

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.57) – APRIL 2023**

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

Date	Reference No.	Prepared By	Certified By
15 May 2023	TCS00881/18/600/R0745v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	11 May 2023	First Submission
2	15 May 2023	Amended according to the IEC's comment

Our Ref: TCS00881/18/300/L0748

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

Attn: Mr. SHUM Ngai Hung, Steven

15 May 2023
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.57) – April 2023**

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 Contracts 1 and 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

Our Ref.: PL-202305027

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

15 May 2023

Dear Sir,

**Site Formation and Associated Infrastructural Works for Development of Columbarium at
Sandy Ridge Cemetery
Monthly Environmental Monitoring and Audit Report (No. 57) April 2023**

I refer to the email of the ET regarding the captioned Monthly Report. According to Section 3.4 of the EP-534/2017/A and the FEP-01/534/2017/A, I hereby verify the Monthly EM&A Report for April 2023 (Version 2) with Ref. No. TCS00881/18/600/R0745v2.

You are required to follow up the comments from EPD and IEC on the relevant EPs requirement and provide supplementary information of this report for our further review as soon as possible.

Yours faithfully,



Leung CH Jacky
Independent Environmental Checker

EXECUTIVE SUMMARY

ES.01. This is the 57th Monthly Environmental Monitoring and Audit (EM&A) Report summarizing the monitoring results and inspection findings under the Project for the period from 1st to 30th April 2023 (the Reporting Month).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

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

Table ES-1 Summary of EM&A Programme in the Reporting Month

Issues	Environmental Monitoring Parameters / Inspection	Monitoring Locations		Total Occasions/ dates
		CV/2016/10	CV/2017/02	
Air Quality	1-hour TSP	ASR-1	ASR-2	54
	24-hour TSP		ASR-3	15
Construction Noise	L _{eq} (30min) Daytime	CN-1 CN-2	CN-3 CN-4	12
Water Quality	In-situ measurement and Water sampling	M3	M1, M2 and M4	13
Ecology	Sensitive Habitat	Transect within site area of CV/2016/10	Transect within site area of CV/2017/02	11 th April 2023
Landscape & Visual	Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	28 th April 2023
Inspection & Audit	Environmental Team (ET) Regular Environmental Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	4
	Independent Environmental Checker (IEC) Monthly Environmental Site Audit			1

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES.03. In the Reporting Month, no exceedance of air quality and water quality monitoring was recorded. No noise complaint (which triggered Action Level) was received and Limit Level exceedance for noise monitoring exceedance was recorded. The statistics of environmental exceedance, Notification 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	
				Investigation Findings	Corrective Actions
Air Quality	1-hour TSP	0	0	-	-
	24-hour TSP	0	0	-	-
Construction Noise	Leq _{30min} Daytime	0	0	-	-
Water Quality	DO	0	0	-	-
	Turbidity	0	0	-	-
	Suspended Solids (SS)	0	0		

ES.04. Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on 11th April 2023. After analysing survey results in April from 2019 to 2023 for Contract 1, the species richness and abundance for wetland habitat were unstable and a rapid rebound from 2022 was recorded recently. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site. For Contract 2, there was approximate 30% decrease in species richness and abundance for wetland and non-wetland habitats in April 2023 when comparing to the April of 2022. Since Action Level of

respond Measures have been triggered, investigation of cause for decrease was conducted and according to the on-site observation, there are new built workshops by others situated on both sides of Lin Ma Hang Road so the disturbance to fauna species from construction works could be increased. Due to the cause identified was not related to this project remedial action to remove or reduce source of disturbance is limited.

- ES.05. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- ES.06. In the Reporting Period, there was no vegetation clearance for both Contract 1 and Contract 2, and precautionary check for the presence of nesting birds was not required to carry out.
- ES.07. Landscape and visual inspection at both Contracts were undertaken on **28th April 2023**. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone and ensure no works is allowed within the TPZ.

ENVIRONMENTAL COMPLAINT

- ES.08. No environmental complaint was recorded in this Reporting Month. The statistics of summons or successful prosecutions are summarized in the following tables.

Table ES-3 Environmental Complaint Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 30 th April 2023	Contract 1	0	2	(1) Air Quality (1) Noise
	Contract 2	0	5	(1) Water (2) Air Quality (1) Noise (1) soil/ muddy water

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES.09. 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 Summons Statistics		
		Frequency	Cumulative	Summons Nature
1 st – 30 th April 2023	Contract 1	0	0	NA
	Contract 2	0	0	NA

Table ES-5 Environmental Prosecution Summaries in the Reporting Month

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Prosecution Nature
1 st – 30 th April 2023	Contract 1	0	0	NA
	Contract 2	0	0	NA

- ES.010. In addition, no complaint and emergency event relating to violation of environmental legislation for illegal dumping and landfilling was received.

REPORTING CHANGE

- ES.011. No reporting change was made in the Reporting Month.

SITE INSPECTION

ES.012. In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the Resident Engineer, ET and the Contractor of the Contract 1 on **6th, 13th, 20th and 27th April 2023**. Moreover, joint site inspections for Contract 2 by the RE, ET and the Contractor of Contract 2 were carried out **6th, 13th, 20th and 27th April 2023**. IEC attended joint site inspection for both Contracts on **20th April 2023**. No non-compliance was noted during the site inspections.

FUTURE KEY ISSUES

ES.013. During wet season, water quality mitigation measures as recommended in the EM&A Manual should be fully implemented, in particular to prevent surface runoff and other pollutants from flowing to local stream and Conservation Area.

ES.014. The Contractors are reminded to pay special attention on the air quality mitigation measures such as wheel wash facilities, watering of haul roads, loose soil construction surface and covering of dusty materials with tarpaulin sheet should be implemented as far as practicable.

ES.015. 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.

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1. INTRODUCTION

1.1 PROJECT BACKGROUND

1.1.1 Civil Engineering and Development Department (CEDD) 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:

Designated Works under EP-534/2017/A

- (i) Site formation of about 5.5 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 800m) connecting the Crematorium and Man Kam To Road and the pick-up/drop-off point at Man Kam To Road;
- (iii) Widening two sections of the existing Sha Ling Road (about 900m and 500m respectively);
- (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 (the barging point is rejected by Tuen Mun DC and no improvement works required)

Designated Works under FEP-01/534/2017/A

- (i) Site formation works for a formed platform of about 1.8 hectares and associated drainage, sewerage and landscape works for development of Columbarium at the Sandy Ridge Cemetery;
- (ii) Construction of the pick-up/drop-off point at Man Kam To Road;
- (iii) Widening of 900m of the existing Sha Ling Road;
- (iv) Improvement works to the existing barging point at Siu Lam (the barging point is rejected by Tuen Mun DC and no improvement works required)

1.1.2 To facilitate the Project management, the Project works were separated into three Contracts to be executed which are described in 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* (hereinafter named “Contract 1”):-

- 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* (hereinafter named “Contract 2”):-

- 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 confirmed):-*

- 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 (AUES) has been commissioned by the Contractors as an Environmental Team (ET) to implement the Environmental Monitoring and Audit (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 Major construction work of Contract 1 and Contract 2 was commenced on 16 August 2018 and 5 November 2018 respectively.

1.1.10 This is the 57th Monthly EM&A Report summarizing the monitoring results and inspection findings for the period from 1st to 30th April 2023.

1.2 REPORT STRUCTURE

1.2.1 The Monthly EM&A 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** *Noise Monitoring Results*
- Section 6** *Water Quality Monitoring Results*
- Section 7** *Ecology Monitoring Results*
- Section 8** *Landscape & Visual*
- Section 9** *Waste Management*
- Section 10** *Site Inspections*

- Section 11** *Environmental Complaints and Non-Compliance*
- Section 12** *Implementation Status of Mitigation Measures*
- Section 13** *Conclusions and Recommendation*

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](#). Construction activities of the Contract 1 and Contract 2 undertaken in the Reporting Month are presented below.

Contract 1 (CV/2016/10)

- Paint Road Marking
- Planting works

Contract 2 (CV/2017/02)

- Construction of footpath at Lin Ma Hang Road
- Watermain pipe and sewer installation at Man Kam To Road North Slow Lane
- Planting works at Sandy Ridge and Lin Ma Hang Road

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 Summary of the relevant permits, licenses, and/or notifications on environmental protection for the 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
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	Sa Ling Road (Sandy Ridge Cemetery)	Valid

Item	Description	License/ Permit ref no.	License/ Permit Status
		14/12/2018	
		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 Valid
		License no: WT00033335-2019 Issued date: 29/03/2019 Expire Date: 31/03/2024	Columbarium at Sandy Ridge Cemetery Valid
		License no: WT00034717-2019 Issued date: 9/10/2019 Expire Date: 31/10/2024	Fanling Station Road 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

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 and no approval is required.
2	Condition 2.11 of FEP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted and no approval is required.
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	Pending approval
5	Condition 2.14 to 2.16 of FEP	Vegetation Survey Report and Vegetation Transplantation Proposal for Contract 1	Approved by EPD on 12 October 2018
6	Condition 2.17 of FEP	Woodland Compensation Plan (Rev.05)	Approved by EPD on 30 Jun 2020
7	Condition 2.18 of FEP	Monitoring and Survey Plan for Golden-headed Cisticola for Contract 1 (Rev.02)	Approved by EPD on 22 Oct 2019
8	Condition 2.20 of FEP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 1 (Rev.04)	Pending approval
9	Condition 2.22 of FEP	Traffic Noise Mitigation Plan Contract 1 (Rev. 4)	Pending approval
10	Condition 3.3 of the FEP	Baseline Monitoring Report (Air, Noise and Water)	Approved by EPD on 25 October 2018

Item	EP and / or FEP Stipulation	Description	Status
11	Condition 4.2 of the FEP	The Contract Internet website	Internet website address has notified EPD on 15 Jun 2018 and no approval is required.

Table 2-4 Status of Submission as under EP

Item	EP and / or FEP Stipulation	Description	Status
1	Condition 2.10 of EP	Management organization of : i) the main construction companies; ii) ET; and iii) IEC and the supporting team	Submitted and no approval is required.
2	Condition 2.11 of EP	i) Detailed phasing programme of all construction works; and ii) Location plan of all construction works	Submitted and no approval is required.
3	Condition 2.12 of EP	Layout Plan for the proposed footpath at Lin Ma Hang Road	Approved by EPD on 25 April 2022
4	Condition 2.13 of EP	Contamination Assessment Plan (CAP)	Approved by EPD on 27 May 2019
5	Condition 2.14 of EP	Grassland Reinstatement Plan	Pending approval
6	Condition 2.15 to 2.17 of EP	Vegetation Survey Report and Vegetation Transplantation Proposal under Contract 2	Approved by EPD on 15 June 2022
7	Condition 2.18 of EP	Woodland Compensation Plan (Rev.05)	Approved by EPD on 30 Jun 2020
8	Condition 2.19 of EP	Monitoring and Survey Plan for Golden-headed Cisticola Contract 2	Approved by EPD on 9 Nov 2022
9	Condition 2.21 – 2.22 of EP	Landscape & Visual Mitigation and Tree Preservation Plan(s) Contract 2	Pending approval
10	Condition 2.23 of EP	Traffic Noise Mitigation Plan Contract 2	Pending approval
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 and no approval is required.

3. SUMMARY OF IMPACT MONITORING REQUIREMENT

3.1 GENERAL

3.1.1 The EM&A 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;
- Ecology; and
- Landscape and visual

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 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 Conservation 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 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	Laser Dust Monitor, Model AM510

Equipment	Model
	/ 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	Rion NL-52 Sound Level Meter /Rion NL-31 Sound Level Meter
Calibrator	Rion NC-73 Acoustical Calibrator
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 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 Teflon/stainless steel bailer or self-made sampling bucket
Thermometer & DO meter	YSI Professional DSS
pH meter	YSI Professional DSS
Turbidimeter	YSI Professional DSS
Salinometer	YSI Professional DSS
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

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

Notes:

- 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, air quality monitoring was performed at all designated locations. Impact monitoring schedule provided to all relevant parties was shown in [Appendix G](#).

4.1.2 In this Reporting Month, there were **6** sessions of 24-hour TSP and **18** sessions of 1-hour TSP undertaken at each designated station for air quality monitoring. The air quality monitoring results 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 monitoring 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 (µg/m ³)	1-hour TSP (µg/m ³)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
1 Apr 23	42	4-Apr-23	13:00	82	83	80
6 Apr 23	25	6-Apr-23	13:05	71	75	78
11 Apr 23	18	12-Apr-23	13:00	85	89	82
17 Apr 23	62	18-Apr-23	13:15	87	91	89
22 Apr 23	54	24 Apr 23	9:20	64	59	57
28 Apr 23	60	29-Apr-23	13:07	73	78	75
Average (Range)	44 (18 – 62)	Average (Range)		78 (57 – 91)		

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

Date	24-hour TSP (µg/m ³)	1-hour TSP (µg/m ³)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
1 Apr 23	47	4-Apr-23	13:06	78	83	80
6 Apr 23	29	6-Apr-23	13:09	71	76	82
11 Apr 23	79	12-Apr-23	13:05	82	86	90
17 Apr 23	57	18-Apr-23	13:20	88	91	85
22 Apr 23	65	24 Apr 23	9:24	60	56	63
28 Apr 23	50	29-Apr-23	13:15	68	64	70
Average (Range)	55 (29 – 79)	Average (Range)		76 (56 – 91)		

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

Date	24-hour TSP (µg/m ³)	1-hour TSP (µg/m ³)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
1 Apr 23	42	4-Apr-23	13:14	72	70	68
6 Apr 23	63	6-Apr-23	13:15	68	65	62
11 Apr 23	45	12-Apr-23	13:14	70	75	76
17 Apr 23	62	18-Apr-23	13:26	86	92	89
22 Apr 23	35	24 Apr 23	9:32	54	51	58
28 Apr 23	31	29-Apr-23	13:30	57	63	65
Average (Range)	46 (31 – 63)	Average (Range)		69 (51 – 92)		

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 below the Action/ Limit 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, noise monitoring was performed at all designated locations. Impact monitoring schedule provided to all relevant parties was shown in [Appendix G](#).

5.1.2 In this Reporting Month, 4 sessions of noise monitoring were undertaken at each 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(*)
4 Apr 23	13:00	65	13:36	60
12 Apr 23	13:00	67	13:28	65
18 Apr 23	15:16	66	14:40	59
24 Apr 23	13:15	68	10:13	68
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
4 Apr 23	14:12	63	15:00	63
12 Apr 23	15:15	58	16:05	58
18 Apr 23	14:03	63	13:26	62
24 Apr 23	14:15	61	15:41	63
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} .

5.2 NOISE MONITORING EXCEEDANCE

5.2.1 As shown in [Tables 5-1 and 5-2](#), no noise complaint (which triggered Action Level) and Limit Level exceedance for noise monitoring exceedance was recorded in the Reporting Month.

6. WATER QUALITY

6.1 MONITORING RESULTS

6.1.1 In the Reporting Month, water quality monitoring was performed at all designated locations. Impact monitoring schedule provided to all relevant parties was shown in [Appendix G](#).

6.1.2 In the Reporting Month, a total of **12** 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)
1 Apr 23	6.65	3.4	7.5
4 Apr 23	7.40	4.9	7.5
6 Apr 23	7.40	4.9	6.5
11 Apr 23	6.86	3.1	7.0
13 Apr 23	6.98	3.1	6.5
15 Apr 23	7.08	3.1	5.5
18 Apr 23	6.66	1.9	3.0
20 Apr 23	6.95	5.5	6.0
22 Apr 23	7.18	5.1	3.5
25 Apr 23	7.09	2.6	3.0
27 Apr 23	7.35	2.7	3.5
29 Apr 23	7.21	3.3	3.5

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
1 Apr 23	8.02	7.77	7.82	6.3	1.4	4.9	6.5	7.0	4.0
4 Apr 23	7.58	7.71	7.31	4.2	4.1	4.7	6.5	8.5	4.0
6 Apr 23	7.72	7.78	7.80	3.8	4.5	5.2	2.5	6.5	4.5
11 Apr 23	7.54	7.64	6.25	2.9	4.8	5.3	3.5	9.5	4.0
13 Apr 23	7.46	7.42	6.51	2.6	4.5	2.7	3.0	7.0	3.5
15 Apr 23	7.53	7.60	5.99	2.5	3.2	5.4	3.5	6.5	4.5
18 Apr 23	7.33	7.79	5.82	2.1	1.4	4.8	2.0	2.5	4.5
20 Apr 23	7.18	7.55	6.24	6.6	4.5	3.8	7.0	4.0	4.0
22 Apr 23	7.30	7.57	6.43	5.4	7.0	4.3	3.5	3.5	3.5
25 Apr 23	7.36	7.80	5.40	2.5	7.3	3.9	3.5	4.0	4.0
27 Apr 23	7.45	7.51	5.93	2.5	3.3	4.2	3.5	3.0	4.5
29 Apr 23	7.51	8.37	5.44	2.4	3.4	4.6	3.5	4.0	2.5

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	7.0	7.7	0.03	0.07	19.8	23.9	<0.1	<0.1
M2	7.1	7.5	0.07	0.10	20.3	25.2	<0.1	<0.1
M3	7.1	7.7	0.01	0.03	20.5	25.0	<0.1	<0.1
M4	7.1	7.5	0.05	0.10	20.9	25.4	<0.1	<0.1

6.2 WATER QUALITY MONITORING EXCEEDANCE

6.2.1 In this Reporting Month, no water quality exceedances were recorded. The summary of non-compliance of water quality performance is shown 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

6.2.1 Notification of Exceedance and the investigation for exceedance in the Reporting Month 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
--	--	--	--

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)	√	√	√	√	√	√	√	√	√	√	√	√

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

Mammal Survey

7.2.4 Mammal surveys will be conducted along the proposed transects (shown in **Appendix K** - Ecological Survey Reports) in 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 K** - Ecological Survey Reports) 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 K** - Ecological Survey Reports) 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 K** - Ecological Survey Reports) 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 **11th April 2023**, 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 would 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 no mammal species recorded in the monitoring area.

Birds

7.3.3 There were a total of 43 bird individuals from 13 species recorded in the monitoring area. No Golden-headed Cisticola was observed during the bird survey.

Herpetofauna

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

Butterfly

7.3.5 There were a total of 4 butterfly individuals from 2 species recorded in the monitoring area.

Dragonfly

7.3.6 There were a total of 2 dragonfly individuals from 1 specie 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** and **7-5**.

Table 7-4 Result of Faunal Survey under Contract 1

Scientific Name	Common / Engineer Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
Mammal Survey								
--	--	--	--	--	--	--	--	--
Avifauna Survey								
<i>Francolinus pintadeanus</i>	Chinese Francolin	中華鷓鴣		1				
<i>Centropus sinensis</i>	Greater Coucal	褐翅鴉鵂			1			
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩		2				
<i>Eudynamis scolopaceus</i>	Asian Koel	噪鵲		1				
<i>Cacomantis merulinus</i>	Plaintive Cuckoo	八聲杜鵑		1				
<i>Hierococyx sparverioides</i>	Large Hawk Cuckoo	大鷹鵂		1				
<i>Apus nipalensis</i>	House Swift	小白腰雨燕		8			1	
<i>Corvus macrorhynchos</i>	Large-billed Crow	大嘴烏鴉		1				
<i>Lanius schach</i>	Long-tailed Shrike	棕背伯勞					1	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鶇					15	
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鶇					4	
<i>Prinia flaviventri</i>	Yellow-bellied Prinia	黃腹鷓鴣					3	
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯		2			1	
Reptile Survey								
N/A	--	--	--	--	--	--	--	--
Amphibian Survey								
N/A	--	--	--	--	--	--	--	--
Butterfly Survey								
<i>Mycalesis mineus</i>	Dark Brand Bush Brown	小眉眼蝶		2			1	
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛺蝶		1				
Odonate Survey								
<i>Orthetrum pruinosum</i>	Common Red Skimmer	赤褐灰蜻						2

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 7-5 Result of Freshwater Communities Survey under Contract 1

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
N/A	--	--	--	--	--	--	--	--

Discussion

- 7.3.9 After analysing survey results in April from 2019 to 2023, the species richness and abundance for wetland habitat were unstable. A rapid rebound from 2022 was recorded recently. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- 7.3.10 Yet, good site practice during construction, with reference to EM&A Manual, is still required to prevent or alleviate environmental impacts. Continuous monitoring is also recommended to inspect any changes in species diversity.

7.4 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 2)

- 7.4.1 In the Reporting Month, ecological monitoring was undertaken at work area of Contract 2 on **11th April 2023**, 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 would 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 no mammal recorded in the monitoring area

Birds

- 7.4.3 There were a total of 7 bird individuals from 4 species recorded in the monitoring area. No Golden-headed Cisticola was observed during the bird survey.

Herpetofauna

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

Butterfly

- 7.4.5 There were total of 3 butterfly individuals from 2 species recorded in the monitoring area.

Dragonfly

- 7.4.6 There were total of 2 dragonfly individuals from 1 specie recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

- 7.4.7 There were 2 species of freshwater fish were recorded in the monitoring area.
- 7.4.8 The summaries of faunal survey result are shown in **Tables 7-6** and **7-7**.

Table 7-6 Result of Faunal Survey under Contract 2

Scientific Name	Common / Engineer Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
Mammal Survey								
--	--	--	--	--	--	--	--	--
Avifauna Survey								
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	白胸苦惡鳥				2		
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鶇					2	
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯		1				

Scientific Name	Common / Engineer Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯		2				
Reptile Survey								
--	--	--	--	--	--	--	--	--
Amphibian Survey								
--	--	--	--	--	--	--	--	--
Butterfly Survey								
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶		1				
<i>Pieris canidia</i>	Indian Cabbage White	東方菜粉蝶		2				
Odonate Survey								
<i>Pantala flavescens</i>	Wandering Glider	黃蜻				2		

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

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

Scientific Name	Common Name	Chinese Name	Conservation Status	Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚						+
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚鯰						+

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
 +: Species appeared but uncountable.

Discussion

- 7.4.9 After analysing survey results in April from 2019 to 2023, there was approximate 30% decrease in species richness and abundance for wetland and non-wetland habitats in April 2023 when comparing to the April of 2022. Since Action Level of respond Measures have been triggered, investigation of cause for decrease was conducted and according to the on-site observation, there are new built workshops by others situated on both sides of Lin Ma Hang Road so the disturbance to fauna species from construction works could be increased. Due to the cause identified was not related to this project remedial action to remove or reduce source of disturbance is limited.
- 7.4.10 Nevertheless, the situation could be benefited by some positive factors such as the major construction works in this contract were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimized internally. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- 7.4.11 Still, a good site practice during construction, with reference to EM&A Manual, is required to prevent or alleviate environmental impacts. For instance, the size of work areas should be minimized and disturbed areas should be reinstated immediately after completion of construction works. In addition, implementing proper waste disposal is necessary to reduce contamination to water and soil. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.
- 7.4.12 The detailed Ecological Survey Reports for Contract 1 and Contract 2 are attached in **Appendix K**.
- 7.4.13 The tentative ecology inspection and monitoring in the next Reporting Month (May 2023) is scheduled on **13th May 2023**.

7.5 MONITORING OF FLORA SPECIES OF CONSERVATION INTEREST UNDER CONTRACT 1

- 7.5.1 According to the approved vegetation survey report and transplantation proposal under FEP-01/534/2017/A, an individual of flora species of conservation interest (the transplanted T-2928) was identified and transplanted to the receptor site.
- 7.5.2 According to approved vegetation survey report and transplantation proposal, post-transplantation monitoring was conducted once per week in the first three months after the transplantation in Oct 2018 and once in each of the following month in the remaining establishment period for 12 month. During the remaining construction phase of the project, the transplanted T-2928 would be monitored on quarterly basis.
- 7.5.3 A landscape sub-contractor was employed by the Contractor to monitor the health condition of transplanted species and provide advice on necessary weeding, fertilizing and pest control. The monitoring records were submitted to ET and IEC for review and record. Moreover, inspection of the transplanted T-2928 was undertaken by ET as part of the weekly site inspection. No construction activity and disturbance were observed at the location of the transplanted T-2928. The health condition of the transplanted T-2928 was fair with normal foliage color and density.

7.6 MEASURE FOR PROTECTION OF NESTING BIRD

- 7.6.1 Pursuant to FEP-01/534/2017/A condition 2.19 and EP-534/2017/A condition 2.20, precautionary checks for the presence of nesting birds shall be carried out in the breeding season (February to July) before vegetation clearance.
- 7.6.2 In the Reporting Period, there was no vegetation clearance for both Contract 1 and Contract 2, and precautionary check for the presence of nesting birds was not required to carry out.

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 for works area of Contract 1 and Contract 2 on *28th April 2023*. 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
28 th April 2023	1. The Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement.	• Reminded only
	2. The Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.	• Reminder only
	3. Transplanted tree T2465 and T2928 were in fair health condition with normal foliage color and density. Contractor is reminded to provide proper maintenance according to the method statement.	• Reminder only

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

Date	Findings and Reminder	Follow-Up Status
28 th April 2023	1. Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement. Contractor should prevent any construction material pile within TPZ and ensure no works is allowed within the TPZ.	• Reminder only

- 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
Total generated C&D Materials (Inert) ('000m ³)	0.120	--	87.490 (#)	--
Reused in this Contract (Inert) ('000m ³)	0	--	0	--
Reused in other Projects (Inert) ('000m ³)	0	--	0	--
Disposal as Public Fill (Inert) ('000m ³)	0.120	Tuen Mun Area 38	87.490 (#)	Tuen Mun Area 38

Remark: the unit is '000kg

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)	0.010	NENT Landfill	2.090 (#)	NENT Landfill

Remark: (#) the unit is in '000kg

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 EM&A 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 **6th, 13th, 20th and 27th April 2023** and IEC attended joint site inspection on **20th April 2023**. No non-compliance was noted in the Reporting Month. 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
6 th April 2023	• No adverse environmental issue was observed.	N/A
13 th April 2023	• The Contractor was reminded to provide protection for transplanted tree.	Reminder only.
20 th April 2023	• No adverse environmental issue was observed.	N/A
27 th April 2023	• No adverse environmental issue was observed.	N/A

Contract 2

10.2.2 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 **6th, 13th, 20th and 27th April 2023** and IEC attended joint site inspection on **20th April 2023**. No non-compliance was noted in the Reporting Month. 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
6 th April 2023	• No adverse environmental issue was observed.	N/A
13 th April 2023	• The Contractor was reminded maintain the housekeeping of the site.	Reminder only.
20 th April 2023	• No adverse environmental issue was observed.	N/A
27 th April 2023	• No adverse environmental issue was observed.	N/A

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*. The complaint log for the Project is shown in *Appendix N*.

Table 11-1 Statistical Summary of Environmental Complaints

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 30 th April 2023	Contract 1	0	2	(1) Air Quality (1) Noise
1 st – 30 th April 2023	Contract 2	0	5	(1) Water (2) Air Quality (1) Noise (1) Soil / muddy water

Table 11-2 Statistical Summary of Environmental Summons

Reporting Month		Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 30 th April 2023	Contract 1	0	0	NA
1 st – 30 th April 2023	Contract 2	0	0	NA

Table 11-3 Statistical Summary of Environmental Prosecution

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
1 st – 30 th April 2023	Contract 1	0	0	NA
1 st – 30 th April 2023	Contract 2	0	0	NA

11.1.2 In addition, no complaints received and emergency event 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.

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**. The status of the Environmental mitigation measures are presented in **Appendix O**.

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 every hour 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.
Ecology	<ul style="list-style-type: none"> • Implementing water control measures (ETWB TCW No. 5/2005) to avoid direct or indirect impacts any watercourses and impact to any aquatic fauna during the construction phase. • Demarcation fencing has been erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. • The construction work and site formation have been phased in order to reduce overall noise disturbance impacts in particular areas. • Works have been restricted to daytime and any construction lighting was designed and positioned as to not impact on adjacent ecologically sensitive areas.
General	<ul style="list-style-type: none"> • The site was generally kept tidy and clean. • Environmental Permit was displayed at site entrance.

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:

- Planting works
- Hydroseeding work
- Paint Road Marking

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

- Construction of footpath at Lin Ma Hang Road
- Watermain pipe and sewer installation work at Man Kam To Road
- Planting works at Sandy Ridge and Lin Ma Hang Road

12.3 KEY ISSUES FOR THE COMING MONTH

12.3.1 The construction activities are illustrated in [Appendix P](#). Key issues to be considered in the coming month for the works of Contract 1 and 2 shown in [Table 12-2](#) and [Table 12-3](#).

Table 12-2 Work Undertaken and Illustrations of Mitigation Measures for Contract 1

Description of Construction Activities	Used on PME	Environmental Mitigation Measures
Planting works	• Excavator	<ul style="list-style-type: none"> • Provided efficient silt removal facilities to reduce SS level before effluent discharge. • Exposed slopes surface were compacted and covered with tarpaulin or similar means. • 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; • Stockpiles of dusty material were covered with impervious sheeting. • Provided workers to clear dusty materials at the vehicle entrance or exit regularly. • 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. • Provided noise barriers or hoarding to enclose the noisy plants or works. • Shut down the plants when not in used. • Provided on-site sorting prior to disposal. • Followed requirements and procedures of the “Trip-ticket System” • Works have been restricted to daytime and any construction lighting was designed and positioned as to not impact on adjacent ecologically sensitive areas. • The site was generally kept tidy and clean.

Table 12-3 Work Undertaken and Illustrations of Mitigation Measures for Contract 2

Construction Activities	Used on PME	Environmental Mitigation Measures
Construction of footpath at Lin Ma Hang Road	<ul style="list-style-type: none"> • Dump truck • Excavator 	<ul style="list-style-type: none"> • Provided efficient silt removal facilities to reduce SS level before effluent discharge. • Exposed slopes surface were compacted and covered with

Construction Activities	Used on PME	Environmental Mitigation Measures
Watermain pipe and sewer installation works at Man Kam To Road	<ul style="list-style-type: none"> ● Excavator 	tarpaulin or similar means. <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.
Planting works at Sandy Ridge and Lin Ma Hang Road	<ul style="list-style-type: none"> ● Excavator ● Roller ● Dump truck 	<ul style="list-style-type: none"> ● Provided water spraying for all active works area, in particular for the soil nail works. ● Stockpiles of dusty material were covered with impervious sheeting. ● Provided workers to clear dusty materials at the vehicle entrance or exit regularly. ● 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. ● Provided on-site sorting prior to disposal. ● Followed requirements and procedures of the “Trip-ticket System” ● Demarcation fencing has been erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. ● Works have been restricted to daytime and any construction lighting was designed and positioned as to not impact on adjacent ecologically sensitive areas. ● The site was generally kept tidy and clean.

12.3.2 The Contractors are reminded to pay special attention on water quality mitigation measures and should fully implement the measures as recommended in the EM&A Manual, in particular to prevent surface runoff and other pollutants from flowing to local stream and Conservation Area.

13. CONCLUSIONS AND RECOMMENTATIONS

13.1 CONCLUSIONS

- 13.1.1 This is the **57th** Monthly EM&A Report presenting the monitoring results and inspection findings for the period of **1st to 30th April 2023**.
- 13.1.2 In the Reporting Month, 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 In the Reporting Month, no noise complaint (which triggered Action Level) was received and no Limit Level exceedance for noise monitoring exceedance was recorded.
- 13.1.4 In the Reporting Month, no water quality monitoring exceedance was recorded.
- 13.1.5 Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on **11th April 2023**. After analysing survey results in April from 2019 to 2023 for Contract 1, the species richness and abundance for wetland habitat were unstable and a rapid rebound from 2022 was recorded recently. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site. For Contract 2, there was approximate 30% decrease in species richness and abundance for wetland and non-wetland habitats in April 2023 when comparing to the April of 2022. Since Action Level of respond Measures have been triggered, investigation of cause for decrease was conducted and according to the on-site observation, there are new built workshops by others situated on both sides of Lin Ma Hang Road so the disturbance to fauna species from construction works could be increased. Due to the cause identified was not related to this project remedial action to remove or reduce source of disturbance is limited.
- 13.1.6 Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.
- 13.1.7 In the Reporting Period, there was no vegetation clearance for both Contract 1 and Contract 2, and precautionary check for the presence of nesting birds was not required to carry out.
- 13.1.8 Landscape and visual inspection at both Contracts were undertaken on **28th April 2023**. The Contractor was reminded to prevent the construction material pile within Tree Protection Zone and ensure no works is allowed within the TPZ.
- 13.1.9 In the Reporting Month, no environmental complaints, summons and prosecution were received. In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.
- 13.1.10 In the Reporting Month, joint site inspections for Contract 1 to evaluate the site environmental performance were carried out by the Resident Engineer, ET and the Contractor of the Contract 1 on **6th, 13th, 20th and 27th April 2023**. Moreover, joint site inspections for Contract 2 by the RE, ET and the Contractor of Contract 2 were carried out on **6th, 13th, 20th and 27th April 2023**. IEC attended the both Contract joint site inspection on **20th April 2023**. No non-compliance was noted during the site inspections.

13.2 RECOMMENDATIONS

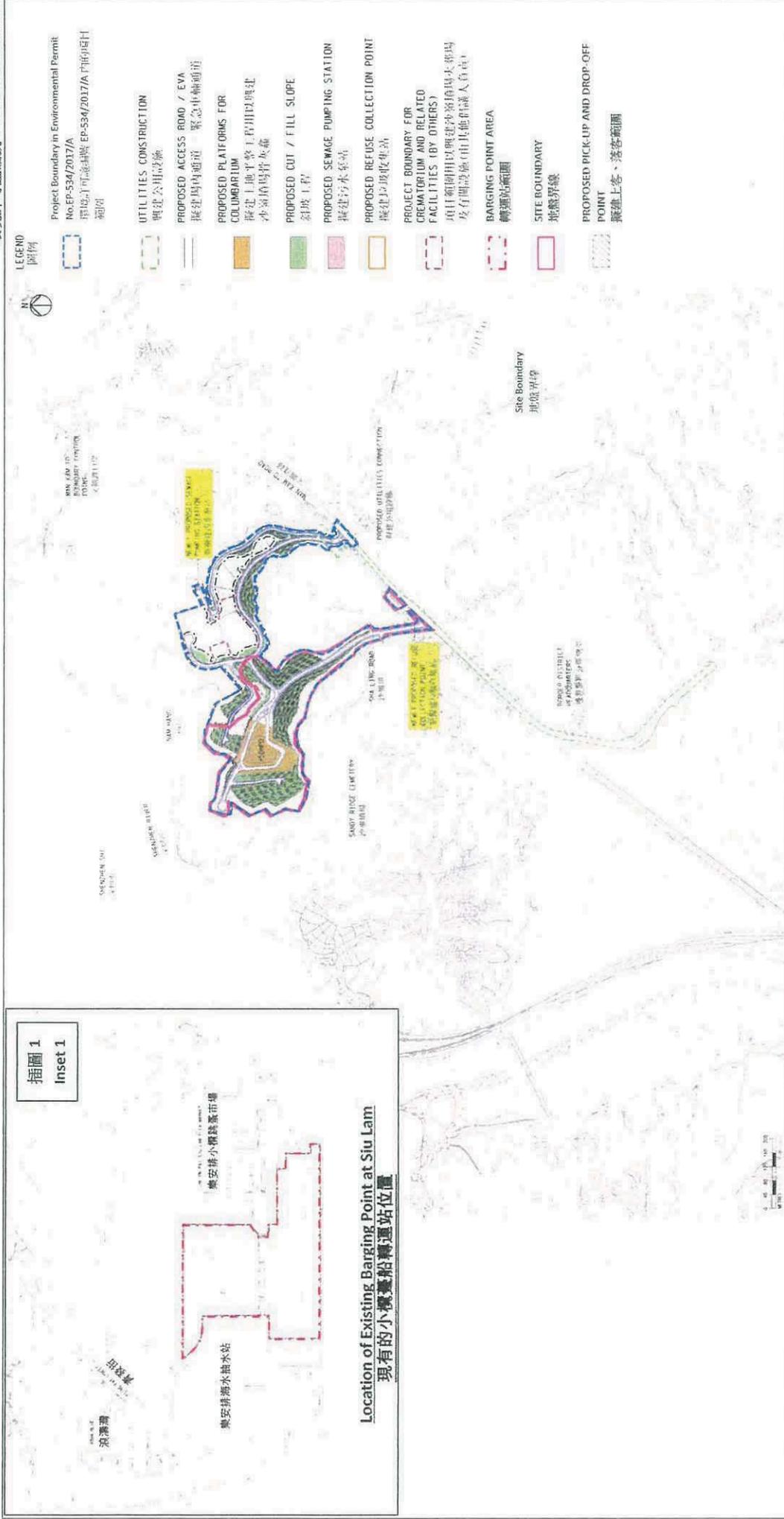
- 13.2.1 During wet season, water quality mitigation measures as recommended in the EM&A Manual should be fully implemented, in particular to prevent surface runoff and other pollutants from flowing to local stream and Conservation Area.

- 13.2.2 The Contractors are reminded to pay special attention on the air quality mitigation measures such as wheel wash facilities, watering of haul roads, loose soil construction surface and covering of dusty materials with tarpaulin sheet should be implemented as far as practicable.
- 13.2.3 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.

Appendix A

Layout Plan of the Project

Layout Plan of Contract CV/2016/10

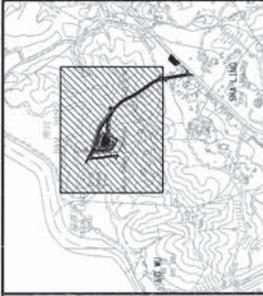
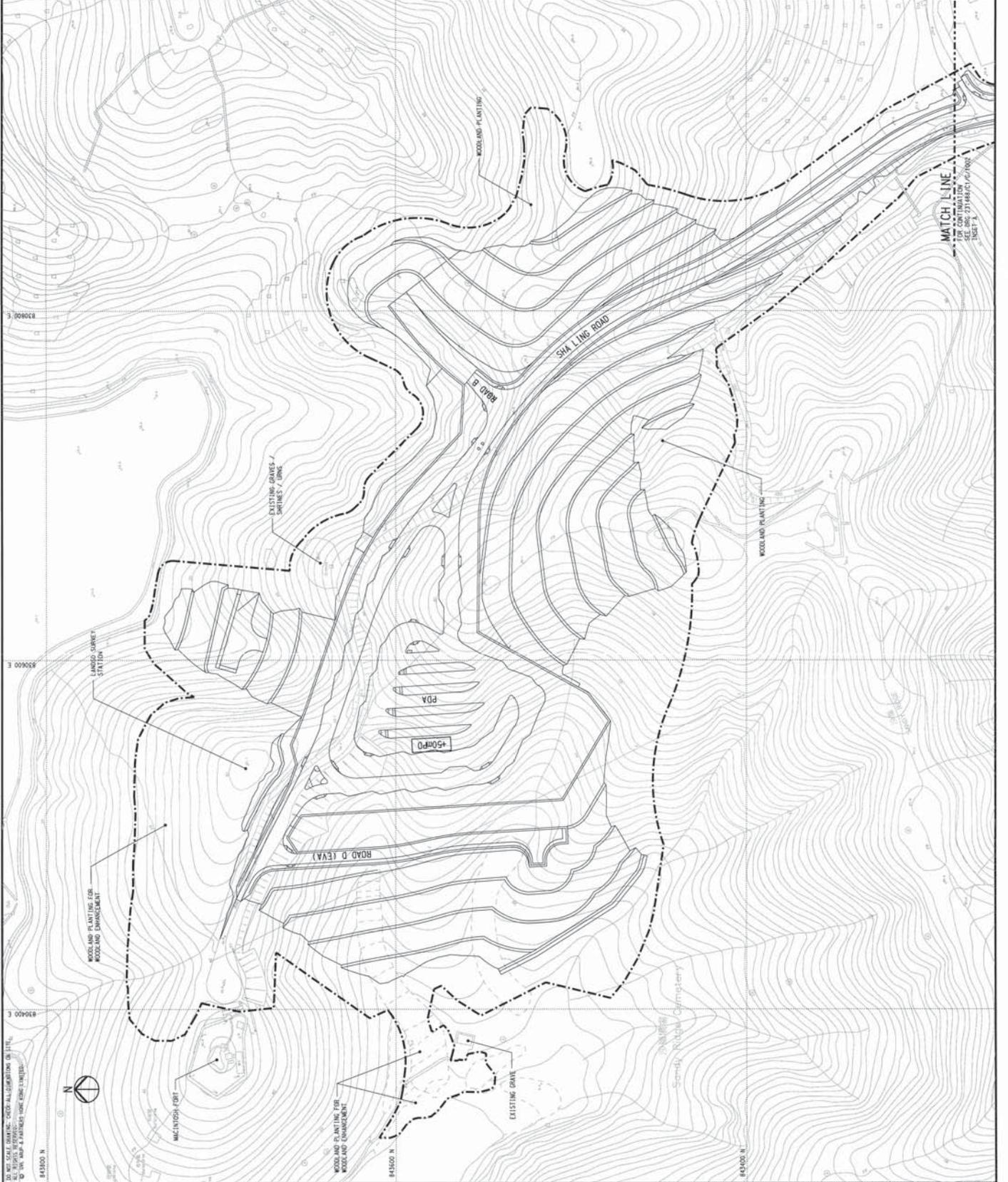


Project Title: Site Formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
 工程名稱: 沙嶺墳場興建骨灰龕的工地平整及相關基建工程

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





KEY PLAN

LEGEND:

PROPOSED WORKS SITE

SITE FORMATION LEVEL

+50mPD

Rev.	Description	By	Date

ARUP

Contract No. and Title
 Contract No. CV/2016/10
 Site Formation and Associated
 Infrastructural Works for
 Development of Columbarium at
 Sandy Ridge Cemetery

Contract No. and Title
 Contract No. 231448/C1/G/1001
 Drawing Title
 GENERAL LAYOUT
 (SHEET 1 OF 3)

Drawing No. 111000-041
 Scale 1:1000
 Date 12/16
 Status CONTRACT
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KEY PLAN

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 - - - - - PROPOSED WORKS SITE

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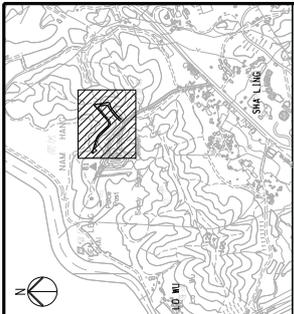
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**GENERAL LAYOUT
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Layout Plan of Contract CV/2017/02



KEY PLAN

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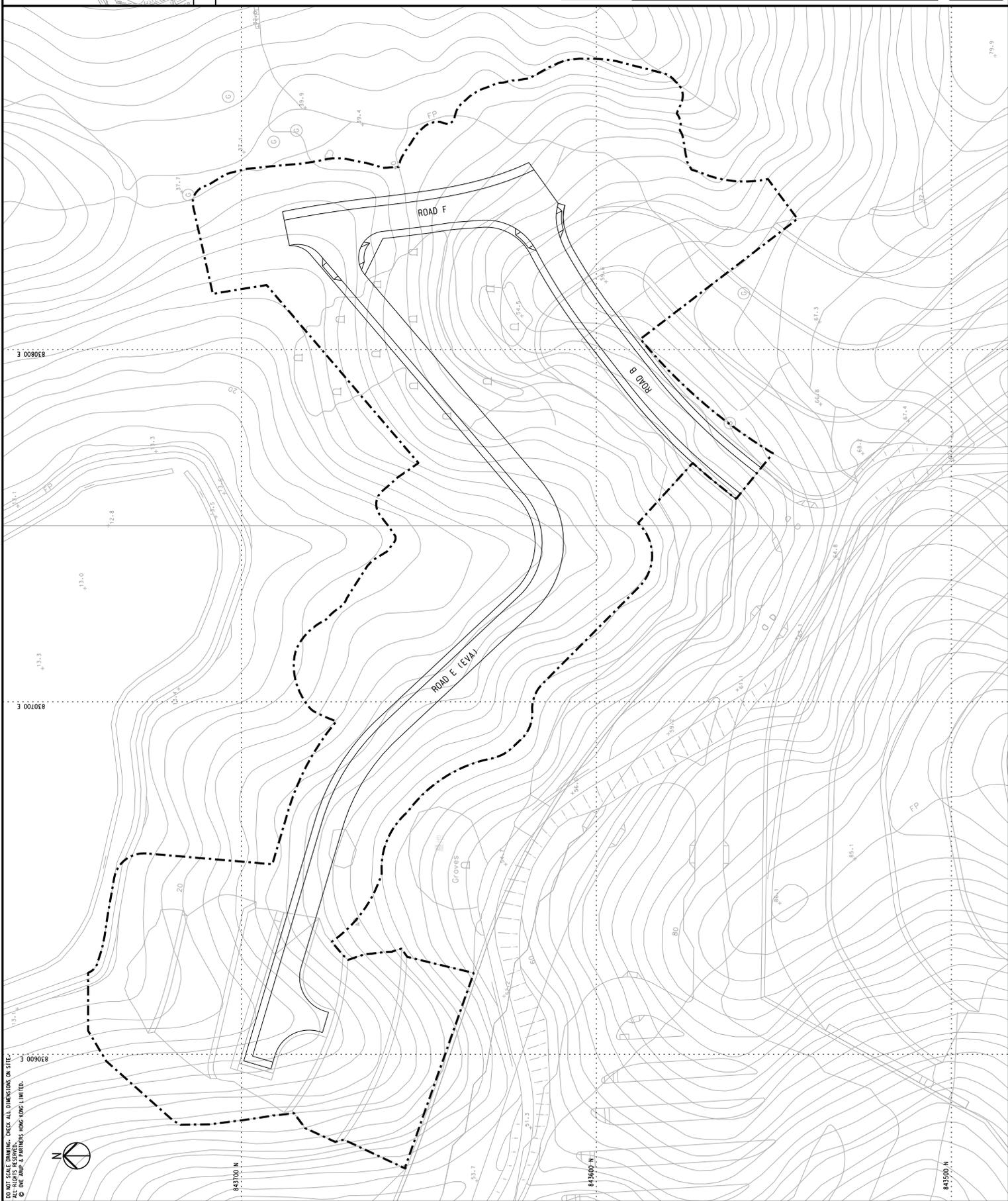
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ARUP

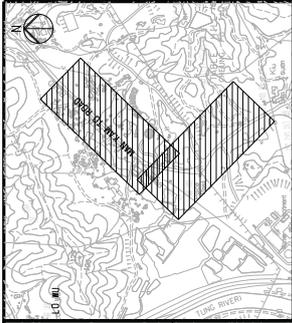
Contract No. and Title
 Contract No. CV/2017/02
 Development of Columbarium
 at Sandy Ridge Cemetery -
 Infrastructural Works at
 Man Kam To Road and
 Lin Ma Hang Road

Drawing Title
**GENERAL LAYOUT
 (SHEET 1 OF 5)**

Drawing No.	231448/C2/C/1001	Rev.	---
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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)

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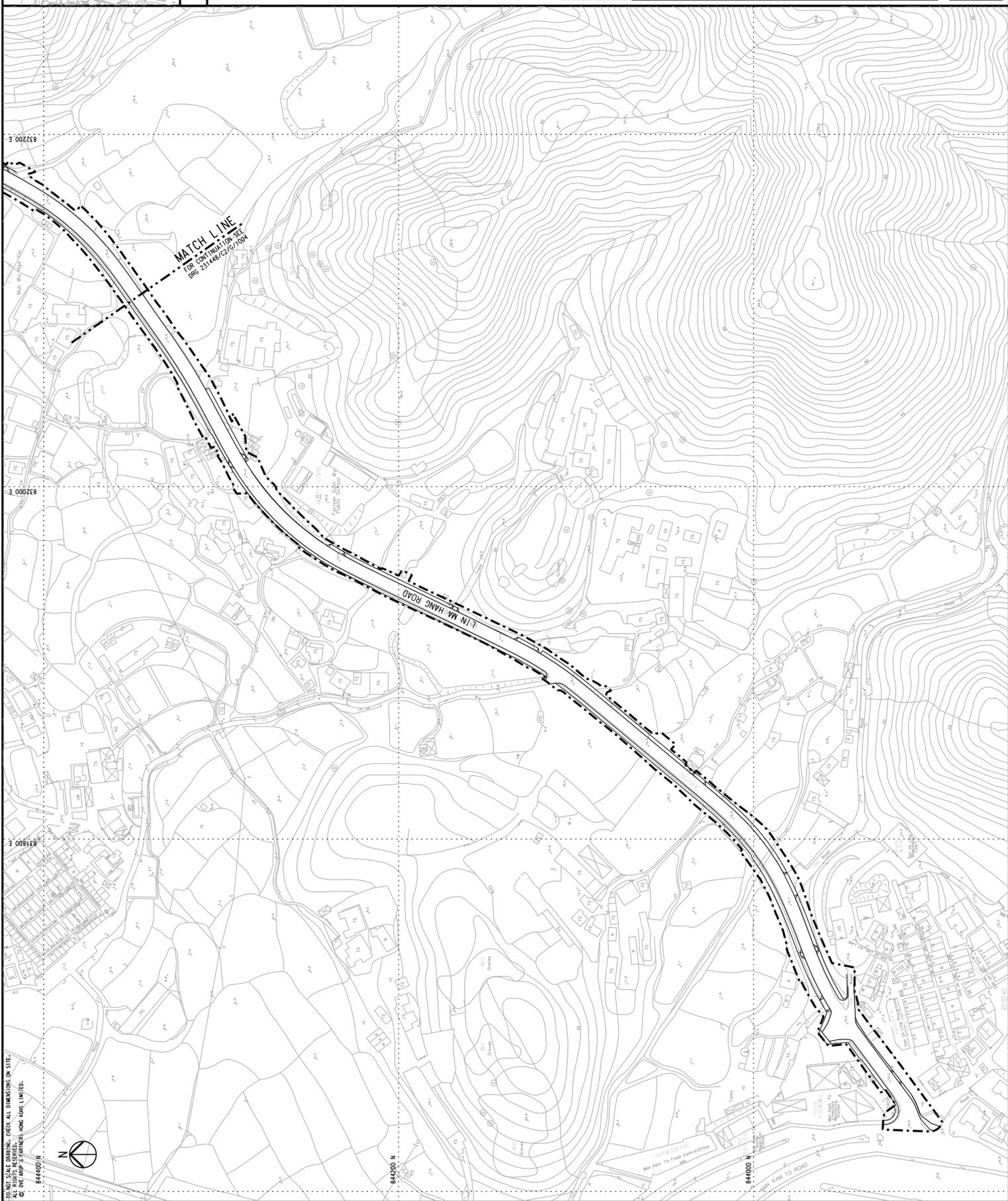
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Contract No. CV/2017/02
 Development of Columbarium
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 Infrastructural Works at
 Man Kam To Road and
 Lin Ma Hang Road

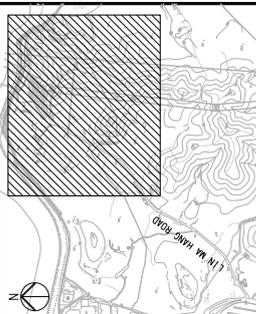
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ARUP

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)

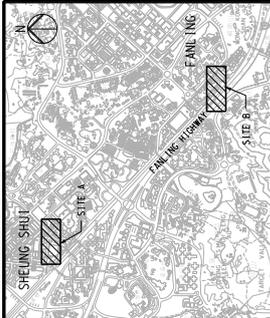
Rev.	Rev.
231448/C2/G/1004	11/17
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KEY PLAN

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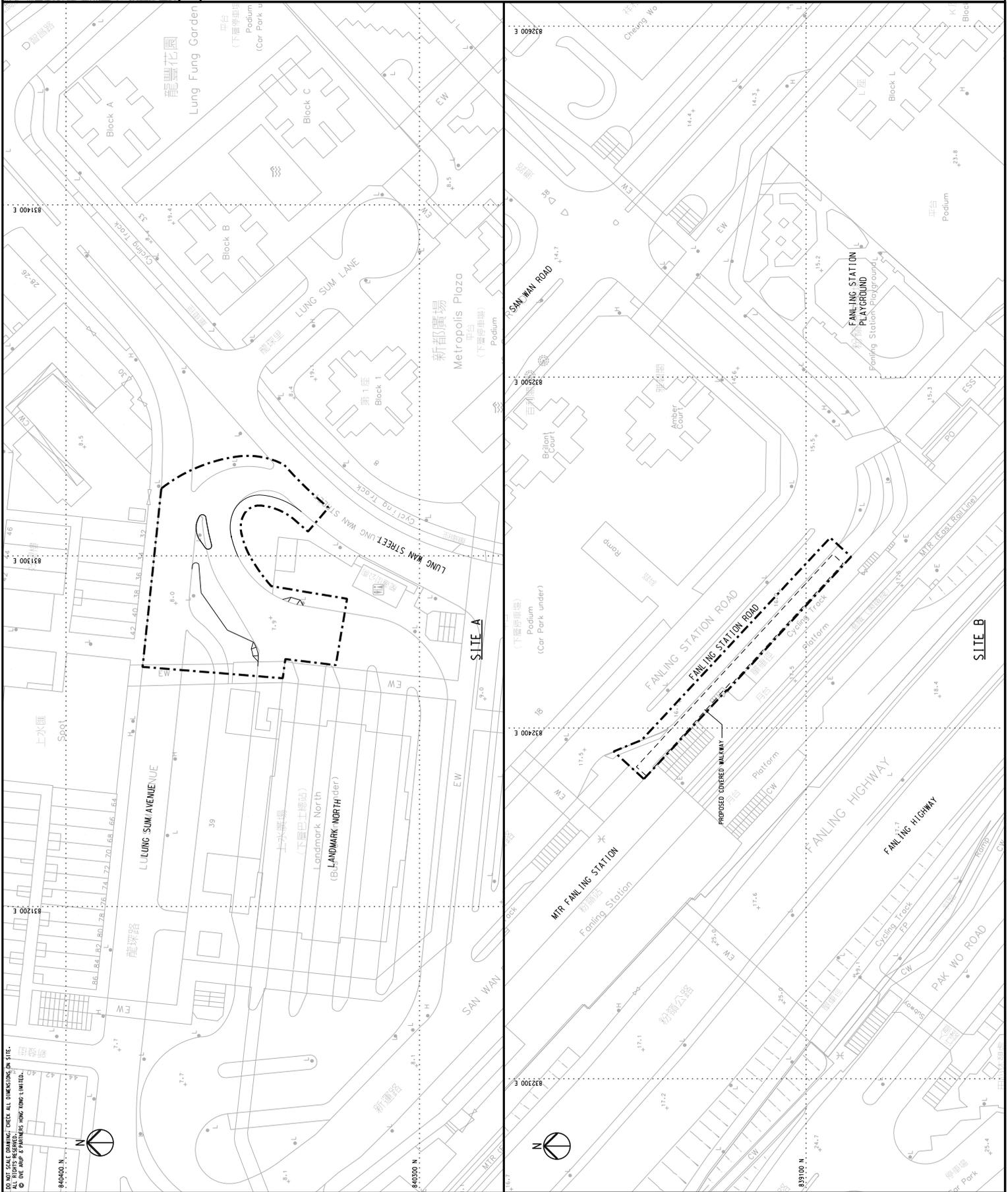
Contract No. and Title

Contract No. CV/2017/02
 Development of Columbarium
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 Infrastructural Works at
 Man Kam To Road and
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Drawing Title

**GENERAL LAYOUT
 (SHEET 5 OF 5)**

Drawing No.	231448/C2/C/1005	Rev.	1
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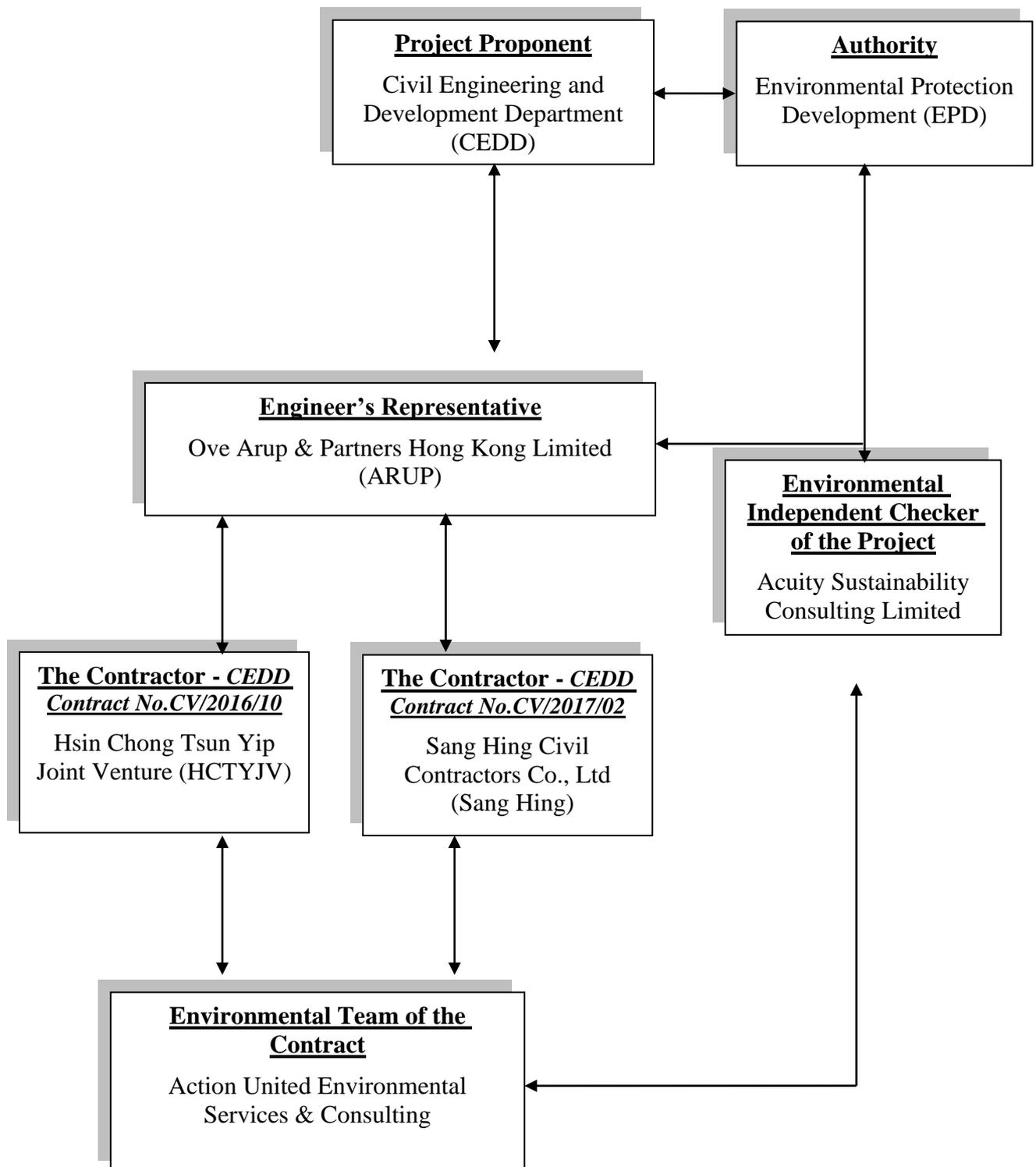


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Appendix B

Organization Structure and Contact Details of Relevant Parties

The Contract’s Environmental Management Organization



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

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
CEDD	Employer	BOK Kwok-ming, Aaron	2762-5624	2714-0695
ARUP	Engineer's Representative	Steve Tang	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Mr. Leung CH Jacky	2698-6833	2698-9383
HCTYJV	Project Director	Mr. Keniel Kwong	9495-2408	2633-4691
HCTYJV	Construction Manager	Mr. Ho Man To	9620-9794	2633-4691
HCTYJV	Environmental Officer	To be advised		
HCTYJV	Environmental supervisor	Mr. Leung Pak Sum	9437-3606	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
AUES	Qualified Ecologist	Mr. Leung Wing Keung, Mike	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. Keith L.W. Kei	2959-6059	2959-6079
AUES	Registered Landscape Architect	Mr. Shui Yau Bun, Ivan	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	BOK Kwok-ming, Aaron	2762-5624	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	Keibi Chan	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
AUES	Qualified Ecologist	Mr. Leung Wing Keung, Mike	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. Keith L.W. Kei	2959-6059	2959-6079
AUES	Qualified Ecologist	Mr. N.L Lam, Alan	2959-6059	2959-6079
AUES	Registered Landscape Architect	Mr. Shui Yau Bun, Ivan	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	1	2	3	4	5	6	7
1	Key Dates	1071 days	Fri 15/12/17							
2	Contract Starting Date	0 days	Fri 15/12/17							
3	Contract Completion Date for Section 1	1 day	Sat 29/8/20							
4	Contract Completion Date for Section 2	1 day	Fri 30/7/21							
5	Contract Completion Date for Section 3	1 day	Thu 21/11/19							
6	Scheduled Completion Date	644 days	Tue 10/12/19							
7	Section 1	0 days	Sat 2/10/21							
8	Section 2	0 days	Mon 14/2/22							
9	Section 3	0 days	Tue 10/12/19							
10	Preliminary Works	144 days	Tue 20/2/18							
11	Submission and Approval Required at Environmental Permit for Commencement of Construction	128 days	Tue 20/3/18							
12	Other Submission (Initial Survey /Tree Survey/ Condition Survey)	106 days	Tue 20/2/18							
13	Section 1 of the Works (Parts A1, A2 & A3)	1041 days	Thu 29/3/18							
14	Ground Investigation and Geotechnical instrumentation for Commencement of Slopework	112 days	Thu 29/3/18							
15	Verification Drillholes (8 Nos., VDH1, 2, 7-9,8-16) / Inspection Pits and Preliminary Results Submission	114 days	Thu 29/3/18							
16	Design Review	36 days	Thu 5/7/18							
17	Retaining Wall RW1	280 days	Thu 16/8/18							
18	General Excavation to Formation Level	37 days	Thu 16/8/18							
19	Plate Load Test and Blinding Layer for Retaining Wall Bays 1-4	3 days	Fri 28/9/18							
20	Plate Load Test and Blinding Layer for Retaining Wall Bays 5-8	3 days	Tue 2/10/18							
21	Plate Load Test and Blinding Layer for Retaining Wall Bays 9-13	15 days	Wed 10/10/18							
22	Plate Load Test and Blinding Layer for Retaining Wall Bays 14-17	7 days	Sat 6/10/18							
23	Base slab of Retaining Wall RW1 Bay 1-4	8 days	Tue 2/10/18							
24	Base slab of Retaining Wall RW1 Bay 5-8	13 days	Mon 8/10/18							
25	Base slab of Retaining Wall RW1 Bay 9-13	17 days	Mon 22/10/18							
26	Base slab of Retaining Wall RW1 Bay 14-17	17 days	Mon 22/10/18							
27	Wall Stem of Retaining Wall RW1 Bay1-4	36 days	Thu 25/10/18							
28	Wall Stem of Retaining Wall RW1 Bay 5-8	26 days	Tue 11/12/18							
29	Wall Stem of Retaining Wall RW1 Bay 10-13	30 days	Wed 14/11/18							
30	Wall Stem of Retaining Wall RW1 Bay 14-17	23 days	Mon 26/11/18							
31	Protective Coating / Subsoil Drain / Filter Layer	5 days	Thu 14/2/19							
32	Drainage and Maintenance Access in front of RW1	75 days	Tue 26/3/19							
33	Construction CP1X & CP7X	102 days	Mon 1/4/19							
34	Filling Works behind Retaining Wall and Fill Slope FS1 South (Section 12 at Drawing C1/GE/1030)	705 days	Mon 1/4/19							
35	Behind Retaining Wall RW1, Filling Stage 1 (up to +25mPD)	95 days	Mon 1/4/19							
36	FS1 South , Filling (Rolling by Pass) (+25 to +27.8mPD)	10 days	Sat 20/7/19							
37	FS1 South Filling Stage 2 (~2.5m, +25.0 to +27.5 mPD)	56 days	Wed 1/4/20							
38	Filling (Rolling by Pass)	1 day	Wed 1/4/20							
39	Filling in 3m Zone	28 days	Thu 2/4/20							
40	Benching Works for Rolling by Pass Surface	3 days	Thu 2/4/20							
41	Lay Rockfill Layer (4.5/1m per 5 days)	25 days	Tue 7/4/20							
42	Drainage and Maintenance Access (+25 to +27.5 mpD)	21 days	Tue 12/5/20							
43	FS1 South Filling Stage 3 (~7.5m height, +27.5 to +35mPD)	320 days	Sat 1/2/20							
44	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	175 days	Sat 1/2/20							
45	Filling in 3m Zone	103 days	Wed 2/9/20							
46	Benching Works for Rolling by Pass Surface	3 days	Wed 2/9/20							
47	Lay Rockfill Layer (7.5/1m per 5 days)	100 days	Sat 5/9/20							
48	Drainage and Maintenance Access (+27.5 to +35 mpD)	28 days	Thu 7/1/21							
49	FS1 South Filling Stage 4 (~7.5m height, +35 to +42.5mPD)	188 days	Wed 2/9/20							
50	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	15 days	Wed 2/9/20							
51	Filling in 3m Zone	41 days	Thu 7/1/21							
52	Benching Works for Rolling by Pass Surface	3 days	Thu 7/1/21							
53	Lay Rockfill Layer (7.5/1m per 5 days)	38 days	Mon 11/1/21							
54	Drainage and Maintenance Access (+35 to +42.5mpD)	35 days	Sat 27/2/21							
55	FS1 South Filling Stage 5 (~7.5m height, +42.5 to +50mPD)	536 days	Mon 2/12/19							
56	Construction of RW11	30 days	Mon 2/12/19							
57	Filling in 3m Zone	109 days	Sat 27/2/21							
58	Benching Works for Rolling by Pass Surface	3 days	Sat 27/2/21							
59	Lay Rockfill Layer (7.5/1m per 5 days)	102 days	Wed 3/3/21							
60	Additional Plate Load Test at FS1	4 days	Thu 8/7/21							
61	Drainage and Maintenance Access (+42.4 to +50 mpD)	35 days	Thu 8/7/21							
62	Fill Slope FS1 Middle (Section 13 at Drawing C1/GE/1030)	386 days	Mon 10/2/20							
63	Drainage and Maintenance Access at toe (+13 mpD)	10 days	Mon 10/2/20							
64	FS1 middle Filling Stage 1 (~7.0m max, +13.0 mPD to +20 mPD)	22 days	Fri 21/2/20							
65	Filling (Rolling by Pass)(~2m, 0.5m per day)	4 days	Fri 21/2/20							
66	Filling in 3m Zone	8 days	Wed 26/2/20							
67	Benching Works for Rolling by Pass Surface	3 days	Wed 26/2/20							
68	Lay Filter Layer	5 days	Sat 29/2/20							
69	Drainage and Maintenance Access (at and below+20 mpD)	10 days	Fri 6/3/20							
70	FS1 middle Filling Stage 2 (~7.5m, +20.0 to +27.5 mPD)	53 days	Wed 26/2/20							
71	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	15 days	Wed 26/2/20							
72	Filling in 3m Zone	23 days	Sat 14/3/20							
73	Benching Works for Rolling by Pass Surface	3 days	Sat 14/3/20							
74	Lay Rockfill Layer (7.5m/1m per 5 day)	20 days	Wed 18/3/20							
75	Drainage and Maintenance Access (at and below+27.5 mpD)	15 days	Wed 15/4/20							
76	FS1 middle Filling Stage 3 (~7.5m height, +27.5 to ~+35mPD)	283 days	Sat 14/3/20							

Task Summary Progress Inactive Milestone Manual Task Manual Summary Rollup Start-only Manual Progress
 Milestone Critical Inactive Task Inactive Summary Duration-only Manual Summary Finish-only

ID	Task Name	Duration	Start	1	2	3	4	5	6	7
77	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	130 days	Sat 14/3/20							
78	Filling in 3m Zone	133 days	Sat 22/8/20							
79	Benching Works for Rolling by Pass Surface	3 days	Sat 22/8/20							
80	Lay Rockfill Layer (7.5m/1m per 5 day)	130 days	Wed 26/8/20							
81	Drainage and Maintenance Access (at and below +35 mpD)	20 days	Mon 1/2/21							
82	FS1 middle Filling Stage 4 (~7.5m height, +35 to +42.5mPD)	241 days	Sat 22/8/20							
83	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	15 days	Sat 22/8/20							
84	Filling in 3m Zone	41 days	Sat 27/2/21							
85	Benching Works for Rolling by Pass Surface	3 days	Sat 27/2/21							
86	Lay Rockfill Layer (7.5/1m per 5 days)	38 days	Wed 3/3/21							
87	Drainage and Maintenance Access (+35 to +42.5mpD)	35 days	Tue 20/4/21							
88	FS1 middle Filling Stage 5 below +42.5mPD and +50mPD)	30 days	Tue 20/4/21							
89	Filling (Rolling by Pass)(~15m, 0.5m per day)	30 days	Tue 20/4/21							
90	Slope Surface forming/ Drainage and Maintenance Access	20 days	Tue 20/4/21							
91	Fill Slope FS1 North (Section 14 at Drawing C1/GE/1030)	900 days	Wed 11/7/18							
92	CE16	264 days	Wed 11/7/18							
93	FS1 North Filling Works Stage 1 (+15 to+19.7mPD)	204 days	Sat 1/6/19							
94	Drainage and Maintenance Access (+15 to +20 mpD)	28 days	Sat 25/1/20							
95	Construction of Outfall CP2X	14 days	Thu 27/2/20							
96	FS1North , Filling (Rolling by Pass) (+19.7 to +22.4mPD)	20 days	Sat 14/3/20							
97	FS1 North Filling Stage 2 (+20 to +27.5 mPD)	100 days	Tue 7/4/20							
98	Drainage and Maintenance Access (+20 to +27.5 mpD)	65 days	Sat 1/8/20							
99	Filling in 3m Zone (below +27.5mPD)	58 days	Mon 9/3/20							
100	Benching Works for Rolling by Pass Surface	3 days	Mon 9/3/20							
101	Lay Filter Layer	5 days	Thu 12/3/20							
102	Filling by SRT (7.5m/ 3 day per 5 day)	50 days	Wed 18/3/20							
103	Filling in 3m Zone (below +27.5mPD) (Rockfill)	23 days	Mon 9/3/20							
104	Benching Works for Rolling by Pass Surface	3 days	Mon 9/3/20							
105	Lay Rockfill Layer (7.5m/1m per 5 day)	20 days	Thu 12/3/20							
106	Drainage and Maintenance Access	22 days	Sat 2/5/20							
107	FS1 North Filling Stage 3 (+27 to +35 mPD)	171 days	Tue 26/11/19							
108	Filling (Rolling by Pass)(~3m, 0.5m per day)	6 days	Tue 26/11/19							
109	Drainage and Maintenance Access (+27.5 to +35 mpD)	30 days	Fri 8/5/20							
110	FS1 North Filling Stage 4 (+35 to +42.5 mPD), Upgrading of Existing Slope Feature 3NW-C/F37	229 days	Fri 12/6/20							
111	Filling (Rolling by Pass)(~3m, 0.5m per day)	20 days	Fri 12/6/20							
112	Drainage and Maintenance Access (+35 to +42.5 mpD)	30 days	Sat 30/1/21							
113	FS1 North Filling Stage 5 (+42.5 to +50mPD), Upgrading of Existing Slope Feature 3NW-C/F37	62 days	Wed 12/5/21							
114	Filling (Rolling by Pass)(~3m, 0.5m per day)	30 days	Wed 12/5/21							
115	Drainage and Maintenance Access (+42.5 to +50 mpD)	30 days	Fri 18/6/21							
116	Civil Works for Pick-up/Drop-off area (Part A1, M011 CH020 to CH140)	162 days	Sat 6/3/21							
117	Waterworks / Drainage / Sewerage/ Utilities Works	131 days	Sat 6/3/21							
118	Sewerage Works / Drainage Works	90 days	Sat 6/3/21							
119	Watermain FW1a (CH29-100)	20 days	Wed 31/3/21							
120	Road Lighting Civil Works Provision	20 days	Thu 22/7/21							
121	Utilities (by others)	10 days	Wed 31/3/21							
122	Carriageway and Footway	72 days	Sat 26/6/21							
123	Backfilling to Formation Level	30 days	Sat 26/6/21							
124	Carriageway	30 days	Mon 2/8/21							
125	Footpath, Road Marking and Street Furniture	12 days	Mon 6/9/21							
126	Landscape Works	172 days	Sat 6/3/21							
127	Shrubs Planting at RW1	30 days	Wed 18/8/21							
128	Woodland Planting at Site 3	10 days	Wed 18/8/21							
129	Hydroseeding at Fill Slope	80 days	Sat 6/3/21							
130	Shrubs Planting at Pick-up/ Drop Off	10 days	Fri 23/7/21							
131	Irrigation System and Water Points (Except Water Connection)	24 days	Mon 2/8/21							
132	Tree Planting Works	10 days	Mon 20/9/21							
133	Section 2 of the Works (Parts B1, B2, C, D, F, G1 & G2)	1232 days	Fri 15/12/17							
134	Part B1	1103 days	Sat 28/4/18							
135	Ground Investigation and Geotechnical instrumentation for Commencement of Slopework	96 days	Sat 28/4/18							
136	Verification Drillholes (10 Nos., VDH3, 6, 10-15,19-20) and Preliminary Results Submission	95 days	Sat 28/4/18							
137	Design Review	36 days	Thu 12/7/18							
138	Cut Slopes CS1 & CS2	170 days	Fri 12/10/18							
139	Excavation (crest to +55mPD)	4 days	Fri 12/10/18							
140	Excavation (+55 to+50mPD)	11 days	Fri 12/10/18							
141	Drainage and Maintenance Access (at +55mPD berm)	55 days	Tue 16/10/18							
142	Drainage and Maintenance Access (+55 to +50 slope surface)	180 days	Tue 16/10/18							
143	Cut Slope CS3	251 days	Wed 4/11/20							
144	Excavation (crest to toe)	15 days	Wed 4/11/20							
145	Drainage and Maintenance Access	29 days	Sat 21/11/20							
146	Southern End of CS13	95 days	Mon 17/5/21							
147	Slope Cutting and Soil Nail	60 days	Mon 17/5/21							
148	Construction of toe wall (5 bays, approx. 66m) (4 days/ bay)	20 days	Thu 29/7/21							
149	Backfilling and drainage	15 days	Sat 21/8/21							
150	Cut Slopes CS11 , CS12 and CS13	880 days	Thu 23/8/18							
151	Slope Cutting (crest to+94.5mPD)	31 days	Thu 23/8/18							
152	Drainage and Maintenance Access (at crest)	29 days	Tue 2/10/18							
153	Slope Cutting and Soil Nail (+94.5 to +87mPD, 59 nos. of Soil Nail)	40 days	Sat 6/10/18							

Task Summary Progress Inactive Milestone Manual Task Manual Summary Rollup Start-only Manual Progress Milestone Critical Inactive Task Inactive Summary Duration-only Manual Summary Finish-only

ID	Task Name	Duration	Start	1	2	3	4	5	6	7
154	Drainage and Maintenance Access (at +94.5mPD berm)	7 days	Fri 26/10/18							
155	Drainage and Maintenance Access (+94.5 to +87mPD slope surface)+ GI Works	24 days	Fri 26/10/18							
156	Slope Cutting and Soil Nail (+87 to+79.5mPD, 84Nos. of Soil Nail)	40 days	Thu 8/11/18							
157	Drainage and Maintenance Access (at +87mPD berm)	33 days	Fri 26/10/18							
158	RFI50 (Waiting Instruction / Abortive Works / Additional Earthwork+25m Uchannel at CS13crest)	61 days	Thu 22/11/18							
159	RFI(Slope Cutting and Soil Nail - additional 24 Nos. of Soil Nail)	39 days	Fri 11/1/19							
160	RFI50(Additional Drainage and Maintenance Access (at 87mPD berm)	13 days	Fri 1/2/19							
161	Drainage and Maintenance Access (+79.5 to +87mPD slope surface)+ GI Works	10 days	Fri 8/2/19							
162	Slope Cutting and Soil Nail (+72 to +79.5,115+21Nos. of Soil Nail)	90 days	Mon 21/1/19							
163	Drainage and Maintenance Access (at +79.5mPD berm)	42 days	Fri 1/2/19							
164	Drainage and Maintenance Access (+72 to +79.5mPD slope surface, CS13 crest)+ GI Works	13 days	Thu 2/5/19							
165	Slope Cutting and Soil Nail (+64.5 to +72 mPD, ,192 Nos. of Soil Nail)	67 days	Mon 8/4/19							
166	Drainage and Maintenance Access (at +72mPD berm)	29 days	Sat 13/4/19							
167	Drainage and Maintenance Access (+64.5 to +72mPD slope surface)+ GI Works	17 days	Wed 3/7/19							
168	Slope Cutting and Soil Nail (+57 to +64.5mPD, 521 nos. of Soil Nail, 96 nos. of Raking Drain)	180 days	Tue 2/7/19							
169	Drainage and Maintenance Access (at +64.5mPD berm)	40 days	Tue 6/8/19							
170	Drainage and Maintenance Access (+57 to +64.5mPD slope surface)+ GI Works	17 days	Fri 7/2/20							
171	Slope Cutting and Soil Nail for CS11 (+57 to +49.5 mPD, 88 nos. of Soil Nail, 19 nos. of Raking Drain)	38 days	Thu 12/3/20							
172	Drainage and Maintenance Access for CS11 (at +57mPD berm)	20 days	Thu 26/3/20							
173	Drainage and Maintenance Access for CS11 (below57 mPD slope surface/ on RW11)+ GI Works	17 days	Sat 2/5/20							
174	Slope Cutting and Soil Nail for CS12/CS13 (+57 to +49.5 mPD, 497 nos. of Soil Nail, 80 nos. of Raking Drain)	85 days	Fri 7/2/20							
175	Drainage and Maintenance Access for CS12/13 (at +57mPD berm)	35 days	Wed 11/3/20							
176	Drainage and Maintenance Access for CS12/CS13 (+49.5 to + 57mPD slope surface)+ GI Works	20 days	Sat 23/5/20							
177	Slope Cutting and Soil Nail for CS12/CS13 (+42 to +49.5 mPD, 383 nos. of Soil Nail, 87 nos. of Raking Drain)	170 days	Tue 2/6/20							
178	Drainage and Maintenance Access for CS12/13 (at +49.5mPD berm)	42 days	Fri 3/7/20							
179	Drainage and Maintenance Access for CS12/CS13 (+42 to +49.5mPD slope surface)+ GI Works	17 days	Sat 29/8/20							
180	Slope Cutting and Soil Nail for CS13 (+42 to +34.5 mPD, 126 nos. of Soil Nail, 55 nos. of Raking Drain)	59 days	Wed 23/12/20							
181	Drainage and Maintenance Access for CS13 (at +42mPD berm)	28 days	Tue 19/1/21							
182	Drainage and Maintenance Access for CS13 (+34.5 to +42mPD slope surface)+ GI Works	25 days	Tue 9/3/21							
183	Slope Cutting and Soil Nail for CS13 (+34.5 mPD to toe, 73 nos. of Soil Nail, 27 nos. of Raking Drain)	100 days	Tue 16/3/21							
184	Drainage and Maintenance Access for CS13 (at +34.5mPD berm)	27 days	Mon 12/4/21							
185	Drainage and Maintenance Access for CS13 (below+34.5 mPD slope surface)+ GI Works	21 days	Mon 19/7/21							
186	Retaining Wall RW11	98 days	Tue 12/11/19							
187	General Excavation with ELS to Formation Level RW11 Bay 1-4	30 days	Tue 12/11/19							
188	Plate Load Test and Blinding Layer for RW11 Bays 1-4	5 days	Tue 17/12/19							
189	Base slab of Retaining Wall RW11 Bay 1-4	10 days	Sun 22/12/19							
190	Wall Stem of Retaining Wall RW11 Bay 1-4	20 days	Mon 13/1/20							
191	Plate Load Test and Blinding Layer for RW11 Bays 5-6	5 days	Tue 17/12/19							
192	Base slab of Retaining Wall RW11 Bay 5-6	10 days	Sun 22/12/19							
193	Wall Stem of Retaining Wall RW11 Bay 5-6	20 days	Tue 7/1/20							
194	Protective Coating / Subsoil Drain / Filter Layer	5 days	Sat 8/2/20							
195	Filling Works behind Retaining Wall RW11, (~5.8m, up to +54.8mPD)	23 days	Fri 14/2/20							
196	Existing Slope Upgrading Works	210 days	Tue 1/12/20							
197	Existing Feature 3NW-C/C256 Rock Joint Mapping, drainage and maintenance access	150 days	Tue 1/12/20							
198	Existing Feature 3NW-C/C258 Slope Upgrading Works	200 days	Mon 28/12/20							
199	Slope Cutting and Soil Nail (Crest to To, 29 Nos. of Soil Nail)	100 days	Mon 28/12/20							
200	Drainage and Maintenance Access (Crest)	100 days	Fri 23/4/21							
201	Cut Slope CS15, CS16 and CS17	753 days	Thu 16/8/18							
202	Slope Cutting and Soil Nail (crest to+69.5mPD,25 nos. of Soil Nail)	36 days	Thu 16/8/18							
203	Drainage and Maintenance Access (at crest)	15 days	Mon 20/8/18							
204	Slope Cutting and Soil Nail (+62 to +69.5mPD, 99 nos. of Soil Nail, 37 nos. of Raking Drain)	62 days	Mon 3/9/18							
205	Drainage and Maintenance Access (at +69.5mPD berm)	49 days	Mon 3/9/18							
206	Drainage and Maintenance Access (+62 to +69.5mPD slope surface)+ GI Works	36 days	Fri 26/10/18							
207	Slope Cutting and Soil Nail (+54.5 to +62mPD, 237 nos. of Soil Nail, 58 nos. of Raking Drain)	66 days	Wed 7/11/18							
208	Drainage and Maintenance Access (at +62mPD berm)	26 days	Wed 7/11/18							
209	Drainage and Maintenance Access (+54.5 to +62mPD slope surface)+ GI Works	38 days	Sat 29/12/18							
210	Slope Cutting and Soil Nail (+47 to +54.5mPD, 548 nos. of Soil Nail, 86 nos. of Raking Drain)	155 days	Mon 7/1/19							
211	Drainage and Maintenance Access (at +54.5mPD berm)	61 days	Sat 19/1/19							
212	Drainage and Maintenance Access (+54.5 to +47mPD slope surface)+ GI Works	90 days	Wed 3/4/19							
213	Slope Cutting and Soil Nail (+39.5 to +47mPD, 490 nos. of Soil Nail, 107 nos. of Raking Drain)	94 days	Mon 6/5/19							
214	Drainage and Maintenance Access (at +47mPD berm)	38 days	Tue 2/7/19							
215	Drainage and Maintenance Access (+39.5 to +47mPD slope surface)+ GI Works	23 days	Tue 27/8/19							
216	Slope Cutting and Soil Nail (+39.5 to toe, 83 nos. of Soil Nail, 18nos. of Raking Drain)	59 days	Mon 4/5/20							
217	Drainage and Maintenance Access (at +39.5mPD berm and Slope Surface) + GI Works	45 days	Tue 5/1/21							
218	Fill Slope FS17	52 days	Fri 2/7/21							
219	Drainage and Maintenance Access at toe	28 days	Fri 2/7/21							
220	FS17 Filling Stage 1 (~2.5m max)	24 days	Wed 4/8/21							
221	Civil Works for Sha Ling Road (M001 CH710 to CH825, MO11 CH00 to CH20, M014)	224 days	Mon 28/12/20							
222	Waterworks / Drainage / Sewerage/ Utilities Works	27 days	Mon 28/12/20							
223	Sewerage Works / Drainage Works	18 days	Mon 28/12/20							
224	Watermain FW1 (CH532-637), FW1a (CH000-029) and FW2 (CH530-618)	15 days	Tue 12/1/21							
225	Road Lighting Civil Works Provision	8 days	Tue 12/1/21							

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ID	Task Name	Duration	Start	1	2	3	4	5	6	7
226	Utilities (by others)	3 days	Tue 12/1/21							
227	Carriageway and Footway	57 days	Fri 23/7/21							
228	Backfilling to Formation Level	11 days	Fri 23/7/21							
229	Carriageway	28 days	Thu 5/8/21							
230	Footpath, Road Marking and Street Furniture	18 days	Tue 7/9/21							
231	Civil Works for PDA (PT04, PT05, PT06, PT07 and PT08)	381.1 days	Fri 5/6/20							
232	Waterworks / Drainage / Sewerage/ Utilities Works	238 days	Fri 5/6/20							
233	Drainage Works (with Petrol Interceptor)	200 days	Fri 5/6/20							
234	Road Lighting Civil Works Provision	10 days	Thu 11/3/21							
235	Carriageway and Footway	143.1 days	Tue 23/3/21							
236	Backfilling to Formation Level	80 days	Tue 23/3/21							
237	Carriageway	60 days	Sat 10/4/21							
238	Footpath, Road Marking and Street Furniture	22 days	Thu 19/8/21							
239	Civil Works for PDA (M011 CH140-215, M08 CH70-102)	161 days	Tue 9/3/21							
240	Waterworks / Drainage / Sewerage/ Utilities Works	90 days	Tue 9/3/21							
241	Sewerage Works / Drainage Works	60 days	Tue 9/3/21							
242	Road Lighting Civil Works Provision	10 days	Mon 29/3/21							
243	Utilities (by others)	10 days	Thu 17/6/21							
244	Carriageway and Footway	71 days	Tue 29/6/21							
245	Backfilling to Formation Level	30 days	Tue 29/6/21							
246	Carriageway	30 days	Wed 4/8/21							
247	Footpath, Road Marking and Street Furniture	11 days	Wed 8/9/21							
248	Civil Works for Sha Ling Road (M001 CH610-710)	114 days	Tue 9/3/21							
249	Waterworks / Drainage / Sewerage/ Utilities Works	44 days	Tue 9/3/21							
250	Sewerage Works / Drainage Works	30 days	Tue 9/3/21							
251	Watermain FW1 (CH433-532) and FW2 (CH433-530)	30 days	Thu 25/3/21							
252	Road Lighting Civil Works Provision	10 days	Thu 25/3/21							
253	Utilities (by others)	10 days	Thu 25/3/21							
254	Carriageway and Footway	70 days	Tue 4/5/21							
255	Backfilling to Formation Level	30 days	Tue 4/5/21							
256	Carriageway	30 days	Wed 9/6/21							
257	Footpath, Road Marking and Street Furniture	10 days	Fri 16/7/21							
258	Civil Works for Sha Ling Road (M001 CH480-610, M08 CH00-70)	555 days	Tue 3/3/20							
259	Sewage Detention Tank Civil and Structural Works	549 days	Tue 3/3/20							
260	Civil and Structural Works	74 days	Tue 3/3/20							
261	Excavation by open cut	25 days	Tue 3/3/20							
262	Blinding layer concreting	1 day	Wed 1/4/20							
263	Construction of base slab	7 days	Thu 2/4/20							
264	Construction of wall and top slab	20 days	Wed 15/4/20							
265	Construction of manhole	7 days	Mon 11/5/20							
266	Backgilling	14 days	Tue 19/5/20							
267	VDS and AMS for Sewage Detention Tank (Permanent Design and Submission Approval)	350 days	Mon 18/5/20							
268	VDS and AMS for Sewage Detention Tank	140 days	Wed 21/7/21							
269	Waterworks / Drainage / Sewerage/ Utilities Works	146 days	Tue 4/5/21							
270	Sewerage Works / Drainage Works	40 days	Wed 8/9/21							
271	Watermain FW1 and FW2 (CH310-433)	17 days	Tue 4/5/21							
272	Road Lighting Civil Works Provision	18 days	Tue 25/5/21							
273	Utilities (by others)	17 days	Wed 16/6/21							
274	Carriageway and Footway	64 days	Thu 28/10/21							
275	Backfilling to Formation Level	12 days	Thu 28/10/21							
276	Carriageway	32 days	Thu 11/11/21							
277	Footpath, Road Marking and Street Furniture	20 days	Sat 18/12/21							
278	Civil Works for Sha Ling Road (M001 CH360-480)	104 days	Wed 28/7/21							
279	Waterworks / Drainage / Sewerage/ Utilities Works	67 days	Wed 28/7/21							
280	Sewerage Works / Drainage Works	28 days	Wed 28/7/21							
281	Watermain FW1 and FW2 (CH175-310)	18 days	Thu 19/8/21							
282	Additional rising main (CE No. 181)	30 days	Thu 9/9/21							
283	Road Lighting Civil Works Provision	15 days	Thu 19/8/21							
284	Utilities (by others)	11 days	Thu 19/8/21							
285	Carriageway and Footway	37 days	Mon 18/10/21							
286	Backfilling to Formation Level	7 days	Mon 18/10/21							
287	Carriageway	18 days	Tue 26/10/21							
288	Footpath, Road Marking and Street Furniture	12 days	Tue 16/11/21							
289	Civil Works for Sha Ling Road (M001 CH180-360)	109 days	Fri 6/8/21							
290	Waterworks / Drainage / Sewerage/ Utilities Works	59 days	Fri 6/8/21							
291	Drainage and Sewerage Works	40 days	Fri 6/8/21							
292	Watermain FW1 and FW2 (CH000-175)	23 days	Tue 7/9/21							
293	Road Lighting Civil Works Provision	22 days	Tue 7/9/21							
294	Utilities (by others)	32 days	Tue 7/9/21							
295	Carriageway and Footway	50 days	Mon 18/10/21							
296	Backfilling to Formation Level	10 days	Mon 18/10/21							
297	Carriageway	24 days	Fri 29/10/21							
298	Footpath, Road Marking and Street Furniture	16 days	Fri 26/11/21							
299	Part B2, G1 and G2	1232 days	Fri 15/12/17							
300	Access Date for Part G1 and G2	0 days	Tue 5/2/19							

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ID	Task Name	Duration	Start	1	2	3	4	5	6	7
301	Land Decontamination Works	293 days	Tue 2/10/18							
302	Re-appraisal and Contamination Assessment Plan (CAP) Submission to EPD	10 days	Tue 2/10/18							
303	EPD Review and Acceptance for CAP	195 days	Fri 12/10/18							
304	Environmental SI for Determination of Decontamination and SI Testing	70 days	Tue 28/5/19							
305	Contamination Assessment Report (CAR) Submission to EPD	18 days	Tue 20/8/19							
306	EPD Review and Acceptance for CAR	14 days	Tue 10/9/19							
307	Civil Works for Sha Ling Road (M001 CH40-110)	717 days	Tue 21/5/19							
308	<i>Objection from Local Village (EW16 & 18)</i>	355 days	Tue 21/5/19							
309	Application for Road Closure / Road Diversion	17 days	Thu 30/7/20							
310	Noise Barrier Bay 5 to Bay 8	322 days	Wed 19/8/20							
311	General Excavation with ELS to Formation Level Bay 5 to Bay 8	15 days	Wed 19/8/20							
312	Base slab of Noise Barrier Bay 5 to Bay 8	30 days	Thu 20/8/20							
313	Wall Stem of Noise Barrier Bay 5 to Bay 8	30 days	Thu 24/9/20							
314	Protective Coating /Temp Fill	5 days	Mon 2/11/20							
315	Installation of panel	10 days	Mon 6/9/21							
316	Waterworks / Drainage / Sewerage/ Utilities Works	70 days	Thu 13/5/21							
317	Sewerage Works / Drainage Works	35 days	Thu 13/5/21							
318	Watermain FW3 (CH045-105)	20 days	Wed 14/7/21							
319	Road Lighting Civil Works Provision	10 days	Fri 25/6/21							
320	Utilities (by others)	15 days	Fri 25/6/21							
321	Carriageway and Footway	59 days	Fri 6/8/21							
322	Backfilling to Formation Level	10 days	Fri 6/8/21							
323	Carriageway	42 days	Wed 18/8/21							
324	Footpath, Road Marking and Street Furniture	7 days	Fri 8/10/21							
325	Ground Investigation and Geotechnical instrumentation for Commencement of Slopework	45 days	Fri 8/2/19							
326	Trial Pit Excavation / Installation of Instruments and Preliminary Results Submission	45 days	Fri 8/2/19							
327	Fill Slope FS13 and FS14	56 days	Fri 6/8/21							
328	Drainage and Maintenance Access at toe	32 days	Fri 6/8/21							
329	FS13 and FS14 Filling Stage 1 (~2.5m max)	24 days	Mon 13/9/21							
330	Cut Slope CS14	20 days	Wed 13/10/21							
331	Slope Cutting (crest to toe)	3 days	Wed 13/10/21							
332	Drainage and Maintenance Access (at crest)	17 days	Mon 18/10/21							
333	Civil Works for Sha Ling Road (M001 CH110-180)	104 days	Fri 8/10/21							
334	Waterworks / Drainage / Sewerage/ Utilities Works	45 days	Fri 8/10/21							
335	Sewerage Works / Drainage Works	30 days	Fri 8/10/21							
336	Watermain FW3 (CH105-175)	12 days	Sat 13/11/21							
337	Road Lighting Civil Works Provision	10 days	Sat 13/11/21							
338	Utilities (by others)	15 days	Sat 13/11/21							
339	Carriageway and Footway	59 days	Wed 1/12/21							
340	Backfilling to Formation Level	10 days	Wed 1/12/21							
341	Carriageway	42 days	Mon 13/12/21							
342	Footpath, Road Marking and Street Furniture	7 days	Mon 7/2/22							
343	Man Kam To Road Bus Shelter (PT01, PT02 and PT03)	1175 days	Fri 15/12/17							
344	Used as Temporary Site Office / Storage Area	340 days	Fri 15/12/17							
345	Investigation for DongJiang Watermain(CE23)	82 days	Thu 10/1/19							
346	<i>Works Area Handing Over to WSD as Request</i>	198 days	Mon 15/4/19							
347	<i>Interface Issue with C2 (As request by Arup to delay XP application) (Including Temp. Road Diversion)</i>	290 days	Tue 28/5/19							
348	TTA and XP Application at Man Kam To Road	14 days	Wed 20/5/20							
349	<i>Works Area Handling to WSD for DongJiang Watermain Works</i>	37 days	Wed 25/11/20							
350	Waterworks / Drainage / Sewerage/ Utilities Works	180 days	Mon 11/1/21							
351	Sewerage Work (Petrol Interceptor)	15 days	Fri 16/7/21							
352	Sewerage Works / Drainage Works	150 days	Mon 11/1/21							
353	Road Lighting Civil Works Provision	11 days	Fri 16/7/21							
354	Utilities (by others)	30 days	Fri 16/7/21							
355	Carriageway and Footway	117 days	Fri 16/7/21							
356	Backfilling to Formation Level	12 days	Fri 20/8/21							
357	Carriageway	56 days	Fri 3/9/21							
358	Footpath, Road Marking and Street Furniture	19 days	Thu 11/11/21							
359	Reinstatement to existing Man Kam To Road	5 days	Fri 16/7/21							
360	Civil Works for Sha Ling Road (M001 CH00-40)	985 days	Thu 30/8/18							
361	TTA and XP Application at Man Kam To Road	14 days	Fri 15/1/21							
362	<i>Works Area Handing Over to WSD as Request</i>	120 days	Mon 6/5/19							
363	<i>Work Area Handling to Sang Hing for Turn Around</i>	190 days	Mon 6/4/20							
364	<i>Works Area Handling to WSD for DongJiang Watermain Works</i>	41 days	Wed 25/11/20							
365	Consent from WSD for Works Near Dong Jing Watermain	325 days	Thu 30/8/18							
366	Investigation works / Trial Pits for Watermains	150 days	Thu 30/8/18							
367	Submission for Tempworks	104 days	Thu 21/2/19							
368	Approval from WSD	80 days	Tue 2/7/19							
369	Noise Barrier Bay 1-4	196 days	Mon 1/2/21							
370	General Excavation with ELS to Formation Level Bay 1-4	30 days	Mon 1/2/21							
371	Base slab of Noise Barrier Bay 1-4	30 days	Thu 11/3/21							
372	Wall Stem of Noise Barrier Bay 1-4	15 days	Mon 19/4/21							
373	Protective Coating /Temp Fill	5 days	Fri 7/5/21							
374	Installation of panel	10 days	Fri 17/9/21							
375	Waterworks / Drainage / Sewerage/ Utilities Works (RHS + Man Kam To EB Slow Lane)	62 days	Thu 13/5/21							
376	Sewerage Works / Drainage Works	54 days	Thu 13/5/21							

Task Summary Progress Inactive Milestone Manual Task Manual Summary Rollup Start-only Manual Progress
 Milestone Critical Inactive Task Inactive Summary Duration-only Manual Summary Finish-only

ID	Task Name	Duration	Start	1	2	3	4	5	6	7
377	Watermain FW3 (CH000-045)	6 days	Mon 19/7/21							
378	Road Lighting Civil Works Provision	8 days	Mon 19/7/21							
379	Utilities (by others)	25 days	Thu 13/5/21							
380	Carriageway and Footway (RHS+ Man Kan To EB Slow Lane)	38 days	Wed 28/7/21							
381	Backfilling to Formation Level	10 days	Wed 28/7/21							
382	Carriageway	24 days	Mon 9/8/21							
383	Footpath, Road Marking and Street Furniture	4 days	Mon 6/9/21							
384	Waterworks / Drainage / Sewerage/ Utilities Works (LHS)	52 days	Mon 6/9/21							
385	Sewerage Works / Drainage Works	42 days	Mon 6/9/21							
386	Road Lighting Civil Works Provision	5 days	Thu 28/10/21							
387	Utilities (by others)	10 days	Thu 28/10/21							
388	Carriageway and Footway (LHS)	38 days	Tue 9/11/21							
389	Backfilling to Formation Level	10 days	Tue 9/11/21							
390	Carriageway	24 days	Sat 20/11/21							
391	Footpath, Road Marking and Street Furniture	4 days	Sat 18/12/21							
392	Part C	902 days	Sat 15/12/18							
393	Consent from WSD for Works Near Dong Jing Watermain	702 days	Sat 15/12/18							
394	Investigation works / Trial Pits for Watermains	60 days	Sat 15/12/18							
395	Submission for Tempworks	102 days	Sat 23/2/19							
396	Approval from WSD (RFI No.66) & Re-design the arrangement	546 days	Tue 2/7/19							
397	Refuse Collection Point	200 days	Tue 4/5/21							
398	General Excavation with ELS to Formation	15 days	Tue 4/5/21							
399	Substructure Construction	20 days	Sat 22/5/21							
400	Superstructure Construction	45 days	Wed 16/6/21							
401	Pavement / Footpath reinstatment	90 days	Mon 9/8/21							
402	ABWF Works	120 days	Mon 9/8/21							
403	E&M and Waterworks	120 days	Mon 9/8/21							
404	Landscape Works	274 days	Tue 2/3/21							
405	at Cut Slope CS1, CS2, CS3	90 days	Wed 8/9/21							
406	at Cut Slope CS11, CS12, CS13	90 days	Thu 12/8/21							
407	at Cut Slope CS15, CS16, CS17	90 days	Tue 2/3/21							
408	at Fill Slope FS13, FS14, FS17	60 days	Wed 13/10/21							
409	Sha Ling Road and Man Kam To Road	30 days	Thu 23/12/21							
410	Woodland Planting at Site 1,2,4, 7, 8, 9	170 days	Tue 2/3/21							
411	Irrigation System and Water Points (Except Water Connection)	30 days	Fri 3/12/21							
412	Section 3 of the Works (Part E)	457 days	Thu 31/5/18							
413	Ground Investigation and Geotechnical Instrumentation for Commencement of Slopework	64 days	Thu 31/5/18							
414	Verification Drillholes (2 Nos., VDH4-5) and Preliminary Results Submission	43 days	Thu 31/5/18							
415	Design Review	36 days	Thu 5/7/18							
416	Fill Slope FS3 (Section 17 at Drawing C1/GE/1053)	424 days	Wed 11/7/18							
417	Time Lag of CE16	100 days	Wed 11/7/18							
418	RFI046 Outfall Location	47 days	Mon 8/10/18							
419	Drainage, Maintenance Access at slope toe	63 days	Sat 16/2/19							
420	Construction of Outfall CP14X	11 days	Mon 7/1/19							
421	FS3 Filling Stage 1 (~+16 to +17.6 mPD)	121 days	Thu 6/12/18							
422	CE50-No Fine at Slope Toe	12 days	Fri 26/4/19							
423	FS Filling (+16.9 to +27.6 mPD) (Rolling by Pass)	60 days	Thu 23/5/19							
424	FS Filling (+27.6 to 30 mPD) (Rolling by Pass)	12 days	Sat 3/8/19							
425	FS3 Filling Stage 1 (+16.9 to +21 mPD)	41 days	Sat 17/8/19							
426	Drainage and Maintenance Access (+21 to +28.5 mpD)	19 days	Tue 8/10/19							
427	FS3 Filling Stage 2 (~-7.5m, 21 to +28.5 mPD)	10 days	Wed 30/10/19							
428	Drainage and Maintenance Access (+28.5 to +35.5mpD)	15 days	Fri 22/11/19							
429	FS3 Filling Stage 3 (~-7.5m, +28.5 to 35.5 mPD)	17 days	Thu 21/11/19							
430	Retaining Wall RW4	96 days	Sat 17/8/19							
431	General Excavation to Formation Level(Bay1~2)	23 days	Sat 17/8/19							
432	Plate Load Test and Blinding Layer for Retaining Wall Bays 3-8	5 days	Fri 13/9/19							
433	Plate Load Test and Blinding Layer for Retaining Wall Bays 1-2	5 days	Fri 20/9/19							
434	Base Slab of Retaining Wall RW4 Bay 1-4	16 days	Fri 20/9/19							
435	Base Slab of Retaining Wall RW4 Bay 5-8	16 days	Thu 26/9/19							
436	Wall Stem of Retaining Wall RW4 Bay 1-4	30 days	Fri 11/10/19							
437	Wall Stem of Retaining Wall RW4 Bay 5-8	20 days	Thu 17/10/19							
438	Protective Coating / Subsoil Drain / Filter Layer	5 days	Sat 9/11/19							
439	Backfilling behind RW4 and Fill Slop FS4 (~8m up to +35.5 mPD)	22 days	Fri 15/11/19							
440	Fill Slope FS2	47 days	Thu 17/10/19							
441	Drainage and Maintenance Access (+35.5 to +43.0 mpD)	19 days	Thu 17/10/19							
442	FS2 Filling Stage 1 (~-7.5m, +35.5 to +43 mPD)	20 days	Fri 8/11/19							
443	Drainage and Maintenance Access (+43.0 to +50 mpD)	30 days	Thu 17/10/19							
444	FS2 Filling Stage 2 (~-7.5m, +43 to +50 mPD)	18 days	Wed 20/11/19							
445	Cut Slope CS18 and CS19	235 days	Mon 25/2/19							
446	Slope Cutting (+54.5 to crest)	30 days	Wed 27/2/19							
447	Confirmation of Interface Details at CS18/19 (NCE29)	30 days	Wed 27/2/19							
448	Drainage and Maintenance Access (crest)+ GI Works	8 days	Wed 3/4/19							
449	Slope Cutting and Raking Drain (+47 to +54.5mPD, 13 nos. of Raking Drain)	113 days	Mon 25/2/19							
450	Drainage and Maintenance Access (+54.5 to +62mPD slope surface/berm)+ GI Works	30 days	Thu 4/4/19							
451	Slope Cutting and Raking Drain (+47mPD to toe, 18 nos. of Raking Drain)	110 days	Mon 6/5/19							
452	Drainage and Maintenance Access (below +47mPD slope surface/berm)+ GI Works	70 days	Sat 14/9/19							

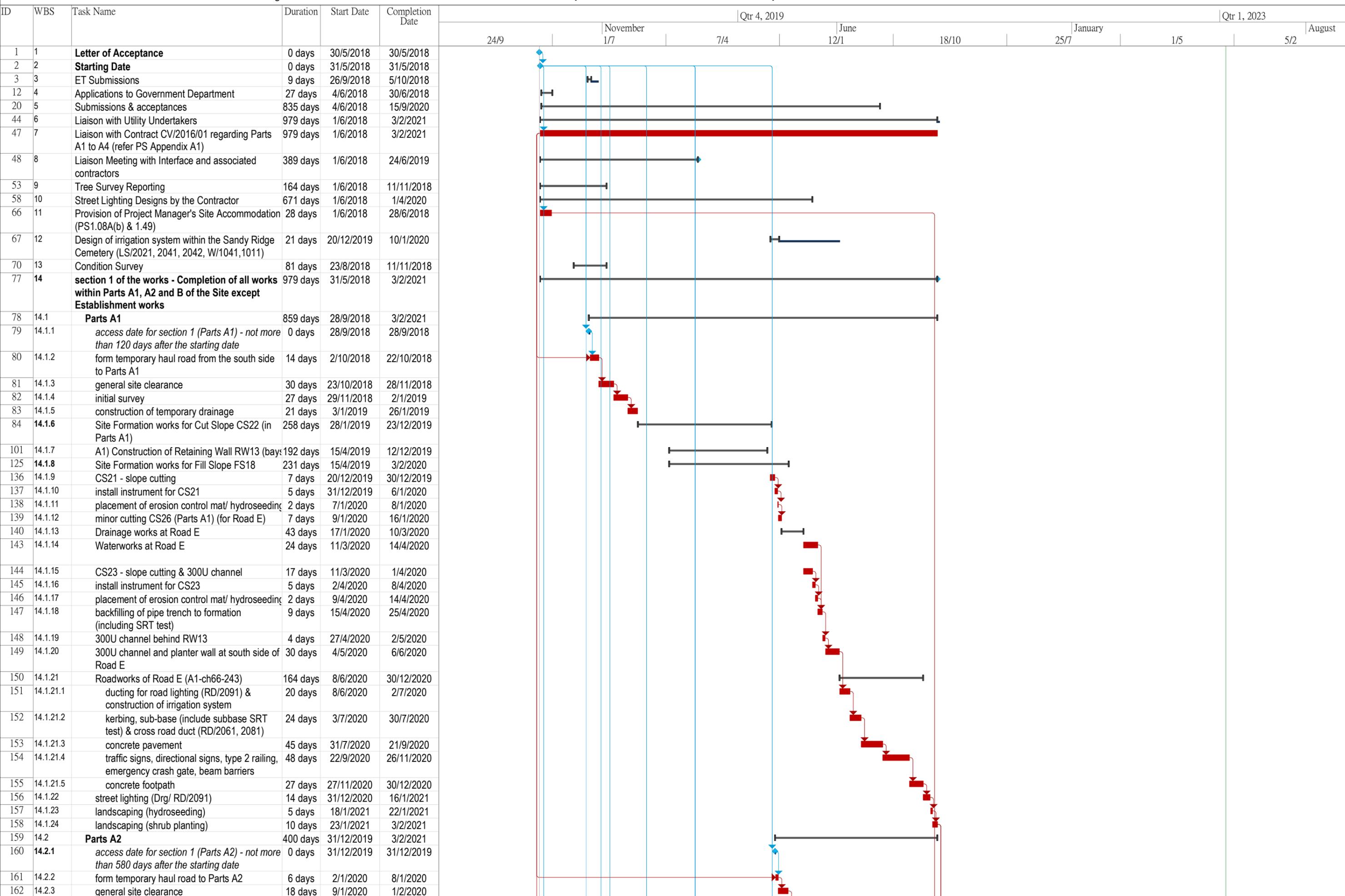
Task Summary Progress Inactive Milestone Manual Task Manual Summary Rollup Start-only Manual Progress
 Milestone Critical Inactive Task Inactive Summary Duration-only Manual Summary Finish-only

3 Month Rolling Programme (April 2023 to June 2023)

ID	Task Name	Duration	Start	2023						
				1	2	3	4	5	6	7
453	Landscape Works	67 days	Mon 16/9/19							
454	at Fill Slope FS2, FS3	50 days	Tue 8/10/19							
455	at Cut Slope CS18, CS19	60 days	Mon 16/9/19							

Task		Summary		Progress		Inactive Milestone		Manual Task		Manual Summary Rollup		Start-only		Manual Progress	
Milestone		Critical		Inactive Task		Inactive Summary		Duration-only		Manual Summary		Finish-only			

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



ID	WBS	Task Name	Duration	Start Date	Completion Date	Qtr 4, 2019					Qtr 1, 2023		
						24/9	November 1/7	7/4	June 12/1	18/10	January 25/7	1/5	August 5/2
934	17.3.27	Phase Ia (stage 105)-south lane (chainage 740-	24 days	16/2/2019	15/3/2019								
945	17.3.28	Phase Ia (stage 106) north lane (chainage 740-	17 days	16/3/2019	4/4/2019								
955	17.3.29	Phase Ia stage 107)-south lane (chainage 790-	21 days	6/4/2019	4/5/2019								
966	17.3.30	Phase Ia (stage 108)-north lane (chainage 790-	29 days	6/5/2019	10/6/2019								
976	17.3.31	Phase Ia (stage 109)-south lane (chainage 840-	31 days	11/6/2019	17/7/2019								
988	17.3.32	Phase Ia (stage 110)-north lane (chainage 840-	18 days	18/7/2019	7/8/2019								
998	17.3.33	Phase III (stage 1)-south lane (chainage 435-4-	20 days	8/8/2019	30/8/2019								
1009	17.3.34	Phase III (stage 2)-north lane (chainage 435-4-	16 days	31/8/2019	19/9/2019								
1019	17.3.35	Phase III (stage 3)-south lane (chainage 490-5-	34 days	20/9/2019	31/10/2019								
1030	17.3.36	Phase III (stage 4)-north lane (chainage 490-5-	17 days	8/11/2019	27/11/2019								
1039	17.3.37	Phase III (stage 5)-south lane (chainage 540-5-	29 days	28/11/2019	3/1/2020								
1049	17.3.38	Phase III (stage 6)-north lane (chainage 540-5-	22 days	4/1/2020	1/2/2020								
1059	17.3.39	Phase III (stage 7)-south lane (chainage 590-6-	29 days	4/2/2020	7/3/2020								
1069	17.3.40	Phase III (stage 8)-north lane (chainage 590-6-	25 days	9/3/2020	7/4/2020								
1079	17.3.41	Street lighting (drawpits, abandon existing public lighting & cable, 100uPVC ducts)	7 days	8/4/2020	18/4/2020								
1080	17.3.42	tree planting	5 days	14/4/2020	18/4/2020								
1081	17.3.43	Street furniture & construction of footpath (ch435-890)	23 days	20/4/2020	18/5/2020								
1082	17.3.44	Phase IV (stage 1)-south lane (chainage 890-9-	22 days	20/9/2019	17/10/2019								
1093	17.3.45	Phase IV (stage 2)-north lane (chainage 890-9-	17 days	18/10/2019	6/11/2019								
1103	17.3.46	Phase IV (stage 3)-south lane (chainage 940-9-	31 days	7/11/2019	12/12/2019								
1113	17.3.47	Phase IV (stage 4)-north lane (chainage 940-9-	16 days	13/12/2019	3/1/2020								
1122	17.3.48	Phase V (stage 1)-south lane (chainage 983-1-	17 days	4/1/2020	23/1/2020								
1132	17.3.49	Phase V (stage 2)-north lane (chainage 983-1-	16 days	24/1/2020	14/2/2020								
1141	17.3.50	Phase V (stage 3)-south lane (chainage 1035-1-	19 days	15/2/2020	7/3/2020								
1151	17.3.51	Phase V (stage 4)-north lane (chainage 1035-1-	12 days	9/3/2020	21/3/2020								
1160	17.3.52	Phase V (stage 5)-south lane (chainage 1087-1-	20 days	23/3/2020	18/4/2020								
1170	17.3.53	Phase V (stage 6)-north lane (chainage 1087-1-	15 days	20/4/2020	8/5/2020								
1179	17.3.54	Phase V (stage 7)-south lane (chainage 1139-1-	20 days	9/5/2020	1/6/2020								
1189	17.3.55	Phase V (stage 8)-north lane (chainage 1139-1-	15 days	2/6/2020	18/6/2020								
1198	17.3.56	Phase VI (stage 1)-south lane (chainage 1190-	21 days	19/6/2020	15/7/2020								
1208	17.3.57	Phase VI (stage 2)-north lane (chainage 1190-	15 days	16/7/2020	1/8/2020								
1217	17.3.58	Phase VI (stage 3)-south lane (chainage 1240-	34 days	3/8/2020	10/9/2020								
1228	17.3.59	Phase VI (stage 4)-north lane (chainage 1240-	15 days	11/9/2020	28/9/2020								
1237	17.3.60	Phase VI (stage 5)-south lane (chainage 1286-	20 days	29/9/2020	23/10/2020								
1247	17.3.61	Phase VI (stage 6) - north lane (chainage 1286-	12 days	24/10/2020	7/11/2020								
1254	17.3.62	Phase VI (stage 7)-south lane (chainage 1332-	27 days	9/11/2020	9/12/2020								
1266	17.3.63	Phase VI (stage 8)-north lane (chainage 1332-	15 days	10/12/2020	29/12/2020								
1275	17.3.64	Street lighting (drawpits, abandon existing public lighting & cable, 100uPVC ducts) (ch890-1377)	7 days	29/12/2020	6/1/2021								
1276	17.3.65	tree planting	1 day	6/1/2021	6/1/2021								
1277	17.3.66	Street furniture & construction of footpath (ch890-1377)	25 days	6/1/2021	3/2/2021								
1278	17.4	Noise Barrier works above the concrete substructure of the noise barrier (section 2 Part	674 days	29/10/2018	3/2/2021								
1279	17.4.1	seek specialist subcontractor to design and bui	210 days	29/10/2018	26/5/2019								
1280	17.4.2	propose specialist subcontractor to PM for acceptance	0 days	26/5/2019	26/5/2019								
1281	17.4.3	acceptance of propose specialist subcontractor by Project Manager	0 days	16/6/2019	16/6/2019								
1282	17.4.4	prepare design & liaise with designer & PM	120 days	17/6/2019	14/10/2019								
1283	17.4.5	submit a proposal detailing the changes to PM's design, if any	14 days	15/10/2019	28/10/2019								
1284	17.4.6	submit 1st design for PM's comment	0 days	28/10/2019	28/10/2019								
1285	17.4.7	PM's comments	21 days	29/10/2019	18/11/2019								
1286	17.4.8	revise design	28 days	19/11/2019	16/12/2019								
1287	17.4.9	re-submit design for PM's acceptance	0 days	16/12/2019	16/12/2019								
1288	17.4.10	submit 3 sample panels for each type & colour for acceptance	7 days	17/12/2019	23/12/2019								
1289	17.4.11	PM's & relevant authorities' acceptance	0 days	13/1/2020	13/1/2020								
1290	17.4.12	ordering of noise barrier panel	0 days	15/1/2020	15/1/2020								

ID	WBS	Task Name	Duration	Start Date	Completion Date	Qtr 4, 2019												Qtr 1, 2023											
						November			December			January			February			March			April			May			June		
1674	29.2.3	general site clearance	15 days	2/1/2020	18/1/2020																								
1675	29.2.4	initial survey	11 days	11/1/2020	23/1/2020																								
1676	29.2.5	construction of temporary drainage	15 days	16/1/2020	5/2/2020																								
1677	29.2.6	Site Formation works for Cut Slope CS24 (include temporary cutting from top of RW12 to toe of CS24) (for RW12 bays 4-6)	7 days	29/1/2020	5/2/2020																								
1678	29.2.7	install instrument for CS24	3 days	6/2/2020	8/2/2020																								
1679	29.2.8	temporary soil nails between CS20 & RW12 (for RW12 bays 4-6)	35 days	6/2/2020	17/3/2020																								
1680	29.2.9	Construction of Retaining Wall RW12 CH 21-40	58 days	18/3/2020	3/6/2020																								
1703	29.2.10	Site Formation works for Cut Slope CS20	125 days	1/6/2020	3/11/2020																								
1737	29.2.11	Site Formation works for Cut Slope CS26 (A4)	8 days	13/10/2020	22/10/2020																								
1738	29.2.12	Site Formation works for Cut Slope CS25 (A4)	9 days	23/10/2020	5/11/2020																								
1739	29.2.13	complete the construction of U channel at CS 25 and 26	15 days	4/11/2020	23/11/2020																								
1740	29.2.14	planter wall	10 days	18/11/2020	28/11/2020																								
1741	29.2.15	Waterworks at Road B	8 days	24/11/2020	2/12/2020																								
1742	29.2.16	Sewerage works at Road B	7 days	27/11/2020	4/12/2020																								
1743	29.2.17	Drainage works at Road B	7 days	30/11/2020	7/12/2020																								
1744	29.2.18	UU - Arrange Town Gas & PCCW to lay cables (not agreed yet)	14 days	8/12/2020	23/12/2020																								
1745	29.2.19	Roadworks of Road B (A4-ch90-130)	23 days	23/12/2020	21/1/2021																								
1750	29.2.20	street lighting (Drg/ RD/2091)	4 days	21/1/2021	25/1/2021																								
1751	29.2.21	landscaping (hydroseeding)	7 days	25/1/2021	1/2/2021																								
1752	29.2.22	landscaping (shrub planting)	5 days	29/1/2021	3/2/2021																								
1753	30	Planned Completion for section 6 of the works	0 days	3/2/2021	3/2/2021																								
1754	31	Completion Date for section 6 of the works	0 days	3/2/2021	3/2/2021																								
1755	32	section 7 of the works (section Subject to Excision) - Completion of Establishment works for the Landscape Softworks within Parts A3	1095 days	4/2/2021	3/2/2024																								
1756	32.1	Establishment works for the Landscape Softworks within Parts A3 and A4 of the Site	1095 days	4/2/2021	3/2/2024																								

Appendix D

Monitoring Locations

Air Quality Monitoring Location

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

Legend

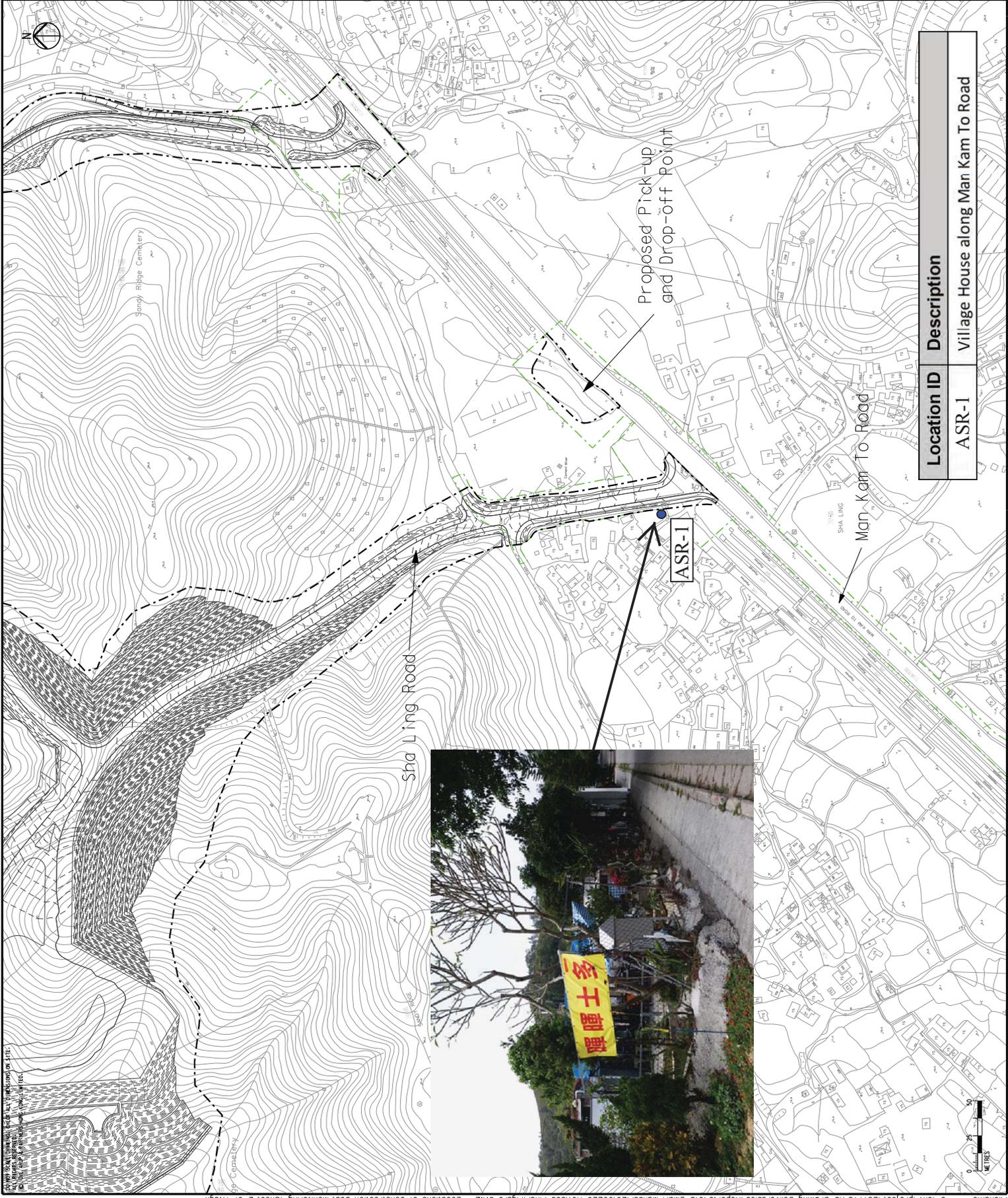
- Project Boundary
- Utilities Construction
- Proposed Air Monitoring Stations

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			

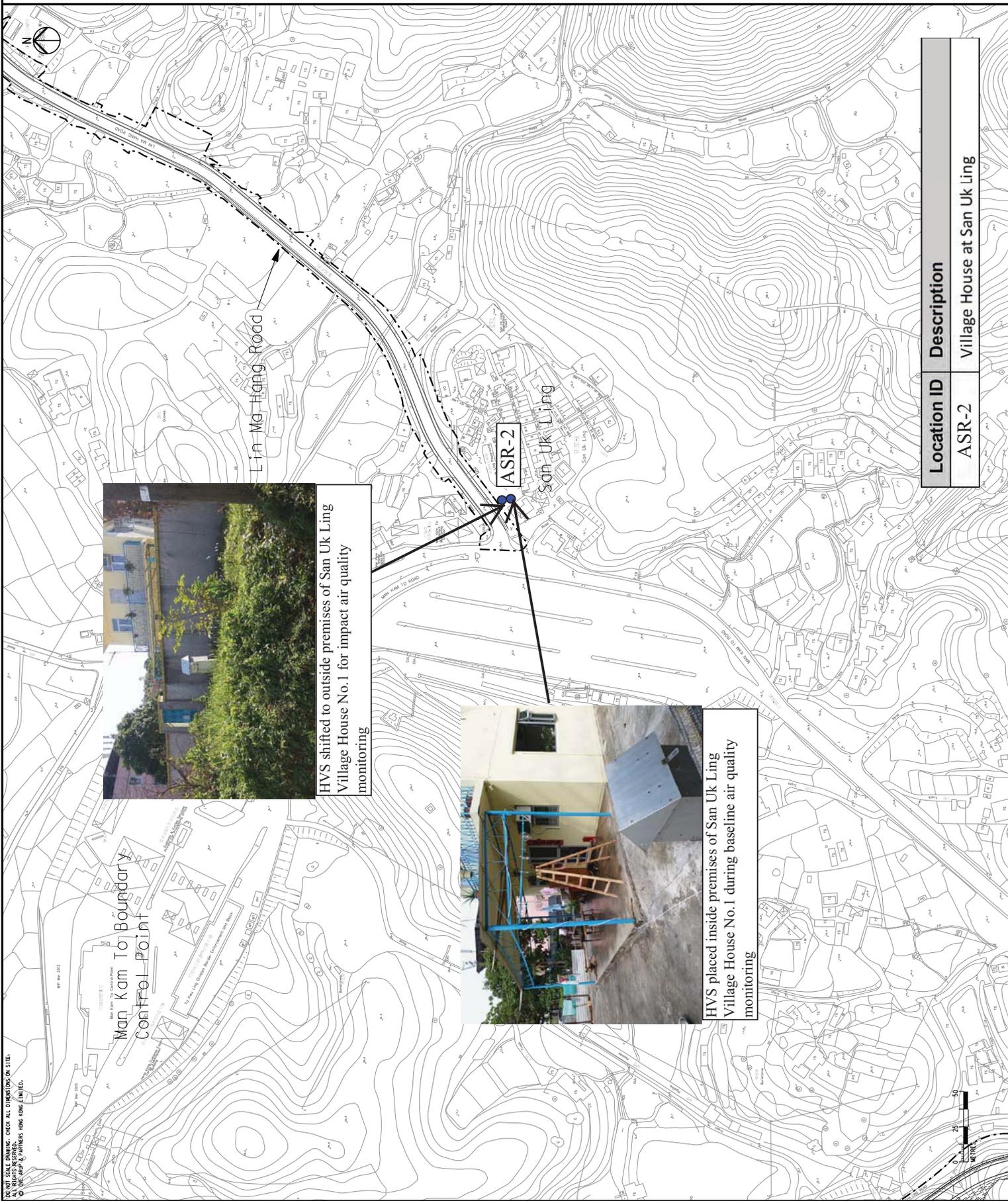
Contract No. and Title:
 Agreement No. CE 1/2013(CE)
 Site Formation and Associated
 Infrastructural Works for Development
 of Columbarium, Crematorium and
 Related Facilities at Sandy Ridge
 Cemetery - Design and Construction

Drawing title

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Legend

- Project Boundary
- Existing Air Monitoring Stations



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

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

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

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)

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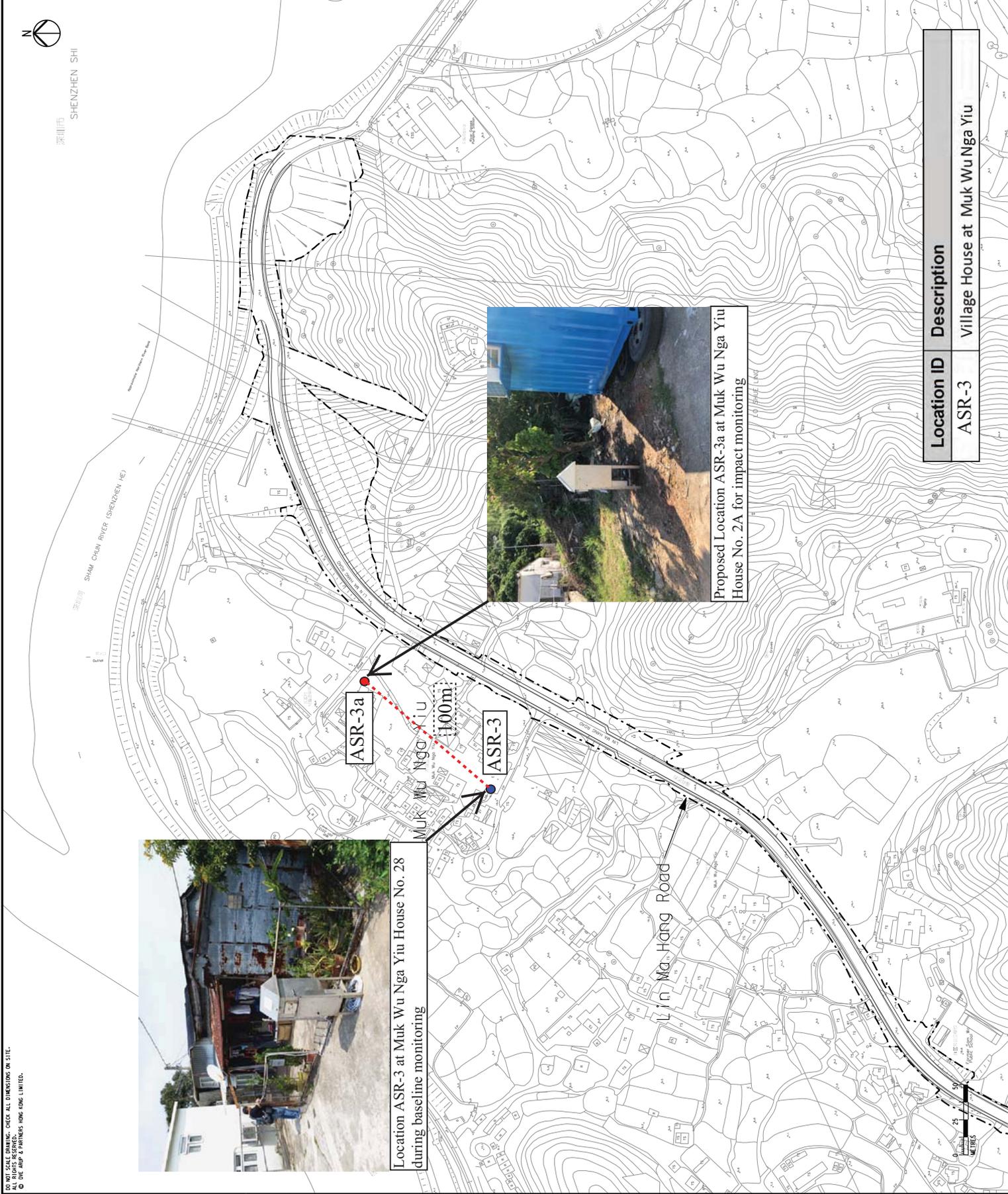
Man Kam To Boundary
 Control Point



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



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

Legend

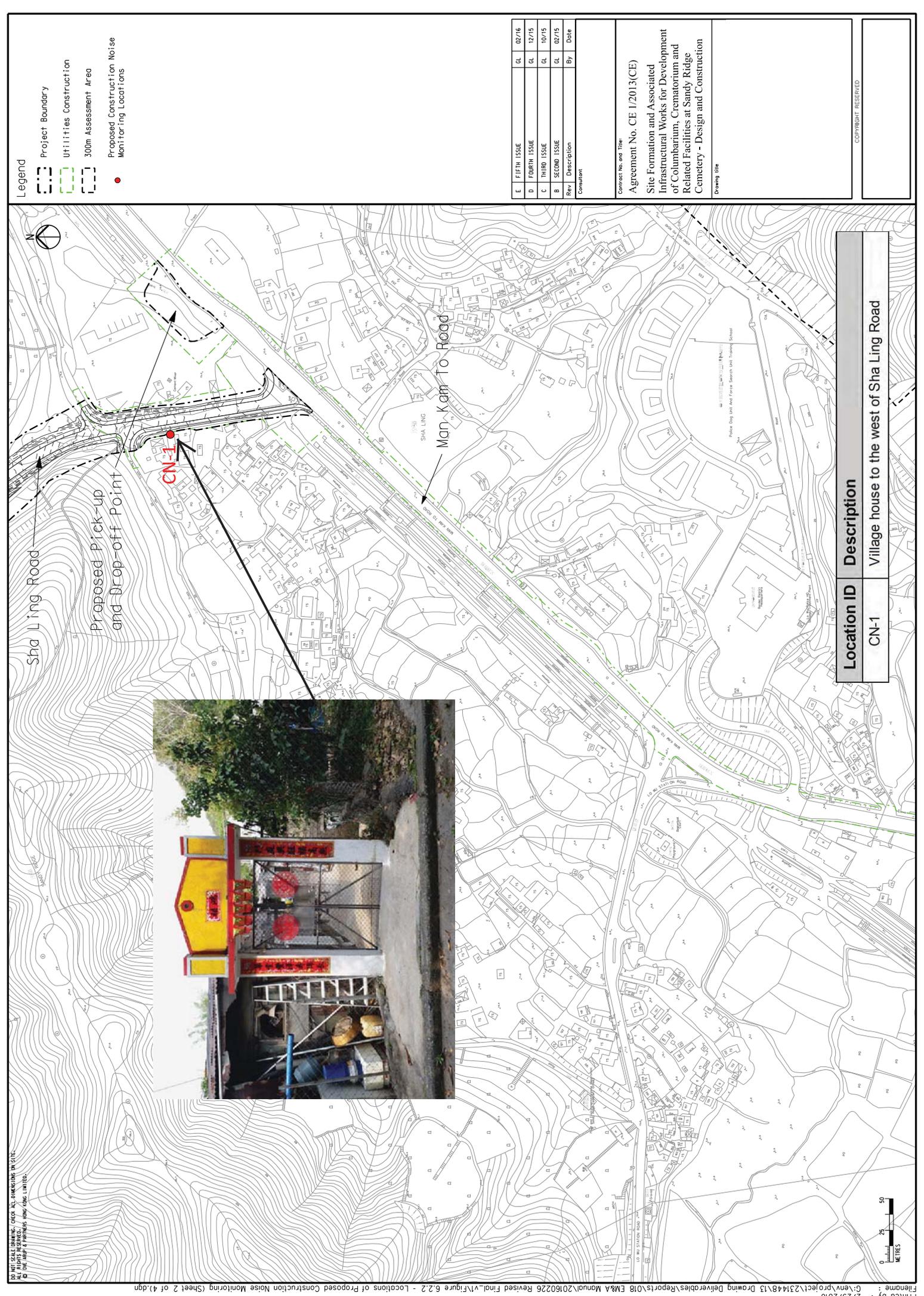
- Project Boundary
- Existing Air Monitoring Station
- Proposed Air Monitoring Station

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

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)

Noise Monitoring Location



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

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

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

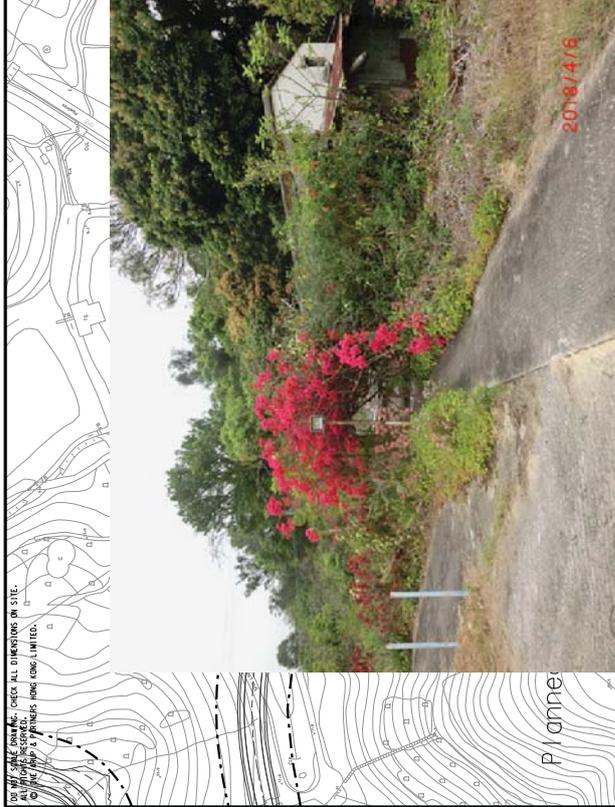
Contract No. and Title:
 Agreement No. CE 1/2013(CE)
 Site Formation and Associated
 Infrastructural Works for Development
 of Columbarium, Crematorium and
 Related Facilities at Sandy Ridge
 Cemetery - Design and Construction

Drawing title

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

Legend

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

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

Contract No. and Title:
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Legend

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

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

Contract No. and Title:
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 Related Facilities at Sandy Ridge
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Drawing Title

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

Man Kam To
 Boundary
 Control Point



Water Quality Monitoring Station

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Legend

- Project Boundary
- Utilities Construction
- 500m Assessment Area
- Channelized River
- Pond
- Watercourse
- Conservation Area (CA)
- Wet Woodland
- Seasonal Watercourse
- Base line Monitoring Station

Printed by : 2/29/2016
 File name : G:\envy\project\231448\13 Drawing Deliverables\Reports\018 EM&A Manual\20160226 Revised Final\vi\figure 7.1.1 - Water Quality Monitoring Locations.dgn



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

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
**Water Quality Monitoring
 Locations**

Drawing no.	Figure 7.1.1	Rev.	E
Drawn	02/16	Checked	Approved
Scale	AS SHOWN	Status	PRELIMINARY

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 Civil Engineering and
 Development Department

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	
1a	Air	TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	31 Mar 23	13 Apr 23	
1b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	15 Apr 23	29 Apr 23	
2a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	31 Mar 23	13 Apr 23	
2b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	15 Apr 23	29 Apr 23	
3a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	31 Mar 23	13 Apr 23	
3b		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	15 Apr 23	29 Apr 23	
4		Calibration Kit TISCH Model TE-5025A Orifice ID 4064 and Rootmeter S/N 438320	15 Dec 22	15 Dec 23	
5		Laser Dust Monitor, Model LD-3B (Serial No. 366407) – EQ107	13 Feb 23	13 Feb 24	
6		Laser Dust Monitor, Model LD-3B (Serial No. 366418) – EQ108	13 Feb 23	13 Feb 24	
7		Laser Dust Monitor, Model LD-3B (Serial No. 366410) – EQ110	13 Feb 23	13 Feb 24	
9		Noise	Rion NL-52 Sound Level Meter (Serial No. 00921191) – EQ013	19 Nov 22	19 Nov 23
10			Rion NL-52 Sound Level Meter (Serial No. 00142581) – EQ015	19 Nov 22	19 Nov 23
11			Rion NC-73 Acoustical Calibrator (Serial No. 10655561) – EQ085	20 Aug 22	20 Aug 23
12	Water	YSI Professional DSS (Serial No.20J101862)	27 Jan 23	27 Apr 23	
12a		YSI Professional DSS (Serial No.17B102764)	18 Apr 23	18 Jul 23	
13		Global Water FP211 Flow Meter (Serial No. 22B106785)	3 May 22	3 May 23	

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 31 Mar 23

Location ID : ASR-1

Next Calibration Date: 13 Apr 23

Name and Model: TISCH HVS Model TE-5170

Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa) 1013.3
 Temperature (°C) 20.3

Corrected Pressure (mm Hg) 759.975
 Temperature (K) 293

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 4064

Qstd Slope -> 2.10977
 Qstd Intercept -> -0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.50	6.50	13.0	1.741	57	57.91	Slope = 37.5294 Intercept = -7.4538 Corr. coeff. = 0.9998
13	5.10	5.10	10.2	1.544	50	50.80	
10	4.20	4.20	8.4	1.403	44	44.70	
7	2.40	2.40	4.8	1.065	32	32.51	
5	1.60	1.60	3.2	0.873	25	25.40	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

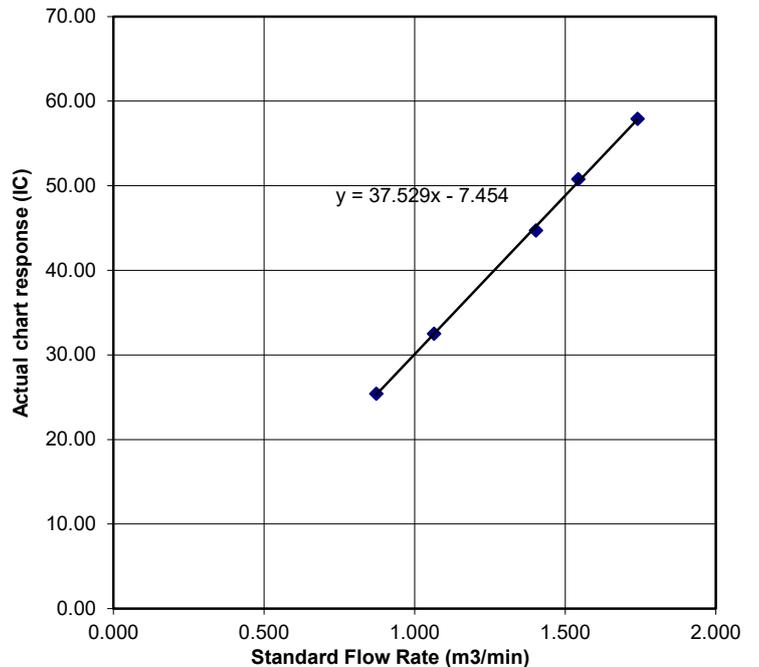
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

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: 31 Mar 23
 Next Calibration Date: 13 Apr 23
 Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa) 1013.3
 Temperature (°C) 20.3

Corrected Pressure (mm Hg) 759.975
 Temperature (K) 293

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 4064

Qstd Slope -> 2.10977
 Qstd Intercept -> -0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.60	6.60	13.2	1.754	59	59.94	Slope = 38.3950 Intercept = -6.6417 Corr. coeff. = 0.9968
13	5.40	5.40	10.8	1.588	54	54.86	
10	4.10	4.10	8.2	1.386	47	47.75	
7	2.50	2.50	5.0	1.086	33	33.53	
5	1.60	1.60	3.2	0.873	27	27.43	

Calculations :

$$Q_{std} = 1/m[\text{Sqrt}(H2O(Pa/P_{std})(T_{std}/T_a))-b]$$

$$IC = I[\text{Sqrt}(Pa/P_{std})(T_{std}/T_a)]$$

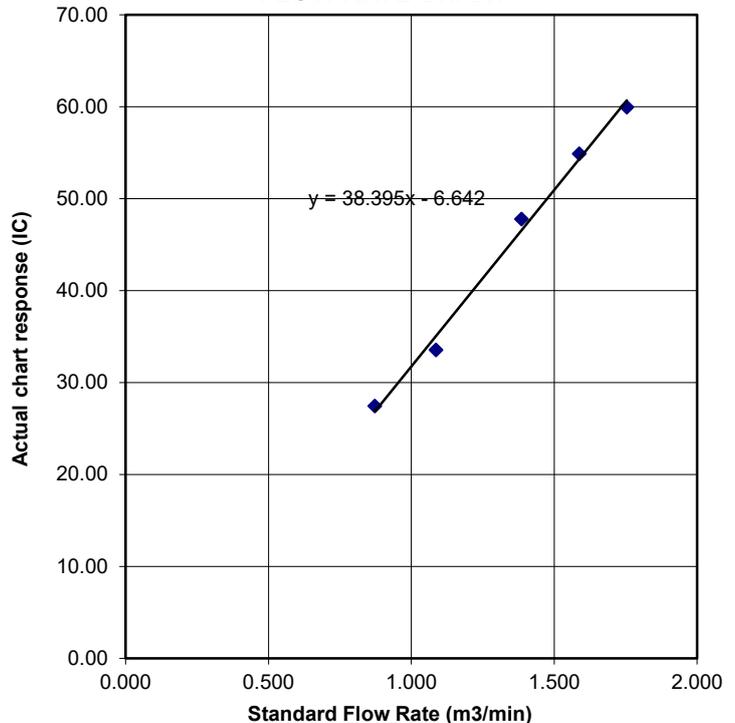
Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

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

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A	Date of Calibration: 31 Mar 23
Location ID : ASR-3a	Next Calibration Date: 13 Apr 23
Name and Model: TISCH HVS Model TE-5170	Technician: Eric Chan

CONDITIONS			
Sea Level Pressure (hPa)	1013.3	Corrected Pressure (mm Hg)	759.975
Temperature (°C)	20.3	Temperature (K)	293

CALIBRATION ORIFICE			
Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Serial # ->	4064		

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.40	6.40	12.8	1.727	54	54.86	Slope = 31.5443 Intercept = -0.2829 Corr. coeff. = 0.9985
13	5.40	5.40	10.8	1.588	48	48.77	
10	4.10	4.10	8.2	1.386	43	43.69	
7	2.40	2.40	4.8	1.065	33	33.53	
5	1.40	1.40	2.8	0.817	25	25.40	

Calculations :

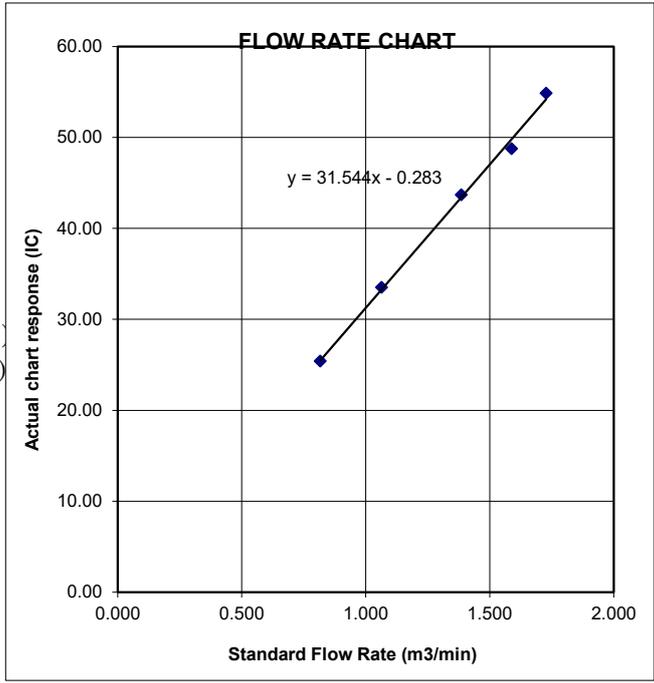
$Qstd = 1/m[\text{Sqrt}(H20(Pa/Pstd)(Tstd/Ta))-b]$
 $IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$

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

For subsequent calculation of sampler flow:

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

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



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6	Date of Calibration: 15 Apr 23
Location ID : ASR-1	Next Calibration Date: 29 Apr 23
Name and Model: TISCH HVS Model TE-5170	Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa)	1009.3	Corrected Pressure (mm Hg)	756.975
Temperature (°C)	26.9	Temperature (K)	300

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope ->
Model-> 5025A	2.10977
Serial # -> 4064	Qstd Intercept ->
	-0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.50	6.50	13.0	1.718	57	56.53	Slope = 37.6590 Intercept = -7.4733 Corr. coeff. = 0.9959
13	5.10	5.10	10.2	1.524	52	51.57	
10	4.10	4.10	8.2	1.368	44	43.63	
7	2.40	2.40	4.8	1.051	31	30.74	
5	1.50	1.50	3.0	0.835	25	24.79	

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

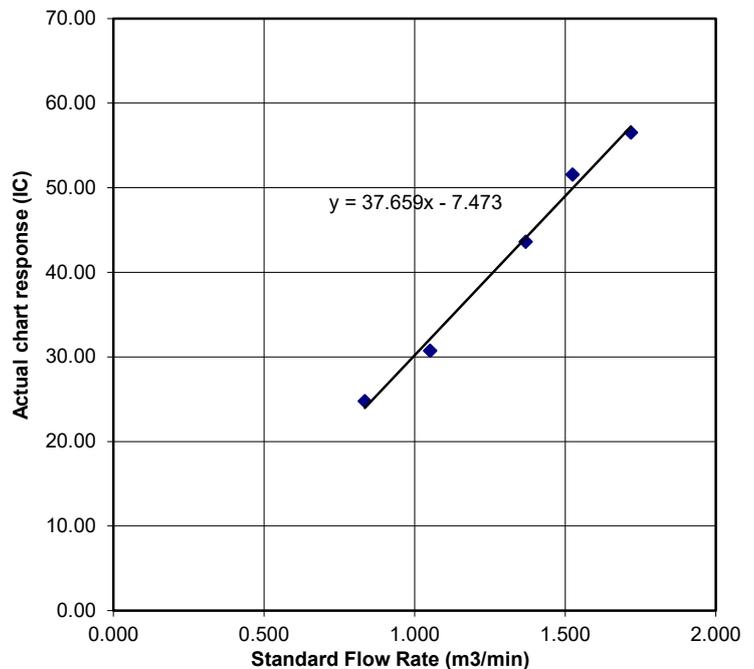
b = sampler intercept

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: 15 Apr 23
 Next Calibration Date: 29 Apr 23
 Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa) 1009.3
 Temperature (°C) 26.9

Corrected Pressure (mm Hg) 756.975
 Temperature (K) 300

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Serial # -> 4064

Qstd Slope -> 2.10977
 Qstd Intercept -> -0.03782

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.50	6.50	13.0	1.718	59	58.51	Slope = 38.3981 Intercept = -7.2605 Corr. coeff. = 0.9978
13	5.40	5.40	10.8	1.568	54	53.55	
10	4.00	4.00	8.0	1.352	45	44.63	
7	2.40	2.40	4.8	1.051	32	31.73	
5	1.60	1.60	3.2	0.861	27	26.78	

Calculations :

$$Q_{std} = 1/m[\text{Sqrt}(H2O(Pa/P_{std})(T_{std}/T_a))-b]$$

$$IC = I[\text{Sqrt}(Pa/P_{std})(T_{std}/T_a)]$$

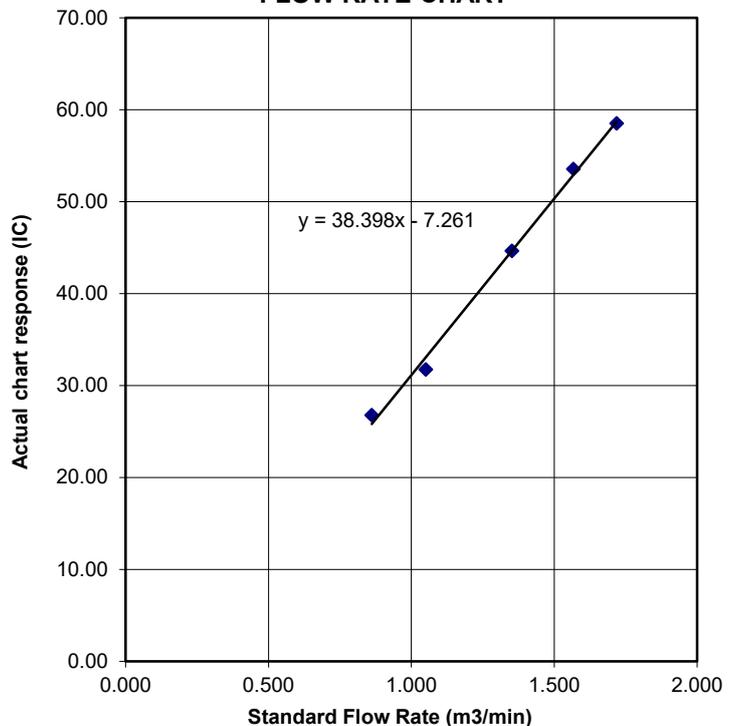
Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

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

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A	Date of Calibration: 15 Apr 23
Location ID : ASR-3a	Next Calibration Date: 29 Apr 23
Name and Model: TISCH HVS Model TE-5170	Technician: Eric Chan

CONDITIONS

Sea Level Pressure (hPa) 1009.3	Corrected Pressure (mm Hg) 756.975
Temperature (°C) 26.9	Temperature (K) 300

CALIBRATION ORIFICE

Make-> TISCH	Qstd Slope -> 2.10977
Model-> 5025A	Qstd Intercept -> -0.03782
Serial # -> 4064	

CALIBRATION

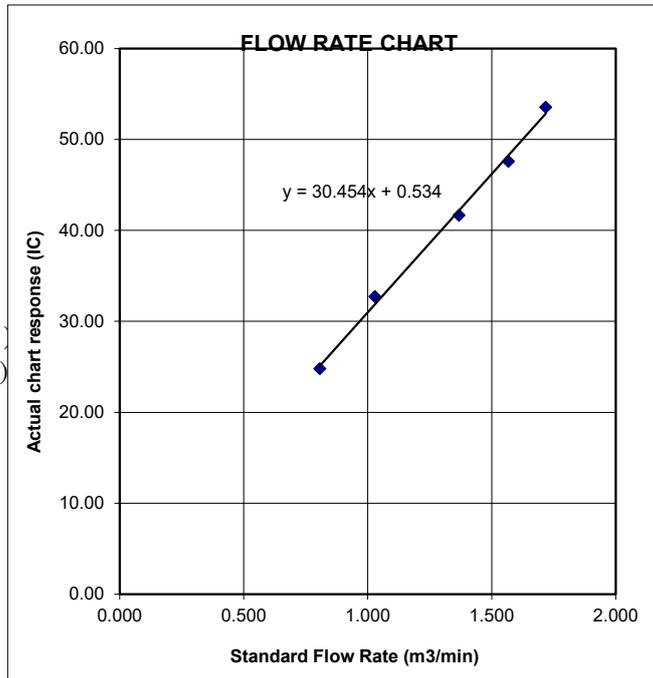
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION		
							Slope =	Intercept =	Corr. coeff. =
18	6.50	6.50	13.0	1.718	54	53.55	Slope = 30.4544 Intercept = 0.5337 Corr. coeff. = 0.9981		
13	5.40	5.40	10.8	1.568	48	47.60			
10	4.10	4.10	8.2	1.368	42	41.65			
7	2.30	2.30	4.6	1.029	33	32.73			
5	1.40	1.40	2.8	0.807	25	24.79			

Calculations :

$Q_{std} = 1/m[\text{Sqrt}(H20(Pa/P_{std})(T_{std}/T_a))-b]$
 $IC = I[\text{Sqrt}(Pa/P_{std})(T_{std}/T_a)]$
 Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: December 15, 2022	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 748.0	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 4064		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	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)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

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

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	: HK2307087
CLIENT	: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH	: 1
		DATE RECEIVED	: 20-FEB-2023
		DATE OF ISSUE	: 27-FEB-2023
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
 - Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
 - Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
 - Calibration was subcontracted to and analysed by Action United Environmental Services & Consulting.
-

Signatories

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

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

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
Kwai Tsing Hong Kong

WORK ORDER : HK2307087
SUB-BATCH : 1
CLIENT : ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2307087-001	S/N: 366407	AIR	20-Feb-2023	S/N: 366407

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
 Location & Location ID: AUES office (calibration room)
 Equipment Ref: HVS 018 & HVS 019
 Last Calibration Date: 14 December 2022 & 10 January 2023

Equipment Verification Results:

Verification Date: 10, 11 & 12 January 2023

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
10-Jan-23	2hr1min	14:41 ~ 16:42	18.2	1018.8	7.6	613	5.1
11-Jan-23	2hr01min	13:16 ~ 15:17	18.1	1017.6	25.2	1786	14.8
11-Jan-23	2hr01min	15:25 ~ 17:26	18.1	1017.6	15.8	1206	10.0
12-Jan-23*	61mins	09:31 ~ 10:32	18.8	1014.5	112.8	3679	60.1
12-Jan-23*	61mins	10:36 ~ 11:37	18.8	1014.5	81.5	2077	33.9

(* Suspended particle was added into calibration room of HVS019 for high concentration test.

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

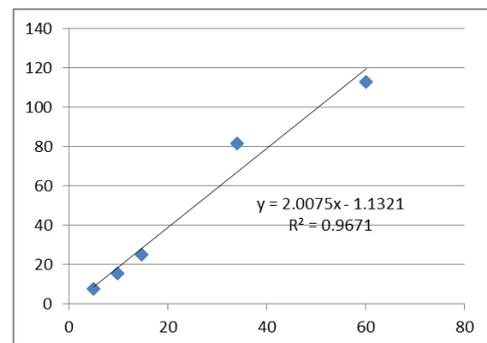
Sensitivity Adjustment Scale Setting (After Calibration) 565 (CPM)

Linear Regression of Y or X

Slope (K-factor): 2.0075 (ug/m³)/CPM

Correlation Coefficient (R) 0.9834

Date of Issue 13 February 2023



Remarks:

- Strong** Correlation (R>0.8)
- Factor 2.0075 (ug/m³)/CPM should be apply for TSP monitoring

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

Operator : Fai So Signature : [Signature] Date : 13 February 2023

QC Reviewer : Ben Tam Signature : [Signature] Date : 13 February 2023

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 14-Dec-22
 Location ID : Calibration Room(HVS 018) Next Calibration Date: 14-Mar-23

CONDITIONS

Sea Level Pressure (hPa)	1021.4	Corrected Pressure (mm Hg)	766.05
Temperature (°C)	12.5	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Calibration Date->	27-Dec-21	Expiry Date->	27-Dec-22

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 29.6312 Intercept = 2.5287 Corr. coeff. = 0.9991
18	6	6	12.0	1.783	54	55.39	
13	4.8	4.8	9.6	1.595	48	49.23	
10	3.8	3.8	7.6	1.420	44	45.13	
8	2.5	2.5	5.0	1.152	36	36.93	
5	1.5	1.5	3.0	0.894	28	28.72	

Calculations :

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

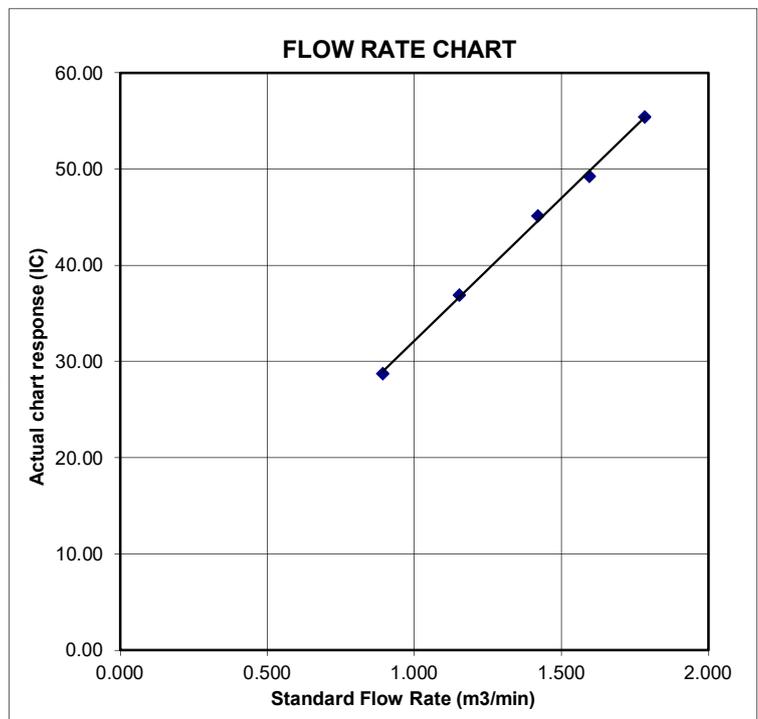
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: December 27, 2021	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 740.4	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	1.3890	3.2	2.00
2	3	4	1	0.9760	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8320	8.8	5.50
5	9	10	1	0.6870	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)
0.9799	0.7055	1.4029	0.9957	0.7168	0.8927
0.9756	0.9996	1.9841	0.9914	1.0157	1.2624
0.9736	1.1140	2.2183	0.9893	1.1320	1.4114
0.9724	1.1688	2.3265	0.9881	1.1876	1.4803
0.9673	1.4079	2.8059	0.9828	1.4306	1.7853
QSTD	m=	1.99838	QA	m=	1.25135
	b=	-0.00903		b=	-0.00574
	r=	0.99999		r=	0.99999

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

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 10-Jan-23
Location ID :	Calibration Room(HVS 019)	Next Calibration Date: 9-Apr-23

CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	18.2	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Calibration Date->	15-Dec-22	Expiry Date->	15-Dec-23

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.683	55	55.79	Slope = 31.4802 Intercept = 1.9499 Corr. coeff. = 0.9967
13	4.9	4.9	9.8	1.523	48	48.69	
10	3.9	3.9	7.8	1.361	44	44.63	
8	2.4	2.4	4.8	1.071	36	36.52	
5	1.5	1.5	3.0	0.851	28	28.40	

Calculations :

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

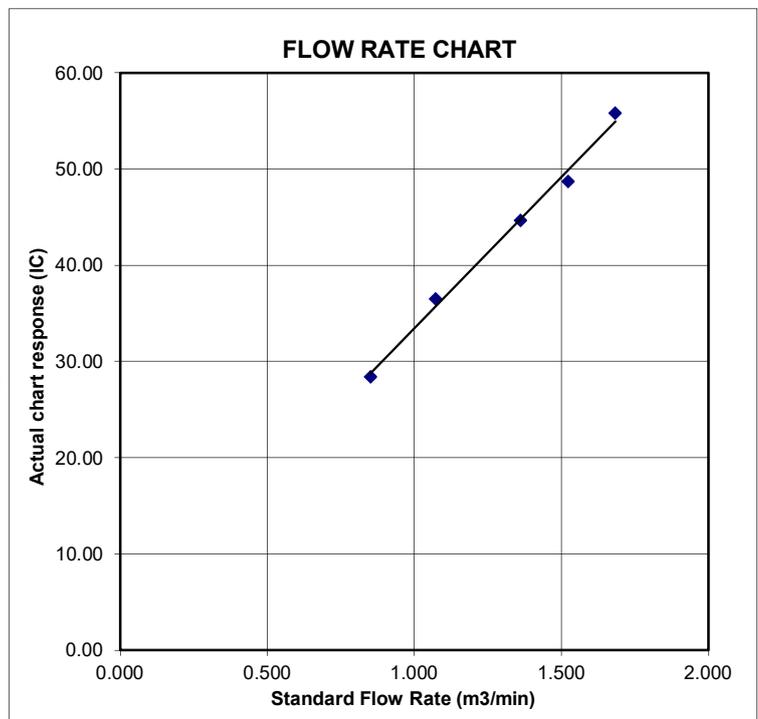
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: December 15, 2022	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 748.0	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 4064		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	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)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

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

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	: HK2307088
CLIENT	: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH	: 1
		DATE RECEIVED	: 20-FEB-2023
		DATE OF ISSUE	: 27-FEB-2023
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
 - Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
 - Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
 - Calibration was subcontracted to and analysed by Action United Environmental Services & Consulting.
-

Signatories

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

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

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
Kwai Tsing Hong Kong

WORK ORDER : HK2307088
SUB-BATCH : 1
CLIENT : ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2307088-001	S/N: 366418	AIR	20-Feb-2023	S/N: 366418

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366418
Equipment Ref: EQ108

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018 & HVS 019
Last Calibration Date: 14 December 2022 & 10 January 2023

Equipment Verification Results:

Verification Date: 10, 11 & 12 January 2023

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
10-Jan-23	2hr1min	14:41 ~ 16:42	18.2	1018.8	7.6	584	4.8
11-Jan-23	2hr01min	13:16 ~ 15:17	18.1	1017.6	25.2	1677	13.9
11-Jan-23	2hr01min	15:25 ~ 17:26	18.1	1017.6	15.8	1106	9.1
12-Jan-23*	61mins	09:31 ~ 10:32	18.8	1014.5	112.8	3546	57.9
12-Jan-23*	61mins	10:36 ~ 11:37	18.8	1014.5	81.5	2110	34.5

(* Suspended particle was added into calibration room of HVS019 for high concentration test.

Sensitivity Adjustment Scale Setting (Before Calibration) 685 (CPM)

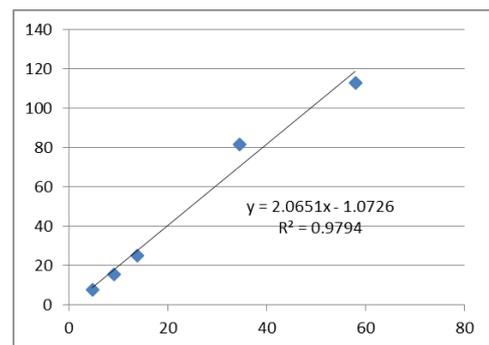
Sensitivity Adjustment Scale Setting (After Calibration) 685 (CPM)

Linear Regression of Y or X

Slope (K-factor): 2.0651 (ug/m³)/CPM

Correlation Coefficient (R) 0.9896

Date of Issue 13 February 2023



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 2.0651 (ug/m³)/CPM should be apply for TSP monitoring

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

Operator : Fai So Signature :  Date : 13 February 2023

QC Reviewer : Ben Tam Signature :  Date : 13 February 2023

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 14-Dec-22
 Location ID : Calibration Room(HVS 018) Next Calibration Date: 14-Mar-23

CONDITIONS

Sea Level Pressure (hPa)	1021.4	Corrected Pressure (mm Hg)	766.05
Temperature (°C)	12.5	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Calibration Date->	27-Dec-21	Expiry Date->	27-Dec-22

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.783	54	55.39	Slope = 29.6312 Intercept = 2.5287 Corr. coeff. = 0.9991
13	4.8	4.8	9.6	1.595	48	49.23	
10	3.8	3.8	7.6	1.420	44	45.13	
8	2.5	2.5	5.0	1.152	36	36.93	
5	1.5	1.5	3.0	0.894	28	28.72	

Calculations :

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

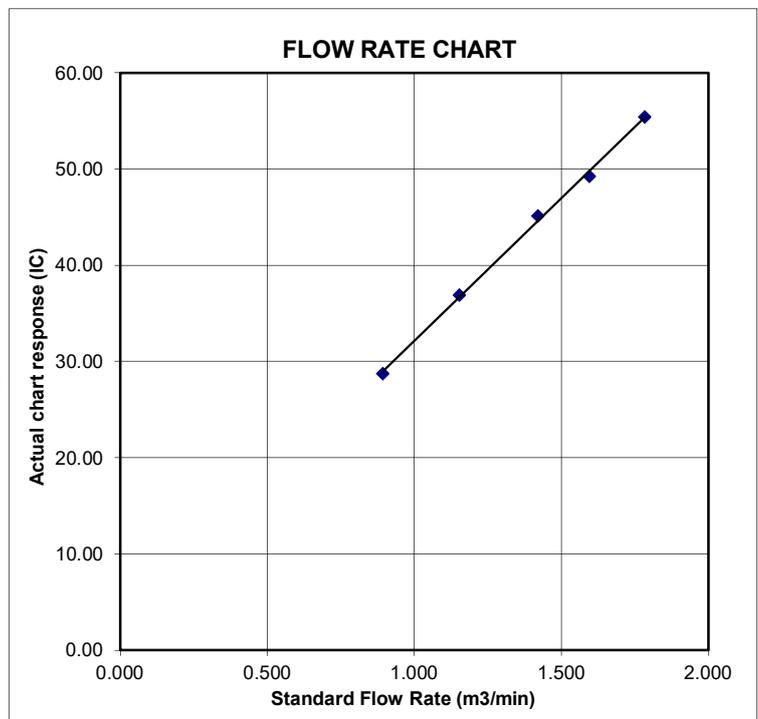
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: December 27, 2021	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 740.4	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	1.3890	3.2	2.00
2	3	4	1	0.9760	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8320	8.8	5.50
5	9	10	1	0.6870	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)
0.9799	0.7055	1.4029	0.9957	0.7168	0.8927
0.9756	0.9996	1.9841	0.9914	1.0157	1.2624
0.9736	1.1140	2.2183	0.9893	1.1320	1.4114
0.9724	1.1688	2.3265	0.9881	1.1876	1.4803
0.9673	1.4079	2.8059	0.9828	1.4306	1.7853
QSTD	m=	1.99838	QA	m=	1.25135
	b=	-0.00903		b=	-0.00574
	r=	0.99999		r=	0.99999

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

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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 10-Jan-23
Location ID :	Calibration Room(HVS 019)	Next Calibration Date: 9-Apr-23

CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	18.2	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Calibration Date->	15-Dec-22	Expiry Date->	15-Dec-23

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.683	55	55.79	Slope = 31.4802 Intercept = 1.9499 Corr. coeff. = 0.9967
13	4.9	4.9	9.8	1.523	48	48.69	
10	3.9	3.9	7.8	1.361	44	44.63	
8	2.4	2.4	4.8	1.071	36	36.52	
5	1.5	1.5	3.0	0.851	28	28.40	

Calculations :

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

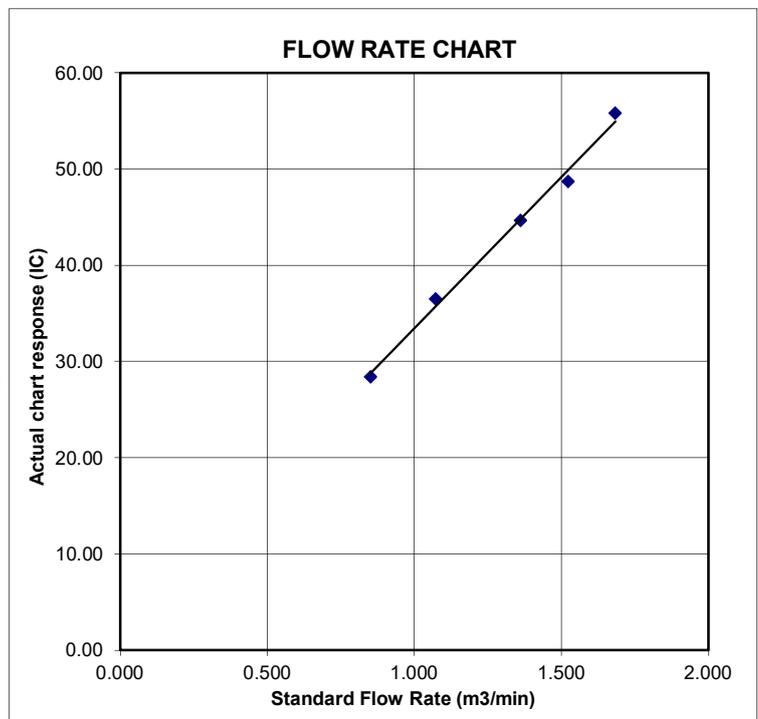
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: December 15, 2022	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 748.0	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 4064		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	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)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

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

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	: HK2307089
CLIENT	: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	SUB-BATCH	: 1
		DATE RECEIVED	: 20-FEB-2023
		DATE OF ISSUE	: 27-FEB-2023
PROJECT	: ----	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

General Comments

- Sample(s) was/ were submitted by client. Sample(s) arrived laboratory in ambient condition. The result(s) related only to the item(s) tested.
 - Sample information (Project name, Sample ID, Sampling date/time, etc.) is provided by client.
 - Result(s) of sample(s) is/are reported on as received basis, unless otherwise specified.
 - Calibration was subcontracted to and analysed by Action United Environmental Services & Consulting.
-

Signatories

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

Signatories

Position

Richard Fung

Managing Director

This report supersedes any previous report(s) with the same work order number.

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
Kwai Tsing Hong Kong

WORK ORDER : HK2307089
SUB-BATCH : 1
CLIENT : ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2307089-001	S/N: 366410	AIR	20-Feb-2023	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

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

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018 & HVS 019
Last Calibration Date: 14 December 2022 & 10 January 2023

Equipment Verification Results:

Verification Date: 10, 11 & 12 January 2023

Date	Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in ug/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/min)
10-Jan-23	2hr1min	14:41 ~ 16:42	18.2	1018.8	7.6	584	4.8
11-Jan-23	2hr01min	13:16 ~ 15:17	18.1	1017.6	25.2	1470	12.2
11-Jan-23	2hr01min	15:25 ~ 17:26	18.1	1017.6	15.8	1103	9.1
12-Jan-23*	61mins	09:31 ~ 10:32	18.8	1014.5	112.8	3507	57.3
12-Jan-23*	61mins	10:36 ~ 11:37	18.8	1014.5	81.5	2311	37.8

(* Suspended particle was added into calibration room of HVS019 for high concentration test.

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

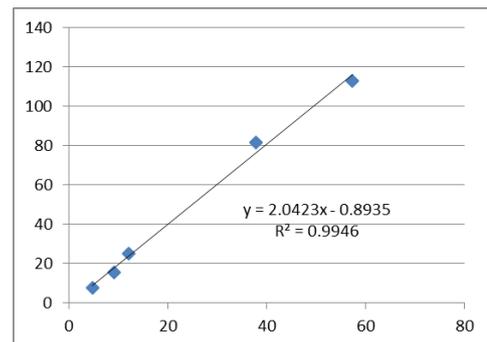
Sensitivity Adjustment Scale Setting (After Calibration) 674 (CPM)

Linear Regression of Y or X

Slope (K-factor): 2.0423 (ug/m³)/CPM

Correlation Coefficient (R) 0.9973

Date of Issue 13 February 2023



Remarks:

1. **Strong** Correlation (R>0.8)
2. Factor 2.0423 (ug/m³)/CPM should be apply for TSP monitoring

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

Operator : Fai So Signature :  Date : 13 February 2023

QC Reviewer : Ben Tam Signature :  Date : 13 February 2023

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung Date of Calibration: 14-Dec-22
 Location ID : Calibration Room(HVS 018) Next Calibration Date: 14-Mar-23

CONDITIONS

Sea Level Pressure (hPa)	1021.4	Corrected Pressure (mm Hg)	766.05
Temperature (°C)	12.5	Temperature (K)	286

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	1.99838
Model->	5025A	Qstd Intercept ->	-0.00903
Calibration Date->	27-Dec-21	Expiry Date->	27-Dec-22

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION Slope = 29.6312 Intercept = 2.5287 Corr. coeff. = 0.9991
18	6	6	12.0	1.783	54	55.39	
13	4.8	4.8	9.6	1.595	48	49.23	
10	3.8	3.8	7.6	1.420	44	45.13	
8	2.5	2.5	5.0	1.152	36	36.93	
5	1.5	1.5	3.0	0.894	28	28.72	

Calculations :

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

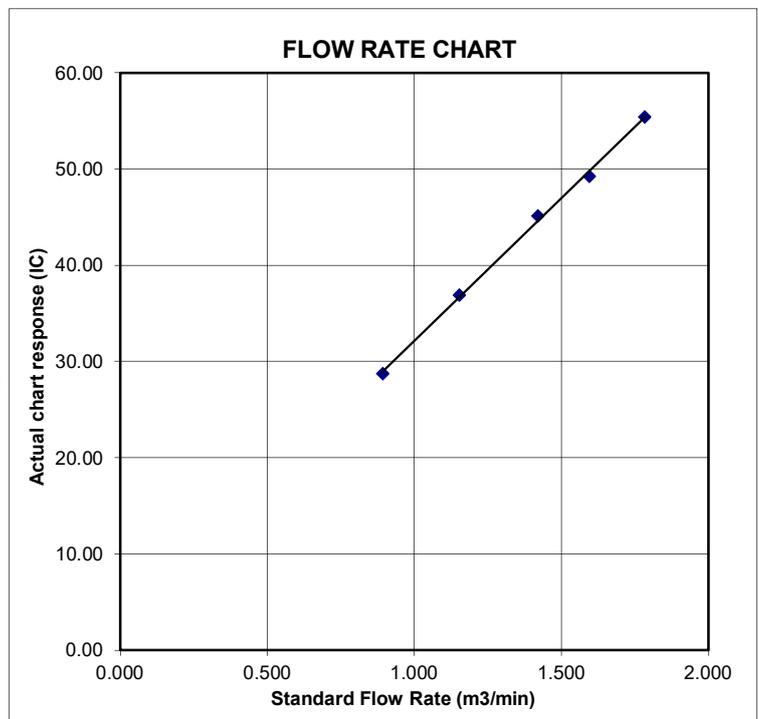
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information

Cal. Date: December 27, 2021	Rootsmeter S/N: 438320	Ta: 295 °K
Operator: Jim Tisch		Pa: 740.4 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	1.3890	3.2	2.00
2	3	4	1	0.9760	6.4	4.00
3	5	6	1	0.8740	7.9	5.00
4	7	8	1	0.8320	8.8	5.50
5	9	10	1	0.6870	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)
0.9799	0.7055	1.4029	0.9957	0.7168	0.8927
0.9756	0.9996	1.9841	0.9914	1.0157	1.2624
0.9736	1.1140	2.2183	0.9893	1.1320	1.4114
0.9724	1.1688	2.3265	0.9881	1.1876	1.4803
0.9673	1.4079	2.8059	0.9828	1.4306	1.7853
QSTD	m=	1.99838	QA	m=	1.25135
	b=	-0.00903		b=	-0.00574
	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

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location :	Gold King Industrial Building, Kwai Chung	Date of Calibration: 10-Jan-23
Location ID :	Calibration Room(HVS 019)	Next Calibration Date: 9-Apr-23

CONDITIONS

Sea Level Pressure (hPa)	1018.8	Corrected Pressure (mm Hg)	764.1
Temperature (°C)	18.2	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10977
Model->	5025A	Qstd Intercept ->	-0.03782
Calibration Date->	15-Dec-22	Expiry Date->	15-Dec-23

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6	6	12.0	1.683	55	55.79	Slope = 31.4802 Intercept = 1.9499 Corr. coeff. = 0.9967
13	4.9	4.9	9.8	1.523	48	48.69	
10	3.9	3.9	7.8	1.361	44	44.63	
8	2.4	2.4	4.8	1.071	36	36.52	
5	1.5	1.5	3.0	0.851	28	28.40	

Calculations :

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

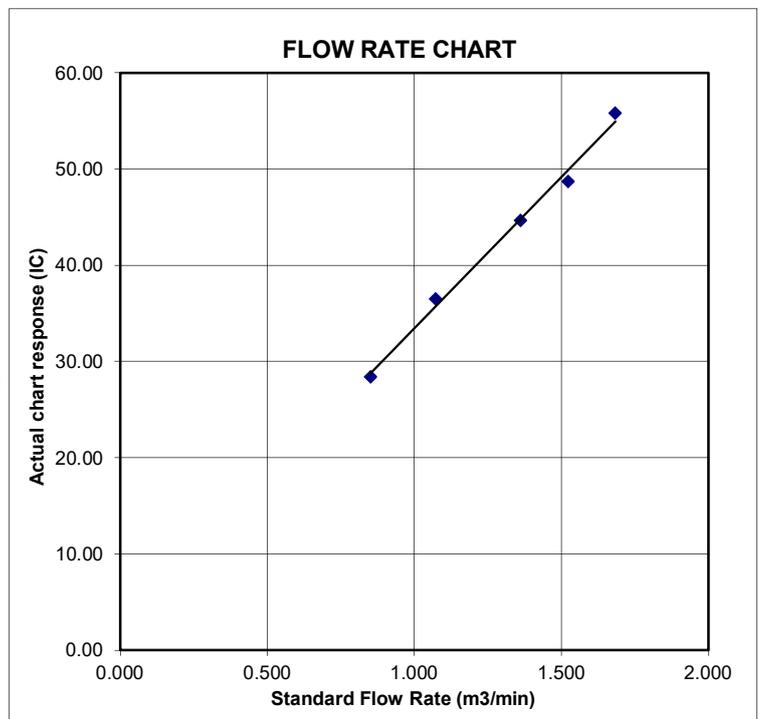
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: December 15, 2022	Rootsmeter S/N: 438320	Ta: 295	°K
Operator: Jim Tisch		Pa: 748.0	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 4064		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4430	3.2	2.00
2	3	4	1	1.0210	6.4	4.00
3	5	6	1	0.9170	7.9	5.00
4	7	8	1	0.8730	8.8	5.50
5	9	10	1	0.7210	12.8	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)
0.9900	0.6861	1.4101	0.9957	0.6900	0.8881
0.9858	0.9655	1.9943	0.9914	0.9711	1.2560
0.9838	1.0728	2.2296	0.9894	1.0790	1.4042
0.9826	1.1255	2.3385	0.9882	1.1320	1.4728
0.9772	1.3554	2.8203	0.9829	1.3632	1.7762
QSTD	m=	2.10977	QA	m=	1.32110
	b=	-0.03782		b=	-0.02382
	r=	0.99998		r=	0.99998

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

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. : C226777
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-2282) Date of Receipt / 收件日期 : 8 November 2022

Description / 儀器名稱 : Sound Level Meter (EQ013)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00921191
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 November 2022

TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : _____
H T Wong
Assistant Engineer

Certified By : 
核證 : _____
K C Lee
Engineer

Date of Issue : 21 November 2022
簽發日期

The test equipment used for calibration is traceable to the National 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. : C226777

證書編號

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

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C220381
CL281	Multifunction Acoustic Calibrator	AV210017

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.8	± 1.1

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	93.8 (Ref.)
				104.00		103.9
				114.00		113.9

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

- 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.3

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

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Certificate of Calibration

校正證書

Certificate No. : C226777

證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.6	-26.2 ± 1.5
					125 Hz	77.6	-16.1 ± 1.5
					250 Hz	85.1	-8.6 ± 1.4
					500 Hz	90.5	-3.2 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.8	-1.1 (+2.1 ; -3.1)
					16 kHz	85.8	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	92.9	-0.8 ± 1.5
					125 Hz	93.6	-0.2 ± 1.5
					250 Hz	93.8	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.0	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					16 kHz	83.9	-8.5 (+3.5 ; -17.0)

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Certificate of Calibration

校正證書

Certificate No. : C226777
證書編號

- Remarks : - UUT Microphone Model No. : UC-59 & S/N : 12910
- 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 |
| | 16 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 is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

c/o 4/F, 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. : C226779
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-2282) Date of Receipt / 收件日期 : 8 November 2022
Description / 儀器名稱 : Sound Level Meter (EQ015)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00142581
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 19 November 2022

TEST RESULTS / 測試結果

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

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

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

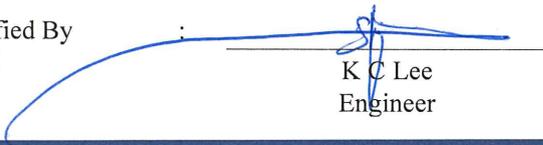
Tested By
測試

:


H T Wong
Assistant Engineer

Certified By
核證

:


K C Lee
Engineer

Date of Issue
簽發日期

:

21 November 2022

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

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Certificate of Calibration

校正證書

Certificate No. : C226779

證書編號

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

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C220381
CL281	Multifunction Acoustic Calibrator	AV210017

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.8	± 1.1

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
30 - 130	L _A	A	Fast	94.00	1	93.8 (Ref.)
				104.00		103.8
				114.00		113.7

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

- 6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
30 - 130	L _A	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.3

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

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Certificate of Calibration

校正證書

Certificate No. : C226779
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.5	-26.2 ± 1.5
					125 Hz	77.6	-16.1 ± 1.5
					250 Hz	85.1	-8.6 ± 1.4
					500 Hz	90.6	-3.2 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.8	-1.1 (+2.1 ; -3.1)
					16 kHz	85.8	-6.6 (+3.5 ; -17.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	92.9	-0.8 ± 1.5
					125 Hz	93.6	-0.2 ± 1.5
					250 Hz	93.8	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.0	-0.8 ± 1.6
					8 kHz	90.9	-3.0 (+2.1 ; -3.1)
					16 kHz	83.9	-8.5 (+3.5 ; -17.0)

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Certificate of Calibration

校正證書

Certificate No. : C226779
證書編號

- Remarks : - UUT Microphone Model No. : UC-59 & S/N : 20044
- 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 |
| | 16 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 is traceable to the National 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. : C224779
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC22-1539) Date of Receipt / 收件日期 : 4 August 2022
Description / 儀器名稱 : Sound Level Calibrator (EQ085)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-73
Serial No. / 編號 : 10655561
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 20 August 2022

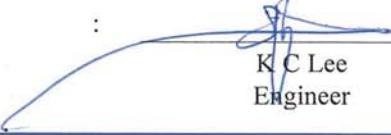
TEST RESULTS / 測試結果

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

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

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

Tested By : 
測試 : _____
H T Wong
Assistant Engineer

Certified By : 
核證 : _____
K C Lee
Engineer

Date of Issue : 23 August 2022
簽發日期

The test equipment used for calibration is traceable to the National 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. : C224779

證書編號

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

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C223647
CL281	Multifunction Acoustic Calibrator	AV210017
TST150A	Measuring Amplifier	C221750

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.5	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	User's Spec.	Uncertainty of Measured Value (Hz)
1	0.953	1 kHz ± 6 %	± 1

Remarks : - The user's specified acceptance criteria (user's spec.) is a customer pre-defined operating tolerance of the UUT, suitable for one's own intended use.

- 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 is traceable to the National Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

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



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT:	MR BEN TAM	WORK ORDER:	HK2303241
CLIENT:	ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING	SUB-BATCH:	0
ADDRESS:	RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T.	LABORATORY:	HONG KONG
		DATE RECEIVED:	21-Jan-2023
		DATE OF ISSUE:	31-Jan-2023

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. 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 laboratory or quoted from relevant international standards.

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

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type:	Multifunctional Meter
Service Nature:	Performance Check
Scope:	Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature
Brand Name/ Model No.:	[YSI]/ [Professional DSS]
Serial No./ Equipment No.:	[20J101862/ 15H103928]/ [EQW018]
Date of Calibration:	27-January-2023

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2303241
SUB-BATCH: 0
DATE OF ISSUE: 31-Jan-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 27-January-2023 Date of Next Calibration: 27-April-2023

PARAMETERS:

Conductivity

Method Ref: APHA (23rd edition), 2510B

Expected Reading ($\mu\text{S}/\text{cm}$)	Displayed Reading ($\mu\text{S}/\text{cm}$)	Tolerance (%)
146.9	145.7	-0.8
6667	6485	-2.7
12890	12675	-1.7
58670	54694	-6.8
	Tolerance Limit (%)	± 10.0

Dissolved Oxygen

Method Ref: APHA (23rd edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.64	2.84	+0.20
4.85	5.01	+0.16
6.89	7.03	+0.14
	Tolerance Limit (mg/L)	± 0.20

pH Value

Method Ref: APHA (23rd edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.88	-0.12
7.0	7.08	+0.08
10.0	9.96	-0.04
	Tolerance Limit (pH unit)	± 0.20

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2303241
SUB-BATCH: 0
DATE OF ISSUE: 31-Jan-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 27-January-2023 Date of Next Calibration: 27-April-2023

PARAMETERS:

Turbidity

Method Ref: APHA (23rd edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.75	--
4	4.31	+7.7
40	36.22	-9.5
80	74.31	-7.1
400	395.27	-1.2
800	772.08	-3.5
	Tolerance Limit (%)	±10.0

Salinity

Method Ref: APHA (23rd edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.25	+2.5
20	20.81	+4.0
30	30.80	+2.7
	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 - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2303241
SUB-BATCH: 0
DATE OF ISSUE: 31-Jan-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [20J101862/ 15H103928]/ [EQW018]
Date of Calibration: 27-January-2023 Date of Next Calibration: 27-April-2023

PARAMETERS:

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
9.0	8.6	-0.4
19.5	18.8	-0.7
40.0	38.6	-1.4
	Tolerance Limit (°C)	±2.0

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

A handwritten signature in blue ink, appearing to read 'Nis'.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK2312949
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 04-Apr-2023
DATE OF ISSUE: 18-Apr-2023

SPECIFIC COMMENTS

Equipment information (Brand name, Model No., Serial No. and Equipment No.) is provided by client. 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 laboratory or quoted from relevant international standards.

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

The validity of equipment/ meter performance only applies to the result(s) stated in the report.

Equipment Type: Multifunctional Meter
Service Nature: Performance Check
Scope: Conductivity, Dissolved Oxygen, pH Value, Turbidity, Salinity and Temperature
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 18-April-2023

GENERAL COMMENTS

This report superseded any previous report(s) with same work order number.

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2312949
SUB-BATCH: 0
DATE OF ISSUE: 18-Apr-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 18-April-2023 Date of Next Calibration: 18-July-2023

PARAMETERS:

Conductivity

Method Ref: APHA (23rd edition), 2510B

Expected Reading ($\mu\text{S}/\text{cm}$)	Displayed Reading ($\mu\text{S}/\text{cm}$)	Tolerance (%)
146.9	155.6	+5.9
6667	7056	+5.8
12890	13643	+5.8
58670	57773	-1.5
	Tolerance Limit (%)	± 10.0

Dissolved Oxygen

Method Ref: APHA (23rd edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
2.65	2.71	+0.06
5.61	5.59	-0.02
7.08	7.05	-0.03
	Tolerance Limit (mg/L)	± 0.20

pH Value

Method Ref: APHA (23rd edition), 4500H: B

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	3.86	-0.14
7.0	6.97	-0.03
10.0	10.07	+0.07
	Tolerance Limit (pH unit)	± 0.20

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2312949
SUB-BATCH: 0
DATE OF ISSUE: 18-Apr-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 18-April-2023 Date of Next Calibration: 18-July-2023

PARAMETERS:

Turbidity

Method Ref: APHA (23rd edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	-0.04	--
4	4.22	+5.5
40	39.62	-1.0
80	75.70	-5.4
400	397.80	-0.5
800	736.18	-8.0
	Tolerance Limit (%)	±10.0

Salinity

Method Ref: APHA (23rd edition), 2520B

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.00	--
10	10.43	+4.3
20	21.18	+5.9
30	32.17	+7.2
	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 - Inorganics

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2312949
SUB-BATCH: 0
DATE OF ISSUE: 18-Apr-2023
CLIENT: ACTION-UNITED ENVIRONMENTAL SERVICES & CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: [YSI]/ [Professional DSS]
Serial No./ Equipment No.: [17B102764/17B100758]/ [EQW019]
Date of Calibration: 18-April-2023 Date of Next Calibration: 18-July-2023

PARAMETERS:

Temperature

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
6.5	7.2	+0.7
24.5	23.9	-0.6
44.0	43.4	-0.6
	Tolerance Limit (°C)	±2.0

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

Ms. Lin Wai Yu, Iris
Assistant Manager - Inorganics

WATER

Manufacturing Certificate

This product has been tested in accordance with procedures established through Global Water Instrumentation's Quality Management System. This product meets or exceeds its manufacturing acceptance criteria.

ITEM DESCRIPTION:	Flow Probe, 5.5 - 14'
MODEL NAME/ NUMBER:	FP211
PART NUMBER:	BB1100
SERIAL NUMBER:	22B106785
ACCURACY:	± 0.1 FPS (0.03 MPS)
POWER REQUIRED:	Internal Lithium Coin Cell Battery
CABLE LENGTH:	N/A
CERTIFICATES:	CE Compliant
RANGE:	0.3 - 19.9 FPS (0.1 - 6.1 MPS)
OUTPUT:	Flow Display, FPS/MPS
CALIBRATION FACTOR:	318

Contact
Global Water
for all your
instrumentation
needs:

Water Level

Water Flow

Water Samplers

Water Quality

Weather

Remote Monitoring

Control

Technician *Barnette, Melinda*

Inspector *Winberg, Josh*

Date *3/5/2022*

NOTE: Global Water Instrumentation warrants that its products are free from defects in material & workmanship under normal use & service for a period of one year from date of original shipment from factory. Repaired components are warranted for a period of 90 days from shipment. Contact us for complete warranty details.



Global Water
a xylem brand

In the U.S. call toll free
at 1-800-876-1172
International: 1-979-690-5560
Fax: 1-979-690-0440
Email: globalw@globalw.com

Visit our online catalog at:
www.globalw.com
Our Service Address:
151 Graham Rd
College Station, TX 77845





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

*is accredited by the Hong Kong Accreditation Service (HKAS) to ISO/IEC 17025:2017
for performing specific laboratory activities as listed in the scope of accreditation within the test category of*
獲香港認可處根據ISO/IEC 17025:2017認可
進行載於認可範圍內下述測試類別中的指定實驗所活動

Environmental Testing
環境測試

*This accreditation to ISO/IEC 17025:2017 demonstrates technical competence for a defined scope and
the implementation of a management system relevant to laboratory operation
(see joint IAF-ILAC-ISO Communiqué).*
此項 ISO/IEC 17025:2017 的認可資格證明此實驗所具備指定範疇內所須的技術能力並
實施一套與實驗所運作相關的管理體系
(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 HKAS is affixed hereto by the authority of the HKAS Executive
現經香港認可處執行機關授權在此蓋上香港認可處的印章


SHUM Wai-leung, Executive Administrator
執行幹事 沈偉良
Issue Date : 28 February 2020
簽發日期：二零二零年二月二十八日

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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
Action level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<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. Amend proposal if appropriate.
Limit level exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 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. 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. 	<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 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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 – April 2023

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

✓	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – May 2023

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

✓	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 (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-Hr TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
1 Apr 23	29249	26878.71	26902.71	1440.00	39	39	39.0	20.3	1012.7	1.25	1794	2.7126	2.7886	0.0760	42
6 Apr 23	29264	26902.00	26926.00	1440.00	39	39	39.0	25.4	1011	1.24	1780	2.7080	2.7530	0.0450	25
11 Apr 23	29266	26926.71	26950.71	1440.00	39	39	39.0	24.2	1012.9	1.24	1784	2.7071	2.7385	0.0314	18
17 Apr 23	29300	26950.71	26974.71	1440.00	39	39	39.0	26.1	1011.5	1.23	1773	2.7143	2.8241	0.1098	62
22 Apr 23	29318	26974.71	26998.71	1440.00	39	39	39.0	23.1	1010.5	1.24	1780	2.7044	2.8004	0.0960	54
28 Apr 23	29325	26998.71	27022.71	1440.00	39	39	39.0	24.1	1013.8	1.24	1780	2.7093	2.8155	0.1062	60

24-Hour TSP Monitoring Data for ASR-2

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-Hr TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
1 Apr 23	29248	24295.36	24319.36	1440.00	41	41	41.0	20.3	1012.7	1.25	1799	2.7134	2.7979	0.0845	47
6 Apr 23	29265	24319.36	24343.36	1440.00	41	41	41.0	25.4	1011	1.24	1784	2.7037	2.7558	0.0521	29
11 Apr 23	29288	24343.36	24367.36	1440.00	41	41	41.0	24.2	1012.9	1.24	1789	2.7146	2.8554	0.1408	79
17 Apr 23	29299	24367.36	24391.36	1440.00	41	41	41.0	26.1	1011.5	1.25	1806	2.7049	2.8077	0.1028	57
22 Apr 23	29317	24391.36	24415.36	1440.00	42	42	42.0	23.1	1010.5	1.28	1850	2.7104	2.8311	0.1207	65
28 Apr 23	29326	24415.36	24439.36	1440.00	42	42	42.0	24.1	1013.8	1.28	1850	2.7210	2.8137	0.0927	50

24-Hour TSP Monitoring Data for ASR-3a

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP (°C)	AVG AIR PRESS (hPa)	STANDARD FLOW RATE (m ³ /min)	AIR VOLUME (std m ³)	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED (g)	24-Hr TSP (µg/m ³)
		INITIAL	FINAL	(min)	MIN	MAX	AVG					INITIAL	FINAL		
1 Apr 23	29247	18085.11	18109.11	1440.00	39	39	39	20.3	1012.7	1.25	1807	2.7154	2.7919	0.0765	42
6 Apr 23	29263	18109.11	18133.11	1440.00	39	39	39	25.4	1011	1.24	1790	2.6999	2.8132	0.1133	63
11 Apr 23	29289	18133.11	18157.11	1440.00	39	39	39	24.2	1012.9	1.25	1795	2.7252	2.8059	0.0807	45
17 Apr 23	29298	18157.11	18181.11	1440.00	39	39	39	26.1	1011.5	1.26	1814	2.7167	2.8300	0.1133	62
22 Apr 23	29316	18181.11	18205.11	1440.00	39	39	39	23.1	1010.5	1.27	1822	2.7092	2.7737	0.0645	35
28 Apr 23	29327	18205.11	18229.11	1440.00	39	39	39	24.1	1013.8	1.27	1822	2.7161	2.7734	0.0573	31

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 Correction (*)
4 Apr 23	13:00	60.4	66.3	56.2	63.4	68.2	59.6	62.8	65.2	57.9	63.3	65.6	57.4	61.8	63.7	57.5	62.2	64.8	58.0	62	65
12 Apr 23	13:00	62.3	63.5	60.8	64.7	65.9	63.4	64.8	67.1	59.7	62.1	63.0	61.2	64.2	65.5	62.2	64.7	65.5	63.9	64	67
18 Apr 23	15:16	65.3	67.5	59.3	63.9	67.5	58.5	62.8	68.0	59.5	61.7	64.0	57.0	60.8	63.5	57.0	62.2	64.5	58.0	63	66
24 Apr 23	13:15	65.2	68.2	61.7	64.1	65.9	58.8	63.7	67.1	58.0	66.0	69.2	61.3	65.8	68.2	61.3	62.8	65.0	58.5	65	68

(*) 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 Correction (*)
4 Apr 23	13:36	57.2	62.6	52.4	56.6	63.5	53.2	58.3	63.1	52	53.9	61.2	49.8	55.6	60.3	48.4	56.2	61.5	49.6	57	60
12 Apr 23	13:28	60.8	65.3	51.9	63	66.1	53.2	61	64	51.7	63.3	66.7	53.5	63.7	67.1	54.2	62.2	63	52	62	65
18 Apr 23	14:40	56.2	62.5	52	56.3	63	51.5	56.8	63	51	55.6	59.5	50	53.8	59.5	49.5	58.6	61.5	68.5	56	59
24 Apr 23	10:13	64.5	67.5	57	63.8	66.8	55.7	62.4	66.5	54	66.7	69.5	58.6	66.5	69.2	57.3	62.3	66.4	54.5	65	68

(*) 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 Correction (*)
4 Apr 23	14:12	59.6	64.8	56.2	58.7	63.3	54.8	58.6	63.8	55.5	59.8	65.6	57.7	61.2	64.5	58.3	60.5	63.8	56.6	60	63
12 Apr 23	15:15	58.5	60.5	51.5	52.8	58.7	48.2	52.5	57.6	48.3	53	58.9	50	51.7	56.2	48.6	56.8	59.3	49.5	55	58
18 Apr 23	14:03	61.5	65	56	59.4	63	55	60.5	63	55.5	58.6	62.5	55.5	59.8	65	57.5	60.3	64.5	56	60	63
24 Apr 23	14:15	52.2	56.6	47.3	54.9	57.4	48.2	54.1	56.6	51.1	53.5	55.5	50.6	59.3	65.5	48.7	63.7	66.3	48.6	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-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}	Façade Correction (*)
4 Apr 23	15:00	62.8	65.2	57.3	63.7	65.8	56.8	61.9	65	57.5	63.2	65.6	57.3	60.8	64.7	56.6	62.4	65.3	56.5	63	
12 Apr 23	16:05	60.5	62.5	51.5	56.6	58	43.5	58.4	59.8	44.9	56.9	59.4	43.8	58.6	60.5	50.8	56	58.9	44.8	58	
18 Apr 23	13:26	62.6	65	56	63.2	65.5	56	60.8	65	55.5	62.7	65	56	63.2	65.5	56.5	60.5	64.5	55.5	62	
24 Apr 23	15:41	61.0	64.8	45.4	62.5	65.0	45.2	63.8	66.8	45.4	62.5	65.5	45.7	63.5	65.8	44.5	61.4	63.5	44.2	63	

Water Quality

Water Quality Impact Monitoring Result for M1

Date	1 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.15	19.8	19.8	<0.1	<0.1	8.05	8.02	93.1	92.8	6.37	6.3	7.31	7.3	0.05	0.05	6	6.5
			19.8		<0.1		7.98		92.4		6.2		7.31		0.05		7	

Date	4 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.14	20.8	20.8	<0.1	<0.1	7.58	7.58	87.7	87.7	4.17	4.2	7.07	7.1	0.07	0.07	6	6.5
			20.8		<0.1		7.57		87.6		4.23		7.07		0.07		7	

Date	6 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	12:40	0.13	20.9	20.9	<0.1	<0.1	7.72	7.72	89.7	89.7	3.9	3.8	7.34	7.3	0.03	0.03	3	2.5
			20.9		<0.1		7.71		89.6		3.64		7.34		0.03		2	

Date	11 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.13	23.1	23.1	<0.1	<0.1	7.54	7.54	90.2	90.2	2.86	2.9	7.32	7.3	0.07	0.07	3	3.5
			23.1		<0.1		7.53		90.1		2.88		7.32		0.07		4	

Date	13 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	10:30	0.13	23.6	23.6	<0.1	<0.1	7.48	7.46	91.4	91.1	2.61	2.6	7.24	7.2	0.07	0.07	3	3.0
			23.6		<0.1		7.43		90.7		2.59		7.24		0.07		3	

Date	15 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	15:30	0.13	23.6	23.6	<0.1	<0.1	7.51	7.53	92.0	92.4	2.48	2.5	7.17	7.2	0.07	0.07	3	3.5
			23.6		<0.1		7.55		92.7		2.51		7.17		0.07		4	

Date	18 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.13	23.5	23.5	<0.1	<0.1	7.33	7.33	90.6	90.6	2.12	2.1	7.30	7.3	0.07	0.07	2	2.0
			23.5		<0.1		7.32		90.5		2.1		7.30		0.07		2	

Date	20 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	14:15	0.17	23.9	23.9	<0.1	<0.1	7.17	7.18	88.2	88.3	6.5	6.6	7.00	7.0	0.06	0.06	7	7.0

			23.9		<0.1		7.18		88.3		6.7		7.00		0.06		7	
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Date		22 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M1	9:30	0.15	23.7	23.7	<0.1	<0.1	7.31	7.30	89.3	89.2	5.27	5.4	7.50	7.5	0.06	0.06	4	3.5	
			23.7		<0.1		7.29		89.1		5.52		7.45		0.06		3		

Date		25 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M1	9:40	0.13	22.9	22.9	<0.1	<0.1	7.36	7.36	89.8	89.8	2.61	2.5	7.42	7.4	0.06	0.06	4	3.5	
			22.9		<0.1		7.35		89.7		2.47		7.42		0.06		3		

Date		27 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M1	9:30	0.14	21.4	21.4	<0.1	<0.1	7.45	7.45	88.8	88.8	2.43	2.5	7.09	7.1	0.04	0.04	3	3.5	
			21.4		<0.1		7.44		88.8		2.54		7.09		0.04		4		

Date		29 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M1	9:30	0.14	23	23.0	<0.1	<0.1	7.51	7.51	91.8	91.8	2.48	2.4	7.73	7.7	0.06	0.06	4	3.5	
			23		<0.1		7.5		91.7		2.39		7.73		0.06		3		

Water Quality Impact Monitoring Result for M2

Date	1 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:00	0.10	20.3	20.3	<0.1	<0.1	7.77	7.77	90.1	90.1	1.44	1.4	7.17	7.2	0.08	0.08	7	7.0
			20.3		<0.1		7.76		90.0		1.4		7.17		0.08		7	

Date	4 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:10	0.10	21.3	21.3	<0.1	<0.1	7.73	7.71	89.6	89.3	4.09	4.1	7.10	7.1	0.09	0.09	9	8.5
			21.3		<0.1		7.68		89.0		4.02		7.10		0.09		8	

Date	6 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	13:30	0.09	21	21.0	<0.1	<0.1	7.78	7.78	90.6	90.6	4.56	4.5	7.27	7.3	0.09	0.09	7	6.5
			21		<0.1		7.77		90.5		4.48		7.27		0.09		6	

Date	11 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:30	0.08	23.8	23.8	<0.1	<0.1	7.64	7.64	92.0	91.9	4.82	4.8	7.35	7.4	0.1	0.10	9	9.5
			23.8		<0.1		7.6+1		91.7		4.79		7.35		0.1		10	

Date	13 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	11:20	0.08	24.1	24.1	<0.1	<0.1	7.42	7.42	91.3	91.3	4.46	4.5	7.32	7.3	0.1	0.10	7	7.0
			24.1		<0.1		7.42		91.2		4.51		7.32		0.1		7	

Date	15 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	16:00	0.08	24.2	24.2	<0.1	<0.1	7.57	7.60	93.7	94.0	3.2	3.2	7.24	7.2	0.07	0.07	7	6.5
			24.2		<0.1		7.63		94.3		3.11		7.24		0.07		6	

Date	18 Apr 23																	
Location	Time	Depth (m)	Temp (oC)	Flow Velocity (m/s)	DO (mg/L)	DO (%)	Turbidity	pH	Salinity	SS(mg/L)								

M2	10:15	0.08	25.2	25.2	<0.1	<0.1	7.79	7.79	97.9	97.9	(NTU)		7.22	7.2	0.07	0.07	2	2.5
			25.2		<0.1		7.79		97.8		1.42	1.4	7.22		0.07		3	

Date	20 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	14:30	0.10	24	24.0	<0.1	<0.1	7.56	7.55	92.2	92.1	4.7	4.5	7.15	7.2	0.08	0.08	4	4.0
			24		<0.1		7.54		92.0		4.3		7.15		0.08		4	

Date	22 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:15	0.09	24.1	24.1	<0.1	<0.1	7.57	7.57	92.2	92.1	7.2	7.0	7.20	7.2	0.07	0.07	3	3.5
			24.1		<0.1		7.56		92.0		6.8		7.25		0.07		4	

Date	25 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:15	0.08	23.1	23.1	<0.1	<0.1	7.8	7.80	95.9	95.9	7.43	7.3	7.45	7.5	0.07	0.07	4	4.0
			23.1		<0.1		7.79		95.8		7.09		7.45		0.07		4	

Date	27 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:05	0.08	22.2	22.2	<0.1	<0.1	7.51	7.51	91.1	91.1	3.2	3.3	7.41	7.4	0.08	0.08	3	3.0
			22.2		<0.1		7.5		91.0		3.48		7.41		0.08		3	

Date	29 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.08	23.7	23.7	<0.1	<0.1	7.39	7.39	92.3	92.3	3.35	3.4	7.53	7.5	0.08	0.08	4	4.0
			23.7		<0.1		7.38		92.2		3.38		7.53		0.08		4	

Water Quality Impact Monitoring Result for M3

Date		1 Apr 23																
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
			M3	10:10	2.36	20.5	20.5	<0.1	<0.1	6.66	6.65	74.3	74.1	3.37	3.4	7.68	7.7	0.01
			20.5		<0.1		6.64		73.9		3.33		7.68		0.01		8	

Date		4 Apr 23																
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
			M3	10:20	2.36	21	21.0	<0.1	<0.1	7.44	7.40	87.1	86.6	4.89	4.9	7.12	7.1	0.03
			21		<0.1		7.36		86.0		4.87		7.12		0.03		8	

Date		6 Apr 23																
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
			M3	13:40	2.35	20.8	20.8	<0.1	<0.1	7.4	7.40	86.7	86.7	4.96	4.9	7.26	7.3	0.01
			20.8		<0.1		7.39		86.6		4.93		7.26		0.01		7	

Date		11 Apr 23																
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
			M3	10:40	2.31	23.7	23.7	<0.1	<0.1	6.86	6.86	82.5	82.4	3.09	3.1	7.08	7.1	0.02
			23.7		<0.1		6.85		82.3		3.03		7.08		0.02		7	

Date		13 Apr 23																
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
			M3	11:30	2.34	24.3	24.3	<0.1	<0.1	6.97	6.98	85.5	85.5	3.08	3.1	7.08	7.1	0.01
			24.3		<0.1		6.98		85.5		3.13		7.08		0.01		6	

Date		15 Apr 23																
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
			M3	16:10	2.33	24.3	24.3	<0.1	<0.1	7.09	7.08	86.9	86.8	3.2	3.1	7.06	7.1	0.01
			24.3		<0.1		7.07		86.7		3.04		7.06		0.01		6	

Date		18 Apr 23																
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Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:25	2.31	25	25.0	<0.1	<0.1	6.66	6.66	82.6	82.7	1.91	1.9	7.25	7.2	0.02	0.02	3	3.0
			25		<0.1		6.66		82.7		1.95		7.23		0.02		3	

Date 20 Apr 23																		
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	14:44	2.42	23.7	23.7	<0.1	<0.1	6.95	6.95	85.6	85.6	5.5	5.5	7.12	7.1	0.02	0.02	6	6.0
			23.7		<0.1		6.94		85.5		5.4		7.15		0.02		6	

Date 22 Apr 23																		
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:25	2.41	24.3	24.3	<0.1	<0.1	7.18	7.18	88.0	88.1	5.1	5.1	7.22	7.2	0.03	0.03	3	3.5
			24.3		<0.1		7.18		88.1		5.01		7.22		0.03		4	

Date 25 Apr 23																		
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:25	2.37	23	23.0	<0.1	<0.1	7.09	7.09	86.7	86.7	2.69	2.6	7.11	7.1	0.03	0.03	3	3.0
			23		<0.1		7.08		86.6		2.41		7.10		0.03		3	

Date 27 Apr 23																		
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:15	2.37	21.8	21.8	<0.1	<0.1	7.35	7.35	87.4	87.4	2.71	2.7	7.33	7.3	0.03	0.03	4	3.5
			21.8		<0.1		7.34		87.3		2.76		7.33		0.03		3	

Date 29 Apr 23																		
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.37	23.6	23.6	<0.1	<0.1	7.21	7.21	88.6	88.6	3.32	3.3	7.37	7.4	0.03	0.03	4	3.5
			23.6		<0.1		7.21		88.5		3.18		7.37		0.03		3	

Water Quality Impact Monitoring Result for M4

Date	1 Apr 23																	
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	20.9	20.9	<0.1	<0.1	7.88	7.82	90.7	90.2	4.4	4.9	7.26	7.3	0.09	0.09	4	4.0
			20.9		<0.1		7.76		89.6		5.3		7.26		0.09		4	

Date	4 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:40	0.41	20.9	20.9	<0.1	<0.1	7.31	7.31	84.7	84.6	4.8	4.7	7.32	7.3	0.1	0.10	4	4.0
			20.9		<0.1		7.3		84.5		4.5		7.22		0.1		4	

Date	6 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	13:55	0.43	21.1	21.1	<0.1	<0.1	7.8	7.80	90.5	90.5	5.1	5.2	7.10	7.1	0.05	0.05	4	4.5
			21.1		<0.1		7.79		90.4		5.2		7.10		0.05		5	

Date	11 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:00	0.42	24	24.0	<0.1	<0.1	6.28	6.25	75.5	75.0	5.4	5.3	7.09	7.1	0.05	0.05	4	4.0
			24		<0.1		6.21		74.5		5.1		7.09		0.05		4	

Date	13 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:50	0.42	24.5	24.5	<0.1	<0.1	6.54	6.51	80.1	79.8	2.5	2.7	7.05	7.1	0.09	0.09	3	3.5
			24.5		<0.1		6.48		79.4		2.8		7.05		0.09		4	

Date	15 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	16:25	0.42	24.5	24.5	<0.1	<0.1	6.01	5.99	73.6	73.3	5.5	5.4	7.05	7.1	0.09	0.09	4	4.5
			24.5		<0.1		5.96		73.0		5.2		7.05		0.09		5	

Date	18 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:45	0.41	25.4	25.4	<0.1	<0.1	5.82	5.82	72.4	72.4	4.7	4.8	7.15	7.2	0.09	0.09	4	4.5
			25.4		<0.1		5.81		72.3		4.8		7.16		0.09		5	

Date	20 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	15:00	0.45	23.9	23.9	<0.1	<0.1	6.24	6.24	76.4	76.4	3.7	3.8	7.12	7.1	0.06	0.06	4	4.0

			23.9		<0.1		6.23		76.3		3.8		7.12		0.06		4	
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Date		22 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M4	10:45	0.43	24.2	24.2	<0.1	<0.1	6.43	6.43	79.1	78.9	4.3	4.3	7.45	7.5	0.06	0.06	3	3.5	
			24.2		<0.1		6.42		78.9		4.4		7.45		0.06		4		

Date		25 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M4	10:45	0.43	23.2	23.2	<0.1	<0.1	5.41	5.40	66.2	66.1	4.0	3.9	7.22	7.2	0.05	0.05	4	4.0	
			23.2		<0.1		5.39		65.9		3.9		7.23		0.05		4		

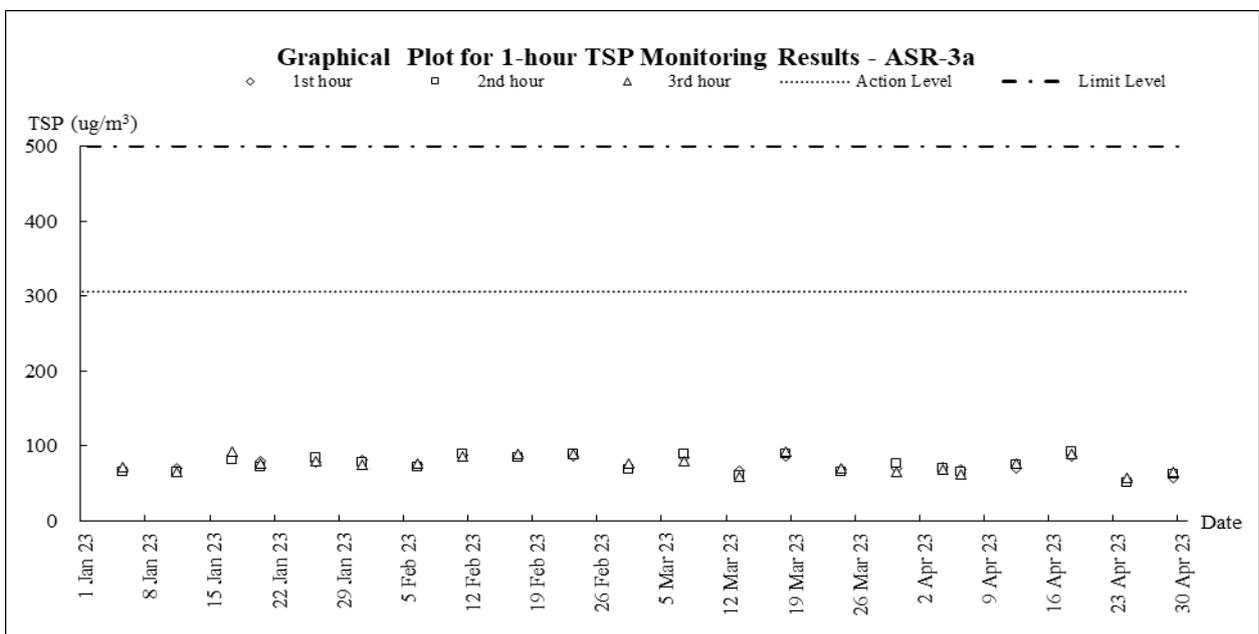
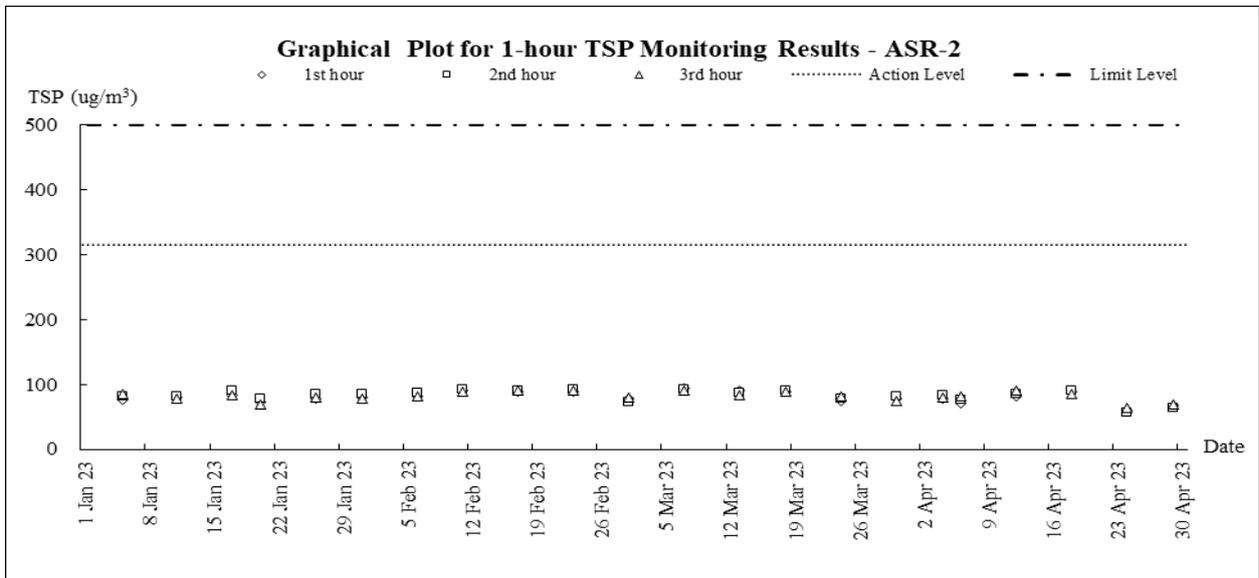
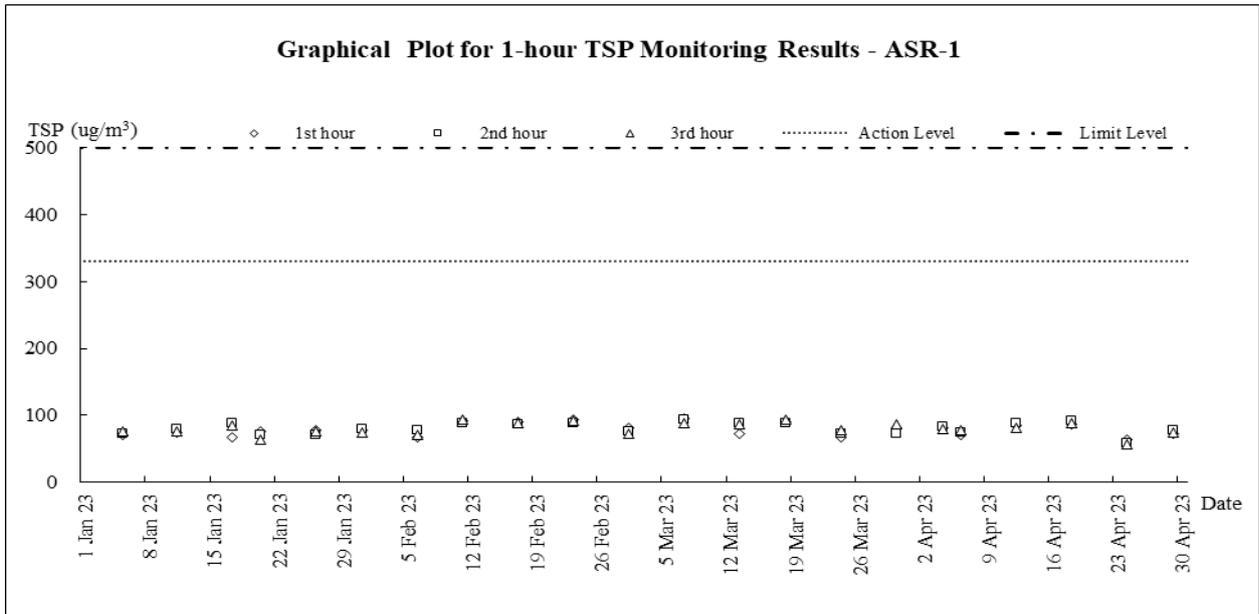
Date		27 Apr 23																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)		
M4	10:30	0.43	21.9	21.9	<0.1	<0.1	5.95	5.93	71.0	70.8	4.2	4.2	7.17	7.2	0.06	0.06	5	4.5	
			21.9		<0.1		5.91		70.6		4.1		7.17		0.06		4		

Date		29 Apr 23																	
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	23.8	23.8	<0.1	<0.1	5.49	5.44	67.2	66.7	4.6	4.6	7.07	7.1	0.06	0.06	3	2.5	
			23.8		<0.1		5.38		66.1		4.5		7.07		0.06		2		

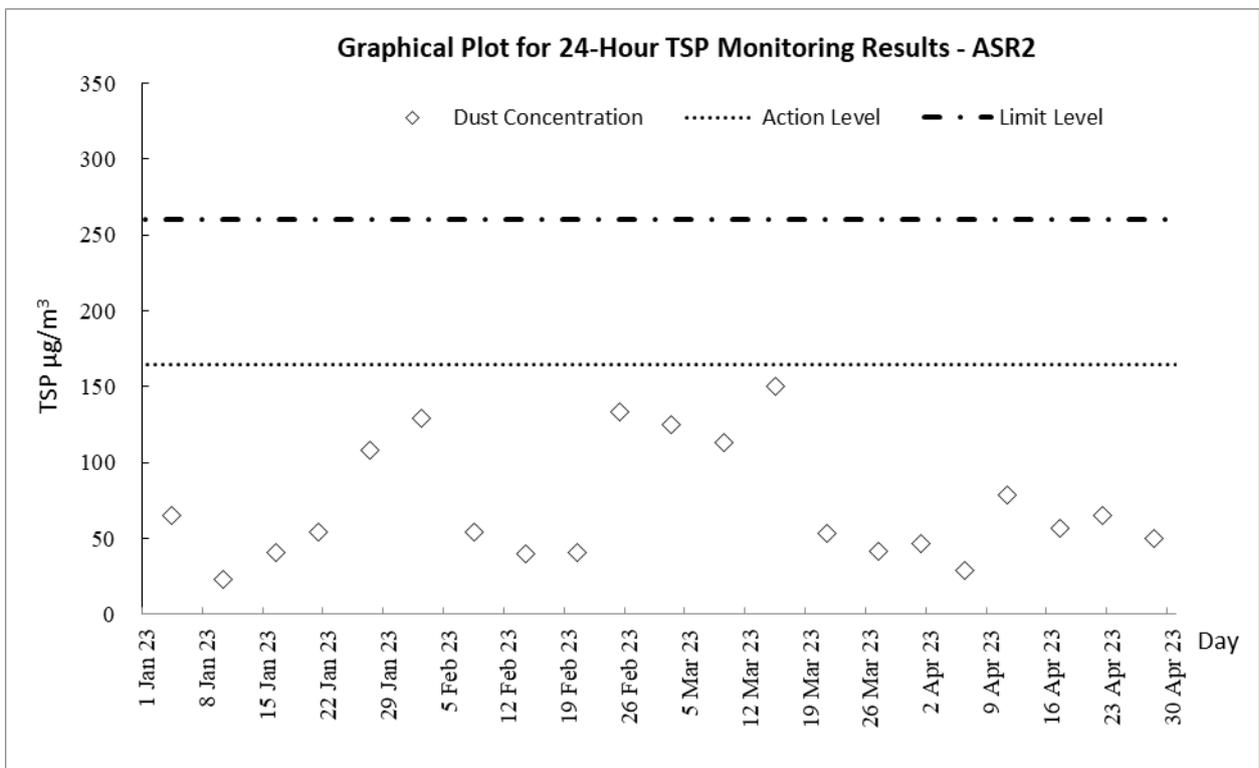
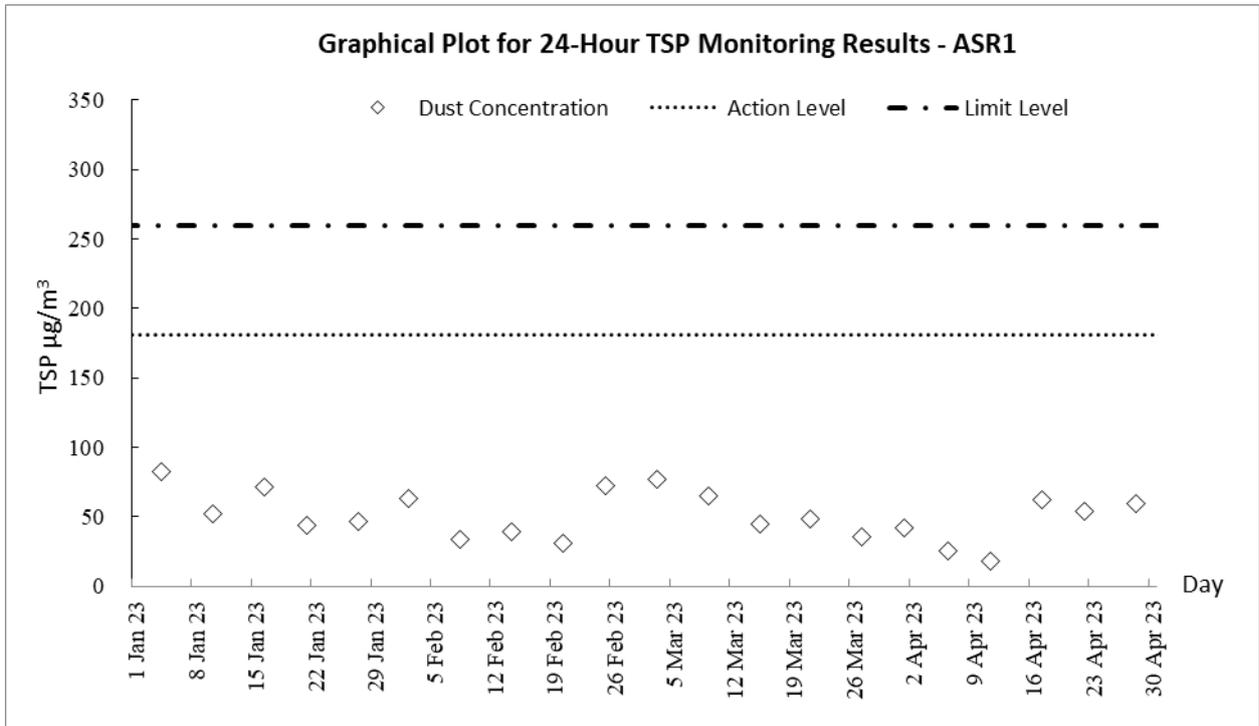
Appendix I

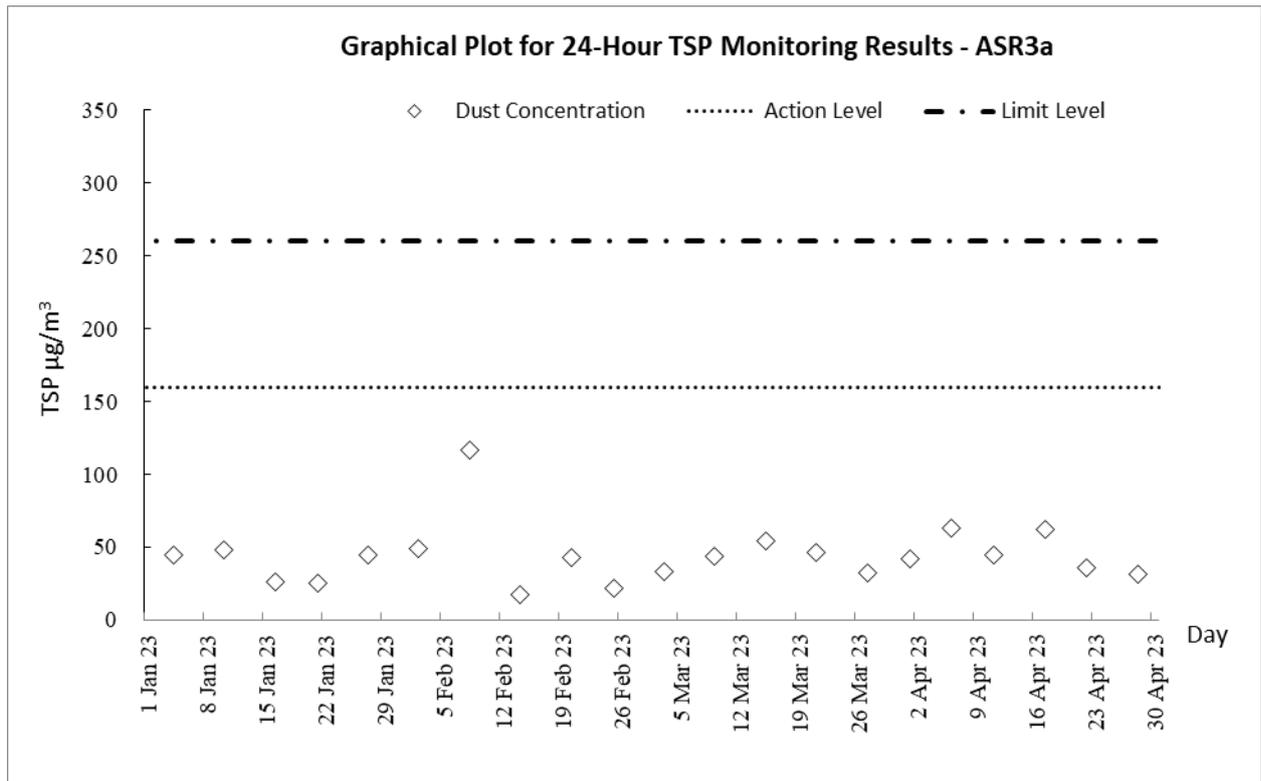
Graphical Plots of Air Quality, Noise and Water Quality

Air Quality Impact Monitoring – 1-hour TSP

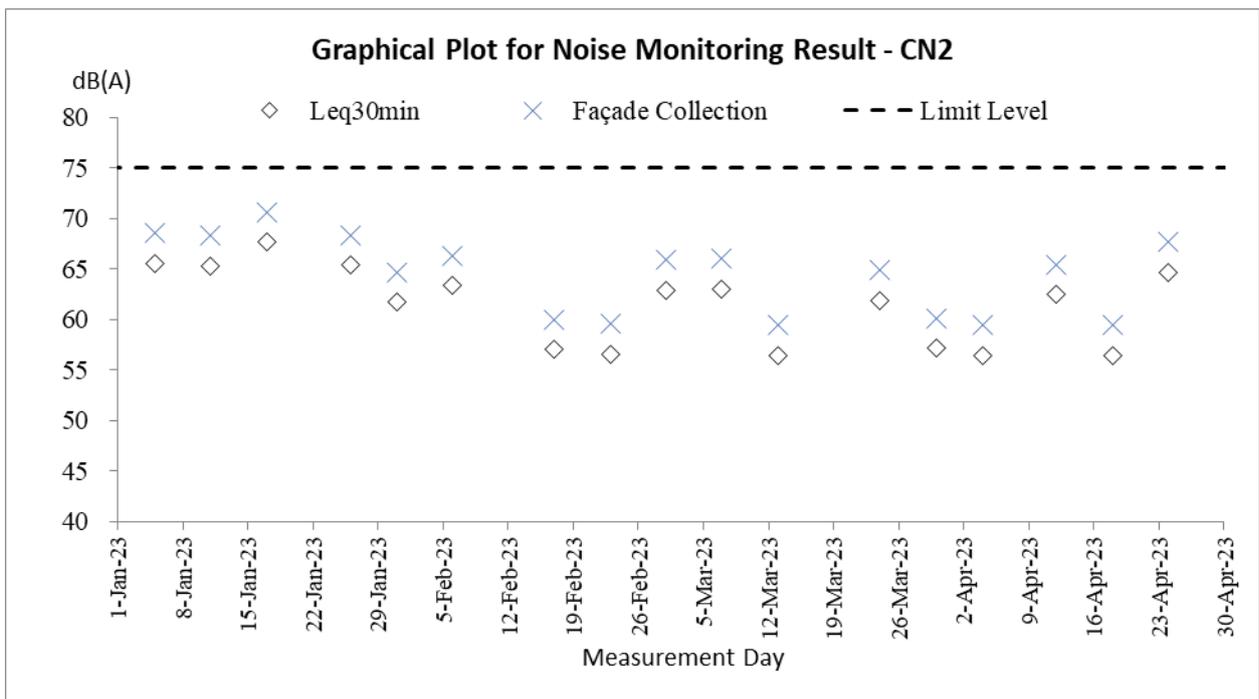
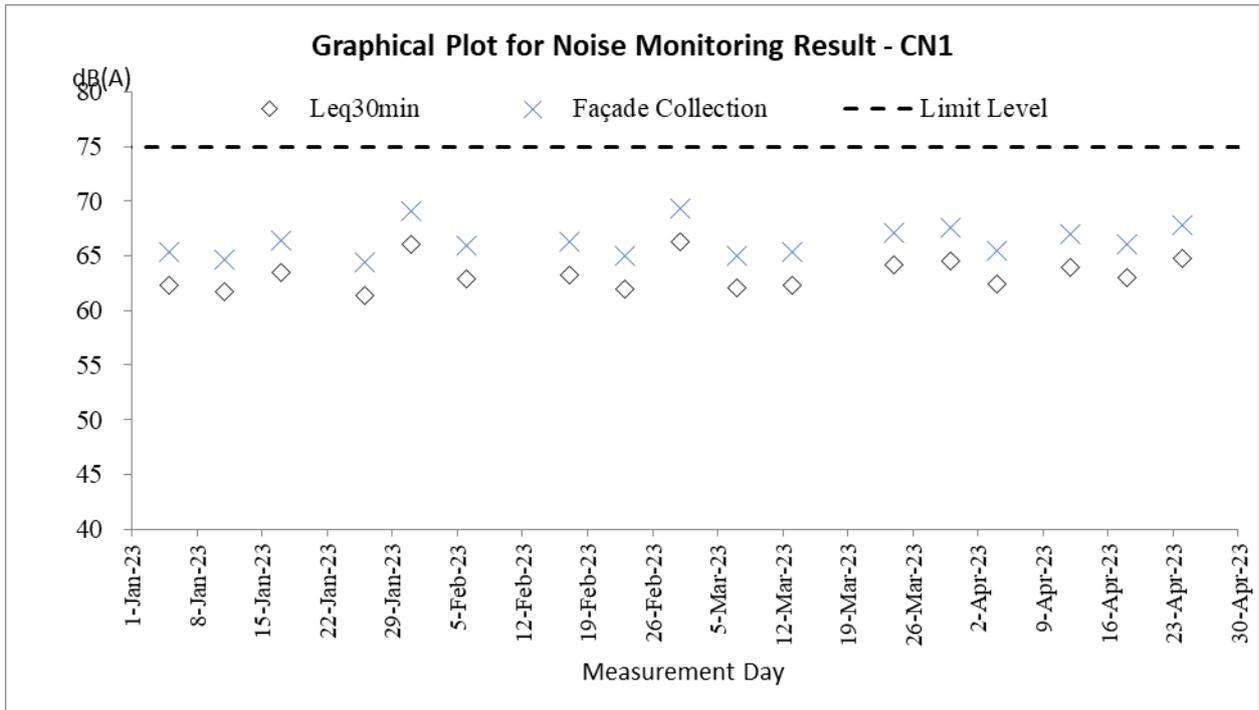


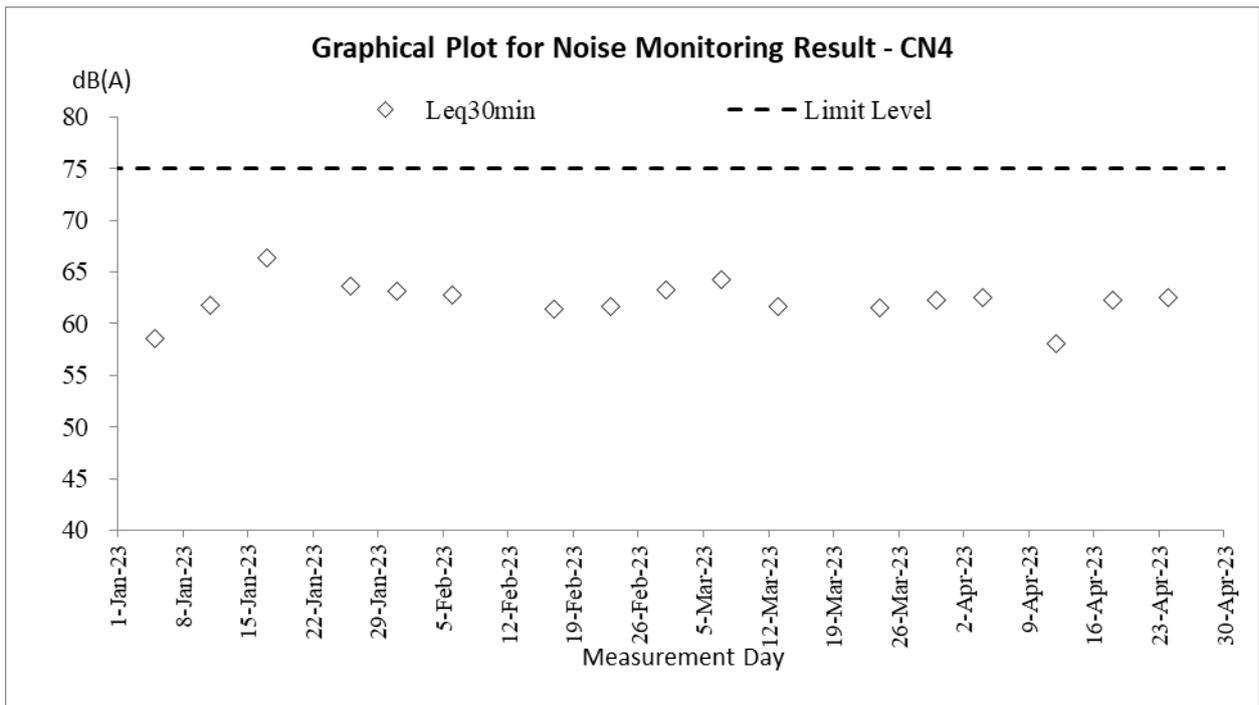
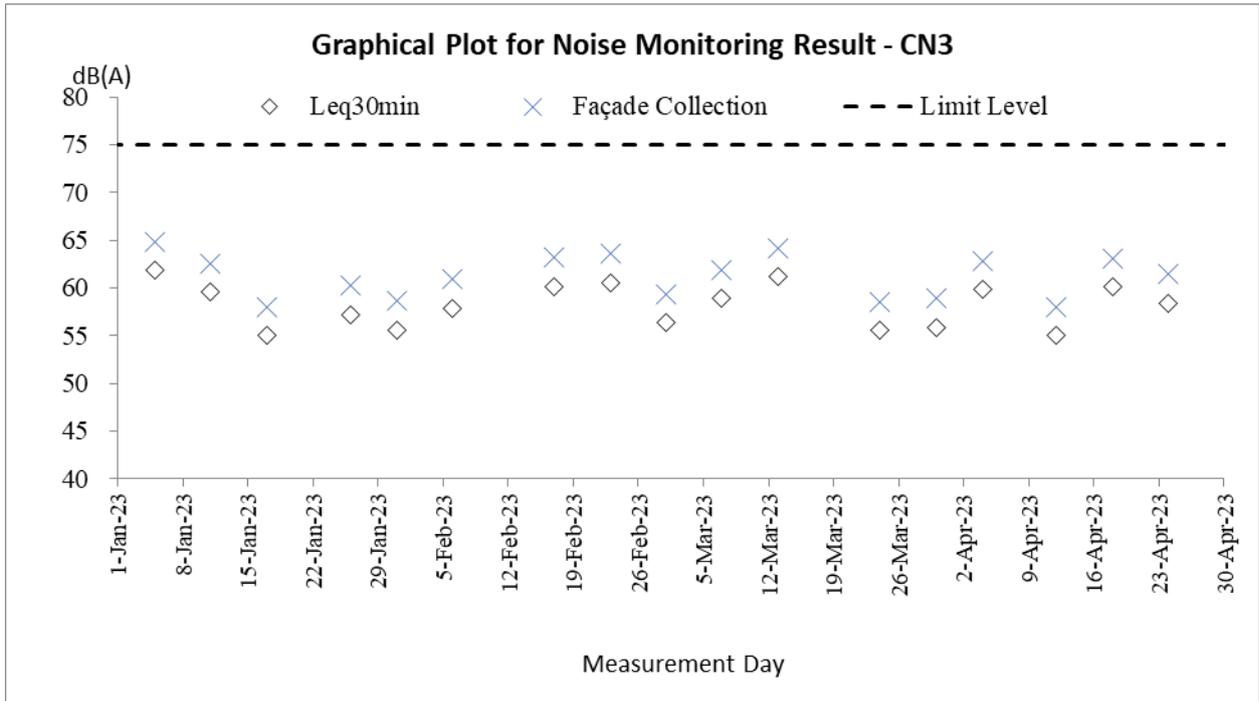
Air Quality Impact Monitoring – 24-hour TSP



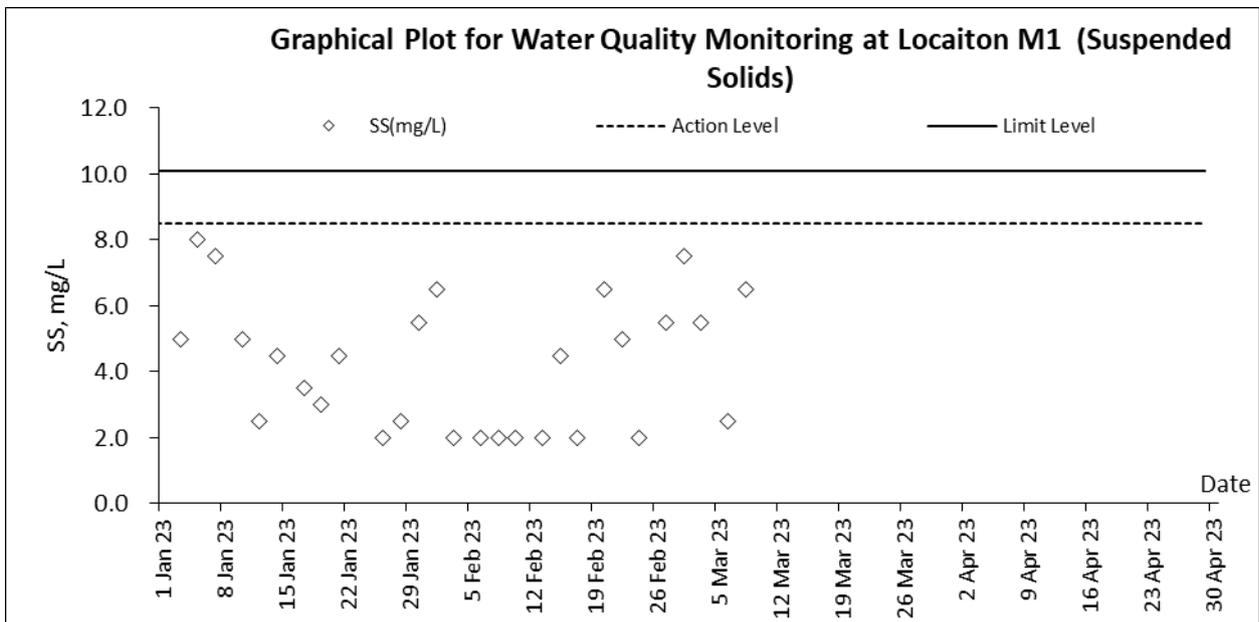
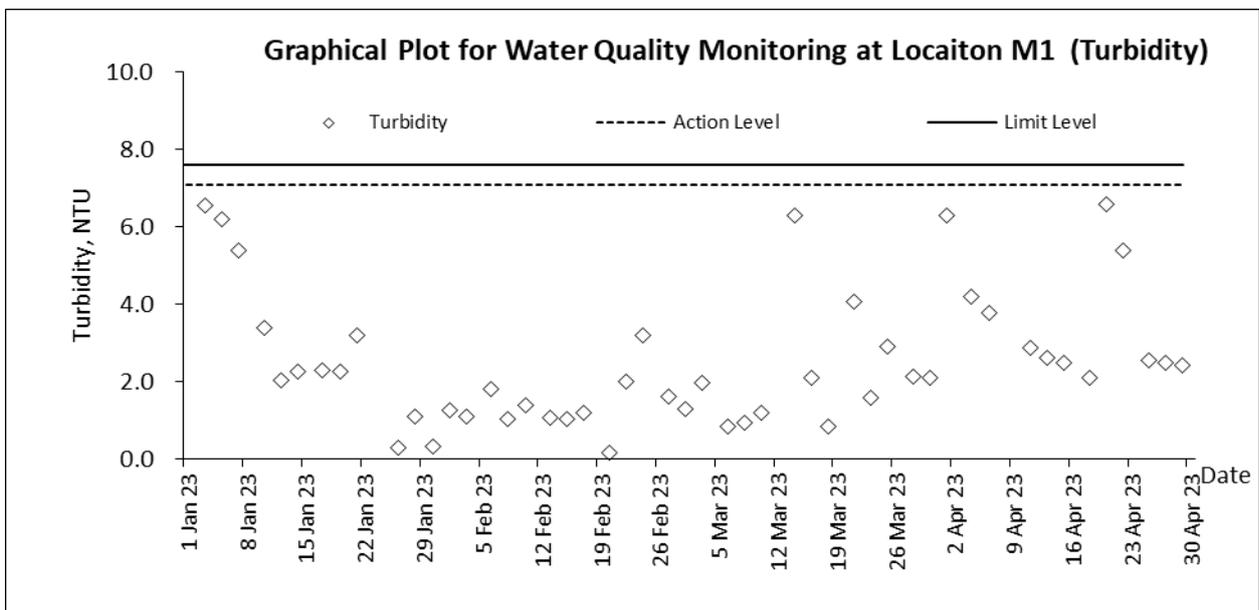
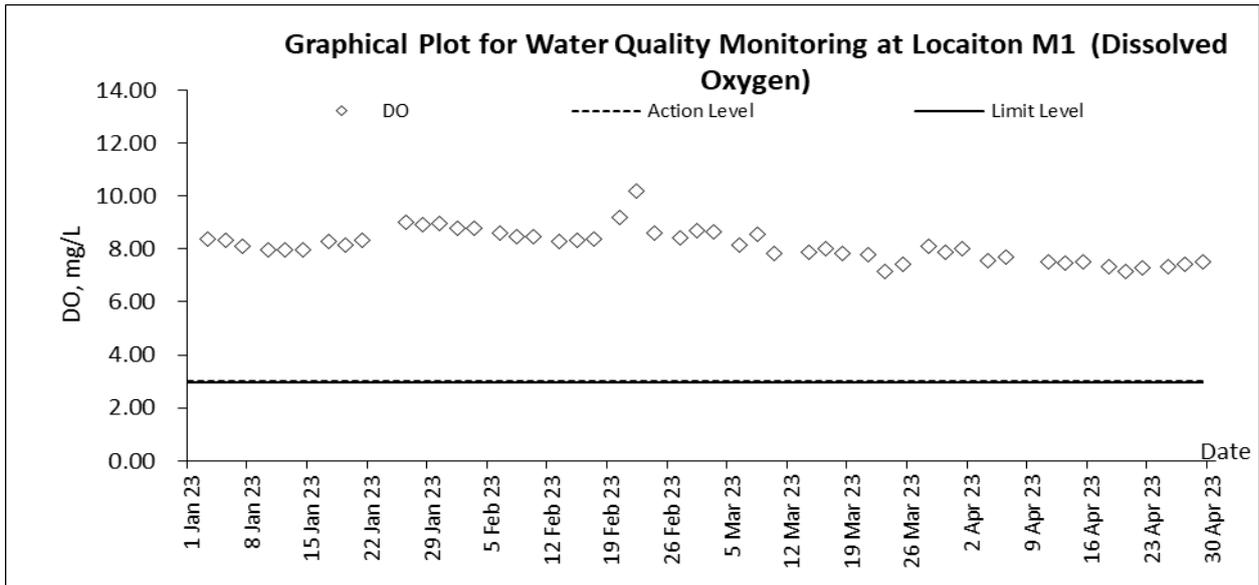


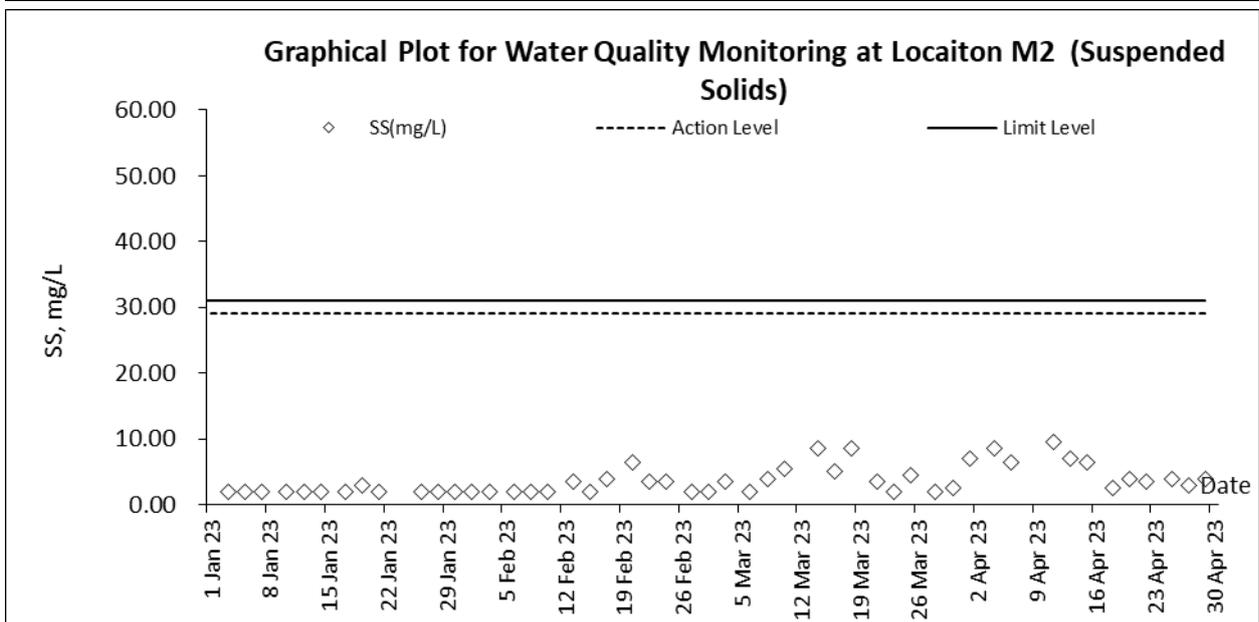
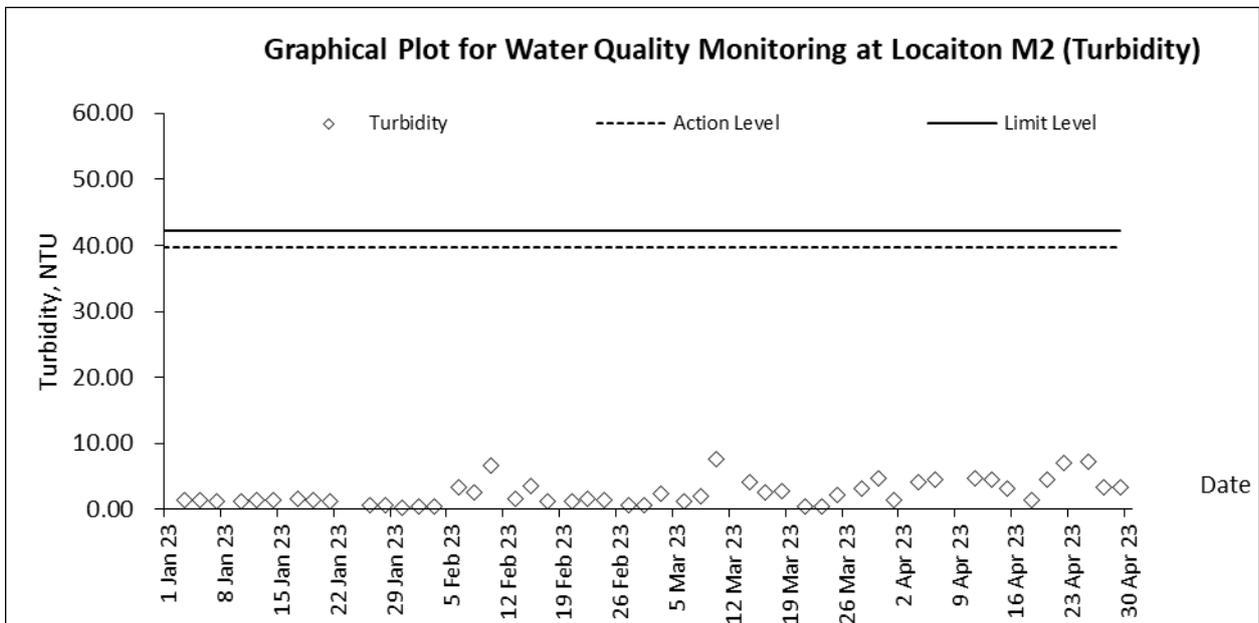
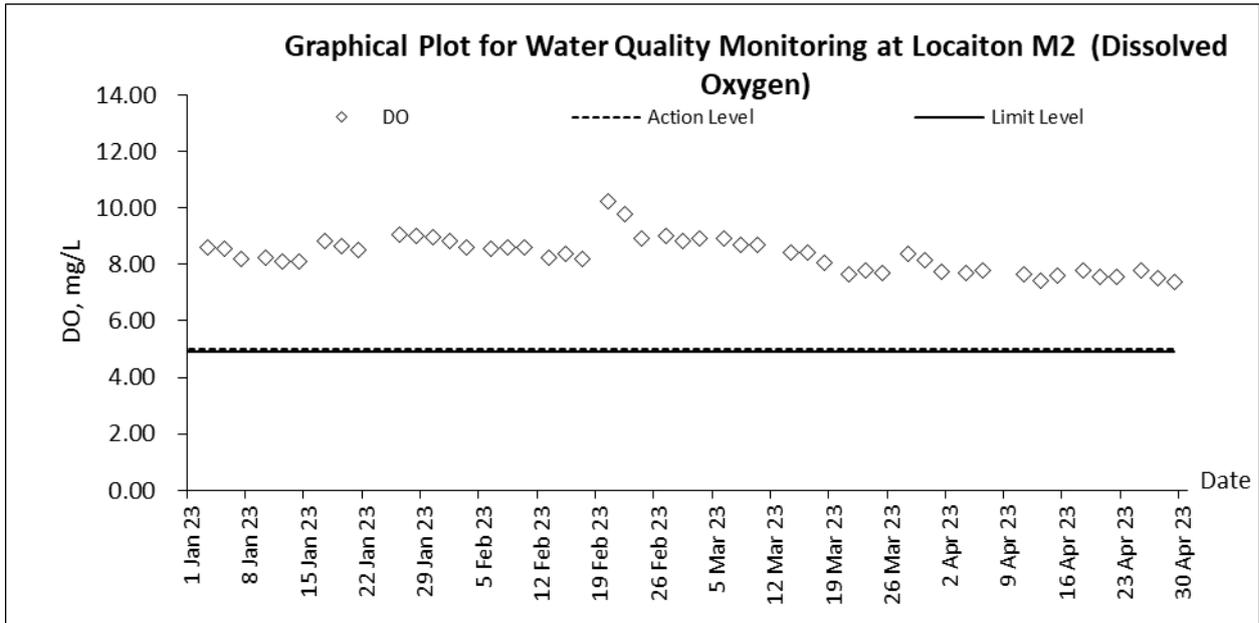
Construction Noise Impact Monitoring

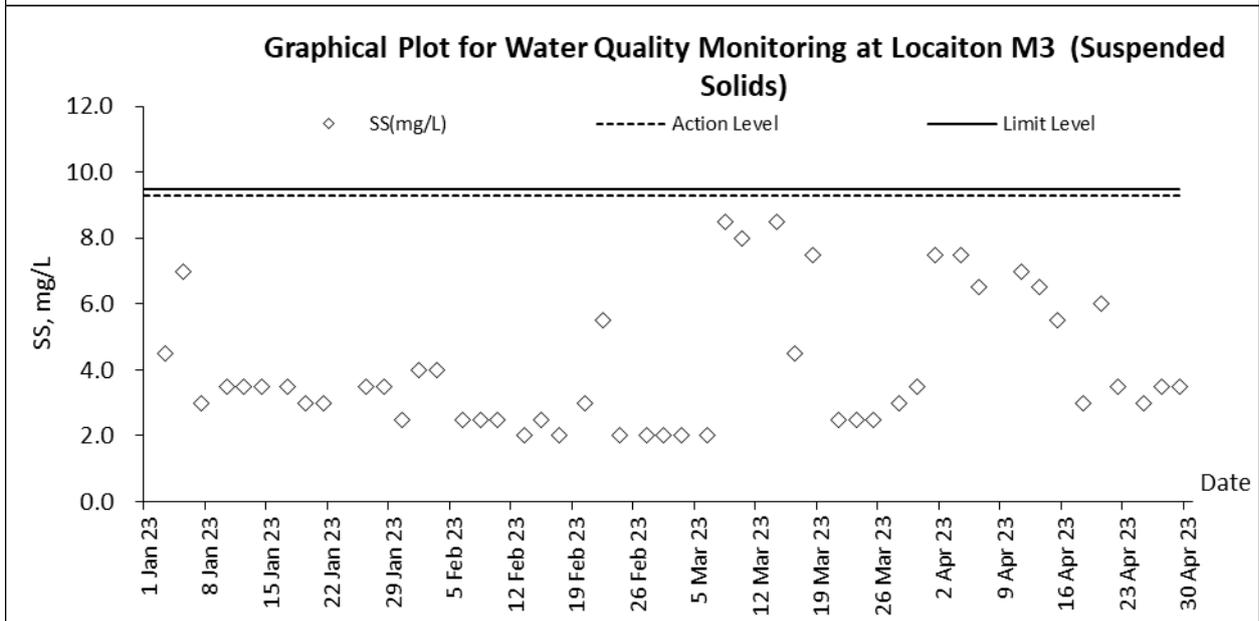
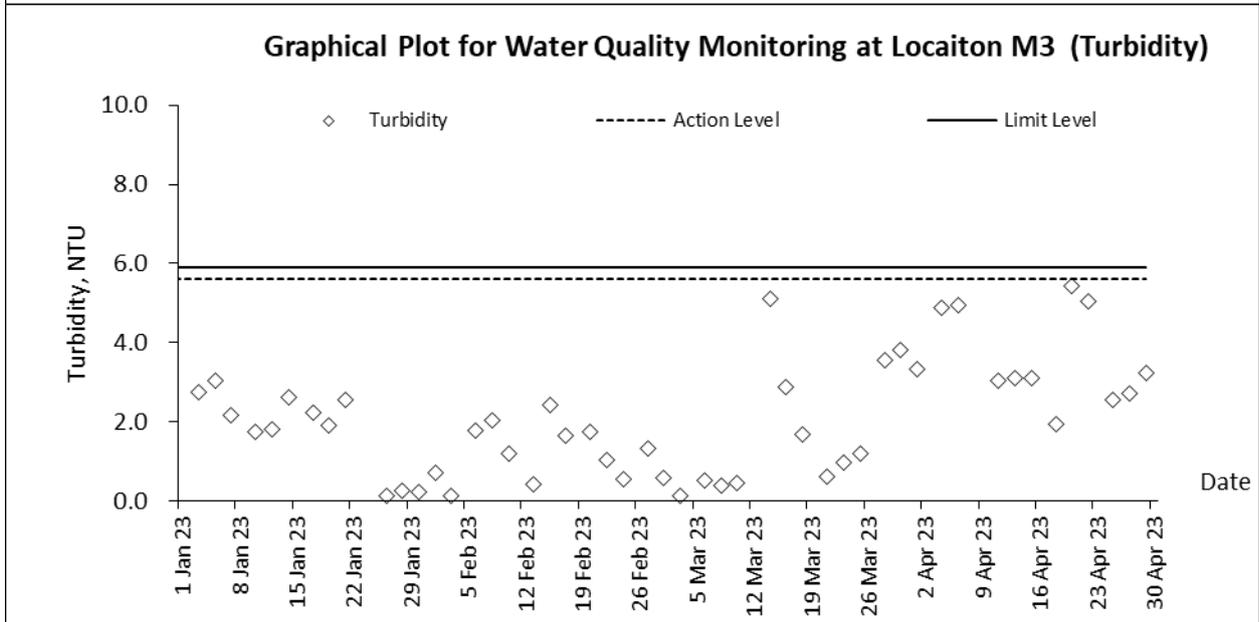
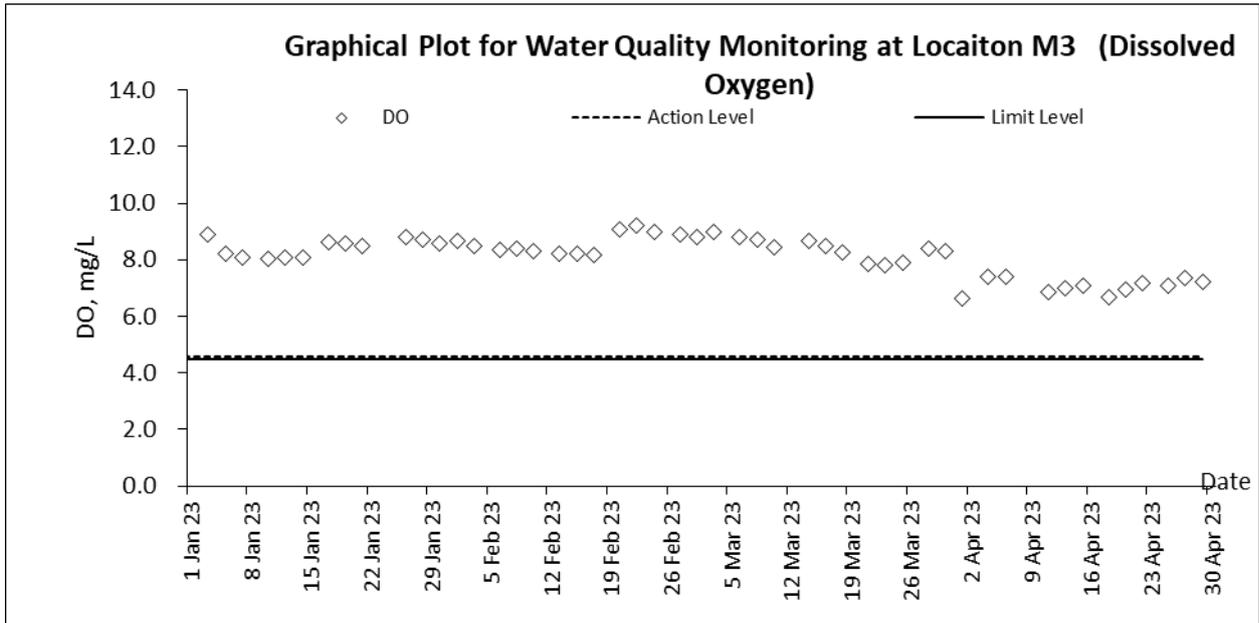


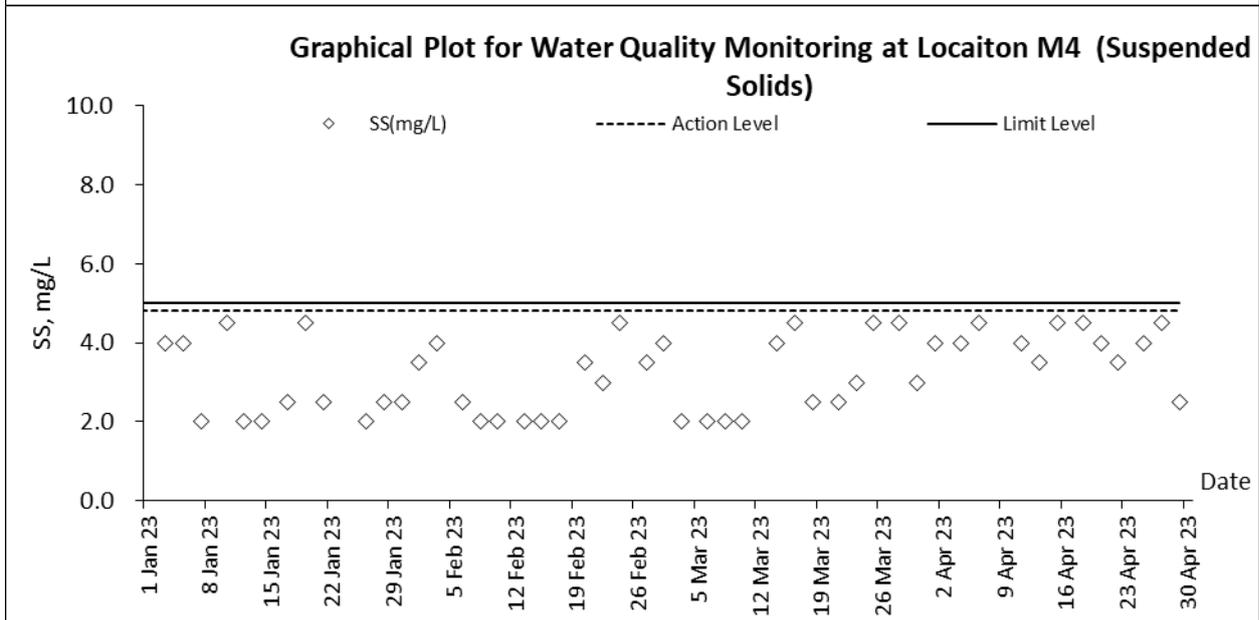
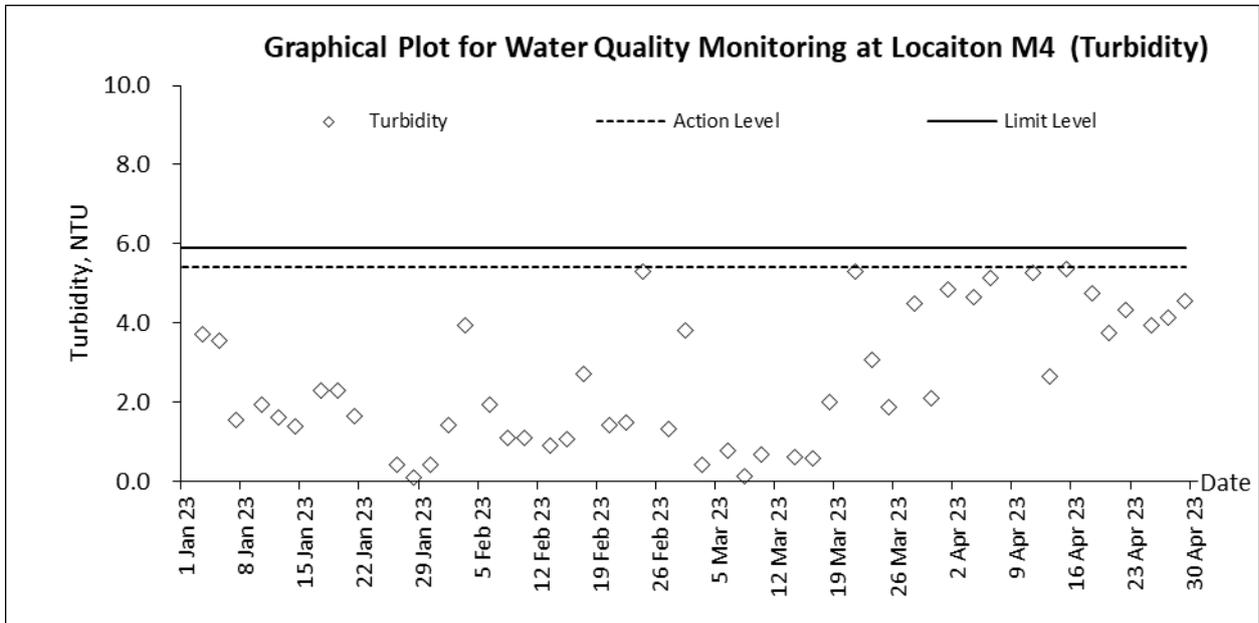
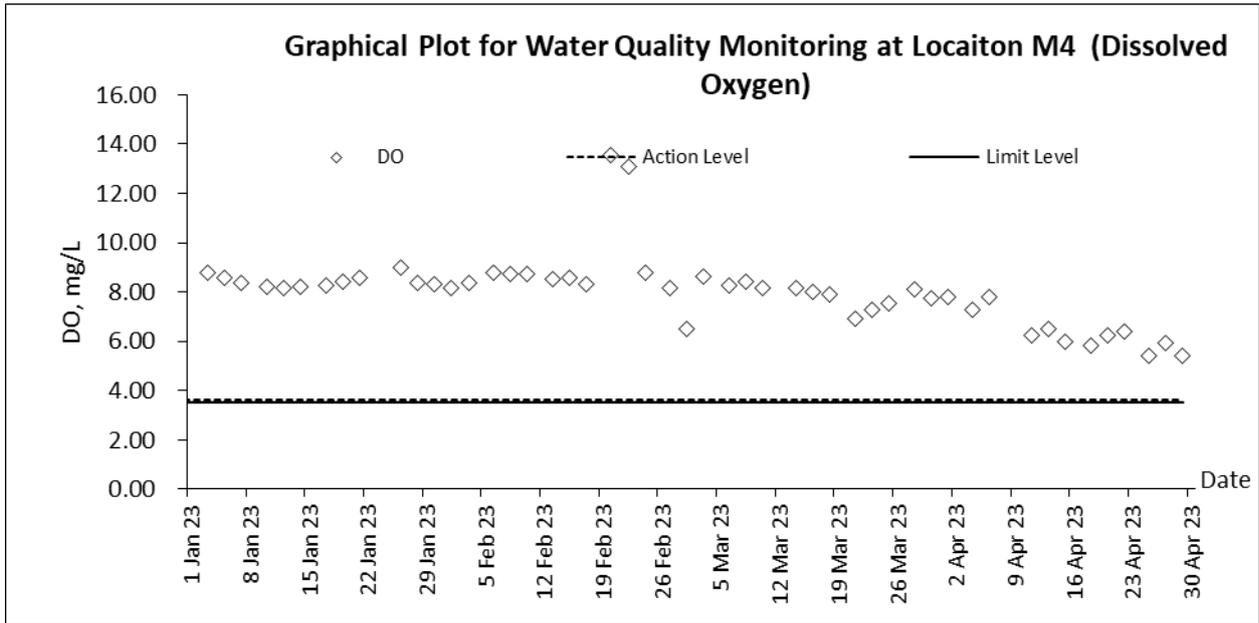


Water Quality Impact Monitoring









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-Apr-23	Sat	Mainly cloudy with a few showers.	0.7	20.8	10.7	82.0	E/SE
2-Apr-23	Sun	Moderate to fresh east to southeasterly winds	0.7	20.7	11.2	87.5	E/SE
3-Apr-23	Mon	Mainly cloudy with a few showers.	2.1	21.0	14.5	86.7	E/SE
4-Apr-23	Tue	Mainly cloudy with a few showers.	4	23.4	12	89.2	S/SE
5-Apr-23	Wed	Mainly cloudy with a few showers.	0.4	24.4	6	93.2	S
6-Apr-23	Thu	Sunny intervals in the morning.	5.9	24.8	7.5	83.2	S/SW
7-Apr-23	Fri	Moderate southerly winds	4.4	21.5	8	82.0	S/SE
8-Apr-23	Sat	Mainly cloudy. Sunny periods	Trace	19.5	10.2	84.5	S
9-Apr-23	Sun	Sunny intervals in the morning.	2.6	20.1	9.7	79.0	E/SE
10-Apr-23	Mon	Moderate southerly winds	0	21.9	11.5	74.5	E/SE
11-Apr-23	Tue	Light to moderate east to southeasterly winds.	0	25.1	10	76.2	E/SE
12-Apr-23	Wed	Light to moderate east to southeasterly winds.	0	25.0	6.2	75.5	E
13-Apr-23	Thu	Moderate southerly winds	0	24.7	11.5	73.2	E/SE
14-Apr-23	Fri	Mainly cloudy with a few showers.	0	25.3	6.7	88.5	E/NE
15-Apr-23	Sat	Mainly cloudy. Sunny intervals and a few showers	0	26.9	7.5	80.0	SE
16-Apr-23	Sun	Moderate easterly winds	0	25.8	9.2	68.0	E/SE
17-Apr-23	Mon	Sunny intervals and a few showers tomorrow.	Trace	25.9	9.2	80.0	E
18-Apr-23	Tue	Mainly cloudy. Sunny intervals and a few showers	Trace	27.0	10	81.0	E
19-Apr-23	Wed	Mainly cloudy with showers and severe squally thunderstorms.	26.5	24.6	11.2	87.5	SW
20-Apr-23	Thu	Mainly cloudy with a few showers.	18.2	24.8	6.2	88.7	E/SE
21-Apr-23	Fri	Light to moderate southeasterly winds.	4.3	24.2	9.2	90.0	E/SE
22-Apr-23	Sat	Isolated squally thunderstorms at first.	0.7	23.5	10.5	81.0	E/SE
23-Apr-23	Sun	Showers will be heavier with a few squally thunderstorms in the afternoon.	0.4	23.5	13.5	85.0	E/SE
24-Apr-23	Mon	Mainly cloudy with a few showers.	1	23.5	9.2	86.2	E/SE
25-Apr-23	Tue	Mainly cloudy with one or two rain patches	4.4	21.1	5	90.7	N
26-Apr-23	Wed	Dry with sunny periods.	0	21.5	14	68.0	N
27-Apr-23	Thu	Mainly cloudy with sunny intervals.	0.3	23.0	12	71.0	N
28-Apr-23	Fri	Moderate easterly winds.	0.9	25.6	9.2	78.0	E/SE
29-Apr-23	Sat	Hot with sunny periods during the day.	Trace	26.1	11.7	81.0	E
30-Apr-23	Sun	Mainly cloudy. Isolated showers tomorrow morning.	0	24.5	10.5	79.2	E

Appendix K

Ecological Survey Report

Ecological 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 – April 2023

Revision	0	
Date of issue	28 April 2023	
Prepared by	Alan Lam	
Reviewed by	Rachel Siu	
Verified by	Mike Leung	

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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, *Somaniathelphusa 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 butterflies 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 11th April 2023, 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 would be identified and counted as accurately as possible.

- **Mammal**

There was no mammal species recorded in the monitoring area.

- **Bird**

There were a total of 43 birds individuals from 13 species recorded in the monitoring area. No Golden-headed Cisticola was observed during the bird survey.

- **Herpetofauna**

There was no reptile species recorded in the monitoring area.

There was no amphibian species recorded in the monitoring area.

- **Butterfly**

There were a total of 4 butterfly individuals from 2 species recorded in the monitoring area.

- **Dragonfly**

There were a total of 2 dragonfly individuals from 1 species recorded in the monitoring area.

- **Freshwater communities**

There was no freshwater community recorded in the monitoring area.

Picture 1
Inside the monitoring site



Picture 2
Inside the monitoring site



Table 4 Result of mammal in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 5 Result of Avifauna in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Francolinus pintadeanus</i>	Chinese Francolin	中華鷓鴣		1				
<i>Centropus sinensis</i>	Greater Coucal	褐翅鴉鵂			1			
<i>Spilopelia chinensis</i>	Spotted Dove	珠頸斑鳩		2				
<i>Eudynamis scolopaceus</i>	Asian Koel	噪鵂		1				
<i>Cacomantis merulinus</i>	Plaintive Cuckoo	八聲杜鵑		1				
<i>Hierococcyx sparveroides</i>	Large Hawk Cuckoo	大鷹鵂		1				
<i>Apus nipalensis</i>	House Swift	小白腰雨燕		8			1	
<i>Corvus macrorhynchos</i>	Large-billed Crow	大嘴烏鴉		1				
<i>Lanius schach</i>	Long-tailed Shrike	棕背伯勞					1	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鶇					15	
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鶇					4	
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鶇鶯					3	
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯		2			1	

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

+ Species appeared but uncountable

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Mycalesis mineus</i>	Dark Brand Bush Brown	小眉眼蝶		2			1	
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶		1				

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
<i>Orthetrum pruinosum</i>	Common Red Skimmer	赤褐灰蜻						2

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				Non-wetland		Wetland		
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

5 DISCUSSION

Data analysis was carried out to compare with the biodiversity within the site boundary in the same month over years. General description of the ecological conditions is first revealed in terms of abundance as well as species richness, following by statistical analysis of the existing database. The result is considered as significant whenever the drop of diversity indexes exceeds the percentages mentioned in previous sections 2.2 and 2.3.

5.1 Total abundance and species richness in April over years were compared to show the trends. Figures 1 and 2 indicate the total species richness and total abundance within the site boundary respectively.

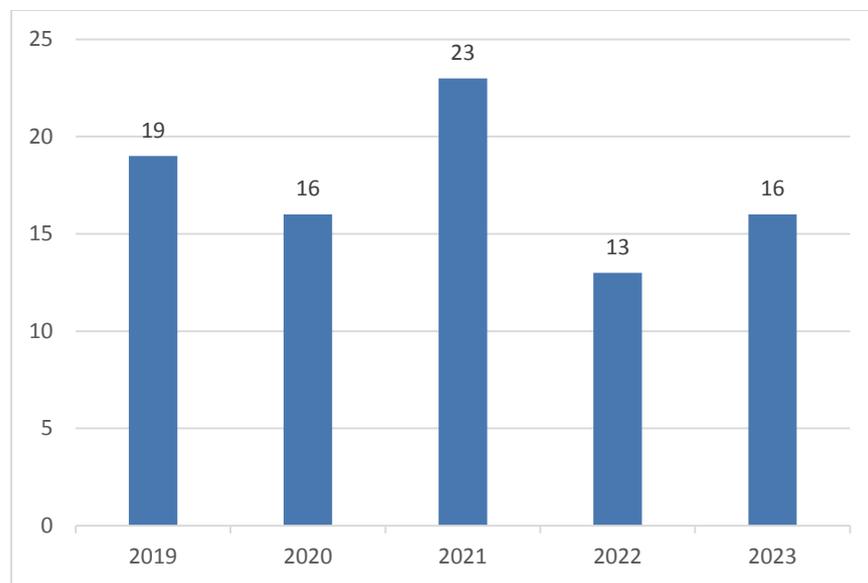


Figure 1: Bar chart showing the total species richness within site boundary from 2019 to 2023 (Actual quantity annotated at the top of each bar)

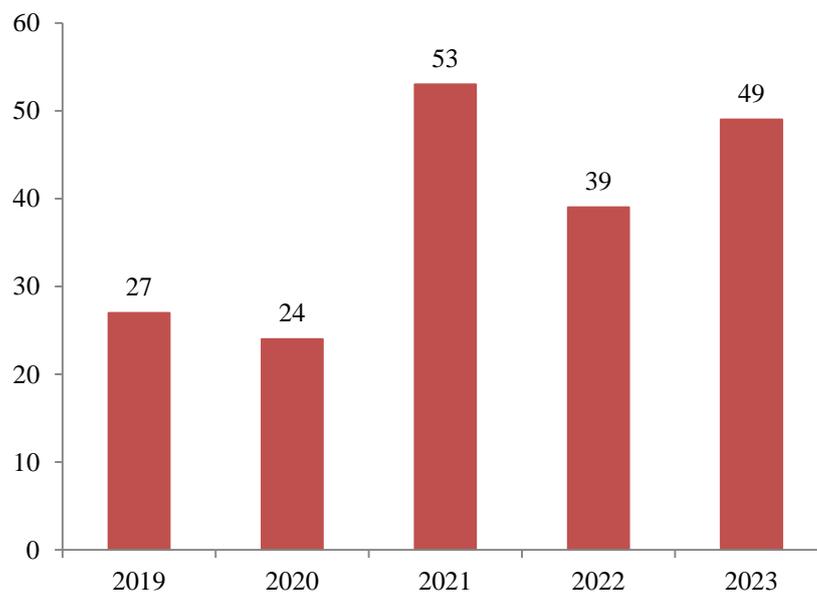


Figure 2: Bar chart showing the total abundance within site boundary from 2019 to 2023 (Actual quantity annotated at the top of each bar)

5.2 As results in section 4 were categorized by taxa, a detailed breakdown of each taxon is shown in figure 3 to further investigate the trend of specific taxa over contract period.

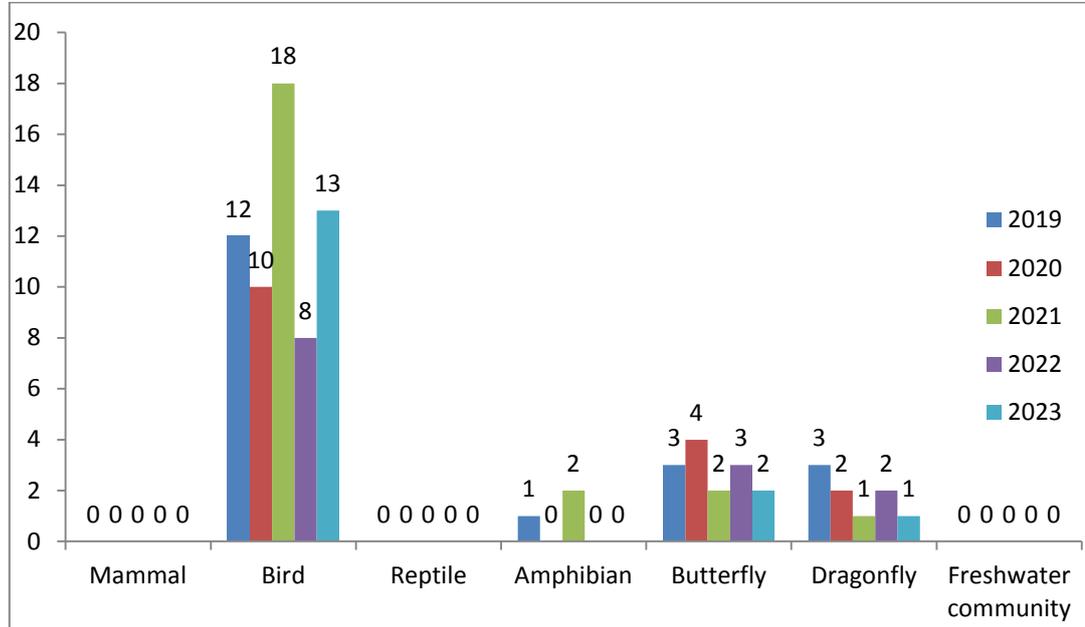


Figure 3: Bar chart showing the species richness within site boundary by taxa from 2019 to 2023 (Actual quantity annotated at the top of each bar)

5.3 According to EM&A Manual, monitoring measures was determined by the species diversity of types of sensitive habitats, i.e. non-wetland and wetland habitats. Abundance and species richness by habitat type in April over years were compared in Figures 4 and 5.

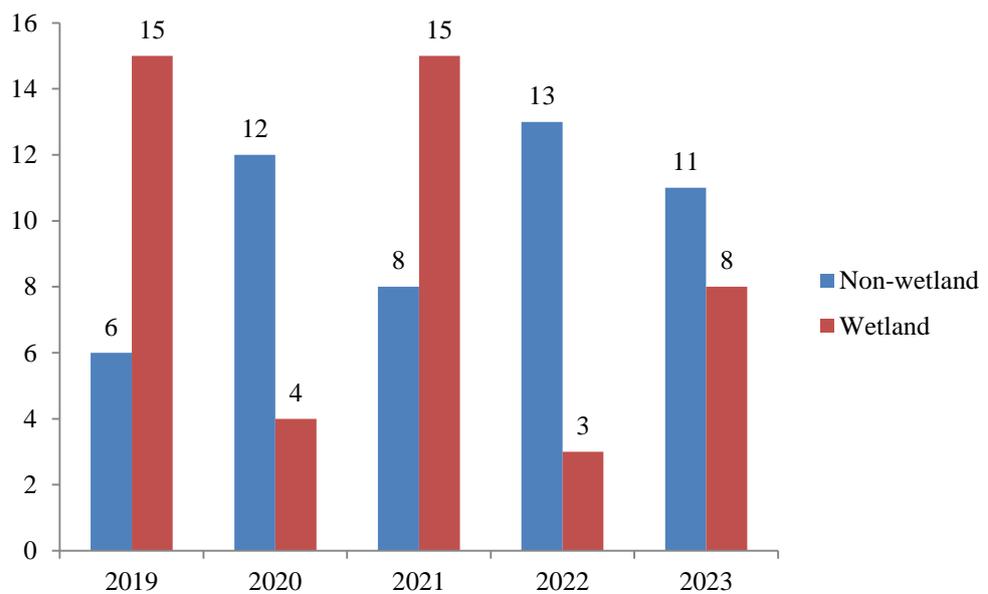


Figure 4: Bar chart showing the species richness based on habitat type from 2019 to 2023 (Actual quantity annotated at the top of each bar)

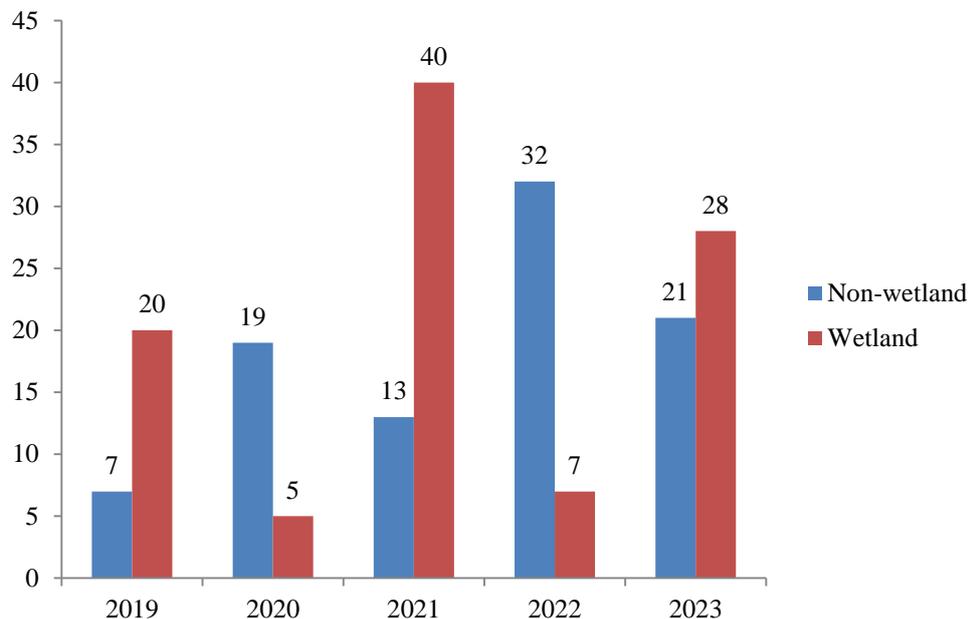


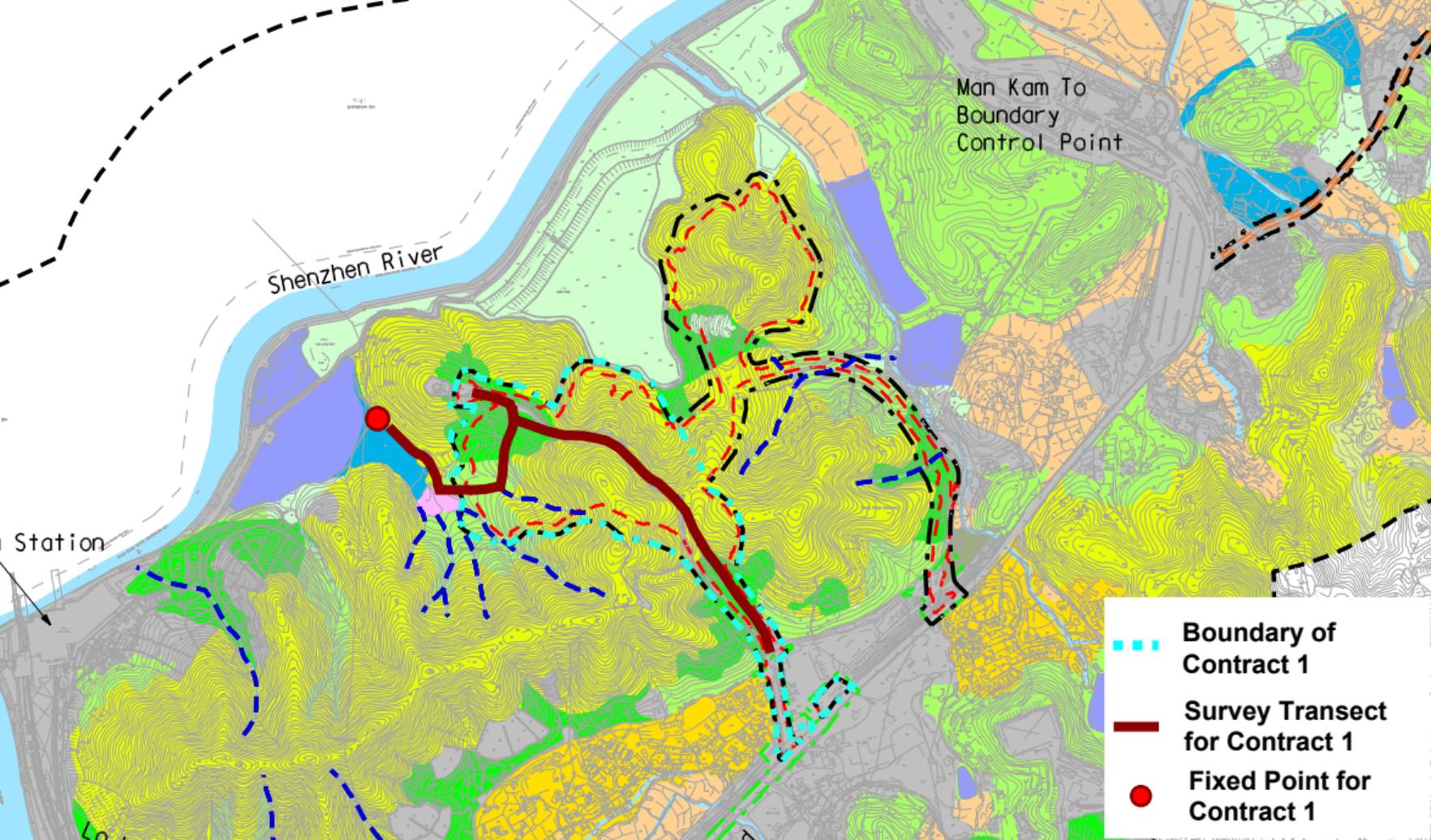
Figure 5: Bar chart showing the abundance based on habitat type from 2019 to 2023
(Actual quantity annotated at the top of each bar)

5.4

After analysing survey results in April from 2019 to 2023, the species richness and abundance for wetland habitat were unstable. A rapid rebound from 2022 was recorded recently. This could be benefited by some positive factors such as the major construction works were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimised. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.

Yet, good site practice during construction, with reference to EM&A Manual, is still required to prevent or alleviate environmental impacts. Continuous monitoring is also recommended to inspect any changes in species diversity.

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



Man Kam To
Boundary
Control Point

Shenzhen River

Station

-  Boundary of Contract 1
-  Survey Transect for Contract 1
-  Fixed Point for Contract 1

**Ecological 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 – April 2023

Revision	0	
Date of issue	28 April 2023	
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Reviewed by	Rachel Siu	
Verified by	Mike Leung	

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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 Watercourses	Upland Grassland 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, *Somaniathelphusa 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 butterflies 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 11th April 2023, 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 would be identified and counted as accurately as possible.

- **Mammal**
There was no mammal recorded in the monitoring area.
- **Bird**
There were total of 7 bird individuals from 4 species recorded in the monitoring area. No Golden-headed Cisticola was observed during the bird survey.
- **Herpetofauna**
There was no reptile recorded in the monitoring area.
There was no amphibian recorded in the monitoring area.
- **Butterfly**
There were total of 3 butterfly individuals from 2 species recorded in the monitoring area.
- **Dragonfly**
There were a total of 2 dragonfly individuals from 1 species recorded in the monitoring area.
- **Freshwater communities**
There were 2 species of freshwater fish recorded in the monitoring area.

Picture 1

Watercourse in monitoring area.



Picture 2

Watercourse in monitoring area.



Table 4 Result of mammal in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 5 Result of Avifauna in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	白胸苦惡鳥				2		
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鶇					2	
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯		1				
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯		2				

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
N/A								

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
 + Species appeared but uncountable

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶		1				
<i>Pieris canidia</i>	Indian Cabbage White	東方菜粉蝶		2				

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
<i>Pantala flavescens</i>	Wandering Glider	黃蜻				2		

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	11/4/2023				
				UG	WL	MA	WW	WC
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚						+
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚鯪						+

*UG: Upland Grassland | WL: Woodland | MA: Marsh | WW: Wet Woodland | WC: Watercourse
 + Species appeared but uncountable

5 DISCUSSION

Data analysis was carried out to compare with the biodiversity within the site boundary in the same month over years. General description of the ecological conditions is first revealed in terms of abundance as well as species richness, following by statistical analysis of the existing database. The result is considered as significant whenever the drop of diversity indexes exceeds the percentages mentioned in previous sections 2.2 and 2.3.

5.1 Total abundance and species richness in April over years were compared to show the trends. Figures 1 and 2 indicate total species richness and total abundance within the site boundary respectively.

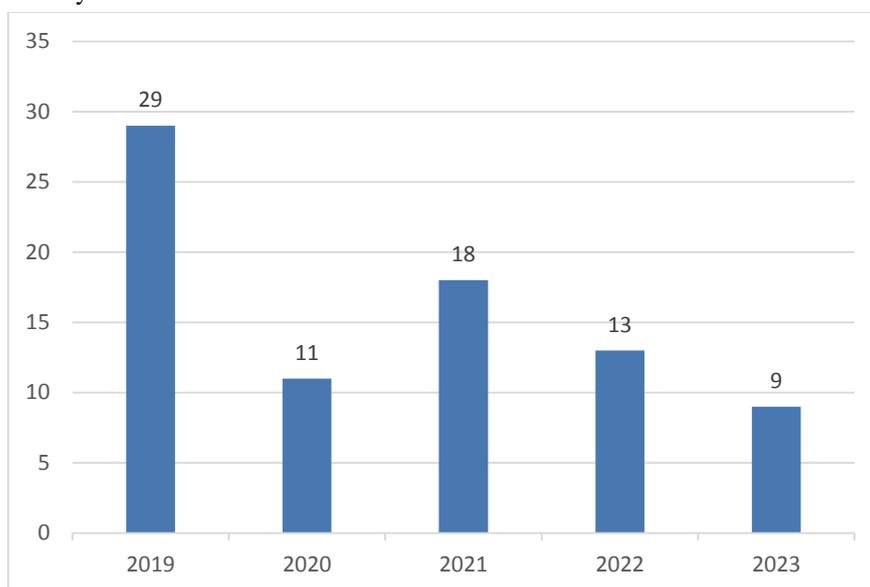


Figure 1: Bar chart showing the total species richness within site boundary from 2019 to 2023 (Actual quantity annotated at the top of each bar)

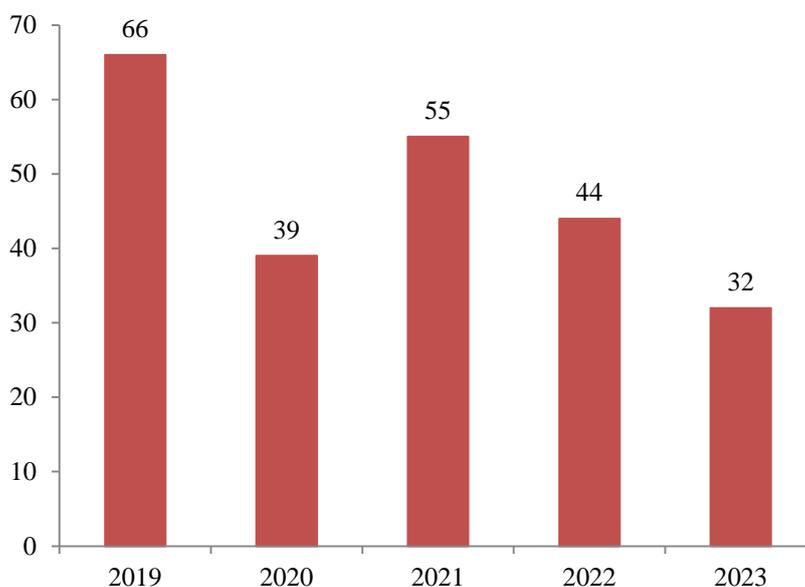


Figure 2: Bar chart showing the total abundance within site boundary from 2019 to 2023 (Actual quantity annotated at the top of each bar)

5.2 As results in section 4 were categorized by taxa, a detailed breakdown of each taxon is shown in figure 3 to further investigate the trend of specific taxa over contract period.

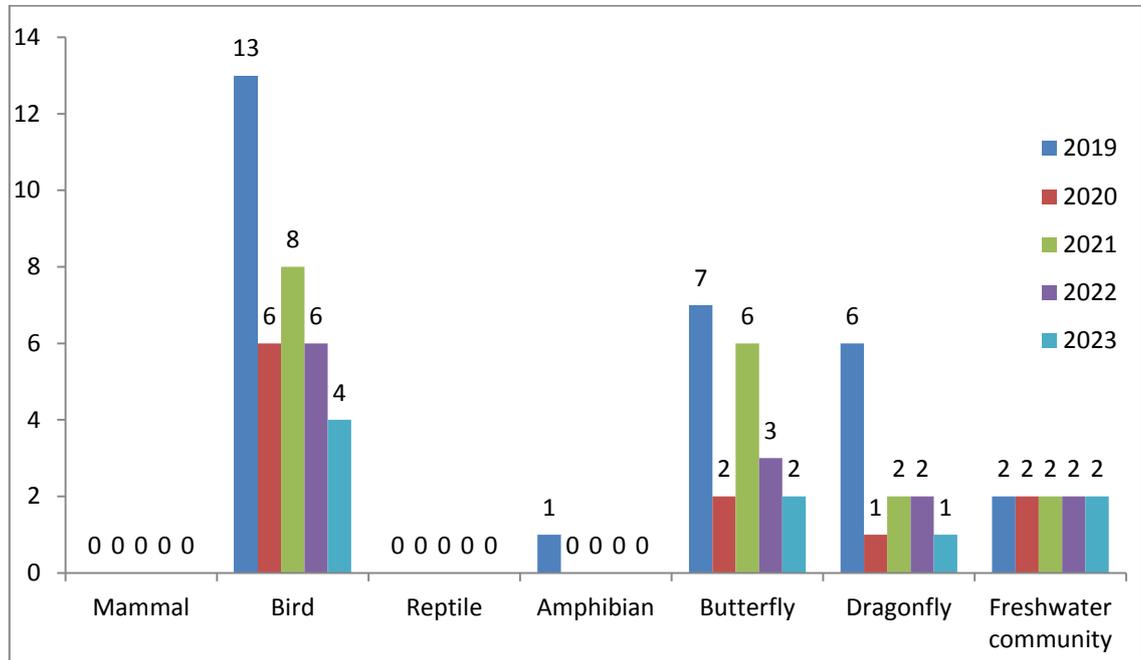


Figure 3: Bar chart showing the species richness within site boundary by taxa from 2019 to 2023 (Actual quantity annotated at the top of each bar)

5.3 According to EM&A Manual, monitoring measures was determined by the species diversity of types of sensitive habitats, i.e. non-wetland and wetland habitats. Abundance and species richness by habitat type in April over years were compared in figures 4 and 5.

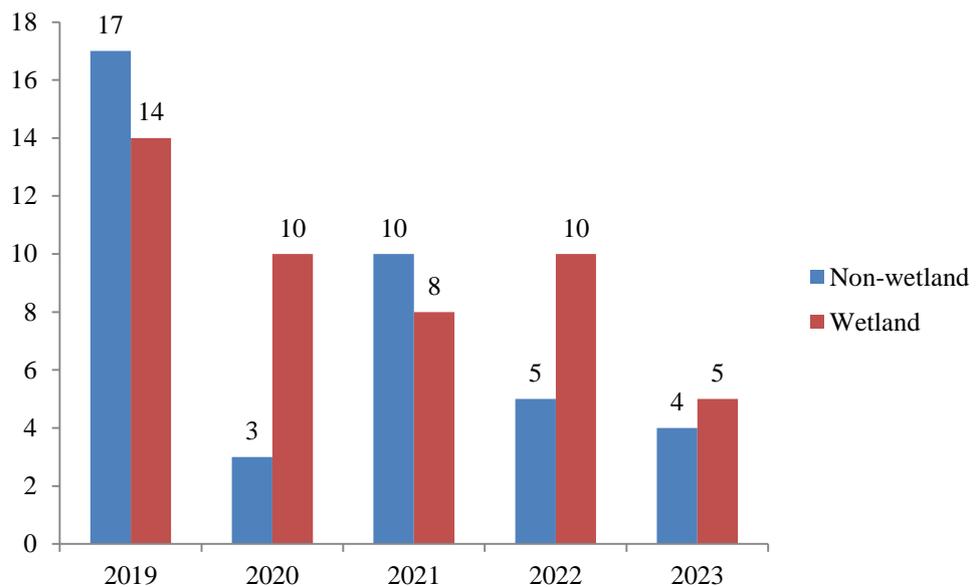


Figure 4: bar chart showing the species richness based on habitat type from 2019 to 2023 (Actual quantity annotated at the top of each bar)

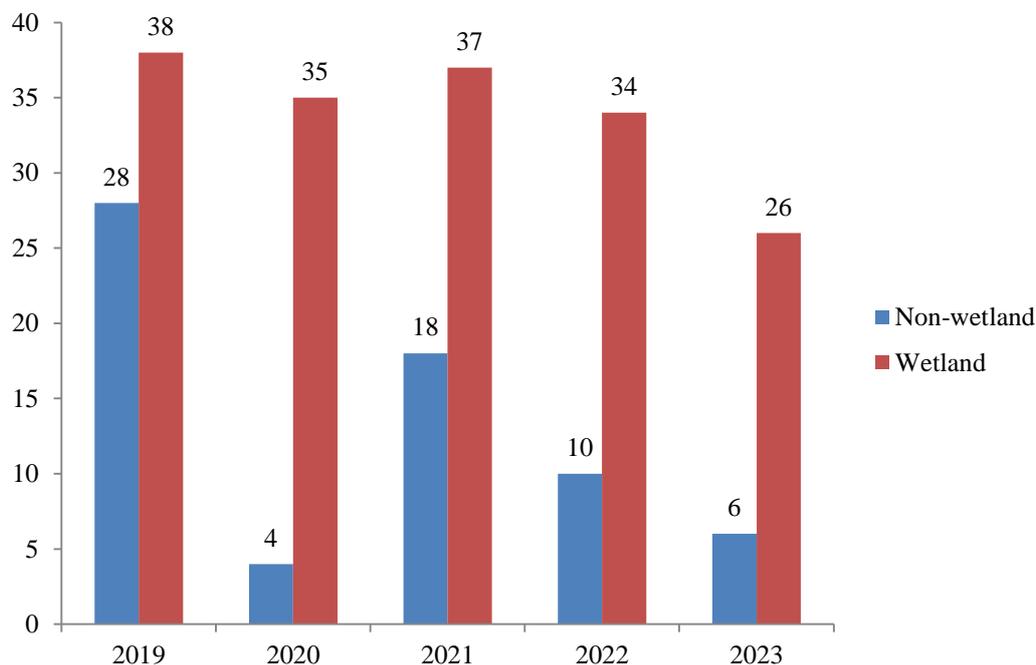


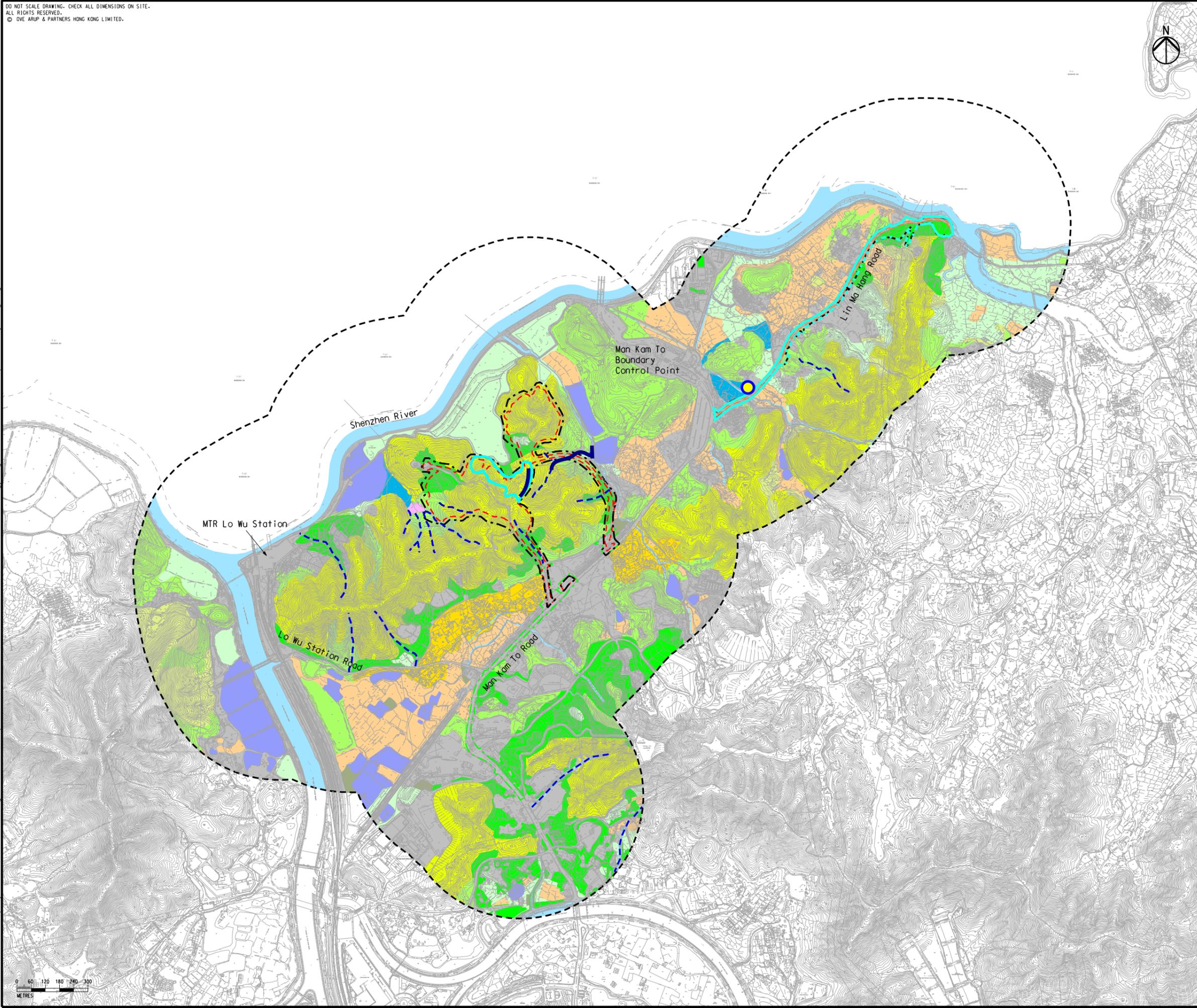
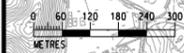
Figure 5: bar chart showing the abundance based on habitat type from 2019 to 2023
(Actual quantity annotated at the top of each bar)

5.4 After analysing survey results in April from 2019 to 2023, there was approximate 30% decrease in species richness and abundance for wetland and non-wetland habitats in April 2023 when comparing to the April of 2022. Since Action Level of respond Measures have been triggered, investigation of cause for decrease was conducted and according to the on-site observation, there are new built workshops by others situated on both sides of Lin Ma Hang Road so the disturbance to fauna species from construction works could be increased. Due to the cause identified was not related to this project remedial action to remove or reduce source of disturbance is limited.

Nevertheless, the situation could be benefited by some positive factors such as the major construction works in this contract were completed and most of the PME has been removed from site. Besides, compensation planting works have been conducted in early Jan 2023. Therefore, disturbance to fauna species from construction works have been largely minimized internally. In addition, woodland compensation and grassland reinstatement would be implemented in the second and third quarter of 2023. Hence, the habitat of fauna species would be gradually recovered and expectation of increase in the species richness and abundance for wetland habitat is high.

Still, a good site practice during construction, with reference to EM&A Manual, is required to prevent or alleviate environmental impacts. For instance, the size of work areas should be minimized and disturbed areas should be reinstated immediately after completion of construction works. In addition, implementing proper waste disposal is necessary to reduce contamination to water and soil. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.

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



Legend

- Project Boundary
- Utilities Construction
- Sandy Ridge Works Area
- Lin Ma Hang Road Works Area
- 500m Assessment Area
- Watercourse
- Seasonal Watercourse
- Pond
- Developed Area
- Agricultural Land
- Marsh
- Wasteland
- Grassland
- Upland Grassland
- Shrubland
- Plantation
- Woodland
- Wet Woodland
- Village Area
- Site boundary of Contract 2
- Survey Transect for Contract 2
- Fixed Point for Contract 2

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
Habitat Map at Sandy Ridge

Drawing no. Figure 9.4b		Rev. G	
Drawn GL	Date 02/16	Checked EL	Approved ST
Scale AS SHOWN		Status PRELIMINARY	

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 Civil Engineering and
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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: 28/04/2023 15:30 **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:

N/A

New observation:

N/A

Reminders:

1. Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement.
2. Contractor is reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.
3. Transplanted trees T2465 and T2928 were in fair health condition with normal foliage color and density. Contractor is reminded to provide proper maintenance according to approved method statement.

Photo Record:

Fig A.



General view (1)

Fig B.



General view (2)

Fig C.



General view (3)

Fig D.



General view (4)

Fig E.



Transplanted tree (T-2465)

Fig F.



Transplanted tree (T-2928)

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

N/A

New Observation:

N/A

Reminders:

1. Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement. Contractor should prevent any 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)

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 –

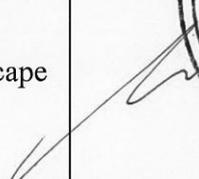
Infrastructural Works at Man Kam To Road and Lin Ma Hang Road

Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 28/04/2023 16:30 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?			✓	
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)			✓	

Signature:

		Signature	Date
Recorded by	Registered Landscape Architect	 	2 May 2023
Checked by	Environmental Team Leader		10 May 2023
	Independent Environmental Checker		13 May 2023

Appendix M

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for 2023

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	0.360	0.000	0.000	0.000	0.340	0.000	0.000	0.000	0.000	0.000	0.020
Feb	0.290	0.000	0.000	0.000	0.300	0.000	0.000	0.000	0.000	0.000	0.015
Mar	0.172	0.000	0.000	0.000	0.157	0.000	0.000	0.000	0.000	0.000	0.015
Apr	0.135	0.000	0.000	0.000	0.120	0.000	0.000	0.000	0.000	0.000	0.010
May											
June											
Sub-total	0.957	0.000	0.000	0.000	0.917	0.000	0.000	0.000	0.000	0.000	0.060
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	0.957	0.000	0.000	0.000	0.917	0.000	0.000	0.000	0.000	0.000	0.060

- 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 2023

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 Litre)	(in '000kg)
JAN	191.800	0.000	0.000	0.000	191.800	0.000	0.000	0.000	0.000	0.000	5.800
FEB	356.600	0.000	0.000	0.000	356.600	0.000	0.000	0.000	0.000	0.000	9.600
MAR	352.230	0.000	0.000	0.000	352.230	0.000	0.000	0.000	0.000	0.000	4.640
APRIL	87.490	0.000	0.000	0.000	87.490	0.000	0.000	0.000	0.000	0.000	2.090
MAY											
JUN											
Sub Total	988.120	0.000	0.000	0.000	988.120	0.000	0.000	0.000	0.000	0.000	22.130
JUL											
AUG											
SEP											
OCT											
NOV											
DEC											
Total	988.120	0.000	0.000	0.000	988.120	0.000	0.000	0.000	0.000	0.000	22.130

Notes: * estimated quantity (pending from EPD NENT (soil) to update the actual quantity)

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	0	0	0	0	1	0

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

Complaint Log

Complaint Log for Contract 1

Log ref.	Date of complaint	Complaint route	Reference no.	Complaint nature	Investigation fining	Status
1	15-Apr-21	EPD	EPD Ref.: EP3/N07/RN/8770-21	Air Quality	Non-project related	Interim IR was submitted to EPD on 22 April 2021 and included in EM&A Report – Apr 2021
2	11-Feb-22	EPD	EPD Ref.: EP3/N07/RN/03921-22	Noise	Non-project related	Interim IR was submitted to EPD on 25 Feb 2022 and included in EM&A Report – Feb 2021

Complaint Log for Contract 2

Log ref.	Date of complaint	Complaint route	Reference no.	Complaint nature	Investigation fining	Status
1	4-Sep-20	EPD	EPD Ref.: EP/RN/419300	Water quality	Non-project related	Interim IR was submitted to EPD on 14 Sep 2020 and included in EM&A Report – Sep 2020
2	15-Apr-21	EPD	EPD Ref.: EP3/N07/RN/8770-21	Air Quality	Non-project related	Interim IR was submitted to EPD on 22 April 2021 and Included in EM&A Report – Apr 2020
3	11-Feb-22	EPD	EPD Ref.: EP3/N07/RN/03921-22	Noise	Non-project related	Interim IR was submitted to EPD on 25 Feb 2022 and included in EM&A Report – Feb 2021
4	14-July-22	EPD	EPD Ref.: N07/RN/00014141-22	Soil/muddy water	Non-project related	Interim IR was submitted to EPD on 19 Aug 2022 and included in EM&A Report – Aug 2022
5	23-9-22	EPD	EPD Ref.: N07/RN/00020415-22	Air Quality	Non-project related	Interim IR was submitted to EPD on 30 Sep 2022 and included in EM&A Report – Sep 2022

Appendix O

Implementation Schedule for Environmental Mitigation Measures

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	Implementation status and remark*
		activities.					
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	<ul style="list-style-type: none"> Annex 5, TM-EIAO 	Implemented * Quiet plants were in used.
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	Implemented where necessary. * Temporary noise barriers are not practicable due to site constraint.
S5.5.5.7	Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered upper portion of superficial density no less than 7kg/m2 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	Implemented where necessary. * Movable noise barriers are not practicable due to site constraint.
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	Implemented

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	Implementation status and remark*
S13.2.1.1	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	Implemented. * 4 noise monitoring stations were Implemented.
S13.4.1.2							
Operational Noise (Road Traffic Noise)							
S5.6.6.4	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: <i>For existing representative NSRs</i> <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); 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); For planned representative NSRs 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 	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 be constructed before intake of planned representative NSRs.	<ul style="list-style-type: none"> TM-EIAO 	Shall be implemented Prior to operation of the Project.

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	Implementation status and remark*
	<ul style="list-style-type: none"> Road near Muk Wu Nga Yiu (MM13); Approx. 3.1m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM14); Approx. 3.1m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM15); Approx. 4.1m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM16); Approx. 340m of low noise surfacing materials along Lin Ma Hang Road near Muk Wu Nga Yiu (MM17). 						
Water Quality (Construction Phase)							
S6.4.4.1	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:	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 	Implemented
S6.4.4.3	<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 offsite 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 the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction; Construction works should be programmed to minimise surface excavation works during the rainy seasons (April to September). All exposed earth areas should be 					Implemented	

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	Implementation status and remark*
	<ul style="list-style-type: none"> 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. 						<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
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; 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. 	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 	<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
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 	<p>No Applicable.</p> <p>* Barging point at Siu Lam is not in used.</p>
Water Quality (Operational Phase)							

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	Implementation status and remark*
S7.3.4.3	<p><u>Waste Reduction Measures</u></p> <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; 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. 	Reduce waste generation	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance 	Implemented Implemented Implemented Implemented Implemented
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 	Implemented Implemented Implemented
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 	Implemented Implemented Implemented Implemented
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 backfilling; carry out on-site sorting; make provisions in the Contract documents to allow and promote the 	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 	Implemented Implemented Implemented Implemented

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	Implementation status and remark*
	<ul style="list-style-type: none"> use of recycled aggregates where appropriate; and implement a recording system for the amount of waste generated, recycled and disposed of for checking. The recommended C&D materials handling should include: <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 Material purchasing. 						<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
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 	Implemented
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 	<p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
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, site condition and activities. Regularly collection by licensed collectors should be arranged to minimise potential environmental impacts. 	Minimise production of sewage impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance 	<p>Implemented</p> <p>Implemented</p>
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 	Implemented

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	Implementation status and remark*
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 	Implemented
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 reappraisal 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	Implemented
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	Implemented
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	Project Proponent /	Potentially contaminated	Prior to the construction	Ditto	Not required as no contamination is

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	Implementation status and remark*
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	measures for the contaminated soil and groundwater identified in the assessment if remediation is required Demonstrate that the decontamination work is adequate and is carried out in accordance with the endorsed CAR and RAP	Detailed Design Consultant Project Proponent / Detailed Design Consultant	site (SRC-1) Potentially contaminated site (SRC-1)	phase Prior to the construction phase	Ditto	identified. Not required as no contamination is identified.
Ecology (Construction Phase)							
S9.7.2.3	Preparation and submission of Upland Grassland Reinstatement Plan to EPD for agreement.	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. A contingency plan	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 	Implemented *Upland Grassland Reinstatement Plan was submitted to EPD.

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	Implementation status and remark*
		<p>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>					
<p>S9.7.2.5 – S9.7.2.6</p>	<p>Preparation and submission of a Vegetation Survey Report and Transplantation Proposal (if needed as concluded in the Vegetation Survey Report) to EPD for agreement.</p>	<p>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, and evaluate suitability and/or practicality of transplantation.</p> <p>The Transplantation Proposal will recommend locations of the receptor site(s), transplantation methodology, implementation programme of transplantation and post-transplantation monitoring</p>	<p>Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Vegetation Survey Report and Transplantation Proposal.</p>	<p>Within the Project Area where applicable</p>	<p>Prior to construction phase</p>	<ul style="list-style-type: none"> Survey findings and transplantation methodology to be detailed in Vegetation Survey Report and Transplantation Plan respectively. TM-EIAO. 	<p>Implemented * Vegetation Survey Report and Transplantation Proposals for Contract 1 and Contract 2 were submitted to EPD.</p>

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	Implementation status and remark*
S9.7.5.3 – S9.7.5.5, S9.8.1.6	Preparation and submission of Enhancement Woodland Proposal to EPD for agreement.	and maintenance programme. 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	<ul style="list-style-type: none"> Enhancement planting and establishment requirements to be detailed in Wooded Enhancement Proposal. TM-EIAO 	Implemented *Woodland compensation plan was submitted to EPD.
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). 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.	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	<ul style="list-style-type: none"> ETWB TCW No. 5/2005 TM-EIAO 	Implemented.

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	Implementation status and remark*
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 birdfriendly 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>	<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</p>	Contractor Project Proponent	All construction sites	Prior to commencement and during construction phase	<ul style="list-style-type: none"> • TM-EIAO. 	
.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 	<p>Minimise impacts on hydrological condition and water quality of hillside watercourses and reduce chances of hillfires.</p>	Contractor	All construction sites	Prior to commencement and during construction phase	<ul style="list-style-type: none"> • TM-EIAO. 	<p>Implemented</p> <p>Implemented</p>

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	Implementation status and remark*
	<p>watercourses;</p> <ul style="list-style-type: none"> 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. 						<p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p> <p>Implemented</p>
S.9.7.3.9	<p>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.</p>	<p>Minimise the impacts to breeding birds within the works areas.</p>	Contractor	All construction sites	Prior to site clearance	<ul style="list-style-type: none"> TM-EIAO WAPO 	<p>Implemented during breeding season.</p>
Ecology (Operational Phase)							
S9.7.2	<p>Establishment, maintenance and monitoring of a Upland Grassland Reinstatement Area</p>	<p>Reinstatement of upland grassland and to maintain connectivity in Sandy Ridge.</p>	Project Proponent/ Contractor / Maintenance Authority	<p>Engineered slopes of Crematorium</p> <p>Indicative locations for Grassland Reinstatement should be referred to Figure 9.11 of the EIA Report</p>	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. 	<p>Upland Grassland Reinstatement Area will be implemented by other contract.</p>
S9.7.5.3 – S9.7.5.6	<p>Establishment, maintenance and monitoring of an enhancement woodland</p>	<p>Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and</p>	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	<p>Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort</p>	Operational phase	<ul style="list-style-type: none"> Enhancement planting and establishment requirements to be detailed in Wooded Area Proposal. TM-EIAO. 	

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	Implementation status and remark*
		maintenance programme.		Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report			
S9.7.4.1 – S9.7.4.5	<p><u>Mitigation for Impacts to Water Quality and Hydrology (Operational Phase)</u></p> <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. 	<p>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 proposed platform. 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. The proposed small diameter bore pile system at the foundation of the</p>	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 	Implemented before Operational phase

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	Implementation status and remark*
		proposed platform structure would allow a notional free area of about 87 – 91% for groundwater to pass through.					
S9.7.4.6	Minimise the potential indirect light disturbance on the Street Lighting on fireflies surrounding the Project Site during operational phase	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	Implemented before Operational phase
S9.7.4.7	<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.						
S9.7.4.9	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.	Minimise the risk of hill fires.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO	Implemented before Operational phase
S9.7.4.9	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.						
Fisheries							
S10.5.1.1	No loss of fish ponds is anticipated and no <i>in situ</i> mitigation is required. 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.	-	-	-	-	-	Not applicable
Landscape & Visual							
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	-	Implemented.

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	Implementation status and remark*
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	-	Implemented.
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	-	Implemented.
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	-	Implemented.
11.8.1.3, 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 	Implemented.
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 	Implemented.

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	Implementation status and remark*
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	(GLTM) Section, DevB <ul style="list-style-type: none"> • Latest recommended horticultural practices from GLTM Section, DevB • ETWB TCW No. 5/2005 – Protection of natural streams/rivers from adverse impacts arising from construction works 	Implemented.
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 	Implemented
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 – 	Implemented

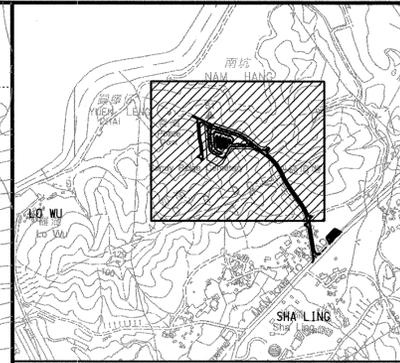
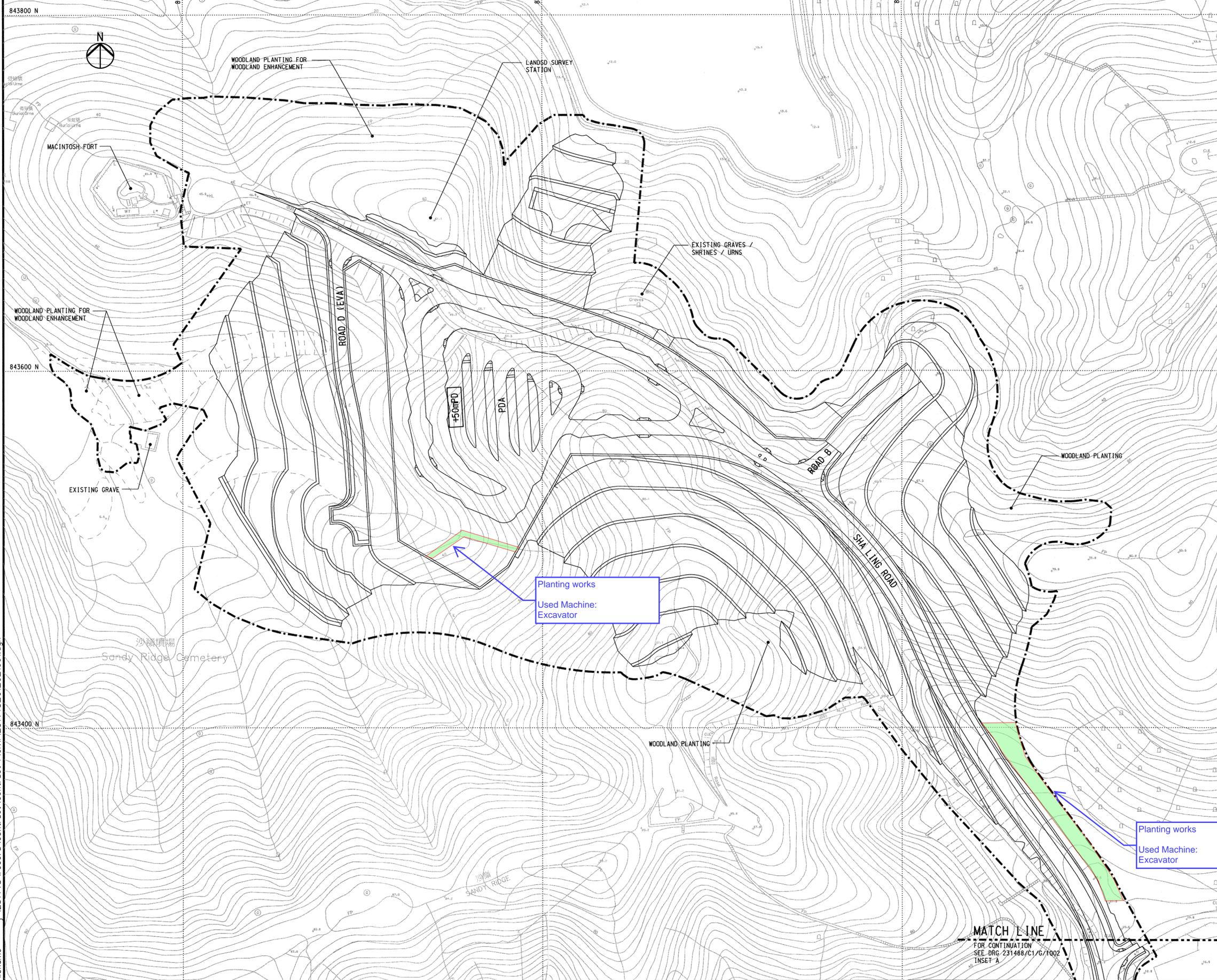
EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved	Implementation status and remark*
S11.8.1.3, Table 11.9	OM3 – Amenity Planting and aesthetic 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 	Implemented
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	<ul style="list-style-type: none"> Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes. 	Implemented
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	-	Implemented 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	-	Implemented 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 	Implemented

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	Implementation status and remark*
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	system.	Implemented
<p>Notes:</p> <p>(a) A detailed Tree Survey Report showing all identified valuable trees and OVT will be undertaken in a separate Tree Preservation and Removal Proposal.</p> <p>(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.</p> <p>(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</p> <p>(d) Highways Department (HyD) is responsible for maintenance and management of landscaping of public road side slope, Leisure and Cultural Services Department (LCS D) 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 management of landscaping of other areas allocated to FEHD..</p> <p>(e) The landscape mitigation treatment of the future development site shall follow the below frameworks:</p> <ul style="list-style-type: none"> - 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. 							
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	Implementation status and remark*
<p>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.</p>							
EM&A Project							
S13.1.1.1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control Performance	Highways Department	All construction sites	Construction phase	• EIAO Guidance Note No.4/2010 • TM-EIAO	Implemented
S13.2.1.1	1) An Environmental Team needs to be employed as per the EM&A Manual.	Perform environmental monitoring & auditing	Highways Department / Contractor	All construction sites	Construction phase	• EIAO Guidance Note No.4/2010 • TM-EIAO	Implemented
S13.4.1.2	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.						

Appendix P

Illustrations of Site Activities

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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)

231448/C1/G/1001 Rev. -

Drawn WM	Date 12/16	Checked AW	Approved DL
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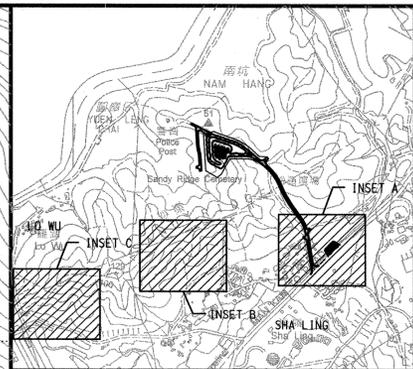
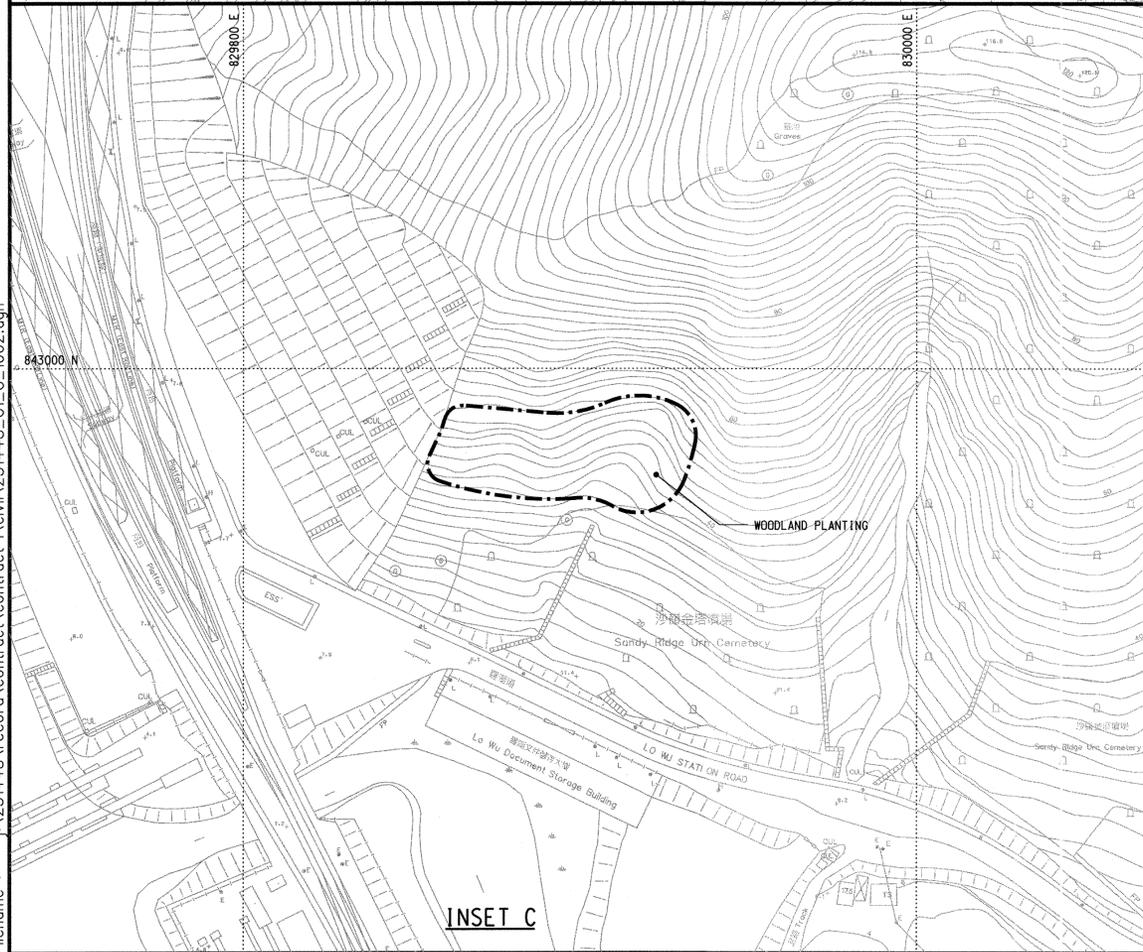
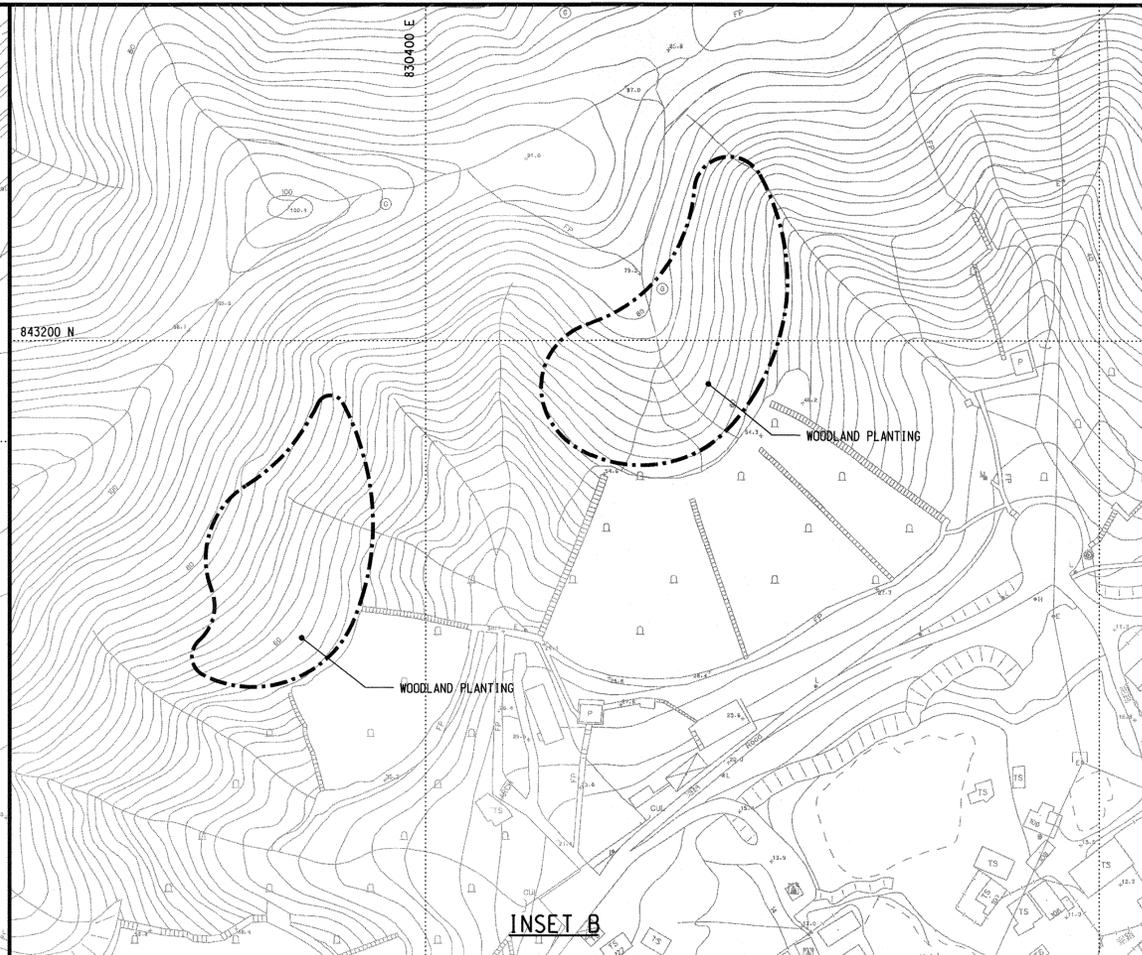
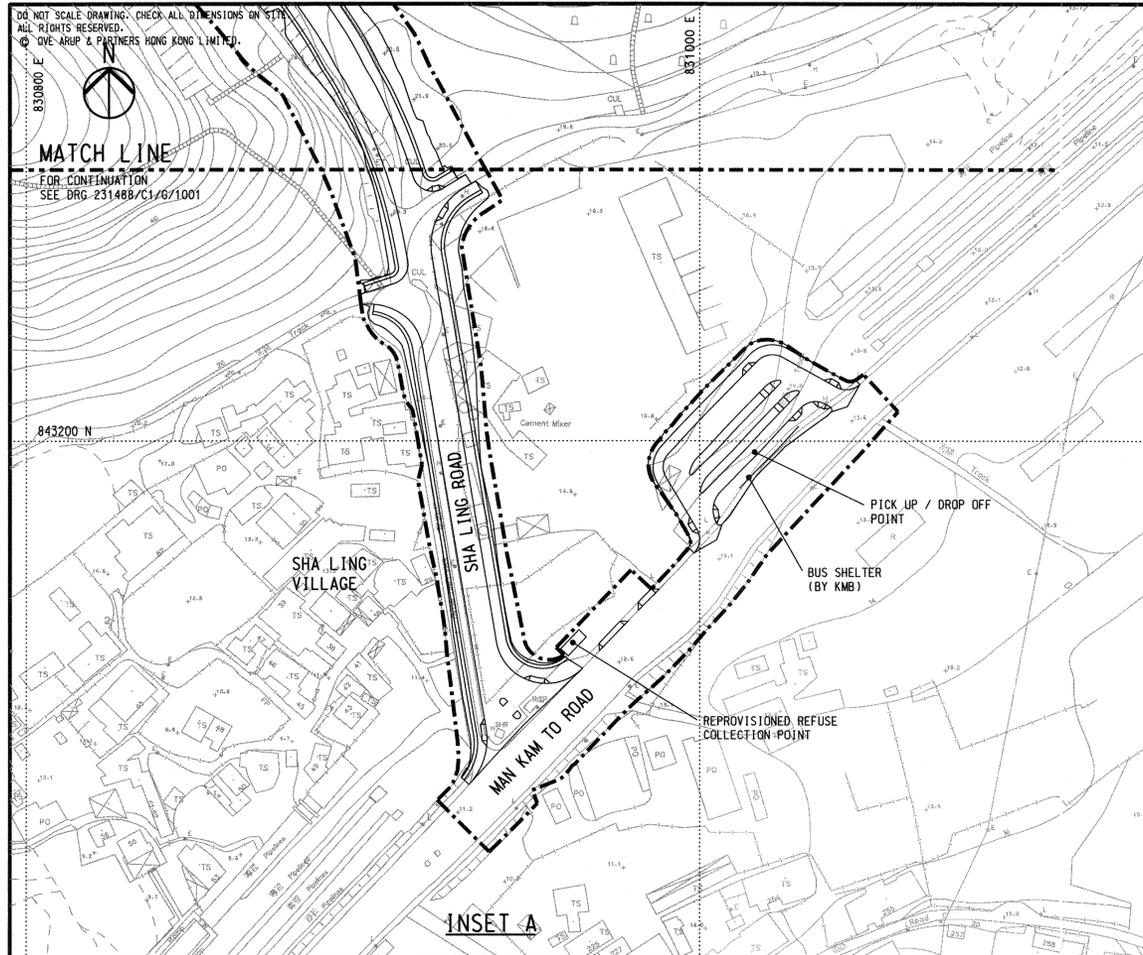
CEDD 土木工程拓展署
 Civil Engineering and Development Department

Planting works
 Used Machine:
 Excavator

Planting works
 Used Machine:
 Excavator

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



KEY PLAN

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. -	
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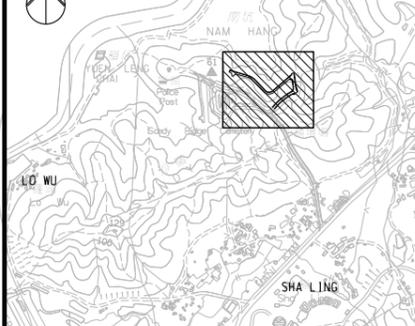
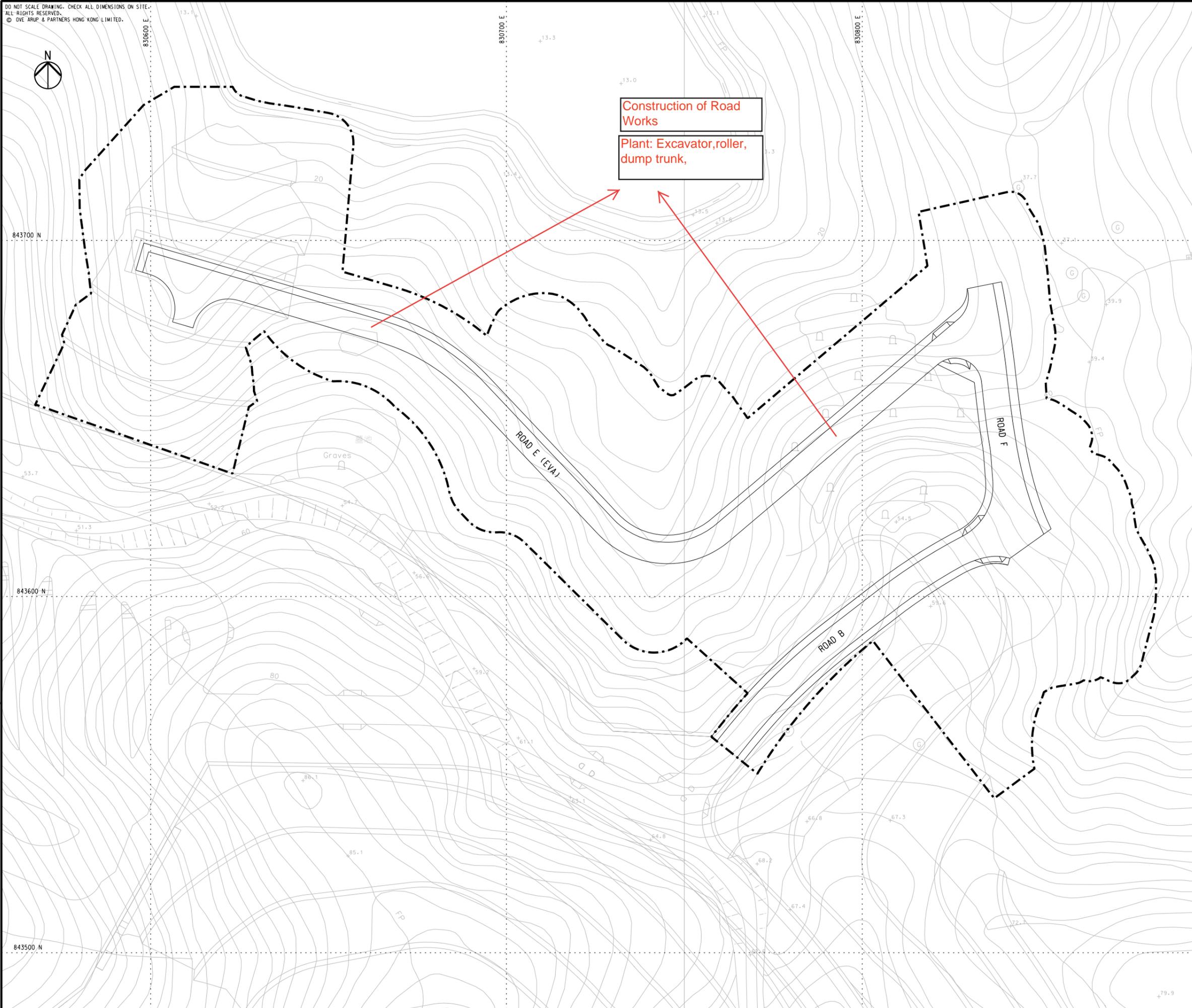
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 Civil Engineering and Development Department

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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 1 OF 5)**

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844400 N



831800 E

832000 E

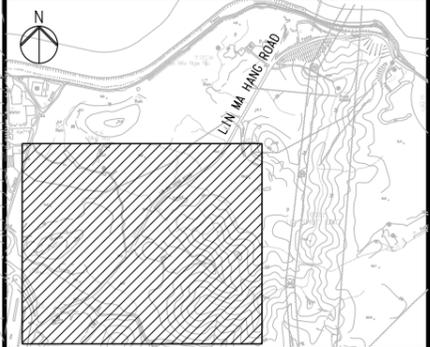
832200 E

844200 N

844000 N

Construction of footpath
 Plant: Excavator, dump truck,

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 DRG. 231448/C2/G/104



KEY PLAN

NOTE:

- PART(S) OF THE SITE WHICH IS/ARE LOCATED IN THE PUBLIC ROADS AND FOOTPATH SHALL ONLY BE OCCUPIED BY THE CONTRACTOR FOR THE EXECUTION OF THE WORKS WITH PRIOR APPROVAL FROM RELEVANT GOVERNMENT AUTHORITIES INCLUDING ACQUIRING EXCAVATION PERMITS ISSUED BY THE HIGHWAYS DEPARTMENT. THE CONTRACTOR SHALL BE RESPONSIBLE TO ACQUIRE APPROVAL OF HIS TEMPORARY TRAFFIC ARRANGEMENT SCHEMES AND ALL NECESSARY EXCAVATION PERMITS FROM RELEVANT AUTHORITIES.
- THE DEMARCATION AND EXTENT OF THE PART(S) OF THE SITE AS SHOWN ARE APPROXIMATE ONLY AND SHALL BE CONFIRMED ON SITE BY THE PROJECT MANAGER / SUPERVISOR.

LEGEND:

- PART A1
- PART A2
- PART A3
- PART A4
- PART B
- PART C1
- PART C2
- PART D
- PART E

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
**PART OF THE SITE
 (SHEET 3 OF 5)**

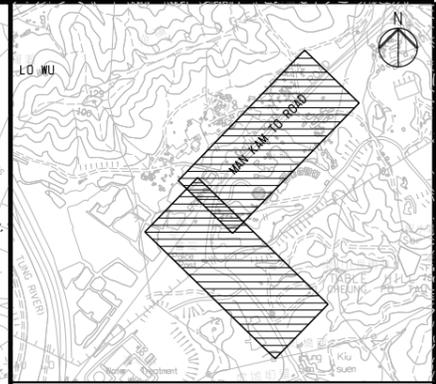
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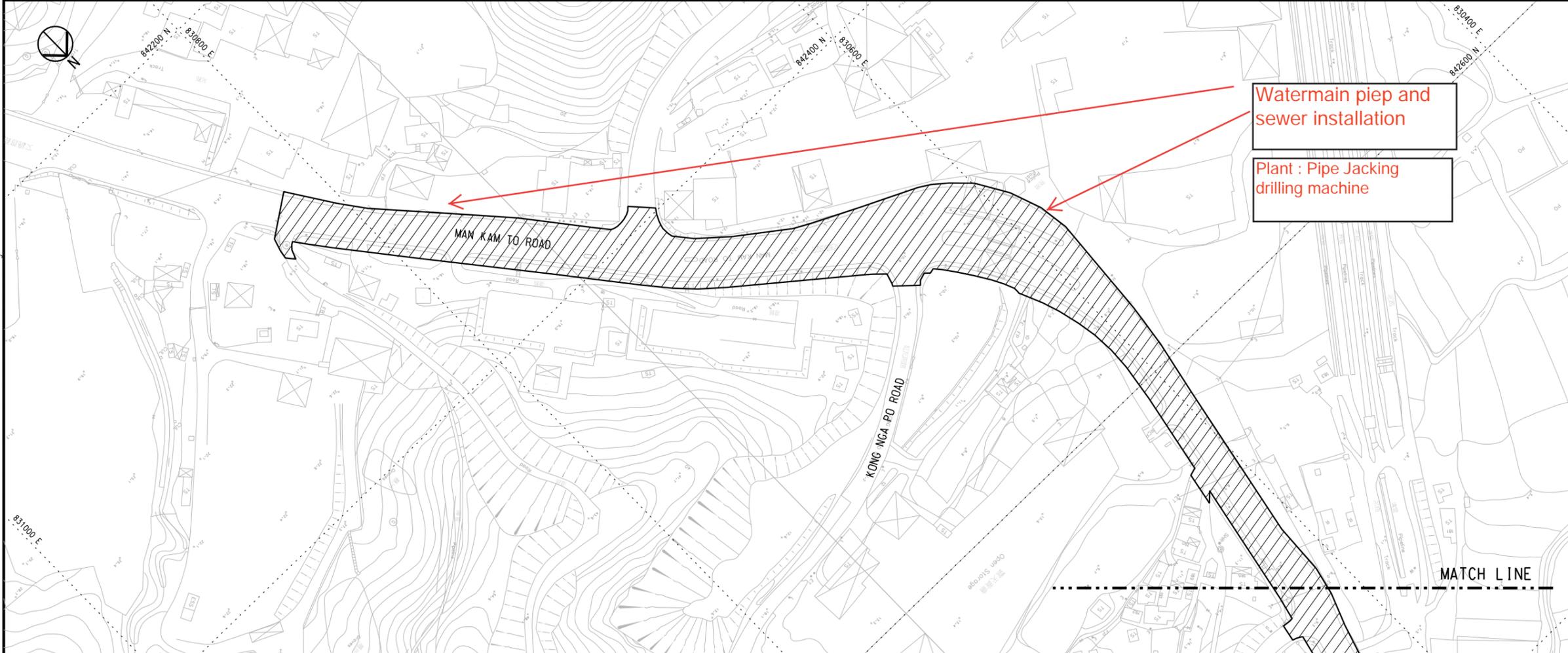


KEY PLAN

- NOTE:**
- PART(S) OF THE SITE WHICH IS/ARE LOCATED IN THE PUBLIC ROADS AND FOOTPATH SHALL ONLY BE OCCUPIED BY THE CONTRACTOR FOR THE EXECUTION OF THE WORKS WITH PRIOR APPROVAL FROM RELEVANT GOVERNMENT AUTHORITIES INCLUDING ACQUIRING EXCAVATION PERMITS ISSUED BY THE HIGHWAYS DEPARTMENT. THE CONTRACTOR SHALL BE RESPONSIBLE TO ACQUIRE APPROVAL OF HIS TEMPORARY TRAFFIC ARRANGEMENT SCHEMES AND ALL NECESSARY EXCAVATION PERMITS FROM RELEVANT AUTHORITIES.
 - THE DEMARCATION AND EXTENT OF THE PART(S) OF THE SITE AS SHOWN ARE APPROXIMATE ONLY AND SHALL BE CONFIRMED ON SITE BY THE PROJECT MANAGER / SUPERVISOR.

LEGEND:

	PART A1
	PART A2
	PART A3
	PART A4
	PART B
	PART C1
	PART C2
	PART D
	PART E



Watermain piep and sewer installation
 Plant : Pipe Jacking drilling machine

-	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
PART OF THE SITE (SHEET 2 OF 5)

Drawing no. 231448/C2/G/1012		Rev. -	
Drawn WM	Date 07/17	Checked AW	Approved DL
Scale 1:1000 @A1		Status TENDER	

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土木工程拓展署
 Civil Engineering and Development Department

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