jul-19	15:10	62.4	66.0	48.2	61.8	66.1	46.2	60.8	65.3	46.1	62.8	67.4	46.8	61.8	66.6	46.1	62.7	67.6	47.8	62	65
31-Jul-19	9:45	58.1	60.5	54.5	57.0	58.0	55.0	58.4	59.5	56.5	58.2	59.5	56.5	58.1	59.5	56.5	57.1	59.5	53.5	58	61

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-3																					
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	Leq _{30min}	Façade Collection (*)
2-Jul-19	10:37	56.9	58.9	49.6	55.5	57.9	49.2	54.3	58.9	49.5	56.5	59.4	50.6	57.4	60.6	51.3	55.8	58.5	51.3	56	59
8-Jul-19	10:54	57.2	59.2	51.1	57.0	60.9	51.6	58.2	61.5	52.1	56.6	59.6	51.9	57.6	61.5	51.7	59.3	61.6	51.4	58	61
19-Jul-19	10:52	52.6	56.0	47.1	52.9	54.3	48.3	55.0	56.9	48.2	56.2	60.1	48.2	55.8	57.6	48.7	56.2	58.9	48.8	55	58
25-Jul-19	15:41	55.7	59.3	50.1	52.0	54.7	48.5	54.2	55.9	49.8	54.8	57.0	49.4	53.2	56.7	49.3	52.7	55.1	48.9	54	57
31-Jul-19	10:26	53.4	55.0	51.5	54.2	55.0	53.0	54.0	54.5	53.0	53.3	54.5	52.0	54.1	55.5	52.0	54.1	55.0	53.0	54	57

(*) A façade correction of +3dB(A) has been added according to acoustical principles and EPD guidelines.

Noise Measurement Results (dB(A)) of CN-4																					
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	Leq _{30min}	
2-Jul-19	11:13	59.7	63.1	45.1	60.6	62.7	43.8	57.4	62.2	44.1	59.2	62.3	43.0	59.5	62.6	43.9	60.6	62.6	43.9	60	
8-Jul-19	11:30	58.4	62.9	44.2	58.3	62.1	44.3	59.1	63.8	45.5	59.5	62.9	44.8	58.2	63.5	45.2	62.8	63.6	45.0	60	
19-Jul-19	11:28	58.4	61.3	43.5	58.0	60.6	43.3	58.7	62.8	43.4	56.0	57.7	42.6	57.8	58.3	43.9	58.1	59.1	43.4	58	
25-Jul-19	16:17	56.5	61.0	43.7	56.2	58.2	42.9	57.6	62.0	42.8	57.7	62.3	42.9	60.7	63.3	42.2	58.1	62.3	43.5	58	
31-Jul-19	11:02	56.0	58.0	52.5	56.4	57.5	54.0	58.1	60.5	53.0	58.3	60.0	56.5	58.0	59.0	56.0	57.5	59.5	54.5	57	

Water Quality

Water Quality Impact Monitoring Result for M1

Date	2-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:40	0.13	30	30.0	<0.1	<0.1	6.84	6.85	91.7	91.8	3.56	3.6	6.40	6.4	0.04	0.04	4	4.0
			30		<0.1		6.86		91.9		3.55		6.40		0.04		4	

Date	4-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:00	0.13	28.5	28.5	<0.1	<0.1	7.55	7.56	99.4	99.5	3.45	3.6	6.50	6.5	0.03	0.03	8	7.5
			28.5		<0.1		7.56		99.5		3.71		6.50		0.03		7	

Date	6-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	11:25	0.13	27.5	27.5	<0.1	<0.1	8.69	8.70	112.1	112.2	3.42	3.2	6.60	6.6	0.03	0.03	4	4.0
			27.5		<0.1		8.7		112.2		2.94		6.60		0.03		4	

Date	8-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	11:05	0.13	27.6	27.6	<0.1	<0.1	7.1	7.12	91.0	91.2	4.84	4.6	6.80	6.8	0.03	0.03	5	5.5
			27.6		<0.1		7.14		91.4		4.29		6.80		0.03		6	

Date	10-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:35	0.13	26.2	26.2	<0.1	<0.1	8.61	8.63	109.5	109.6	3.46	3.2	6.50	6.5	0.03	0.03	6	6.5
			26.2		<0.1		8.64		109.7		2.99		6.50		0.03		7	

Date	12-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	11:40	0.13	29	29.0	<0.1	<0.1	6.03	6.03	78.2	78.2	2.86	2.9	6.77	6.8	0.04	0.04	2	2.5
			28.9		<0.1		6.02		78.1		2.84		6.76		0.04		3	

Date	15-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:45	0.14	28.1	28.1	<0.1	<0.1	8.11	8.14	103.9	104.2	3.78	3.5	6.10	6.1	0.03	0.03	5	5.5
			28.1		<0.1		8.17		104.4		3.28		6.10		0.03		6	

Date	17-Jul-19									
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)

M1	9:45	0.13	28.3	28.3	<0.1	<0.1	6.92	6.92	95.8	95.8	6.13	6.1	6.30	6.3	0.03	0.03	8	8.0
			28.3		<0.1		6.91		95.8		6.16		6.30		0.03		8	

Date	19-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:50	0.13	29.2	29.2	<0.1	<0.1	6.49	6.50	90.7	90.8	2.64	2.8	6.60	6.6	0.03	0.03	5	5.0
			29.2		<0.1		6.5		90.9		2.95		6.60		0.03		5	

Date	22-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:10	0.13	27.2	27.2	<0.1	<0.1	3.88	3.96	52.6	53.8	2.48	2.3	6.00	6.0	0.03	0.03	5	5.0
			27.2		<0.1		4.04		55.0		2.04		6.00		0.03		5	

Date	24-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:15	0.13	27.9	27.9	<0.1	<0.1	6.2	6.21	84.7	84.8	1.89	1.9	6.00	6.0	0.03	0.03	3	3.0
			27.9		<0.1		6.21		84.8		1.95		6.00		0.03		3	

Date	26-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:45	0.13	31.6	31.6	<0.1	<0.1	6.32	6.33	85.8	86.1	2.2	1.8	6.20	6.2	0.03	0.03	2	2.0
			31.6		<0.1		6.34		86.3		1.46		6.20		0.03		2	

Date	29-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:55	0.13	27.5	27.5	<0.1	<0.1	6.59	6.60	90.1	90.2	2.41	2.3	6.50	6.5	0.03	0.03	2	2.0
			27.5		<0.1		6.6		90.3		2.15		6.50		0.03		2	

Date	31-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	11:10	0.14	30.5	30.5	<0.1	<0.1	6.24	6.31	84.8	85.6	3.42	3.3	7.00	7.0	0.04	0.04	2	2.0
			30.5		<0.1		6.37		86.3		3.13		7.00		0.04		<2	

Water Quality Impact Monitoring Result for M2

Date	2-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	14:05	0.12	31.2	31.2	<0.1	<0.1	6.18	6.13	83.2	82.6	28.8	28.6	6.40	6.4	0.05	0.05	23	22.5
			31.2		<0.1		6.08		81.9		28.4		6.40		0.05		22	

Date	4-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	13:30	0.12	29.5	29.5	<0.1	<0.1	6.63	6.61	87.0	86.7	32	30.0	6.20	6.2	0.04	0.04	29	28.5
			29.5		<0.1		6.59		86.3		28		6.20		0.04		28	

Date	6-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	11:50	0.12	29.2	29.2	<0.1	<0.1	8.05	8.11	104.8	105.3	23.7	23.6	6.40	6.4	0.03	0.03	22	21.5
			29.2		<0.1		8.17		105.8		23.5		6.40		0.03		21	

Date	8-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:25	0.12	29.3	29.3	<0.1	<0.1	5.12	5.23	66.8	67.6	31.8	31.9	6.80	6.8	0.09	0.09	12	12.5
			29.3		<0.1		5.34		68.3		31.9		6.80		0.09		13	

Date	10-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:10	0.12	27.5	27.5	<0.1	<0.1	7.18	7.19	92.9	93.0	19.9	21.2	6.40	6.4	0.04	0.04	25	25.5
			27.5		<0.1		7.2		93.0		22.5		6.40		0.04		26	

Date	12-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	11:30	0.10	33.9	33.9	<0.1	<0.1	5.6	5.60	79.1	79.0	11.03	11.0	7.08	7.1	0.12	0.12	2	2.0
			33.9		<0.1		5.59		78.9		11.02		7.08		0.12		2	

Date	15-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.12	30.1	30.1	<0.1	<0.1	7.19	7.28	94.3	95.2	25.4	24.8	6.10	6.1	0.05	0.05	22	21.5
			30.1		<0.1		7.37		96.1		24.1		6.10		0.05		21	

Date	17-Jul-19														
------	-----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.10	30.3	30.3	<0.1	<0.1	6.16	6.17	85.5	85.6	11.4	12.5	6.20	6.2	0.05	0.05	14	14.5
			30.3		<0.1		6.17		85.6		13.5		6.20		0.05		15	

Date	19-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:40	0.10	31.3	31.3	<0.1	<0.1	5.47	5.48	73.9	74.2	35.7	35.5	6.50	6.5	0.08	0.08	11	10.5
			31.3		<0.1		5.49		74.4		35.3		6.50		0.08		10	

Date	22-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:35	0.12	28.1	28.1	<0.1	<0.1	4.99	5.01	68.1	68.5	16.2	16.7	6.20	6.2	0.08	0.08	25	25.0
			28.1		<0.1		5.03		68.8		17.2		6.20		0.08		25	

Date	24-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:45	0.11	28.6	28.6	<0.1	<0.1	4.99	5.01	67.8	67.9	15.1	16.2	6.20	6.2	0.07	0.07	15	17.0
			28.6		<0.1		5.02		67.9		17.2		6.20		0.07		19	

Date	31-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.15	31.6	31.6	<0.1	#DIV/0!	4.93	5.02	63.1	66.6	4.44	3.9	6.70	6.7	0.16	0.16	8	7.0
			31.6		<0.1		5.1		70.0		3.28		6.70		0.16		6	

Water Quality Impact Monitoring Result for M3

Date	2-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	14:10	2.50	30.2	30.2	0.1	0.1	6.27	6.25	84.4	84.0	2.51	2.6	6.30	6.3	0.0	0.01	7	7.5
			30.2		0.1		6.22		83.6		2.67		6.30		0.0		8	

Date	4-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	13:35	2.50	29.1	29.1	0.1	0.1	5.66	5.65	74.6	74.5	5.48	5.2	6.10	6.1	0.0	0.00	7	7.0
			29.1		0.1		5.64		74.4		4.86		6.10		0.0		7	

Date	6-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	11:55	2.50	30.2	30.2	0.1	0.1	6.26	6.27	82.4	82.5	5.36	5.2	6.30	6.3	0.0	0.00	3	3.5
			30.2		0.1		6.27		82.6		4.96		6.30		0.0		4	

Date	8-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.50	30.4	30.4	0.1	0.1	5.16	5.14	68.4	68.3	4.77	4.7	6.50	6.5	0.0	0.00	4	4.0
			30.4		0.1		5.12		68.1		4.72		6.50		0.0		4	

Date	10-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:15	2.50	26.8	26.8	0.1	0.1	7.56	7.60	97.8	98.2	5.43	5.3	6.20	6.2	0.0	0.00	4	4.0
			26.8		0.1		7.64		98.6		5.26		6.20		0.0		4	

Date	12-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	11:20	2.50	31.6	31.6	<0.1	<0.1	4.85	4.83	55.8	55.5	3.18	3.2	6.20	6.2	0.0	0.01	3	3.0
			31.6		<0.1		4.8		55.2		3.16		6.20		0.0		3	

Date	15-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:25	2.45	29	29.0	<0.1	<0.1	7.44	7.49	97.0	97.5	5.4	5.4	6.20	6.2	0.0	0.00	5	5.0
			29		<0.1		7.54		97.9		5.31		6.20		0.0		5	

Date	17-Jul-19									
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity (NTU)	pH	Salinity	SS(mg/L)

M3	10:25	2.45	29.2 29.2	29.2	<0.1 <0.1	<0.1	6.28 6.29	6.29	87.3 87.5	87.4	5.44 4.25	4.8	6.10 6.10	6.1	0.0 0.0	0.00	6 5	5.5
----	-------	------	--------------	------	--------------	------	--------------	------	--------------	------	--------------	-----	--------------	-----	------------	------	--------	-----

Date	19-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:45	2.45	32.4 32.4	32.4	<0.1 <0.1	<0.1	4.64 4.66	4.65	63.8 64.3	64.1	5.25 5.03	5.1	6.50 6.50	6.5	0.0 0.0	0.00	5 6	5.5

Date	22-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:40	2.45	27.4 27.4	27.4	<0.1 <0.1	<0.1	5.4 5.42	5.41	73.6 74.2	73.9	4.84 4.32	4.6	6.00 6.00	6.0	0.0 0.0	0.00	4 4	4.0

Date	24-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:50	2.44	28 28	28.0	<0.1 <0.1	<0.1	6.28 6.3	6.29	86.5 86.7	86.6	3.73 3.66	3.7	6.20 6.20	6.2	0.0 0.0	0.00	4 4	4.0

Date	26-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.45	32 32	32.0	<0.1 <0.1	<0.1	5.44 5.46	5.45	74.3 75.0	74.7	4.86 4.86	4.9	6.30 6.30	6.3	0.0 0.0	0.00	4 5	4.5

Date	29-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.45	28 28	28.0	<0.1 <0.1	<0.1	5.72 5.73	5.73	78.2 78.3	78.3	5.03 4.9	5.0	6.40 6.40	6.4	0.0 0.0	0.00	5 5	5.0

Date	31-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:35	2.50	30.7 30.7	30.7	0.1 0.1	0.1	6.68 6.7	6.69	90.9 91.5	91.2	3.81 4.81	4.3	7.10 7.10	7.1	0.0 0.0	0.00	6 4	5.0

Water Quality Impact Monitoring Result for M4

Date	2-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	14:30	0.40	30.5	30.5	<0.1	<0.1	6.91	6.90	92.8	92.7	3.1	3.1	6.30	6.3	0.04	0.04	<2	<2
			30.5		<0.1		6.88		92.5		3.1		6.30		0.04		<2	

Date	4-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	13:55	0.40	29.6	29.6	<0.1	<0.1	7.61	7.68	100.1	100.8	5.3	5.4	6.00	6.0	0.02	0.02	3	3.0
			29.6		<0.1		7.75		101.4		5.4		6.00		0.02		3	

Date	6-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	12:05	0.40	27.6	27.6	<0.1	<0.1	8.04	8.04	106.3	105.9	4.5	4.6	6.20	6.2	0.02	0.02	3	3.5
			27.6		<0.1		8.03		105.4		4.6		6.20		0.02		4	

Date	8-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:50	0.40	27.8	27.8	<0.1	<0.1	7.5	7.53	94.9	95.2	4.9	4.6	6.40	6.4	0.02	0.02	<2	<2
			27.8		<0.1		7.55		95.5		4.2		6.40		0.02		<2	

Date	10-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:30	0.40	26.5	26.5	<0.1	<0.1	7.58	7.58	94.0	93.9	4.5	4.7	6.90	6.9	0.04	0.04	<2	<2
			26.5		<0.1		7.57		93.7		4.9		6.90		0.04		<2	

Date	12-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:50	0.40	26.8	26.8	<0.1	<0.1	6.46	6.46	78.0	77.9	3.7	3.7	6.83	6.8	0.03	0.03	2	2.0
			26.8		<0.1		6.45		77.8		3.7		6.83		0.03		<2	

Date	15-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	9:50	0.40	29.5	29.5	<0.1	<0.1	7.22	7.35	95.5	96.8	3.7	3.5	6.10	6.1	0.03	0.03	2	2.5
			29.5		<0.1		7.48		98.1		3.2		6.10		0.03		3	

Date	17-Jul-19																
------	-----------	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:35	0.40	29.4	29.4	<0.1	<0.1	6.37	6.38	88.9	89.0	4.3	4.3	6.00	6.0	0.03	0.03	3	3.0
			29.4		<0.1		6.39		89.1		4.3		6.00		0.03		3	

Date	19-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:10	0.40	29.5	29.5	<0.1	<0.1	6.77	6.79	88.7	88.9	2.5	2.5	6.40	6.4	0.04	0.04	3	3.0
			29.5		<0.1		6.8		89.1		2.6		6.40		0.04		3	

Date	22-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:55	0.40	27.5	27.5	<0.1	<0.1	6.63	6.67	90.8	91.1	2.2	2.2	6.80	6.8	0.05	0.05	<2	<2
			27.5		<0.1		6.71		91.4		2.2		6.80		0.05		<2	

Date	24-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:05	0.40	28.6	28.6	<0.1	<0.1	6.24	6.25	86.0	86.1	2.6	2.7	6.80	6.8	0.05	0.05	<2	<2
			28.6		<0.1		6.25		86.1		2.7		6.80		0.05		<2	

Date	26-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	9:55	0.40	28.9	28.9	<0.1	<0.1	6.75	6.77	87.7	88.0	4.7	4.8	6.20	6.2	0.03	0.03	3	3.0
			28.9		<0.1		6.78		88.3		4.8		6.20		0.03		3	

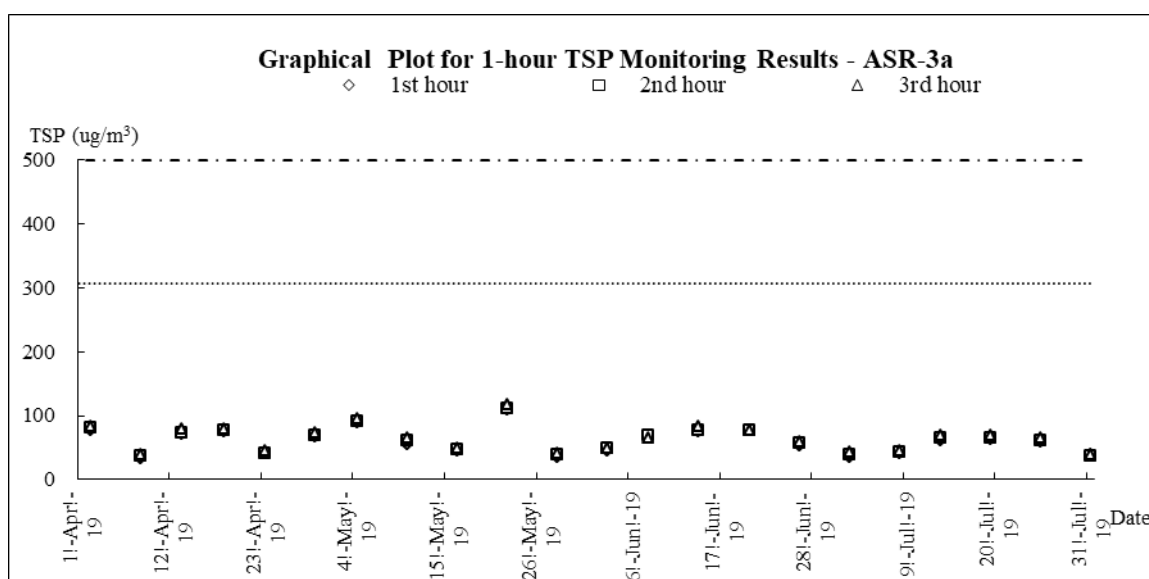
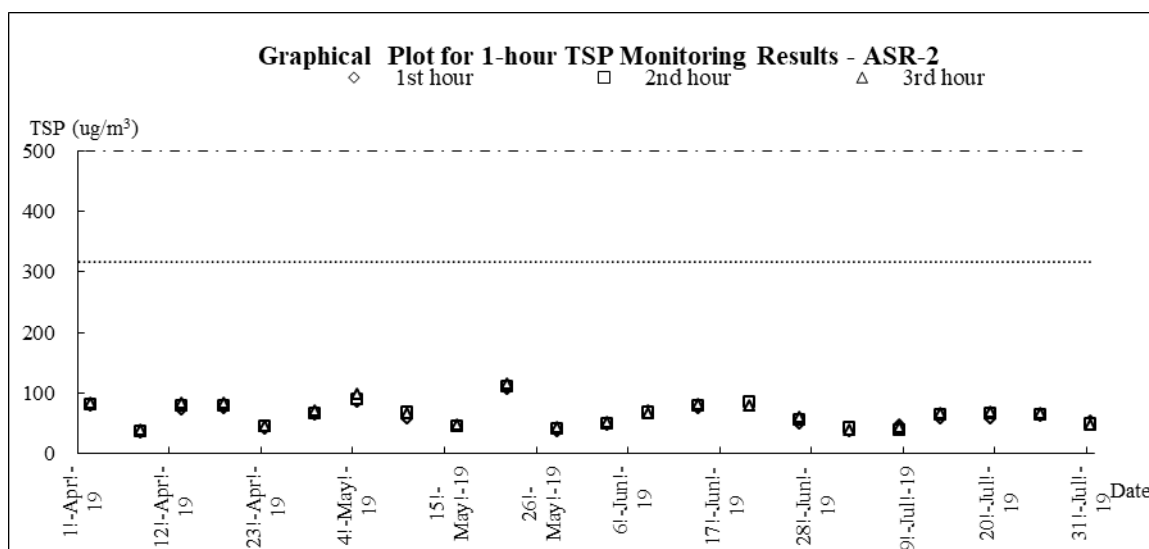
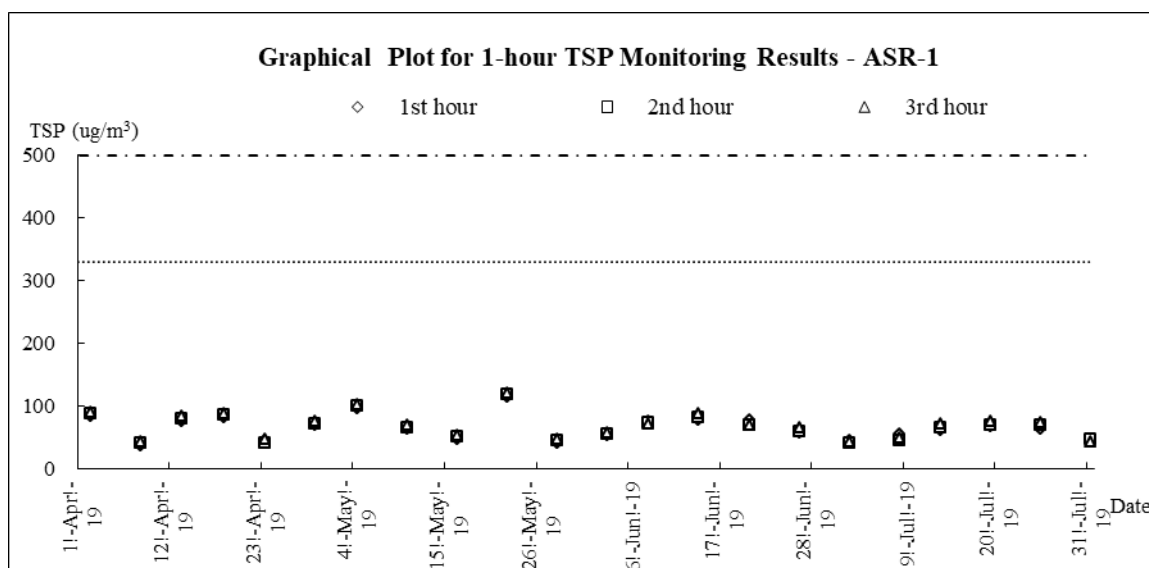
Date	29-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:55	0.40	28.4	28.4	<0.1	<0.1	6.58	6.59	90.2	90.4	3.3	3.2	6.00	6.0	0.03	0.03	<2	<2
			28.4		<0.1		6.6		90.5		3.1		6.00		0.03		<2	

Date	31-Jul-19																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:55	0.42	30.8	30.8	<0.1	<0.1	6.44	6.47	87.8	88.2	3.1	3.3	6.80	6.8	0.02	0.02	4	3.5
			30.8		<0.1		6.49		88.6		3.6		6.80		0.02		3	

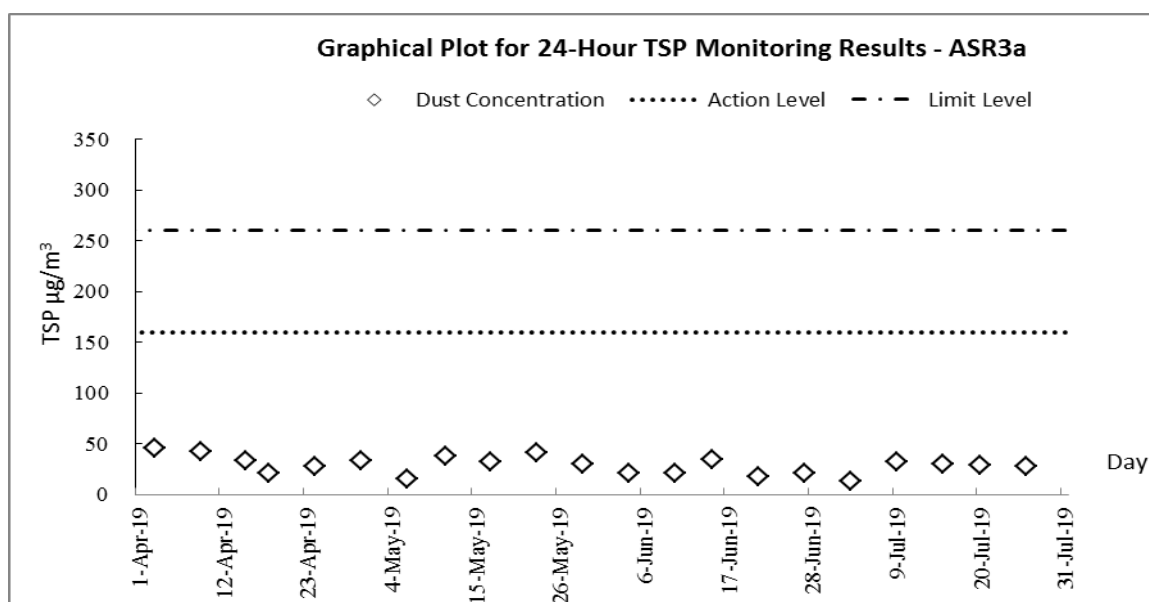
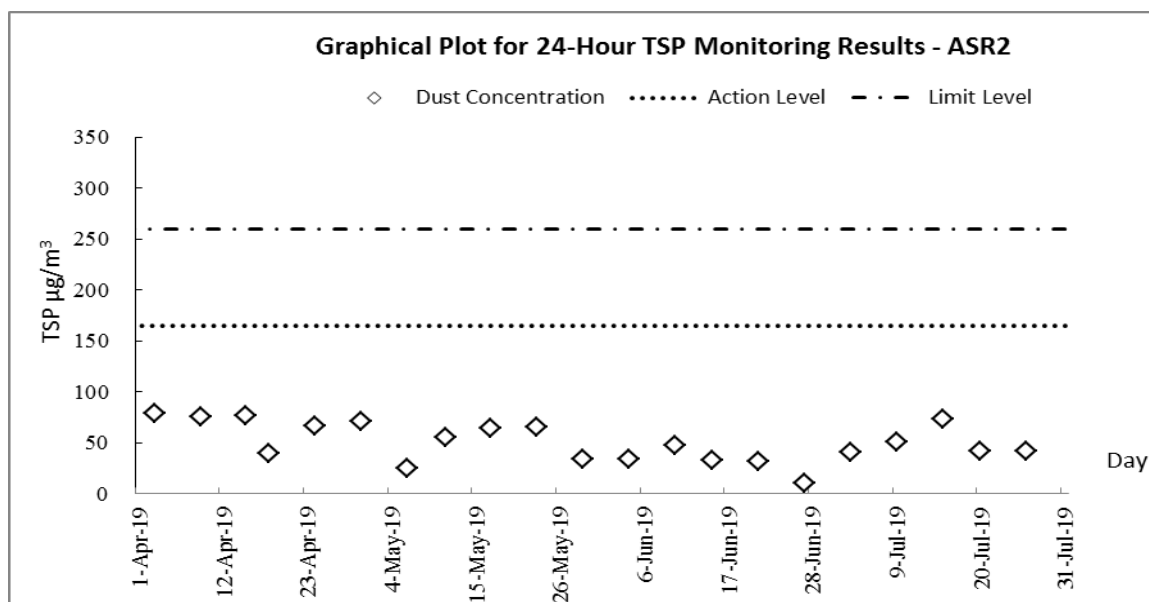
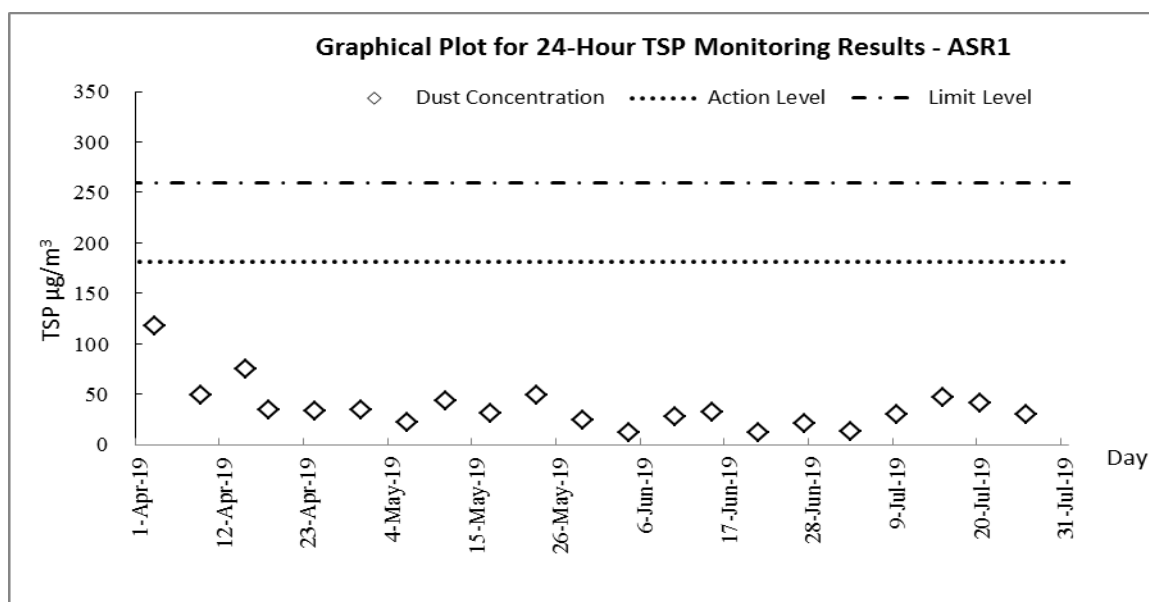
Appendix I

Graphical Plots of Air Quality, Noise and Water Quality

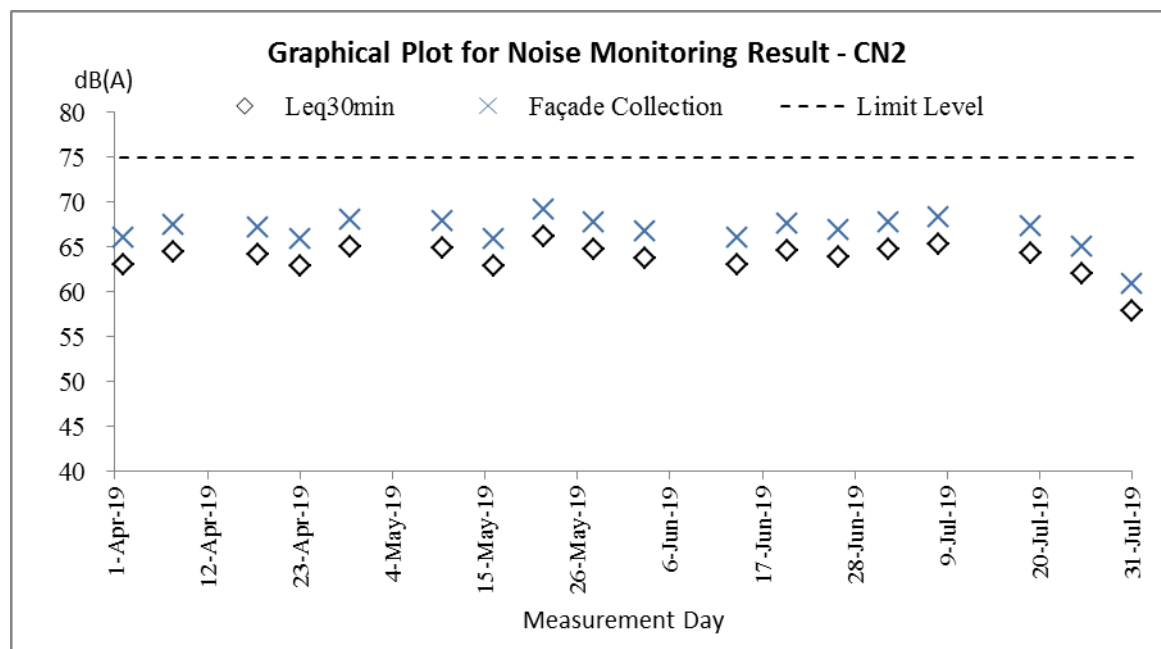
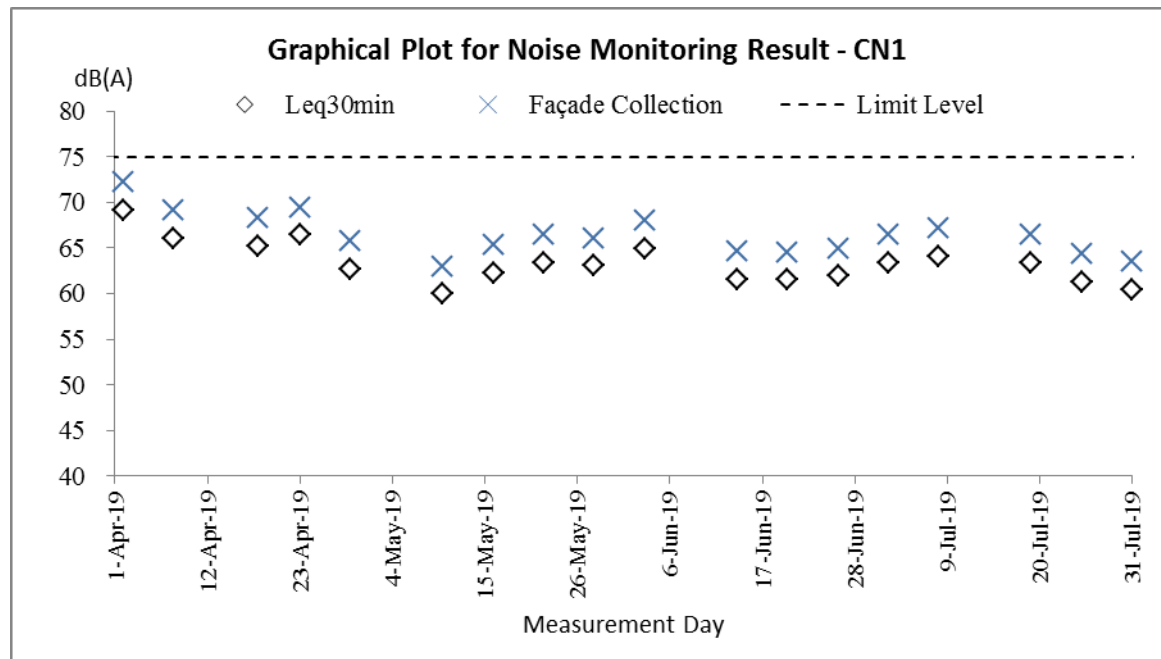
Air Quality Impact Monitoring – 1-hour TSP

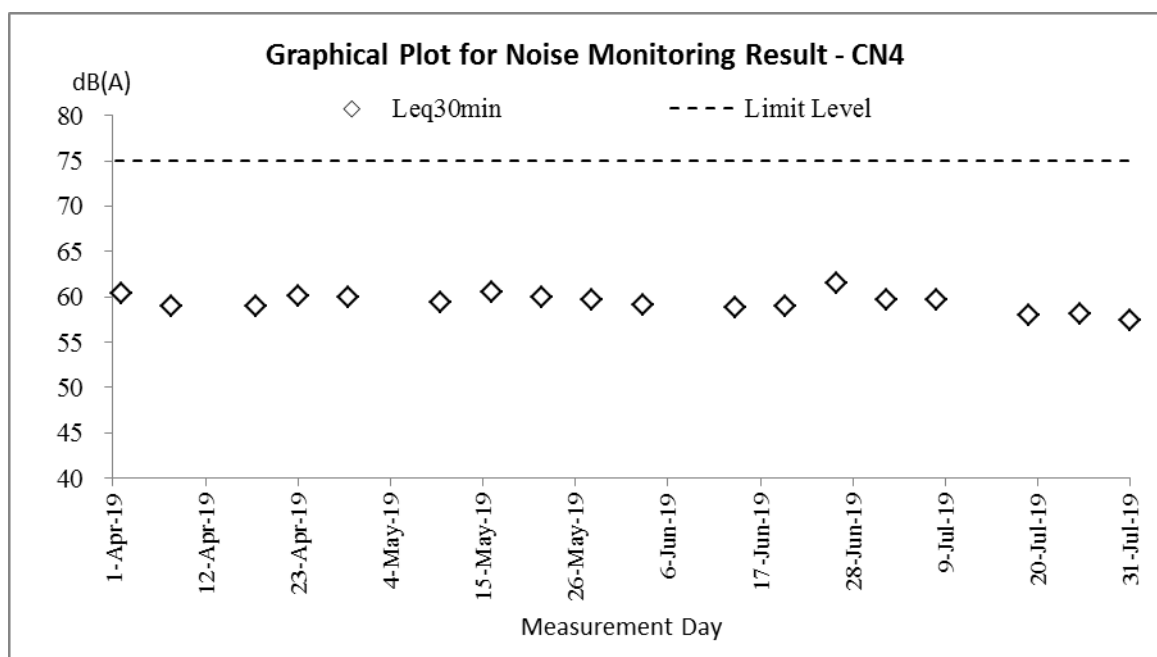
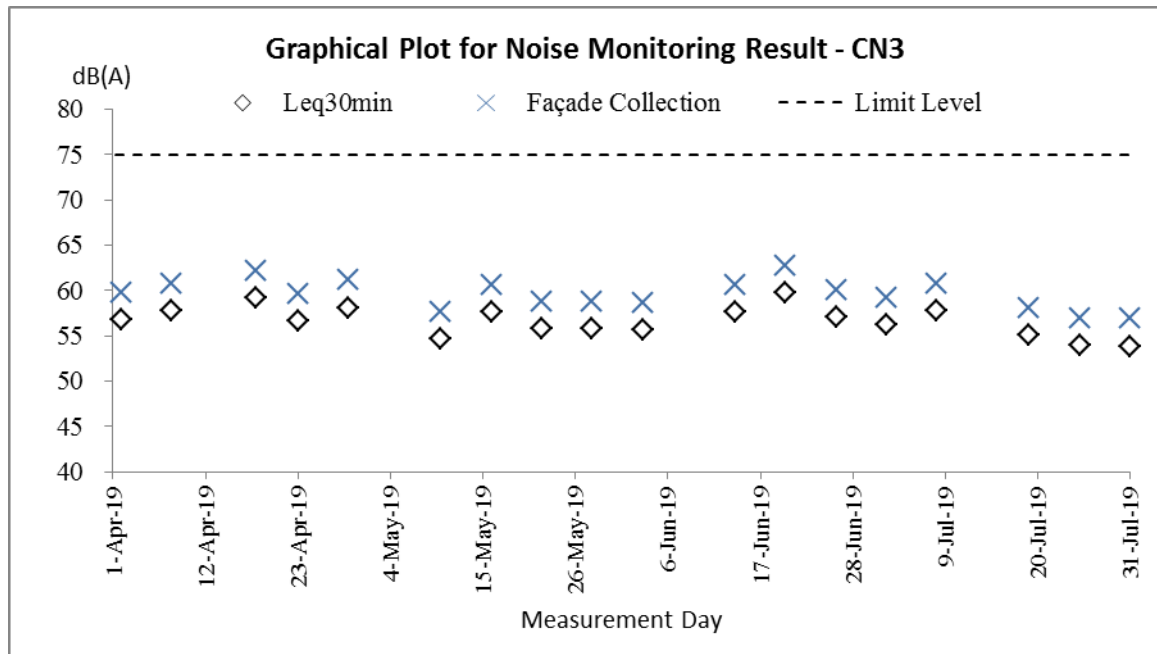


Air Quality Impact Monitoring – 24-hour TSP

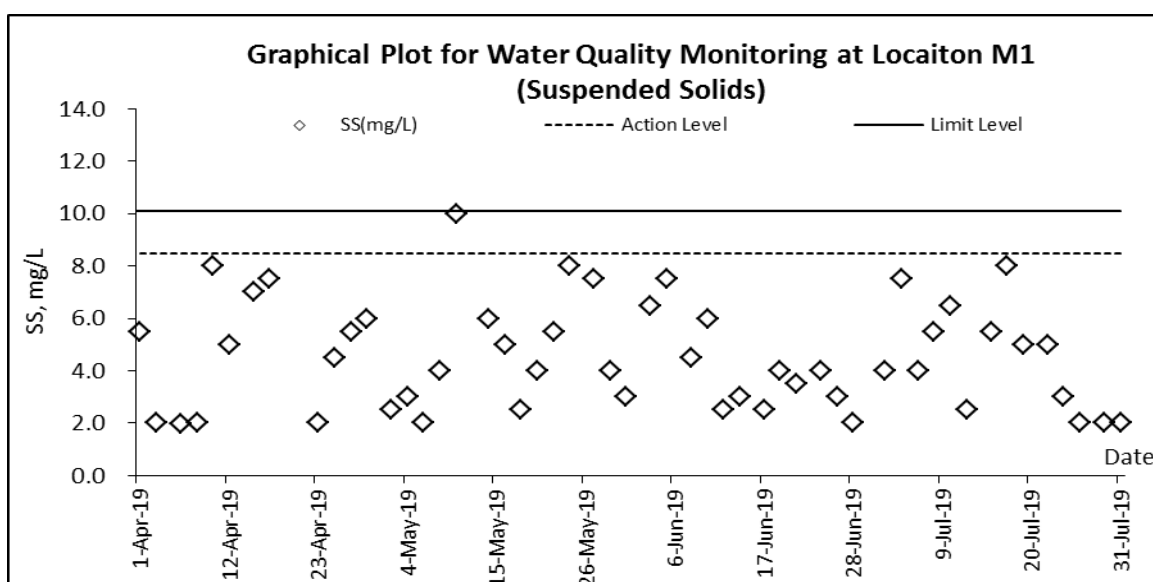
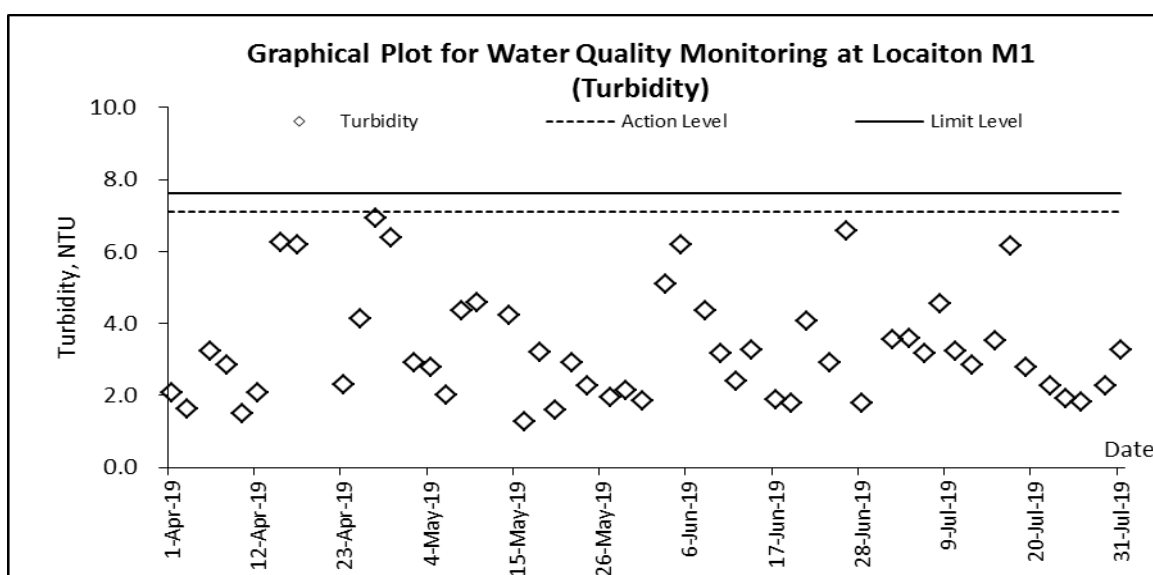
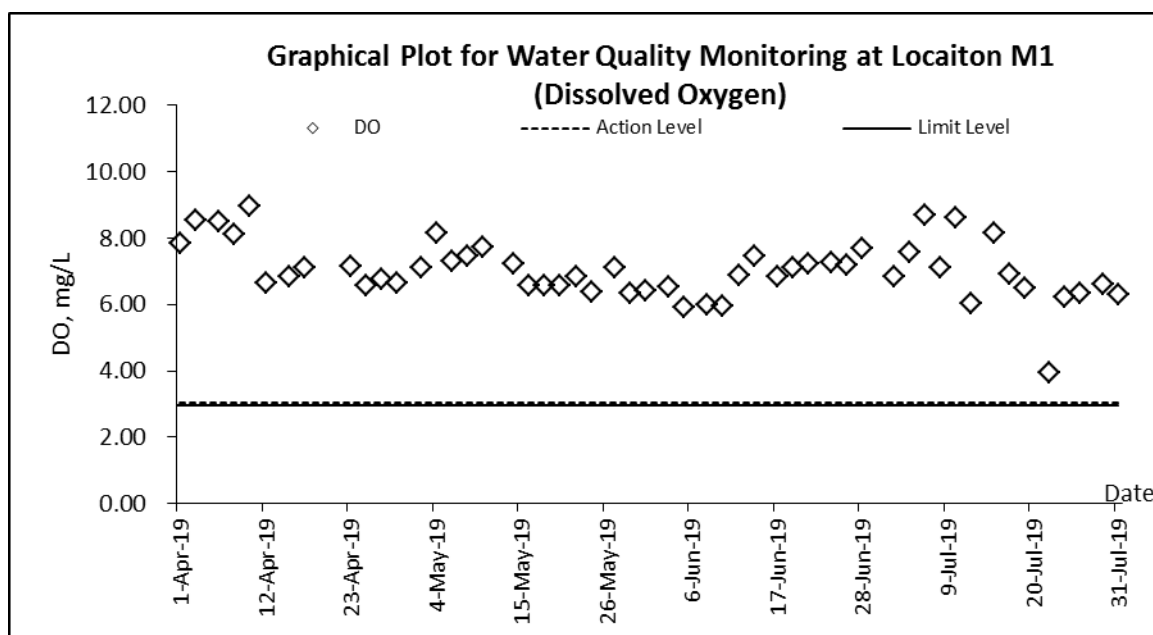


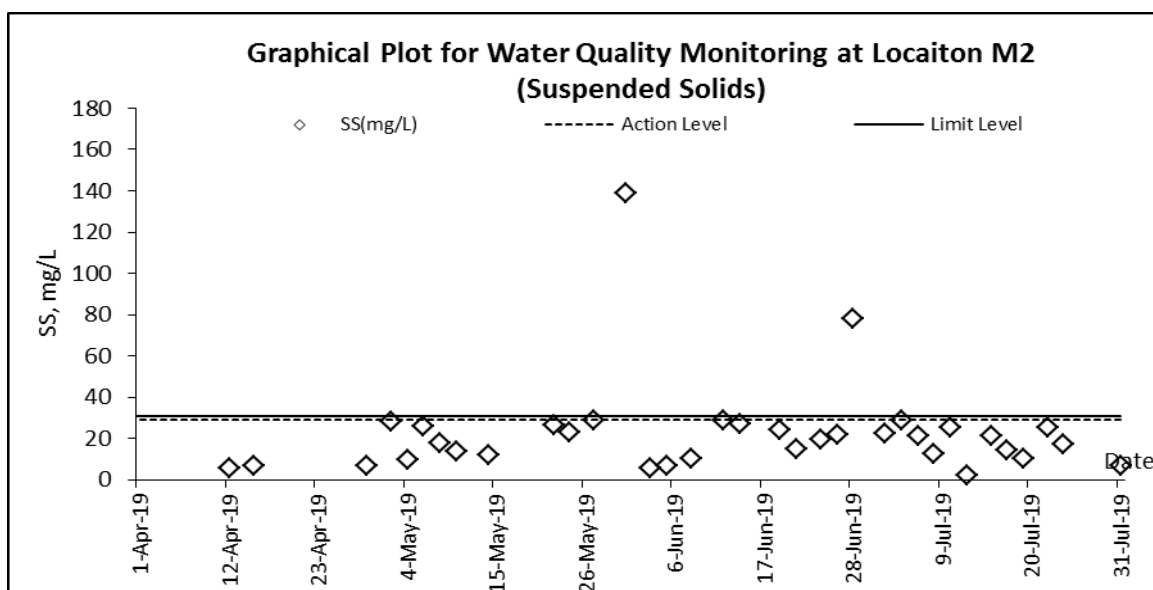
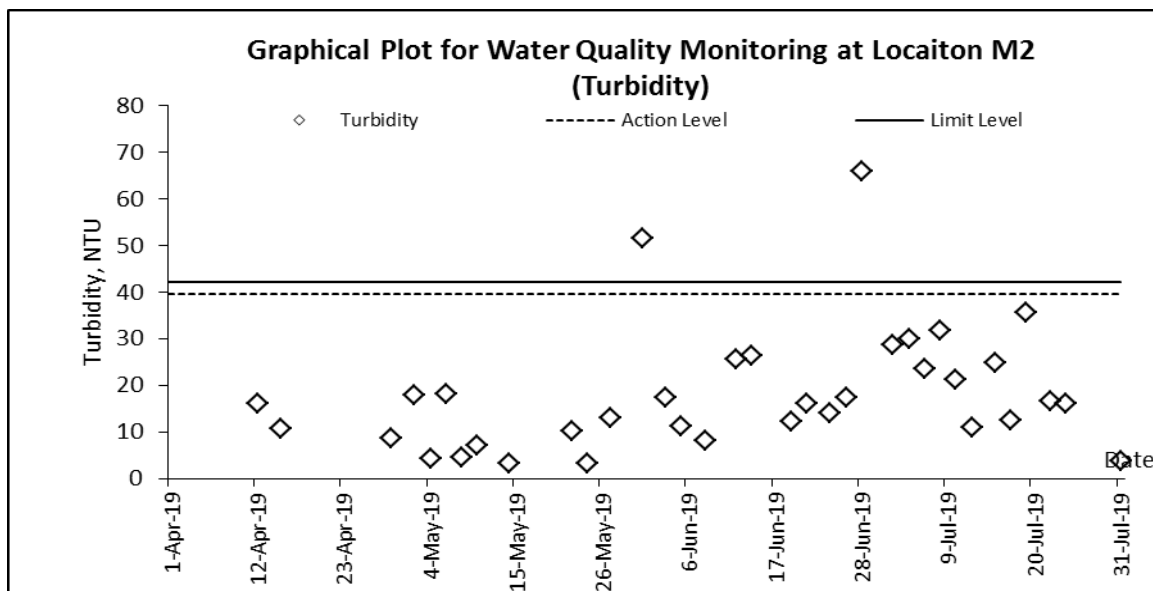
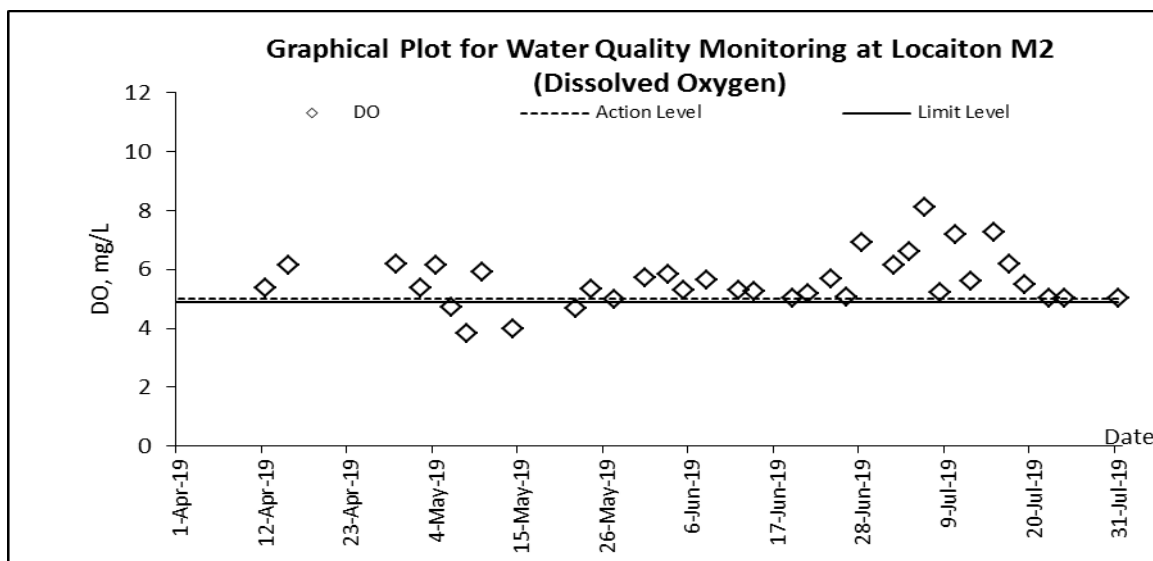
Construction Noise Impact Monitoring

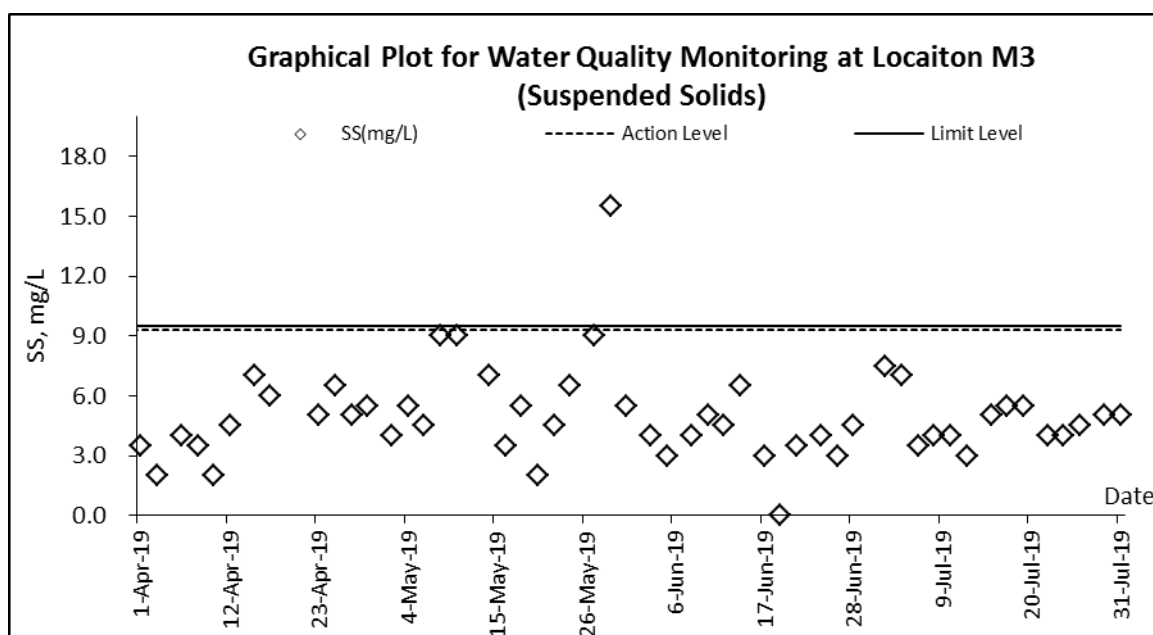
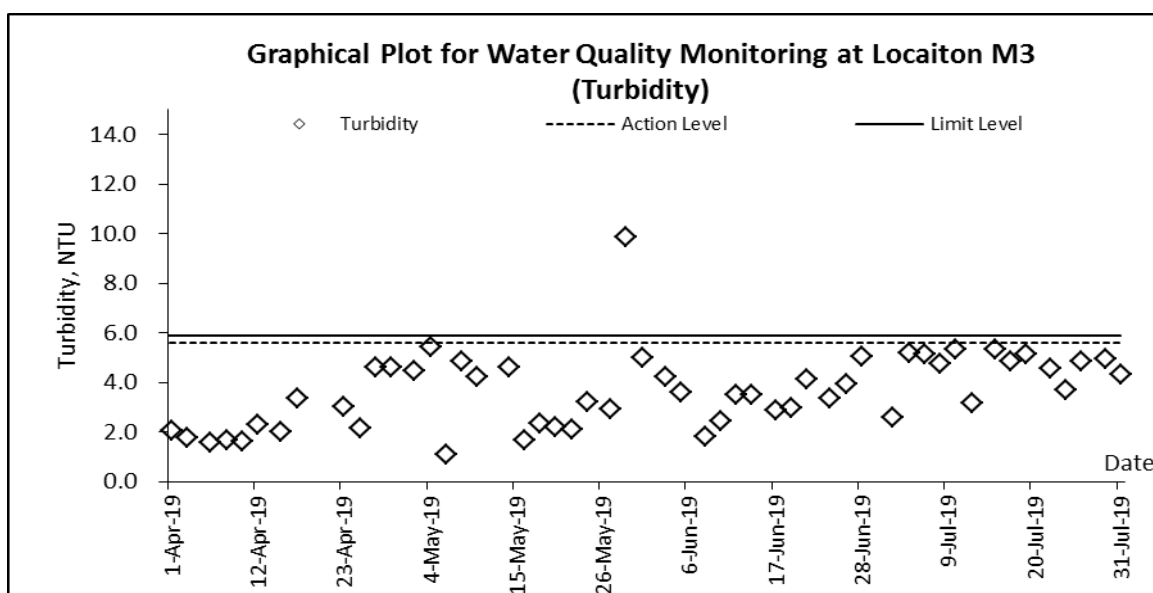
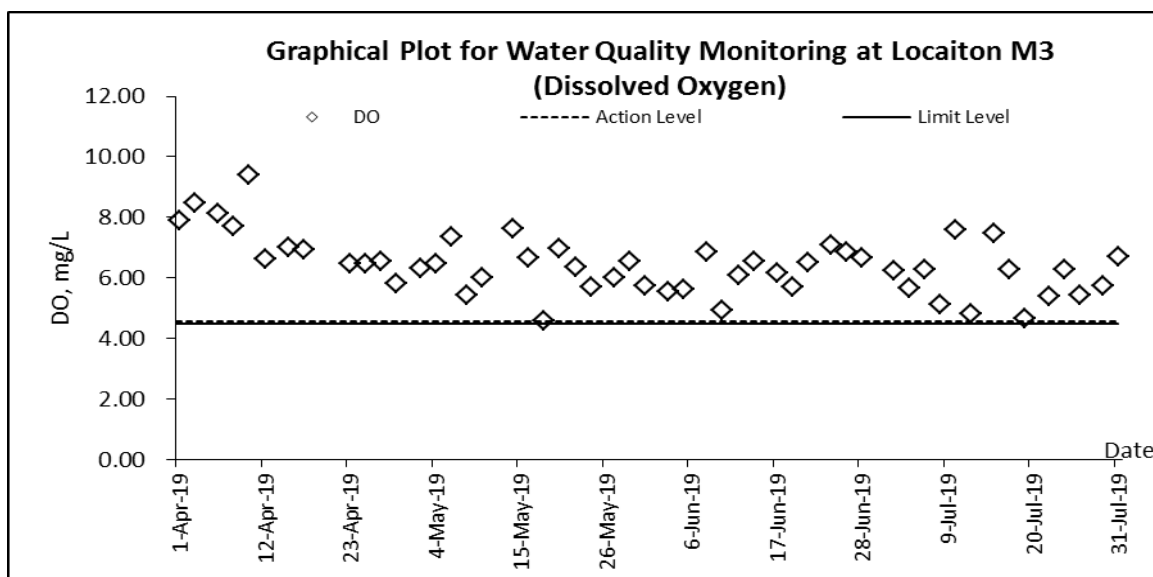


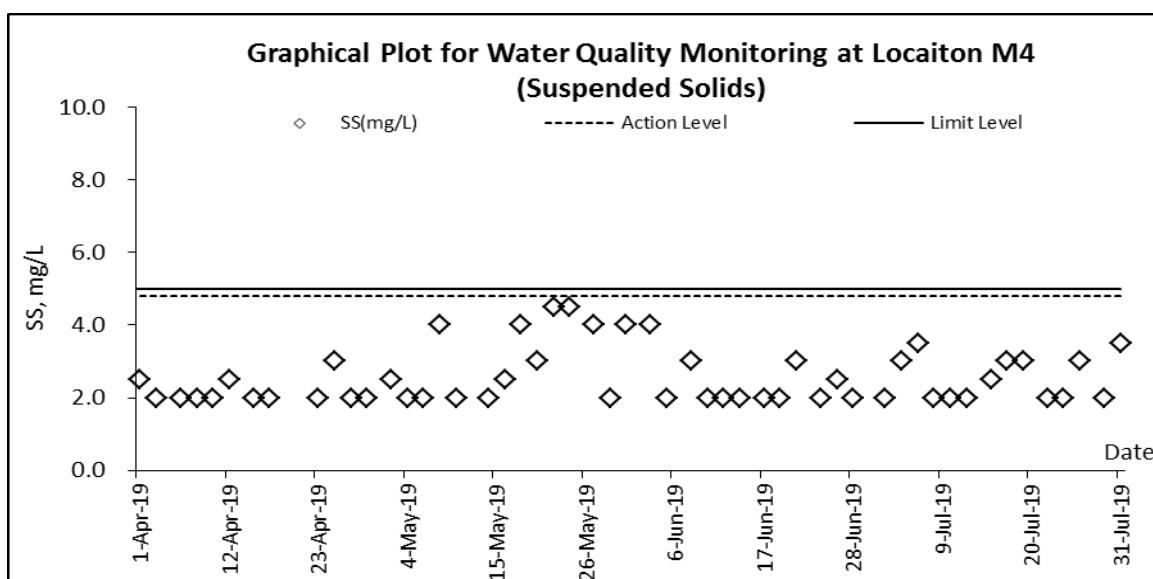
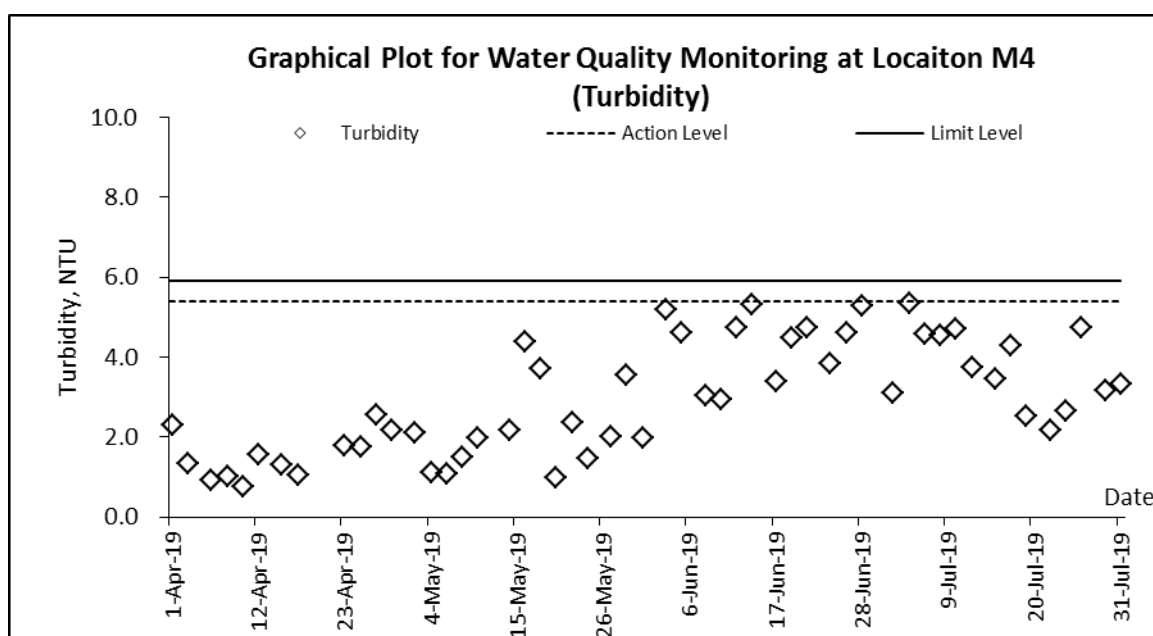
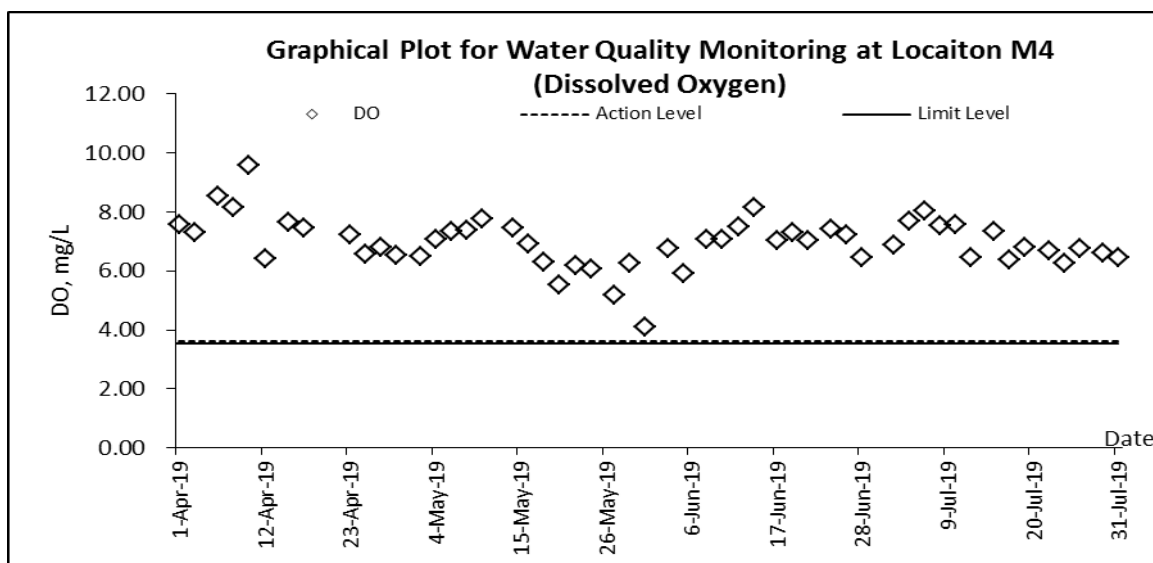


Water Quality Impact Monitoring









Appendix J

Meteorological Data of the Reporting Month

Date		Weather	Total Rainfall (mm)	Ta Kwu Ling Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Jul-19	Mon	Hot with sunny periods and a few showers.	15.3	30.2	9	75.5	E
2-Jul-19	Tue	Hot with sunny periods and one or two showers	19.1	29.1	10.7	80.5	E
3-Jul-19	Wed	Cloudy with occasional heavy squally showers and thunderstorms.	79.1	26.3	6.7	93.7	E
4-Jul-19	Thu	Hot with sunny periods and a few showers.	13	29.2	8.3	80.5	S/SE
5-Jul-19	Fri	Mainly cloudy tonight. Moderate southwesterly winds, fresh offshore.	1.3	29.3	7	80.5	S/SW
6-Jul-19	Sat	Moderate south to southwesterly winds, occasionally fresh offshore.	1.5	29.4	7.5	79	S/SW
7-Jul-19	Sun	Hot with sunny periods and one or two showers	4.3	29.2	8.4	82.5	S/SW
8-Jul-19	Mon	Hot with sunny intervals in the afternoon.	0.1	30	10.8	79.2	S/SW
9-Jul-19	Tue	Mainly cloudy with a few showers.	6	29.9	11.2	77.7	S/SW
10-Jul-19	Wed	Mainly cloudy with a few showers.	14.3	28.4	6.8	85	S/SW
11-Jul-19	Thu	Isolated thunderstorms in the afternoon.	6	28.5	6	85.5	S/SW
12-Jul-19	Fri	Mainly fine. Very hot in the afternoon.	2.6	29.4	16.5	81	SW
13-Jul-19	Sat	Isolated thunderstorms in the afternoon.	Trace	30.5	10.5	81.5	S/SW
14-Jul-19	Sun	Hot with sunny periods and one or two showers	Trace	29.7	9.2	82.5	S/SW
15-Jul-19	Mon	Mainly fine. Very hot in the afternoon. Light to moderate southerly winds.	0	29.8	10	77.2	S/SE
16-Jul-19	Tue	Fine and very hot. Light to moderate southerly winds.	0	30.1	5	76.2	W/SW
17-Jul-19	Wed	Mainly fine and very hot apart from some haze. Light winds.	0	31	6.1	76	N
18-Jul-19	Thu	Moderate west to southwesterly winds.	Trace	31	7.2	76	E
19-Jul-19	Fri	Mainly cloudy with showers and a few thunderstorms.	22.6	30.5	10.5	79.2	W/SW
20-Jul-19	Sat	Territories with isolated thunderstorms.	6.4	28.5	9.2	81	W/SW
21-Jul-19	Sun	Hot with sunny intervals in the afternoon	0.1	28.6	7.8	83.5	W/SW
22-Jul-19	Mon	Mainly cloudy with a few showers.	0.4	28.4	8.5	86.2	E
23-Jul-19	Tue	Hot with sunny periods and a few showers.	Trace	29.4	8.2	80.2	E
24-Jul-19	Wed	Isolated thunderstorms in the morning. Moderate southeasterly winds.	Trace	29.8	15.7	79.5	NE
25-Jul-19	Thu	Very hot in the afternoon.	1	29.5	6	79	S/SE
26-Jul-19	Fri	Mainly fine apart from isolated showers	Trace	30.1	6	76.5	W/SW
27-Jul-19	Sat	Mainly fine and very hot with isolated showers.	0	30.5	7	77.5	W/SW
28-Jul-19	Sun	Mainly fine and very hot with isolated showers	0.5	29.3	6.1	76.2	E/SE
29-Jul-19	Mon	Hot with sunny intervals and a few showers.	1	29.6	10.6	76.5	E
30-Jul-19	Tue	Hot with sunny intervals in the afternoon.	12.8	29.4	11.2	79	E/NE
31-Jul-19	Wed	Cloudy with occasional squally showers and thunderstorms	121.1	26.7	14.3	86	E/NE

Appendix K

Ecology Survey Report

**Ecology Survey Report for
Contract CV/2016/10**

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Monthly Report of Ecologically Sensitive Habitats Monitoring –July 2019




Revision	0	
Date of issue	23 July 2019	
Prepared by	Alan Lam	
Reviewed by	Edwina Yeung	
Verified by	Desmond Tang	

Table of Contents

1	INTRODUCTION	4
1.1	BACKGROUND	4
1.2	OBJECTIVE	4
2	ECOLOGICALLY SENSITIVE HABITATS	5
2.1	DESCRIPTION OF HABITATS	5
2.2	MONITORING MEASURES OF WETLAND HABITATS	6
2.3	MONITORING MEASURES OF NON-WETLAND HABITATS	6
3	METHODOLOGY	7
3.1	MAMMAL SURVEY	7
3.2	BIRD SURVEY	7
3.3	HERPETOFAUNA SURVEY	7
3.4	DRAGONFLY SURVEY	7
3.5	BUTTERFLY SURVEY	8
3.6	AQUATIC FAUNA SURVEY	8
4	RESULT	9
	Appendix I – Transect Routes for Contract CV/2016/10	14

<u>LIST OF TABLE</u>	
Table 1	Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna
Table 2	Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna
Table 3	Survey Schedule
Table 4	Result of Mammal in survey
Table 5	Result of Avifauna in survey
Table 6	Result of Reptile in survey
Table 7	Result of Amphibian in survey
Table 8	Result of Butterfly in survey
Table 9	Result of Odonate in survey
Table 10	Result of Freshwater Communities in survey

<u>LIST OF APPENDIX</u>	
Appendix I	Transect Routes for Contract CV/2016/10

1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 The main objective of the proposed site formation and associated infrastructural works for development of columbarium, crematorium (C&C) and related facilities at Sandy Ridge Cemetery is to increase the public cremation services and supply of public niches to meet the future demand.
- 1.1.2 The project includes site formation and associated works for development of C&C facilities at the Sandy Ridge Cemetery, road works within Sandy Ridge Cemetery, widening a section of Lin Ma Hang Road (from 6.5m to 7.3m), provision of off-site pick-up/drop-off points for shuttle buses as well as barging point at Siu Lam, Lok On Pai.
- 1.1.3 The Environmental Impact Assessment (EIA) report, including Environmental Monitoring and Audit Manual (EM&A Manual), was approved with conditions on 8 August 2016 (Register No.: AEIAR-198/2016). EPD issued an Environmental Permit (EP) for the Project (EP-534/2017) on 7 April 2017. A Further Environment Permit (FEP) for the Project (FEP-01/534/2017) was issued on 23 February 2018, variation of EP (EP-534/2017/A) and variation of FEP (FEP-01/534/2017/A) were issued on 24 December 2018.
- 1.1.4 According to Clause 3.1 of the FEP (FEP-01/534/2017/A), “The Permit Holder shall implement the EM&A programme in accordance with the procedures and requirements as set out in the EM&A Manual. Any changes to the programme shall be justified by the ET Leader and verified by the IEC as conforming to the information and requirements contained in the EM&A Manual before submission to the Director for approval”.
- 1.1.5 This Ecologically Sensitive Habitats Monitoring Methodology articulates the protocol of monitoring the ecology of concerned habitats as specified in EM&A Manual.

1.2 OBJECTIVE

- 1.2.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.
- 1.2.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution.

2 ECOLOGICALLY SENSITIVE HABITATS

2.1 DESCRIPTION OF HABITATS

- 2.1.1 In order to monitor the effectiveness of the measures to the minimise impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland and non-wetland habitats:

Wetland habitats	Non-wetland habitats
Wet Woodland	Upland Grassland
Watercourses	Woodland

- 2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conservation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.
- 2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.
- 2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

- 2.1.5 Scattered patches of woodland are present throughout the assessment area, with the largest contiguous block located immediately to the east of the project boundary. These woodlands are relatively young with single-layered of canopy dominants (~10 – 15m tall) including *A. dioica*, *Bridelia tomentosa*, *Cinnamomum burmannii*, *Daphniphyllum calycinum*, *Litsea glutinosa*, *Rhus succedanea*, and *Zanthoxylum avicennae*. Such areas comprise secondary woodland which is largely derived from natural regeneration and colonisation of trees as a result of seed dispersal by birds and/or bats. A mature tree of *A. sinensis* is located at the woodland edge at the central part of the Project according to EIA report.

2.2 MONITORING MEASURES OF WETLAND HABITATS

- 2.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardised quantitative methodology will be conducted at fixed points. For seasonal watercourse, survey shall be conducted whenever the habitat appears.
- 2.2.2 Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and action and limit levels to trigger these measures are detailed in Table 1.

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

- 2.3.1 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts.
- 2.3.2 Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and action and limit levels to trigger these measures are detailed in Table 2.

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 2 Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

3 METHODOLOGY

The ecological survey includes all taxa being investigated in EIA report. Table 3 summarizes schedule of faunal surveys.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

- 3.1.1 Mammal surveys will be conducted along the transects shown in Appendix 1 during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

3.2 BIRD SURVEY

- 3.2.1 Bird surveys will be conducted along the transects shown in Appendix 1 during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilising.

3.3 HERPETOFAUNA SURVEY

- 3.3.1 Reptile and amphibian surveys will be conducted along transects shown in Appendix 1 during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

3.4 DRAGONFLY SURVEY

- 3.4.1 Dragonfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.5 BUTTERFLY SURVEY

- 3.5.1 Butterfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.6 AQUATIC FAUNA SURVEY

- 3.6.1 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

4 RESULT

This monitoring survey started on 9th Jul 2019. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen will be identified and counted as accurately as possible.

- Mammal
There was an unknown bat recorded in the monitoring area.
- Bird
There were a total of 21 bird individuals from 8 species recorded in the monitoring area. One species of conservation interests was recorded in the monitoring area: *Egretta garzetta*, Little Egret(小白鷺)
- Herpetofauna
There was no reptile recorded in the monitoring area.
There was one amphibian species recorded in the monitoring area.
- Butterfly
There were 10 butterfly individuals from 6 species recorded in the monitoring area.
- Dragonfly
There were 28 odonate individuals from 10 species recorded in the monitoring area. Two species of conservation interests were recorded in the monitoring area: *Rhyothemis triangularis*, Sapphire Flutterer(三角麗翅蜻) and *Urothemis signata*, Scarlet Basker (赤斑曲鈎脈蜻).
- Freshwater communities
There was no freshwater community recorded in the monitoring area.

Figure 1

Urothemis signata ,Scarlet Basker(赤斑曲鈎脈蜻)



Figure 2

Wetland in monitoring area.



Table 4 Result of Mammal in survey

Scientific Name	English Name	Chinese Name	Conservation Status	9-Jul-19	
				Non-wetland	Wetland
Unknown Bat					1

Table 5 Result of Avifauna in survey

Scientific Name	English Name	Chinese Name	Conservation Status	9-Jul-19	
				Non-wetland	Wetland
<i>Egretta garzetta</i>	Little Egret	小白鷺	Fellowes et al. (2002): RC		1
<i>Lanius schach</i>	Long-tailed Shrike	棕背伯勞			1
<i>Dicrurus hottentottus</i>	Hair-crested Drongo	髮冠卷尾			7
<i>Pycnonotus aurigaster</i>	Sooty-headed Bulbul	白喉紅臀鵲			2
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鷯			1
<i>Garrulax perspicillatus</i>	Masked Laughingthrush	黑臉噪鵲			5
<i>Garrulax chinensis</i>	Black-throated Laughingthrush	黑喉噪鵲			2
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領棕鳥		2	

Table 6 Result of Reptile in survey

Table 6 Result of Repeat in Survey				
Scientific Name	Common Name	Chinese Name	9-Jul-19	
			Non-wetland	Wetland
N/A				

Table 7 Result of Amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-19	
				Non-wetland	Wetland
<i>Bufo melanostictus</i>	Asian Common Toad	黑眶蟾蜍			+

+: Species appear but uncountable

Table 8 Result of Butterfly in survey

Scientific Name	Common Name	Chinese Name	9-Jul-19	
			Non-wetland	Wetland
<i>Parnara guttata</i>	Common Straight Swift	直紋稻弄蝶		1
<i>Pelopidas conjunctus</i>	Conjoined Swift	古銅穀弄蝶		1
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛺蝶		5
<i>Hestina assimilis</i>	Red Ring Skirt	黑脈蛺蝶	1	
<i>Hypolimnas bolina</i>	Great Egg-fly	幻紫斑蛺蝶	1	
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶		1

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-19	
				Non-wetland	Wetland
<i>Brachydiplax chalybea</i>	Blue Dasher	藍額疏脈蜻			4
<i>Ceriagrion auranticum</i>	Orange-tailed Sprite	琉球橘黃蟴			1
<i>Neurothemis tullia</i>	Pied Percher	截斑脈蜻			2
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻		1	
<i>Pantala flavescens</i>	Wandering Glider	黃蜻			10

<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原螳			1
<i>Pseudagrion rubriceps</i>	Orange-faced Sprite	丹頂斑螳			1
<i>Rhyothemis triangularis</i>	Sapphire Flutterer	三角麗翅蜻	Fellowes et al. (2002): LC	1	1
<i>Rhyothemis variegata</i>	Variegated Flutterer	斑麗翅蜻		1	
<i>Urothemis signata</i>	Scarlet Basker	赤斑曲鈎脈蜻	Fellowes et al. (2002): LC	2	3

Table 10 Result of Freshwater Communities in survey

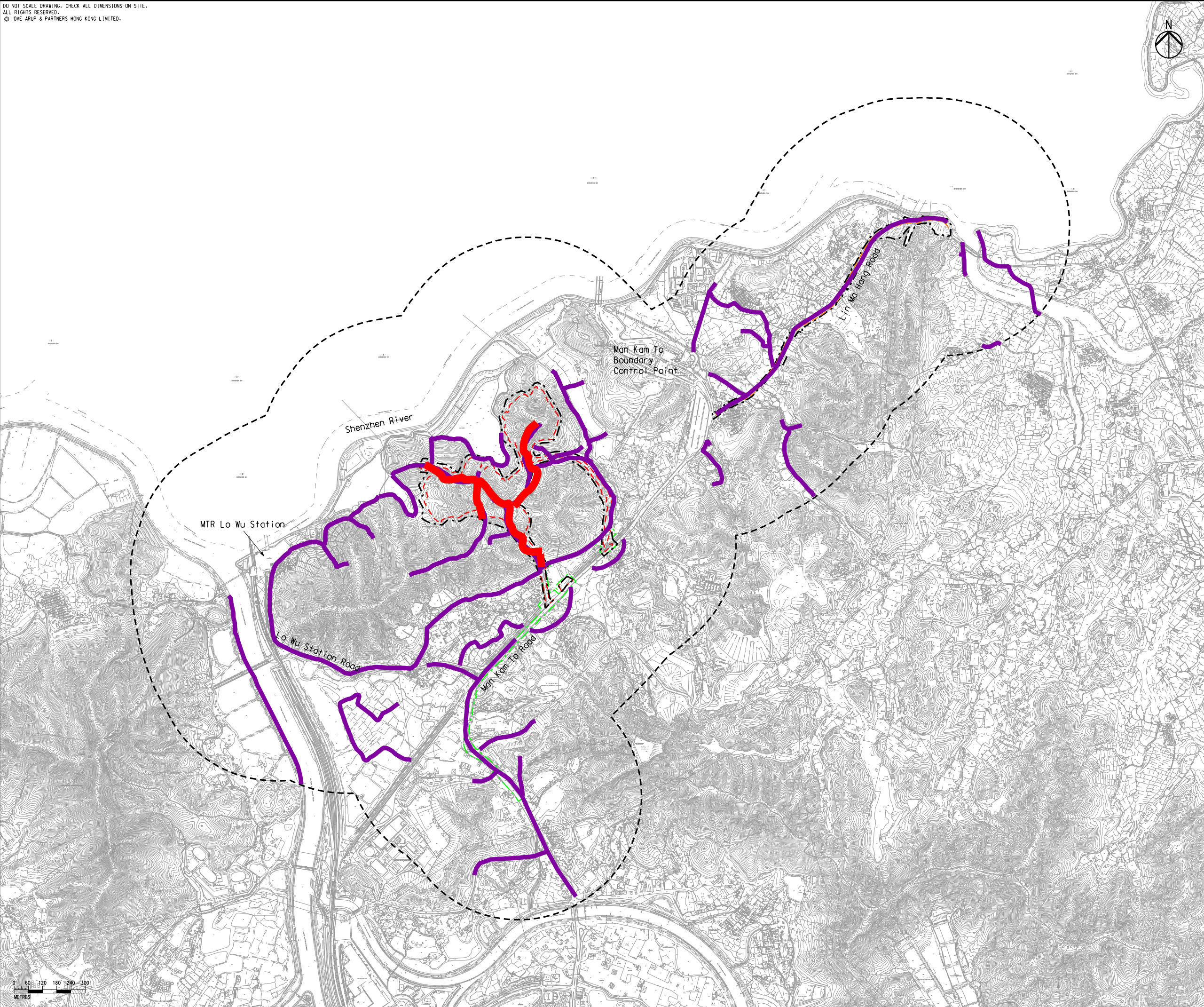
Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-19	
				Non-wetland	Wetland
N/A					

Appendix I – Transect Routes for Contract CV/2016/10

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© OVE ARUP & PARTNERS HONG KONG LIMITED.



- Legend
- Project Boundary
 - Utilities Construction
 - Sandy Ridge Works Area
 - Lin Ma Hang Road Works Area
 - 500m Assessment Area
 - Survey Transect



G	SEVENTH ISSUE	GL	02/16
F	SIXTH ISSUE	GL	01/16
E	FIFTH ISSUE	GL	12/15
D	FOURTH ISSUE	GL	10/15
Rev	Description	By	Date

Consultant

ARUP

Contract No. and Title:

Agreement No. CE 1/2013(CE)

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title

Transect Routes at Sandy Ridge

Drawing no.		Figure 9.2		Rev.	G
Drawn	Date	Checked	Approved		
GL	02/16	EL	ST		
Scale	AS SHOWN		Status	PRELIMINARY	

COPYRIGHT RESERVED



**Ecology Survey Report for
Contract CV/2017/02**

Contract No. CV/2017/02

Development of Columbarium at Sandy Ridge Cemetery – Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Monthly Report of Ecologically Sensitive Habitats Monitoring – July 2019




Revision	0	
Date of issue	23 Jul 2019	
Prepared by	Alan Lam	
Reviewed by	Edwina Yeung	
Verified by	Desmond Tang	

Table of Contents

1	INTRODUCTION	4
1.1	BACKGROUND	4
1.2	OBJECTIVE	4
2	ECOLOGICALLY SENSITIVE HABITATS	5
2.1	DESCRIPTION OF HABITATS	5
2.2	MONITORING MEASURES OF WETLAND HABITATS	6
2.3	MONITORING MEASURES OF NON-WETLAND HABITATS	6
3	METHODOLOGY	7
3.1	MAMMAL SURVEY	7
3.2	BIRD SURVEY	7
3.3	HERPETOFAUNA SURVEY	7
3.4	DRAGONFLY SURVEY	7
3.5	BUTTERFLY SURVEY	8
3.6	AQUATIC FAUNA SURVEY	8
4	RESULT	9
	Appendix I – Transect Routes for Contract CV/2017/02	13

<u>LIST OF TABLE</u>	
Table 1	Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna
Table 2	Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna
Table 3	Survey Schedule
Table 4	Result of Mammal in survey
Table 5	Result of Avifauna in survey
Table 6	Result of Reptile in survey
Table 7	Result of Amphibian in survey
Table 8	Result of Butterfly in survey
Table 9	Result of Odonate in survey
Table 10	Result of Freshwater Communities in survey

<u>LIST OF APPENDIX</u>	
Appendix I	Transect Routes for Contract CV/2017/02

1 INTRODUCTION

1.1 BACKGROUND

- 1.1.1 The main objective of the proposed site formation and associated infrastructural works for development of columbarium, crematorium (C&C) and related facilities at Sandy Ridge Cemetery is to increase the public cremation services and supply of public niches to meet the future demand.
- 1.1.2 The project includes site formation and associated works for development of C&C facilities at the Sandy Ridge Cemetery, road works within Sandy Ridge Cemetery, widening a section of Lin Ma Hang Road (from 6.5m to 7.3m), provision of off-site pick-up/drop-off points for shuttle buses as well as barging point at Siu Lam, Lok On Pai.
- 1.1.3 The Environmental Impact Assessment (EIA) report, including Environmental Monitoring and Audit Manual (EM&A Manual), was approved with conditions on 8 August 2016 (Register No.: AEIAR-198/2016). EPD issued an Environmental Permit (EP) for the Project (EP-534/2017) on 7 April 2017, variation of EP (EP-534/2017/A) were issued on 24 December 2018.
- 1.1.4 According to Clause 3.1 of the EP (EP-534/2017/A), “The Permit Holder shall implement the EM&A programme in accordance with the procedures and requirements as set out in the EM&A Manual. Any changes to the programme shall be justified by the ET Leader and verified by the IEC as conforming to the information and requirements contained in the EM&A Manual before submission to the Director for approval”.
- 1.1.5 This Ecologically Sensitive Habitats Monitoring Methodology articulates the protocol of monitoring the ecology of concerned habitats as specified in EM&A Manual.

1.2 OBJECTIVE

- 1.2.1 According to approved EIA report (AEIAR-198/2016), habitat types within project boundary comprise of watercourse, grassland, upland grassland, plantation, woodland and developed area. Natural habitats were of moderate ecological value in terms of species diversity, species rarity, species abundance, ecological linkage as well as nursery. Moreover, 0.3ha of wet woodland on the northern side of Sandy Ridge was deemed habitat with high ecological value. Four types of habitats were regarded as ecologically sensitive habitats, namely wet woodland, watercourses, upland grassland and woodland. Considering human disturbance in upcoming construction and operation phases, ecologically sensitive habitats shall be monitored in accordance with EM&A Manual.
- 1.2.2 The objective of ecologically sensitive habitats monitoring is to evaluate the effectiveness of measures to minimize impacts on concerned habitats from disturbance and pollution.

2 ECOLOGICALLY SENSITIVE HABITATS

2.1 DESCRIPTION OF HABITATS

- 2.1.1 In order to monitor the effectiveness of the measures to the minimise impact on ecologically sensitive habitats from disturbance and pollution, monthly monitoring during construction and operation phases is required as specified in EM&A Manual. Standard faunal transect and sampling surveys cover both wetland and non-wetland habitats:

Wetland habitats	Non-wetland habitats
Wet Woodland	Upland Grassland
Watercourses	Woodland

- 2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conservation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.
- 2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.
- 2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest

were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

- 2.1.5 Scattered patches of woodland are present throughout the assessment area, with the largest contiguous block located immediately to the east of the project boundary. These woodlands are relatively young with single-layered of canopy dominants (~10 – 15m tall) including *A. dioica*, *Bridelia tomentosa*, *Cinnamomum burmannii*, *Daphniphyllum calycinum*, *Litsea glutinosa*, *Rhus succedanea*, and *Zanthoxylum avicennae*. Such areas comprise secondary woodland which is largely derived from natural regeneration and colonisation of trees as a result of seed dispersal by birds and/or bats. A mature tree of *A. sinensis* is located at the woodland edge at the central part of the Project according to EIA report.

2.2 MONITORING MEASURES OF WETLAND HABITATS

- 2.2.1 Wetland habitats include wet woodland and watercourses. Monitoring surveys using standardised quantitative methodology will be conducted at fixed points. For seasonal watercourse, survey shall be conducted whenever the habitat appears.
- 2.2.2 Measures to respond to decreases in numbers of aquatic fauna using the wetland habitats and action and limit levels to trigger these measures are detailed in Table 1.

Action Level	Response	Limit Level	Response
Reduction in taxa diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in taxa diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

- 2.3.1 Non-wetland habitats consist of upland grassland and woodland. Monthly quantitative surveys of non-aquatic fauna will be conducted using standard route transect counts.
- 2.3.2 Measures to respond to decreases in numbers of non-aquatic fauna using the non-wetland habitats and action and limit levels to trigger these measures are detailed in Table 2.

Action Level	Response	Limit Level	Response
Reduction in species diversity by 30%	Investigate cause and if cause identified as related to the project instigate remedial action to remove or reduce source of disturbance.	Reduction in species diversity by 50%	Investigate cause and if cause identified as related to the project instigate remedial action.

Table 2 Action and Limit Levels and Responses to Evidence of Declines in Non-Aquatic Fauna

3 METHODOLOGY

The ecological survey includes all taxa being investigated in EIA report. Table 3 summarizes schedule of faunal surveys.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mammals	√	√	√	√	√	√	√	√	√	√	√	√
Birds (day)	√	√	√	√	√	√	√	√	√	√	√	√
Birds (night)				√	√	√	√	√	√	√		
Herpetofauna				√	√	√	√	√	√	√		
Dragonflies			√	√	√	√	√	√	√	√		
Butterflies			√	√	√	√	√	√	√	√		
Aquatic fauna	√	√	√	√	√	√	√	√	√	√	√	√

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

- 3.1.1 Mammal surveys will be conducted along the transects shown in Appendix 1 during both daytime and night time periods. Along with direct observations, other field signs, such as scats and tracks, will be searched and recorded if present.

3.2 BIRD SURVEY

- 3.2.1 Bird surveys will be conducted along the transects shown in Appendix 1 during the surveys, species and their vocalizing individuals recorded will be enumerated and recorded according to the habitat(s) they are utilising.

3.3 HERPETOFAUNA SURVEY

- 3.3.1 Reptile and amphibian surveys will be conducted along transects shown in Appendix 1 during surveys careful searches of appropriate microhabitats and refugia for reptiles and their vocalizing individuals will be undertaken and all reptiles observed will be identified and counted.

3.4 DRAGONFLY SURVEY

- 3.4.1 Dragonfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.5 BUTTERFLY SURVEY

- 3.5.1 Butterfly surveys will be conducted along transects shown in Appendix 1 during surveys all dragonflies seen will be identified and counted as accurately as possible.

3.6 AQUATIC FAUNA SURVEY

- 3.6.1 Freshwater fishes and macro-invertebrates will be recorded by direct observation. All species trapped/recorded will be enumerated and identified (to the lowest taxonomic level possible), and the species of conservation importance photographed.

4 RESULT

This monitoring survey started on 9th Jul 2019. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen will be identified and counted as accurately as possible.

- Mammal
There was one unknown bat recorded in the monitoring area.
- Bird
There were a total of 5 bird individuals from 4 species recorded in the monitoring area.
- Herpetofauna
There was no reptile recorded in the monitoring area.
There was one amphibian recorded in the monitoring area.
- Butterfly
There were 8 butterfly individuals from 7 species recorded in the monitoring area.
- Dragonfly
There were 7 odonate individuals from 5 species recorded in the monitoring area.
- Freshwater communities
There were two species of freshwater fish recorded in the monitoring area.

Figure 1
The wetland in monitoring area.



Figure 2
The construction site in monitoring area.



Table 4 Result of Mammal in survey

Scientific Name	English Name	Chinese Name	Conservation Status	9-Jul-2019	
				Non-wetland	Wetland
Unknown bat					1

Table 5 Result of Avifauna in survey

Scientific Name	English Name	Chinese Name	Conservation Status	9-Jul-2019	
				Non-wetland	Wetland
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩			1
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鸲			2
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯			1
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯			1

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	9-Jul-2019	
			Non-wetland	Wetland
N/A				

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-2019	
				Non-wetland	Wetland
<i>Bufo melanostictus</i>	Asian Common Toad	黑眶蟾蜍			+

+: Species appear but uncountable

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	9-Jul-2019	
			Non-wetland	Wetland
<i>Jamides alecto</i>	Metallic Cerulean	素雅灰蝶		1
<i>Pseudozizeeria maha</i>	Pale Grass Blue	酢漿灰蝶	1	
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛺蝶	2	
<i>Chilasa clytia</i>	Common Mime	斑鳳蝶	1	
<i>Papilio paris</i>	Paris Peacock	巴黎翠鳳蝶	1	
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶		1
<i>Catopsilia pomona</i>	Lemon Emigrant	遷粉蝶	1	

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-2019	
				Non-wetland	Wetland
<i>Copera marginipes</i>	Yellow Featherlegs	黃狹扇蟌			2
<i>Orthetrum luzonicum</i>	Marsh Skimmer	呂宋灰蜻			1
<i>Orthetrum pruinosum neglectum</i>	Common Red Skimmer	赤褐灰蜻			1
<i>Pantala flavescens</i>	Wandering Glider	黃蜻			2
<i>Pseudagrion rubriceps rubriceps</i>	Orange-faced Sprite	丹頂斑蟌			1

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	9-Jul-2019
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚		+
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮		+

+ : Species appear but uncountable

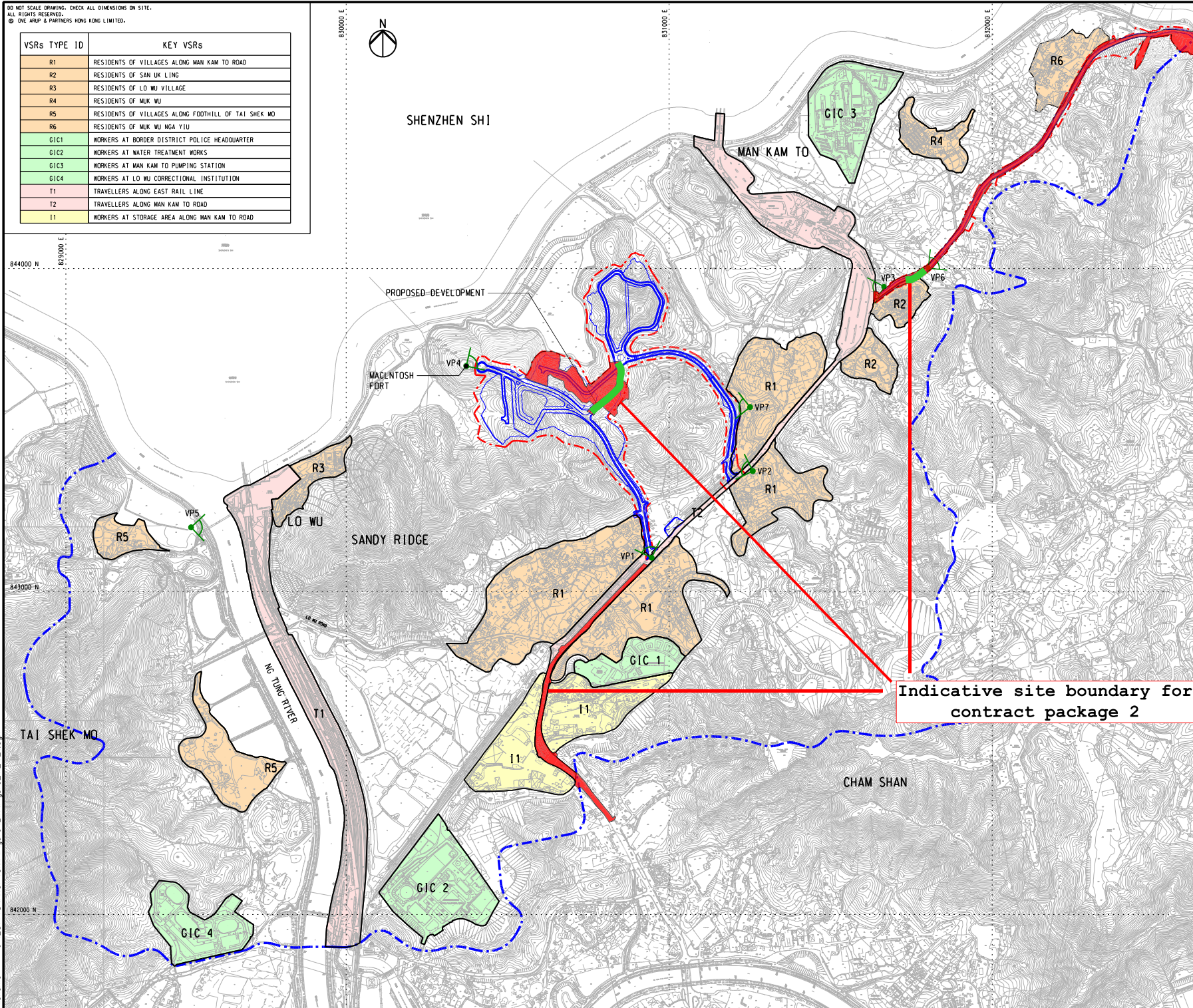
Appendix I – Transect Routes for Contract CV/2017/02

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
ALL RIGHTS RESERVED.
© C.Y.E. ARUP & PARTNERS HONG KONG LIMITED.

VSRs	TYPE	ID	KEY VSRs
R1			RESIDENTS OF VILLAGES ALONG MAN KAM TO ROAD
R2			RESIDENTS OF SAN UK LING
R3			RESIDENTS OF LO WU VILLAGE
R4			RESIDENTS OF MUK WU
R5			RESIDENTS OF VILLAGES ALONG FOOTHILL OF TAI SHEK MO
R6			RESIDENTS OF MUK WU NGA YIU
G1C1			WORKERS AT BORDER DISTRICT POLICE HEADQUARTER
G1C2			WORKERS AT WATER TREATMENT WORKS
G1C3			WORKERS AT MAN KAM TO PUMPING STATION
G1C4			WORKERS AT LO WU CORRECTIONAL INSTITUTION
T1			TRAVELLERS ALONG EAST RAIL LINE
T2			TRAVELLERS ALONG MAN KAM TO ROAD
I1			WORKERS AT STORAGE AREA ALONG MAN KAM TO ROAD



SHENZHEN SH1



LEGEND:

- PROJECT BOUNDARY
- ZONE OF VISUAL ENVELOPE
- VANTAGE POINTS
- Transect of C2

Rev	Description	By	Date
A	REVISED SUBMISSION	WM	01/15

Consultant
ARUP

Contract No. and Title:
Agreement No. CE 1/2013(CE)
Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery - Design and Construction

Drawing title
VISUAL ENVELOPE LOCATIONS OF VISUAL SENSITIVE RECEIVERS (VSRs) AND VANTAGE POINT (VPs)

Drawn	Date	Checked	Approved
WM	08/13	PC	DL
Scale	N.T.S.	Status	PRELIMINARY

COPYRIGHT RESERVED
 **土木工程拓展署**
Civil Engineering and Development Department

Appendix L

Landscape & Visual Inspection Checklist

Contract No. CV/2016/10

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 25/07/2019 10:00 **Weather:** Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	Landscape and Visual				
1.1	Is the construction period become shortened?			✓	Under review.
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or “camouflaged” and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)	✓			
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?	✓			
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?	✓			
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?			✓	Tree planting works have not yet been commenced.
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)	✓			
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)	✓			

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

1. Some Tree protection zone (TPZ) was damaged/missing.

New observation:

1. T2928 was in fair health condition with normal foliage color and density.

Reminders:

1. Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.
2. Contractor is reminded to provide proper maintenance for transplanted tree (T2465, T2468 and T2928) according to approved method statement.

Photo Record:

Fig A.



General view (1)

Fig B.



General view (2)

Fig C.



General view (3)

Fig D.



Transplanted tree (T2928)_Wholeview

Fig E.



Transplanted tree (T2928)_Crown condition

Fig F.



Transplanted tree (T2465) _Damaged TPZ

Fig G.



Transplanted tree (T2468)

Contract No. CV/2017/02

Site Formation and Associated Infrastructural Works for Development of Columbarium, Crematorium and Related Facilities at Sandy Ridge Cemetery

Development of Columbarium at Sandy Ridge Cemetery –

Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 25/07/2019 11:00 **Weather:** Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	Landscape and Visual				
1.1	Is the construction period become shortened?			✓	Under review
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or “camouflaged” and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)			✓	
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?		✓		
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?			✓	Tree transplanting works have not yet been commenced
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?			✓	
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)			✓	
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)			✓	

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

1. Tree Protection Zone were set up around retain trees.

New Observation:

1. Construction works near retained trees was observed.

Reminders:

1. Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.

Photo Record:

Fig A.



General view (1)

Fig B.



General view (2)

Fig C.



General view (3)

Fig D.



General view (4)

Fig E.



Tree Protection Zone (1)

Fig F.



Tree Protection Zone (2)

Signature:

		Signature	Date
Recorded by	Registered Landscape Architect	 	29 Jul 2019
Checked by	Environmental Team Leader		7/8/2019
	Independent Environmental Checker		13/8/2019

Appendix M

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for July 2019

Department: Civil Engineering and Development Department Contract No.: CV/2016/10
 Contract Title: Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
 Commencement Date: 15-Dec-2017 Estimated completion Date 22-Dec-2023 Estimated Contract Sum: 780M

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	44.444	0.000	10.431	0.000	34.013	0.000	0.000	0.000	0.000	0.332	0.088
Feb	37.322	0.000	13.008	0.000	24.314	0.000	0.000	0.000	0.000	0.000	0.010
Mar	31.192	0.000	0.696	0.000	30.496	0.000	0.000	0.000	0.000	0.000	0.492
Apr	28.659	0.000	9.739	0.000	18.920	0.000	0.000	0.000	0.000	0.000	0.590
May	12.591	0.000	3.856	0.000	8.735	0.000	0.000	0.000	0.000	0.000	0.060
June	13.357	0.000	5.187	0.000	8.170	0.000	0.000	0.000	0.000	0.498	0.041
Sub-total	167.565	0.000	42.918	0.000	124.647	0.000	0.000	0.000	0.000	0.830	1.281
July	23.057	0.000	12.253	0.000	10.804	0.000	0.000	0.000	0.000	0.000	0.071
Aug											
Sept											
Oct											
Nov											
Dec											
Total	190.622	0.000	55.172	0.000	135.451	0.000	0.000	0.000	0.000	0.830	1.352

- Notes: (1) The waste flow table should cover the whole construction period of the Contract.
- (2) The original estimates of the C&D materials should be the estimates at contract commencement and should not be altered during construction.
- (3) Inert C&D materials that are specified in the Contract to be imported for use at the Site shall be separately indicated.
- (4) The yearly estimates of the C&D materials should be updated as appropriate taking into account the latest works programme etc.
- (5) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (6) Broken concrete for recycling into aggregates.

Name of Department: CEDD

Monthly Summary Waste Flow Table for 2019

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)
JAN	13.050	0.000	13.050	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
FEB	355.770	0.000	0.000	0.000	355.77	0.000	0.000	0.000	0.000	0.000	0.000
MAR	184.340	0.000	0.000	0.000	184.34	0.000	0.000	0.000	0.000	0.000	0.000
APRIL	467.030	0.000	0.000	0.000	467.03	0.000	0.000	0.000	0.000	0.000	1.460
MAY	496.260	0.000	0.000	0.000	496.26	0.000	0.000	0.000	0.000	0.000	0.000
JUN	695.540	0.000	0.000	0.000	695.54	0.000	0.000	0.000	0.000	0.000	3.430
Sub Total	2211.990	0.000	13.050	0.000	2198.940	0.000	0.000	0.000	0.000	0.000	4.890
JUL	649.090	0.000	0.000	0.000	649.09	0.000	0.000	0.000	0.000	0.000	8.210
AUG	--	--	--	--	--	--	--	--	--	--	--
SEP	--	--	--	--	--	--	--	--	--	--	--
OCT	--	--	--	--	--	--	--	--	--	--	--
NOV	--	--	--	--	--	--	--	--	--	--	--
DEC	--	--	--	--	--	--	--	--	--	--	--
Total	2861.080	0.000	13.050	0.000	2848.030	0.000	0.000	0.000	0.000	0.000	13.100

Notes:

Name of Department: CEDD

Forecast of Total Quantities of C&D Materials to be Generated from the Contract (see Note 4)										
Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in Other Projects	Disposed as Public Fill	Imported Fill	Metal	Paper / cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
0	0	0	0	0	350	30	4	2	1	4

Notes:

- (1) The performance targets are given in PS clause 6(14) above.
- (2) The waste flow table shall also include C&D materials that are specified in the Contractor to be imported for use at the Site.
- (3) Plastic refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature
 - Hard Rocks and Large Broken Concrete = Cannot be defined at this stage
 - Imported Fill = Estimated by the Contractor
 - Metal = Estimated by the Contractor
 - Paper/cardboard packaging = Estimated by the Contractor
 - Plastics = Estimated by the Contractor
 - Chemical Waste = Estimated by the Contractor (Spent lubricating oil, assume density 0.9kg/L)
 - Other, e.g. general refuse = Estimated by the Contractor

Appendix N

Implementation Schedule for Environmental Mitigation Measures (ISEMM)

Environmental Mitigation Implementation Schedule – Sandy Ridge

Note: Chapters 1 to 3 of the EIA report present the background information of the Project, identified concurrent projects, objectives and scope for various environmental aspects, and description on alternative options and construction description. Chapters 4 to 12 of the EIA report present the EIA findings and mitigation measures are described below with cross-reference to the EIA report. Chapters 13 to 15 describe the environmental monitoring requirements and conclusion.

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Common Mitigation Measures (Applicable to ALL Project Components, including DPs and Non-DPS)						
Construction Dust Impact						
S4.4.5.2	The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Minimise dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • APCO • To control the dust impact to meet HKAQO and TM-EIAO criteria
S4.4.5.3	Water spraying every hour for all active works area.	Minimise dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • APCO • To control the dust impact to meet HKAQO and TM-EIAO criteria
S4.4.5.2	<ul style="list-style-type: none"> • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extended beyond the pedestrian barriers, fencing or traffic cones; • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Vehicle wheel washing facilities should be provided at each construction 	Minimise dust impact at the nearby sensitive receivers	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • APCO • To control the dust impact to meet HKAQO and TM-EIAO criteria

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels;</p> <ul style="list-style-type: none"> • When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shortcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies. 					

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S4.4.5.1	Implement regular dust monitoring under EM&A programme during the construction stage.	Monitoring of dust impact	Contractor	Selected representative dust monitoring station	Construction phase	• TM-EIAO
S4.4.5.3	<ul style="list-style-type: none"> All road surface within the barging facilities will be paved. Dust enclosures will be provided for the loading ramp, installation of 3-sided screen with top cover and the provision of water sprays at the discharge point would be provided. Vehicles will be required to pass through designated wheel wash facilities. Continuous water spray at the loading point. 	Minimise dust impact at the nearby sensitive receivers	Contractor	Barging point at Siu Lam	Construction phase	• TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Construction Noise						
S5.5.5.3	<p>Implement the following good site management practices:</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; machines and plant (such as trucks, cranes) 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, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; mobile plant should be sited as far away from NSRs as possible and practicable; material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 	Control construction noise	Contractor	All construction sites	Construction phase	• Annex 5, TM-EIAO
S5.5.5.5	Adopt quiet plants during the construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road. The quiet plants should be made reference to the PME listed in the TM or the QPME/ other commonly used PME listed in EPD web pages or taken from BS5228: Part 1: 2009 Noise Control on Construction and Open Sites as far as possible.	Reduce the noise levels of plant items	Contractor	Works area for construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road	Construction phase	• Annex 5, TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S5.5.5.6	Install temporary noise barriers (in the form of site hoardings, approx. 2.4m high) located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S5.5.5.7 – S5.5.5.12	Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered upper portion of superficial density no less than 7kg/m ² on a skid footing with 25mm thick internal sound absorptive lining), acoustic mat or full enclosure, screen the noisy plants including air compressors, generators etc.	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S5.5.5.13	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction noise	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S13.2.1.1 – S13.4.1.2	Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction phase	• TM-EIAO
Operational Noise (Road Traffic Noise)						
S5.6.6.4	<p>Provide a series of noise mitigation measures including absorptive noise barriers and low noise road surfacing materials along Lin Ma Hang Road and Sha Ling Road before operation of the proposed project for existing and planned representative NSRs. Locations of noise mitigation measures are stated as following:</p> <p><i>For existing representative NSRs</i></p> <ul style="list-style-type: none"> • Approx. 12m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM1); • Approx. 92m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM2); 	Reduce operation noise from road traffic	Contractor	Refer to Figures 5.6.9 – 5.6.13 of the EIA Report	Prior to operation of the Project for existing representative NSRs. While for barriers to protect planned representative NSRs, it should constructed before intake of planned representative NSRs.	• TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> Approx. 28m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM3); Approx. 51m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM4); Approx. 25m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM5); Approx. 21m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM6); Approx. 14m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM7); Approx. 18m of absorptive noise barrier 3m above road level along Lin Ma Hang Road near San Uk Ling (MM8); Approx. 42m of absorptive noise barrier 3m above road level along temporary pullover space opposite San Uk Ling (MM9); Approx. 93m of absorptive noise barrier 3m above road level along Lin Ma Hang Road opposite San Uk Ling (MM10); Approx. 185m of low noise surfacing materials along Lin Ma Hang Road near San Uk Ling (MM11); <p><i>For planned representative NSRs</i></p> <ul style="list-style-type: none"> Approx. 36m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM12); Approx. 47m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM13); Approx. 31m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM14); Approx. 31m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM15); Approx. 41m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM16); 					

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> Approx. 340m of low noise surfacing materials along Lin Ma Hang Road near Muk Wu Nga Yiu (MM17). 					

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Water Quality (Construction Phase)						
S6.4.4.1 – S6.4.4.3	<p>In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN1/94), construction phase mitigation measures shall include the following:</p> <p><u>General Site Operation</u></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 will be undertaken by the contractor prior to the commencement of construction; Diversion of natural stormwater should be avoided as far as possible. The design of temporary on-site drainage should prevent runoff going through site surface, construction machinery and equipment in order to avoid or minimise polluted runoff. Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m³ capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped; The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a site/sediment trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates; The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of 	To minimise water quality impact from construction site runoff and general construction activities	Contractor	All construction sites where applicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance ProPECC PN1/94 TM-EIAO TM-DSS

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction;</p> <ul style="list-style-type: none"> Construction works should be programmed to minimise surface excavation works during the rainy seasons (April to September). All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means; If the excavation of trenches in wet periods is necessary, it should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; 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 following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas; All open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than 50m³ 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 always be covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers; Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC 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; 					

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<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 facilities should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis 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; Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heavy rain; Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts; All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby; Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the water bodies, marsh and ponds; Adopt best management practices. 					
S6.4.4.4 – S6.4.4.5	<p><u>Sewage from workforce</u></p> <ul style="list-style-type: none"> Portable chemical toilets and sewage holding tanks are recommended for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance; 	To minimise water quality from sewage effluent	Contractor	All construction sites where practicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project; Regular environmental audit on the construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. 					
S6.4.4.6	<p><u>Operation of Barging Point at Siu Lam</u></p> <ul style="list-style-type: none"> All barges should be fitted with tight bottom seals to prevent leakage of materials during transport; Barges or hoppers should not be filled to a level that will cause overflow of materials or polluted water during loading or transportation; All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; and Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Mitigation measures for land-based activities as outlined in Section 6.4.4 should be applied to minimise water quality impacts from site runoff and open stockpile spoils at the proposed barging facilities where appropriate. 	To minimise water quality from operation of barging point at Siu Lam	Contractor	All construction sites where practicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS
Water Quality (Operational Phase)						
S6.5.4.1 – S6.5.4.6	<p>The following mitigation measures during operational phase are recommended:</p> <ul style="list-style-type: none"> Sewage and wastewater discharge should be connected to foul sewerage system; Proper drainage systems with silt traps and oil interceptors should be installed; 	To minimise the road runoff, wastewater discharge and erosion of seasonal watercourse during the operational phase	Highways Department / Contractors	Whole alignment	Construction / Operational Phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> • The design of road gullies with silt traps should be incorporated especially for the catchment leading to the existing wet woodland area located at the north of the site; • The silt traps and oil interceptors should be cleaned and maintained regularly, especially before peak seasons of the visitors in Ching Ming Festival and Chung Yeung Festival; • Energy dissipaters should be installed at the seasonally wet watercourses to reduce the magnitude of the first flush in order to minimise the erosion impact to the wet woodland. 					

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Waste Management (Construction Waste)						
S7.3.3.8	<u>Construction & Demolition Material Management Plan (C&DMMP)</u> <ul style="list-style-type: none"> A C&DMMP shall be submitted to the Public Fill Committee for approval in the case of C&D materials disposal exceeding 50,000m³. 	To enhance the management of construction and demolition (C&D) material including rock in public works projects	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Project Administrative Handbook for Civil Engineering Works, 2012 Edition
S7.3.4.2	<u>Good Site Practice</u> <p>The following good site practices are recommended throughout the construction activities:</p> <ul style="list-style-type: none"> nomination of an approved personnel, such as a site manager, to be responsible for the implementation of 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 site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; provision of sufficient waste disposal points and regular collection for disposal; appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; a Waste Management Plan (WMP) should be prepared by the contractor and submitted to the Engineer for approval. 	Minimise waste generation during construction	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.3.4.3	<u>Waste Reduction Measures</u> <p>Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction:</p> <ul style="list-style-type: none"> segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal; 	Reduce waste generation	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> proper storage and site practices to minimise the potential for damage and contamination of construction materials; plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste; sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling. 					
S7.3.4.5	<p><u>Storage of Waste</u></p> <p>The following recommendation should be implemented to minimise the impacts:</p> <ul style="list-style-type: none"> non-inert C&D materials such as soil should be handled and stored well to ensure secure containment; stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; different locations should be designated to stockpile each material to enhance reuse; 	Good site practice to minimise the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance ETWB TCW No. 19/2005
S7.3.4.6	<p><u>Collection and Transportation of Waste</u></p> <p>The following recommendation should be implemented to minimise the impacts:</p> <ul style="list-style-type: none"> remove waste in timely manner; employ the trucks with cover or enclosed containers for waste transportation; obtain relevant waste disposal permits from the appropriate authorities; and disposal of waste should be done at licensed waste disposal facilities. 	Minimise waste impacts from storage	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.3.4.8 – S7.3.4.15	<p><u>Excavated and C&D Materials</u></p> <p>Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at public filling areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials:</p> <ul style="list-style-type: none"> maintain temporary stockpiles and reuse excavated fill material for 	Minimise waste impacts from excavated and C&D materials	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>backfilling;</p> <ul style="list-style-type: none"> carry out on-site sorting; make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; and implement a recording system for the amount of waste generated, recycled and disposed of for checking. <p>The recommended C&D materials handling should include:</p> <ul style="list-style-type: none"> On-site sorting of C&D materials; Reuse of C&D materials; and Use of Standard Formwork and Planning of Construction Materials purchasing. 					<ul style="list-style-type: none"> ETWB TCW No. 19/2005 Project Administrative Handbook for Civil Engineering Works, 2012 Edition
S7.3.4.17 – S7.3.4.18	<p><u>Chemical Waste</u></p> <p>If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producer. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste Contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
S7.3.4.19	<p><u>General Refuse</u></p> <ul style="list-style-type: none"> General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. A reputable waste collector should be employed to remove general refuse on a daily basis. 	Minimise production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.3.4.20	<p><u>Sewage</u></p> <ul style="list-style-type: none"> The WMP should document the locations and number of portable chemical toilets depending on the number of workers, land availability, 	Minimise production of sewage impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>site condition and activities.</p> <ul style="list-style-type: none"> Regularly collection by licensed collectors should be arranged to minimise potential environmental impacts. 					
Waste Management (Operational Waste)						
S7.4.4.1	<p><u>General Refuse</u></p> <p>A reputable waste collector should be employed to remove general refuse on a daily basis.</p>	Remove general refuse during routine road cleaning activities on the roads network and avoid odour, pest and litter impacts	Highways Department / Contractor	Roads network for the C&C facilities and Lin Ma Hang Road	Operational phase	<ul style="list-style-type: none"> Waste Disposal Ordinance

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Land Contamination						
S8.9.1.1	Re-appraisal of the potentially contaminated site (SRC-1)	Identify any hot spots for SI within the southeast and western portions of SRC-1	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Once the works area for the Project is confirmed and site access is available (e.g. after land resumption)	<ul style="list-style-type: none"> • Annex 19 of the TM-EIAO, Guidelines for Assessment of Impact On Sites of Cultural Heritage and Other Impacts (Section 3 : Potential Contaminated Land Issues); • Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management; • Guidance Notes for Contaminated Land Assessment and Remediation; and • Practice Guide for Investigation and Remediation of Contaminated Land • Recommendations in Health Risk Assessment
S8.11.1.1	Preparation and submission of Contamination Assessment Plan (CAP) to EPD for review and approval, if required	Present the findings of the re-appraisal and strategy of the recommended SI, if required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	After land resumption and prior to the construction phase	Ditto
S8.11.1.2	Preparation and submission of Contamination Assessment Report (CAR) to EPD for review and approval, if required	Present the findings of SI, if any, and evaluate the level and extent of potential contamination	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S8.11.1.2	Preparation and submission of Remediation Action Plan (RAP) to EPD for review and approval if contamination is identified	Recommend appropriate mitigation measures for the contaminated soil and groundwater identified in the assessment if remediation is required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto
S8.11.1.2	Preparation and submission of Remediation Report (RR) to EPD for review and approval following the completion of any necessary remediation works	Demonstrate that the decontamination work is adequate and is carried out in accordance with the endorsed CAR and RAP	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
<i>Ecology (Construction Phase)</i>						
S9.7.2.3	Preparation and submission of Upland Grassland Reinstatement Plan to EPD for agreement.	<p>An Upland Grassland Reinstatement Plan will be prepared by a qualified ecologist/botanist with full details of the findings of a baseline grassland survey, the practical details and methodology of the physical excavation, transport and storage or turves/topsoil and their subsequent reinstatement once the receptor sites have been established, along with an implementation programme of reinstatement, post- reinstatement monitoring and maintenance programme.</p> <p>A contingency plan should be proposed in the Grassland Reinstatement Plan so as to describe the action and limit levels and the action plan if certain performance criteria (such as area of preferred habitat) are not met during the monitoring and maintenance period.</p>	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Upland Grassland Reinstatement Plan	Engineered slopes of Crematorium Indicative locations for Grassland Reinstatement should be referred to Figure 9.11 of the EIA Report	Prior to construction phase	<ul style="list-style-type: none"> • Reinstatement and establishment requirements to be detailed in Upland Grassland Reinstatement Plan • TM-EIAO
S9.7.2.5 – S9.7.2.6	Preparation and submission of a Vegetation Survey Report and Transplantation Proposal (if needed as concluded in the Vegetation Survey Report) to EPD for agreement.	The Vegetation Survey will report the presence, as well as update the conditions, number, locations and habitat types of any identified floral species of conservation importance to be impacted by the development,	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for	Within the Project Area where applicable	Prior to construction phase	<ul style="list-style-type: none"> • Survey findings and transplantation methodology to be detailed in Vegetation Survey Report and Transplantation Plan

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
		and evaluate suitability and/or practicality of transplantation. The Transplantation Proposal will recommend locations of the receptor site(s), transplantation methodology, implementation programme of transplantation and post-transplantation monitoring and maintenance programme.	Vegetation Survey Report and Transplantation Proposal.			respectively. • TM-EIAO.
S9.7.5.3 – S9.7.5.5, S9.8.1.6	Preparation and submission of Enhancement Woodland Proposal to EPD for agreement.	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report	Prior to construction phase	• Enhancement planting and establishment requirements to be detailed in Wooded Enhancement Proposal. • TM-EIAO
S9.7.3.1 – S9.7.3.3	Indirect impacts due to potential changes in water quality, hydrology and sedimentation could occur to a series of downstream watercourses and wetland systems (including the wet woodland, marsh and mitigation ponds) during both the construction (for the Platform and LMHR widening works) and operational stages. Generally, indirect water impact to any aquatic fauna during the construction phase should easily be avoided by implementing water control measures (ETWB TCW No. 5/2005) to avoid direct or indirect impacts any watercourses and good site practices (further details are discussed in Section 6 of the EIA Report).	Minimise the indirect impacts to Water Quality and Hydrology	Contractor /detailed design consultant.	On the edge of any active works area, 30m from the watercourse	Prior to commencement and during construction phase	• ETWB TCW No. 5/2005 • TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	In addition, construction phase impacts on the watercourses, riparian corridor and fauna using these areas will be minimised by erection of a 2m high, solid, dull green site boundary fence on the edge of any active works area, 30m from the watercourse. Where this is not practicable due to site constraints, demarcation fencing will need to be erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. Detailed mitigation measures will be designed at the detailed design stage.					
S9.7.3.4 – S9.7.3.6	<p>Mitigation for noise disturbance (details refer to S5.5.5 to S5.6.6 of this table). Site formation and construction are tentatively proposed to cover a 65-month period from mid 2017 to late 2022.</p> <p>As a precautionary approach, consideration should be given at the detailed design stage to avoid the use of highly reflective materials in the design and implementing the use of opaque materials, fritting, breaking up external reflections with stickers or plastic wrap and/or any other bird-friendly design for noise barriers.</p> <p>Works will be restricted to daytime and any construction lighting should be designed and positioned as to not impact on adjacent ecologically sensitive areas.</p>	The construction work and site formation will be phased in order to reduce overall noise disturbance impacts in particular areas. Collisions usually occurs as a result of birds perceiving a clear path through an object that is transparent or appears to be transparent at some distance, or if the noise barrier is highly reflective which would appear to be composed of the adjacent natural vegetation. Furthermore, mitigation measures to control noise disturbance during this phase will involve the selection of quieter plant, use of movable noise barriers and erection of hoarding and fencing to demarcate the site boundary	Contractor Project Proponent	All construction sites	Prior to commencement and during construction phase	• TM-EIAO.

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S.9.7.3.7	<p>In order to demonstrate ecological awareness and to minimise the risk of indirect impacts from water pollution and hill fires, a series of good site practices should be adopted by site staff throughout the construction phase at each works site. These are as follows:</p> <ul style="list-style-type: none"> • Put up signs to alert site staff about any locations which are ecologically sensitive and measures to prevent accidental impacts; • Erection of temporary geotextile silt or sediment fences/oil traps around any earth-moving works to trap any sediments and prevent them from entering watercourses; • Prohibition of soil storage against trees or close to waterbodies; • Delineation of works site to prevent encroachment onto adjacent habitats and fence off areas which have some ecological value; • No smoking, hot works or sources of fire close to upland grassland; • No on-site burning of waste; and • Waste and refuse in appropriate receptacles. 	Minimise impacts on hydrological condition and water quality of hillside watercourses and reduce chances of hillfires.	Contractor	All construction sites	Prior to commencement and during construction phase	• TM-EIAO.
S.9.7.3.9	Precautionary checks by a suitably experienced ecologist of the vegetation for the presence of nesting birds should be carried out in the breeding season (February to July) before vegetation clearance. These impacts can be avoided by conducting vegetation clearance during the non-breeding season (tentatively August-January) and phased through the project period to minimise impacts.	Minimise the impacts to breeding birds within the works areas.	Contractor	All construction sites	Prior to site clearance	• TM-EIAO • WAPO
Ecology (Operational Phase)						

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S9.7.2	Establishment, maintenance and monitoring of a Upland Grassland Reinstatement Area	Reinstatement of upland grassland and to maintain connectivity in Sandy Ridge.	Project Proponent / Contractor / Maintenance Authority	Engineered slopes of Crematorium Indicative locations for Grassland Reinstatement should be referred to Figure 9.11 of the EIA Report	Operational phase	<ul style="list-style-type: none"> Monitoring methodology and successfulness of survival of upland grassland should follow Upland Grassland Reinstatement Plan. TM-EIAO.
S9.7.5.3 – S9.7.5.6	Establishment, maintenance and monitoring of an enhancement woodland	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report	Operational phase	<ul style="list-style-type: none"> Enhancement planting and establishment requirements to be detailed in Wooded Area Proposal. TM-EIAO.
S9.7.4.1 – S9.7.4.5	<u>Mitigation for Impacts to Water Quality and Hydrology (Operational Phase)</u> <ul style="list-style-type: none"> Stormwater drainage system will be further developed in detailed design stage to collect dusty materials from water collected from the platform and associated road system. Silt traps will be installed to ensure removal of dusty materials. Regular cleaning will be conducted to avoid debris entering downstream rivers during first flush; and The proposed small diameter bore pile system at the foundation of the proposed platform structure. 	Specific mitigation measures will be implemented to prevent indirect impacts wetland habitats and fauna. Mitigation measures are to be further developed in the detailed design stage to address any water quality impacts due to the drainage from the proposed platform, and any erosion issues due to the drainage from the	Detailed Design Consultant	Wet woodland (and further down the marsh and mitigation ponds) and the seasonal watercourse to the east of the Project boundary	Detailed Design phase/Operational phase	<ul style="list-style-type: none"> TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
		<p>proposed platform.</p> <p>The surface runoff collected on the platform will be captured by a stormwater drainage system, which will be further developed at the detailed design stage</p> <p>The proposed small diameter bore pile system at the foundation of the proposed platform structure would allow a notional free area of about 87 – 91% for groundwater to pass through</p>				
S9.7.4.6 – S9.7.4.7	<p><u>Minimise the potential indirect light disturbance on the Street Lighting on fireflies surrounding the Project Site during operational phase</u></p> <ul style="list-style-type: none"> It is considered that at the detailed design stage, street lighting of similar lux/light intensity as to what is currently present is utilised. Furthermore, as a precautionary measure, it is suggested that deflectors are fixed to the back of the street lights to prevent additional light reaching the marsh and causing adverse impacts to fireflies. 	Reduce light pollution and impact on the nearby habitats and their associated wildlife groups, particularly nocturnal fireflies.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO
S9.7.4.9 – S9.7.4.9	<p>The increase in visitors to the columbarium allows greater public access to the upland grassland of Sandy Ridge and in turn, the potential for hill fires is also increased. Fires may emanate from discarded cigarettes and from specific practices during festivals or grave-sweeping.</p> <p>In order to reduce the risk of hill fires, sufficient educational signage should be displayed throughout the columbarium warning people of the risks of fire and strictly prohibits practices that could cause hill fires. This will require input in the detailed design phase.</p>	Minimise the risk of hill fires.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Fisheries						
S10.5.1.1	<p>No loss of fish ponds is anticipated and no <i>in situ</i> mitigation is required.</p> <p>However, mitigation measures for water quality (S6.4.4 – S6.5.4 in this table) proposed are also pertinent in ensuring that fisheries impacts of the Project do not occur downstream of the Project area either locally or in Inner Deep Bay.</p>	-	-	-	-	-

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
<i>Landscape & Visual</i>						
S11.8.1.3, Table 11.9	CM1 – The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape, and the reliance on off-site construction.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM3 – Screening of construction works by hoardings/noise barriers around works area in visually unobtrusive colours and to screen construction works. It is proposed that screening be compatible with the surrounding environment and non-reflective, recessive colours be used. Hoarding should be taken down at the end of the construction period.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM4 – Dust and Erosion Control for Exposed Soil - Excavation works and demolition of existing building blocks shall be well planned with precautions to suppress dust. Exposed soil shall be covered or watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Suitable drainage shall be provided around construction sites to avoid discharge of contaminants and sediments into sensitive water-based habitat.	Minimise indirect landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM5 – Control night-time lighting and glare by hooding all lights.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	CM6 – Tree Protection and Preservation – Woodland, plantation and other vegetation within the Study Area will be protected and preserved as far as possible in accordance with ETWB TCW No. 29/2004 - Registration of Old and Valuable Trees, and Guidelines for their Preservation and DEVB TCW No.07/2015 – Tree Preservation. Detailed Design Considerations are made to avoid impacts to trees, e.g. proper viaduct/ bridge design routing to avoid majority of the woodland, locating the columbarium buildings in areas with less trees and ensuring design of the buildings has as small a footprint as practical.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB
S11.8.1.3, Table 11.9	CM7 – Tree Transplantation – Tree(s) will be affected according to the Tree Preservation and Removal Proposal to be carried out in a later stage. Established trees of value are to be re-located where practically feasible.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	<ul style="list-style-type: none"> • ‘Guidelines for Tree Risk Management and Assessment Arrangement on an Area Basis and on a Tree Basis’, issued January 2011, Greening, Landscape and Tree Management (GLTM) Section, DevB • Latest recommended horticultural practices from GLTM Section, DevB

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	CM8 - Implementing precautionary control measures during construction stage accordingly to ETWB TCW No. 5/2005 – Protection of natural streams/ rivers from adverse impacts arising from construction works to avoid direct or indirect impacts any watercourses and good site practices.	Minimize landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	<ul style="list-style-type: none"> • ETWB TCW No. 5/2005 – Protection of natural streams/ rivers from adverse impacts arising from construction works
S11.8.1.3, Table 11.9	OM1 – Compensatory Woodland Planting - The arrangement of compensatory planting (e.g. areas of woodland to be compensated and space to be allowed within the Project Site) will be subject to detailed engineering design, landscape design and planting plan, and is recommended to be implemented prior to the construction activities as far as practical.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Prior to Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	OM2 – Compensatory Tree Planting for Plantation and Other Vegetated Areas - Compensatory planting should be provided in accordance with DEVB TCW No. 07/2015 to compensate for those trees felled. According to the preliminary design, compensatory trees will be planted on the cut/fill slopes, along new roads and in car parks. The selection of planting species shall be made with reference to the species identified in the future Detailed Tree Survey and be native to Hong Kong or the South China region.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
S11.8.1.3, Table 11.9	OM3 – Amenity Planting and aesthetic streetscape design of hard landscaping for Pedestrian Walkway, Roadside - Roadside amenity planting should be provided along Sha Ling Road, Lin Ma Hang Road, as well as the internal road within Sandy Ridge columbarium and crematorium site; to enhance the landscape quality of the existing and proposed transport routes. Climbers are proposed to cover vertical, hard surfaces of the piers of the proposed viaducts, and also the newly formed retaining wall within the site. Shade tolerant plants will be planted, where light is sufficient, to improve aesthetic value of areas under viaducts.	Minimise visual impact and also enhance landscape.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	<ul style="list-style-type: none"> • Guidelines on Greening of Noise Barriers, issued April 2012, GLTMS, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
S11.8.1.3, Table 11.9	OM4 – Greening Works and Contour Grading Works on Cut/ Fill Slopes - Greening works such as hydroseeding/ terraces of shrub or tree planting will be provided where slope gradient allows, according to Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	OM5 – Landscape design treatment to be provided by relevant government department.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-
S11.8.1.3, Table 11.9	OM6 – Architectural and chromatic treatment of the hard architectural and engineering structures and facilities.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-
S11.8.1.3, Table 11.9	OM7 – Aesthetic design of the proposed noise barriers.	Mitigate the visual impact	Funded by CEDD and implemented by Contractor	Along Sha Ling Road and Lin Ma Hang Road	Construction phase	<ul style="list-style-type: none"> • WBTC No. 36/2004 - ACABAS - submission is required to ACABAS for approval of any bridges and associated structures within the public highway system.
S11.8.1.3, Table 11.9	OM8 - Silt traps should also be incorporated into design of road gullies for the natural water stream(s).	Minimise the landscape impact on natural stream	Funded by CEDD and implemented by Contractor	Within Project Site	Construction Phase	

Notes:

- (a) A detailed Tree Survey Report showing all identified valuable trees and OVT will be undertaken in a separate Tree Preservation and Removal Proposal.
- (b) Wood resulting from tree removal should be recycled as mulch or soil conditioner for re-use within the Project or in other projects as far as possible e.g. for the construction of soft landscape work, were practical.
- (c) Contractor is responsible for landscaping during the agreed establishment and maintenance period. Other designated management and maintenance agents to take up maintenance and management of landscaping after end of agreed period.
- (d) Highways Department (HyD) is responsible for maintenance and management of landscaping of public road side slope, Leisure and Cultural Services Department (LCSD) is responsible for the management and maintenance of soft landscapes along non-expressway public roads outside Country Park and Food and Environmental Hygiene Department (FEHD) is responsible for maintenance and management of landscaping of other areas allocated to FEHD.
- (e) The landscape mitigation treatment of the future development site shall follow the below frameworks:
 - Buffer planting shall be provided to soften the edge of the site.
 - Aesthetic landscape treatment including both soft and hard landscape features shall be provided.
 - Vertical greening shall be provided as far as practicable.
 - At-grade tree planting shall be provided as far as possible while planting space is allowed, to enhance the overall environment.
 - Architectural design shall blend in with the surrounding environment.
 - Overall greening ratio shall comply with TC(W) No.3/2012 Site coverage of Greenery for Government Building Projects.

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
The compensatory woodland planting shall be included woodland mixed whips, seeding, and shrubs. The principle of the location shall be the extension of the existing woodland, as well as the original lost woodland location. The proposal will be agreed with AFCD, the woodland enhancement planting shall refer to Chapter 9.						

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
<i>EM&A Project</i>						
S13.1.1.1, S13.2.1.2	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Highways Department	All construction sites	Construction phase	<ul style="list-style-type: none"> • EIAO Guidance Note No.4/2010 • TM-EIAO
S13.2.1.1 – S13.4.1.2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Highways Department / Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • EIAO Guidance Note No.4/2010 • TM-EIAO

Appendix O

Implementation of Water Quality Mitigation Measures

Water Quality Mitigation Measures under CV/2016/10 (Contract 1)



Provided efficient silt removal facilities to prevent leakage of muddy runoff from site area.



Temporary drainage was provided to prevent runoff going through site surface.



Provided earth bunds and barriers to minimize muddy runoff.



Hydro-seeding was applied on the slope to minimize muddy runoff.



Hydro-seeding was applied on the slope to minimize muddy runoff.



Exposed slopes surface were compacted and covered with tarpaulin sheet or similar means.

Water Quality Mitigation Measures under CV/2017/02 (Contract 2)



Sedimentation tank was provided to treat any wastewater at TTA1.



Sedimentation tank was provided to treat any wastewater at TTA2.



Sump pit and geo-textile were installed to prevent leakage of muddy runoff at Area Part A1.



Exposed slopes surface was paved by cement mortar to minimize muddy runoff.