



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.33) – APRIL 2021**

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

Date	Reference No.	Prepared By	Certified By
14 May 2021	TCS00881/18/600/R0540v2		
		Nicola Hon (Environmental Consultant)	Tam Tak Wing (Environmental Team Leader)

Version	Date	Remarks
1	11 May 2021	First Submission
2	14 May 2021	Amended according to the IEC's comment

Our Ref: TCS00881/18/300/L0541

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

Attn: Mr. SHUM Ngai Hung, Steven

14 May 2021
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.33) –April 2021**

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

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

Yours sincerely,
For and on Behalf of
Action-United Environmental Services & Consulting (AUES)



T. W. Tam
Environmental Team Leader
TW/nh

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



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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

14 May 2021

Dear Sir,

Site formation and Associated Infrastructural Works for Development of Columbarium at Sandy Ridge Cemetery
Monthly Environmental Monitoring and Audit Report (No. 33) April 2021

I refer to the email of the ET dated on 14/05/2021 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 2021 with Ref. No. TCS00881/18/600/R0540v2.

You are required to follow up the comments from EPD and IEC on the relevant EPs requirement and reports for our further review as soon as possible.

Yours faithfully,

CH Leung

Leung CH Jacky
Independent Environmental Checker

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

EXECUTIVE SUMMARY

ES.01. This is the **33rd** 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 2021** (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	18
Construction Noise	L _{eq} (30min) Daytime	CN-1 CN-2	CN-3 CN-4	16
Water Quality	In-situ measurement and Water sampling	M3	M1, M2 and M4	11
Ecology	Sensitive Habitat	Transect within site area of CV/2016/10	Transect within site area of CV/2017/02	8 th Apr 21
Landscape & Visual	Site Inspection	Site area of CV/2016/10	Site area of CV/2017/02	19 th Apr 21
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, noise monitoring and water quality was recorded. The statistics of environmental exceedance, Notification of Exceedance (NOE) issued and investigation of exceedance are summarized in the following table.

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

Environmental Issues	Monitoring Parameters	Action Level	Limit Level	Event & Action	
				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	-	-
	SS	0	0	-	-

Note: NOE – Notification of Exceedance

ES.04. Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on **8th April 2021**. After analysing survey results in April from 2019 to 2021, it is found that the species diversity and abundance in Contract 1 reduced in 2020 but increased this year for wetland habitat. For Contract 2, there was no significant drop for wetland but both species richness and abundance reduced and increased in 2021 for wetland habitats. The reduction could be due to natural fluctuation and initial construction work. Good practice during construction is required to prevent environmental contamination as well as unnecessary site clearance. Continuous monitoring is also recommended to inspect any significant decrease in species diversity. Besides, as advised by

both Contractors, there were no vegetation clearance conducted within the site in the Reporting Month and therefore precautionary check for the presence of nesting birds was not required.

- ES.05. Landscape and visual inspection at both Contracts were undertaken on **19th April 2021**. 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.06. In this Reporting Period, one environmental complaint was received under the EM&A programme regarding the dust nuisance arising from the construction site on Sandy Ridge. Investigation was conducted by IEC and ET and investigation result revealed that complaint is unlikely valid to the Project. The statistics of environmental complaint are summarized in the following table.

Table ES-3 Environmental Complaint Summaries in the Reporting Month

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 30 April 2021	Contract 1	1	1	Air Quality
	Contract 2	1	2	Air Quality

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

- ES.07. 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 – 30 April 2021	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 – 30 April 2021	Contract 1	0	0	NA
	Contract 2	0	0	NA

- ES.08. In addition, no complaint and emergency event relating to violation of environmental legislation for illegal dumping and landfilling was received.

REPORTING CHANGE

- ES.09. No reporting change was made in the Reporting Month.

SITE INSPECTION

- ES.010. 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 **8th, 15th, 22nd and 29th April 2021**. Moreover, joint site inspections for Contract 2 by the RE, ET and the Contractor of Contract 2 were carried out on **8th, 15th, 22nd and 29th April 2021**. IEC attended the both Contract joint site inspection on **22nd April 2021**. No non-compliance was noted during the site inspections.

FUTURE KEY ISSUES

- ES.011. 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.
- ES.012. During wet season, 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.

- ES.013. Construction noise mitigation measures such as use of movable noise barriers and Quality Powered Mechanical Equipment should be properly provided to reduce construction noise impact, where appropriate.
- ES.014. The Contractors should properly maintain the cleanliness and tidiness of the site. In addition, mosquito control should be performed to prevent mosquito breeding on site.

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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 the following:

A Designated Works under EP-534/2017/A

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

Non-Designated Works

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

- 1.1.2 To facilitate the Project management, the Project works were separated into three 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 **33rd** Monthly EM&A Report summarizing the monitoring results and inspection findings for the period from **1st** to **30th April 2021**.

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	<i>Environmental Complaints and Non-Compliance</i>
Section 12	<i>Implementation Status of Mitigation Measures</i>
Section 13	<i>Conclusions and Recommendation</i>

2. PROJECT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONSTRUCTION CONTRACT PACKAGING

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

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

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

2.2 CONSTRUCTION PROGRESS

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

Contract 1 (CV/2016/10)

- General site housekeeping
- Bulk excavation
- Construction of cut slope, installation of soil nailing and construction of surface channel and planter wall
- Construction of fill slope and surface channel
- Construction of pick-up and drop-off Point near Man Kam To Road
- Construction of storm/ sewer drain
- Laying of street lighting ducts
- Laying of watermain

Contract 2 (CV/2017/02)

- Construction of Manhole, gullies, drainage pipe at Lin Ma Hang Road between CH50-160 Northbound & CH780-890 Northbound & CH1345-1377 Northbound.
- Man Kam To Road DN800 DI Sewerage Pipe 4.23-4.28 reinstatement works
- Man Kam To Road DN400 DI Watermain CH510-690 reinstatement works at North Fast Lane
- Construction of Manhole, gullies, drainage pipe at Sandy Ridge Road E CH180-300 (~120m)
- Construction of Manhole, gullies, drainage pipe at Sandy Ridge Road F CH690-730 (~40m)
- Backfilling of Retaining Wall 12.
- Fanling Station Road Covered Walkway

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 14/12/2018	Sa Ling Road (Sandy Ridge Cemetery)	Valid
		Ref. no. 440401 Acknowledged by EPD on 14/12/2018	Lin Ma Hang Road (San Uk Ling – Muk Wu Nga Yiu)	Valid
		Ref. no. 440402 Acknowledged by EPD on 14/12/2018	Lung Sum Avenue (near Landmark North)	Valid
2	Chemical waste Producer Registration	WPN: 5213-641-S4151-01 Issued by EPD on 04/02/2019		Valid
3	Water Pollution Control Ordinance	License no: WT00032936-2018 Issued date: 16/01/2019 Expire Date: 31/01/2024	Man Kam To Road & Lin Ma Hang Road, Man Kam To	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	Approved by EPD on 22 Oct

Item	EP and / or FEP Stipulation	Description	Status
		Golden-headed Cisticola for Contract 1 (Rev.02)	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
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	Pending approval
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	Pending approval
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	Pending approval
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:
- Be at the site boundary or such locations close to the major dust emission source;
 - Close to the sensitive receptors;
 - Take into account the prevailing meteorological conditions;
 - For monitoring location located in the vicinity of the ASRs, care shall be taken to cause minimal disturbance to the occupants during monitoring.
 - When positioning the HVS, the following points shall be noted:
 - a horizontal platform with appropriate support to secure the samples against gusty wind shall be provided;
 - no two samplers shall be placed less than 2m apart;
 - 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;
 - a minimum of 2 m separation from walls, parapets and penthouses is required for HVS at the rooftop;
 - a minimum of 2 m separation from any supporting structure, measures horizontally is required;
 - no furnace or incinerator flue is nearby;
 - airflow around the sampler is unrestricted;
 - the HVS is more than 20 m from the dripline;
 - any wire fence and gate to protect the HVS, shall not cause any obstruction during monitoring;
 - permission must be obtained to set up the HVS and to obtain access to the monitoring stations; and
 - 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	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
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/ YSI 550A
pH meter	AZ8685 pH meter / YSI Professional DSS

Equipment	Model
Turbidimeter	Hach 2100Q/ YSI Professional DSS
Salinometer	Atago refractometer Atago S Salinity Meter / 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
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 ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
1-Apr-21	46	1-Apr-21	9:11	83	76	70
7-Apr-21	95	7-Apr-21	9:27	53	57	51
12-Apr-21	70	13-Apr-21	9:48	81	76	75
17-Apr-21	94	19-Apr-21	9:13	106	118	113
23-Apr-21	122	24-Apr-21	9:25	74	83	80
29-Apr-21	33	30-Apr-21	13:00	84	76	82
Average (Range)	77 (33 – 122)	Average (Range)		80 (51 – 118)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
1-Apr-21	19	1-Apr-21	9:14	77	84	70
7-Apr-21	26	7-Apr-21	9:33	44	52	47
12-Apr-21	24	13-Apr-21	9:53	76	74	73
17-Apr-21	40	19-Apr-21	9:19	91	97	94
23-Apr-21	50	24-Apr-21	9:17	88	76	70
29-Apr-21	88	30-Apr-21	13:08	76	83	88
Average (Range)	41 (19 – 88)	Average (Range)		76 (44 – 97)		

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

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	1-hour TSP ($\mu\text{g}/\text{m}^3$)				
		Date	Start Time	1 st hour measured	2 nd hour measured	3 rd hour measured
1-Apr-21	23	1-Apr-21	9:21	76	77	68
7-Apr-21	21	7-Apr-21	9:38	46	48	44
12-Apr-21	20	13-Apr-21	10:03	78	75	74
17-Apr-21	35	19-Apr-21	9:24	87	93	89
23-Apr-21	48	24-Apr-21	9:09	83	75	68
29-Apr-21	18	30-Apr-21	13:15	74	81	79
Average (Range)	27 (18 – 48)	Average (Range)		73 (44 – 93)		

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(*)
7-Apr-21	9:07	70	9:45	67
13-Apr-21	13:00	72	13:41	66
19-Apr-21	14:34	65	15:11	65
30-Apr-21	13:08	71	13:48	67
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
7-Apr-21	10:22	64	11:14	57
13-Apr-21	14:20	61	15:08	63
19-Apr-21	15:52	60	16:29	57
30-Apr-21	14:28	61	15:09	56
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 Limit Level exceedance for noise monitoring exceedance was recorded in the Reporting Month. Moreover, no noise complaint (which triggered Action Level) was received. No Notification of Exceedance (NOE) of construction noise criterion was issued and no corrective action was therefore required.

6. WATER QUALITY

6.1 MONITORING RESULTS

- 6.1.1 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 **11** 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)
7-Apr-21	6.70	1.3	3.5
9-Apr-21	6.27	1.9	2.5
12-Apr-21	6.16	1.9	2.0
14-Apr-21	8.04	1.3	4.5
16-Apr-21	8.03	1.6	3.5
19-Apr-21	8.34	1.2	4.0
21-Apr-21	7.27	2.5	3.5
23-Apr-21	5.60	2.1	2.0
26-Apr-21	6.58	1.8	2.5
28-Apr-21	7.39	1.7	3.5
30-Apr-21	7.14	1.8	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
7-Apr-21	5.24	#	8.11	5.0	#	4.2	4.5	#	3.5
9-Apr-21	6.29	#	6.28	2.6	#	1.4	4.5	#	<2
12-Apr-21	6.26	#	6.20	2.0	#	1.4	6.5	#	2.5
14-Apr-21	7.05	#	8.15	2.0	#	1.2	8.0	#	3.5
16-Apr-21	7.44	#	8.19	3.0	#	0.5	6.0	#	3.0
19-Apr-21	6.96	#	8.44	2.5	#	1.0	8.0	#	2.5
21-Apr-21	6.30	#	7.86	2.1	#	1.5	7.0	#	<2
23-Apr-21	5.72	#	5.89	2.5	#	1.1	3.5	#	<2
26-Apr-21	6.39	#	7.13	2.7	#	1.8	5.5	#	<2
28-Apr-21	7.48	#	7.45	6.2	#	1.5	6.0	#	2.5
30-Apr-21	7.51	#	7.76	1.9	#	1.3	7.0	#	<2

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

Note: **Bold and underlined value indicated Limit Level exceedance**
Italic and bold value indicated Action Level exceedance.

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

Table 6-3 Summary of Field Measurements for Water Quality

Monitoring Location	Parameters of field measurements							
	pH (Averaged) (unit)		Salinity (Averaged) (ppt)		Temp (Averaged) (°C)		Water Flow (Averaged) (m/s)	
	min	max	min	max	min	max	min	max
M1	6.6	9.4	0.05	0.11	19.8	27.9	<0.1	<0.1
M2	#	#	#	#	#	#	#	#
M3	6.8	9.0	0.02	0.04	20.9	28.4	<0.1	<0.1
M4	6.6	8.7	0.06	0.1	20.5	28.5	<0.1	<0.1

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

6.2 WATER QUALITY MONITORING EXCEEDANCE

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

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

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

- 6.2.2 Notification of Exceedance (NOE) 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 **8th April 2021** at work area of Contract 1. A sunny day. The day survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen will be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 1

Mammal

- 7.3.2 There was no mammal recorded in the monitoring area

Birds

- 7.3.3 There were a total of 30 bird individuals from 18 species recorded in the monitoring area. Five species of conservation interests were recorded in the monitoring area: *Ardeola bacchus*, Chinese Pond Heron 池鷺, *Milvus migrans*, Black Kite 黑鳶, *Buteo japonicus* Eastern Buzzard 普通鵟, *Centropus bengalensis* Lesser Coucal 小鴉鵂, and *Otus lettia* Collared Scops Owl 領角鴞. Golden-headed Cisticola was not observed during the bird survey.

Herpetofauna

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

Butterfly

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

Dragonfly

- 7.3.6 There was a total of one odonate individuals from one species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

- 7.3.7 There was no freshwater community recorded in the monitoring area.

- 7.3.8 The summaries of faunal survey result are shown in **Tables 7-4 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
Mammal Survey					
--	--	--	--	--	--
Avifauna Survey					
<i>Francolinus pintadeanus</i>	Chinese Francolin	中華鷓鴣		1	
<i>Ardeola bacchus</i>	Chinese Pond Heron	池鷺	Fellowes et al. (2002): PRC,(RC)	1	
<i>Milvus migrans</i>	Black Kite	黑鳶	Fellowes et al. (2002): RC; Appendix 2 of CITES	1	
<i>Buteo japonicus</i>	Eastern Buzzard	普通鵟	Appendix 2 of CITES	1	
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	白胸苦惡鳥			1
<i>Centropus bengalensis</i>	Lesser Coucal	小鴉鵂	Class 2 Protected Animal of China;China Red Data Book Status: (Vulnerable)		3
<i>Otus lettia</i>	Collared Scops Owl	領角鴞	Class 2 Protected Animal of China; Appendix 2 of CITES		1
<i>Caprimulgus affinis</i>	Savanna Nightjar	林夜鷹			1
<i>Dicrurus hottentottus</i>	Hair-crested Drongo	髮冠卷尾			1
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鵲		4	
<i>Pycnonotus aurigaster</i>	Sooty-headed Bulbul	白喉紅臀鵲			3
<i>Hirundo rustica</i>	Barn Swallow	家燕		3	
<i>Phylloscopus fuscatus</i>	Dusky Warbler	褐柳鶯			1
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯		1	
<i>Prinia inornata</i>	Plain Prinia	純色鷦鶯			2
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯		1	
<i>Acridotheres cristatellus</i>	Crested Myna	八哥			2
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領棕鳥			2
Reptile Survey					
--	--	--	--	--	--
Amphibian Survey					

Scientific Name	Common / Engineer Name	Chinese Name	Conservation Status	Non-wetland	Wetland
<i>Bufo melanostictus</i>	Asian Common Toad	黑眶蟾蜍			+
<i>Fejervarya limnocharis</i>	Paddy Frog	澤蛙			+
Butterfly Survey					
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶			1
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶			1
Odonate Survey					
<i>Pseudocoptera ciliata</i>	Black-kneed Featherlegs	白狹扇蟋			1

+ Species counted by vocal identification

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

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Apr-21	
				Non-wetland	Wetland
--	--	--	--	--	--

Discussion

- 7.3.9 After analysing survey results in April from 2019 to 2021, it is found that the species diversity and abundance reduced in 2020 but increased this year for wetland habitat. The reduction could be due to natural fluctuation and initial construction work. Good practice during construction is required to prevent environmental contamination as well as unnecessary site clearance. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.

7.4 ECOLOGICAL MONITORING SURVEY FINDINGS (CONTRACT 2)

- 7.4.1 In the Reporting Month, ecological monitoring was undertaken on **8th April 2021** at work area of Contract 2. A sunny day. The day survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen will be identified and counted as accurately as possible. Results of the monitoring survey are presented below:

Monitoring Result for Contract 2

Mammal

- 7.4.2 There was no mammal recorded in the monitoring area

Birds

- 7.4.3 There were total of 16 bird individuals from 8 species recorded in the monitoring area. Golden-headed Cisticola was not observed during the bird survey.

Herpetofauna

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

Butterfly

- 7.4.5 There was total 9 butterfly individuals from 6 species recorded in the monitoring area.

Dragonfly

- 7.4.6 There were 10 odonate individuals from 2 species recorded in the monitoring area.

Aquatic Fauna Survey (Freshwater communities)

- 7.4.7 There were two species of freshwater fish were recorded in the monitoring area.

- 7.4.8 The summaries of faunal survey result are shown in **Tables 7-6** 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
Mammal Survey					
--	--	--	--	--	--
Avifauna Survey					
<i>Eudynamis scolopaceus</i>	Asian Koel	噪鵲		1	
<i>Parus cinereus</i>	Cinereous Tit	蒼背山雀		2	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鵲			2
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鷯			2
<i>Prinia inornata</i>	Plain Prinia	純色鷦鷯			2
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鷦		2	
<i>Garrulax perspicillatus</i>	Masked Laughingthrush	黑臉噪鵲		4	
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領棕鳥			1
Reptile Survey					
--	--	--	--	--	--
Amphibian Survey					
--	--	--	--	--	--
Butterfly Survey					
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛺蝶		2	
<i>Mycalesis mineus</i>	Dark Brand Bush Brown	小眉眼蝶		1	
<i>Papilio memnon</i>	Great Mormon	美鳳蝶		1	
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶		2	
<i>Pieris canidia</i>	Indian Cabbage White	東方菜粉蝶		1	
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶		2	
Odonate Survey					
<i>Trithemis aurora</i>	Crimson Dropwing	曉褐蜻			1
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原螳			9

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

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Apr-2021
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚		+
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮		+

+: Species appeared but uncountable.

Discussion

7.4.9 After analysing survey results in April 2019 to 2021, there was no significant drop for wetland but both species richness and abundance reduced and increased in 2021 for wetland habitats. This could be because of natural fluctuation as well as disturbance from construction work. A good practice during construction is required to prevent environmental contamination as well as unnecessary site clearance. Moreover, continuous monitoring is required to inspect any significant reduction of species diversity.

7.4.10 The detailed Ecological Survey Reports for Contract 1 and Contract 2 are attached in **Appendix K**.

7.4.11 The tentative ecology inspection and monitoring in the next Reporting Month (May 2021) is scheduled on **14th May 2021**.

7.5 MONITORING OF FLORA SPECIES OF CONSERVATION INTEREST

- 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 As advised by both Contractors, there were no vegetation clearance conducted within the site in the Reporting Month and therefore precautionary check for the presence of nesting birds was not required.

8. LANDSCAPE AND VISUAL

8.1 REQUIREMENT

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

8.2 FINDINGS / DEFICIENCIES DURING SITE INSPECTION IN THE REPORTING MONTH

- 8.2.1 In the Reporting Month, landscape & Visual inspection was carried out by the Registered Landscape Architect (RLA) for works area of Contract 1 and Contract 2 on **19th April 2021**. 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
19 th April 2021	1. The Contractor is reminded to set up TPZ of proper size and with appropriate material around retain trees according to approved method statement.	• Reminder 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 trees T2465, T2468 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.	• Reminder only

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

Date	Findings and Reminder	Follow-Up Status
19 th April 2021	1. Some TPZ were found missing and construction works with heavy machinery near retained trees were observed.	• TPZ was reinstalled for the retained trees of concerned area. Moreover, the Contractor advised that construction work near the retained trees was completed and no heavy machinery was observed in subsequent ET's inspection.
	2. The Contractor is reminded to set up TPZ of proper size and with appropriate	• Reminder only

Date	Findings and Reminder	Follow-Up Status
	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.	

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)	4.101	--	1467.27 (#)	--
Reused in this Contract (Inert) ('000m ³)	0.615	Within Contract area	0	--
Reused in other Projects (Inert) ('000m ³)	1.762	--	0	--
Disposal as Public Fill (Inert) ('000m ³)	3.681	Tuen Mun Area 38	1467.27 (#)	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)	0.073	NENT Landfill	27.7 (#)	NENT Landfill

Remark: the unit is '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 *8th, 15th, 22nd and 29th April 2021* and IEC attended joint site inspection on *22nd April 2021*. No non-compliance was noted.
- 10.2.2 The findings / deficiencies that observed during the weekly site inspection are listed in *Table 10-1*.

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

Date	Findings / Deficiencies	Follow-Up Status
8 th April 2021	<ul style="list-style-type: none"> The Contractor was reminded to cover open cement bags properly at PDA. 	<ul style="list-style-type: none"> Reminder only.
15 th April 2021	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
22 nd April 2021	<ul style="list-style-type: none"> Chemical container on the ground should be placed inside drip tray. Muddy surface run-off and muddy materials should be cleared as soon as possible at site entrance. The Contractor was reminded to cover stockpile properly at PDA 	<ul style="list-style-type: none"> Chemical container on the ground was removed. Muddy surface run-off and material near site entrance was cleaned. Reminder only.
29 th April 2021	<ul style="list-style-type: none"> Open stockpile should be covered with tarpaulin sheet for dust suppression. The Contractor was reminded to provide drip tray for air compressor used within site area 	<ul style="list-style-type: none"> To be followed up. Reminder only.

Contract 2

- 10.2.3 In the Reporting Month, joint site inspections for Contract 2 to evaluate the site environmental performance carried out by the RE, ET and the Contractor was on *8th, 15th, 22nd and 29th April 2021* and IEC attended joint site inspection on *22nd April 2021* non-compliance was noted.
- 10.2.4 The findings / deficiencies that observed during the weekly site inspection are listed in *Table 10-2*.

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

Date	Findings / Deficiencies	Follow-Up Status
22 nd April 2021	<ul style="list-style-type: none"> The Contractor was reminded to dispose general refuse regularly at RW 12. 	<ul style="list-style-type: none"> Reminder only.
15 th April 2021	<ul style="list-style-type: none"> No adverse environmental issue was observed. 	<ul style="list-style-type: none"> NA
22 nd April 2021	<ul style="list-style-type: none"> Oil stains were observed on the ground at Jacking Pit. The Contractor was advised to clean it as soon as possible. The Contractor was reminded to spray water regularly at exposed work area. 	<ul style="list-style-type: none"> Oil stains were cleaned and disposed as chemical waste. Reminder only.
29 th April 2021	<ul style="list-style-type: none"> The Contractor should clean the stagnant water inside drip tray underneath generator and dispose as chemical waste at Jacking Pit. 	<ul style="list-style-type: none"> To be followed up.

11. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

11.1.1 In the Reporting Month, one environmental complaint was received from EPD regarding the dust nuisance arising from the construction site on Sandy Ridge. The status of the investigation report in previous months is summarized below.

Date of complaint	Complaint Detail	Investigation Result	Follow up action
15 April 2021	A public complaint was received from EPD regarding the dust nuisance arising from the construction site on Sandy Ridge.	Weekly joint site inspections were carried out by RE, Contractors and ET for the implementation status of mitigation measures and audit the site practice of Contractors. In our investigation, both Contractors have implemented dust mitigation measures to eliminate the dust impact and status of implementation of dust mitigation measures was considered effective based on the site observation. Moreover, it was mostly cloudy and rainy in the first half of April 2021 which is typical wet season in Hong Kong, the dust impact is alleviated when compared to dry season. In addition to the dust mitigation measures implemented provided by the Contractors and potential dust impact generated from other project on Man Kam Road was observed, it is considered that the complaint is unlikely valid to the Project.	The interim Investigation Reports of IEC and ET were submitted to EPD on 22 April 2021. The Contractor was reminded to fully implement the dust mitigation measures as far as practicable. The ET will closely inspect the implementation of mitigation measures during regularly site inspection and give advice on enhancement measures, where necessary.

11.1.2 No summons and prosecution was lodged for the project. The statistical summary table of the environmental complaint, summons and prosecution are presented in [Tables 11-1, 11-2](#) and [11-3](#).

Table 11-1 Statistical Summary of Environmental Complaints

Reporting Month		Environmental Complaint Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 30 April 2021	Contract 1	1	1	Air Quality
1 – 30 April 2021	Contract 2	1	2	Air Quality

Table 11-2 Statistical Summary of Environmental Summons

Reporting Month		Environmental Summons Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 30 April 2021	Contract 1	0	0	NA
1 – 30 April 2021	Contract 2	0	0	NA

Table 11-3 Statistical Summary of Environmental Prosecution

Reporting Month		Environmental Prosecution Statistics		
		Frequency	Cumulative	Complaint Nature
1 – 30 April 2021	Contract 1	0	0	NA
1 – 30 April 2021	Contract 2	0	0	NA

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

Table 12-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Water Quality	<ul style="list-style-type: none"> • Provided efficient silt removal facilities to reduce SS level before effluent discharge. • Provided ditches, earth bunds or sand bag barriers to minimize polluted runoff. • Temporary drainage was provided to prevent runoff going through site surface and minimize polluted runoff. • Provided perimeter cut-off drains at site boundaries to intercept storm runoff from crossing the site. • Exposed slopes surface were compacted and covered with tarpaulin or similar means. • Provided portable chemical toilets on site.
Air Quality	<ul style="list-style-type: none"> • Maintain damp / wet surface on access road. • Maintain low vehicular speed within the works areas. • Provided vehicle wheel washing facilities at each construction site exit; • Provided water spraying for all active works area. • Stockpiles of dusty material were covered with impervious sheeting. • Provided workers to clear dusty materials at the vehicle entrance or exit regularly. • Stockpile more than 20 bags of cement or dry pulverized fuel ash (PFA) has been covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.
Noise	<ul style="list-style-type: none"> • Restricted operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants. • Placed noisy plants away from residence and school. • Provided noise barriers or hoarding to enclose the noisy plants or works. • Shut down the plants when not in used.
Waste and Chemical Management	<ul style="list-style-type: none"> • Provided on-site sorting prior to disposal. • Followed requirements and procedures of the “Trip-ticket System” • Predicted required quantity of concrete accurately. • Collected the unused fresh concrete at designated locations in the sites for subsequent disposal.
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.

12.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

12.2.1 According to the information provided by HCTYJV, the forthcoming construction activities for Contract 1 are listed below:

- General Site Housekeeping
- Bulk Excavation
- Construction of cut slope, installation of soil nailing and construction of surface channel and planter wall.
- Construction of fill slope and surface channel
- Construction of pick-up and drop-off point near Man Kam To Road
- Construction of sewer and storm drain
- Laying of street lighting ducts
- Construction of watermains
- Construction of Refuse Collection Point.

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

- Construction of Manhole, gullies, drainage pipe at Sandy Ridge Road E CH180-300 (~120m).
- Construction of Manhole, gullies, drainage pipe at Sandy Ridge Road F CH690-730 (~40m)
- Retaining Wall 14 backfilling
- Backfilling of Retaining Wall 12
- Soil Nail Works at Lin Ma Hang Road Slope C231 & C224
- Fanling Station Road Covered Walkway
- Lung Sum Avenue road surface modification works

12.3 KEY ISSUES FOR THE COMING MONTH

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

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

12.3.2 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. The implementation of water quality mitigation measures conducted by the Contractors is shown in Appendix O.

12.3.3 During wet season, 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 **33rd** Monthly EM&A Report presenting the monitoring results and inspection findings for the period of **1st to 30th April 2021**.
- 13.1.2 No 24-hour or 1-hour TSP monitoring result that triggered the Action or Limit Levels was recorded. No NOEs or the associated corrective action was therefore required.
- 13.1.3 No noise complaint (which is an Action Level exceedance) was received and no construction noise measurement result that exceeded the Limit Level was recorded in this Reporting Month. No NOEs or the associated corrective actions were therefore issued.
- 13.1.4 For water quality monitoring, no Action Level and Limit Level water quality exceedance was recorded.
- 13.1.1 Monthly ecological monitoring for sensitive habitat for area of Contract 1 and Contract 2 were undertaken on **8th April 2021**. After analysing survey results in April from 2019 to 2021, it is found that the species diversity and abundance in Contract 1 reduced in 2020 but increased this year for wetland habitat. For Contract 2, there was no significant drop for wetland but both species richness and abundance reduced and increased in 2021 for wetland habitats. The reduction could be due to natural fluctuation and initial construction work. Good practice during construction is required to prevent environmental contamination as well as unnecessary site clearance. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.
- 13.1.2 As advised by both Contractors, there were no vegetation clearance conducted within the site in the Reporting Month and therefore precautionary check for the presence of nesting birds was not required.
- 13.1.3 Landscape and visual inspection at both Contracts were undertaken by the RLA on **19th April 2021**. The Contractor was reminded to prevent the construction material pile within TPZ and ensure no works is allowed within the TPZ.
- 13.1.4 In this Reporting Period, one environmental complaint was received under the EM&A programme regarding the dust nuisance arising from the construction site on Sandy Ridge. Investigation was conducted by IEC and ET and investigation result revealed that complaint is unlikely valid to the Project.
- 13.1.5 In the Reporting Month, no summons and prosecution was received. In addition, no complaints received and emergency events relating to violation of environmental legislation for illegal dumping and landfilling were received.
- 13.1.6 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 of the Contract 1 on **8th, 15th, 22nd and 29th April 2021**. Moreover, joint site inspections for Contract 2 by the RE, ET and the Contractor of Contract 2 were carried out on **8th, 15th, 22nd and 29th April 2021**. IEC attended the both Contract joint site inspection on **22nd April 2021**. No non-compliance was noted during the site inspections.

13.2 RECOMMENDATIONS

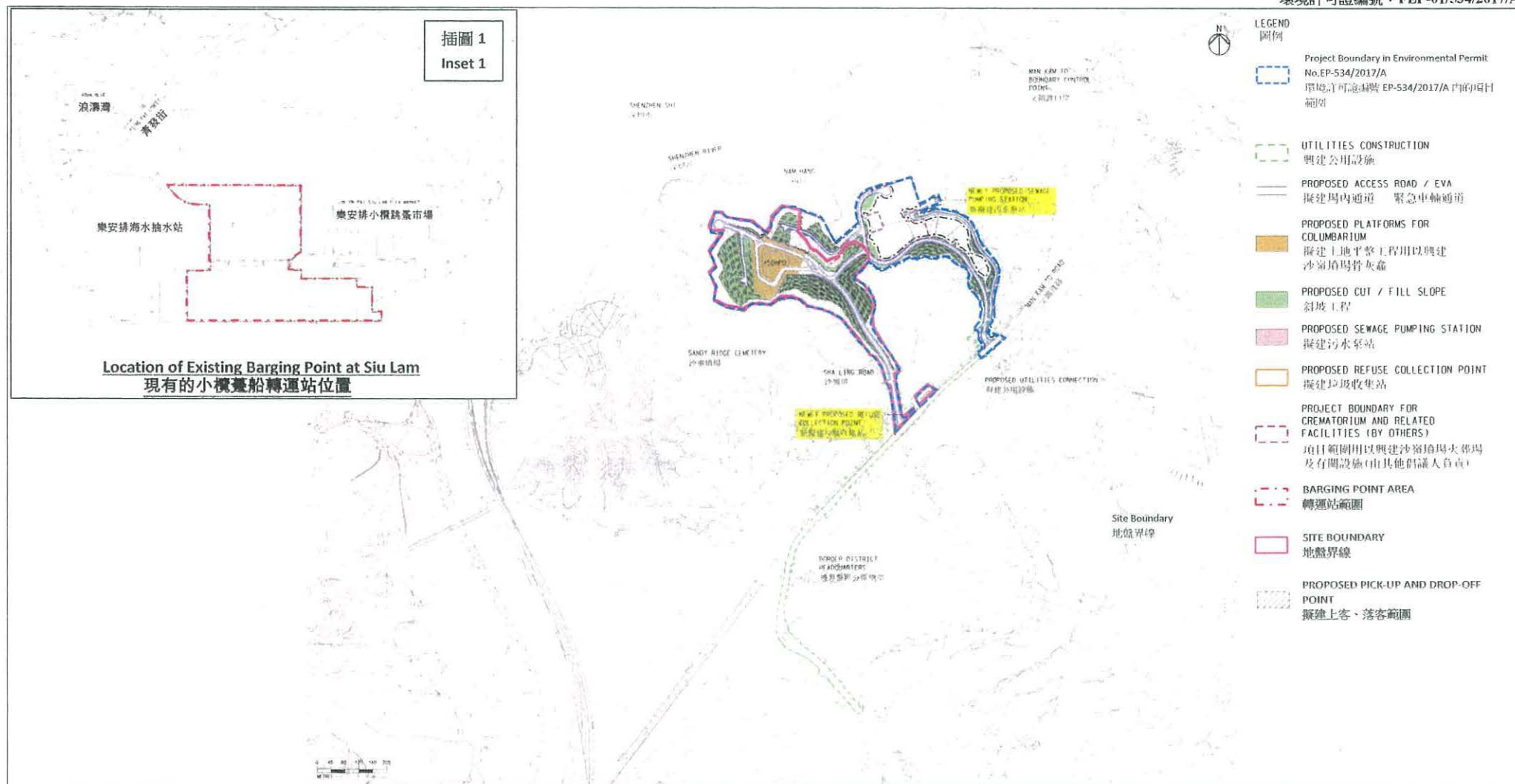
- 13.2.1 The Contractors are reminded to pay special attention on water quality mitigation measures and should fully implement the measures as recommended in the EM&A Manual, in particular to prevent surface runoff and other pollutants from flowing to local stream and Conservation Area.
- 13.2.2 During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

- 13.2.3 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.
- 13.2.4 Since some of the construction site under the Project is located near villages, both Contractors should fully implement air quality mitigation measures to reduce construction dust emission.
- 13.2.5 Furthermore, daily cleaning and weekly tidiness shall be properly performed and maintained. In addition, mosquito control should be performed to prevent mosquito breeding on site.

Appendix A

Layout Plan of the Project

Layout Plan of Contract CV/2016/10



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

Figure 1: Project Location Plan

圖 1: 項目位置圖

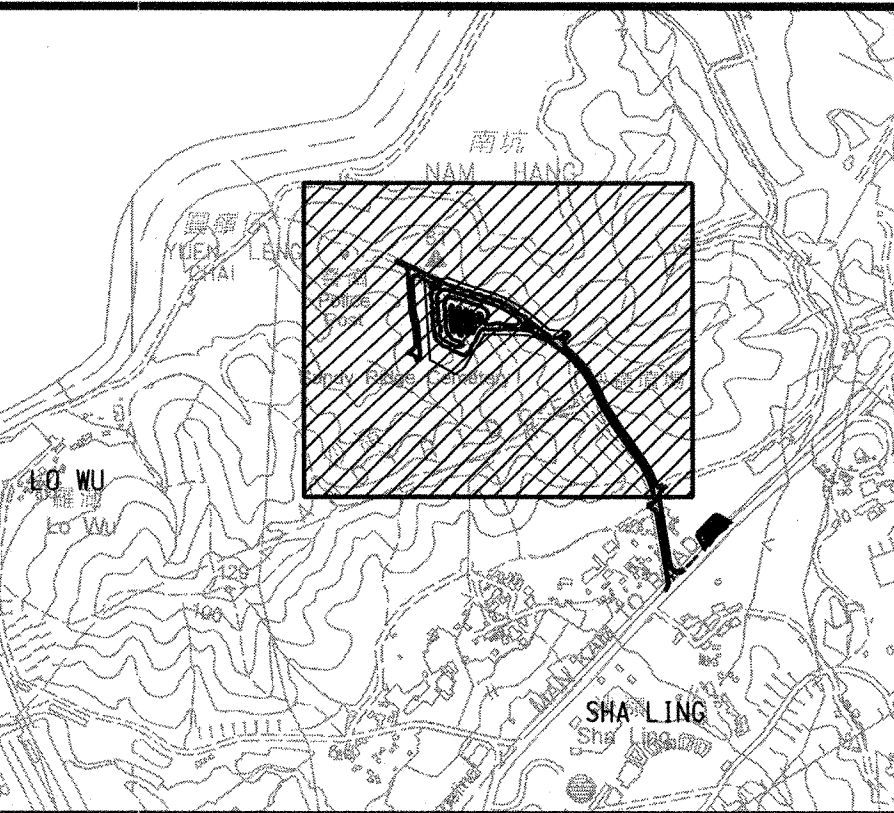
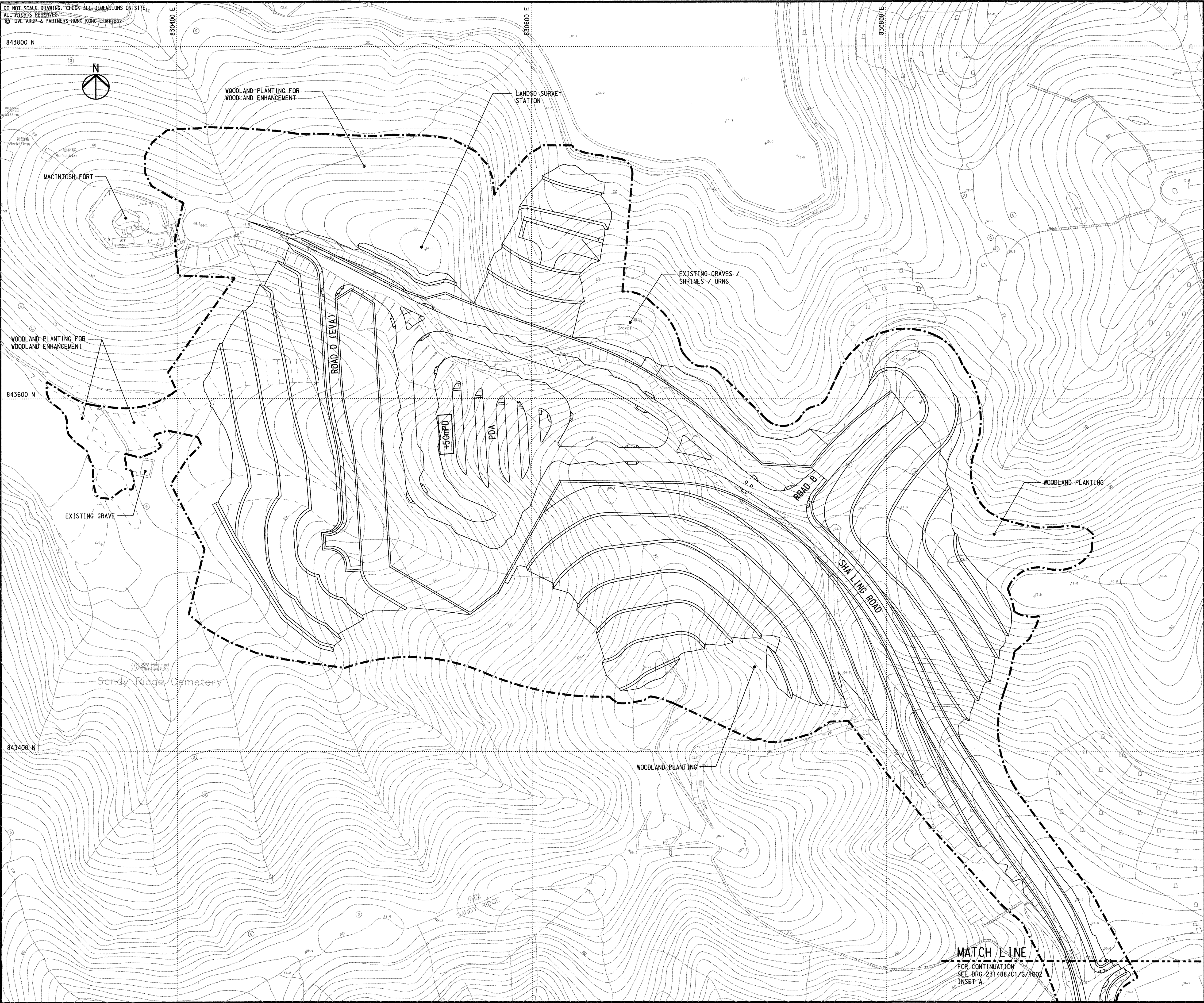
(This figure was prepared based on Figure 1 attached to the VEP Application No. VEP-555/2018 and Figures 1.3 of the Approved EIA Report No. AEIAR-198/2016)

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

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

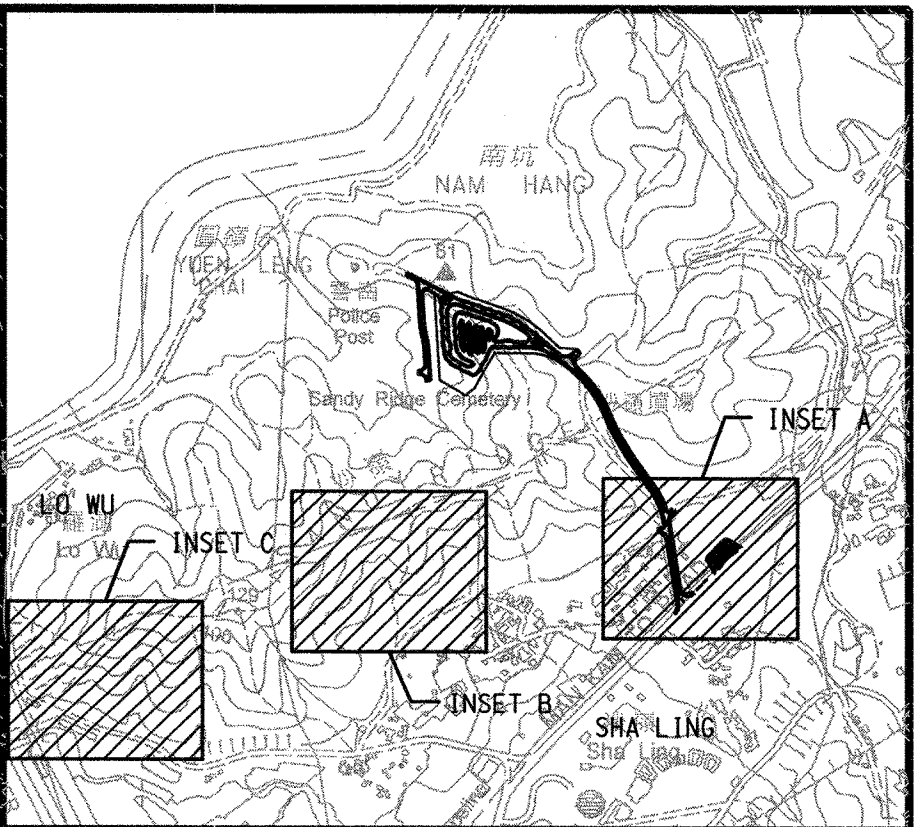
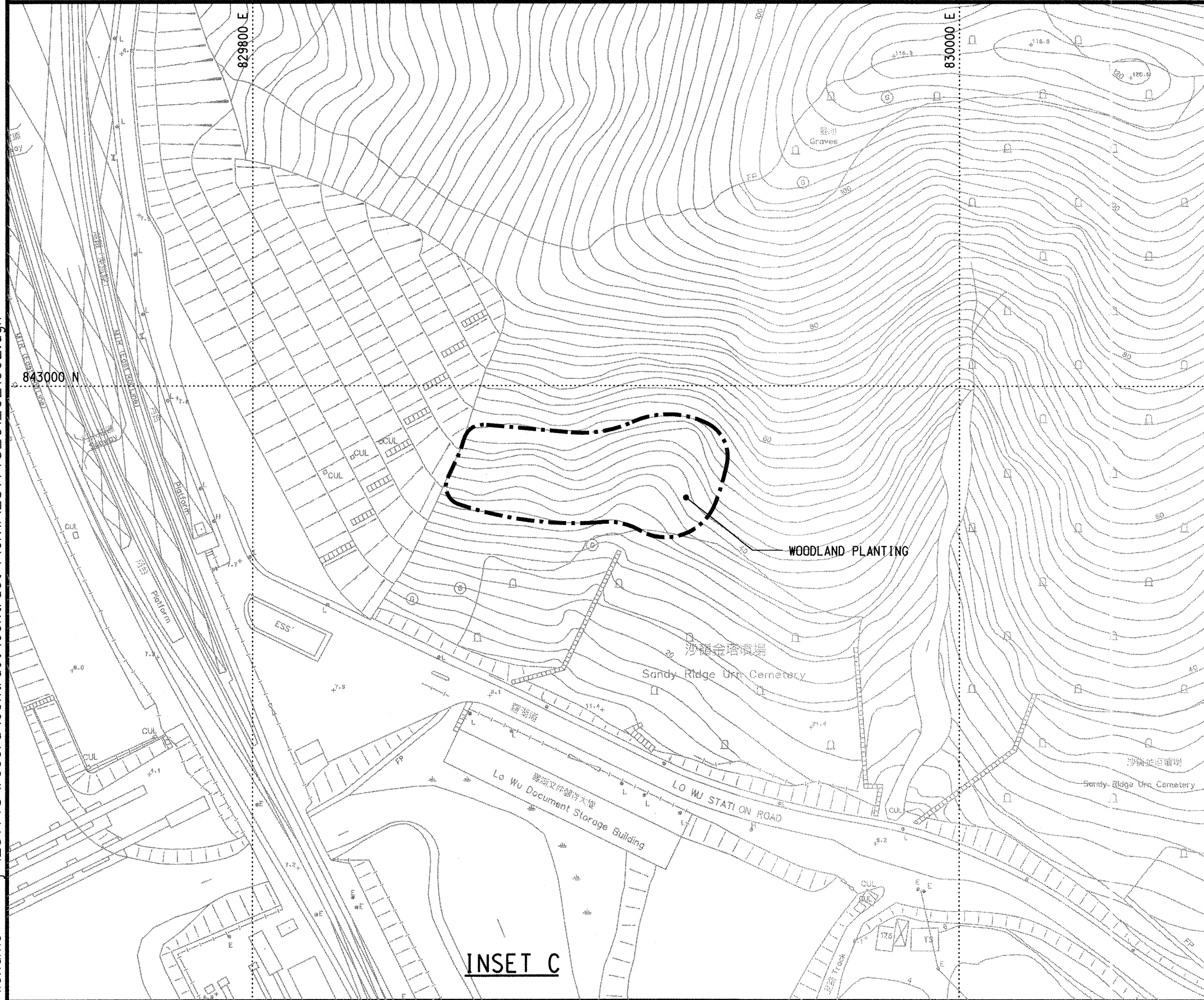
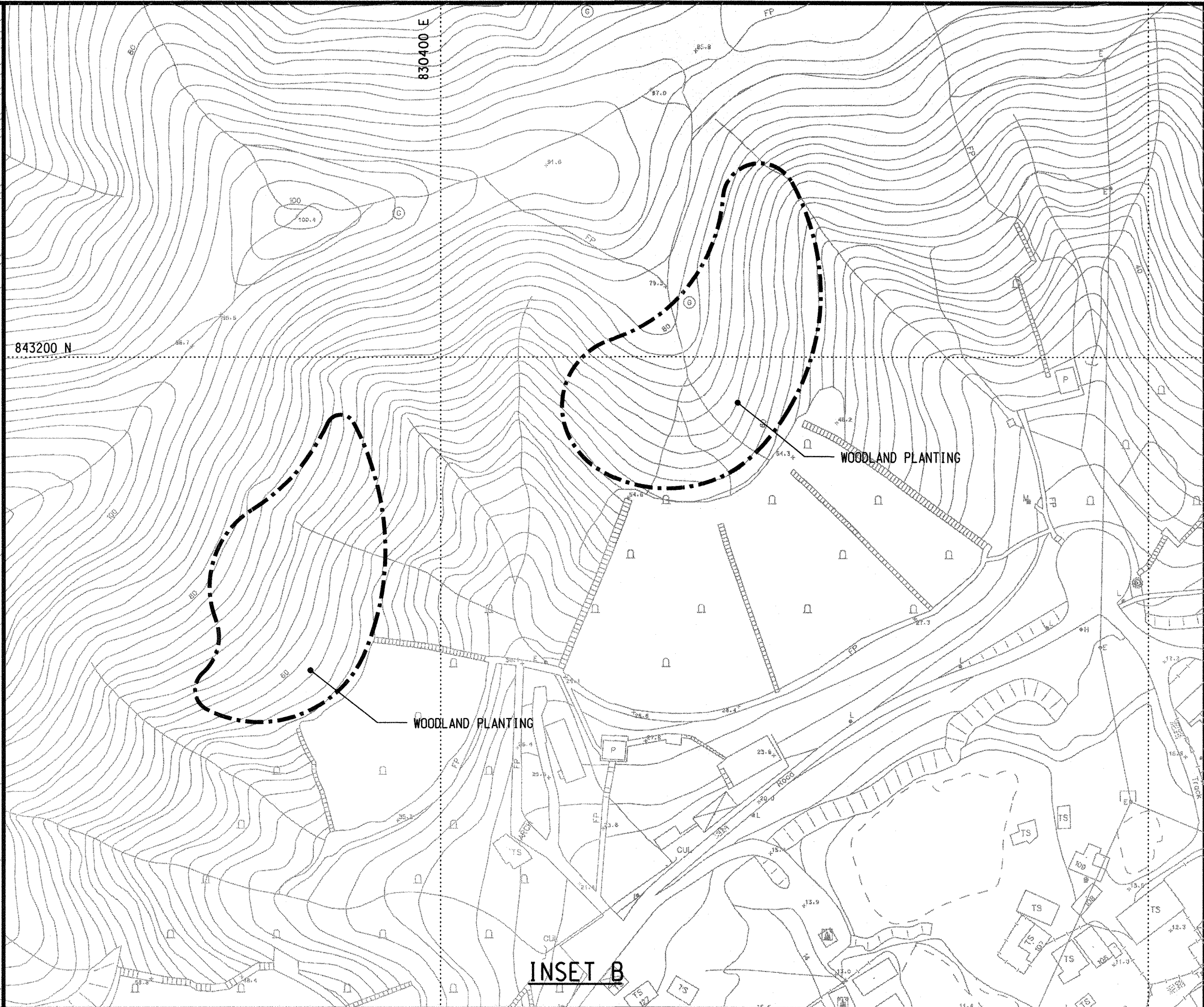
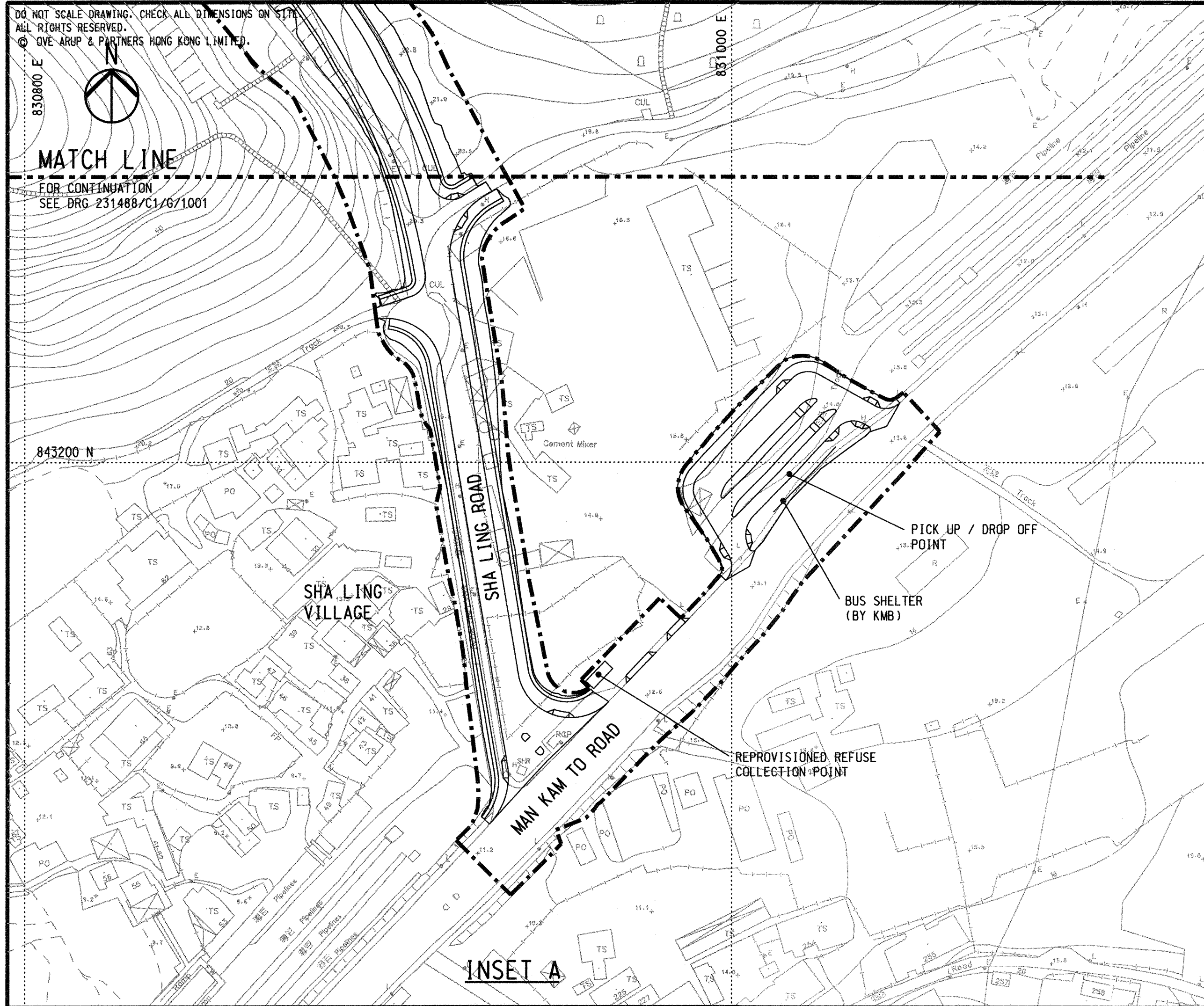


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KEY PLAN	
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+50mPD	SITE FORMATION LEVEL

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Contract No. CV/2016/10			
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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

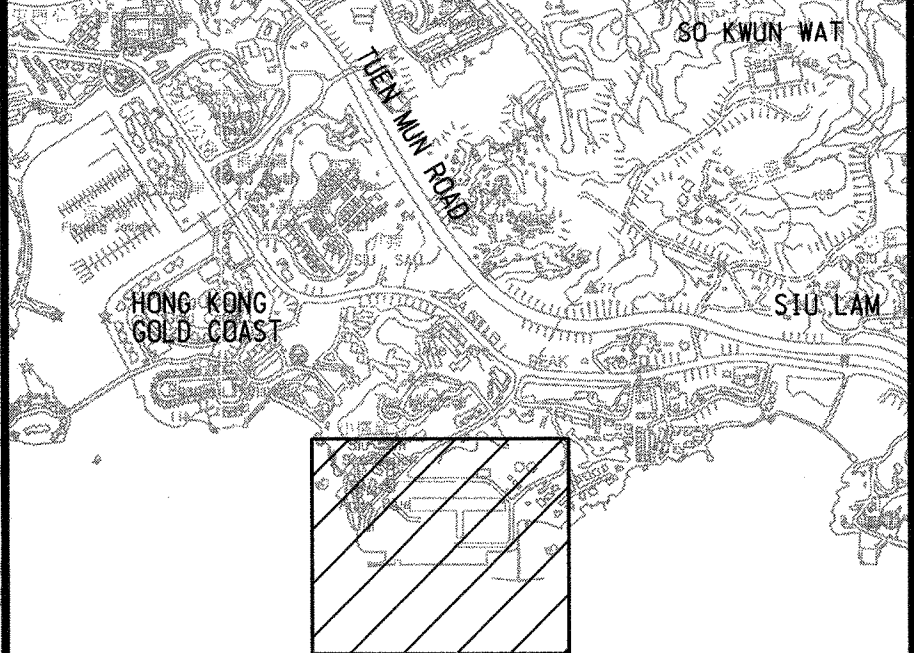
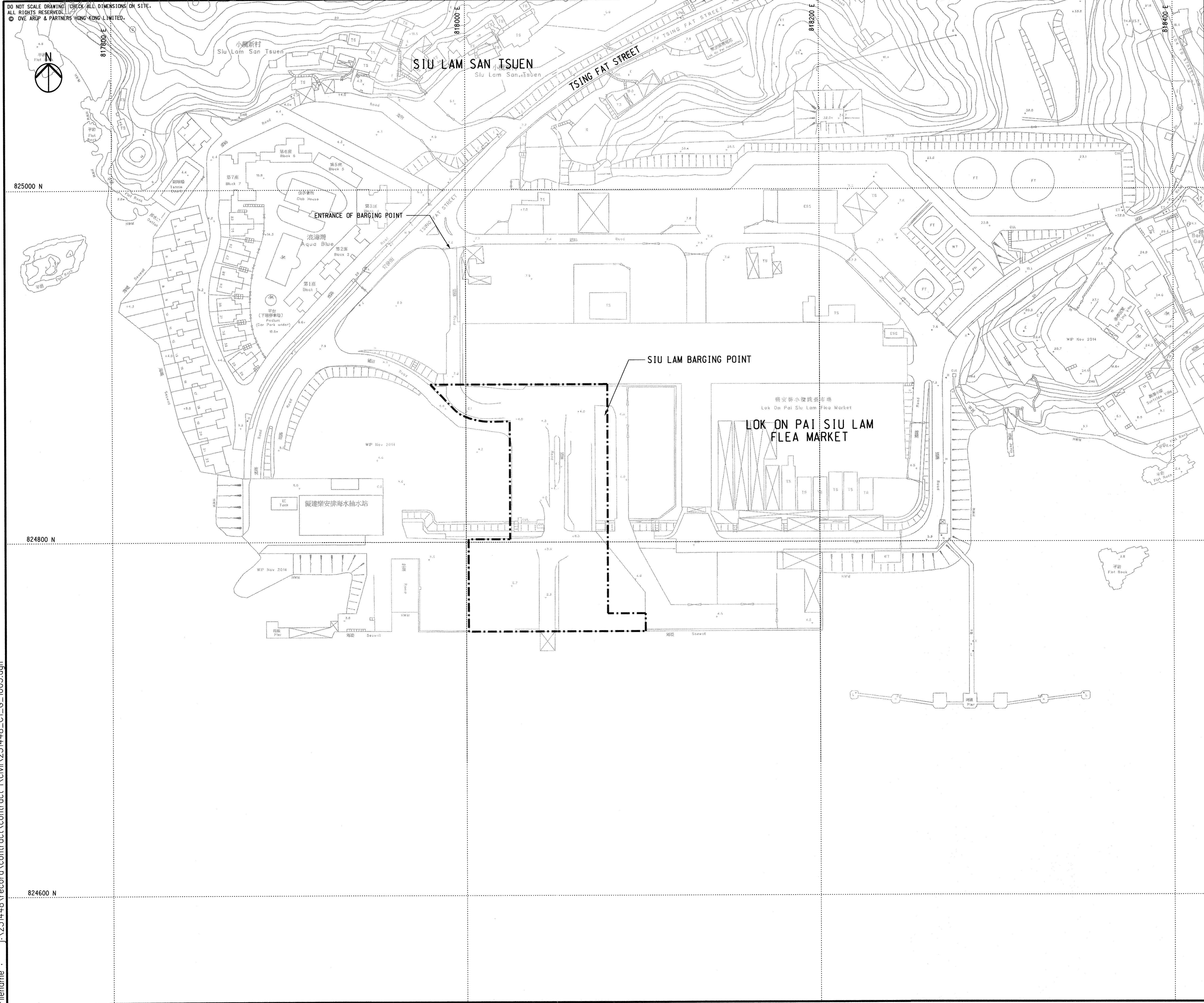
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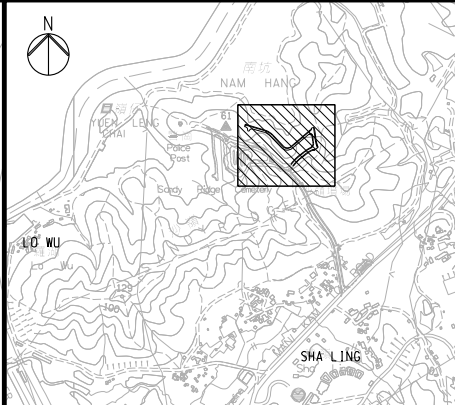
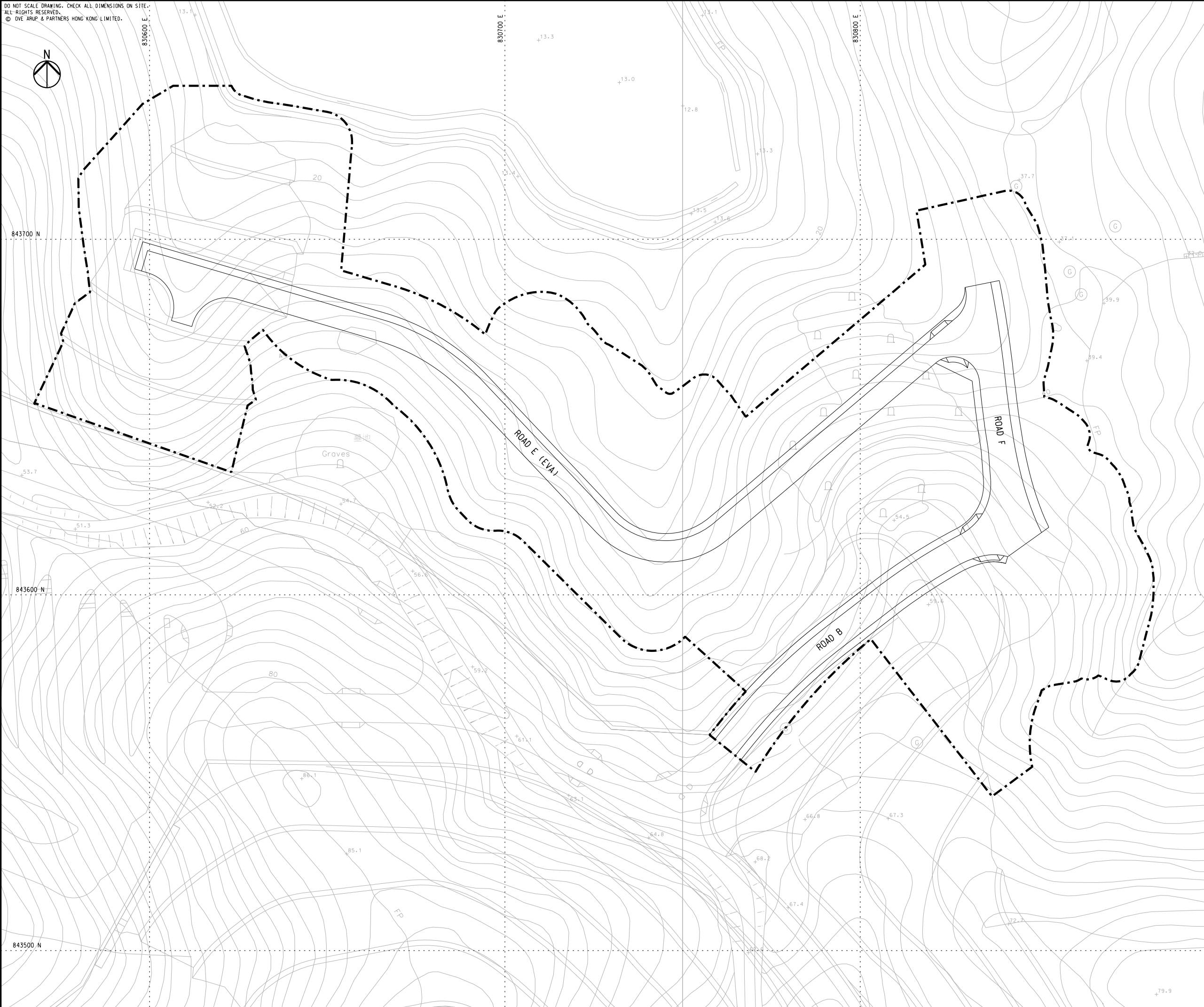
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Layout Plan of Contract CV/2017/02

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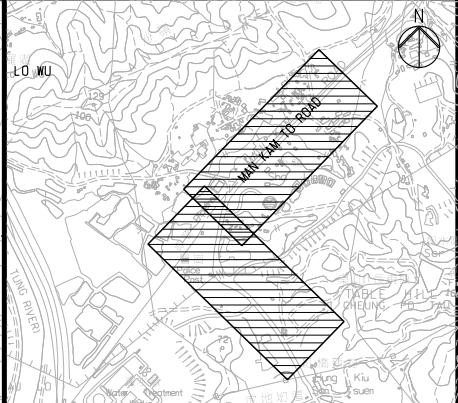
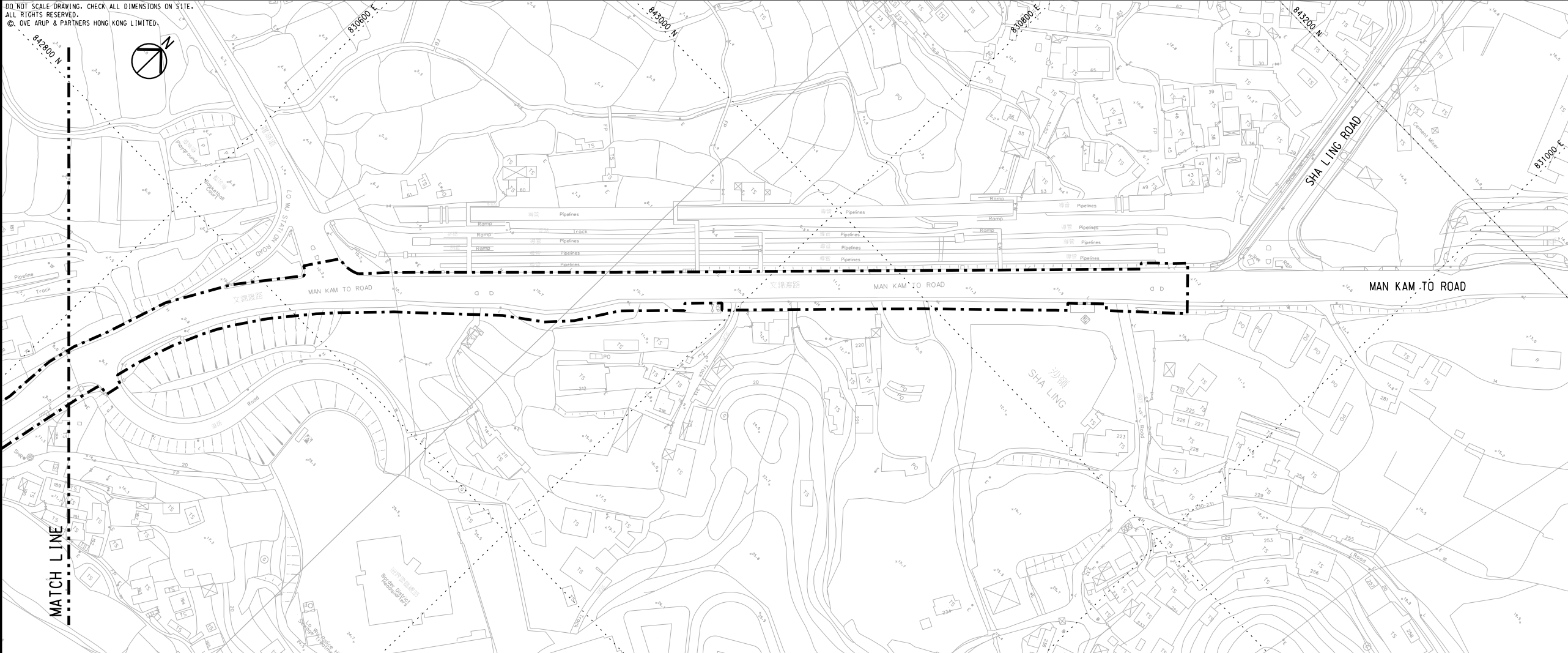
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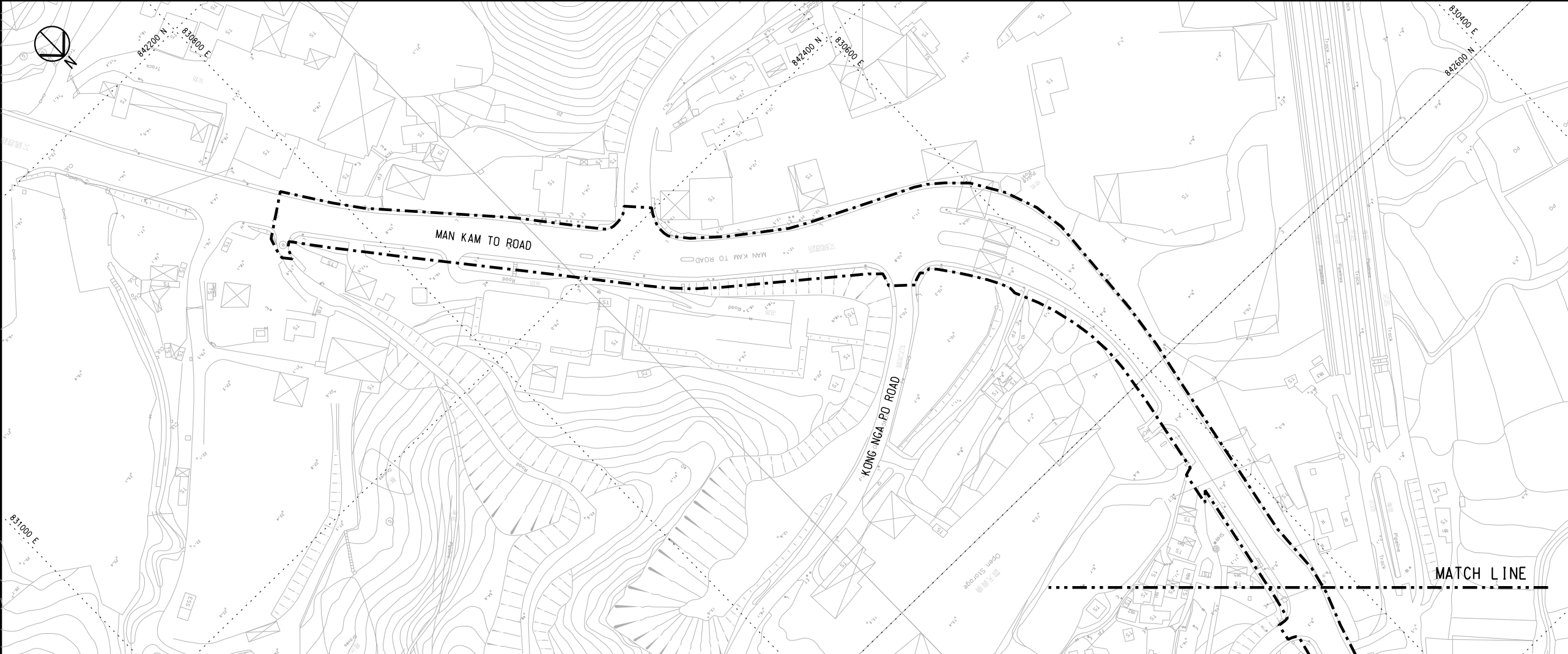
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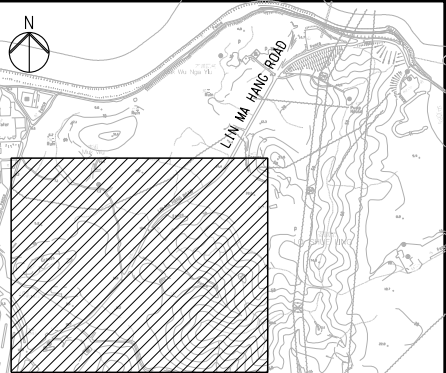
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LIN MA HANG ROAD



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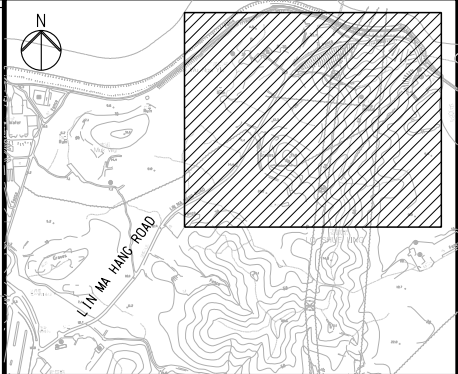
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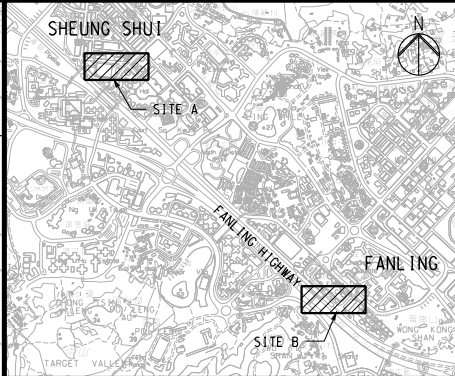
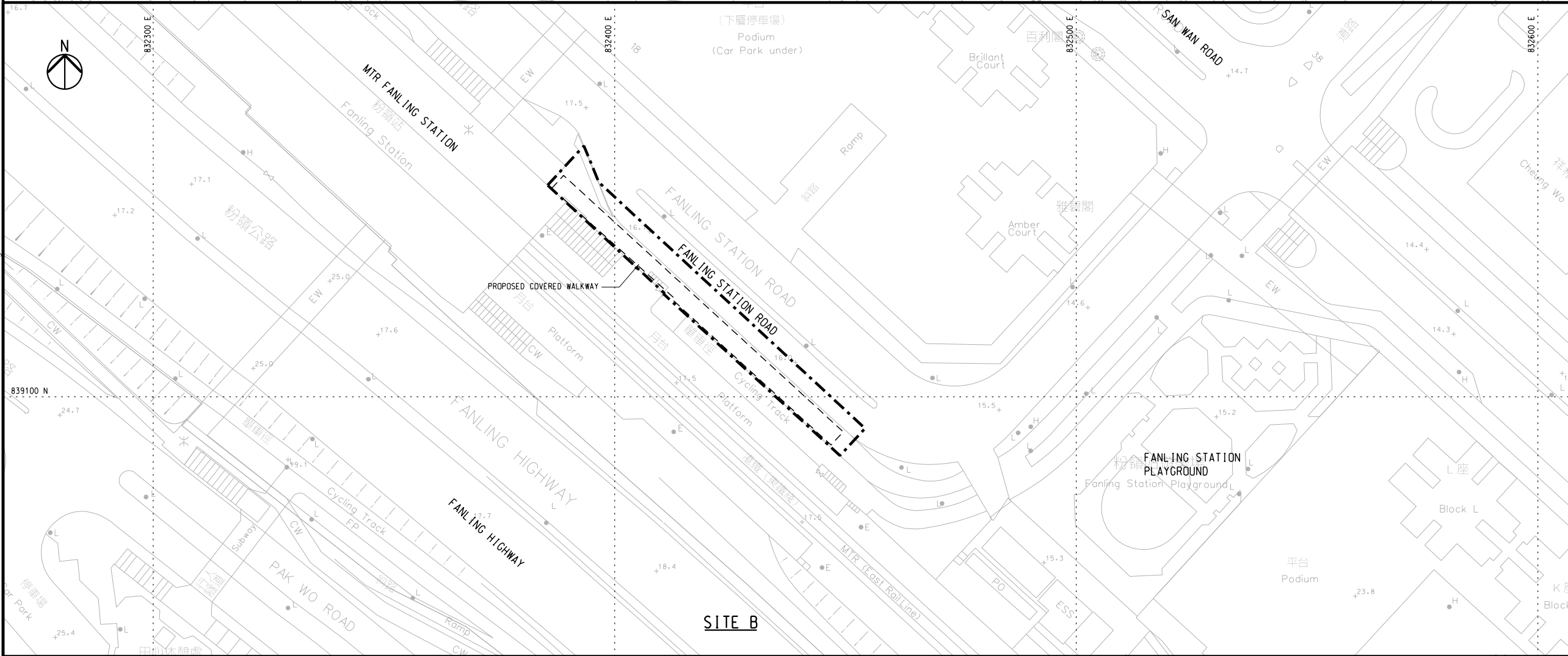
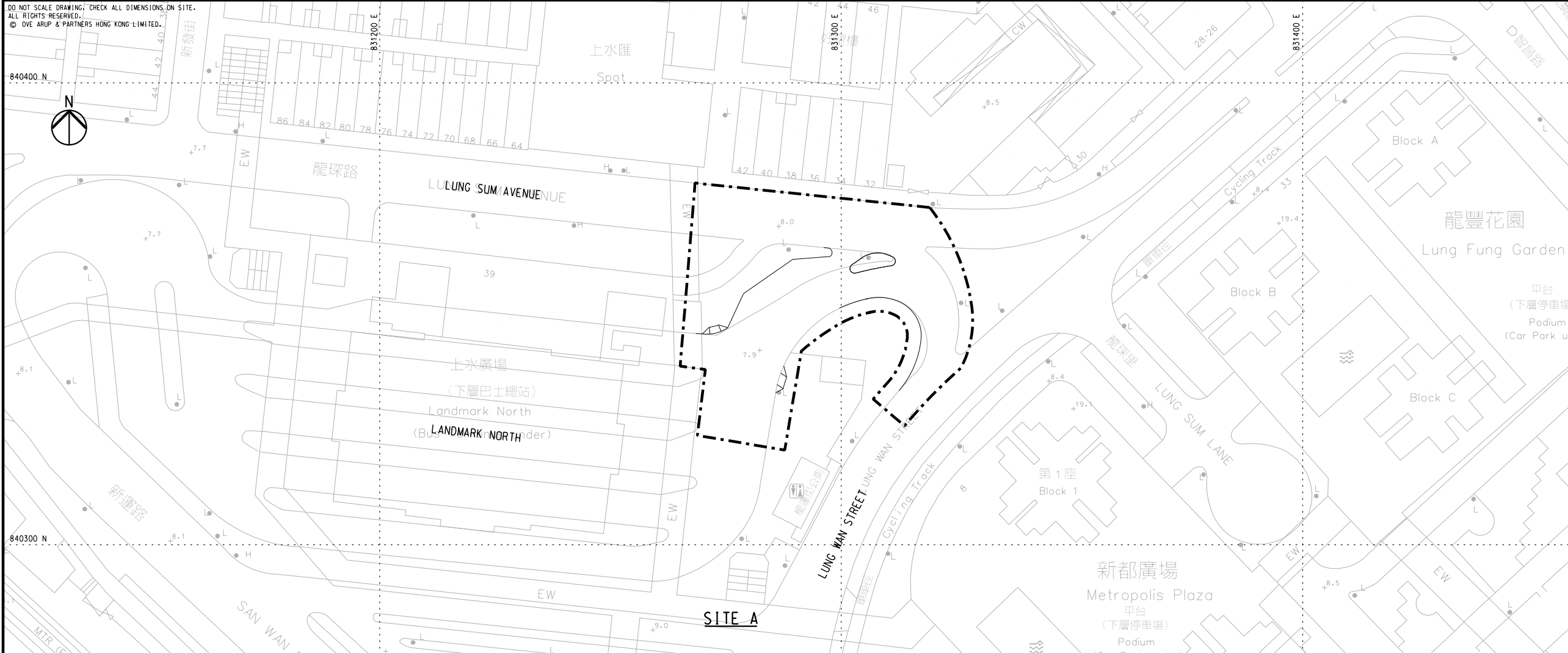
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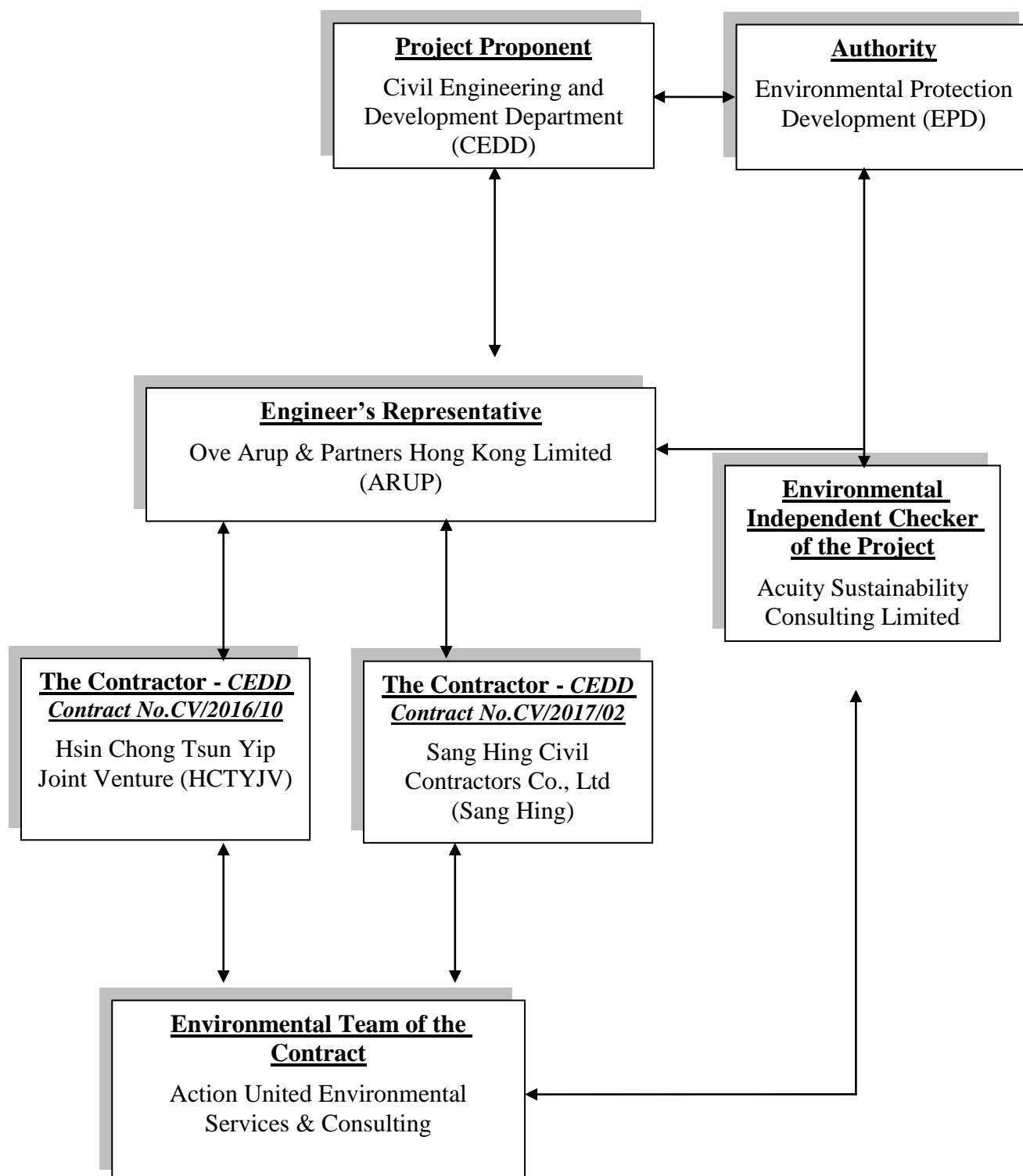
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Appendix B

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	CHOI Wing-hing	2762-5620	2714-0695
ARUP	Engineer's Representative	Steve Tang	6190-1513	2268-3950
ACUITY	Independent Environmental Checker	Ir. Leung CH Jacky	2698-6833	2698-9383
HCTYJV	Project Director	Mr. Kan Kwok Cheung	9495-2408	2633-4691
HCTYJV	Construction Manager	Mr. Keniel Kwong	9863-0020	2633-4691
HCTYJV	Site Agent	Mr. Ho Man To	9507-9634	2633-4691
HCTYJV	Environmental Officer	Mr. Chan Ming Tai	9358-7007	2633-4691
AUES	Environmental Team Leader	Mr. T.W. Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Mr. Ben Tam	2959-6059	2959-6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959-6059	2959-6079
AUES	Environmental Site Inspector	Mr. Martin Li	2959-6059	2959-6079

Legend:

CEDD (Employer) – Civil Engineering and Development Department

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

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

ACUITY (IEC) – Acuity Sustainability Consulting Limited

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

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

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

Legend:

CEDD (Employer) – Civil Engineering and Development Department

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

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

ACUITY (IEC) – Acuity Sustainability Consulting Limited

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

Appendix C

Three Months rolling Programme

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

3 Month Rolling Programme (Mar 2021 to May 2021)

ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021
1	Key Dates	1046 days	Fri 15/12/17	Fri 2/7/21	0%	1046 days			456
2	Contract Starting Date	0 days	Fri 15/12/17	Fri 15/12/17	0%	0 days			
3	Contract Completion Date for Section 1	0 days	Sat 11/7/20	Sat 11/7/20	0%	0 days		Include CE14,15,19,22, 27,34,40,49,65,66,67,74, 75,79, 98,99,100,102,111, 126,147	
4	Contract Completion Date for Section 2	0 days	Fri 2/7/21	Fri 2/7/21	0%	0 days			271
5	Contract Completion Date for Section 3	0 days	Mon 4/11/19	Mon 4/11/19	0%	0 days			
6	Scheduled Completion Date	634 days	Tue 10/12/19	Sat 29/1/22	0%	634 days			
7	Section 1	0 days	Sat 29/5/21	Sat 29/5/21	0%	0 days	13FF		29/5
8	Section 2	0 days	Sat 29/1/22	Sat 29/1/22	0%	0 days	135FF		
9	Section 3	0 days	Tue 10/12/19	Tue 10/12/19	0%	0 days	408FF		
10	Preliminary Works	144 days	Tue 20/2/18	Wed 15/8/18	100%	0 days			
11	Submission and Approval Required at Environmental Permit for Commencement of Construction	128 days	Tue 20/3/18	Wed 15/8/18	100%	0 days			
12	Other Submission (Initial Survey /Tree Survey/ Condition Survey)	106 days	Tue 20/2/18	Fri 22/6/18	100%	0 days			
13	Section 1 of the Works (Parts A1, A2 & A3)	937 days	Thu 29/3/18	Sat 29/5/21	56%	408.16 days			
14	Ground Investigation and Geotechnical instrumentation for Commencement of Slopework	112 days	Thu 29/3/18	Wed 15/8/18	100%	0 days			
15	Verification Drillholes (8 Nos., VDH1, 2, 7-9,8-16) / Inspection Pits and Preliminary Results Submission	114 days	Thu 29/3/18	Wed 8/8/18	100%	0 days			
16	Design Review	36 days	Thu 5/7/18	Wed 15/8/18	100%	0 days			
17	Retaining Wall RW1	280 days	Thu 16/8/18	Sat 27/7/19	100%	0 days			
18	General Excavation to Formation Level	37 days	Thu 16/8/18	Thu 27/9/18	100%	0 days			
19	Plate Load Test and Blinding Layer for Retaining Wall Bays 1-4	3 days	Fri 28/9/18	Mon 1/10/18	100%	0 days			
20	Plate Load Test and Blinding Layer for Retaining Wall Bays 5-8	3 days	Tue 2/10/18	Thu 4/10/18	100%	0 days			
21	Plate Load Test and Blinding Layer for Retaining Wall Bays 9-13	15 days	Wed 10/10/18	Fri 26/10/18	100%	0 days			
22	Plate Load Test and Blinding Layer for Retaining Wall Bays 14-17	7 days	Sat 6/10/18	Sat 13/10/18	100%	0 days			
23	Base slab of Retaining Wall RW1 Bay 1-4	8 days	Tue 2/10/18	Wed 10/10/18	100%	0 days			
24	Base slab of Retaining Wall RW1 Bay 5-8	13 days	Mon 8/10/18	Mon 22/10/18	100%	0 days			
25	Base slab of Retaining Wall RW1 Bay 9-13	17 days	Mon 22/10/18	Fri 9/11/18	100%	0 days			
26	Base slab of Retaining Wall RW1 Bay 14-17	17 days	Mon 22/10/18	Fri 9/11/18	100%	0 days			
27	Wall Stem of Retaining Wall RW1 Bay1-4	36 days	Thu 25/10/18	Wed 5/12/18	100%	0 days			
28	Wall Stem of Retaining Wall RW1 Bay 5-8	26 days	Tue 11/12/18	Wed 9/1/19	100%	0 days			
29	Wall Stem of Retaining Wall RW1 Bay 10-13	30 days	Wed 14/11/18	Tue 18/12/18	100%	0 days			
30	Wall Stem of Retaining Wall RW1 Bay 14-17	23 days	Mon 26/11/18	Fri 21/12/18	100%	0 days			
31	Protective Coating / Subsoil Drain / Filter Layer	5 days	Thu 14/2/19	Tue 19/2/19	100%	0 days			
32	Drainage and Maintenance Access in front of RW1	75 days	Tue 26/3/19	Thu 20/6/19	100%	0 days			
33	Construction CP1X & CP7X	102 days	Mon 1/4/19	Sat 27/7/19	100%	0 days			
34	Filling Works behind Retaining Wall and Fill Slope FS1 South (Section 12 at Drawing C1/GE/1030)	605 days	Mon 1/4/19	Sat 17/4/21	38%	374.31 days			
35	Behind Retaining Wall RW1, Filling Stage 1 (up to +25mPD)	95 days	Mon 1/4/19	Fri 19/7/19	100%	0 days			
36	FS1 South , Filling (Rolling by Pass) (+25 to +27.8mPD)	10 days	Sat 20/7/19	Wed 31/7/19	100%	0 days			
37	FS1 South Filling Stage 2 (~2.5m, +25.0 to +27.5 mPD)	56 days	Wed 1/4/20	Thu 4/6/20	100%	0 days		3 days per SRT +9 day (CE16)	
38	Filling (Rolling by Pass)	1 day	Wed 1/4/20	Wed 1/4/20	100%	0 days			
39	Filling in 3m Zone	28 days	Thu 2/4/20	Mon 11/5/20	100%	0 days			
40	Benching Works for Rolling by Pass Surface	3 days	Thu 2/4/20	Mon 6/4/20	100%	0 days	38		
41	Lay Rockfill Layer (4.5/1m per 5 days)	25 days	Tue 7/4/20	Mon 11/5/20	100%	0 days	40		
42	Drainage and Maintenance Access (+25 to +27.5 mpD)	21 days	Tue 12/5/20	Thu 4/6/20	100%	0 days	41		
43	FS1 South Filling Stage 3 (~7.5m height, +27.5 to +35mPD)	320 days	Sat 1/2/20	Mon 8/2/21	30%	224.86 days		3 days per SRT +9 day (CE16)+17day (PMI57)	
44	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	130 days	Sat 1/2/20	Tue 1/9/20	5%	123 days	38		
45	Filling in 3m Zone	103 days	Wed 2/9/20	Wed 6/1/21	50%	52 days			
46	Benching Works for Rolling by Pass Surface	3 days	Wed 2/9/20	Fri 4/9/20	100%	0 days	44		
47	Lay Rockfill Layer (7.5/1m per 5 days)	100 days	Sat 5/9/20	Wed 6/1/21	48%	52 days	46		
48	Drainage and Maintenance Access (+27.5 to +35 mpD)	28 days	Thu 7/1/21	Mon 8/2/21	70%	8.4 days	47		
49	FS1 South Filling Stage 4 (~7.5m height, +35 to +42.5mPD)	188 days	Wed 2/9/20	Thu 8/4/21	0%	188 days		3 days per SRT, ~7.5m = 25 layers	
50	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	15 days	Wed 2/9/20	Fri 18/9/20	0%	15 days	44		
51	Filling in 3m Zone	41 days	Thu 7/1/21	Fri 26/2/21	0%	41 days			
52	Benching Works for Rolling by Pass Surface	3 days	Thu 7/1/21	Sat 9/1/21	0%	3 days	50,47		
53	Lay Rockfill Layer (7.5/1m per 5 days)	38 days	Mon 11/1/21	Fri 26/2/21	0%	38 days	52		
54	Drainage and Maintenance Access (+35 to +42.5mpD)	35 days	Sat 27/2/21	Thu 8/4/21	0%	35 days	53		
55	FS1 South Filling Stage 5 (~7.5m height, +42.5 to +50mPD)	432 days	Mon 2/12/19	Sat 17/4/21	0%	432 days		3 days per SRT, ~7.5m = 25 layers	
56	Construction of RW11	30 days	Mon 2/12/19	Wed 8/1/20	0%	30 days	36		
57	Filling in 3m Zone	38 days	Sat 27/2/21	Thu 15/4/21	0%	38 days			
58	Benching Works for Rolling by Pass Surface	3 days	Sat 27/2/21	Tue 2/3/21	0%	3 days	53		
59	Lay Rockfill Layer (7.5/1m per 5 days)	35 days	Wed 3/3/21	Thu 15/4/21	0%	35 days	58		
60	Drainage and Maintenance Access (+42.4 to +50 mpD)	35 days	Tue 9/3/21	Sat 17/4/21	0%	35 days	58FS+5 days	140m, 4m per day	
61	Fill Slope FS1 Middle (Section 13 at Drawing C1/GE/1030)	360 days	Mon 10/2/20	Tue 27/4/21	32%	245.09 days			
62	Drainage and Maintenance Access at toe (+13 mpD)	10 days	Mon 10/2/20	Thu 20/2/20	100%	0 days			
63	FS1 middle Filling Stage 1 (~7.0m max, +13.0 mPD to +20 mPD)	22 days	Fri 21/2/20	Tue 17/3/20	100%	0 days		3 days per SRT +24day (CE16) + + 8day (CE55)	
64	Filling (Rolling by Pass)(~2m, 0.5m per day)	4 days	Fri 21/2/20	Tue 25/2/20	100%	0 days			
65	Filling in 3m Zone	8 days	Wed 26/2/20	Thu 5/3/20	100%	0 days			
66	Benching Works for Rolling by Pass Surface	3 days	Wed 26/2/20	Fri 28/2/20	100%	0 days	64		
67	Lay Filter Layer	5 days	Sat 29/2/20	Thu 5/3/20	100%	0 days			
68	Drainage and Maintenance Access (at and below+20 mpD)	10 days	Fri 6/3/20	Tue 17/3/20	100%	0 days	67	65m, 6m per day	
69	FS1 middle Filling Stage 2 (~7.5m, +20.0 to +27.5 mPD)	53 days	Wed 26/2/20	Mon 4/5/20	100%	0 days		3 days per SRT +25day (CE16)	
70	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	15 days	Wed 26/2/20	Fri 13/3/20	100%	0 days	64		
71	Filling in 3m Zone	23 days	Sat 14/3/20	Tue 14/4/20	100%	0 days			
72	Benching Works for Rolling by Pass Surface	3 days	Sat 14/3/20	Tue 17/3/20	100%	0 days	70,67		
73	Lay Rockfill Layer (7.5m/1m per 5 day)	20 days	Wed 18/3/20	Tue 14/4/20	100%	0 days	72		

3 Month Rolling Programme (Mar 2021 to May 2021)

ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021			
									4	5	6	
74	Drainage and Maintenance Access (at and below+27.5 mpD)	15 days	Wed 15/4/20	Mon 4/5/20	100%	0 days	73	60m, 6m per day				
75	FS1 middle Filling Stage 3 (~7.5m height, +27.5 to ~+35mPD)	304 days	Sat 14/3/20	Tue 23/3/21	19%	247.67 days		3 days per SRT +9 day (CE16)+17day (PMI 57)				
76	Filling (Rolling by Pass)(~7.5m, 0.5m per day)	130 days	Sat 14/3/20	Fri 21/8/20	12%	115 days	70					
77	Filling in 3m Zone	163 days	Sat 22/8/20	Wed 10/3/21	14%	140 days						
78	Benching Works for Rolling by Pass Surface	3 days	Sat 22/8/20	Tue 25/8/20	100%	0 days	76,74					
79	Lay Rockfill Layer (7.5m/1m per 5 day)	160 days	Wed 26/8/20	Wed 10/3/21	13%	140 days	78					
80	Drainage and Maintenance Access (at and below +35 mpD)	20 days	Mon 1/3/21	Tue 23/3/21	100%	0 days	78	75m, 6m per day				
81	FS1 middle Filling Stage 4 below +42.5mPD and +50mPD)	38 days	Thu 11/3/21	Tue 27/4/21	0%	38 days		3 days per SRT, ~7.4m = 25 layers				
82	Filling (Rolling by Pass)(~15m, 0.5m per day)	30 days	Thu 11/3/21	Sat 17/4/21	0%	30 days	79					
83	Slope Surface forming/ Drainage and Maintenance Access	20 days	Thu 1/4/21	Tue 27/4/21	0%	20 days	79	70m, 6m per day				
84	Fill Slope FS1 North (Section 14 at Drawing C1/GE/1030)	831 days	Wed 11/7/18	Wed 28/4/21	69%	260.84 days						
85	CE16	264 days	Wed 11/7/18	Fri 31/5/19	38%	164 days		include 7 day Mobilization				
86	FS1 North Filling Works Stage 1 (+15 to+19.7mPD)	204 days	Sat 1/6/19	Fri 24/1/20	100%	0 days	85					
87	Drainage and Maintenance Access (+15 to +20 mpD)	28 days	Sat 25/1/20	Wed 26/2/20	100%	0 days	86	+8 days (CE55)				
88	Construction of Outfall CP2X	14 days	Thu 27/2/20	Fri 13/3/20	100%	0 days	87					
89	FS1North , Filling (Rolling by Pass) (+19.7 to +22.4mPD)	20 days	Sat 14/3/20	Mon 6/4/20	100%	0 days	88					
90	FS1 North Filling Stage 2 (+20 to +27.5 mPD)	100 days	Tue 7/4/20	Fri 31/7/20	100%	0 days	87	3 days per SRT +25day (CE16)				
91	Drainage and Maintenance Access (+20 to +27.5 mpD)	65 days	Sat 1/8/20	Thu 15/10/20	100%	0 days	90	85m, 4.m per day				
92	Filling in 3m Zone (below +27.5mPD)	58 days	Mon 9/3/20	Thu 21/5/20	100%	0 days						
93	Benching Works for Rolling by Pass Surface	3 days	Mon 9/3/20	Wed 11/3/20	100%	0 days	91					
94	Lay Filter Layer	5 days	Thu 12/3/20	Tue 17/3/20	100%	0 days	93					
95	Filling by SRT (7.5m/ 3 day per 5 day)	50 days	Wed 18/3/20	Thu 21/5/20	100%	0 days	94					
96	Filling in 3m Zone (below +27.5mPD) (Rockfill)	23 days	Mon 9/3/20	Fri 3/4/20	100%	0 days						
97	Benching Works for Rolling by Pass Surface	3 days	Mon 9/3/20	Wed 11/3/20	100%	0 days						
98	Lay Rockfill Layer (7.5m/1m per 5 day)	20 days	Thu 12/3/20	Fri 3/4/20	100%	0 days	97					
99	Drainage and Maintenance Access	22 days	Sat 2/5/20	Wed 27/5/20	100%	0 days	98					
100	FS1 North Filling Stage 3 (+27 to +35 mpD)	171 days	Tue 26/11/19	Thu 11/6/20	100%	0 days		3 days per SRT +9 day (CE16)+17day (PMI 57)				
101	Filling (Rolling by Pass)(~3m, 0.5m per day)	6 days	Tue 26/11/19	Mon 2/12/19	100%	0 days	90					
102	Filling in 3m Zone (below +27.5mPD) (Rockfill)	23 days	Sat 4/4/20	Thu 7/5/20	100%	0 days						
103	Benching Works for Rolling by Pass Surface	3 days	Sat 4/4/20	Wed 8/4/20	100%	0 days	98,101					
104	Lay Rockfill Layer (7.5m/1m per 5 day)	20 days	Thu 9/4/20	Thu 7/5/20	100%	0 days	103					
105	Drainage and Maintenance Access (+27.5 to +35 mpD)	30 days	Fri 8/5/20	Thu 11/6/20	100%	0 days	104	120m, 4m per day				
106	FS1 North Filling Stage 4 (+35 to +42.5 mPD), Upgrading of Existing Slope Feature 3NW-C/F37	374 days	Tue 3/12/19	Wed 10/2/21	32%	252.7 days		3 days per SRT, ~7.5m = 25 layers				
107	Filling (Rolling by Pass)(~3m, 0.5m per day)	15 days	Tue 3/12/19	Thu 19/12/19	100%	0 days	101					
108	Filling in 3m Zone (below +27.5mPD) (Rockfill)	123 days	Wed 2/9/20	Fri 29/1/21	19%	100 days						
109	Benching Works for Rolling by Pass Surface	3 days	Wed 2/9/20	Fri 4/9/20	100%	0 days	107,104					
110	Lay Rockfill Layer (7.5m/1m per 5 day)	120 days	Sat 5/9/20	Fri 29/1/21	17%	100 days	109					
111	Drainage and Maintenance Access (+30 to +42.5 mpD)	10 days	Sat 30/1/21	Wed 10/2/21	100%	0 days	110	140m, 4m per day				
112	FS1 North Filling Stage 5 (+42.5 to +50mPD), Upgrading of Existing Slope Feature 3NW-C/F37	425 days	Fri 20/12/19	Wed 28/4/21	0%	425 days		3 days per SRT, ~7.5m = 25 layers				
113	Filling (Rolling by Pass)(~3m, 0.5m per day)	15 days	Fri 20/12/19	Thu 9/1/20	0%	15 days	107					
114	Filling in 3m Zone (below +27.5mPD) (Rockfill)	50 days	Thu 11/2/21	Fri 16/4/21	0%	50 days						
115	Benching Works for Rolling by Pass Surface	10 days	Thu 11/2/21	Thu 25/2/21	0%	10 days	111					
116	Lay Rockfill Layer (7.5m/1m per 5 day)	40 days	Fri 26/2/21	Fri 16/4/21	0%	40 days	115					
117	Drainage and Maintenance Access (+42.5 to +50 mpD)	10 days	Sat 17/4/21	Wed 28/4/21	0%	10 days	116	130m, 4m per day				
118	Civil Works for Pick-up/Drop-off area (Part A1, M011 CH020 to CH140)	75 days	Thu 11/2/21	Mon 17/5/21	0%	75 days						
119	Waterworks / Drainage / Sewerage/ Utilities Works	31 days	Thu 11/2/21	Mon 22/3/21	0%	31 days						
120	Sewerage Works / Drainage Works	28 days	Thu 11/2/21	Thu 18/3/21	0%	28 days	111	~225m main drains, 8m per day				
121	Watermain FW1a (CH29-100)	7 days	Thu 11/3/21	Thu 18/3/21	0%	7 days	120SS+21 days	~71m water mains, 10m per day				
122	Road Lighting Civil Works Provision	5 days	Thu 11/3/21	Tue 16/3/21	0%	5 days	120SS+21 days	~75m ducting, 15m per day				
123	Utilities (by others)	10 days	Thu 11/3/21	Mon 22/3/21	0%	10 days	120SS+21 days	~150m ducting, 15m per day				
124	Carriageway and Footway	44 days	Tue 23/3/21	Mon 17/5/21	0%	44 days						
125	Backfilling to Formation Level	8 days	Tue 23/3/21	Wed 31/3/21	0%	8 days	119	~120m, 100m per 6 day				
126	Carriageway	24 days	Thu 1/4/21	Mon 3/5/21	0%	24 days	125	~120m, 20m per 3 day + 6 day uchannel				
127	Footpath, Road Marking and Street Furniture	12 days	Tue 4/5/21	Mon 17/5/21	0%	12 days	126	~120m, 20m per 2 day				
128	Landscape Works	85 days	Thu 11/2/21	Sat 29/5/21	0%	85 days						
129	Shrubs Planting at RW1	30 days	Mon 19/4/21	Tue 25/5/21	0%	30 days	34					
130	Woodland Planting at Site 1, 2, 3	30 days	Mon 19/4/21	Tue 25/5/21	0%	30 days	34					
131	Hydroseeding at Fill Slope	80 days	Thu 11/2/21	Mon 24/5/21	0%	80 days	106					
132	Shrubs Planting at Pick-up/ Drop Off	10 days	Thu 29/4/21	Tue 11/5/21	0%	10 days	117					
133	Irrigation System and Water Points (Except Water Connection)	24 days	Fri 19/3/21	Mon 19/4/21	0%	24 days	121					
134	Tree Planting Works	10 days	Tue 18/5/21	Sat 29/5/21	0%	10 days	127					
135	Section 2 of the Works (Parts B1, B2, C, D, F, G1 & G2)	1222 days	Fri 15/12/17	Sat 29/1/22	52%	589.24 days		Change from 30/6 to 22/7 Due to EP delay				
136	Part B1	1091 days	Sat 28/4/18	Wed 29/12/21	61%	426.85 days						
137	Ground Investigation and Geotechnical instrumentation for Commencement of Slopework	96 days	Sat 28/4/18	Wed 22/8/18	100%	0 days						
138	Verification Drillholes (10 Nos., VDH3, 6, 10-15,19-20) and Preliminary Results Submission	95 days	Sat 28/4/18	Tue 21/8/18	100%	0 days						
139	Design Review	36 days	Thu 12/7/18	Wed 22/8/18	100%	0 days						
140	Cut Slopes CS1 & CS2	170 days	Fri 12/10/18	Mon 13/5/19	100%	0 days						
141	Excavation (crest to +55mPD)	4 days	Fri 12/10/18	Tue 16/10/18	100%	0 days						
142	Excavation (+55 to+50mPD)	11 days	Fri 12/10/18	Wed 24/10/18	100%	0 days						
143	Drainage and Maintenance Access (at +55mPD berm)	55 days	Tue 16/10/18	Tue 18/12/18	100%	0 days						
144	Drainage and Maintenance Access (+55 to +50 slope surface)	180 days	Tue 16/10/18	Mon 13/5/19	100%	0 days						
145	Cut Slope CS3	44 days	Wed 4/11/20	Thu 24/12/20	0%	44 days						
146	Excavation (crest to toe)	15 days	Wed 4/11/20	Fri 20/11/20	0%	15 days						
147	Drainage and Maintenance Access	29 days	Sat 21/11/20	Thu 24/12/20	0%	29 days	146					

3 Month Rolling Programme (Mar 2021 to May 2021)

ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021			
									4	5	6	
148	Cut Slopes CS11 , CS12 and CS13	837 days	Thu 23/8/18	Mon 21/6/21	79%	176.66 days						
149	Slope Cutting (crest to+94.5mPD)	31 days	Thu 23/8/18	Fri 28/9/18	100%	0 days						
150	Drainage and Maintenance Access (at crest)	29 days	Tue 2/10/18	Mon 5/11/18	100%	0 days						
151	Slope Cutting and Soil Nail (+94.5 to +87mPD, 59 nos. of Soil Nail)	40 days	Sat 6/10/18	Thu 22/11/18	100%	0 days						
152	Drainage and Maintenance Access (at +94.5mPD berm)	7 days	Fri 26/10/18	Fri 2/11/18	100%	0 days						
153	Drainage and Maintenance Access (+94.5 to +87mPD slope surface)+ GI Works	24 days	Fri 26/10/18	Thu 22/11/18	100%	0 days		Temporary stop Due to RFI22				
154	Slope Cutting and Soil Nail (+87 to+79.5mPD, 84Nos. of Soil Nail)	40 days	Thu 8/11/18	Mon 24/12/18	100%	0 days						
155	Drainage and Maintenance Access (at +87mPD berm)	33 days	Fri 26/10/18	Mon 3/12/18	100%	0 days						
156	RFI50 (Waiting Instruction / Abortive Works / Additional Earthwork+25m Uchannel at CS13crest)	61 days	Thu 22/11/18	Mon 4/2/19	100%	0 days						
157	RFI(Slope Cutting and Soil Nail - additional 24 Nos. of Soil Nail)	39 days	Fri 11/1/19	Thu 28/2/19	100%	0 days						
158	RFI50(Additional Drainage and Maintenance Access (at 87mPD berm)	13 days	Fri 1/2/19	Tue 19/2/19	100%	0 days						
159	Drainage and Maintenance Access (+79.5 to +87mPD slope surface)+ GI Works	10 days	Fri 8/2/19	Tue 19/2/19	100%	0 days						
160	Slope Cutting and Soil Nail (+72 to +79.5,115+21Nos. of Soil Nail)	90 days	Mon 21/1/19	Wed 15/5/19	100%	0 days						
161	Drainage and Maintenance Access (at +79.5mPD berm)	42 days	Fri 1/2/19	Mon 25/3/19	100%	0 days						
162	Drainage and Maintenance Access (+72 to +79.5mPD slope surface, CS13 crest)+ GI Works	13 days	Thu 2/5/19	Fri 17/5/19	100%	0 days						
163	Slope Cutting and Soil Nail (+64.5 to +72 mPD, ,192 Nos. of Soil Nail)	67 days	Mon 8/4/19	Tue 2/7/19	100%	0 days						
164	Drainage and Maintenance Access (at +72mPD berm)	29 days	Sat 13/4/19	Wed 22/5/19	100%	0 days						
165	Drainage and Maintenance Access (+64.5 to +72mPD slope surface)+ GI Works	17 days	Wed 3/7/19	Mon 22/7/19	100%	0 days	163	~85m, 5m/day using 2 gang				
166	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	Thu 6/2/20	100%	0 days						
167	Drainage and Maintenance Access (at +64.5mPD berm)	40 days	Tue 6/8/19	Sat 21/9/19	100%	0 days	166SS+30 days	~200m, 5m/day using 2 gang				
168	Drainage and Maintenance Access (+57 to +64.5mPD slope surface)+ GI Works	17 days	Fri 7/2/20	Wed 26/2/20	100%	0 days	166	~85m, 5m/day using 2 gang				
169	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	Wed 29/4/20	100%	0 days	193	4 nails/day & 10 drains/day using 2 rigs+14days				
170	Drainage and Maintenance Access for CS11 (at +57mPD berm)	20 days	Thu 26/3/20	Wed 22/4/20	100%	0 days	169SS+12 days	~60m, 3m/day				
171	Drainage and Maintenance Access for CS11 (below57 mPD slope surface/ on RW11)+ GI Works	17 days	Sat 2/5/20	Thu 21/5/20	100%	0 days	169	~50m, 3m/day				
172	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	Fri 22/5/20	100%	0 days	166,167,168FS-28 days	8 nails/day & 20 drains/day using 4 rigs+21days				
173	Drainage and Maintenance Access for CS12/13 (at +57mPD berm)	35 days	Wed 11/3/20	Fri 24/4/20	100%	0 days	172SS+28 days	~175m, 5m/day using 2 gang				
174	Drainage and Maintenance Access for CS12/CS13 (+49.5 to + 57mPD slope surface)+ GI Works	20 days	Sat 23/5/20	Mon 15/6/20	100%	0 days	172	~100m, 5m/day using 2 gang				
175	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	Tue 22/12/20	44%	96 days	172,173,174FS-12 days	8 nails/day & 20 drains/day using 4 rigs+21days				
176	Drainage and Maintenance Access for CS12/13 (at +49.5mPD berm)	42 days	Fri 3/7/20	Thu 20/8/20	100%	0 days	175SS+25 days	~210m, 5m/day using 2 gang				
177	Drainage and Maintenance Access for CS12/CS13 (+42 to +49.5mPD slope surface)+ GI Works	17 days	Sat 29/8/20	Thu 17/9/20	100%	0 days	175	~85m, 5m/day using 2 gang				
178	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	Mon 8/3/21	0%	59 days	175,176,177FS-20 days	4 nails/day & 10 drains/day using 2 rigs+21days				
179	Drainage and Maintenance Access for CS13 (at +42mPD berm)	28 days	Tue 19/1/21	Tue 23/2/21	0%	28 days	178SS+20 days	~140m, 5m/day using 2 gang				
180	Drainage and Maintenance Access for CS13 (+34.5 to +42mPD slope surface)+ GI Works	25 days	Tue 9/3/21	Fri 9/4/21	0%	25 days	178	~75m, 3m/day				
181	Slope Cutting and Soil Nail for CS13 (+34.5 mPDto toe, 73 nos. of Soil Nail, 27 nos. of Raking Drain)	57 days	Tue 16/3/21	Wed 26/5/21	0%	57 days	178,179,180FS-19 days	2nails/day & 5 drains/day using 1 rigs+14 days				
182	Drainage and Maintenance Access for CS13 (at +34.5mPD berm)	27 days	Mon 12/4/21	Thu 13/5/21	0%	27 days	181SS+20 days	~80m, 3m/day				
183	Drainage and Maintenance Access for CS13 (below+34.5 mPD slope surface)+ GI Works	21 days	Thu 27/5/21	Mon 21/6/21	0%	21 days	181	~65m, 3m/day				
184	Retaining Wall RW11	98 days	Tue 12/11/19	Wed 11/3/20	100%	0 days						
185	General Excavation with ELS to Formation Level RW11 Bay 1-4	30 days	Tue 12/11/19	Mon 16/12/19	100%	0 days	166	~30day for 4 bays				
186	Plate Load Test and Blinding Layer for RW11 Bays 1-4	5 days	Tue 17/12/19	Sat 21/12/19	100%	0 days	185	5 days for each test				
187	Base slab of Retaining Wall RW11 Bay 1-4	10 days	Sun 22/12/19	Mon 6/1/20	100%	0 days	186	4 to 5 days per bay				
188	Wall Stem of Retaining Wall RW11 Bay 1-4	20 days	Mon 13/1/20	Fri 7/2/20	100%	0 days	187	7 to 8 days per bay				
189	Plate Load Test and Blinding Layer for RW11 Bays 5-6	5 days	Tue 17/12/19	Sat 21/12/19	100%	0 days	185	5 days for each test				
190	Base slab of Retaining Wall RW11 Bay 5-6	10 days	Sun 22/12/19	Mon 6/1/20	100%	0 days	189	4 to 5 days per bay				
191	Wall Stem of Retaining Wall RW11 Bay 5-6	20 days	Tue 7/1/20	Sat 1/2/20	100%	0 days	190	7 to 8 days per bay				
192	Protective Coating / Subsoil Drain / Filter Layer	5 days	Sat 8/2/20	Thu 13/2/20	100%	0 days	188,191					
193	Filling Works behind Retaining Wall RW11, (~-5.8m, up to +54.8mPD)	23 days	Fri 14/2/20	Wed 11/3/20	100%	0 days	192	~5.8m, 0.25m per day (Rolling by Pass)				
194	Existing Slope Upgrading Works	73 days	Tue 1/12/20	Tue 2/3/21	0%	73 days						
195	Existing Feature 3NW-C/C256 Rock Joint Mapping, drainage and maintenance access	60 days	Tue 1/12/20	Mon 8/2/21	0%	60 days	172SS+110 days					
196	Existing Feature 3NW-C/C258 Slope Upgrading Works	56 days	Mon 28/12/20	Tue 2/3/21	0%	56 days						
197	Slope Cutting and Soil Nail (Crest to To, 29 Nos. of Soil Nail)	36 days	Mon 28/12/20	Sat 6/2/21	0%	36 days	172SS+110 days	2nails/ day using 1 rig +21days				
198	Drainage and Maintenance Access (Crest)	20 days	Mon 8/2/21	Tue 2/3/21	0%	20 days	197	~60m, 3m per day				
199	Cut Slope CS15, CS16 and CS17	753 days	Thu 16/8/18	Mon 1/3/21	98%	17.5 days						
200	Slope Cutting and Soil Nail (crest to+69.5mPD,25 nos. of Soil Nail)	36 days	Thu 16/8/18	Thu 27/9/18	100%	0 days						
201	Drainage and Maintenance Access (at crest)	15 days	Mon 20/8/18	Wed 5/9/18	100%	0 days						
202	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	Fri 16/11/18	100%	0 days						
203	Drainage and Maintenance Access (at +69.5mPD berm)	49 days	Mon 3/9/18	Thu 1/11/18	100%	0 days						
204	Drainage and Maintenance Access (+62 to +69.5mPD slope surface)+ GI Works	36 days	Fri 26/10/18	Thu 6/12/18	100%	0 days						
205	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	Fri 25/1/19	100%	0 days						
206	Drainage and Maintenance Access (at +62mPD berm)	26 days	Wed 7/11/18	Thu 6/12/18	100%	0 days						
207	Drainage and Maintenance Access (+54.5 to +62mPD slope surface)+ GI Works	38 days	Sat 29/12/18	Fri 15/2/19	100%	0 days						
208	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	Thu 18/7/19	100%	0 days						
209	Drainage and Maintenance Access (at +54.5mPD berm)	61 days	Sat 19/1/19	Wed 3/4/19	100%	0 days						
210	Drainage and Maintenance Access (+54.5 to +47mPD slope surface)+ GI Works	90 days	Wed 3/4/19	Thu 25/7/19	100%	0 days						
211	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	Mon 26/8/19	100%	0 days						
212	Drainage and Maintenance Access (at +47mPD berm)	38 days	Tue 2/7/19	Wed 14/8/19	100%	0 days						
213	Drainage and Maintenance Access (+39.5 to +47mPD slope surface)+ GI Works	23 days	Tue 27/8/19	Mon 23/9/19	100%	0 days	211	~70m, 3m/day				
214	Slope Cutting and Soil Nail (+39.5 to toe, 83 nos. of Soil Nail, 18nos. of Raking Drain)	59 days	Mon 4/5/20	Mon 13/7/20	100%	0 days	211	2nails/ day using 1 rig +14 days				
215	Drainage and Maintenance Access (at +39.5mPD berm and Slope Surface) + GI Works	30 days	Tue 5/1/21	Mon 1/3/21	32%	20.4 days		~90m, 3m/day				
216	Fill Slope FS17	52 days	Tue 2/3/21	Wed 5/5/21	0%	52 days						

3 Month Rolling Programme (Mar 2021 to May 2021)

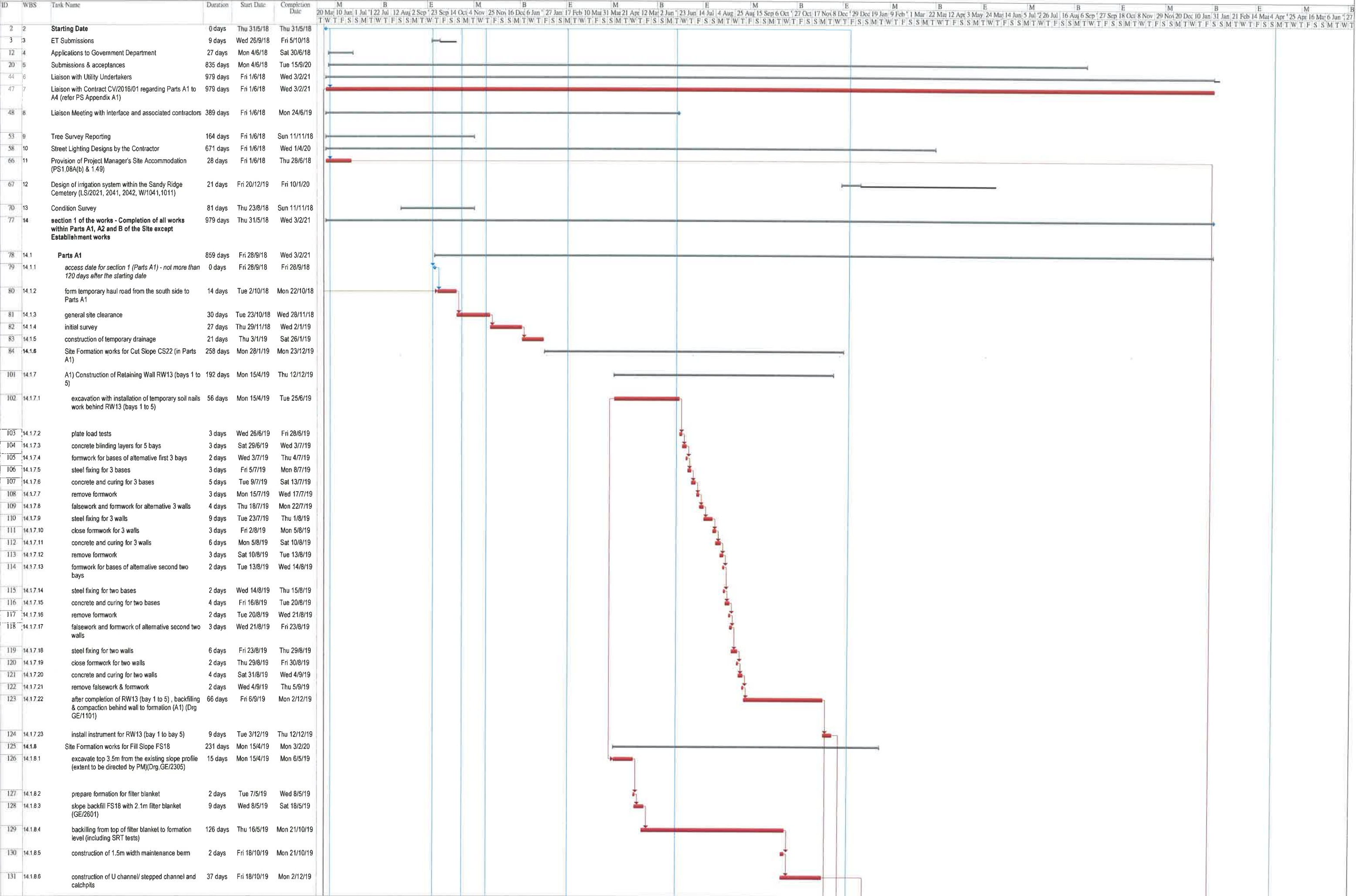
ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021			
									4	5	6	
217	Drainage and Maintenance Access at toe	28 days	Tue 2/3/21	Tue 6/4/21	0%	28 days	215	110m, 4m per day				
218	FS17 Filling Stage 1 (~2.5m max)	24 days	Wed 7/4/21	Wed 5/5/21	0%	24 days	217	3 days per SRT, ~2.5m = 8 layers...				
219	Civil Works for Sha Ling Road (M001 CH710 to CH825, MO11 CH00 to CH20, M014)	84 days	Mon 28/12/20	Mon 12/4/21	0%	84 days						
220	Waterworks / Drainage / Sewerage/ Utilities Works	27 days	Mon 28/12/20	Thu 28/1/21	0%	27 days						
221	Sewerage Works / Drainage Works	18 days	Mon 28/12/20	Mon 18/1/21	0%	18 days	140,147	~145m main drains, 8m per day				
222	Watermain FW1 (CH532-637), FW1a (CH000-029) and FW2 (CH530-618)	15 days	Tue 12/1/21	Thu 28/1/21	0%	15 days	221SS+12 days	~220m water mains, 15m per day				
223	Road Lighting Civil Works Provision	8 days	Tue 12/1/21	Wed 20/1/21	0%	8 days	221SS+12 days	~110m ducting, 15m per day				
224	Utilities (by others)	3 days	Tue 12/1/21	Thu 14/1/21	0%	3 days	221SS+12 days	~40m ducting, 15m per day				
225	Carriageway and Footway	57 days	Fri 29/1/21	Mon 12/4/21	0%	57 days						
226	Backfilling to Formation Level	11 days	Fri 29/1/21	Wed 10/2/21	0%	11 days	220	~175m, 100m per 6 day				
227	Carriageway	28 days	Thu 11/2/21	Thu 18/3/21	0%	28 days	226	~175m, 20m per 3 day + 1 day uchannel				
228	Footpath, Road Marking and Street Furniture	18 days	Fri 19/3/21	Mon 12/4/21	0%	18 days	227	~175m, 20m per 2 day				
229	Civil Works for PDA (PT04, PT05, PT06, PT07 and PT08)	190 days	Fri 5/6/20	Thu 21/1/21	5%	180.15 days						
230	Waterworks / Drainage / Sewerage/ Utilities Works	128 days	Fri 5/6/20	Fri 6/11/20	8%	117.25 days						
231	Drainage Works (with Petrol Interceptor)	90 days	Fri 5/6/20	Sat 19/9/20	9%	81.6 days	440	~215m main drains, 8m per day + 15 day for Petrol Interceptor(3 nos)				
232	Road Lighting Civil Works Provision	10 days	Tue 27/10/20	Fri 6/11/20	0%	10 days	231FS+28 days	~150m ducting, 15m per day				
233	Carriageway and Footway	62 days	Sat 7/11/20	Thu 21/1/21	0%	62 days						
234	Backfilling to Formation Level	13 days	Sat 7/11/20	Sat 21/1/20	0%	13 days	230	~435m, 200m per 6 day				
235	Carriageway	27 days	Mon 23/11/20	Wed 23/12/20	0%	27 days	234	~435m, 60m per 3 day + 5 day uchannel				
236	Footpath, Road Marking and Street Furniture	22 days	Thu 24/12/20	Thu 21/1/21	0%	22 days	235	~435m, 40m per 2 day				
237	Civil Works for PDA (M011 CH140-215,M08 CH70-102)	65 days	Tue 9/3/21	Fri 28/5/21	0%	65 days						
238	Waterworks / Drainage / Sewerage/ Utilities Works	27 days	Tue 9/3/21	Mon 12/4/21	0%	27 days						
239	Sewerage Works / Drainage Works	26 days	Tue 9/3/21	Sat 10/4/21	0%	26 days	178	~210m main drains, 8m per day				
240	Road Lighting Civil Works Provision	10 days	Mon 29/3/21	Mon 12/4/21	0%	10 days	239SS+17 days	~140m ducting, 15m per day				
241	Utilities (by others)	10 days	Mon 29/3/21	Mon 12/4/21	0%	10 days	239SS+17 days	~140m ducting, 15m per day				
242	Carriageway and Footway	38 days	Tue 13/4/21	Fri 28/5/21	0%	38 days						
243	Backfilling to Formation Level	6 days	Tue 13/4/21	Mon 19/4/21	0%	6 days	238	~105m, 100m per 6 day				
244	Carriageway	21 days	Tue 20/4/21	Fri 14/5/21	0%	21 days	243	~105m, 20m per 3 day + 5 day uchannel				
245	Footpath, Road Marking and Street Furniture	11 days	Sat 15/5/21	Fri 28/5/21	0%	11 days	244	~105m, 20m per 2 day				
246	Civil Works for Sha Ling Road (M001 CH610-710)	62 days	Fri 19/3/21	Fri 4/6/21	0%	62 days						
247	Waterworks / Drainage / Sewerage/ Utilities Works	27 days	Fri 19/3/21	Thu 22/4/21	0%	27 days						
248	Sewerage Works / Drainage Works	20 days	Fri 19/3/21	Wed 14/4/21	0%	20 days	436,227,235,178	~160m main drains, 8m per day				
249	Watermain FW1 (CH433-532) and FW2 (CH433-530)	13 days	Thu 8/4/21	Thu 22/4/21	0%	13 days	248SS+14 days	~195m water mains, 15m per day				
250	Road Lighting Civil Works Provision	7 days	Thu 8/4/21	Thu 15/4/21	0%	7 days	248SS+14 days	~100m ducting, 15m per day				
251	Utilities (by others)	9 days	Thu 8/4/21	Sat 17/4/21	0%	9 days	248SS+14 days	~130m ducting, 15m per day				
252	Carriageway and Footway	35 days	Fri 23/4/21	Fri 4/6/21	0%	35 days						
253	Backfilling to Formation Level	6 days	Fri 23/4/21	Thu 29/4/21	0%	6 days	247	~100m, 100m per 6 day				
254	Carriageway	19 days	Fri 30/4/21	Mon 24/5/21	0%	19 days	253	~100m, 20m per 3 day + 4 day uchannel				
255	Footpath, Road Marking and Street Furniture	10 days	Tue 25/5/21	Fri 4/6/21	0%	10 days	254	~100m, 20m per 2 day				
256	Civil Works for Sha Ling Road (M001 CH480-610, M08 CH00-70)	471 days	Tue 3/3/20	Sat 2/10/21	22%	365.4 days						
257	Sewage Detention Tank Civil and Structural Works	449 days	Tue 3/3/20	Sat 4/9/21	30%	314.49 days						
258	Civil and Structural Works	74 days	Tue 3/3/20	Wed 3/6/20	80%	15 days						
259	Excavation by open cut	25 days	Tue 3/3/20	Tue 31/3/20	40%	15 days						
260	Blinding layer concreting	1 day	Wed 1/4/20	Wed 1/4/20	100%	0 days	259					
261	Construction of base slab	7 days	Thu 2/4/20	Tue 14/4/20	100%	0 days	260					
262	Construction of wall and top slab	20 days	Wed 15/4/20	Sat 9/5/20	100%	0 days	261					
263	Construction of manhole	7 days	Mon 11/5/20	Mon 18/5/20	100%	0 days	262					
264	Backgilling	14 days	Tue 19/5/20	Wed 3/6/20	100%	0 days	263					
265	VDS and AMS for Sewage Detention Tank (Permanent Design and Submission Approval)	250 days	Mon 18/5/20	Wed 17/3/21	32%	170 days	264					
266	VDS and AMS for Sewage Detention Tank	140 days	Thu 18/3/21	Sat 4/9/21	0%	140 days	265					
267	Waterworks / Drainage / Sewerage/ Utilities Works	45 days	Tue 25/5/21	Sat 17/7/21	0%	45 days						
268	Sewerage Works / Drainage Works	40 days	Tue 25/5/21	Mon 12/7/21	0%	40 days	258,254,244	~320m main drains, 8m per day				
269	Watermain FW1 and FW2 (CH310-433)	17 days	Sat 26/6/21	Fri 16/7/21	0%	17 days	268SS+27 days	~245m water mains, 15m per day				
270	Road Lighting Civil Works Provision	18 days	Sat 26/6/21	Sat 17/7/21	0%	18 days	268SS+27 days	~270m ducting, 15m per day				
271	Utilities (by others)	17 days	Sat 26/6/21	Fri 16/7/21	0%	17 days	268SS+27 days	~250m ducting, 15m per day				
272	Carriageway and Footway	64 days	Mon 19/7/21	Sat 2/10/21	0%	64 days						
273	Backfilling to Formation Level	12 days	Mon 19/7/21	Sat 31/7/21	0%	12 days	267	~200m, 100m per 6 day				
274	Carriageway	32 days	Mon 2/8/21	Tue 7/9/21	0%	32 days	273	~200m, 20m per 3 day + 2 day uchannel				
275	Footpath, Road Marking and Street Furniture	20 days	Wed 8/9/21	Sat 2/10/21	0%	20 days	274	~200m, 20m per 2 day				
276	Civil Works for Sha Ling Road (M001 CH360-480)	74 days	Sat 5/6/21	Wed 1/9/21	0%	74 days						
277	Waterworks / Drainage / Sewerage/ Utilities Works	37 days	Sat 5/6/21	Tue 20/7/21	0%	37 days						
278	Sewerage Works / Drainage Works	28 days	Sat 5/6/21	Fri 9/7/21	0%	28 days	255	~220m main drains, 8m per day				
279	Watermain FW1 and FW2 (CH175-310)	18 days	Tue 29/6/21	Tue 20/7/21	0%	18 days	278SS+19 days	~270m water mains, 15m per day				
280	Road Lighting Civil Works Provision	15 days	Tue 29/6/21	Fri 16/7/21	0%	15 days	278SS+19 days	~220m ducting, 15m per day				
281	Utilities (by others)	11 days	Tue 29/6/21	Mon 12/7/21	0%	11 days	278SS+19 days	~110m ducting, 10m per day				
282	Carriageway and Footway	37 days	Wed 21/7/21	Wed 1/9/21	0%	37 days						
283	Backfilling to Formation Level	7 days	Wed 21/7/21	Wed 28/7/21	0%	7 days	277	~120m, 100m per 6 day				
284	Carriageway	18 days	Thu 29/7/21	Wed 18/8/21	0%	18 days	283	~120m, 20m per 3 day				
285	Footpath, Road Marking and Street Furniture	12 days	Thu 19/8/21	Wed 1/9/21	0%	12 days	284	~120m, 20m per 2 day				
286	Civil Works for Sha Ling Road (M001 CH180-360)	109 days	Thu 19/8/21	Wed 29/12/21	0%	109 days						
287	Waterworks / Drainage / Sewerage/ Utilities Works	59 days	Thu 19/8/21	Fri 29/10/21	0%	59 days						
288	Drainage and Sewerage Works	40 days	Thu 19/8/21	Wed 6/10/21	0%	40 days	216,284	~320m main drains, 8m per day				
289	Watermain FW1 and FW2 (CH000-175)	23 days	Mon 20/9/21	Tue 19/10/21	0%	23 days	288SS+27 days	~350m water mains, 15m per day				
290	Road Lighting Civil Works Provision	22 days	Mon 20/9/21	Mon 18/10/21	0%	22 days	288SS+27 days	~320m ducting, 15m per day				

ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021			
291	Utilities (by others)	32 days	Mon 20/9/21	Fri 29/10/21	0%	32 days	288SS+27 days	~160m ducting, 5m per day	4	5	6	
292	Carriageway and Footway	50 days	Sat 30/10/21	Wed 29/12/21	0%	50 days						
293	Backfilling to Formation Level	10 days	Sat 30/10/21	Wed 10/11/21	0%	10 days	287	~160m, 100m per 6 day				
294	Carriageway	24 days	Thu 11/11/21	Wed 8/12/21	0%	24 days	293	~160m, 20m per 3 day				
295	Footpath, Road Marking and Street Furniture	16 days	Thu 9/12/21	Wed 29/12/21	0%	16 days	294	~160m, 20m per 2 day				
296	Part B2, G1 and G2	1201 days	Fri 15/12/17	Wed 5/1/22	58%	506.96 days						
297	Access Date for Part G1 and G2	0 days	Tue 5/2/19	Tue 5/2/19	0%	0 days						
298	Land Decontamination Works	293 days	Tue 2/10/18	Thu 26/9/19	100%	0 days						
299	Re-appraisal and Contamination Assessment Plan (CAP) Submission to EPD	10 days	Tue 2/10/18	Fri 12/10/18	100%	0 days						
300	EPD Review and Acceptance for CAP	195 days	Fri 12/10/18	Wed 12/6/19	100%	0 days						
301	Environmental SI for Determination of Decontamination and SI Testing	70 days	Tue 28/5/19	Mon 19/8/19	100%	0 days						
302	Contamination Assessment Report (CAR) Submission to EPD	18 days	Tue 20/8/19	Mon 9/9/19	100%	0 days	301					
303	EPD Review and Acceptance for CAR	14 days	Tue 10/9/19	Thu 26/9/19	100%	0 days	302					
304	Civil Works for Sha Ling Road (M001 CH40-110)	668 days	Tue 21/5/19	Tue 17/8/21	73%	180.94 days						
305	Objection from Local Village (EW16 & 18)	348 days	Tue 21/5/19	Tue 21/7/20	100%	0 days		EW No.16,18				
306	Application for Road Closure / Road Diversion	10 days	Wed 22/7/20	Sat 1/8/20	0%	10 days	305					
307	Noise Barrier Bay 5 to Bay 8	260 days	Mon 3/8/20	Fri 18/6/21	80%	52 days						
308	General Excavation with ELS to Formation Level Bay 5 to Bay 8	15 days	Mon 3/8/20	Wed 19/8/20	100%	0 days	306					
309	Base slab of Noise Barrier Bay 5 to Bay 8	30 days	Thu 20/8/20	Wed 23/9/20	100%	0 days	308					
310	Wall Stem of Noise Barrier Bay 5 to Bay 8	30 days	Thu 24/9/20	Sat 31/10/20	100%	0 days	309					
311	Protective Coating /Temp Fill	5 days	Mon 2/11/20	Fri 6/11/20	100%	0 days	310					
312	Installation of panel	20 days	Wed 26/5/21	Fri 18/6/21	0%	20 days	319					
313	Waterworks / Drainage / Sewerage/ Utilities Works	50 days	Sat 19/6/21	Tue 17/8/21	0%	50 days						
314	Sewerage Works / Drainage Works	35 days	Sat 19/6/21	Fri 30/7/21	0%	35 days	307	~140m main drains, 4m per day				
315	Watermain FW3 (CH045-105)	10 days	Sat 31/7/21	Wed 11/8/21	0%	10 days	314	~60m water mains, 6m per day				
316	Road Lighting Civil Works Provision	10 days	Sat 31/7/21	Wed 11/8/21	0%	10 days	314	~140m ducting, 15m per day				
317	Utilities (by others)	15 days	Sat 31/7/21	Tue 17/8/21	0%	15 days	314	~70m ducting, 5m per day				
318	Carriageway and Footway	59 days	Thu 13/5/21	Fri 23/7/21	0%	59 days						
319	Backfilling to Formation Level	10 days	Thu 13/5/21	Tue 25/5/21	0%	10 days	370	~70m, 100m per 10 day				
320	Carriageway	42 days	Wed 26/5/21	Thu 15/7/21	0%	42 days	319	~70m, 20m per 12 day				
321	Footpath, Road Marking and Street Furniture	7 days	Fri 16/7/21	Fri 23/7/21	0%	7 days	320	~70m, 20m per 2 day				
322	Ground Investigation and Geotechnical instrumentation for Commencement of Slopework	45 days	Fri 8/2/19	Mon 1/4/19	100%	0 days						
323	Trial Pit Excavation / Installation of Instruments and Preliminary Results Submission	45 days	Fri 8/2/19	Mon 1/4/19	100%	0 days	11,297					
324	Fill Slope FS13 and FS14	56 days	Wed 18/8/21	Mon 25/10/21	0%	56 days						
325	Drainage and Maintenance Access at toe	32 days	Wed 18/8/21	Fri 24/9/21	0%	32 days	322,313	260m, 8m per day				
326	FS13 and FS14 Filling Stage 1 (~2.5m max)	24 days	Sat 25/9/21	Mon 25/10/21	0%	24 days	325	3 days per SRT, ~2.5m = 8 layers...				
327	Cut Slope CS14	20 days	Tue 26/10/21	Wed 17/11/21	0%	20 days						
328	Slope Cutting (crest to toe)	3 days	Tue 26/10/21	Thu 28/10/21	0%	3 days	324					
329	Drainage and Maintenance Access (at crest)	17 days	Fri 29/10/21	Wed 17/11/21	0%	17 days	328	~50m, 3m/day				
330	Civil Works for Sha Ling Road (M001 CH110-180)	143 days	Fri 16/7/21	Wed 5/1/22	0%	143 days						
331	Waterworks / Drainage / Sewerage/ Utilities Works	45 days	Fri 16/7/21	Mon 6/9/21	0%	45 days						
332	Sewerage Works / Drainage Works	30 days	Fri 16/7/21	Thu 19/8/21	0%	30 days	320	~120m main drains, 4m per day				
333	Watermain FW3 (CH105-175)	12 days	Fri 20/8/21	Thu 2/9/21	0%	12 days	332	~70m water mains, 6m per day				
334	Road Lighting Civil Works Provision	10 days	Fri 20/8/21	Tue 31/8/21	0%	10 days	332	~140m ducting, 15m per day				
335	Utilities (by others)	15 days	Fri 20/8/21	Mon 6/9/21	0%	15 days	332	~70m ducting, 5m per day				
336	Carriageway and Footway	59 days	Tue 26/10/21	Wed 5/1/22	0%	59 days	326					
337	Backfilling to Formation Level	10 days	Tue 26/10/21	Fri 5/11/21	0%	10 days	331	~70m, 100m per 10 day				
338	Carriageway	42 days	Sat 6/11/21	Fri 24/12/21	0%	42 days	337	~70m, 20m per 12 day				
339	Footpath, Road Marking and Street Furniture	7 days	Tue 28/12/21	Wed 5/1/22	0%	7 days	338	~70m, 20m per 2 day				
340	Man Kam To Road Bus Shelter (PT01, PT02 and PT03)	1090 days	Fri 15/12/17	Sat 21/8/21	62%	417.49 days						
341	Used as Temporary Site Office / Storage Area	340 days	Fri 15/12/17	Mon 11/2/19	100%	0 days	2SS					
342	Investigation for DongJiang Watermain(CE23)	82 days	Thu 10/1/19	Tue 23/4/19	100%	0 days						
343	Works Area Handing Over to WSD as Request	198 days	Mon 15/4/19	Thu 12/12/19	100%	0 days						
344	Interface Issue with C2 (As request by Arup to delay XP application) (Including Temp. Road Diversion)	290 days	Tue 28/5/19	Tue 19/5/20	35%	188.75 days		NCE035				
345	TTA and XP Application at Man Kam To Road	14 days	Wed 20/5/20	Thu 4/6/20	0%	14 days	344					
346	Works Area Handling to WSD for DongJiang Watermain Works	37 days	Wed 25/11/20	Sat 9/1/21	0%	37 days		NCE080				
347	Waterworks / Drainage / Utilities Works	90 days	Mon 11/1/21	Mon 3/5/21	0%	90 days						
348	Sewerage Work (Petrol Interceptor)	15 days	Thu 25/3/21	Wed 14/4/21	0%	15 days	349					
349	Sewerage Works / Drainage Works	60 days	Mon 11/1/21	Wed 24/3/21	0%	60 days	346	~115m main drains, 4m per day				
350	Road Lighting Civil Works Provision	11 days	Thu 25/3/21	Fri 9/4/21	0%	11 days	349	~160m ducting, 15m per day				
351	Utilities (by others)	30 days	Thu 25/3/21	Mon 3/5/21	0%	30 days	349					
352	Carriageway and Footway	92 days	Tue 4/5/21	Sat 21/8/21	0%	92 days						
353	Backfilling to Formation Level	12 days	Tue 4/5/21	Mon 17/5/21	0%	12 days	347	~185m, 100m per 6 day				
354	Carriageway	56 days	Tue 18/5/21	Sat 24/7/21	0%	56 days	353	~185m, 20m per 6 day				
355	Footpath, Road Marking and Street Furniture	19 days	Mon 26/7/21	Mon 16/8/21	0%	19 days	354	~185m, 20m per 2 day				
356	Reinstatement to existing Man Kam To Road	5 days	Tue 17/8/21	Sat 21/8/21	0%	5 days	355					
357	Civil Works for Sha Ling Road (M001 CH00-40)	985 days	Thu 30/8/18	Wed 22/12/21	42%	575.62 days						
358	TTA and XP Application at Man Kam To Road	14 days	Fri 15/1/21	Sat 30/1/21	0%	14 days	361					
359	Works Area Handing Over to WSD as Request	120 days	Mon 6/5/19	Thu 26/9/19	80%	24 days		NCE No.34				
360	Work Area Handling to Sang Hing for Turn Around	190 days	Mon 6/4/20	Tue 24/11/20	0%	190 days		NCE No.70				
361	Works Area Handling to WSD for DongJiang Watermain Works	41 days	Wed 25/11/20	Thu 14/1/21	0%	41 days	360	NCE No.80				
362	Consent from WSD for Works Near Dong Jing Watermain	325 days	Thu 30/8/18	Fri 4/10/19	99%	3.89 days						
363	Investigation works / Trial Pits for Watermains	150 days	Thu 30/8/18	Sat 2/3/19	100%	0 days						

ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021				
364	Submission for Tempworks	104 days	Thu 21/2/19	Sat 29/6/19	100%	0 days			4	5	6		
365	Approval from WSD	80 days	Tue 2/7/19	Fri 4/10/19	95%	4 days	364						
366	Noise Barrier Bay 1-4	130 days	Mon 1/2/21	Tue 13/7/21	0%	130 days							
367	General Excavation with ELS to Formation Level Bay 1-4	30 days	Mon 1/2/21	Wed 10/3/21	0%	30 days	358,310,359						
368	Base slab of Noise Barrier Bay 1-4	30 days	Thu 11/3/21	Sat 17/4/21	0%	30 days	367						
369	Wall Stem of Noise Barrier Bay 1-4	15 days	Mon 19/4/21	Thu 6/5/21	0%	15 days	368						
370	Protective Coating /Temp Fill	5 days	Fri 7/5/21	Wed 12/5/21	0%	5 days	369						
371	Installation of panel	20 days	Sat 19/6/21	Tue 13/7/21	0%	20 days	312						
372	Waterworks / Drainage / Sewerage/ Utilities Works (RHS + Man Kam To EB Slow Lane)	62 days	Thu 13/5/21	Tue 27/7/21	0%	62 days							
373	Sewerage Works / Drainage Works	54 days	Thu 13/5/21	Sat 17/7/21	0%	54 days	370	~95m main drains, 4m per day + 30day crossing watermain					
374	Watermain FW3 (CH000-045)	6 days	Mon 19/7/21	Sat 24/7/21	0%	6 days	373	~45m water mains, 6m per day					
375	Road Lighting Civil Works Provision	8 days	Mon 19/7/21	Tue 27/7/21	0%	8 days	373	~100m ducting, 15m per day					
376	Utilities (by others)	25 days	Thu 13/5/21	Fri 11/6/21	0%	25 days	370						
377	Carriageway and Footway (RHS+ Man Kan To EB Slow Lane)	38 days	Wed 28/7/21	Thu 9/9/21	0%	38 days							
378	Backfilling to Formation Level	10 days	Wed 28/7/21	Sat 7/8/21	0%	10 days	372	~40m, 100m per 10 day					
379	Carriageway	24 days	Mon 9/8/21	Sat 4/9/21	0%	24 days	378	~40m, 20m per 12 day					
380	Footpath, Road Marking and Street Furniture	4 days	Mon 6/9/21	Thu 9/9/21	0%	4 days	379	~40m, 20m per 2 day					
381	Waterworks / Drainage / Sewerage/ Utilities Works (LHS)	52 days	Mon 6/9/21	Mon 8/11/21	0%	52 days							
382	Sewerage Works / Drainage Works	42 days	Mon 6/9/21	Wed 27/10/21	0%	42 days	379	~45m main drains, 4m per day + 30day crossing watermain					
383	Road Lighting Civil Works Provision	5 days	Thu 28/10/21	Tue 2/11/21	0%	5 days	382	~50m ducting, 15m per day					
384	Utilities (by others)	10 days	Thu 28/10/21	Mon 8/11/21	0%	10 days	382	~50m ducting, 5m per day					
385	Carriageway and Footway (LHS)	38 days	Tue 9/11/21	Wed 22/12/21	0%	38 days							
386	Backfilling to Formation Level	10 days	Tue 9/11/21	Fri 19/11/21	0%	10 days	381	~40m, 100m per 10 day					
387	Carriageway	24 days	Sat 20/11/21	Fri 17/12/21	0%	24 days	386	~40m, 20m per 12 day					
388	Footpath, Road Marking and Street Furniture	4 days	Sat 18/12/21	Wed 22/12/21	0%	4 days	387	~40m, 20m per 2 day					
389	Part C	876 days	Sat 15/12/18	Mon 29/11/21	22%	684.68 days							
390	Consent from WSD for Works Near Dong Jing Watermain	636 days	Sat 15/12/18	Sat 6/2/21	37%	399.73 days							
391	Investigation works / Trial Pits for Watermains	60 days	Sat 15/12/18	Fri 1/3/19	100%	0 days							
392	Submission for Tempworks	102 days	Sat 23/2/19	Sat 29/6/19	100%	0 days							
393	Approval from WSD (RFI No.66) & Re-design the arrangement	480 days	Tue 2/7/19	Sat 6/2/21	16%	403.5 days	392						
394	Refuse Collection Point	240 days	Mon 8/2/21	Mon 29/11/21	0%	240 days							
395	General Excavation with ELS to Formation	30 days	Mon 8/2/21	Wed 17/3/21	0%	30 days	393						
396	Substructure Construction	45 days	Thu 18/3/21	Thu 13/5/21	0%	45 days	395						
397	Superstructure Construction	45 days	Fri 14/5/21	Thu 8/7/21	0%	45 days	396						
398	Pavement / Footpath reinstatment	90 days	Fri 9/7/21	Mon 25/10/21	0%	90 days	397						
399	ABWF Works	120 days	Fri 9/7/21	Mon 29/11/21	0%	120 days	397						
400	E&M and Waterworks	120 days	Fri 9/7/21	Mon 29/11/21	0%	120 days	397						
401	Landscape Works	325 days	Mon 28/12/20	Sat 29/1/22	0%	325 days							
402	at Cut Slope CS1, CS2, CS3	90 days	Mon 28/12/20	Mon 19/4/21	0%	90 days	140,145						
403	at Cut Slope CS11, CS12, CS13	90 days	Tue 22/6/21	Thu 7/10/21	0%	90 days	148						
404	at Cut Slope CS15, CS16, CS17	90 days	Tue 2/3/21	Mon 21/6/21	0%	90 days	199						
405	at Fill Slope FS13, FS14, FS17	60 days	Tue 26/10/21	Thu 6/1/22	0%	60 days	216,324						
406	Sha Ling Road and Man Kam To Road	30 days	Thu 23/12/21	Sat 29/1/22	0%	30 days	388						
407	Woodland Planting at Site 4, 7, 8, 9	170 days	Tue 2/3/21	Fri 24/9/21	0%	170 days	215						
408	Section 3 of the Works (Part E)	457 days	Thu 31/5/18	Tue 10/12/19	91%	40.56 days							
409	Ground Investigation and Geotechnical Instrumentation for Commencement of Slopework	64 days	Thu 31/5/18	Wed 15/8/18	100%	0 days							
410	Verification Drillholes (2 Nos., VDH4-5) and Preliminary Results Submission	43 days	Thu 31/5/18	Sat 21/7/18	100%	0 days							
411	Design Review	36 days	Thu 5/7/18	Wed 15/8/18	100%	0 days							
412	Fill Slope FS3 (Section 17 at Drawing C1/GE/1053)	424 days	Wed 11/7/18	Tue 10/12/19	99%	4.02 days							
413	Time Lag of CE16	100 days	Wed 11/7/18	Wed 7/11/18	100%	0 days							
414	RFI046 Outfall Location	47 days	Mon 8/10/18	Sat 1/12/18	100%	0 days							
415	Drainage, Maintenance Access at slope toe	63 days	Sat 16/2/19	Mon 6/5/19	100%	0 days							
416	Construction of Outfall CP14X	11 days	Mon 7/1/19	Fri 18/1/19	100%	0 days							
417	FS3 Filling Stage 1 (~+16 to +17.6 mPD)	121 days	Thu 6/12/18	Wed 8/5/19	100%	0 days							
418	CE50-No Fine at Slope Toe	12 days	Fri 26/4/19	Fri 10/5/19	100%	0 days							
419	FS Filling (+16.9 to +27.6 mPD) (Rolling by Pass)	60 days	Thu 23/5/19	Fri 2/8/19	100%	0 days							
420	FS Filling (+27.6to 30 mPD) (Rolling by Pass)	12 days	Sat 3/8/19	Fri 16/8/19	100%	0 days	419	0.2m per day (Rolling by Pass)					
421	FS3 Filling Stage 1 (+16.9 to +21 mPD)	41 days	Sat 17/8/19	Sat 5/10/19	100%	0 days	420	3 days per SRT					
422	Drainage and Maintenance Access (+21 to +28.5 mpD)	19 days	Tue 8/10/19	Tue 29/10/19	100%	0 days	421	75m, 4m per day					
423	FS3 Filling Stage 2 (~7.5m, 21 to +28.5 mPD)	10 days	Wed 30/10/19	Sat 9/11/19	100%	0 days	422	3 days per SRT +25day (CE16)					
424	Drainage and Maintenance Access (+28.5 to +35.5mpD)	15 days	Fri 22/11/19	Mon 9/12/19	67%	5 days	423	85m, 4m per day					
425	FS3 Filling Stage 3 (~7.5m, +28.5 to 35.5 mPD)	17 days	Thu 21/11/19	Tue 10/12/19	100%	0 days	432,433	3 days per SRT +25day (CE16)					
426	Retaining Wall RW4	96 days	Sat 17/8/19	Tue 10/12/19	99%	0.68 days							
427	General Excavation to Formation Level(Bay1~2)	23 days	Sat 17/8/19	Thu 12/9/19	100%	0 days	420						
428	Plate Load Test and Blinding Layer for Retaining Wall Bays 3-8	5 days	Fri 13/9/19	Thu 19/9/19	100%	0 days	427	5 days for each test					
429	Plate Load Test and Blinding Layer for Retaining Wall Bays 1-2	5 days	Fri 20/9/19	Wed 25/9/19	100%	0 days	428	5 days for each test					
430	Base Slab of Retaining Wall RW4 Bay 1-4	16 days	Fri 20/9/19	Thu 10/10/19	100%	0 days	428	4 to 5 days per bay					
431	Base Slab of Retaining Wall RW4 Bay 5-8	16 days	Thu 26/9/19	Wed 16/10/19	100%	0 days	429	4 to 5 days per bay					
432	Wall Stem of Retaining Wall RW4 Bay 1-4	30 days	Fri 11/10/19	Thu 14/11/19	100%	0 days	430	7 to 8 days per bay					
433	Wall Stem of Retaining Wall RW4 Bay 5-8	20 days	Thu 17/10/19	Fri 8/11/19	100%	0 days	431	7 to 8 days per bay					
434	Protective Coating / Subsoil Drain / Filter Layer	5 days	Sat 9/11/19	Thu 14/11/19	100%	0 days	432,433						
435	Backfilling behind RW4 and Fill Slop FS4 (~8m up to +35.5 mPD)	22 days	Fri 15/11/19	Tue 10/12/19	95%	1 day	434	~6.85m, 0.25m per day (Rolling by Pass)					
436	Fill Slope FS2	47 days	Thu 17/10/19	Tue 10/12/19	100%	0 days							
437	Drainage and Maintenance Access (+35.5 to +43.0 mpD)	19 days	Thu 17/10/19	Thu 7/11/19	100%	0 days	431	75m, 4m per day					

ID	Task Name	Duration	Start	Finish	% Complete	Remaining Duration	Predecessors	Notes	2021			
									4	5	6	
438	FS2 Filling Stage 1 (~7.5m, +35.5 to +43 mPD)	20 days	Fri 8/11/19	Sat 30/11/19	100%	0 days	437	3 days per SRT, ~7.5m = 25 layers				
439	Drainage and Maintenance Access (+43.0 to +50 mpD)	30 days	Thu 17/10/19	Wed 20/11/19	100%	0 days	431	75m, 4m per day				
440	FS2 Filling Stage 2 (~7.5m, +43 to +50 mPD)	18 days	Wed 20/11/19	Tue 10/12/19	100%	0 days	439	3 days per SRT, ~7m = 24 layers				
441	Cut Slope CS18 and CS19	235 days	Mon 25/2/19	Sat 7/12/19	100%	0 days						
442	Slope Cutting (+54.5 to crest)	30 days	Wed 27/2/19	Tue 2/4/19	100%	0 days						
443	Confirmation of Interface Details at CS18/19 (NCE29)	30 days	Wed 27/2/19	Tue 2/4/19	100%	0 days						
444	Drainage and Maintenance Access (crest)+ GI Works	8 days	Wed 3/4/19	Fri 12/4/19	100%	0 days						
445	Slope Cutting and Raking Drain (+47 to +54.5mPD, 13 nos. of Raking Drain)	113 days	Mon 25/2/19	Mon 15/7/19	100%	0 days		match with CS16/17 works				
446	Drainage and Maintenance Access (+54.5 to +62mPD slope surface/berm)+ GI Works	30 days	Thu 4/4/19	Wed 15/5/19	100%	0 days						
447	Slope Cutting and Raking Drain (+47mPD to toe, 18 nos. of Raking Drain)	110 days	Mon 6/5/19	Fri 13/9/19	100%	0 days	446FS-30 days,211	match with CS16/17 works				
448	Drainage and Maintenance Access (below +47mPD slope surface/berm)+ GI Works	70 days	Sat 14/9/19	Sat 7/12/19	100%	0 days	447	~90m, 3m/day				
449	Landscape Works	67 days	Mon 16/9/19	Wed 4/12/19	0%	67 days						
450	at Fill Slope FS2, FS3	50 days	Tue 8/10/19	Wed 4/12/19	0%	50 days	421					
451	at Cut Slope CS18, CS19	60 days	Mon 16/9/19	Tue 26/11/19	0%	60 days	447					

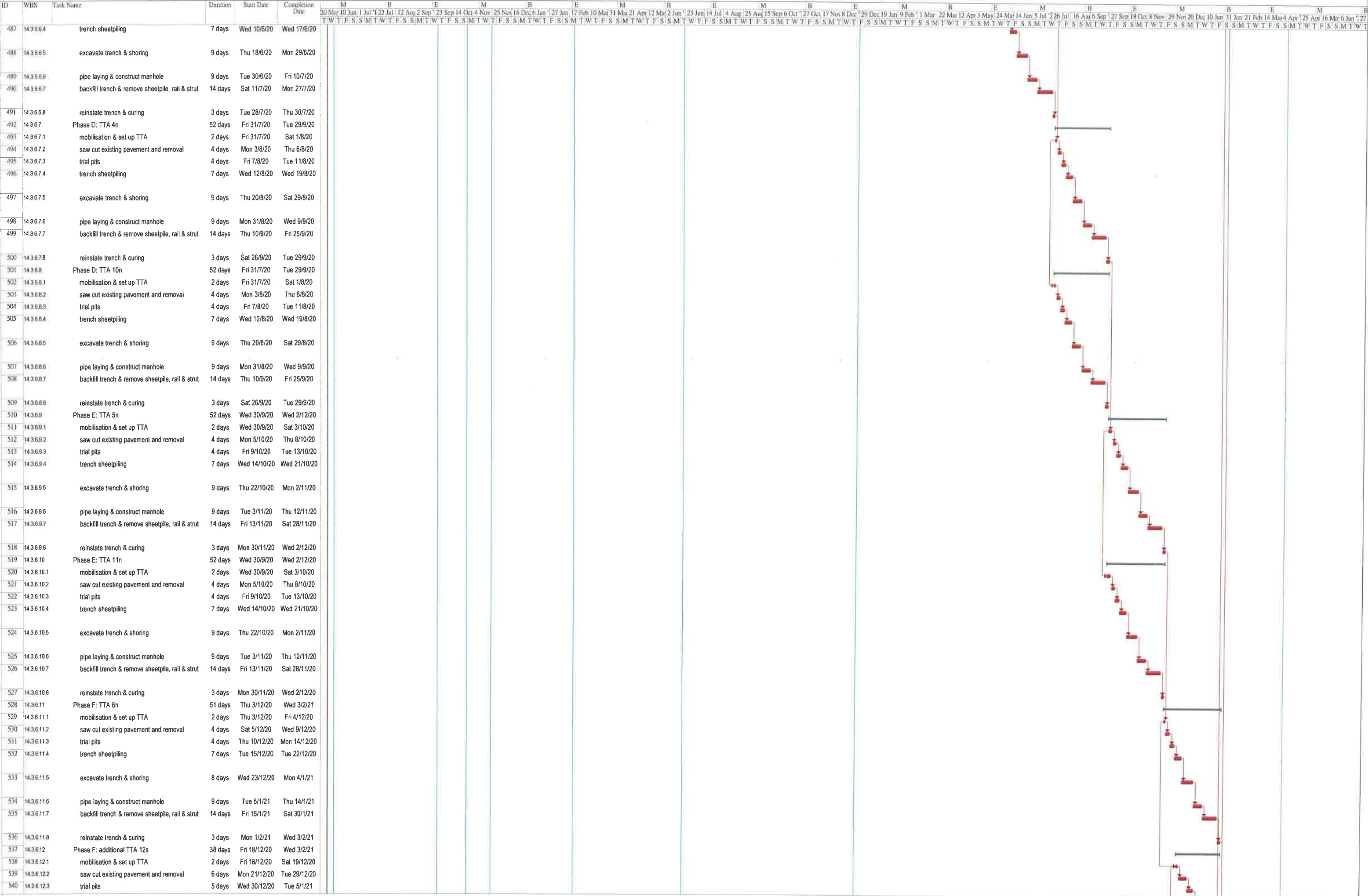
**Three Months rolling Programme of
Contract CV/2017/02**



Sang Hing Civil Contractors Company Limited



3 month rolling programme 20210326(26 Mar 21-25 Jun 21)



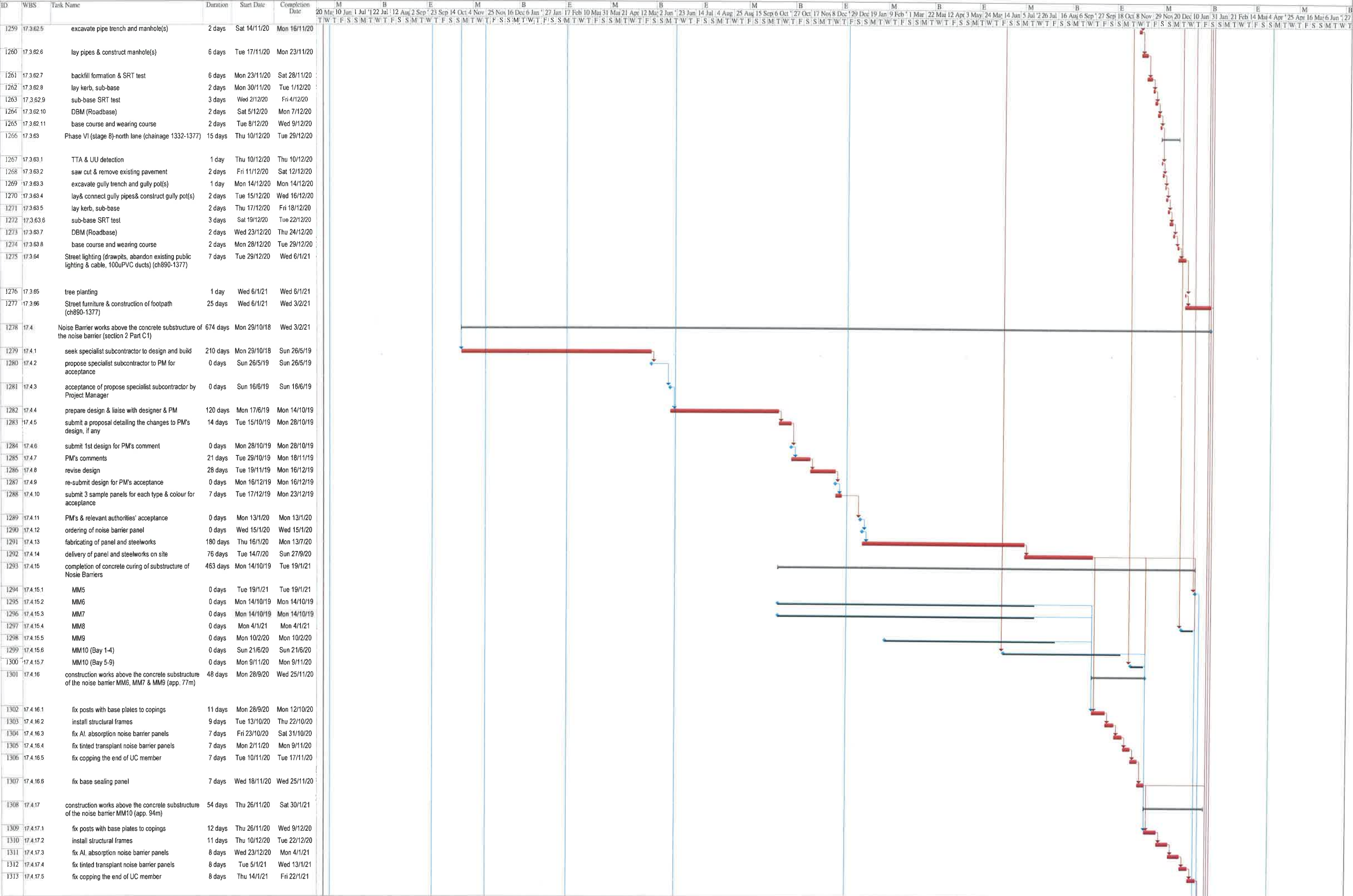
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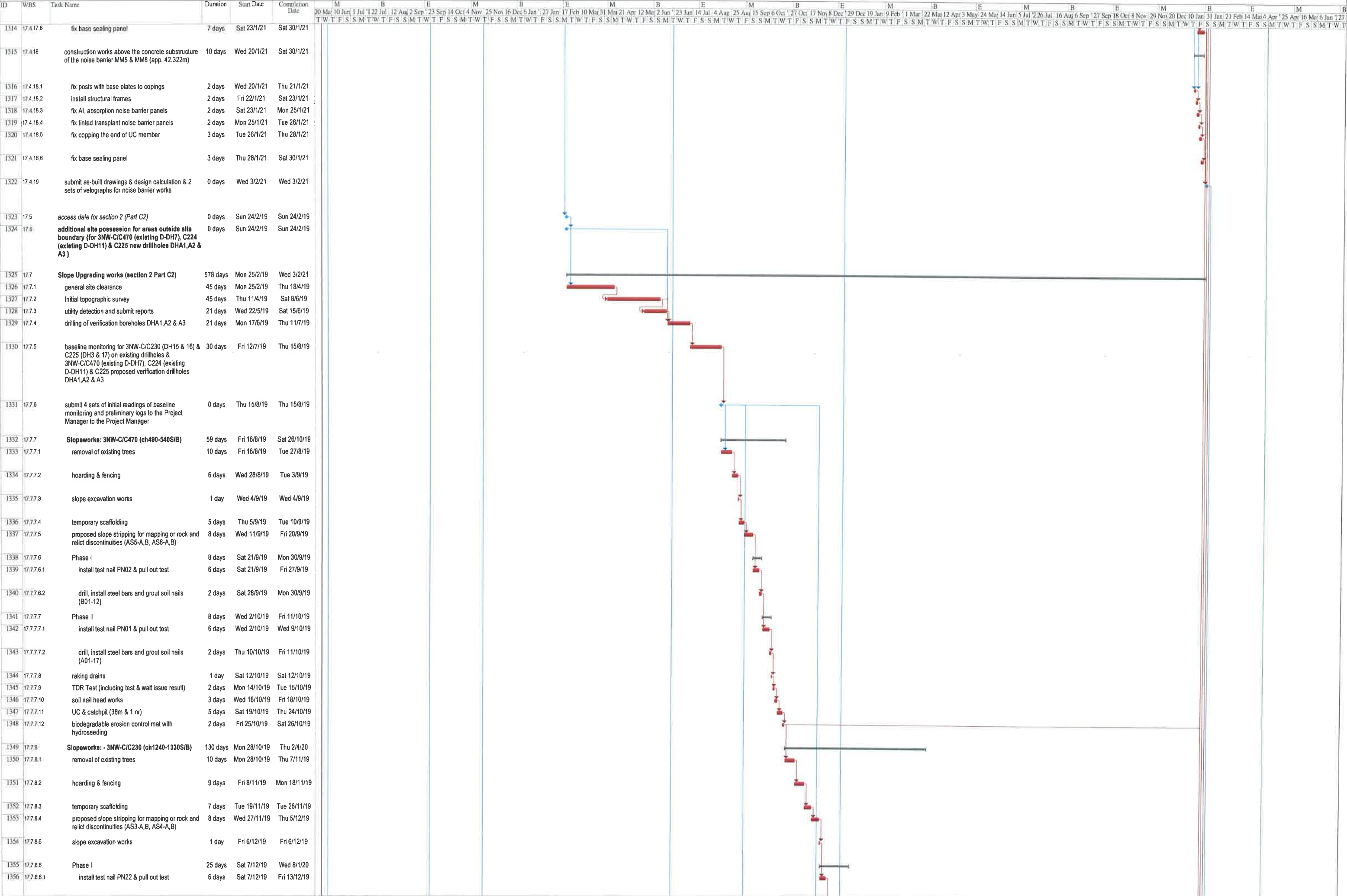
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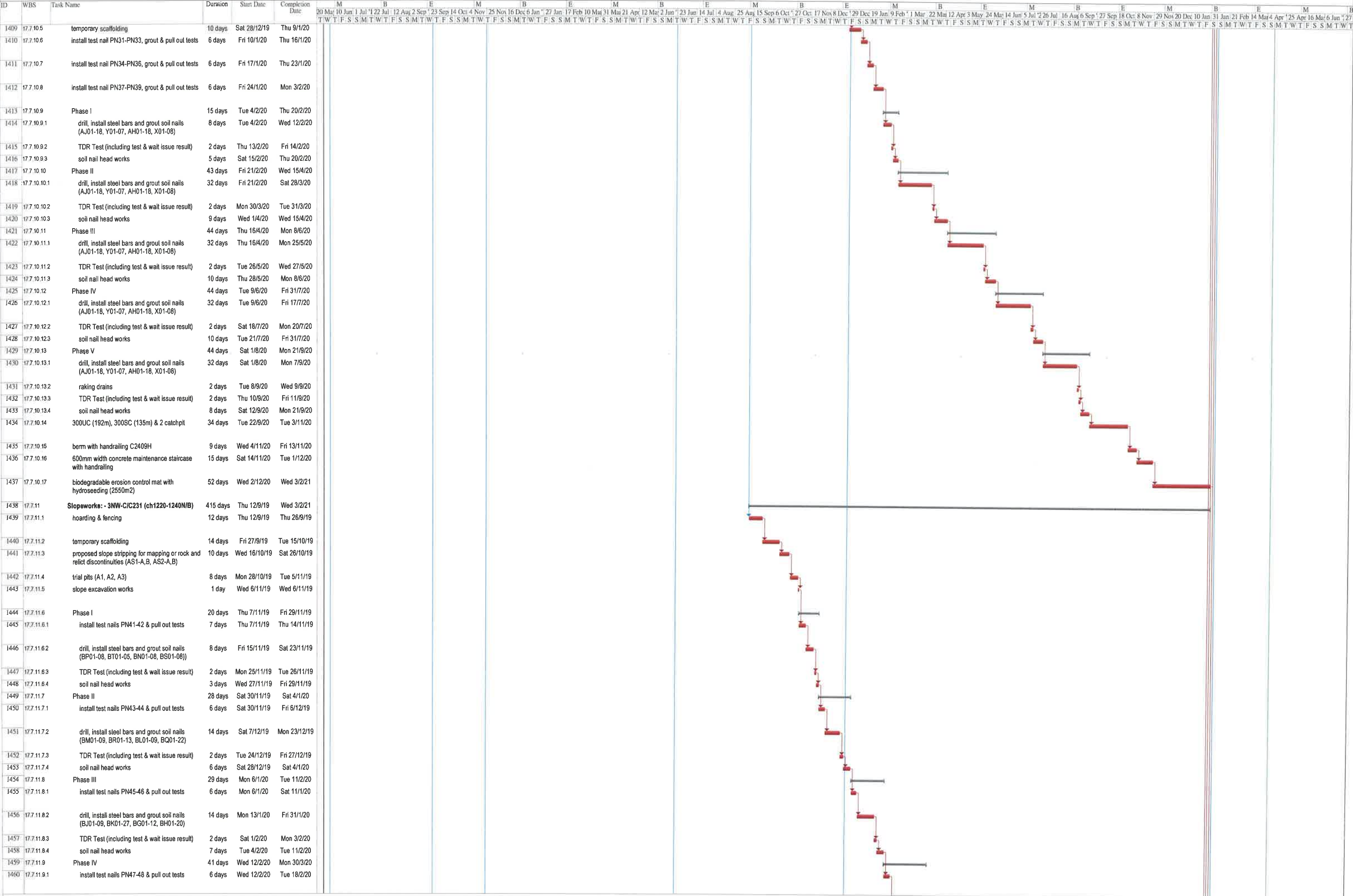
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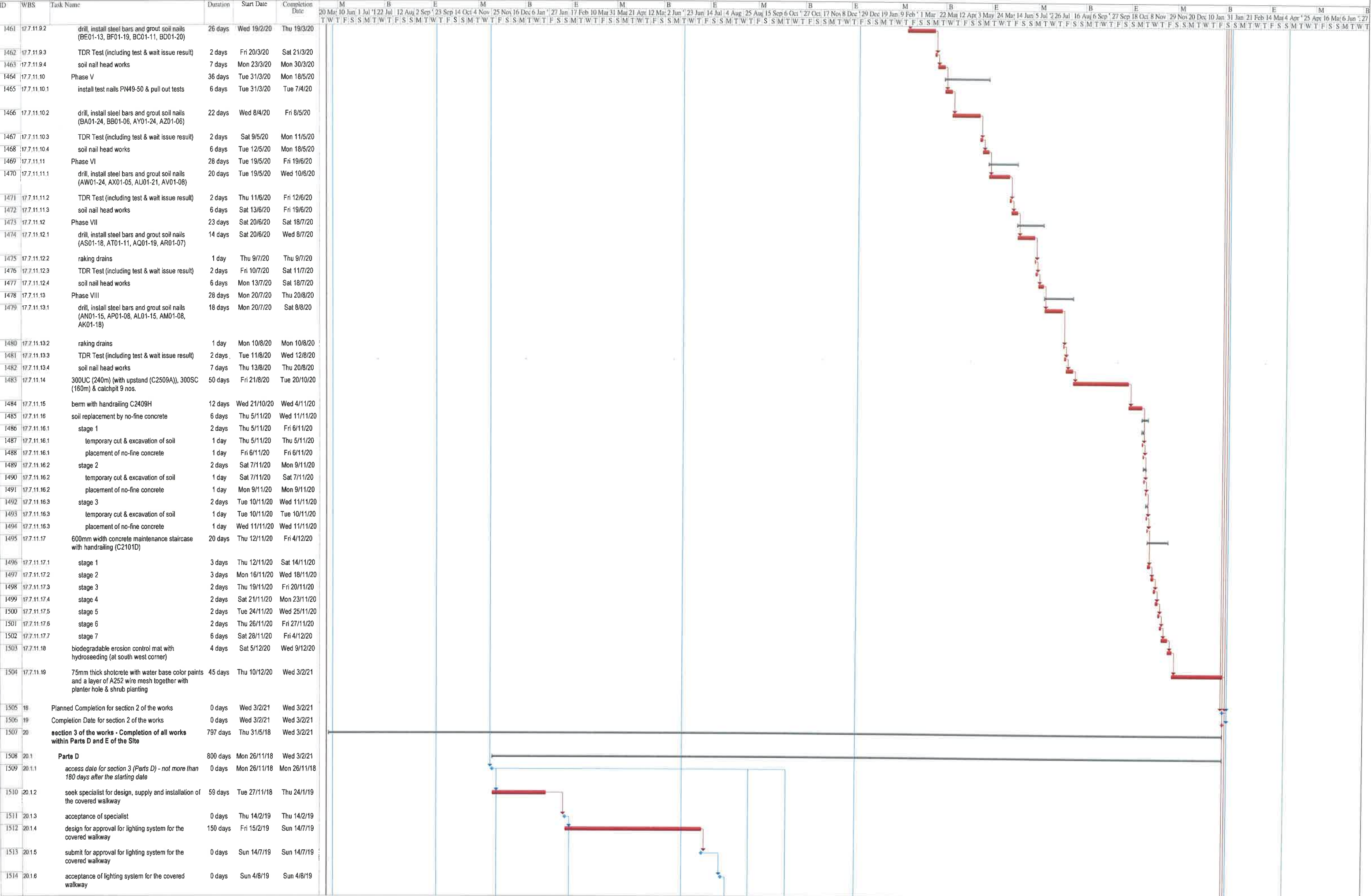
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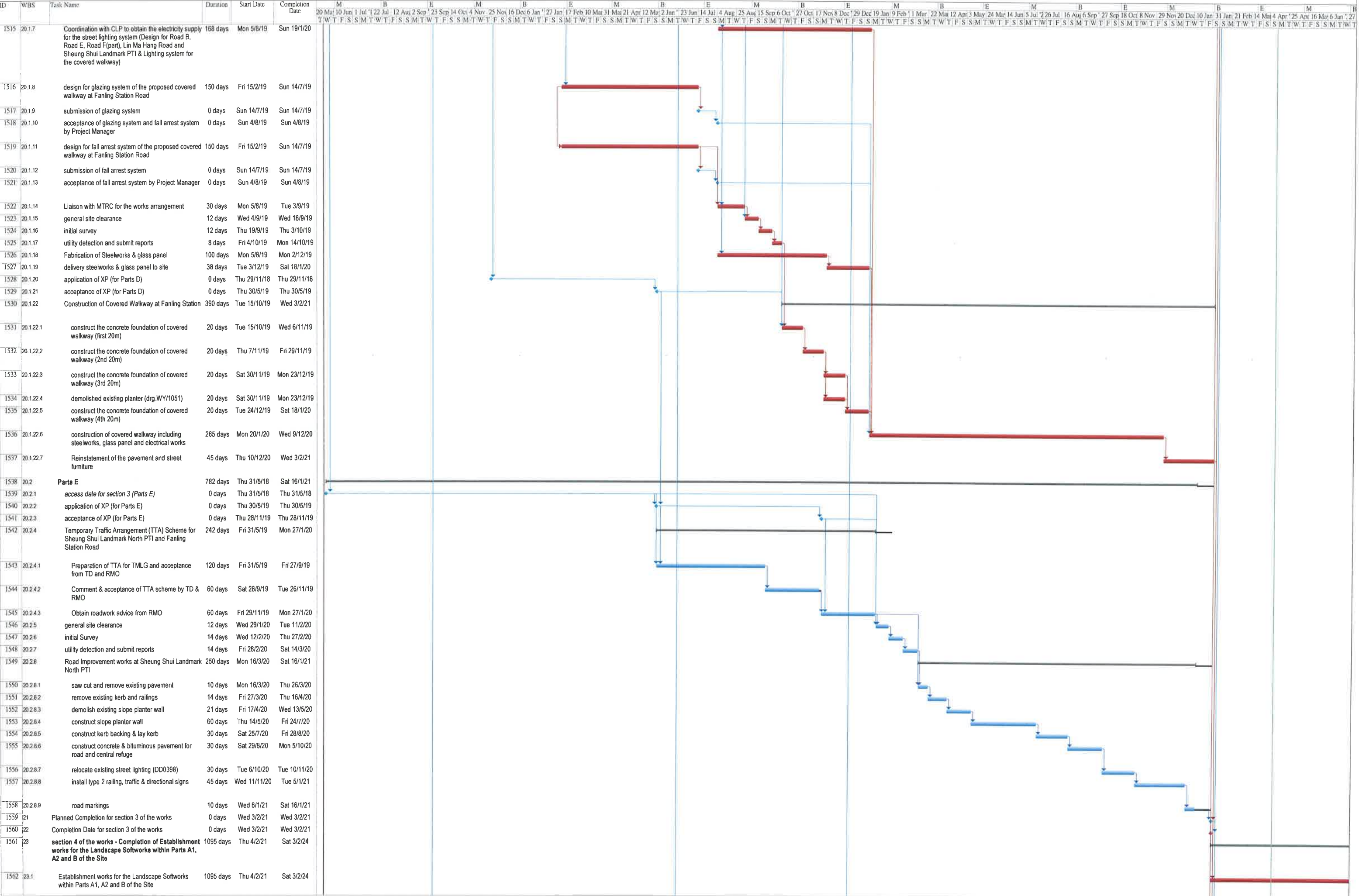




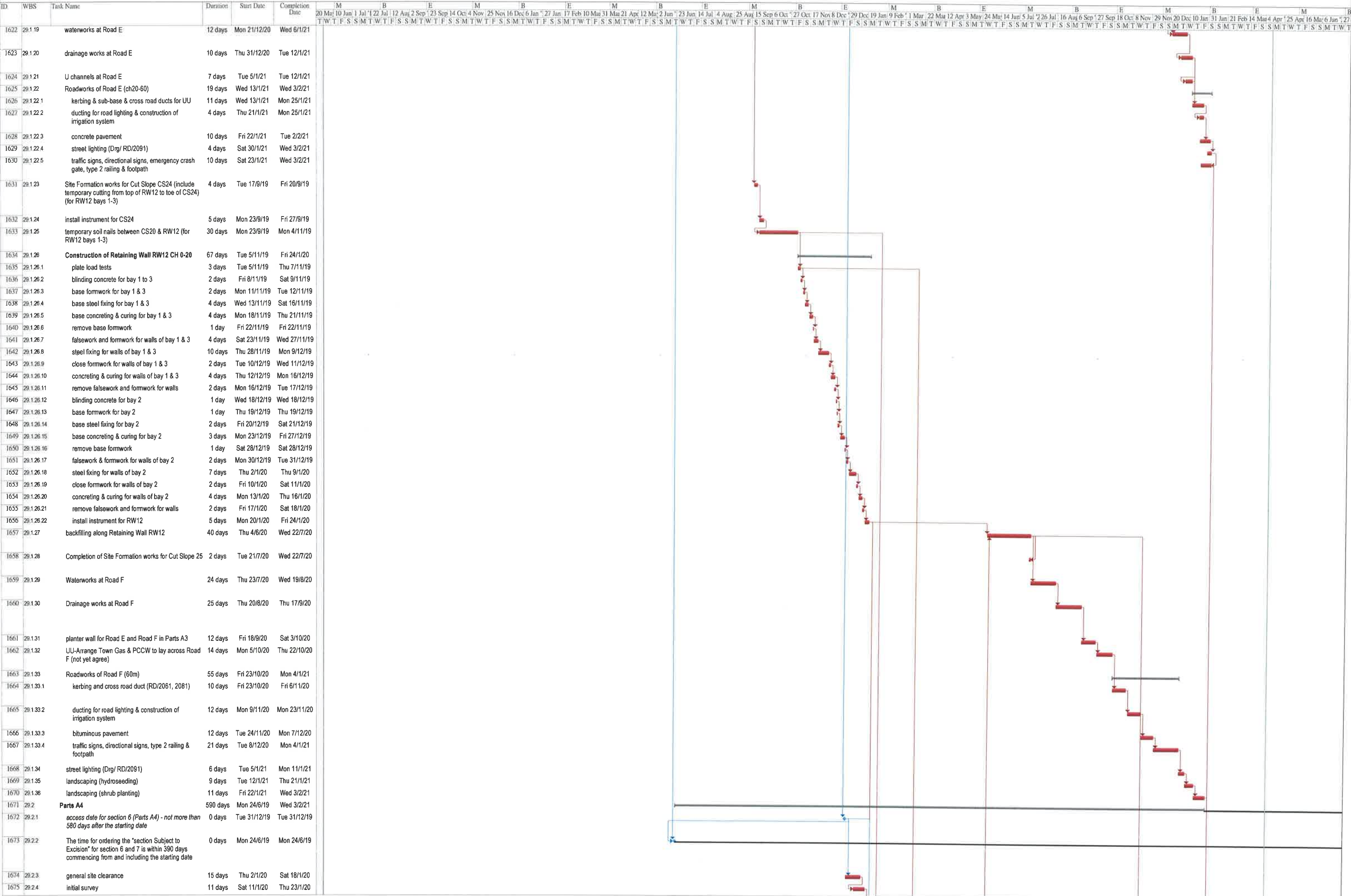
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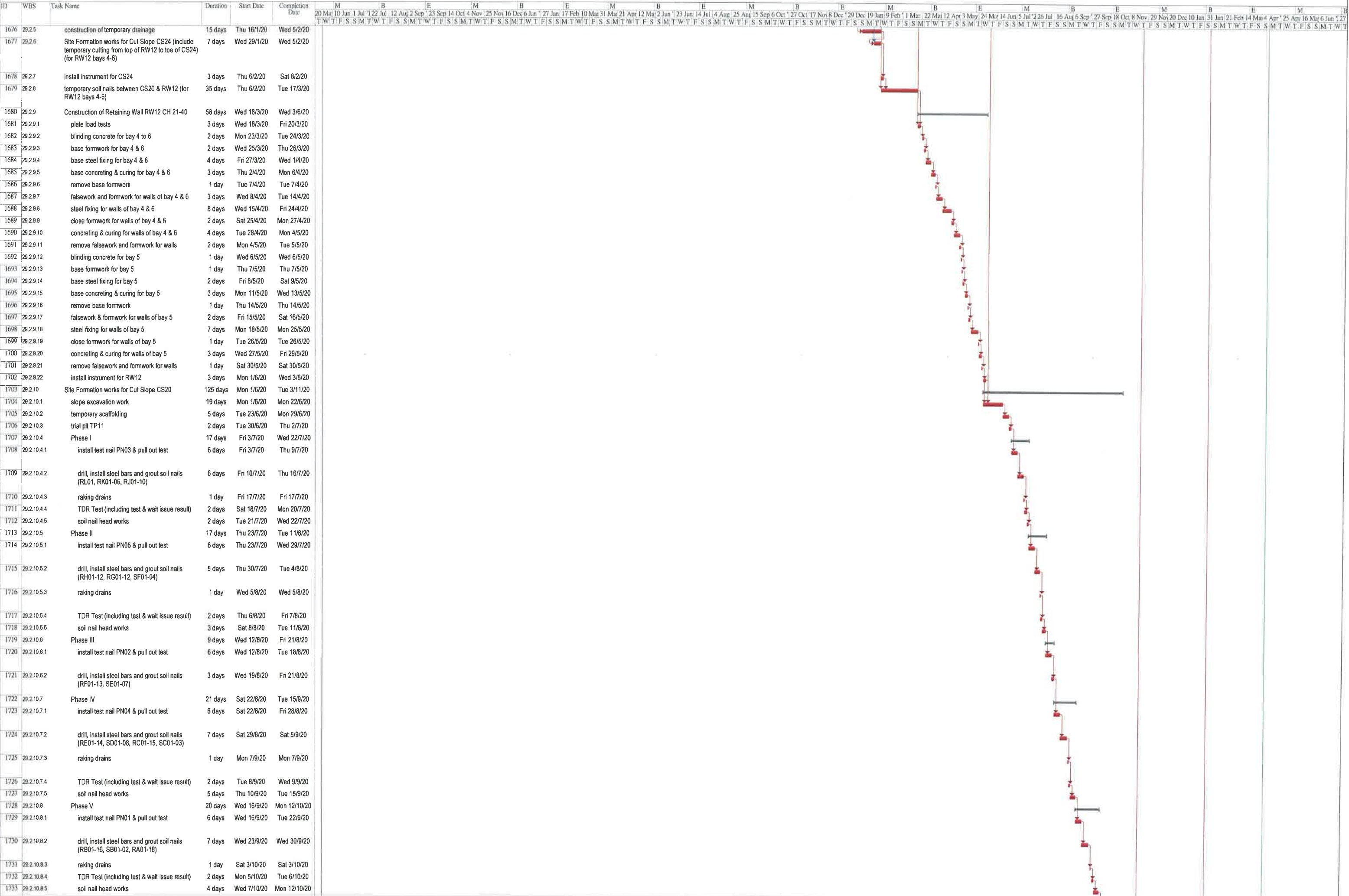






Sang Hing Civil Contractors Company Limited





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Appendix D

Monitoring Locations

Air Quality Monitoring Location

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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
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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

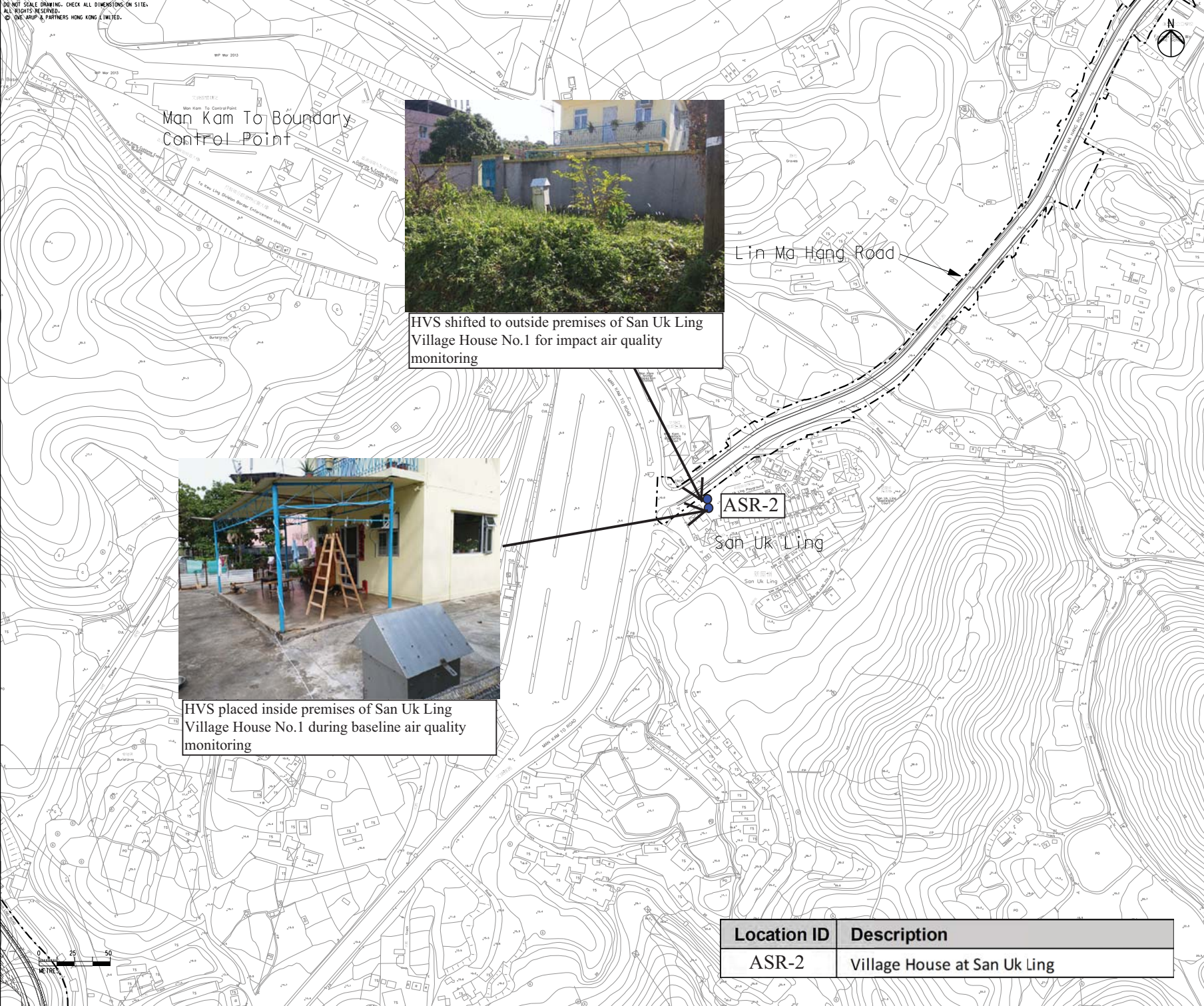
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Location ID	Description
ASR-1	Village House along Man Kam To Road

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Man Kam To Boundary
Control Point



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

Lin Ma Hang Road



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

ASR-2

San Uk Ling

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

Legend

- Project Boundary
- Existing Air Monitoring Stations

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Figure 1
Air Quality Monitoring Location (ASR-2)

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Legend

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



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

Muk Wu Nga Yiu

ASR-3

ASR-3a

100m

Lin Ma Hang Road



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

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B	SECOND ISSUE	GL	02/15
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Figure 2
Air Quality Monitoring
Location (ASR-3)

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Noise Monitoring Location

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

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

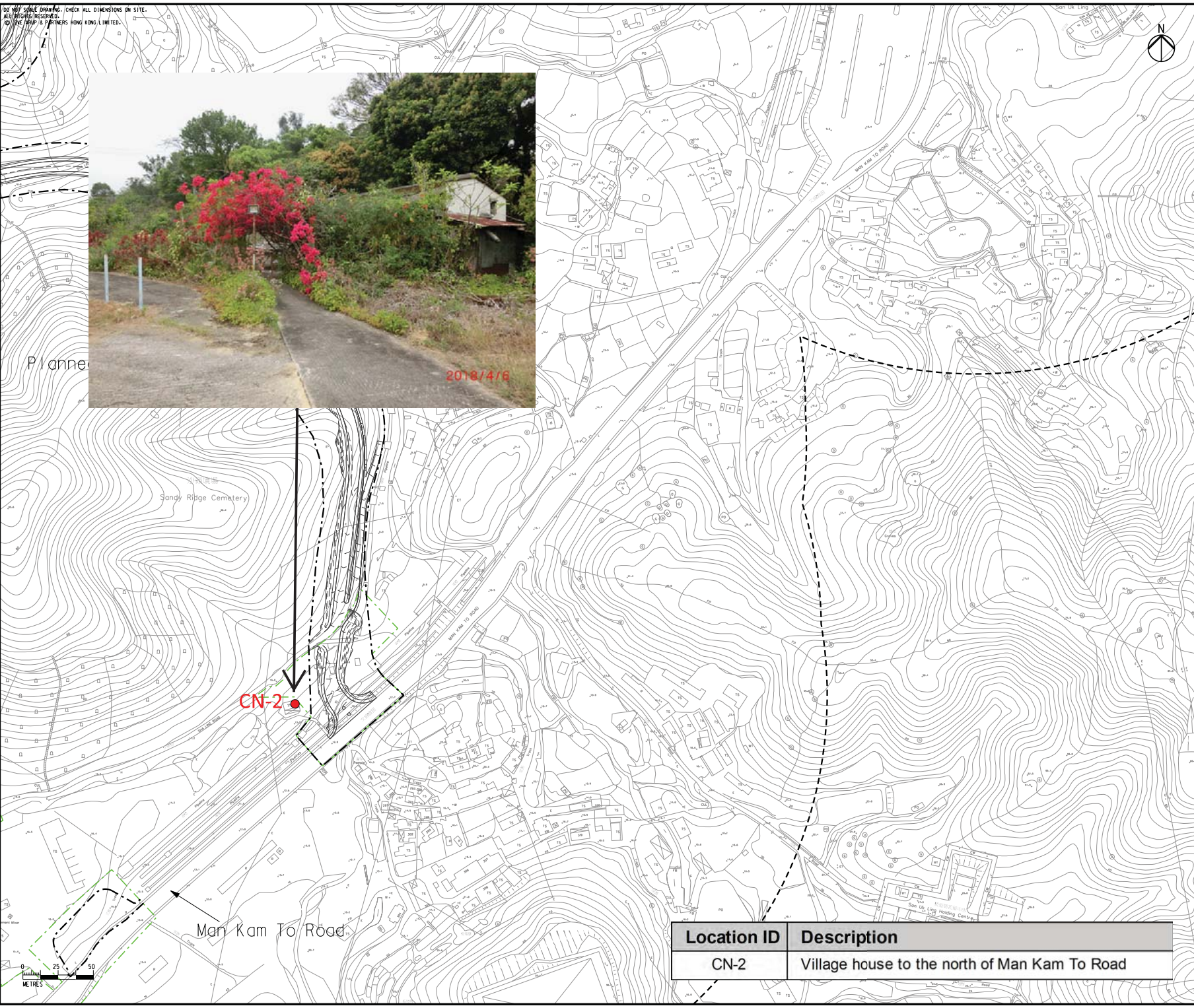
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Location ID	Description
CN-1	Village house to the west of Sha Ling Road

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Figure 6.2.3 - Locations of Proposed Construction Noise Monitoring (Sheet 3 of 4).dgn



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

E	FIFTH ISSUE	GL	02/16
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C	THIRD ISSUE	GL	10/15
B	SECOND ISSUE	GL	02/15
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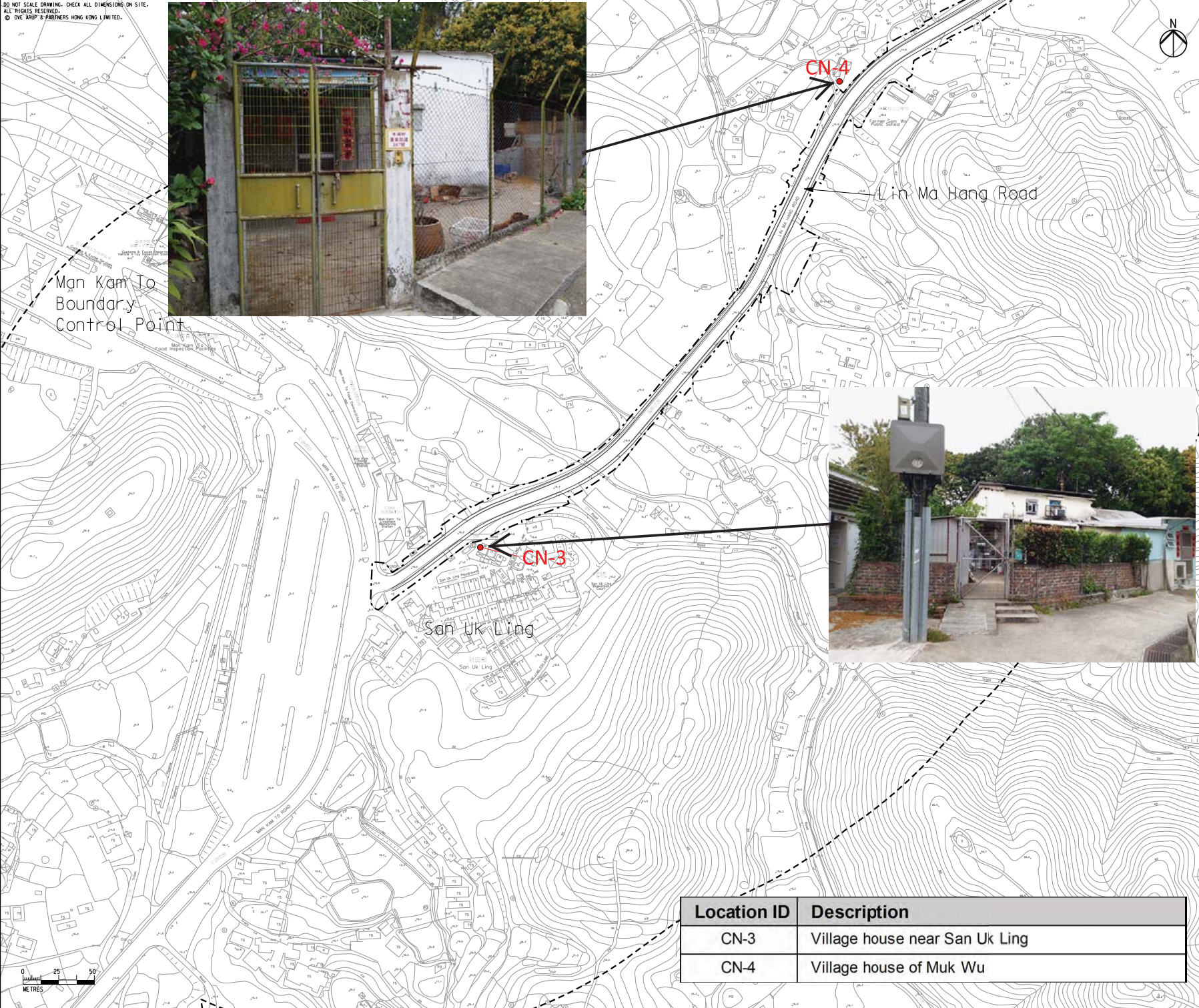
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Location ID	Description
CN-2	Village house to the north of Man Kam To Road

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Legend

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

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

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
 - Water Quality Monitoring Stations in EM&A Manual

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

Consultant

Contract No. and Title:

Agreement No. CE 1/2013(CE)

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Appendix E

Calibration Certificate of Monitoring Equipment and Laboratory Certificate

CALIBRATION CERTIFICATES FOR MONITORING EQUIPMENT USED IN THE REPORTING MONTH

Items	Aspect	Description of Equipment	Date of Calibration	Date of Next Calibration
1	Air	TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	30 Mar 21	14 Apr 21
1a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-1	16 Apr 21	30 Apr 21
2		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	30 Mar 21	14 Apr 21
2a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-2	16 Apr 21	30 Apr 21
3		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	30 Mar 21	14 Apr 21
3a		TISCH High Volume Air Sampler, HVS Model TE-5170 TSP Sampler Calibration Spreadsheet for ASR-3a	16 Apr 21	30 Apr 21
4		Calibration Kit TISCH Model TE-5025A Orifice ID 1941 and Rootsmerter S/N 438320	19 Jan 21	19 Jan 22
5		Laser Dust Monitor, Model AM510 (Serial No. 11008017) – EQ102	8 Jan 21	8 Jan 22
6		Laser Dust Monitor, Model LD-3B (Serial No. 2X6145) – EQ105	8 Jan 21	8 Jan 22
7		Laser Dust Monitor, Model AM510 (Serial No. 11008060) – EQ101	6 Jul 20	6 Jul 21
8		Laser Dust Monitor, Model LD-3B (Serial No. 366410) – EQ110	8 Jan 21	8 Jan 22
9		Laser Dust Monitor, Model LD-3B (Serial No. 3Y6503) – EQ112	8 Jan 21	8 Jan 22
10	Noise	Rion NL- 52 Sound Level Meter (Serial No. 00921191) – EQ013	11 Aug 20	11 Aug 21
11		Rion NL- 52 Sound Level Meter (Serial No. 00142581) – EQ015	30 Sep 20	30 Sep 21
12		Rion NC - 75 Acoustical Calibrator (Serial No. 34680623) – EQ089	20 Jan 21	20 Jan 22
13	Water	YSI Pro DSS (Serial No.20J101862)	1 Feb 21	1 May 21
14		Global Water FP211 Flow Meter (Serial No. 1449006330)	2 Sep 20	2 Sep 21

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 30-Mar-21

Location ID : ASR-1

Next Calibration Date: 14-Apr-21

Name and Model: TISCH HVS Model TE-5170

Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)
Temperature (°C)

1006.2
26.6

Corrected Pressure (mm Hg)
Temperature (K)

754.65
300

CALIBRATION ORIFICE

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

Qstd Slope -> 2.10574
Qstd Intercept -> -0.00985

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	5.90	5.90	11.8	1.626	49	48.57	Slope = 38.0886
13	4.70	4.70	9.4	1.452	41	40.64	Intercept = -14.6931
10	3.70	3.70	7.4	1.289	33	32.71	Corr. coeff. = 0.9943
7	2.40	2.40	4.8	1.039	24	23.79	
5	1.30	1.30	2.6	0.766	16	15.86	

Calculations :

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

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

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:

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

m = sampler slope

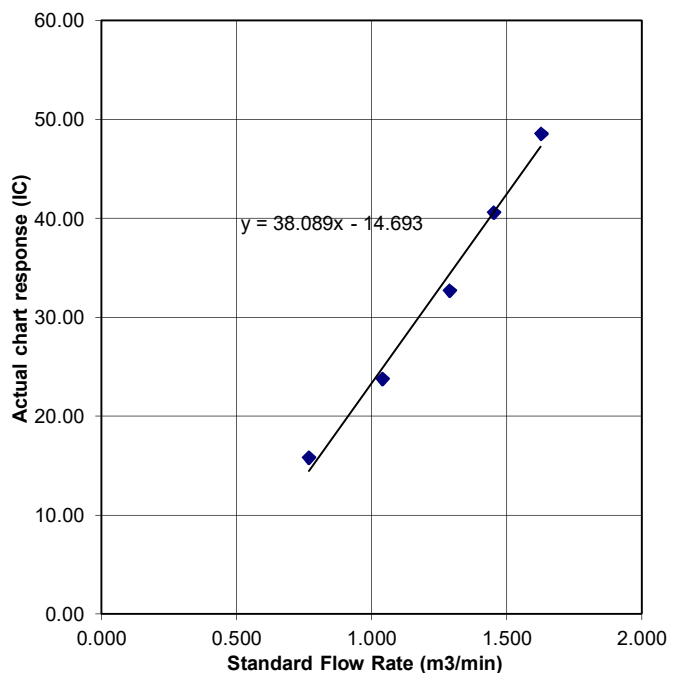
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

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

Date of Calibration: 30-Mar-21
 Next Calibration Date: 14-Apr-21
 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)
 Temperature (°C)

1006.2
 26.6

Corrected Pressure (mm Hg)
 Temperature (K)

754.65
 300

CALIBRATION ORIFICE

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

Qstd Slope ->
 Qstd Intercept ->

2.10574
 -0.00985

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.00	6.00	12.0	1.640	51	50.55	Slope = 36.3367
13	4.90	4.90	9.8	1.482	43	42.62	Intercept = -10.4758
10	3.85	3.85	7.7	1.314	36	35.68	Corr. coeff. = 0.9951
7	2.40	2.40	4.8	1.039	28	27.75	
5	1.50	1.50	3.0	0.822	20	19.82	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

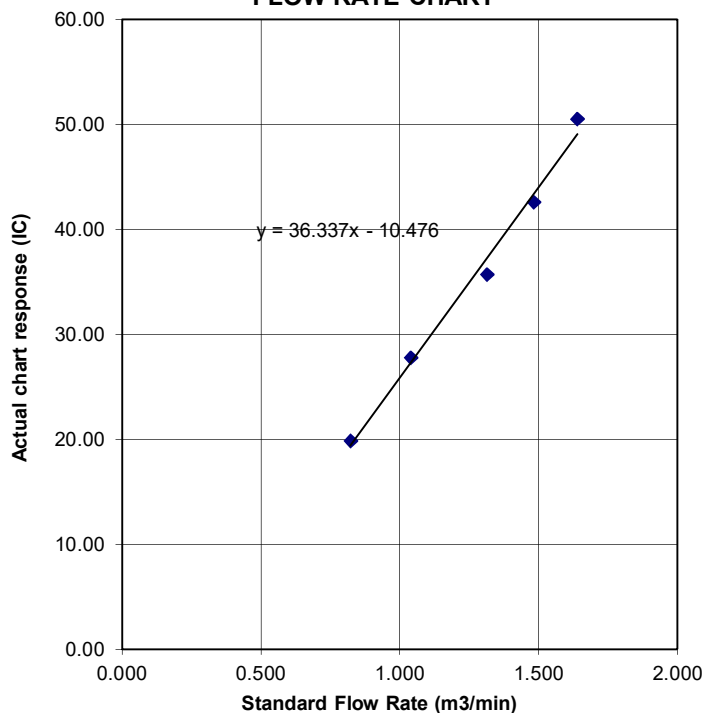
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A				Date of Calibration: 30-Mar-21			
Location ID : ASR-3a				Next Calibration Date: 14-Apr-21			
Name and Model: TISCH HVS Model TE-5170				Technician: Leung Ka Wai			

CONDITIONS							
Sea Level Pressure (hPa)		1006.2		Corrected Pressure (mm Hg)		754.65	
Temperature (°C)		26.6		Temperature (K)		300	

CALIBRATION ORIFICE							
Make->		TISCH		Qstd Slope ->		2.10574	
Model->		5025A		Qstd Intercept ->		-0.00985	
Serial # ->		1941					

CALIBRATION							
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.80	6.80	13.6	1.745	52	51.54	Slope = 44.9151 Intercept = -28.2779 Corr. coeff. = 0.9928
13	5.70	5.70	11.4	1.598	44	43.61	
10	4.80	4.80	9.6	1.467	36	35.68	
7	3.60	3.60	7.2	1.271	28	27.75	
5	2.40	2.40	4.8	1.039	20	19.82	

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

FLOW RATE CHART

The chart displays a linear relationship between the Standard Flow Rate (m3/min) on the x-axis and the Actual chart response (IC) on the y-axis. The regression line is defined by the equation $y = 44.915x - 28.278$.

Standard Flow Rate (m3/min)	Actual chart response (IC)
1.039	19.82
1.271	27.75
1.467	35.68
1.598	43.61
1.745	51.54

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Sha Ling Village House No.6

Date of Calibration: 16-Apr-21

Location ID : ASR-1

Next Calibration Date: 30-Apr-21

Name and Model: TISCH HVS Model TE-5170

Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)
Temperature (°C)

1013.7
22.8

Corrected Pressure (mm Hg)
Temperature (K)

760.275
296

CALIBRATION ORIFICE

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

Qstd Slope -> 2.10574
Qstd Intercept -> -0.00985

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.00	6.00	12.0	1.656	50	50.38	Slope = 38.7988
13	4.80	4.80	9.6	1.482	41	41.31	Intercept = -15.4290
10	3.60	3.60	7.2	1.284	33	33.25	Corr. coeff. = 0.9946
7	2.40	2.40	4.8	1.049	24	24.18	
5	1.40	1.40	2.8	0.802	17	17.13	

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

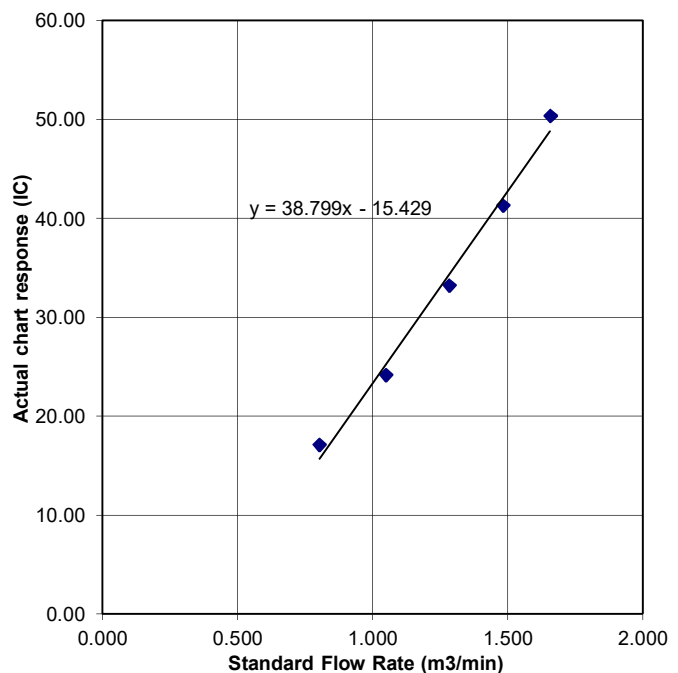
b = sampler intercept

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: 16-Apr-21
 Next Calibration Date: 30-Apr-21
 Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa) 1013.7
 Temperature (°C) 22.8

Corrected Pressure (mm Hg) 760.275
 Temperature (K) 296

CALIBRATION ORIFICE

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

Qstd Slope -> 2.10574
 Qstd Intercept -> -0.00985

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.00	6.00	12.0	1.656	53	53.40	Slope = 36.8299
13	5.10	5.10	10.2	1.527	45	45.34	Intercept = -9.3809
10	3.70	3.70	7.4	1.302	38	38.29	Corr. coeff. = 0.9944
7	2.40	2.40	4.8	1.049	28	28.21	
5	1.30	1.30	2.6	0.773	20	20.15	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

m = sampler slope

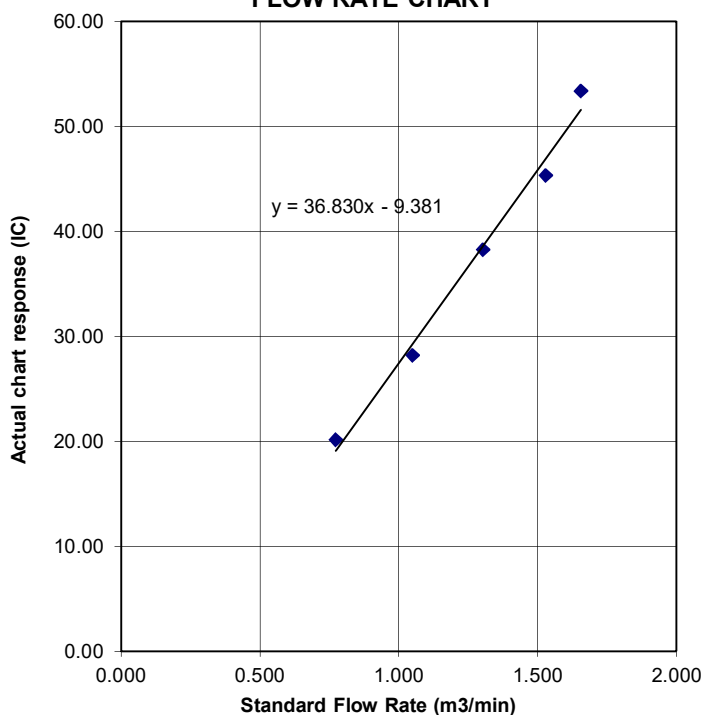
b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure

FLOW RATE CHART



TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Muk Wu Nga Yiu House No.2A	Date of Calibration: 16-Apr-21
Location ID : ASR-3a	Next Calibration Date: 30-Apr-21
Name and Model: TISCH HVS Model TE-5170	Technician: Leung Ka Wai

CONDITIONS

Sea Level Pressure (hPa)	1013.7	Corrected Pressure (mm Hg)	760.275
Temperature (°C)	22.8	Temperature (K)	296

CALIBRATION ORIFICE

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

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	1.737	51	51.39	Slope = 40.4500 Intercept = -20.6456 Corr. coeff. = 0.9941
13	5.80	5.80	11.6	1.628	44	44.34	
10	4.80	4.80	9.6	1.482	38	38.29	
7	3.40	3.50	6.9	1.257	29	29.22	
5	2.20	2.00	4.2	0.982	20	20.15	

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:

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

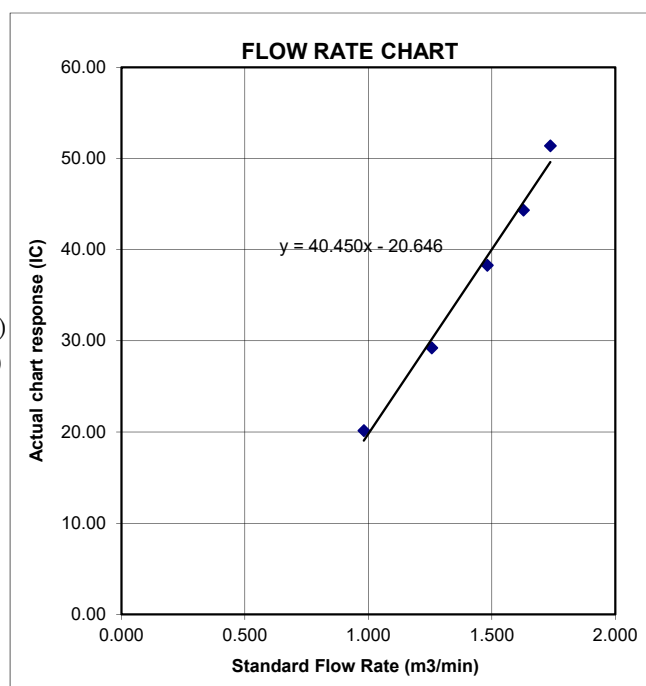
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



Certificate of Calibration

Calibration Certification Information

Cal. Date: January 19, 2021 **Rootsmeter S/N:** 438320 **Ta:** 294 °K
Operator: Jim Tisch **Pa:** 755.1 mm Hg
Calibration Model #: TE-5025A **Calibrator S/N:** 1941

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4830	3.2	2.00
2	3	4	1	1.0420	6.4	4.00
3	5	6	1	0.9290	8.0	5.00
4	7	8	1	0.8840	8.8	5.50
5	9	10	1	0.7340	12.9	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
1.0029	0.6762	1.4192	0.9958	0.6715	0.8824
0.9986	0.9583	2.0071	0.9915	0.9516	1.2479
0.9965	1.0726	2.2440	0.9894	1.0650	1.3952
0.9954	1.1260	2.3535	0.9883	1.1180	1.4633
0.9899	1.3487	2.8385	0.9829	1.3391	1.7648
QSTD	m=	2.10574	QA	m=	1.31858
	b=	-0.00985		b=	-0.00612
	r=	0.99992		r=	0.99992

Calculations

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

Standard Conditions

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

RECALIBRATION

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2102490
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 15-JAN-2021
		DATE OF ISSUE	: 26-JAN-2021
PROJECT	:	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ---

General Comments

- Samples(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.
- 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 is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

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

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WORK ORDER : HK2102490
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT :



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2102490-001	S/N: 2X6145	AIR	15-Jan-2021	S/N: 2X6145

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 2X6145
Equipment Ref: EQ105
Job Order HK2102490

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 8 October 2020

Equipment Verification Results:

Testing Date: 31 December 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr01min	09:16 ~ 11:17	10.9	1027.0	0.058	3107	25.6
2hr01min	11:19 ~ 11:20	10.9	1027.0	0.027	1724	14.2
2hr01min	11:22 ~ 13:23	10.9	1027.0	0.026	1300	10.8

Sensitivity Adjustment Scale Setting (Before Calibration) 586 (CPM)

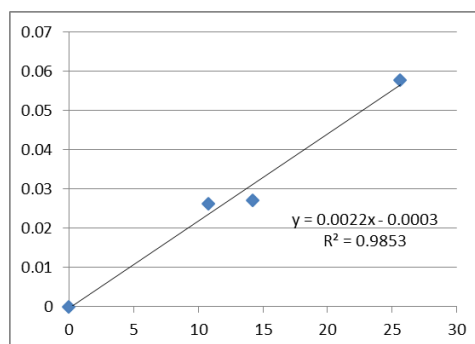
Sensitivity Adjustment Scale Setting (After Calibration) 586 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9926

Date of Issue 8 January 2021



Remarks:

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

Operator : Fai So Signature :  Date : 8 January 2021

QC Reviewer : Ben Tam Signature :  Date : 8 January 2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 8-Oct-20
 Next Calibration Date: 8-Jan-21

CONDITIONS

Sea Level Pressure (hPa) 1015.2
 Temperature (°C) 25.5

Corrected Pressure (mm Hg) 761.4
 Temperature (K) 299

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 7-Feb-20

Qstd Slope -> 2.03014
 Qstd Intercept -> -0.04616
 Expiry Date-> 7-Feb-21

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.785	56	56.00	Slope = 38.0056 Intercept = -11.6655 Corr. coeff. = 0.9991
13	5.1	5.1	10.2	1.596	49	49.00	
10	4	4	8.0	1.416	42	42.00	
8	2.5	2.5	5.0	1.124	32	32.00	
5	1.5	1.5	3.0	0.876	21	21.00	

Calculations :

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

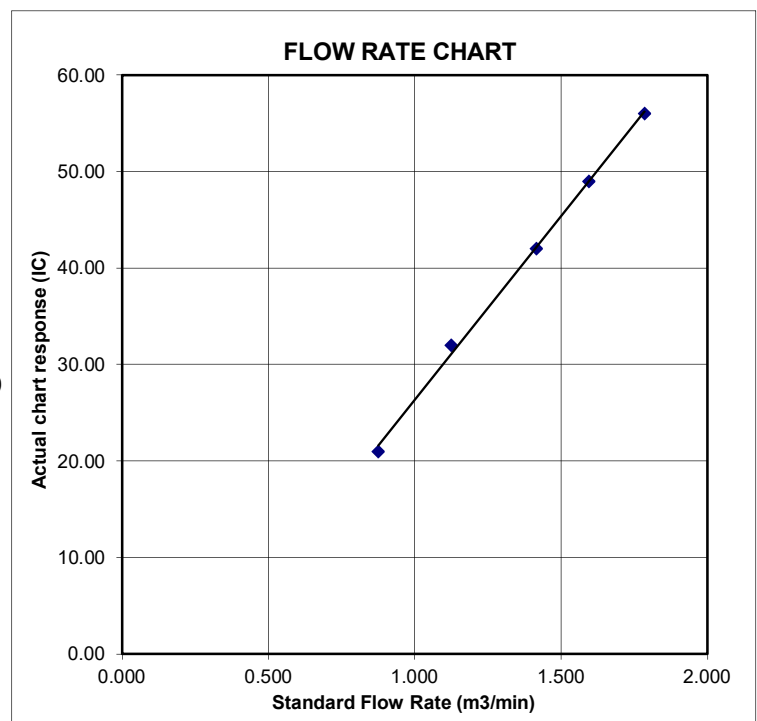
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: February 7, 2020	Rootsmeter S/N: 438320	Ta: 295 °K	
Operator: Jim Tisch		Pa: 745.5 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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	m=	2.03014	QA	m=	1.27124
	b=	-0.04616		b=	-0.02917
	r=	0.99995		r=	0.99995

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

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

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2102509
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 15-JAN-2021
		DATE OF ISSUE	: 26-JAN-2021
PROJECT	:	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ---

General Comments

- Samples(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.
- 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 is the Final Report and supersedes any preliminary report with this batch 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
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK2102509
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT :



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2102509-001	S/N: 11008017	AIR	18-Jan-2021	S/N: 11008017

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: TSI AM510
Serial No. 11008017
Equipment Ref: EQ102
Work Order: HK2102509

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: AUES Office (Calibration Room)
Equipment Ref: HVS 018
Last Calibration Date: 8 October 2020

Equipment Verification Results:

Verification Date: 31 December 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Concentration in mg/m ³ (Calibrated Equipment)	Tolerance (mg/m ³)
2hr01min	09:16 ~ 11:17	10.9	1027.0	0.058	0.097	+0.039
2hr01min	11:19 ~ 11:20	10.9	1027.0	0.027	0.058	+0.031
2hr01min	11:22 ~ 13:23	10.9	1027.0	0.026	0.053	+0.027

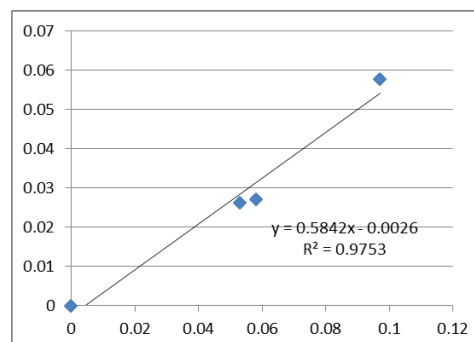
Linear Regression of Y or X

Slope (factor): 0.5842
Correlation Coefficient (R): 0.9876
Date of Issue: 8 January 2021

Remarks:

- Strong** Correlation ($R > 0.8$)
- Factor 0.5842 should be apply for TSP monitoring

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



Operator : Fai So Signature :  Date : 8 January 2021

QC Reviewer : Ben Tam Signature :  Date : 8 January 2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 8-Oct-20
 Next Calibration Date: 8-Jan-21

CONDITIONS

Sea Level Pressure (hPa) 1015.2
 Temperature (°C) 25.5

Corrected Pressure (mm Hg) 761.4
 Temperature (K) 299

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 7-Feb-20

Qstd Slope -> 2.03014
 Qstd Intercept -> -0.04616
 Expiry Date-> 7-Feb-21

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.785	56	56.00	Slope = 38.0056 Intercept = -11.6655 Corr. coeff. = 0.9991
13	5.1	5.1	10.2	1.596	49	49.00	
10	4	4	8.0	1.416	42	42.00	
8	2.5	2.5	5.0	1.124	32	32.00	
5	1.5	1.5	3.0	0.876	21	21.00	

Calculations :

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

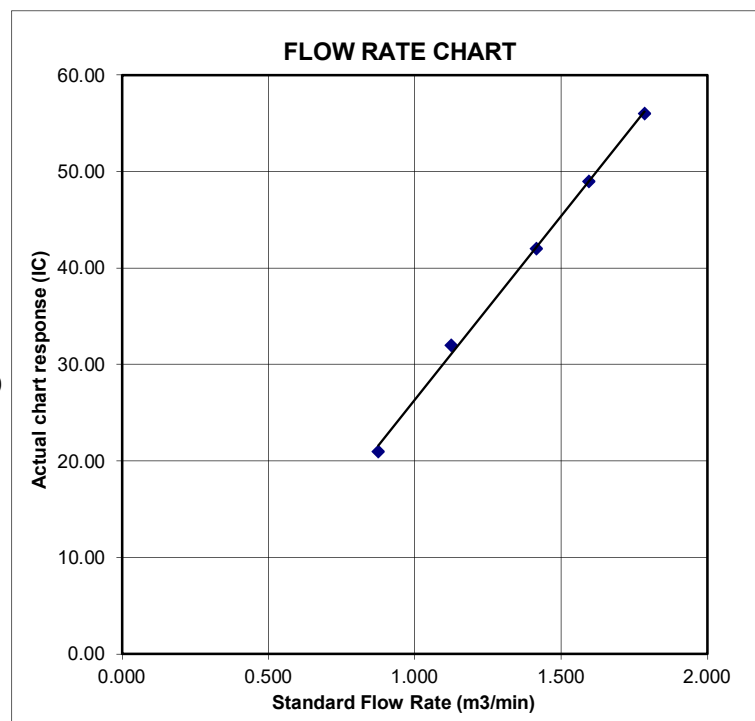
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date: February 7, 2020	Rootsmeter S/N: 438320	Ta: 295 °K	
Operator: Jim Tisch		Pa: 745.5 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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	m=	2.03014	QA	m=	1.27124
	b=	-0.04616		b=	-0.02917
	r=	0.99995		r=	0.99995

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

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

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2102511
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 15-JAN-2021
		DATE OF ISSUE	: 26-JAN-2021
PROJECT	:	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ---

General Comments

- Samples(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.
- 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 is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

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

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

WORK ORDER : HK2102511
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT :



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2102511-001	S/N: 3Y6503	AIR	15-Jan-2021	S/N: 3Y6503

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 3Y6503
Equipment Ref: EQ112
Job Order HK2102511

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 8 October 2020

Equipment Verification Results:

Testing Date: 31 December 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr01min	09:16 ~ 11:17	10.9	1027.0	0.058	3127	25.8
2hr01min	11:19 ~ 11:20	10.9	1027.0	0.027	1347	11.1
2hr01min	11:22 ~ 13:23	10.9	1027.0	0.026	1298	10.8

Sensitivity Adjustment Scale Setting (Before Calibration) 655 (CPM)

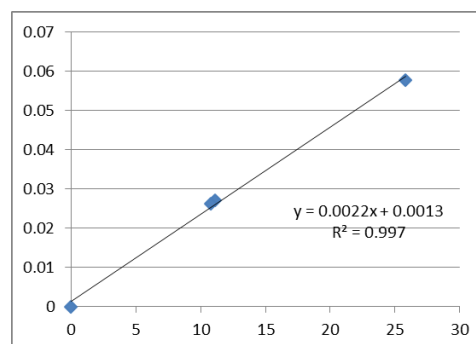
Sensitivity Adjustment Scale Setting (After Calibration) 655 (CPM)

Linear Regression of Y or X

Slope (K-factor): 0.0022

Correlation Coefficient 0.9985

Date of Issue 8 January 2021



Remarks:

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

Operator : Fai So Signature :  Date : 8 January 2021

QC Reviewer : Ben Tam Signature :  Date : 8 January 2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 8-Oct-20
 Next Calibration Date: 8-Jan-21

CONDITIONS

Sea Level Pressure (hPa) 1015.2
 Temperature (°C) 25.5

Corrected Pressure (mm Hg) 761.4
 Temperature (K) 299

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 7-Feb-20

Qstd Slope -> 2.03014
 Qstd Intercept -> -0.04616
 Expiry Date-> 7-Feb-21

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.785	56	56.00	Slope = 38.0056 Intercept = -11.6655 Corr. coeff. = 0.9991
13	5.1	5.1	10.2	1.596	49	49.00	
10	4	4	8.0	1.416	42	42.00	
8	2.5	2.5	5.0	1.124	32	32.00	
5	1.5	1.5	3.0	0.876	21	21.00	

Calculations :

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

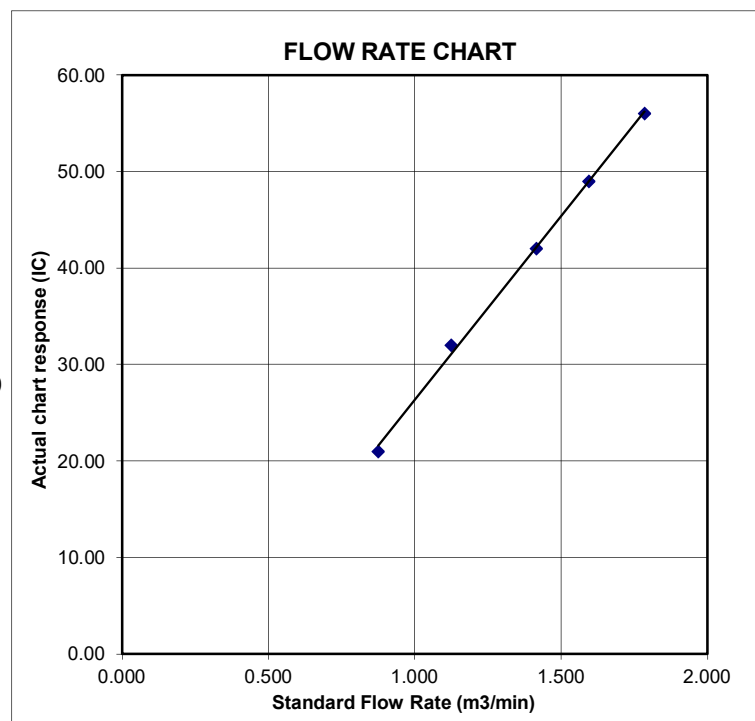
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information

Cal. Date: February 7, 2020

Rootsmeter S/N: 438320

Ta: 295

°K
Operator: Jim Tisch

Pa: 745.5

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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	m=	2.03014	QA	m=	1.27124
	b=	-0.04616		b=	-0.02917
	r=	0.99995		r=	0.99995

Calculations

$$Vstd = \Delta Vol \left(\frac{Pa - \Delta P}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)$$

$$Va = \Delta Vol \left(\frac{Pa - \Delta P}{Pa} \right)$$

$$Qstd = Vstd / \Delta Time$$

$$Qa = Va / \Delta Time$$

For subsequent flow rate calculations:

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

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

Standard Conditions

Tstd: 298.15 °K

Pstd: 760 mm Hg

Key

ΔH: calibrator manometer reading (in H2O)

ΔP: rootsmeter manometer reading (mm Hg)

Ta: actual absolute temperature (°K)

Pa: actual barometric pressure (mm Hg)

b: intercept

m: slope

RECALIBRATION

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



SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2102507
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 15-JAN-2021
		DATE OF ISSUE	: 26-JAN-2021
PROJECT	:	NO. OF SAMPLES	: 1
		CLIENT ORDER	: ---

General Comments

- Samples(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.
- 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 is the Final Report and supersedes any preliminary report with this batch number.

All pages of this report have been checked and approved for release.

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

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WORK ORDER : HK2102507
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT :



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2102507-001	S/N: 366410	AIR	15-Jan-2021	S/N: 366410

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: Sibata LD-3B
Serial No. 366410
Equipment Ref: EQ110
Job Order HK2102507

Standard Equipment:

Standard Equipment: Higher Volume Sampler
Location & Location ID: AUES office (calibration room)
Equipment Ref: HVS 018
Last Calibration Date: 8 October 2020

Equipment Verification Results:

Testing Date: 31 December 2020

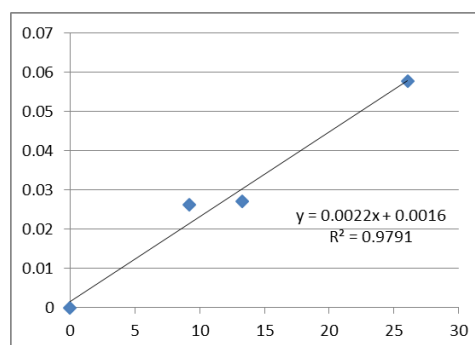
Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr01min	09:16 ~ 11:17	10.9	1027.0	0.058	3158	26.1
2hr01min	11:19 ~ 11:20	10.9	1027.0	0.027	1608	13.3
2hr01min	11:22 ~ 13:23	10.9	1027.0	0.026	1107	9.2

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

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

Linear Regression of Y or X

Slope (K-factor): 0.0022
Correlation Coefficient 0.9895
Date of Issue 8 January 2021



Remarks:

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

Operator : Fai So Signature :  Date : 8 January 2021

QC Reviewer : Ben Tam Signature :  Date : 8 January 2021

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 8-Oct-20
 Next Calibration Date: 8-Jan-21

CONDITIONS

Sea Level Pressure (hPa) 1015.2
 Temperature (°C) 25.5

Corrected Pressure (mm Hg) 761.4
 Temperature (K) 299

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 7-Feb-20

Qstd Slope -> 2.03014
 Qstd Intercept -> -0.04616
 Expiry Date-> 7-Feb-21

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.785	56	56.00	Slope = 38.0056 Intercept = -11.6655 Corr. coeff. = 0.9991
13	5.1	5.1	10.2	1.596	49	49.00	
10	4	4	8.0	1.416	42	42.00	
8	2.5	2.5	5.0	1.124	32	32.00	
5	1.5	1.5	3.0	0.876	21	21.00	

Calculations :

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

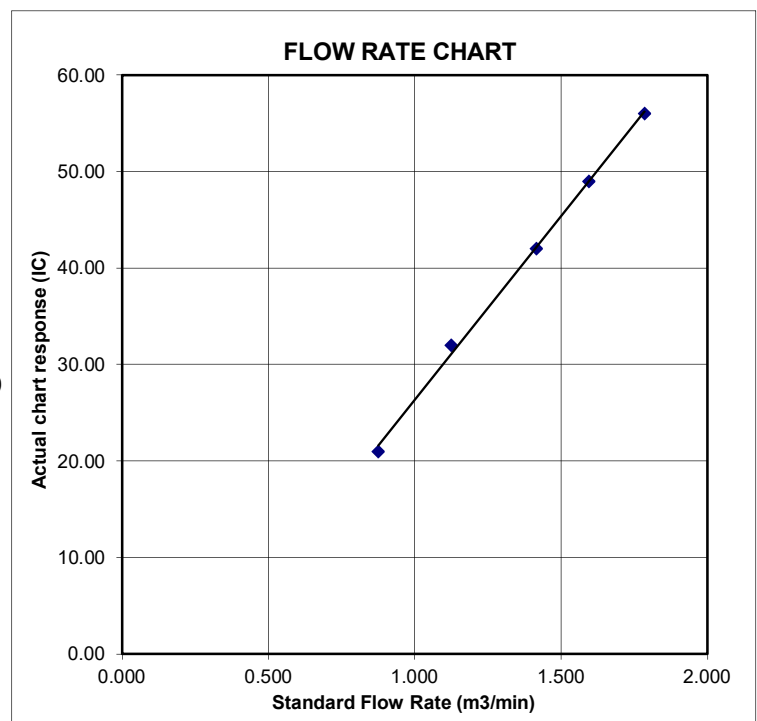
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

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

For subsequent calculation of sampler flow:

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

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





Certificate of Calibration

Calibration Certification Information			
Cal. Date:	February 7, 2020	Rootsmeter S/N:	438320
Operator:	Jim Tisch	Ta:	295 °K
Calibration Model #:	TE-5025A	Pa:	745.5 mm Hg
		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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	m=	2.03014	QA	m=	1.27124
	b=	-0.04616		b=	-0.02917
	r=	0.99995		r=	0.99995

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



ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

SUB-CONTRACTING REPORT

CONTACT	: MR BEN TAM	WORK ORDER	: HK2025133
CLIENT	: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING		
ADDRESS	: RM A 20/F., GOLD KING IND BLDG, NO. 35-41 TAI LIN PAI ROAD, KWAI CHUNG, N.T. HONG KONG	SUB-BATCH	: 1
		DATE RECEIVED	: 7-JUL-2020
		DATE OF ISSUE	: 14-JUL-2020
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., if any) is provided by client.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

Signatories

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

Signatories

Position

Richard Fung

Managing Director

This is the Final Report and supersedes any preliminary report with this batch 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
Tel. +852 2610 1044 Fax. +852 2610 2021 www.alsglobal.com

WORK ORDER : HK2025133
SUB-BATCH : 1
CLIENT : ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING
PROJECT : ----



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK2025133-001	S/N: 11008060	AIR	07-Jul-2020	S/N: 11008060

Equipment Verification Report (TSP)

Equipment Calibrated:

Type: Laser Dust monitor
Manufacturer: TSI AM510
Serial No. 11008060
Equipment Ref: EQ101
Work Order: HK2025133

Standard Equipment:

Standard Equipment: Higher Volume Sampler (TSP)
Location & Location ID: Calibration Room
Equipment Ref: HVS 018
Last Calibration Date: 30 June 2020

Equipment Verification Results:

Testing Date: 30 June 2020

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m ³ (Standard Equipment)	Concentration in mg/m ³ (Calibrated Equipment)	Tolerance (mg/m ³)
2hr02min	09:14 ~ 11:16	30.7	1004.6	0.013	0.016	+0.003
2hr02min	11:20 ~ 13:22	30.7	1004.6	0.010	0.013	+0.003
2hr02min	13:25 ~ 15:27	30.7	1004.6	0.006	0.009	+0.003

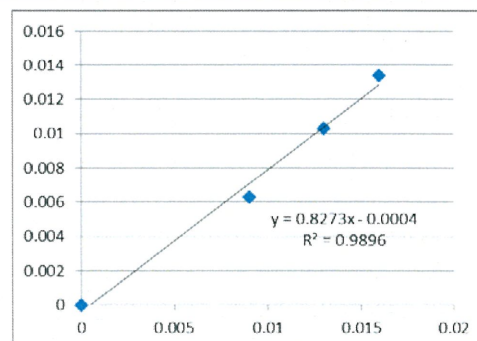
Linear Regression of Y or X

Slope (factor): 0.8273
Correlation Coefficient (R) 0.9948
Date of Issue 6 July 2020

Remarks:

1. **Strong** Correlation ($R > 0.8$)
2. Factor 0.8273 should be apply for TSP monitoring

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



Operator : Fai So Signature :  Date : 6 July 2020

QC Reviewer : Ben Tam Signature :  Date : 6 July 2020

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Gold King Industrial Building, Kwai Chung
 Location ID : Calibration Room

Date of Calibration: 30-Jun-20
 Next Calibration Date: 30-Sep-20

CONDITIONS

Sea Level Pressure (hPa) 1004.6
 Temperature (°C) 30.7

Corrected Pressure (mm Hg) 753.45
 Temperature (K) 304

CALIBRATION ORIFICE

Make-> TISCH
 Model-> 5025A
 Calibration Date-> 7-Feb-20

Qstd Slope -> 2.03014
 Qstd Intercept -> -0.04616
 Expiry Date-> 7-Feb-21

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.4	6.4	12.8	1.761	56	55.23	Slope = 38.2549 Intercept = -10.8486 Corr. coeff. = 0.9947
13	4.9	4.9	9.8	1.544	49	48.33	
10	3.7	3.7	7.4	1.344	43	42.41	
8	2.4	2.4	4.8	1.087	32	31.56	
5	1.5	1.5	3.0	0.864	21	20.71	

Calculations :

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

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

Qstd = standard flow rate

IC = corrected chart responses

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pstd = actual pressure during calibration (mm Hg)

For subsequent calculation of sampler flow:

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

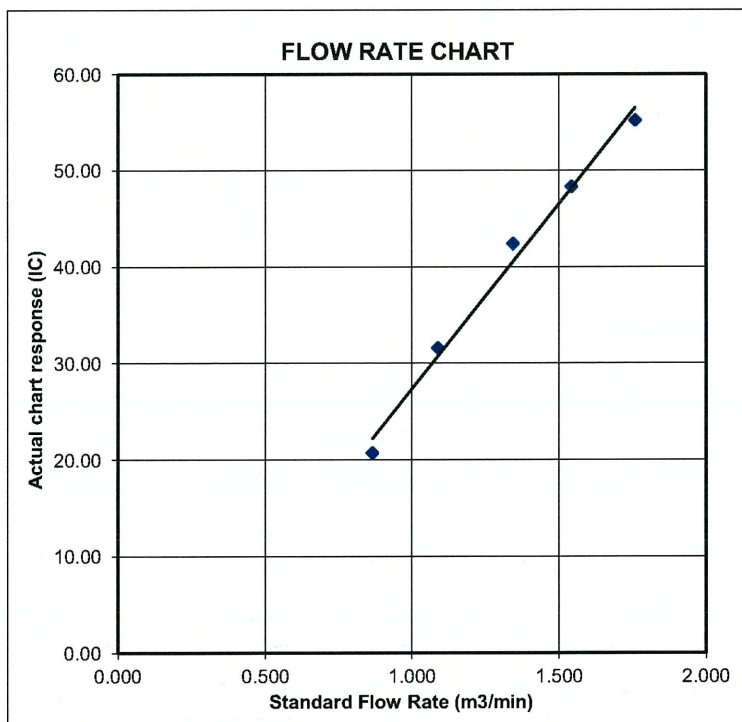
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure





Certificate of Calibration

Calibration Certification Information

Cal. Date: February 7, 2020

Rootsmeter S/N: 438320

Ta: 295

°K

Operator: Jim Tisch

Pa: 745.5

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	1.3730	3.2	2.00
2	3	4	1	0.9820	6.4	4.00
3	5	6	1	0.8780	8.0	5.00
4	7	8	1	0.8340	8.8	5.50
5	9	10	1	0.6900	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)
0.9866	0.7186	1.4078	0.9957	0.7252	0.8896
0.9824	1.0004	1.9909	0.9914	1.0096	1.2581
0.9802	1.1165	2.2259	0.9893	1.1267	1.4066
0.9792	1.1741	2.3345	0.9882	1.1849	1.4753
0.9739	1.4114	2.8155	0.9828	1.4244	1.7792
QSTD	m=	2.03014	QA	m=	1.27124
	b=	-0.04616		b=	-0.02917
	r=	0.99995		r=	0.99995

Calculations

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

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. : C204359

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號: IC20-1324)

Date of Receipt / 收件日期: 30 July 2020

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

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

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 5 August 2020

TEST RESULTS / 測試結果

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

The results do not exceed manufacturer's specification.


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

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

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

Tested By

測試


K P Cheuk
Assistant Engineer

Certified By

核證


K C Lee
Engineer

Date of Issue

簽發日期

11 August 2020

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. : C204359

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	C200258
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

- 6.1 Sound Pressure Level

- 6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.6	± 1.1

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.6 (Ref.)
				104.00		103.6
				114.00		113.6

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	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	93.6	Ref.
			Slow			93.6	± 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. : C204359

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	67.3	-26.2 ± 1.5
					125 Hz	77.4	-16.1 ± 1.5
					250 Hz	84.9	-8.6 ± 1.4
					500 Hz	90.3	-3.2 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	94.8	+1.2 ± 1.6
					4 kHz	94.6	+1.0 ± 1.6
					8 kHz	92.5	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.1	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	92.8	-0.8 ± 1.5
					125 Hz	93.4	-0.2 ± 1.5
					250 Hz	93.6	0.0 ± 1.4
					500 Hz	93.6	0.0 ± 1.4
					1 kHz	93.6	Ref.
					2 kHz	93.4	-0.2 ± 1.6
					4 kHz	92.8	-0.8 ± 1.6
					8 kHz	90.6	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.2	-6.2 (+3.0 ; -6.0)

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Sun Creation Engineering Limited – Calibration & Testing Laboratory

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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. : C204359

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
	12.5 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

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

Note :

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

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

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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. : C205469

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC20-1324) Date of Receipt / 收件日期 : 22 September 2020

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

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

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration

DATE OF TEST / 測試日期 : 29 September 2020

TEST RESULTS / 測試結果

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


The results do not exceed manufacturer's specification. (after adjustment)

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

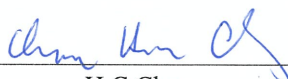
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試

: 
K P Cheuk
Assistant Engineer

Certified By
核證

: 
H C Chan
Engineer

Date of Issue

簽發日期

: 30 September 2020

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. : C205469

證書編號

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

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C200258
CL281	Multifunction Acoustic Calibrator	CDK1806821

- Test procedure : MA101N.

- Results :

- Sound Pressure Level

- Reference Sound Pressure Level

- Before Adjustment

UUT Setting				Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)	(dB)
30 - 130	L _A	A	Fast	94.00	1	* 92.4	± 1.1

* Out of IEC 61672 Class 1 Spec.

- After Adjustment

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

- Linearity

UUT Setting				Applied Value		UUT Reading
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	(dB)
30 - 130	L _A	A	Fast	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		114.2

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

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Certificate of Calibration

校正證書

Certificate No. : C205469

證書編號

6.2 Time Weighting

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

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _A	A	Fast	94.00	63 Hz	67.7	-26.2 ± 1.5
					125 Hz	77.8	-16.1 ± 1.5
					250 Hz	85.3	-8.6 ± 1.4
					500 Hz	90.7	-3.2 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.6
					4 kHz	95.0	+1.0 ± 1.6
					8 kHz	93.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.6	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L _C	C	Fast	94.00	63 Hz	93.1	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.5
					250 Hz	94.0	0.0 ± 1.4
					500 Hz	94.0	0.0 ± 1.4
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.6
					4 kHz	93.2	-0.8 ± 1.6
					8 kHz	91.1	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.6	-6.2 (+3.0 ; -6.0)

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E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com

Certificate of Calibration

校正證書

Certificate No. : C205469

證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 15585

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

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

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

Note :

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

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

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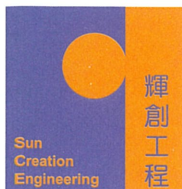
c/o 香港新界屯門興安里一號四樓

Tel/電話: (852) 2927 2606

Fax/傳真: (852) 2744 8986

E-mail/電郵: callab@suncreation.com

Website/網址: www.suncreation.com



輝創工程有限公司

Sun Creation Engineering Limited

Calibration & Testing Laboratory

Certificate of Calibration

校正證書

Certificate No. : C210388

證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC21-0122)

Date of Receipt / 收件日期 : 19 January 2021

Description / 儀器名稱 : Sound Calibrator (EQ089)

Manufacturer / 製造商 : Rion

Model No. / 型號 : NC-75

Serial No. / 編號 : 34680623

Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

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

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

Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 20 January 2021

TEST RESULTS / 測試結果

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

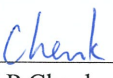
The results do not exceed manufacturer's specification.

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

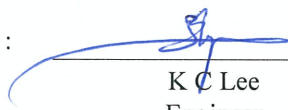
The test equipment used for calibration are traceable to National Standards via :

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

Tested By
測試

: 
K P Cheuk
Assistant Engineer

Certified By
核證

: 
K C Lee
Engineer

Date of Issue
簽發日期

: 20 January 2021

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。

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. : C210388

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

CL130

CL281

TST150A

Description

Universal Counter

Multifunction Acoustic Calibrator

Measuring Amplifier

Certificate No.

C203952

CDK1806821

C201309

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	± 0.25	± 0.2

5.2 Frequency Accuracy

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

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

Note :

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

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



REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK2103650
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 26-Jan-2021
DATE OF ISSUE: 02-Feb-2021

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: 01-February-2021

GENERAL COMMENTS

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

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REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2103650
 SUB-BATCH: 0
 DATE OF ISSUE: 02-Feb-2021
 CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter
 Brand Name/ Model No.: YSI Professional DSS
 Serial No./ Equipment No.: 20J101862/ 15H103928 (EQW018)
 Date of Calibration: 01-February-2021 Date of Next Calibration: 01-May-2021

PARAMETERS:

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

Expected Reading ($\mu\text{S}/\text{cm}$)	Displayed Reading ($\mu\text{S}/\text{cm}$)	Tolerance (%)
146.9	145.2	-1.2
6667	6679	+0.2
12890	12970	+0.6
58670	57892	-1.3
	Tolerance Limit (%)	± 10.0

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

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
3.86	3.92	+0.06
5.32	5.28	-0.04
8.87	8.82	-0.05
	Tolerance Limit (mg/L)	± 0.20

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

Expected Reading (pH unit)	Displayed Reading (pH unit)	Tolerance (pH unit)
4.0	4.16	+0.16
7.0	7.06	+0.06
10.0	10.02	+0.02
	Tolerance Limit (pH unit)	± 0.20

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

Mr Chan Siu Ming, Vico
 Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2103650
SUB-BATCH: 0
DATE OF ISSUE: 02-Feb-2021
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/Model No.: YSI Professional DSS
Serial No./Equipment No.: 20J101862/ 15H103928 (EQW018)
Date of Calibration: 01-February-2021 Date of Next Calibration: 01-May-2021

PARAMETERS:

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

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.53	--
4	4.06	+1.5
40	39.72	-0.7
80	83.12	+3.9
400	425.24	+6.3
800	789.11	-1.4
Tolerance Limit (%)		±10.0

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

Expected Reading (ppt)	Displayed Reading (ppt)	Tolerance (%)
0	0.01	--
10	9.97	-0.3
20	19.92	-0.4
30	30.76	+2.5
Tolerance Limit (%)		±10.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganic

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



WORK ORDER: HK2103650
SUB-BATCH: 0
DATE OF ISSUE: 02-Feb-2021
CLIENT: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Equipment Type: Multifunctional Meter
Brand Name/ Model No.: YSI Professional DSS
Serial No./ Equipment No.: 20J101862/ 15H103928 (EQW018)
Date of Calibration: 01-February-2021 Date of Next Calibration: 01-May-2021

PARAMETERS:

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

Expected Reading (°C)	Displayed Reading (°C)	Tolerance (°C)
10.5	10.3	-0.2
20.5	20.2	-0.3
39.5	39.1	-0.4
	Tolerance Limit (°C)	±2.0

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

Mr Chan Siu Ming, Vico
Manager - Inorganic



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

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

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

WORK ORDER: HK2035809
SUB-BATCH: 0
LABORATORY: HONG KONG
DATE RECEIVED: 18-Sep-2020
DATE OF ISSUE: 05-Oct-2020

SPECIFIC COMMENTS

The calibration of flow rate performed by AUES staff on 02 September 2020.

Scope of Test: Flow rate
Equipment Type: Flow Meter
Brand Name: Global Water
Model No.: FP211
Serial No.: 1449006330
Equipment No.: --
Calibration Factor: 314
Date of Calibration: 02 September, 2020

GENERAL COMMENTS

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


Mr. Fung Lim Chee, Richard
Managing Director, Life Sciences
Hong Kong

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Page 1 of 2

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION



Work Order: HK2035809
Sub-batch: 0
Date of Issue: 05-Oct-2020
Client: ACTION UNITED ENVIRONMENT SERVICES AND CONSULTING

Reference Equipment:

Model: SonTek IQ Standard
Serial Number : IQ1217004

Equipment to be calibrated:

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

Date of Calibration: 02 September, 2020

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

Flow rate

Trial	Reading of Reference Equipment (m/s) SonTek IQ Standard Serial No: IQ1217004	Reading of Equipment to be calibrated (m/s) Global Water FP211 Serial No. 1449006330
1	0.09	0.1
2	0.22	0.2
3	0.43	0.4
5	0.98	1.0
6	1.13	1.1


Mr. Fung Lim Chee, Richard
Managing Director, Life Sciences
Hong Kong



Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

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

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

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

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

Environmental Testing
環境測試

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

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

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

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

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

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



Appendix F

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

Event and Action Plan for air quality

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

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

Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level Exceedance	<ol style="list-style-type: none"> 1. Notify IEC, ER and Contractor; 2. Carry out investigation; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness 	<ol style="list-style-type: none"> 1. Review the analyzed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC and ER; 2. Implement noise mitigation proposals
Limit Level Exceedance	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC, ER, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analyzed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Note:

ET – Environmental Team

IEC – Independent Environmental Checker

ER – Engineer's Representative

Event and Action Plan for Water Quality

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

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

Appendix G

Monitoring Schedules of the Reporting Month and Coming Month

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – April 2021

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

✓	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule of Air Quality, Noise and Water Quality – May 2021

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

✓	Monitoring Day
	Sunday or Public Holiday

Appendix H

Monitoring Data

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

Air Quality (24-hour TSP)

24-Hour TSP Monitoring Data for ASR-1

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
1-Apr-21	26311	23840.74	23864.74	1440.00	38	38	38.0	21.9	1016.2	1.39	2002	2.6748	2.7663	0.0915	46
7-Apr-21	26984	23864.74	23888.74	1440.00	37	38	37.5	21.7	1013.9	1.38	1982	2.6517	2.8405	0.1888	95
12-Apr-21	27023	23888.74	23912.74	1440.00	37	38	37.5	24.6	1016.1	1.37	1976	2.8264	2.9639	0.1375	70
17-Apr-21	27029	23912.74	23936.74	1440.00	37	38	37.5	23.4	1012.5	1.37	1968	2.8214	3.0073	0.1859	94
23-Apr-21	26760	23926.74	23950.74	1440.00	40	40	40.0	18.9	1020.6	1.44	2078	2.7527	3.0070	0.2543	122
29-Apr-21	27062	23950.74	23974.74	1440.00	42	42	42.0	24.1	1013.3	1.48	2134	2.8101	2.8815	0.0714	33

24-Hour TSP Monitoring Data for ASR-2

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
1-Apr-21	26226	21245.33	21269.33	1440.00	28	28	28.0	21.9	1016.2	1.06	1532	2.6939	2.7231	0.0292	19
7-Apr-21	26985	21269.33	21293.33	1440.00	28	28	28.0	21.7	1013.9	1.06	1531	2.6519	2.6921	0.0402	26
12-Apr-21	27024	21293.33	21317.33	1440.00	28	30	29.0	24.6	1016.1	1.09	1567	2.8254	2.8624	0.0370	24
17-Apr-21	27027	21317.33	21341.33	1440.00	28	30	29.0	23.4	1012.5	1.04	1503	2.8266	2.8869	0.0603	40
23-Apr-21	26758	21341.33	21365.33	1440.00	28	30	29.0	18.9	1020.6	1.05	1517	2.7682	2.8444	0.0762	50
29-Apr-21	27063	21365.33	21389.33	1440.00	28	30	29.0	24.1	1013.2	1.04	1502	2.8097	2.9423	0.1326	88

24-Hour TSP Monitoring Data for ASR-3a

DATE	SAMPLE NUMBER	ELAPSED TIME			CHART READING			AVG TEMP	AVG AIR PRESS	STANDARD FLOW RATE	AIR VOLUME	FILTER WEIGHT (g)		DUST WEIGHT COLLECTED	24-Hr TSP ($\mu\text{g}/\text{m}^3$)
		INITIAL	FINAL	(min)	MIN	MAX	AVG	($^{\circ}\text{C}$)	(hPa)	(m^3/min)	(std m^3)	INITIAL	FINAL	(g)	
1-Apr-21	26537	15035.45	15059.45	1440.00	30	32	31.0	21.9	1016.2	1.32	1907	2.6785	2.7225	0.0440	23
7-Apr-21	26986	15059.45	15084.31	1491.60	30	32	31.0	21.7	1013.9	1.32	1975	2.6435	2.6855	0.0420	21
12-Apr-21	27006	15084.31	15108.31	1440.00	28	28	28.0	24.6	1016.1	1.25	1806	2.8352	2.8705	0.0353	20
17-Apr-21	27028	15108.31	15132.31	1440.00	28	30	29.0	23.4	1012.5	1.23	1770	2.8357	2.8971	0.0614	35
23-Apr-21	27036	15132.31	15156.61	1458.00	30	30	30.0	18.9	1020.6	1.26	1841	2.8069	2.8946	0.0877	48
29-Apr-21	27061	15156.61	15180.84	1453.80	28	28	28.0	24.1	1013.3	1.20	1750	2.7200	2.7521	0.0321	18

Noise

Noise Measurement Results (dB(A)) of CN-1																					
Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq _{30min}	Façade Collection (*)
7-Apr-21	9:07	66.7	69.8	61.6	65.4	68.3	61.5	66.9	70.4	63.3	67.7	69.8	64.2	65.9	67.6	62	68.5	70.2	65.1	67	70
13-Apr-21	13:00	69.3	71.9	64.5	72	74.9	67.8	67	69.1	64.6	67.5	70.2	60.6	69.1	71.3	65.7	68.7	70.8	63.7	69	72
19-Apr-21	14:34	61.4	64	55.9	62	64.8	57.1	63.3	65.4	59.9	61.1	62.7	59.3	62.3	64.9	57.9	61.7	62.7	57.1	62	65
30-Apr-21	13:08	66.2	67.8	62.4	66.9	68.5	63.3	67.8	69.6	64.5	69.3	72.2	65.6	68.1	71.2	64.8	68.8	71.8	65	68	71

(*) 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 nd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq _{30min}	Façade Collection (*)
7-Apr-21	9:45	64.5	68.6	51.3	63.5	64.8	50.8	65.2	68.9	53.6	63.3	67.6	52.2	64.1	68.2	53.4	61.6	64.8	50.2	64	67
13-Apr-21	13:41	62.9	64.6	60.8	62.8	65.2	60	63.7	65.3	61.2	62.6	64	60.7	63.1	65	60.8	64.2	66.3	62.3	63	66
19-Apr-21	15:11	59.2	63.1	48.9	63.5	66	49.8	61.3	65.2	49.5	62.5	66.8	49.5	63.9	66.7	49.9	61.2	65.9	48	62	65
30-Apr-21	13:48	63.4	66.3	50.2	62.9	65.5	49.5	64.4	67.1	54.8	62.8	66.2	50.8	65.6	68.8	56.4	63.5	66.7	55.5	64	67

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

Noise Measurement Results (dB(A)) of CN-3																					
Date	Start Time	1 st Leq _{5min}	L10	L90	2 nd Leq _{5min}	L10	L90	3 rd Leq _{5min}	L10	L90	4 th Leq _{5min}	L10	L90	5 th Leq _{5min}	L10	L90	6 th Leq _{5min}	L10	L90	Leq _{30min}	Façade Collection (*)
7-Apr-21	10:22	62.8	63.9	56	58.5	62.6	53	63.7	64.8	54.5	59.7	60.7	52.7	59	62.1	51.6	56.1	59.2	51.9	61	64
13-Apr-21	14:20	57.6	59.1	55	56.8	58.4	54.5	57	58.2	55	57.6	59.3	54.6	56.5	55.2	52.7	59.1	58.1	53.3	58	61
19-Apr-21	15:52	57.8	60.9	53.6	58.2	60.2	52.6	56.2	58.5	52.6	56.2	59.7	52.7	57.5	58.5	51.2	55	58.2	52.5	57	60
30-Apr-21	14:28	59.5	61.6	52.4	56.8	57.7	49.5	57.5	61.3	50.2	54.9	56.5	48.3	57.4	61.5	49.8	58.8	62.6	51.5	58	61

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

Noise Measurement Results (dB(A)) of CN-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}
7-Apr-21	11:14	57.5	60.2	44.5	56.8	58.7	44.7	58.4	59.8	44.9	56.9	59.4	43.8	58.6	60.5	45.2	56	58.9	45.6	57
13-Apr-21	15:08	63.1	65.1	60.9	64.1	65.3	62.6	64.1	65.5	62.2	63.6	65.1	61.5	62.6	64.2	60.8	63.2	65	61	63
19-Apr-21	16:29	56.5	59.7	43.2	58.5	60.9	42.1	53.1	56.8	39	58.5	61.7	42	57.2	60.8	38	55.3	58.9	38.5	57
30-Apr-21	15:09	56.5	59.2	43.5	55.8	57.7	43.7	57.4	58.8	43.9	55.9	58.4	42.8	57.6	59.5	44.2	55	57.9	43.8	56

Water Quality

Water Quality Impact Monitoring Result for M1

Date	7-Apr-21																	
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	20.6	20.6	<0.1	<0.1	5.19	5.24	62.4	63.1	5.32	5.0	7.04	7.0	0.06	0.06	4	4.5
			20.6		<0.1		5.28		63.7		4.74		7.04		0.06		5	

Date	9-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:50	0.12	20.8	20.8	<0.1	<0.1	6.27	6.29	76.0	76.3	2.24	2.6	9.40	9.4	0.06	0.06	7	4.5
			20.8		<0.1		6.31		76.6		3.04		9.40		0.06		2	

Date	12-Apr-21																	
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	23.8	23.8	<0.1	<0.1	6.2	6.26	74.4	75.5	1.93	2.0	9.20	9.2	0.06	0.06	9	6.5
			23.8		<0.1		6.32		76.5		2.09		9.20		0.06		4	

Date	14-Apr-21																	
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	21.8	21.8	<0.1	<0.1	7.05	7.05	86.6	86.5	2.08	2.0	7.71	7.7	0.08	0.08	8	8.0
			21.8		<0.1		7.04		86.4		1.89		7.71		0.08		8	

Date	16-Apr-21																	
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	21	21.0	<0.1	<0.1	7.54	7.44	89.1	88.4	3.08	3.0	7.78	7.8	0.07	0.07	6	6.0
			21		<0.1		7.34		87.6		2.94		7.78		0.07		6	

Date	19-Apr-21																	
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	19.8	19.8	<0.1	<0.1	7	6.96	83.0	82.5	2.4	2.5	7.50	7.5	0.08	0.08	7	8.0
			19.8		<0.1		6.91		82.0		2.5		7.50		0.08		9	

Date	21-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:30	0.12	22.5	22.5	<0.1	<0.1	6.4	6.30	78.4	77.3	2.04	2.1	6.90	6.9	0.06	0.06	7	7.0
			22.5		<0.1		6.2		76.1		2.1		6.90		0.06		7	

Date	23-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	9:30	0.12	24.6	24.6	<0.1	<0.1	5.79	5.72	72.7	72.1	2.6	2.5	8.57	8.6	0.09	0.09	3	3.5
			24.6		<0.1		5.65		71.4		2.49		8.57		0.09		4	

Date	26-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:30	0.12	24.5	24.5	<0.1	<0.1	6.51	6.39	83.1	81.5	2.85	2.7	7.69	7.7	0.11	0.11	6	5.5
			24.5		<0.1		6.26		79.9		2.52		7.69		0.11		5	

Date	28-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:30	0.13	24.9	24.9	<0.1	<0.1	7.46	7.48	92.0	92.2	6.1	6.2	7.56	7.6	0.06	0.06	6	6.0
			24.9		<0.1		7.5		92.3		6.37		7.56		0.06		6	

Date	30-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M1	13:30	0.12	27.9	27.9	<0.1	<0.1	7.3	7.51	91.1	93.7	1.97	1.9	6.61	6.6	0.05	0.05	7	7.0
			27.9		<0.1		7.72		96.3		1.76		6.61		0.05		7	

Water Quality Impact Monitoring Result for M2

Date	7-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:00	0.01(#)																

Date	9-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:35	0.01(#)																

Date	12-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:20	0.01 (#)																

Date	14-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
	M2	10:10	0.01(#)															

Date	16-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
	M2	9:55	0.01(#)															

Date	19-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:10	0.01 (#)																

Date	21-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	13:55	0.01 (#)																

Date	23-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	10:10	0.01 (#)																

Date	26-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
	M2	14:15	0.01 (#)															

Date	28-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M2	14:15	0.01(#)																

Date	30-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
	M2	14:00	0.01 (#)															

Remarks: (#) During the water monitoring, the channel of M2 was observed dried up and water sampling was unable be carried out

Water Quality Impact Monitoring Result for M3

Date	7-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:10	2.45	22.6	22.6	<0.1	<0.1	6.81	6.70	80.3	80.0	1.32	1.3	7.23	7.2	0.03	0.03	4	3.5
			22.6		<0.1		6.58		79.7		1.29		7.23		0.03		3	

Date	9-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:45	2.45	21.4	21.4	<0.1	<0.1	6.26	6.27	75.7	75.8	1.89	1.9	8.90	8.9	0.02	0.02	2	2.5
			21.4		<0.1		6.28		75.9		1.84		8.90		0.02		3	

Date	12-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:30	2.45	24.1	24.1	<0.1	<0.1	6.13	6.16	74.2	74.6	1.89	1.9	9.00	9.0	0.02	0.02	2	2.0
			24.1		<0.1		6.18		75.0		1.95		9.00		0.02		2	

Date	14-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:20	2.45	23.1	23.1	<0.1	<0.1	8.01	8.04	98.7	99.1	1.32	1.3	7.81	7.8	0.04	0.04	6	4.5
			23.1		<0.1		8.07		99.4		1.23		7.81		0.04		3	

Date	16-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:05	2.45	22.5	22.5	<0.1	<0.1	8	8.03	95.9	96.3	1.6	1.6	7.70	7.7	0.04	0.04	3	3.5
			22.5		<0.1		8.05		96.7		1.58		7.70		0.04		4	

Date	19-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:20	2.45	20.9	20.9	<0.1	<0.1	8.4	8.34	99.4	98.9	1.1	1.2	7.60	7.6	0.04	0.04	4	4.0
			20.9		<0.1		8.28		98.3		1.2		7.60		0.04		4	

Date	21-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	14:10	2.43	23.9	23.9	<0.1	<0.1	7.28	7.27	89.5	89.3	2.42	2.5	6.90	6.9	0.03	0.03	3	3.5
			23.9		<0.1		7.25		89.1		2.63		6.90		0.03		4	

Date	23-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	10:20	2.41	24.9	24.9	<0.1	<0.1	5.66	5.60	71.5	70.6	2.33	2.1	7.81	7.8	0.04	0.04	2	2.0
			24.9		<0.1		5.53		69.6		1.77		7.81		0.04		2	

Date	26-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	14:25	2.41	25.4	25.4	<0.1	<0.1	6.22	6.58	79.4	84.1	1.68	1.8	7.54	7.5	0.04	0.04	3	2.5
			25.4		<0.1		6.93		88.8		1.83		7.54		0.04		2	

Date	28-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	14:25	2.42	25.3	25.3	<0.1	<0.1	7.35	7.39	91.3	91.7	1.64	1.7	7.62	7.6	0.04	0.04	4	3.5
			25.3		<0.1		7.42		92.1		1.66		7.62		0.04		3	

Date	30-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M3	14:10	2.35	28.4	28.4	<0.1	<0.1	6.77	7.14	84.0	88.5	1.65	1.8	6.76	6.8	0.03	0.03	4	3.5
			28.4		<0.1		7.51		93.0		1.91		6.76		0.03		3	

Water Quality Impact Monitoring Result for M4

Date	7-Apr-21																	
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	22.7	22.7	<0.1	<0.1	8.12	8.11	97.5	97.4	4.2	4.2	7.01	7.0	0.08	0.08	3	3.5
			22.7		<0.1		8.09		97.2		4.2		7.01		0.08		4	

Date	9-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	11:05	0.44	20.5	20.5	<0.1	<0.1	6.23	6.28	75.5	76.4	1.0	1.4	8.50	8.5	0.07	0.07	<2	<2
			20.5		<0.1		6.32		77.2		1.9		8.50		0.07		<2	

Date	12-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:50	0.44	24.4	24.4	<0.1	<0.1	6.19	6.20	74.8	75.0	1.4	1.4	8.70	8.7	0.06	0.06	2	2.5
			24.4		<0.1		6.2		75.2		1.5		8.70		0.06		3	

Date	14-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	10:40	0.43	23.4	23.4	<0.1	<0.1	8.18	8.15	100.6	100.3	1.2	1.2	7.44	7.4	0.08	0.08	5	3.5
			23.4		<0.1		8.12		99.9		1.1		7.44		0.08		2	

Date	16-Apr-21																	
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	22.6	22.6	<0.1	<0.1	8.17	8.19	97.9	98.1	0.5	0.5	7.27	7.3	0.08	0.08	3	3.0
			22.6		<0.1		8.2		98.3		0.5		7.27		0.08		3	

Date	19-Apr-21																	
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	21.2	21.2	<0.1	<0.1	8.5	8.44	100.0	99.5	0.9	1.0	7.30	7.3	0.09	0.09	2	2.5
			21.2		<0.1		8.37		99.0		1.0		7.30		0.09		3	

Date	21-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	14:25	0.42	24.2	24.2	<0.1	<0.1	7.85	7.86	96.8	97.0	1.5	1.5	6.90	6.9	0.09	0.09	<2	<2
			24.2		<0.1		7.87		97.1		1.5		6.90		0.09		<2	

Date	23-Apr-21																	
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	25.2	25.2	<0.1	<0.1	5.93	5.89	76.1	75.6	1.0	1.1	7.53	7.5	0.1	0.10	<2	<2
			25.2		<0.1		5.85		75.0		1.1		7.53		0.1			

Date	26-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	14:45	0.42	25.5	25.5	<0.1	<0.1	6.98	7.13	89.1	91.1	1.7	1.8	7.13	7.1	0.1	0.10	<2	<2
			25.5		<0.1		7.27		93.1		1.9		7.13		0.1			

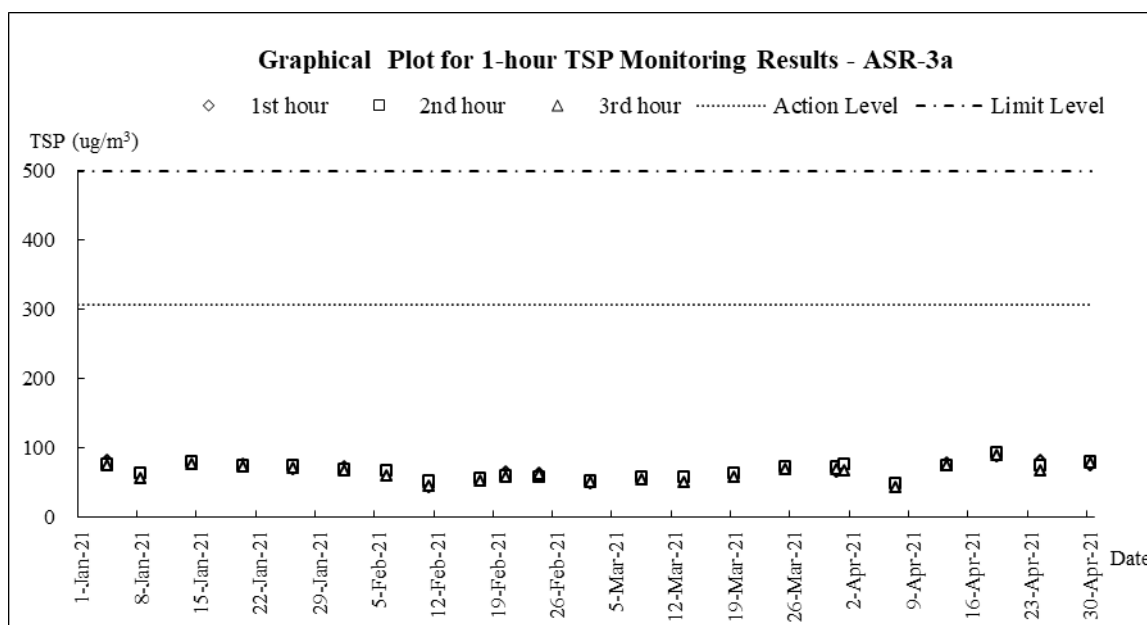
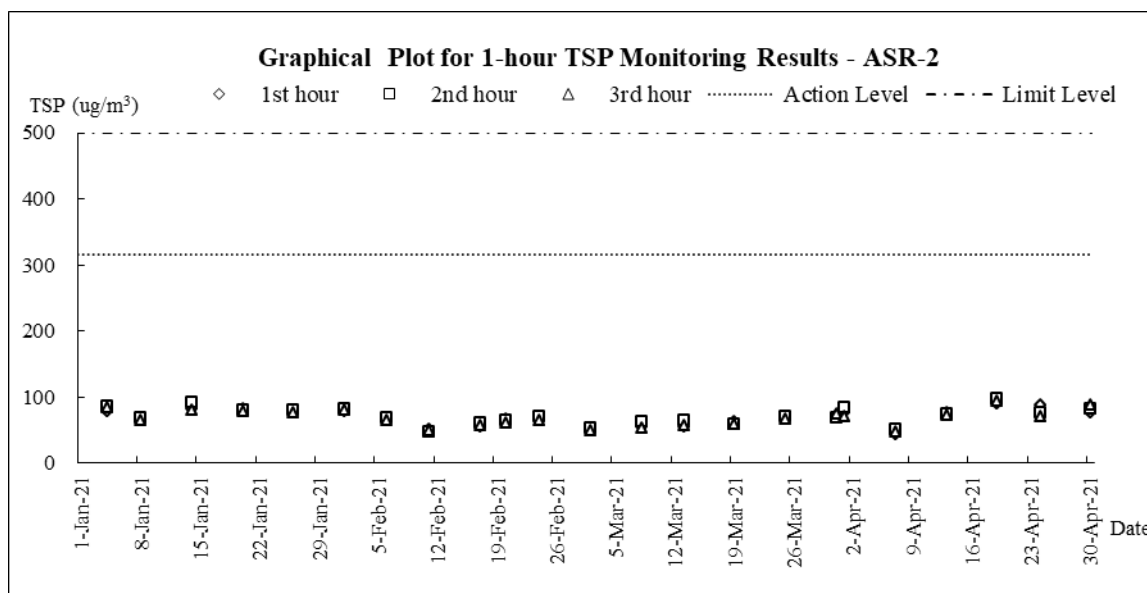
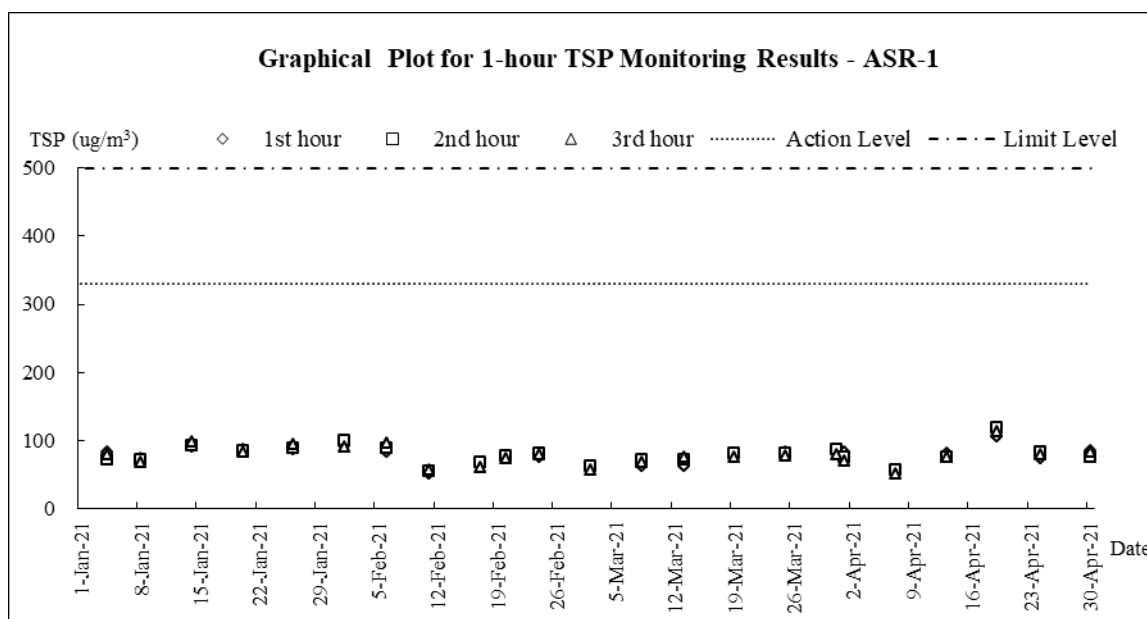
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Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	14:40	0.43	25.1	25.1	<0.1	<0.1	7.44	7.45	92.3	92.4	1.6	1.5	7.19	7.2	0.1	0.10	3	2.5
			25.1		<0.1		7.45		92.4		1.3		7.19		0.1		2	

Date	30-Apr-21																	
Location	Time	Depth (m)	Temp (oC)		Flow Velocity (m/s)		DO (mg/L)		DO (%)		Turbidity (NTU)		pH		Salinity		SS(mg/L)	
M4	14:30	0.40	28.5	28.5	<0.1	<0.1	7.77	7.76	96.5	96.4	1.5	1.3	6.60	6.6	0.09	0.09	<2	<2
			28.5		<0.1		7.75		96.2		1.2		6.60		0.09		<2	

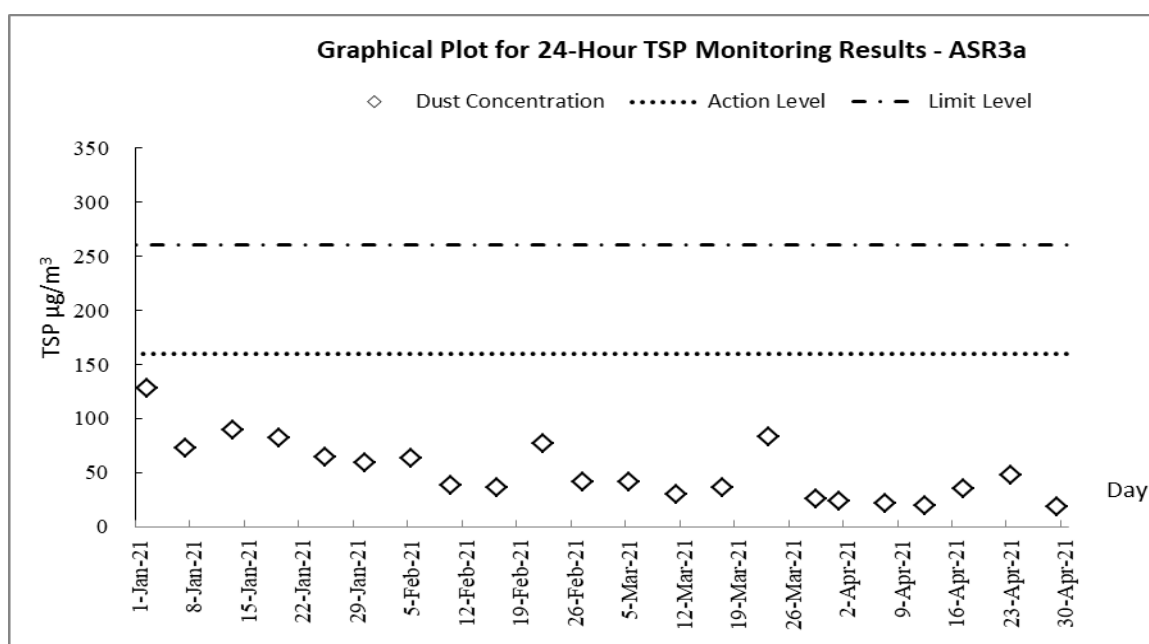
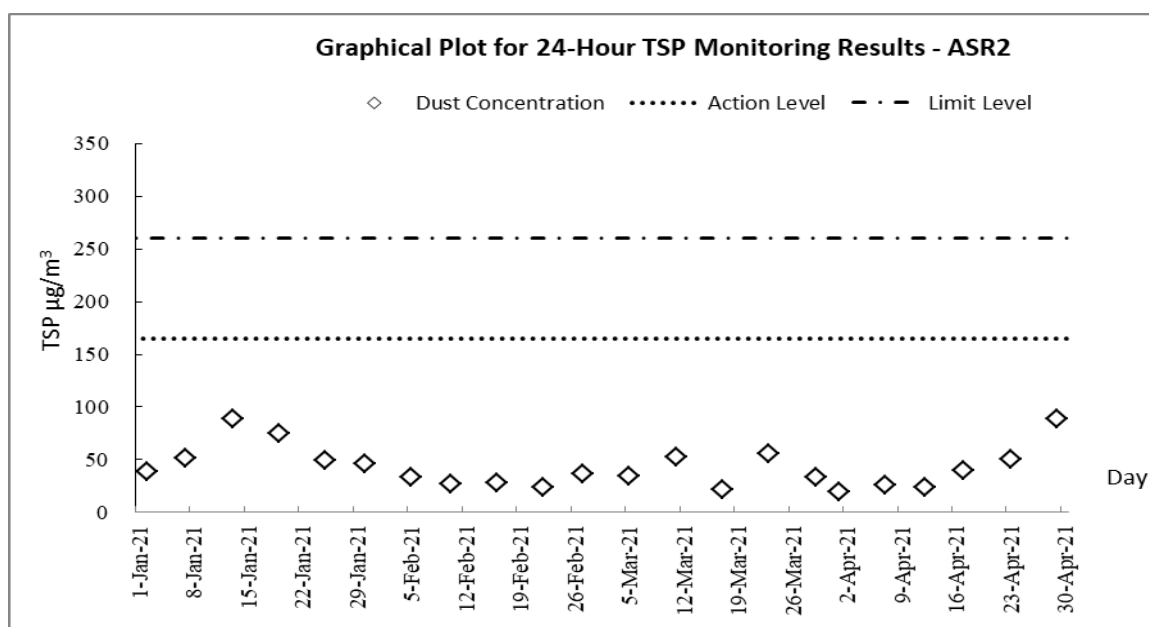
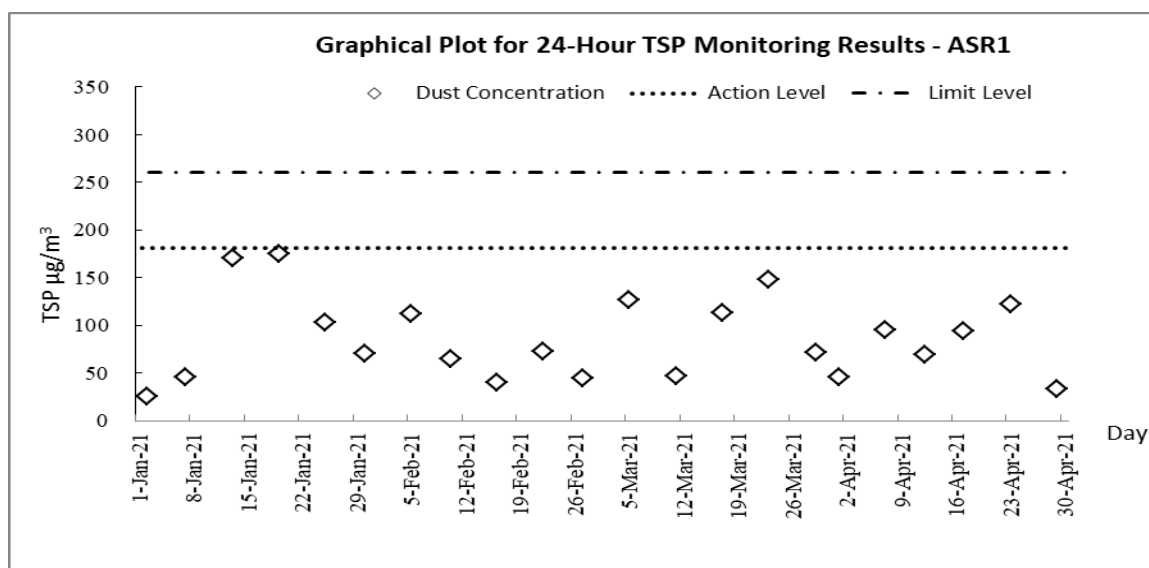
Appendix I

Graphical Plots of Air Quality, Noise and Water Quality

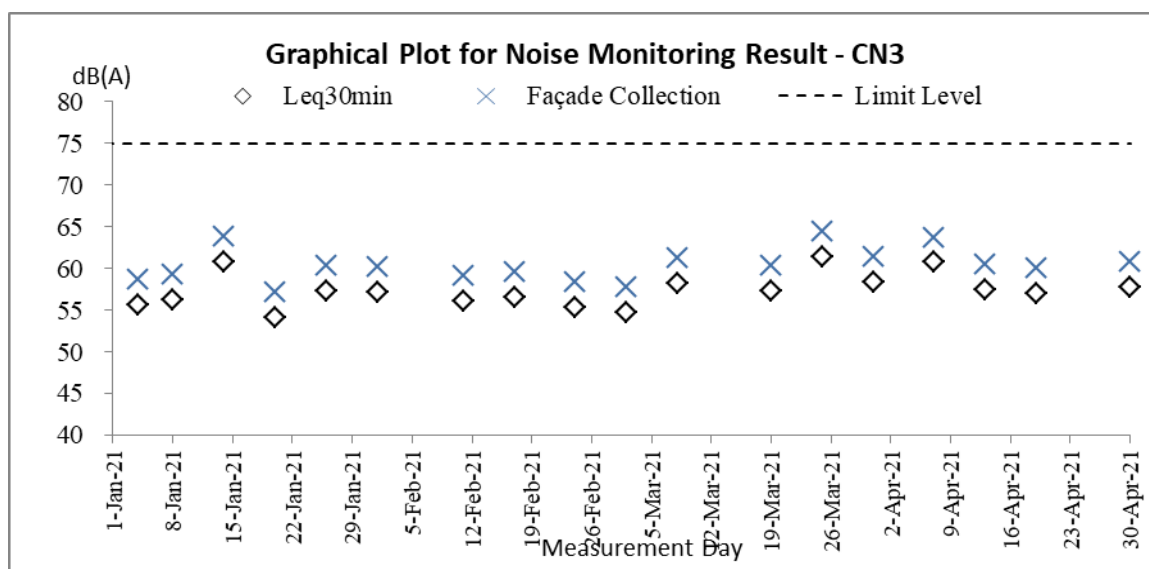
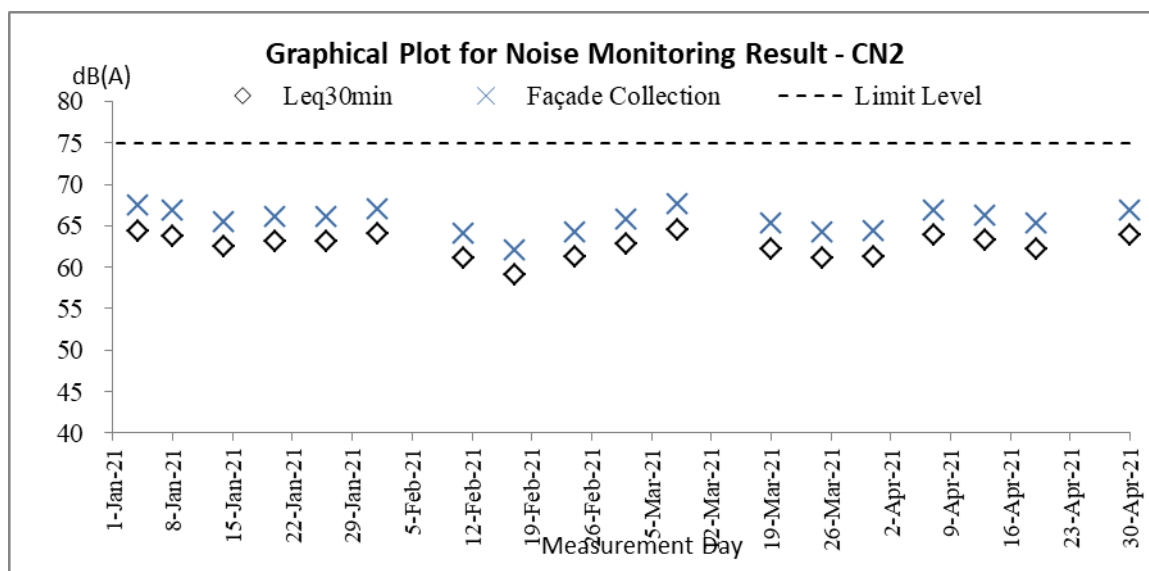
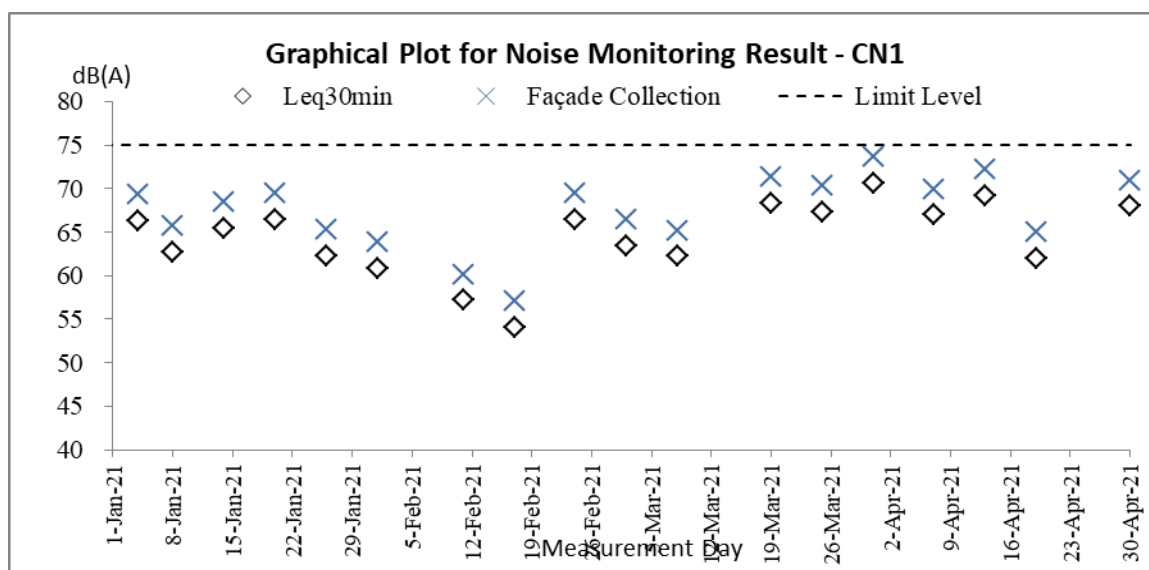
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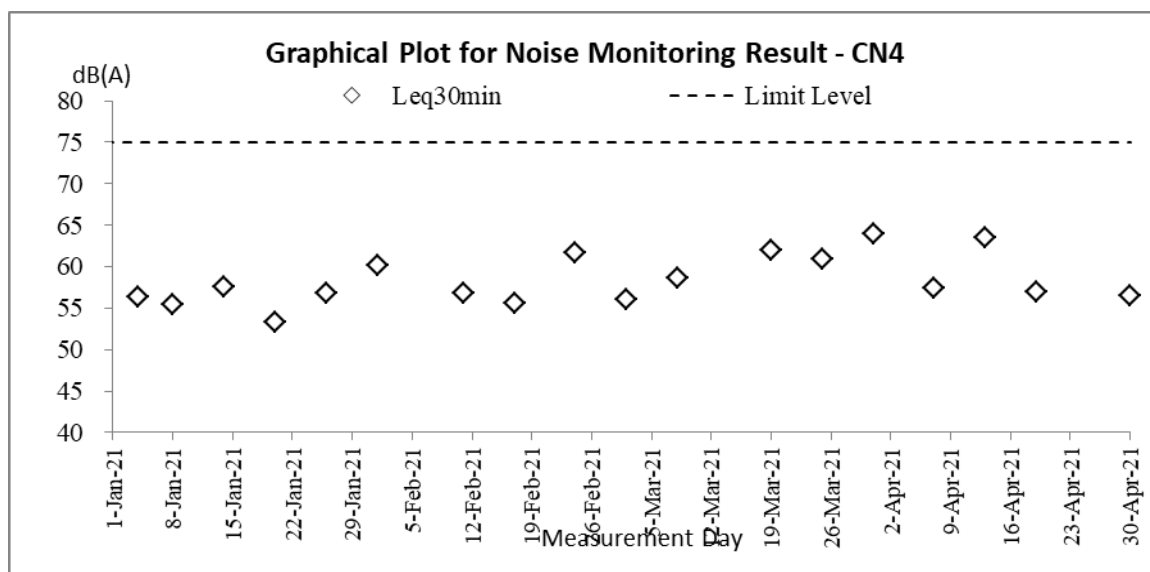


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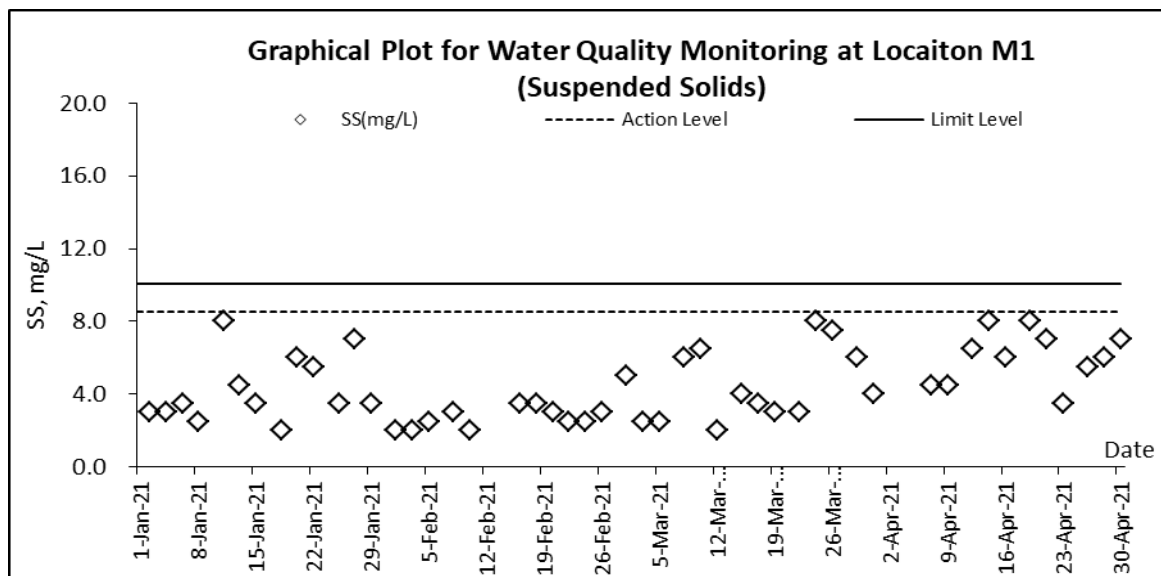
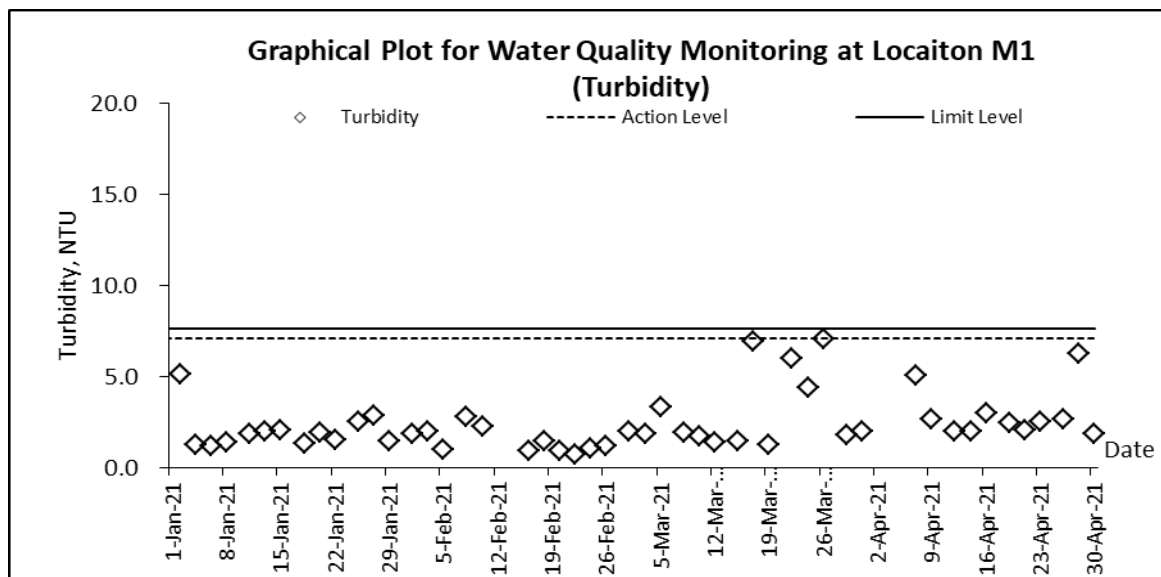
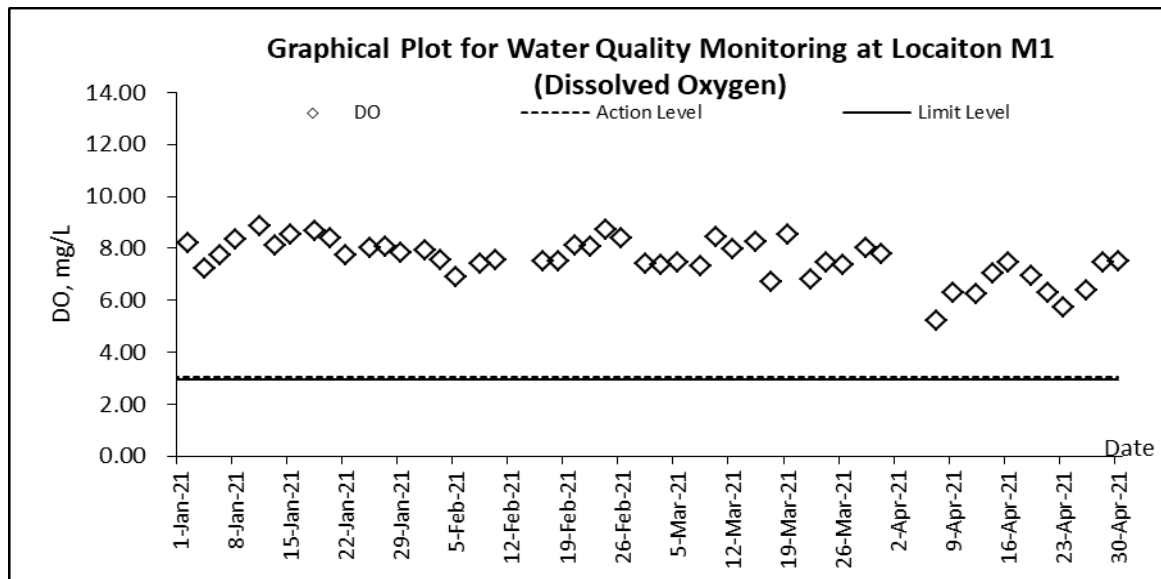


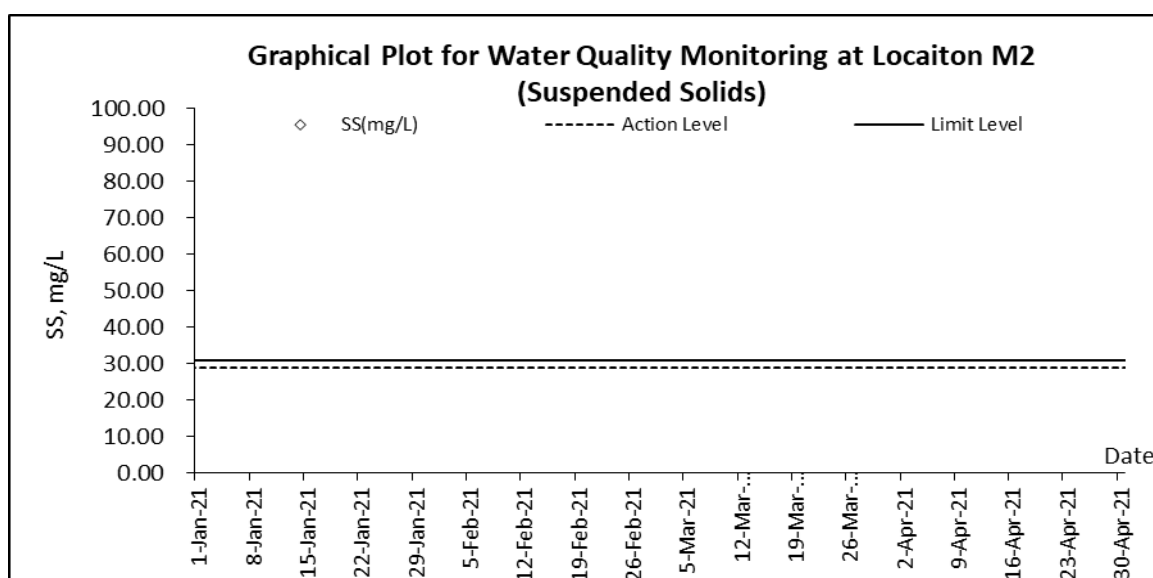
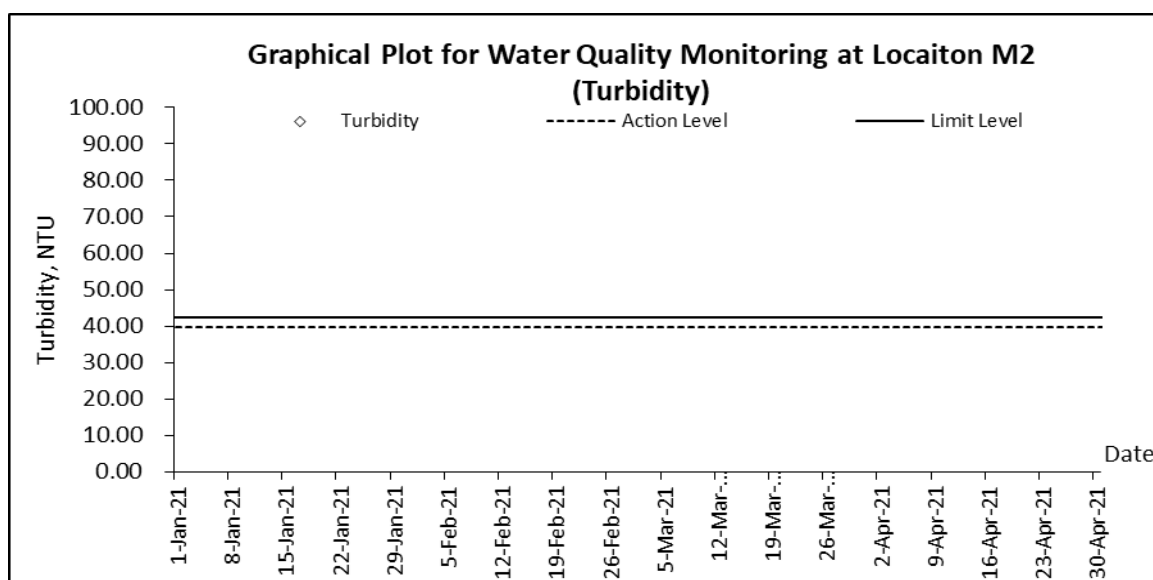
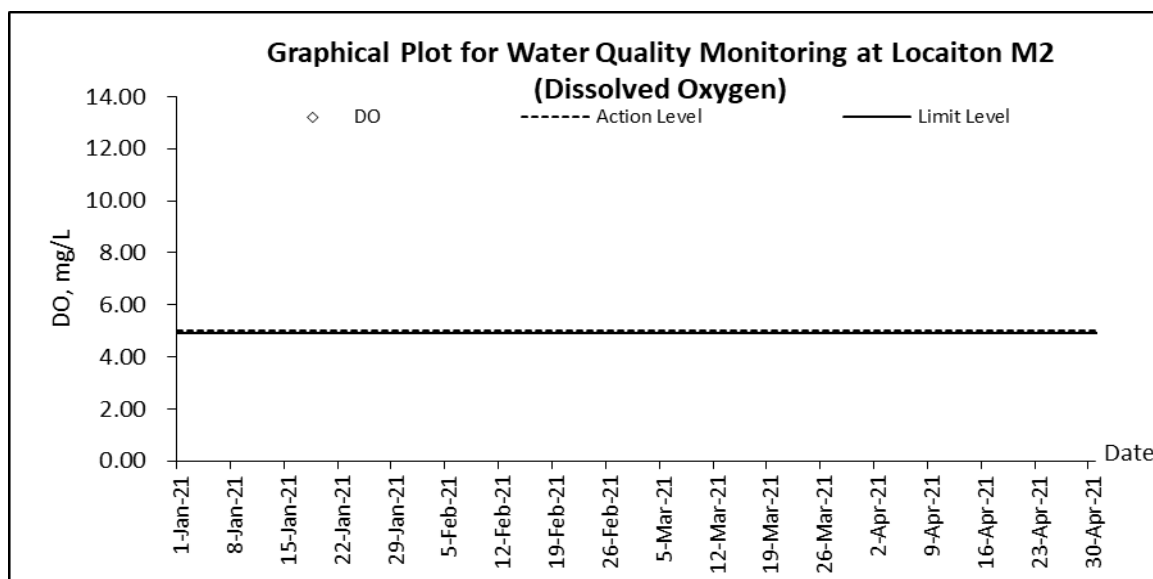
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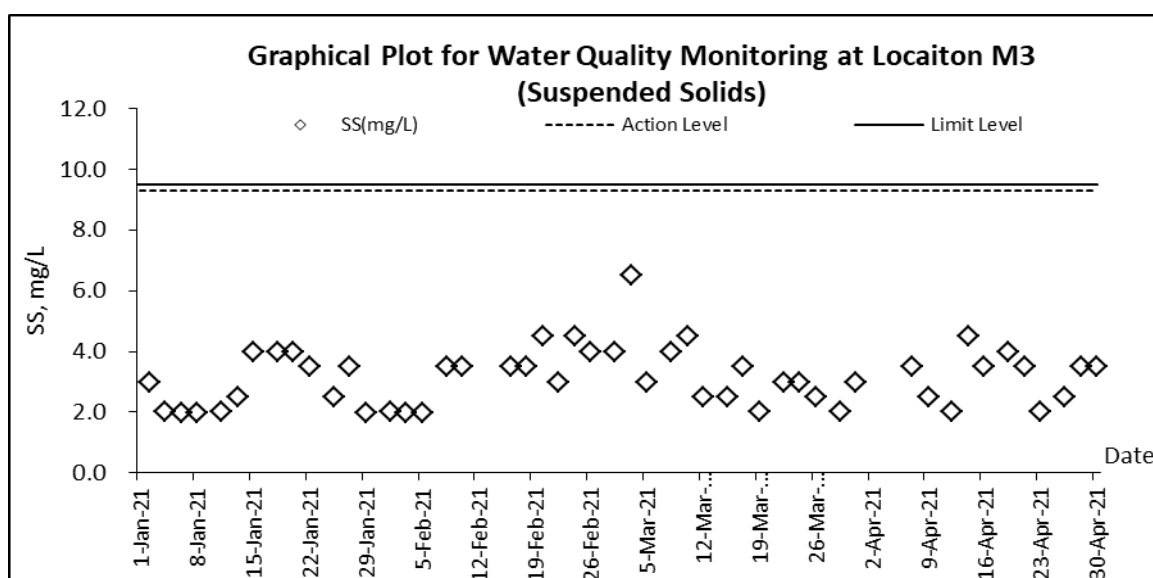
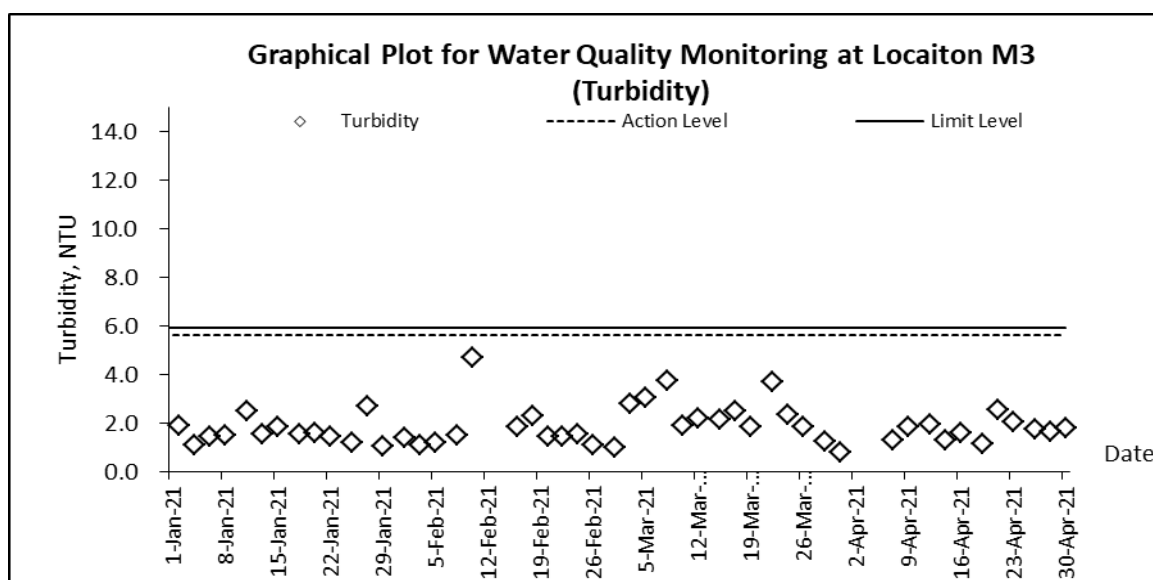
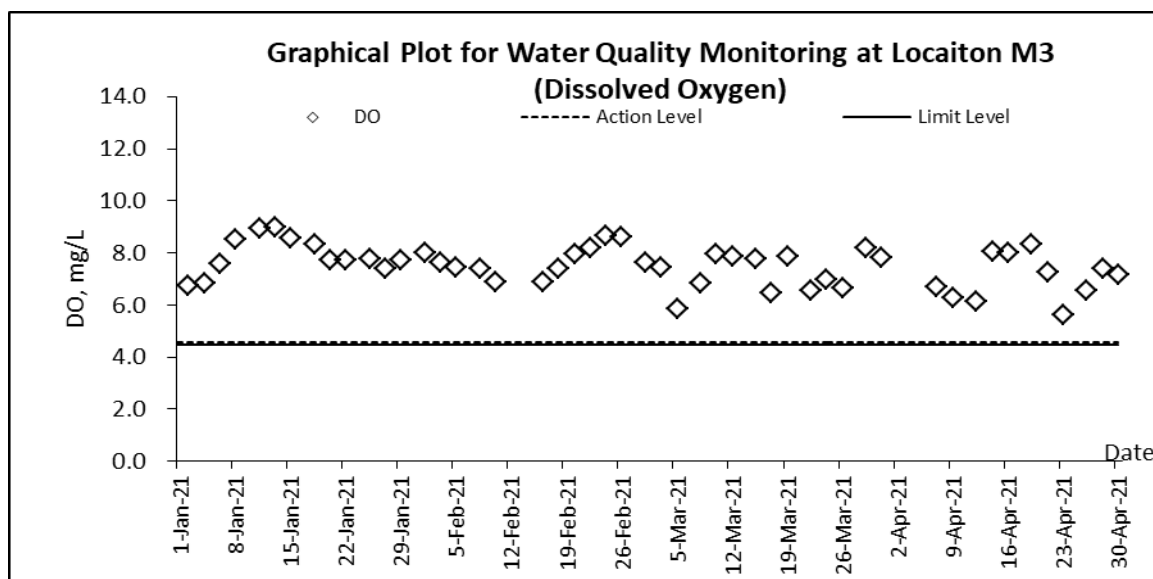


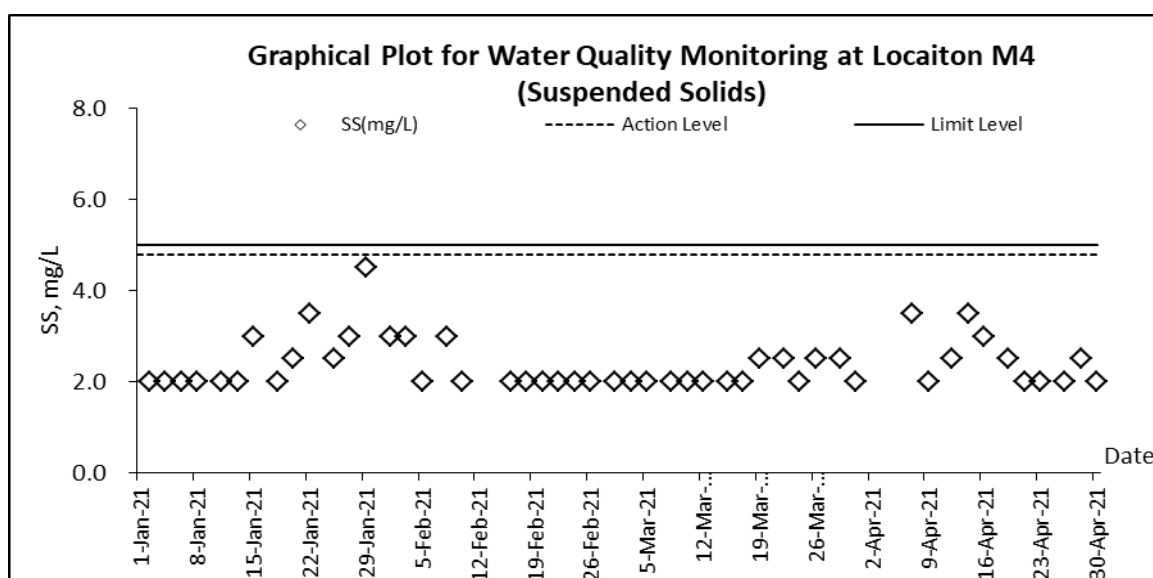
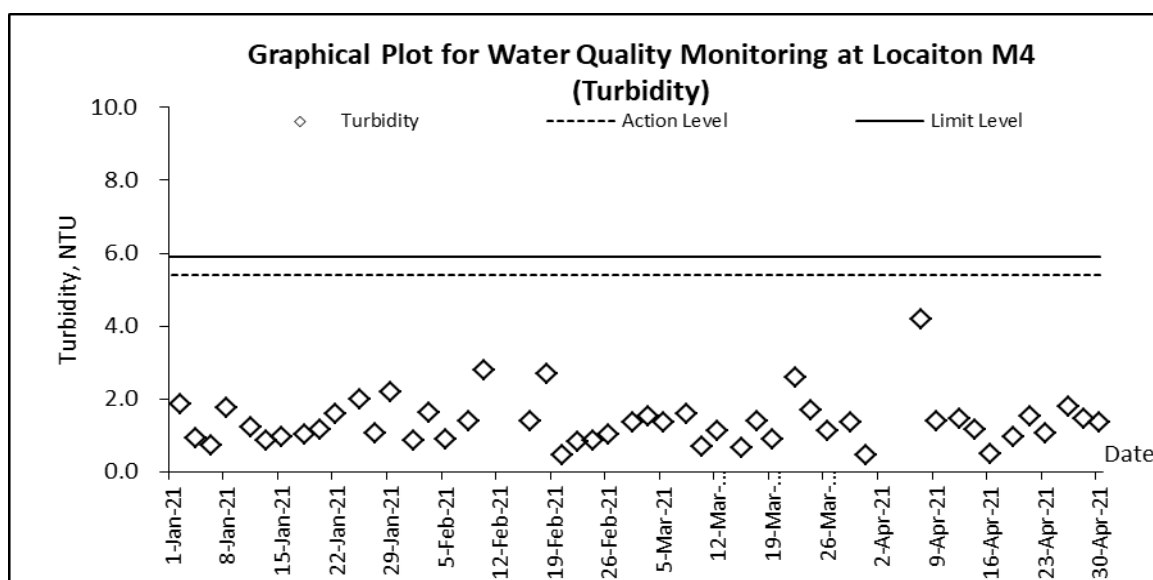
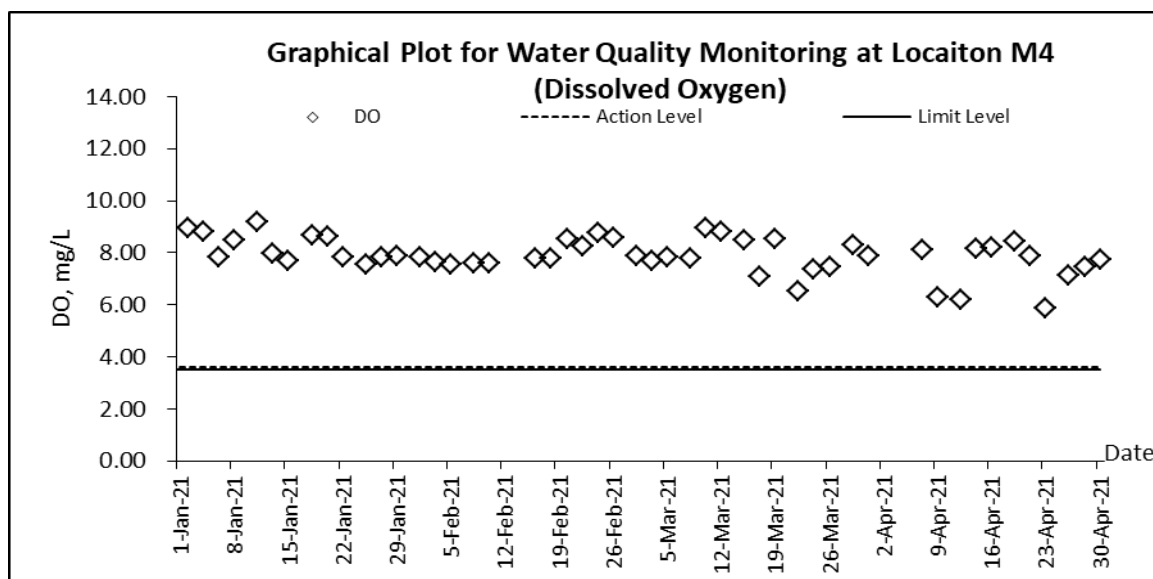


Water Quality Impact Monitoring









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-21	Thu	Mainly cloudy with one or two showers.	Trace	26.9	8.5	74	S/SW
2-Apr-21	Fri	Cloudy with a few showers.	0	26.8	10.7	69	S/SW
3-Apr-21	Sat	Fine. Hot. Light winds.	0	26.6	11.2	71.5	E
4-Apr-21	Sun	Moderate easterly winds, strengthening gradually overnight	0.8	24.3	10.5	67.2	E
5-Apr-21	Mon	Moderate east to northeasterly winds, occasionally fresh offshore.	0.7	21.7	9.2	81	E/SE
6-Apr-21	Tue	Sunny intervals at first tomorrow and a few showers later.	0	24.6	11.5	73.5	E
7-Apr-21	Wed	Becoming cloudy tonight.	0	23.7	11	70.7	E/SE
8-Apr-21	Thu	Cloudy with a few showers.	0	23	10	71.7	E/SE
9-Apr-21	Fri	Cloudy with one or two rain patches.	7.5	18.8	6.2	89.7	E/SE
10-Apr-21	Sat	Moderate to fresh east to northeasterly winds	0	22.6	8.1	71.2	E/NE
11-Apr-21	Sun	Fine. Hot. Light winds.	0	23.9	7.5	68	E
12-Apr-21	Mon	Mainly cloudy with one or two showers.	0	24.1	6.2	78	E/SE
13-Apr-21	Tue	Mainly cloudy with one or two showers.	0	25.7	5	76	S/SE
14-Apr-21	Wed	Becoming cloudy tonight.	Trace	24.7	8.7	81	E/SE
15-Apr-21	Thu	Cloudy with a few showers.	8.3	22.3	12	85	E/SE
16-Apr-21	Fri	Moderate northerly winds.	1.5	23.5	11.2	83.7	E/SE
17-Apr-21	Sat	Light winds tomorrow.	2.5	23.7	10.5	67.2	E/SE
18-Apr-21	Sun	Moderate to fresh easterly winds	Trace	24.5	14.2	52.2	E/SE
19-Apr-21	Mon	Fine. Hot. Light winds.	0	24.1	15	55.7	E/SE
20-Apr-21	Tue	Light winds tomorrow.	0	23.9	12	64.5	E/SE
21-Apr-21	Wed	Fine. Hot. Light winds.	0	25.6	12.5	61.5	S/SE
22-Apr-21	Thu	Cloudy periods overnight.	0	25.9	8.5	69	W/SW
23-Apr-21	Fri	Moderate northerly winds.	0	26.9	6	74	E/SE
24-Apr-21	Sat	Light winds tomorrow.	Trace	26.1	7.5	71.5	E/SE
25-Apr-21	Sun	Moderate to fresh easterly winds	0.9	24.7	12.5	82	E/SE
26-Apr-21	Mon	Mainly cloudy with a few showers.	0.3	23.2	10.7	80	E/SE
27-Apr-21	Tue	Cloudy periods overnight.	5.7	23	9.2	89	E
28-Apr-21	Wed	Fine and hot during the day tomorrow.	4.2	24.9	7.5	82.5	N
29-Apr-21	Thu	Moderate to fresh easterly winds	0.1	25.4	11	68.0	N
30-Apr-21	Fri	occasionally strong offshore at first.	0	25.6	6.7	69.0	W/NW

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 2021




Revision	0	
Date of issue	28 Apr 2021	
Prepared by	Alan Lam	
Reviewed by	Edwina Yeung	
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, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.
- 2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.
- 2.1.4 Upland grassland is the major habitat within the project boundary. The semi-natural habitat is dominated by typical upland grassland species: fern *Dicranopteris pedata*, grass *Neyraudia reynaudiana*, *Miscanthus floridulus*, climbing vines *Smilax china*, *Smilax glabra*, and shrubs such as *Rhodomyrtus tomentosa*, *Breynia fruticosa* and *Helicteres angustifolia*. Approximately 30 flowering spikes of two orchid species Bamboo Orchid and Toothed Habenaria were recorded near the hill top in the northern part of this upland grassland. Golden-headed Cisticola, which is considered as Local Concern by Fellowes *et al.* (2002), was also recorded in upland grassland on Sandy Ridge, including a proved breeding record of fledged young in September 2013. In addition, numerous species of conservation interest were recorded in EIA report, such as East Asian Porcupine, Leopard Cat, Red Muntjac, Great Swift, Tamil Grass Dart, Small Three-ring and Small Grass Yellow.

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

2.2 MONITORING MEASURES OF WETLAND HABITATS

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

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

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

2.3 MONITORING MEASURES OF NON-WETLAND HABITATS

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

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

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

3 METHODOLOGY

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

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

Table 3 Survey Schedule

3.1 MAMMAL SURVEY

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

3.2 BIRD SURVEY

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

3.3 HERPETOFAUNA SURVEY

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

3.4 DRAGONFLY SURVEY

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

3.5 BUTTERFLY SURVEY

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

3.6 AQUATIC FAUNA SURVEY

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

4 RESULT

This monitoring survey started on 8th April 2021. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed points. All species seen will be identified and counted as accurately as possible.

- Mammal
There was no mammal recorded in the monitoring area.
- Bird
There were a total of 30 bird individuals from 18 species recorded in the monitoring area. Five species of conservation interests were recorded in the monitoring area: *Ardeola bacchus*, Chinese Pond Heron 池鷺, *Milvus migrans*, Black Kite 黑鳶, *Buteo japonicus* Eastern Buzzard 普通鵟, *Centropus bengalensis* Lesser Coucal 小鴉鵂, and *Otus lettia* Collared Scops Owl 領角鴞.
- Herpetofauna
There was no reptile species recorded in the monitoring area.
There was two amphibian species recorded in the monitoring area.
- Butterfly
There was a total of 2 butterfly individuals from 2 species recorded in the monitoring area.
- Dragonfly
There was a total of one odonate individuals from one species recorded in the monitoring area.
- Freshwater communities
There was no freshwater community recorded in the monitoring area.

Figure 1
Part of the monitoring area.



Figure 2
Wetland in monitoring area.



Table 4 Result of mammal in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-4-2021	
				Non-wetland	Wetland
N/A					

Table 5 Result of Avifauna in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-4-2021	
				Non-wetland	Wetland
<i>Francolinus pintadeanus</i>	Chinese Francolin	中華鷓鴣		1	
<i>Ardeola bacchus</i>	Chinese Pond Heron	池鷺	Fellowes et al. (2002): PRC,(RC)	1	
<i>Milvus migrans</i>	Black Kite	黑鳶	Fellowes et al. (2002): RC; Appendix 2 of CITES	1	
<i>Buteo japonicus</i>	Eastern Buzzard	普通鵟	Appendix 2 of CITES	1	
<i>Amaurornis phoenicurus</i>	White-breasted Waterhen	白胸苦惡鳥			1
<i>Centropus bengalensis</i>	Lesser Coucal	小鴉鵂	Class 2 Protected Animal of China; China Red Data Book Status: (Vulnerable)		3
<i>Otus lettia</i>	Collared Scops Owl	領角鴞	Class 2 Protected Animal of China; Appendix 2 of CITES		1
<i>Caprimulgus affinis</i>	Savanna Nightjar	林夜鷹			1
<i>Dicrurus hottentottus</i>	Hair-crested Drongo	髮冠卷尾			1

<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鵲		4	
<i>Pycnonotus aurigaster</i>	Sooty-headed Bulbul	白喉紅臀鵲			3
<i>Hirundo rustica</i>	Barn Swallow	家燕		3	
<i>Phylloscopus fuscatus</i>	Dusky Warbler	褐柳鶯			1
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鶯		1	
<i>Prinia inornata</i>	Plain Prinia	純色鷦鶯			2
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鶯		1	
<i>Acridotheres cristatellus</i>	Crested Myna	八哥			2
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領棕鳥			2

Table 6 Result of reptile in survey

Table 6 Result of Reptile in survey				
Scientific Name	Common Name	Chinese Name	8-4-2021	
			Non-wetland	Wetland
N/A				

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-4-2021	
				Non-wetland	Wetland
<i>Bufo melanostictus</i>	Asian Common Toad	黑眶蟾蜍			+
<i>Fejervarya limnocharis</i>	Paddy Frog	澤蛙			+

+ Species counted by vocal identification

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	8-4-2021	
			Non-wetland	Wetland
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶		1
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶		1

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-4-2021	
				Non-wetland	Wetland
<i>Pseudocopteryx ciliata</i>	Black-kneed Featherlegs	白狹扇尾			1

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-4-2021	
				Non-wetland	Wetland
N/A					

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 abundances and species richness in November over years were compared to show the trend. Figures 1 and 2 indicate total species richness and total abundance with the site boundary respectively.

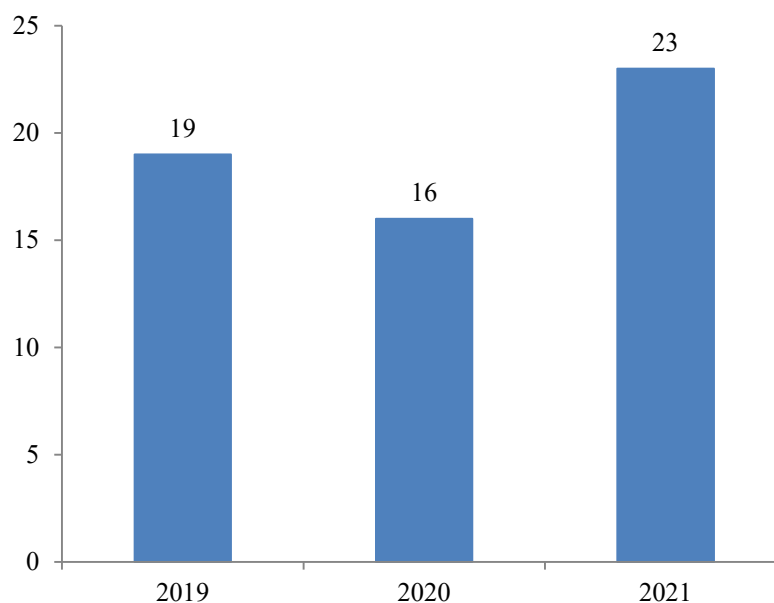


Figure 1: bar chart showing the total species richness within site boundary from 2019 to 2021 (Actual quantity annotated at the top of each bar)

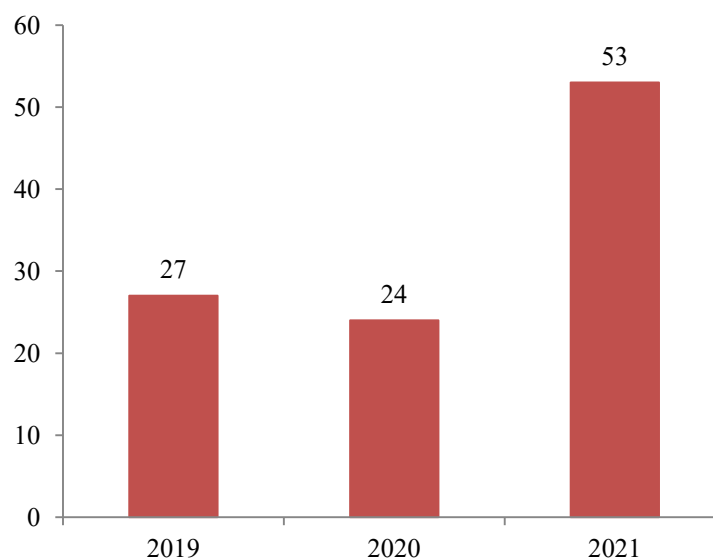


Figure 2: bar chart showing the total abundance within site boundary from 2019 to 2021 (Actual quantity annotated at the top of each bar)

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

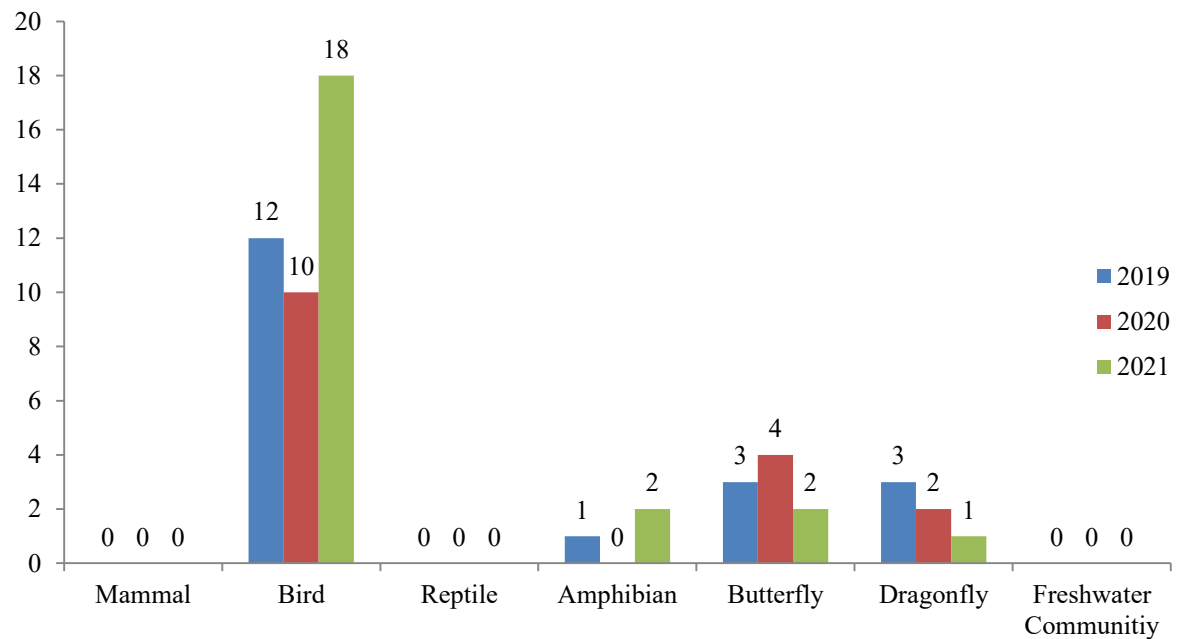


Figure 3: bar chart showing the species richness within site boundary by taxa from 2019 to 2021 (Actual quantity annotated at the top of each bar)

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 September over years were compared in figures 4 and 5.

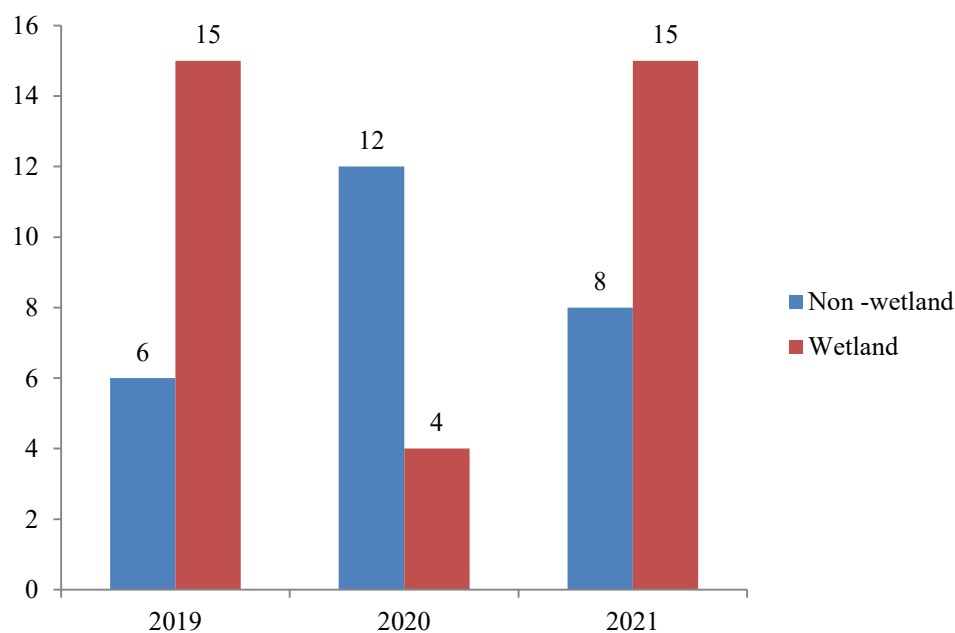


Figure 4: bar chart showing the species richness based on habitat type from 2019 to 2021 (Actual quantity annotated at the top of each bar)

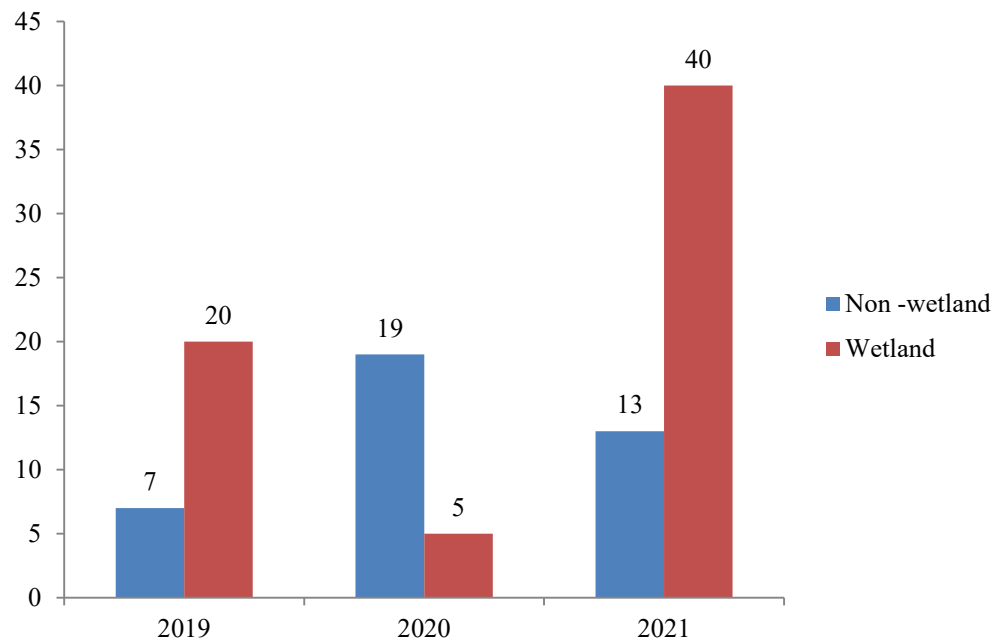
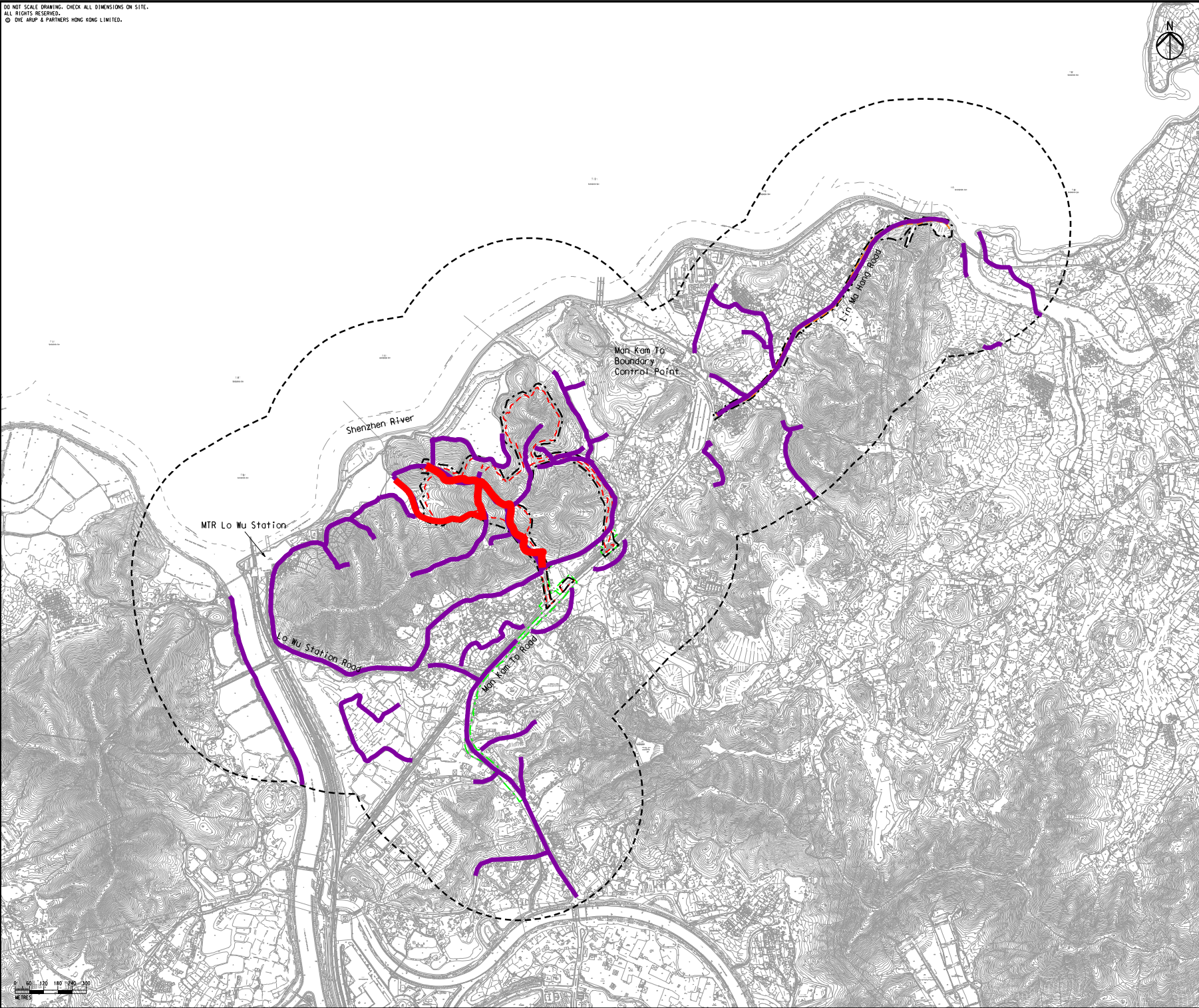


Figure 5: bar chart showing the abundance based on habitat type from 2019 to 2021 (Actual quantity annotated at the top of each bar)

- 5.4 After analysing survey results in April from 2019 to 2021, it is found that the species diversity and abundance reduced in 2020 but increased this year for wetland habitat. The reduction could be due to natural fluctuation and initial construction work. Good practice during construction is required to prevent environmental contamination as well as unnecessary site clearance. Continuous monitoring is also recommended to inspect any significant decrease in species diversity.

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

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Legend

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

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

Consultant

ARUP

Contract No. and Title:

Agreement No. CE 1/2013(CE)

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

Drawing title

Transect Routes at Sandy Ridge

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

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**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 2021




Revision	0	
Date of issue	28 Apr 2021	
Prepared by	Alan Lam	
Reviewed by	Edwina Yeung	
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	Upland Grassland
Watercourses	Woodland

- 2.1.2 Wet woodland is small patch present on northwest of the project boundary, and is confined by the marsh area to the north and the secondary woodland to the east, south and south-west parts. A number of mature trees *Cleistocalyx nervosum* and *Acronychia pedunculata* form the tree canopy, with other self-sown shrubs (including *Psychotria asiatica*, *Ligustrum sinense* and *Glochidion lanceolarium*) and trees (*Aporosa dioica* and *Litsea monopetala*). Whilst botanically it comprises of naturally regenerated secondary woodland and ground level are a series of small braided streams and weep points which even during the dry season remain wet. This creates a rather uncommon habitat in Hong Kong offering suitable conditions for a good assemblage of common wetland species. The wet woodland provides a good assemblage of micro-habitats, which is relatively undisturbed and has good linkages to other natural habitats. Several species of conservation importance were recorded in EIA report from this habitat: East Asian Porcupine, Leopard Cat, Red Muntjac, Two-striped Grass Frog, Small Snakehead, *Somanniathelphusa zanklon*, Dancing Shadow-emerald.
- 2.1.3 Seasonal watercourse running west to east in the eastern part of the area inside the Project boundary is shallower in gradient than those running off the hillside. This seasonal watercourse is heavily vegetated with wetland-associated herbs including *Commelina diffusa*, *Polygonum chinense*, *Colocasia esculenta* and *Dracaena sanderiana*. A mature tree of *Aquilaria sinensis* was recorded at the bank of the seasonal watercourse to the west of the Sandy Ridge Cemetery Office. Seasonal watercourses are restricted to the steeper slopes within the project boundary and are characterised by being entirely dry for much of the dry season. However, endemic crab *S. zanklon* population is supported by ephemeral watercourses close to the project boundary.
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- 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.
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Table 1 Action and Limit Levels and Responses to Evidence of Declines in Aquatic Fauna

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- 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.

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3.5 BUTTERFLY SURVEY

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

3.6 AQUATIC FAUNA SURVEY

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

4 RESULT

This monitoring survey started on 8th April 2021. A sunny day. The day and night survey covered wetland and non-wetland areas. The survey was conducted by transect and at fixed point. All species seen will be identified and counted as accurately as possible.

- Mammal
There was no mammal recorded in the monitoring area.
- Bird
There were total of 16 bird individuals from 8 species recorded in the monitoring area.
- Herpetofauna
There was no reptile recorded in the monitoring area.
There was no amphibian recorded in the monitoring area.
- Butterfly
There was total 9 butterfly individuals from 6 species recorded in the monitoring area.
- Dragonfly
There were ten odonate individuals from two species recorded in the monitoring area.
- Freshwater communities
There were two species of freshwater fish recorded in the monitoring area.

Figure 1
The engineering site in monitoring area.



Figure 2
The engineering site in monitoring area.



Table 4 Result of mammal in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-Apr-2021	
				Non-wetland	Wetland
N/A					

Table 5 Result of Avifauna in survey

Scientific Name	English Name	Chinese Name	Conservation Status	8-Apr-2021	
				Non-wetland	Wetland
<i>Eudynamys scolopaceus</i>	Asian Koel	噪鵲		1	
<i>Parus cinereus</i>	Cinereous Tit	蒼背山雀		2	
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鵲			2
<i>Prinia flaviventris</i>	Yellow-bellied Prinia	黃腹鷦鷯			2
<i>Prinia inornata</i>	Plain Prinia	純色鷦鷯			2
<i>Orthotomus sutorius</i>	Common Tailorbird	長尾縫葉鷽		2	
<i>Garrulax perspicillatus</i>	Masked Laughingthrush	黑臉噪鵲		4	
<i>Gracupica nigricollis</i>	Black-collared Starling	黑領椋鳥			1

Table 6 Result of reptile in survey

Scientific Name	Common Name	Chinese Name	8-Apr-2021	
			Non-wetland	Wetland
N/A				

Table 7 Result of amphibian in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Apr-2021	
				Non-wetland	Wetland
N/A					

Table 8 Result of butterfly in survey

Scientific Name	Common Name	Chinese Name	8-Apr-2021	
			Non-wetland	Wetland
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛱蝶	2	
<i>Mycalesis mineus</i>	Dark Brand Bush Brown	小眉眼蝶	1	
<i>Papilio memnon</i>	Great Mormon	美鳳蝶	1	
<i>Papilio polytes</i>	Common Mormon	玉帶鳳蝶	2	
<i>Pieris canidia</i>	Indian Cabbage White	東方菜粉蝶	1	
<i>Eurema hecabe</i>	Common Grass Yellow	寬邊黃粉蝶	2	

Table 9 Result of Odonate in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Apr-2021	
				Non-wetland	Wetland
<i>Trithemis aurora</i>	Crimson Dropwing	曉褐蜻			1
<i>Prodasineura autumnalis</i>	Black Threadtail	烏齒原螳			9

Table 10 Result of freshwater communities in survey

Scientific Name	Common Name	Chinese Name	Conservation Status	8-Apr-2021
<i>Gambusia affinis</i>	Mosquito fish	食蚊魚		+
<i>Puntius semifasciolatus</i>	Chinese Barb	五線無鬚魮		+

+: 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 abundances and species richness in April over years were compared to show the trend. Figures 1 and 2 indicate total species richness and total abundance with the site boundary respectively.

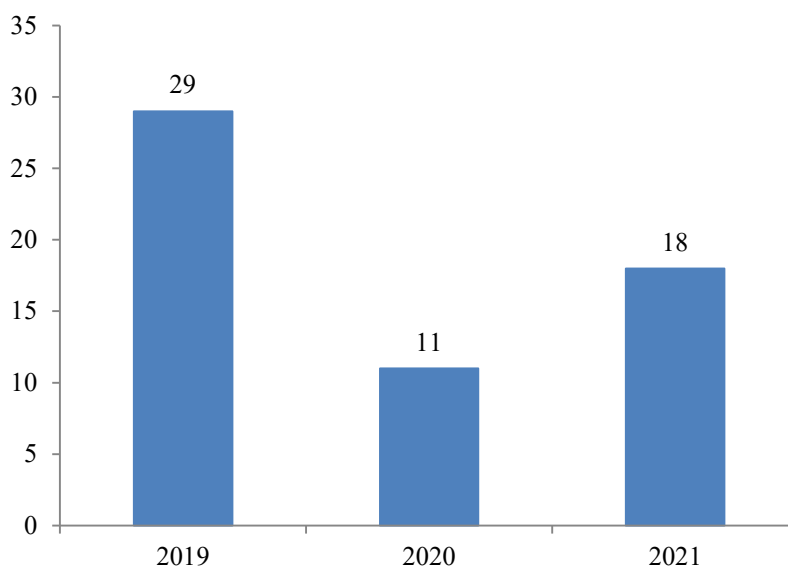


Figure 1: bar chart showing the total species richness within site boundary from 2019 to 2021 (Actual quantity annotated at the top of each bar)

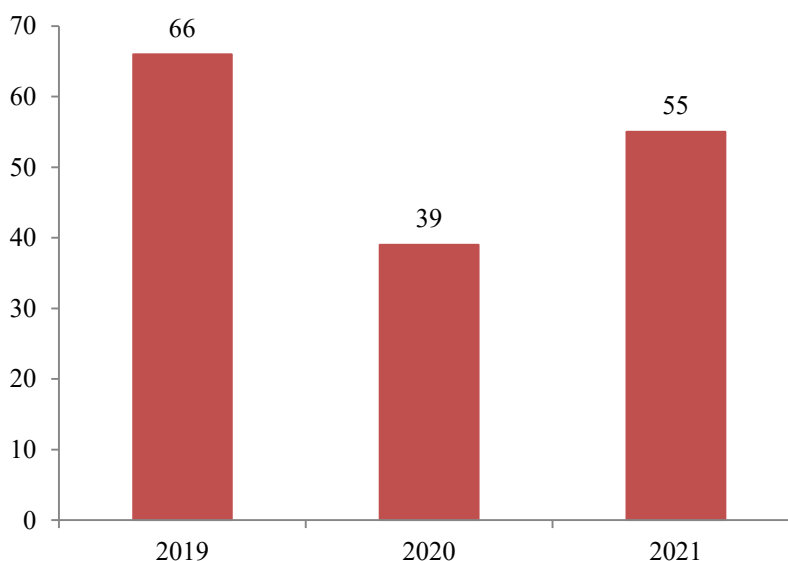


Figure 2: bar chart showing the total abundance within site boundary from 2019 to 2021 (Actual quantity annotated at the top of each bar)

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

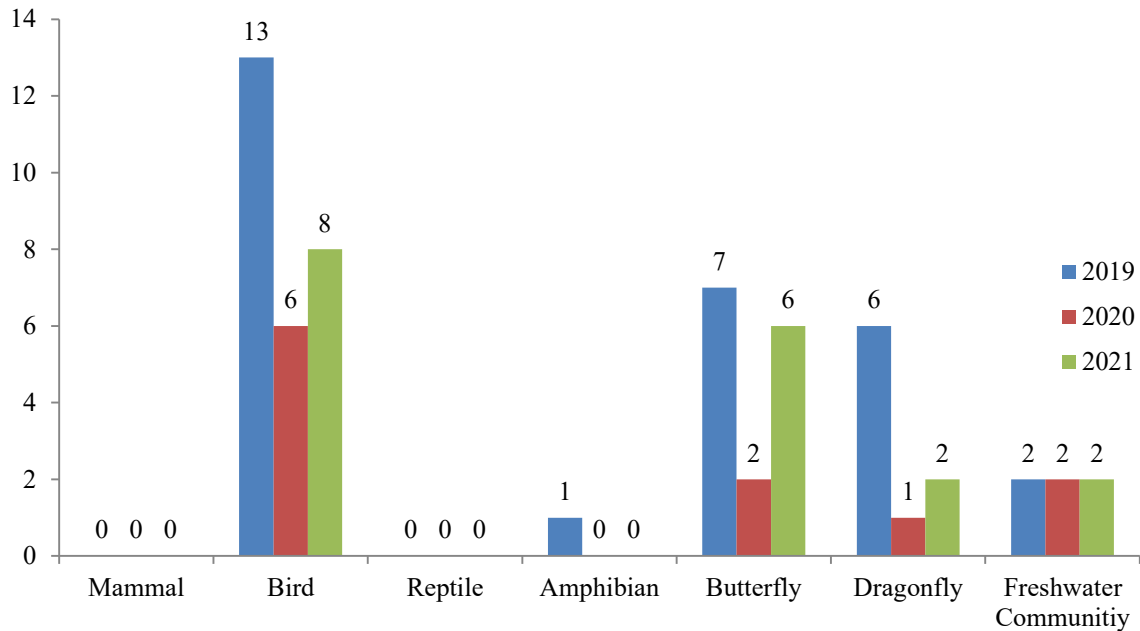


Figure 3: bar chart showing the species richness within site boundary by taxa from 2019 to 2021 (Actual quantity annotated at the top of each bar)

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.

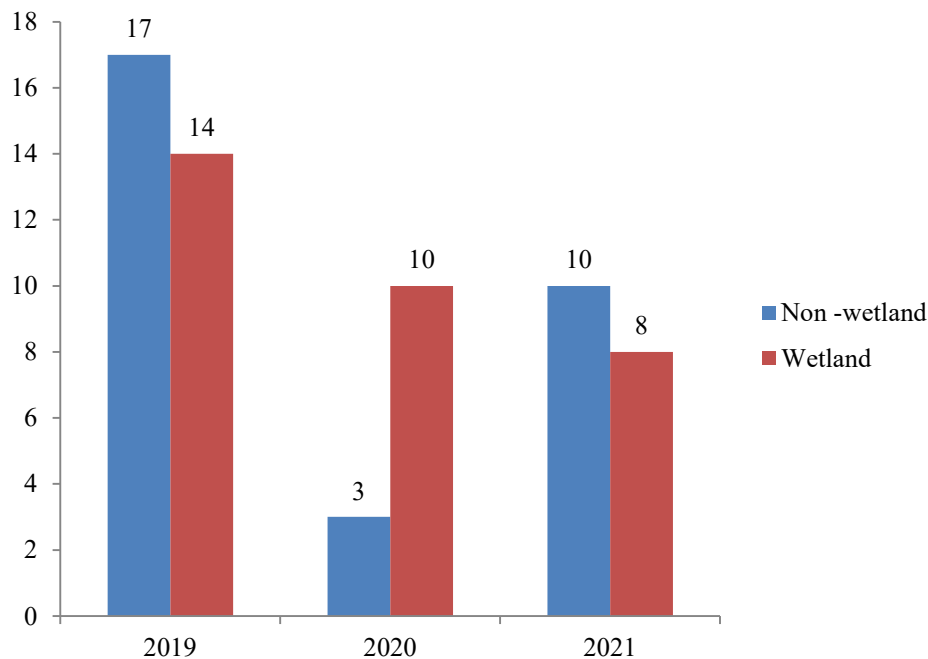


Figure 4: bar chart showing the species richness based on habitat type from 2019 to 2021 (Actual quantity annotated at the top of each bar)

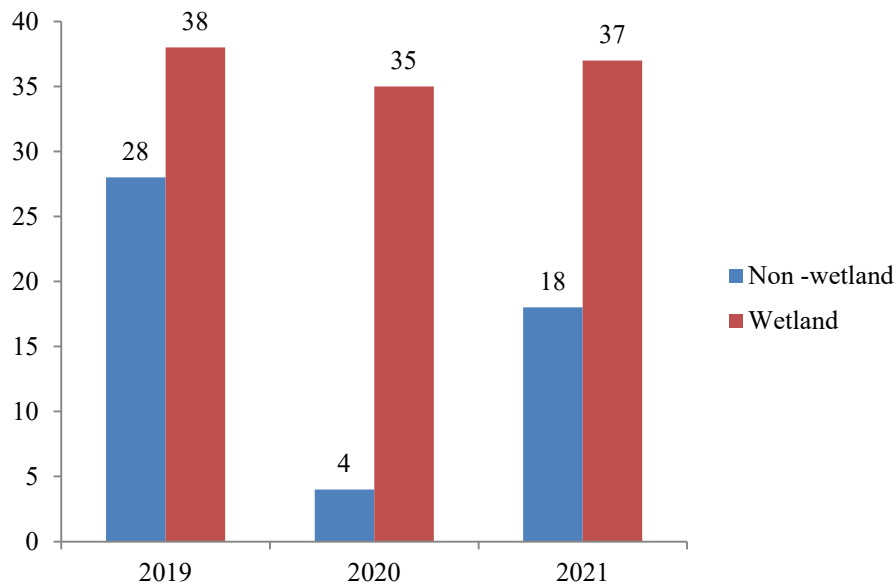


Figure 5: bar chart showing the abundance based on habitat type from 2019 to 2021 (Actual quantity annotated at the top of each bar)

- 5.4 After analysing survey results in April 2019 to 2021, there was no significant drop for wetland but both species richness and abundance reduced and increased in 2021 for wetland habitats. This could be because of natural fluctuation as well as disturbance from construction work. A good practice during construction is required to prevent environmental contamination as well as unnecessary site clearance. Moreover, continuous monitoring is required to inspect any significant reduction of species diversity.

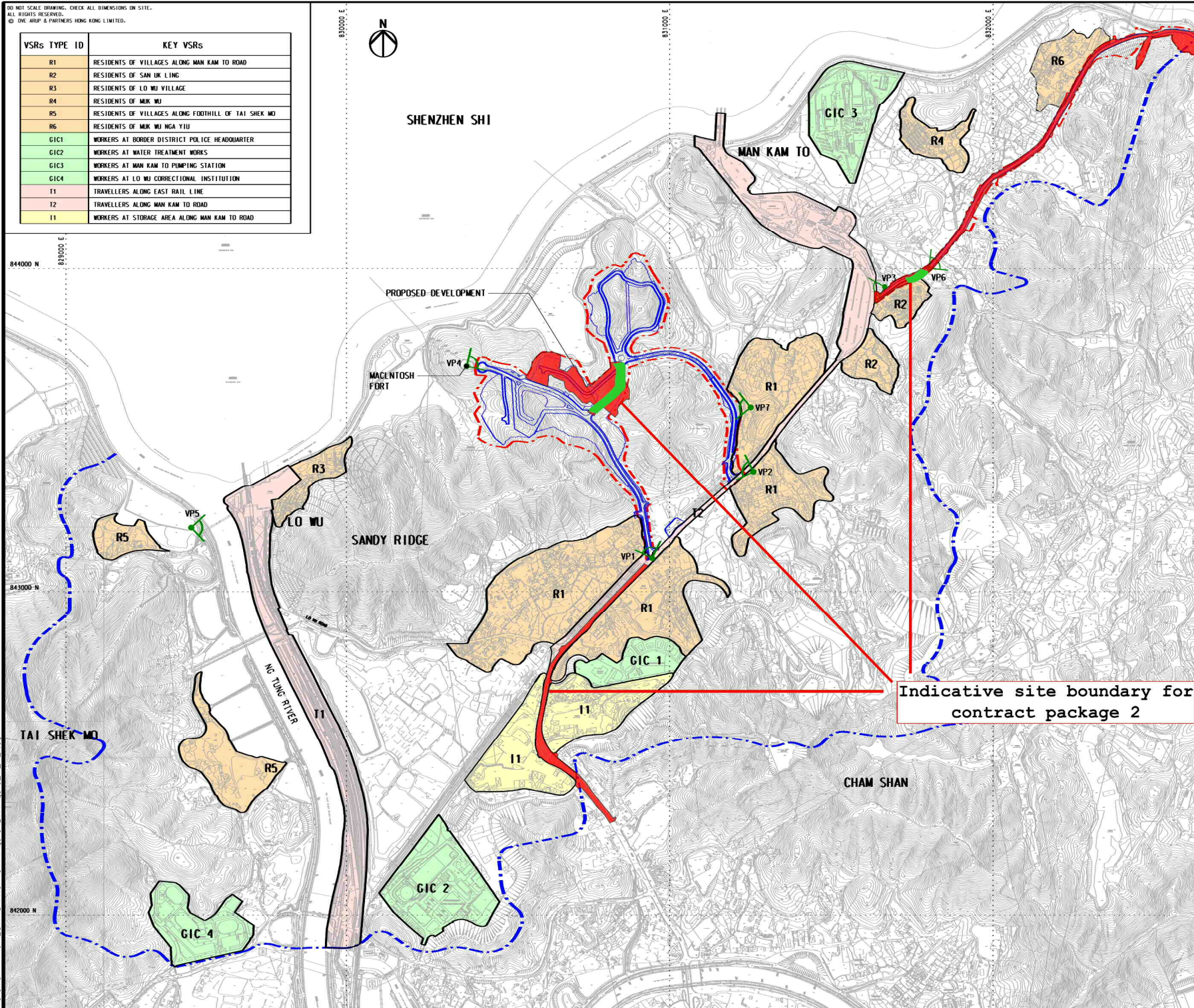
Appendix I – Transect Routes for Contract CV/2017/02

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.
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VSRs	TYPE	ID	KEY VSRs
R1			RESIDENTS OF VILLAGES ALONG MAN KAM TO ROAD
R2			RESIDENTS OF SAN UK LING
R3			RESIDENTS OF LO WU VILLAGE
R4			RESIDENTS OF MUK WU
R5			RESIDENTS OF VILLAGES ALONG FOOTHILL OF TAI SHEK MO
R6			RESIDENTS OF MUK WU NGA YIU
G1C1			WORKERS AT BORDER DISTRICT POLICE HEADQUARTER
G1C2			WORKERS AT WATER TREATMENT WORKS
G1C3			WORKERS AT MAN KAM TO PUMPING STATION
G1C4			WORKERS AT LO WU CORRECTIONAL INSTITUTION
T1			TRAVELLERS ALONG EAST RAIL LINE
T2			TRAVELLERS ALONG MAN KAM TO ROAD
I1			WORKERS AT STORAGE AREA ALONG MAN KAM TO ROAD



SHENZHEN SHI



LEGEND:

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

Rev	Description	By	Date
A	REVISED SUBMISSION	WU	01/15

Consultant
ARUP

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

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

Drawing no.	FIGURE 11.4.1	Rev.	A
Drawn	WU	Date	08/13
Scale	N.T.S.	Checked	PC
Status	PRELIMINARY	Approved	DL

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Civil Engineering and Development Department

Appendix L

Landscape & Visual Inspection Checklist

Contract No. CV/2016/10

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

Landscape and Visual Impact Assessment Checklist for Site Audit

Date/ Time: 19/4/2021 11:00 **Weather:** Fine/ Overcast/ Rain/ Windy

Item	Mitigation Measures	Implementation			Actions/ Remarks
		Yes	No	N/A	
1	Landscape and Visual				
1.1	Is the construction period become shortened?			✓	Under review.
1.2	Is the work site confined within site boundaries and without encroaching into the landscape resources offsite?	✓			
1.3	Is the site kept clean and tidy (E.g. storage of materials, location and appearance of site accommodation being well positioned)	✓			
1.4	Is the construction site screened properly by hoardings or noise barriers in visually unobstructed colours?	✓			
1.5	Is the erosion and dust control for exposed soil well performed during excavation work? (E.g. Exposed soil shall be covered or “camouflaged” and watered frequently. Areas that are expected to be left with bare soil for a long period of time should be hydro seeded and / or covered with suitable protective fabrics.)	✓			
1.6	Are the woodland, plantation and other vegetation being protected and preserved in accordance with DEVB TC(W) No. 07/2015(E.g. Set up Tree Protection Zone)?	✓			
1.7	Are the trees which are in direct conflict with the development proposal being transplanted as far as practical in accordance with and DEVB TC(W) No. 07/2015?	✓			
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, T2468 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.



Tree Protection Zone

Fig E.



Transplanted tree (T-2465)

Fig F.



Transplanted tree (T-2468)

Fig G.



Tree protection zone (T-2468)

Fig H.



Transplanted tree (T-2928)

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: 19/4/2021 12:30 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?			✓	Tree transplanting works have not yet been commenced
1.8	Are compensatory planting for trees being provided to compensate the trees felled in accordance with DEVB TC(W) No. 07/2015?			✓	
1.9	Are precautionary control measures to protect natural streams and rivers from adverse impact being implemented in accordance with ETWWB TCW No. 5/2005? (E.g. Construction debris and spoil should be covered up and properly disposed)			✓	
1.10	Is light and glare control such as hooding being implemented during construction and operation to minimize light pollution and night time glare? (E.g. All security floodlights for construction sites should be equipped with adjustable shield, frosted diffusers and reflective covers)			✓	

Summary / Remarks:

Follow up actions taken by Contractor for previous comments:

N/A

New Observation:

1. Some TPZ were found missing and construction works with heavy machinery near retain trees were observed.

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.



TPZ missing

Signature:

		Signature	Date
Recorded by	Registered Landscape Architect	 	20 Apr 2021
Checked by	Environmental Team Leader		11 May 2021
	Independent Environmental Checker		14 May 2021

Appendix M

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for April 2021

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	3.044	0.000	0.525	0.000	0.119	2.400	0.000	0.000	0.000	0.000	0.022
Feb	2.419	0.000	0.958	0.000	0.135	1.326	0.000	0.000	0.000	0.000	0.030
Mar	8.541	0.000	0.754	0.525	6.344	1.968	0.000	0.000	0.000	0.000	0.242
Apr	4.101	0.000	0.615	1.762	3.681	1.567	0.000	0.000	0.000	0.000	0.073
May											
June											
Sub-total	18.105	0.000	2.852	2.287	10.279	7.261	0.000	0.000	0.000	0.000	0.367
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	18.105	0.000	2.852	2.287	10.279	7.261	0.000	0.000	0.000	0.000	0.367

- 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 2021

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse
	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)
JAN	741.560	0.000	0.000	0.000	741.56	0.000	0.000	0.000	0.000	0.000	8.770
FEB	672.150	0.000	0.000	0.000	672.15	0.000	0.000	0.000	0.000	0.000	4.700
MAR	1512.670	0.000	0.000	0.000	1512.67	0.000	0.000	0.000	0.000	0.000	9.380
APRIL	1467.270	0.000	0.000	0.000	1467.27	0.000	0.000	0.000	0.000	0.000	27.700
MAY											
JUN											
Sub Total	4393.650	0.000	0.000	0.000	4393.650	0.000	0.000	0.000	0.000	0.000	50.550
JUL											
AUG											
SEP											
OCT											
NOV											
DEC											
Total	4393.650	0.000	0.000	0.000	4393.650	0.000	0.000	0.000	0.000	0.000	50.550

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

Implementation Schedule for Environmental Mitigation Measures

Environmental Mitigation Implementation Schedule – Sandy Ridge

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

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

Environmental Mitigation Implementation Schedule – Sandy Ridge

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

Environmental Mitigation Implementation Schedule – Sandy Ridge

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

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Construction Noise						
S5.5.5.3	<p>Implement the following good site management practices:</p> <ul style="list-style-type: none"> only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; mobile plant should be sited as far away from NSRs as possible and practicable; material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 	Control construction noise	Contractor	All construction sites	Construction phase	• Annex 5, TM-EIAO
S5.5.5.5	Adopt quiet plants during the construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road. The quiet plants should be made reference to the PME listed in the TM or the QPME/ other commonly used PME listed in EPD web pages or taken from BS5228: Part 1: 2009 Noise Control on Construction and Open Sites as far as possible.	Reduce the noise levels of plant items	Contractor	Works area for construction of viaduct, widening of Sha Ling Road, construction of platform for crematorium and widening of Lin Ma Hang Road	Construction phase	• Annex 5, TM-EIAO

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S5.5.5.6	Install temporary noise barriers (in the form of site hoardings, approx. 2.4m high) located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S5.5.5.7 – S5.5.5.12	Install movable noise barriers (typical design is wooden framed barrier with a small-cantilevered upper portion of superficial density no less than 7kg/m ² on a skid footing with 25mm thick internal sound absorptive lining), acoustic mat or full enclosure, screen the noisy plants including air compressors, generators etc.	Screen the noisy plant items to be used at all construction sites	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S5.5.5.13	Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction noise	Contractor	All construction sites where practicable	Construction phase	• Annex 5, TM-EIAO
S13.2.1.1 – S13.4.1.2	Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction phase	• TM-EIAO
Operational Noise (Road Traffic Noise)						
S5.6.6.4	<p>Provide a series of noise mitigation measures including absorptive noise barriers and low noise road surfacing materials along Lin Ma Hang Road and Sha Ling Road before operation of the proposed project for existing and planned representative NSRs. Locations of noise mitigation measures are stated as following:</p> <p><i>For existing representative NSRs</i></p> <ul style="list-style-type: none"> • Approx. 12m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM1); • Approx. 92m of absorptive noise barrier 2.5m above road level along Sha Ling Road (MM2); 	Reduce operation noise from road traffic	Contractor	Refer to Figures 5.6.9 – 5.6.13 of the EIA Report	Prior to operation of the Project for existing representative NSRs. While for barriers to protect planned representative NSRs, it should constructed before intake of planned representative NSRs.	• TM-EIAO

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> Approx. 28m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM3); Approx. 51m of absorptive noise barrier 3m above road level along Project Road near Sha Ling Road (MM4); Approx. 25m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM5); Approx. 21m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM6); Approx. 14m of absorptive noise barrier 4m above road level along Lin Ma Hang Road near San Uk Ling (MM7); Approx. 18m of absorptive noise barrier 3m above road level along Lin Ma Hang Road near San Uk Ling (MM8); Approx. 42m of absorptive noise barrier 3m above road level along temporary pullover space opposite San Uk Ling (MM9); Approx. 93m of absorptive noise barrier 3m above road level along Lin Ma Hang Road opposite San Uk Ling (MM10); Approx. 185m of low noise surfacing materials along Lin Ma Hang Road near San Uk Ling (MM11); <p><i>For planned representative NSRs</i></p> <ul style="list-style-type: none"> Approx. 36m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM12); Approx. 47m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM13); Approx. 31m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM14); Approx. 31m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM15); Approx. 41m of absorptive noise barrier 5m above road level along Lin Ma Hang Road near Muk Wu Nga Yiu (MM16); 					

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> Approx. 340m of low noise surfacing materials along Lin Ma Hang Road near Muk Wu Nga Yiu (MM17). 					

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Water Quality (Construction Phase)						
S6.4.4.1 – S6.4.4.3	<p>In accordance with the Practice Note for Professional Persons on Construction Site Drainage, Environmental Protection Department, 1994 (ProPECC PN1/94), construction phase mitigation measures shall include the following:</p> <p><u>General Site Operation</u></p> <ul style="list-style-type: none"> At the start of site establishment, perimeter cut-off drains to direct off-site water around the site should be constructed with internal drainage works and erosion and sedimentation control facilities implemented. Channels (both temporary and permanent drainage pipes and culverts), earth bunds or sand bag barriers should be provided on site to direct stormwater to silt removal facilities. The design of the temporary on-site drainage system will be undertaken by the contractor prior to the commencement of construction; Diversion of natural stormwater should be avoided as far as possible. The design of temporary on-site drainage should prevent runoff going through site surface, construction machinery and equipment in order to avoid or minimise polluted runoff. Sedimentation tanks with sufficient capacity, constructed from pre-formed individual cells of approximately 6 to 8 m³ capacities, are recommended as a general mitigation measure which can be used for settling surface runoff prior to disposal. The system capacity shall be flexible and able to handle multiple inputs from a variety of sources and suited to applications where the influent is pumped; The dikes or embankments for flood protection should be implemented around the boundaries of earthwork areas. Temporary ditches should be provided to facilitate the runoff discharge into an appropriate watercourse, through a site/sediment trap. The sediment/silt traps should be incorporated in the permanent drainage channels to enhance deposition rates; The design of efficient silt removal facilities should be based on the guidelines in Appendix A1 of ProPECC PN 1/94. The detailed design of 	To minimise water quality impact from construction site runoff and general construction activities	Contractor	All construction sites where applicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance ProPECC PN1/94 TM-EIAO TM-DSS

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>the sand/silt traps shall be undertaken by the contractor prior to the commencement of construction;</p> <ul style="list-style-type: none"> Construction works should be programmed to minimise surface excavation works during the rainy seasons (April to September). All exposed earth areas should be completed and vegetated as soon as possible after earthworks have been completed. If excavation of soil cannot be avoided during the rainy season, or at any time of year when rainstorms are likely, exposed slope surfaces should be covered by tarpaulin or other means; If the excavation of trenches in wet periods is necessary, it should be dug and backfilled in short sections wherever practicable. Water pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly following rainstorms. Deposited silt and grit should be removed regularly and disposed of by spreading evenly over stable, vegetated areas; All open stockpiles of construction materials (for example, aggregates, sand and fill material) of more than 50m³ should be covered with tarpaulin or similar fabric during rainstorms. Measures should be taken to prevent the washing away of construction materials, soil, silt or debris into any drainage system; Manholes (including newly constructed ones) should always be covered and temporarily sealed so as to prevent silt, construction materials or debris being washed into the drainage system and storm runoff being directed into foul sewers; Precautions be taken at any time of year when rainstorms are likely, actions to be taken when a rainstorm is imminent or forecasted, and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94. Particular attention should be paid to the control of silty surface runoff during storm events, especially for areas located near steep slopes; 					

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facilities should be provided at every construction site exit where practicable. Wash-water should have sand and silt settled out and removed at least on a weekly basis to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains; Oil interceptors should be provided in the drainage system downstream of any oil/fuel pollution sources. The oil interceptors should be emptied and cleaned regularly to prevent the release of oil and grease into the storm water drainage system after accidental spillage. A bypass should be provided for the oil interceptors to prevent flushing during heavy rain; Construction solid waste, debris and rubbish on site should be collected, handled and disposed of properly to avoid water quality impacts; All fuel tanks and storage areas should be provided with locks and sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank to prevent spilled fuel oils from reaching water sensitive receivers nearby; Regular environmental audit on the construction site should be carried out in order to prevent any malpractices. Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the water bodies, marsh and ponds; Adopt best management practices. 					
S6.4.4.4 – S6.4.4.5	<p><u>Sewage from workforce</u></p> <ul style="list-style-type: none"> Portable chemical toilets and sewage holding tanks are recommended for handling the construction sewage generated by the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance; 	To minimise water quality from sewage effluent	Contractor	All construction sites where practicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project; Regular environmental audit on the construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. 					
S6.4.4.6	<p><u>Operation of Barging Point at Siu Lam</u></p> <ul style="list-style-type: none"> All barges should be fitted with tight bottom seals to prevent leakage of materials during transport; Barges or hoppers should not be filled to a level that will cause overflow of materials or polluted water during loading or transportation; All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; and Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Mitigation measures for land-based activities as outlined in Section 6.4.4 should be applied to minimise water quality impacts from site runoff and open stockpile spoils at the proposed barging facilities where appropriate. 	To minimise water quality from operation of barging point at Siu Lam	Contractor	All construction sites where practicable	Construction phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS
Water Quality (Operational Phase)						
S6.5.4.1 – S6.5.4.6	<p>The following mitigation measures during operational phase are recommended:</p> <ul style="list-style-type: none"> Sewage and wastewater discharge should be connected to foul sewerage system; Proper drainage systems with silt traps and oil interceptors should be installed; 	To minimise the road runoff, wastewater discharge and erosion of seasonal watercourse during the operational phase	Highways Department / Contractors	Whole alignment	Construction / Operational Phase	<ul style="list-style-type: none"> Water Pollution Control Ordinance TM-DSS

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> • The design of road gullies with silt traps should be incorporated especially for the catchment leading to the existing wet woodland area located at the north of the site; • The silt traps and oil interceptors should be cleaned and maintained regularly, especially before peak seasons of the visitors in Ching Ming Festival and Chung Yeung Festival; • Energy dissipaters should be installed at the seasonally wet watercourses to reduce the magnitude of the first flush in order to minimise the erosion impact to the wet woodland. 					

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Waste Management (Construction Waste)						
S7.3.3.8	<u>Construction & Demolition Material Management Plan (C&DMMP)</u> <ul style="list-style-type: none"> A C&DMMP shall be submitted to the Public Fill Committee for approval in the case of C&D materials disposal exceeding 50,000m³. 	To enhance the management of construction and demolition (C&D) material including rock in public works projects	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Project Administrative Handbook for Civil Engineering Works, 2012 Edition
S7.3.4.2	<u>Good Site Practice</u> <p>The following good site practices are recommended throughout the construction activities:</p> <ul style="list-style-type: none"> nomination of an approved personnel, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; provision of sufficient waste disposal points and regular collection for disposal; appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; a Waste Management Plan (WMP) should be prepared by the contractor and submitted to the Engineer for approval. 	Minimise waste generation during construction	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.3.4.3	<u>Waste Reduction Measures</u> <p>Waste reduction is best achieved at the planning and design phase, as well as by ensuring the implementation of good site practices. The following recommendations are proposed to achieve reduction:</p> <ul style="list-style-type: none"> segregate and store different types of waste in different containers, skip or stockpiles to enhance reuse or recycling of materials and their proper disposal; 	Reduce waste generation	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<ul style="list-style-type: none"> proper storage and site practices to minimise the potential for damage and contamination of construction materials; plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste; sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling. 					
S7.3.4.5	<p><u>Storage of Waste</u></p> <p>The following recommendation should be implemented to minimise the impacts:</p> <ul style="list-style-type: none"> non-inert C&D materials such as soil should be handled and stored well to ensure secure containment; stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away; different locations should be designated to stockpile each material to enhance reuse; 	Good site practice to minimise the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance ETWB TCW No. 19/2005
S7.3.4.6	<p><u>Collection and Transportation of Waste</u></p> <p>The following recommendation should be implemented to minimise the impacts:</p> <ul style="list-style-type: none"> remove waste in timely manner; employ the trucks with cover or enclosed containers for waste transportation; obtain relevant waste disposal permits from the appropriate authorities; and disposal of waste should be done at licensed waste disposal facilities. 	Minimise waste impacts from storage	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.3.4.8 – S7.3.4.15	<p><u>Excavated and C&D Materials</u></p> <p>Wherever practicable, C&D materials should be segregated from other wastes to avoid contamination and ensure acceptability at public filling areas or reclamation sites. The following mitigation measures should be implemented in handling the excavated and C&D materials:</p> <ul style="list-style-type: none"> maintain temporary stockpiles and reuse excavated fill material for 	Minimise waste impacts from excavated and C&D materials	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>backfilling;</p> <ul style="list-style-type: none"> carry out on-site sorting; make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; and implement a recording system for the amount of waste generated, recycled and disposed of for checking. <p>The recommended C&D materials handling should include:</p> <ul style="list-style-type: none"> On-site sorting of C&D materials; Reuse of C&D materials; and Use of Standard Formwork and Planning of Construction Materials purchasing. 					<ul style="list-style-type: none"> ETWB TCW No. 19/2005 Project Administrative Handbook for Civil Engineering Works, 2012 Edition
S7.3.4.17 – S7.3.4.18	<p><u>Chemical Waste</u></p> <p>If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producer. Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste Contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.</p>	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
S7.3.4.19	<p><u>General Refuse</u></p> <ul style="list-style-type: none"> General refuse should be stored in enclosed bins separately from construction and chemical wastes. Recycling bins should also be placed to encourage recycling. Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. A reputable waste collector should be employed to remove general refuse on a daily basis. 	Minimise production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance
S7.3.4.20	<p><u>Sewage</u></p> <ul style="list-style-type: none"> The WMP should document the locations and number of portable chemical toilets depending on the number of workers, land availability, 	Minimise production of sewage impacts	Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> Waste Disposal Ordinance

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
	<p>site condition and activities.</p> <ul style="list-style-type: none"> Regularly collection by licensed collectors should be arranged to minimise potential environmental impacts. 					
Waste Management (Operational Waste)						
S7.4.4.1	<p><u>General Refuse</u></p> <p>A reputable waste collector should be employed to remove general refuse on a daily basis.</p>	Remove general refuse during routine road cleaning activities on the roads network and avoid odour, pest and litter impacts	Highways Department / Contractor	Roads network for the C&C facilities and Lin Ma Hang Road	Operational phase	<ul style="list-style-type: none"> Waste Disposal Ordinance

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Land Contamination						
S8.9.1.1	Re-appraisal of the potentially contaminated site (SRC-1)	Identify any hot spots for SI within the southeast and western portions of SRC-1	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Once the works area for the Project is confirmed and site access is available (e.g. after land resumption)	<ul style="list-style-type: none"> • Annex 19 of the TM-EIAO, Guidelines for Assessment of Impact On Sites of Cultural Heritage and Other Impacts (Section 3 : Potential Contaminated Land Issues); • Guidance Manual for Use of Risk-Based Remediation Goals (RBRGs) for Contaminated Land Management; • Guidance Notes for Contaminated Land Assessment and Remediation; and • Practice Guide for Investigation and Remediation of Contaminated Land • Recommendations in Health Risk Assessment
S8.11.1.1	Preparation and submission of Contamination Assessment Plan (CAP) to EPD for review and approval, if required	Present the findings of the re-appraisal and strategy of the recommended SI, if required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	After land resumption and prior to the construction phase	Ditto
S8.11.1.2	Preparation and submission of Contamination Assessment Report (CAR) to EPD for review and approval, if required	Present the findings of SI, if any, and evaluate the level and extent of potential contamination	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S8.11.1.2	Preparation and submission of Remediation Action Plan (RAP) to EPD for review and approval if contamination is identified	Recommend appropriate mitigation measures for the contaminated soil and groundwater identified in the assessment if remediation is required	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto
S8.11.1.2	Preparation and submission of Remediation Report (RR) to EPD for review and approval following the completion of any necessary remediation works	Demonstrate that the decontamination work is adequate and is carried out in accordance with the endorsed CAR and RAP	Project Proponent / Detailed Design Consultant	Potentially contaminated site (SRC-1)	Prior to the construction phase	Ditto

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
<i>Ecology (Construction Phase)</i>						
S9.7.2.3	Preparation and submission of Upland Grassland Reinstatement Plan to EPD for agreement.	<p>An Upland Grassland Reinstatement Plan will be prepared by a qualified ecologist/botanist with full details of the findings of a baseline grassland survey, the practical details and methodology of the physical excavation, transport and storage or turves/topsoil and their subsequent reinstatement once the receptor sites have been established, along with an implementation programme of reinstatement, post- reinstatement monitoring and maintenance programme.</p> <p>A contingency plan should be proposed in the Grassland Reinstatement Plan so as to describe the action and limit levels and the action plan if certain performance criteria (such as area of preferred habitat) are not met during the monitoring and maintenance period.</p>	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Upland Grassland Reinstatement Plan	Engineered slopes of Crematorium Indicative locations for Grassland Reinstatement should be referred to Figure 9.11 of the EIA Report	Prior to construction phase	<ul style="list-style-type: none"> • Reinstatement and establishment requirements to be detailed in Upland Grassland Reinstatement Plan • TM-EIAO
S9.7.2.5 – S9.7.2.6	Preparation and submission of a Vegetation Survey Report and Transplantation Proposal (if needed as concluded in the Vegetation Survey Report) to EPD for agreement.	The Vegetation Survey will report the presence, as well as update the conditions, number, locations and habitat types of any identified floral species of conservation importance to be impacted by the development,	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for	Within the Project Area where applicable	Prior to construction phase	<ul style="list-style-type: none"> • Survey findings and transplantation methodology to be detailed in Vegetation Survey Report and Transplantation Plan

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
		and evaluate suitability and/or practicality of transplantation. The Transplantation Proposal will recommend locations of the receptor site(s), transplantation methodology, implementation programme of transplantation and post-transplantation monitoring and maintenance programme.	Vegetation Survey Report and Transplantation Proposal.			respectively. • TM-EIAO.
S9.7.5.3 – S9.7.5.5, S9.8.1.6	Preparation and submission of Enhancement Woodland Proposal to EPD for agreement.	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report	Prior to construction phase	• Enhancement planting and establishment requirements to be detailed in Wooded Enhancement Proposal. • TM-EIAO
S9.7.3.1 – S9.7.3.3	Indirect impacts due to potential changes in water quality, hydrology and sedimentation could occur to a series of downstream watercourses and wetland systems (including the wet woodland, marsh and mitigation ponds) during both the construction (for the Platform and LMHR widening works) and operational stages. Generally, indirect water impact to any aquatic fauna during the construction phase should easily be avoided by implementing water control measures (ETWB TCW No. 5/2005) to avoid direct or indirect impacts any watercourses and good site practices (further details are discussed in Section 6 of the EIA Report).	Minimise the indirect impacts to Water Quality and Hydrology	Contractor /detailed design consultant.	On the edge of any active works area, 30m from the watercourse	Prior to commencement and during construction phase	• ETWB TCW No. 5/2005 • TM-EIAO

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	In addition, construction phase impacts on the watercourses, riparian corridor and fauna using these areas will be minimised by erection of a 2m high, solid, dull green site boundary fence on the edge of any active works area, 30m from the watercourse. Where this is not practicable due to site constraints, demarcation fencing will need to be erected to prevent unauthorised encroachment into the riparian corridor by constructions works and traffic. Detailed mitigation measures will be designed at the detailed design stage.					
S9.7.3.4 – S9.7.3.6	<p>Mitigation for noise disturbance (details refer to S5.5.5 to S5.6.6 of this table). Site formation and construction are tentatively proposed to cover a 65-month period from mid 2017 to late 2022.</p> <p>As a precautionary approach, consideration should be given at the detailed design stage to avoid the use of highly reflective materials in the design and implementing the use of opaque materials, fritting, breaking up external reflections with stickers or plastic wrap and/or any other bird-friendly design for noise barriers.</p> <p>Works will be restricted to daytime and any construction lighting should be designed and positioned as to not impact on adjacent ecologically sensitive areas.</p>	The construction work and site formation will be phased in order to reduce overall noise disturbance impacts in particular areas. Collisions usually occurs as a result of birds perceiving a clear path through an object that is transparent or appears to be transparent at some distance, or if the noise barrier is highly reflective which would appear to be composed of the adjacent natural vegetation. Furthermore, mitigation measures to control noise disturbance during this phase will involve the selection of quieter plant, use of movable noise barriers and erection of hoarding and fencing to demarcate the site boundary	Contractor Project Proponent	All construction sites	Prior to commencement and during construction phase	• TM-EIAO.

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S.9.7.3.7	<p>In order to demonstrate ecological awareness and to minimise the risk of indirect impacts from water pollution and hill fires, a series of good site practices should be adopted by site staff throughout the construction phase at each works site. These are as follows:</p> <ul style="list-style-type: none"> • Put up signs to alert site staff about any locations which are ecologically sensitive and measures to prevent accidental impacts; • Erection of temporary geotextile silt or sediment fences/oil traps around any earth-moving works to trap any sediments and prevent them from entering watercourses; • Prohibition of soil storage against trees or close to waterbodies; • Delineation of works site to prevent encroachment onto adjacent habitats and fence off areas which have some ecological value; • No smoking, hot works or sources of fire close to upland grassland; • No on-site burning of waste; and • Waste and refuse in appropriate receptacles. 	Minimise impacts on hydrological condition and water quality of hillside watercourses and reduce chances of hillfires.	Contractor	All construction sites	Prior to commencement and during construction phase	• TM-EIAO.
S.9.7.3.9	Precautionary checks by a suitably experienced ecologist of the vegetation for the presence of nesting birds should be carried out in the breeding season (February to July) before vegetation clearance. These impacts can be avoided by conducting vegetation clearance during the non-breeding season (tentatively August-January) and phased through the project period to minimise impacts.	Minimise the impacts to breeding birds within the works areas.	Contractor	All construction sites	Prior to site clearance	• TM-EIAO • WAPO
Ecology (Operational Phase)						

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S9.7.2	Establishment, maintenance and monitoring of a Upland Grassland Reinstatement Area	Reinstatement of upland grassland and to maintain connectivity in Sandy Ridge.	Project Proponent / Contractor / Maintenance Authority	Engineered slopes of Crematorium Indicative locations for Grassland Reinstatement should be referred to Figure 9.11 of the EIA Report	Operational phase	<ul style="list-style-type: none"> Monitoring methodology and successfulness of survival of upland grassland should follow Upland Grassland Reinstatement Plan. TM-EIAO.
S9.7.5.3 – S9.7.5.6	Establishment, maintenance and monitoring of an enhancement woodland	Recommend appropriate enhancement planting programme, planting and post-transplantation monitoring methodology, action plan for monitoring the enhancement planting and maintenance programme.	Project Proponent/ Detailed Design Consultant (qualified ecologist/ botanist) for Wooded Area Proposal.	Filled slope west of the platform, and north west of the platform in the valley below MacIntosh Fort Indicative locations for Enhancement Woodland should be referred to Figure 9.11 of the EIA Report	Operational phase	<ul style="list-style-type: none"> Enhancement planting and establishment requirements to be detailed in Wooded Area Proposal. TM-EIAO.
S9.7.4.1 – S9.7.4.5	<u>Mitigation for Impacts to Water Quality and Hydrology (Operational Phase)</u> <ul style="list-style-type: none"> Stormwater drainage system will be further developed in detailed design stage to collect dusty materials from water collected from the platform and associated road system. Silt traps will be installed to ensure removal of dusty materials. Regular cleaning will be conducted to avoid debris entering downstream rivers during first flush; and The proposed small diameter bore pile system at the foundation of the proposed platform structure. 	Specific mitigation measures will be implemented to prevent indirect impacts wetland habitats and fauna. Mitigation measures are to be further developed in the detailed design stage to address any water quality impacts due to the drainage from the proposed platform, and any erosion issues due to the drainage from the	Detailed Design Consultant	Wet woodland (and further down the marsh and mitigation ponds) and the seasonal watercourse to the east of the Project boundary	Detailed Design phase/Operational phase	<ul style="list-style-type: none"> TM-EIAO

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		<p>proposed platform.</p> <p>The surface runoff collected on the platform will be captured by a stormwater drainage system, which will be further developed at the detailed design stage</p> <p>The proposed small diameter bore pile system at the foundation of the proposed platform structure would allow a notional free area of about 87 – 91% for groundwater to pass through</p>				
S9.7.4.6 – S9.7.4.7	<p><u>Minimise the potential indirect light disturbance on the Street Lighting on fireflies surrounding the Project Site during operational phase</u></p> <ul style="list-style-type: none"> It is considered that at the detailed design stage, street lighting of similar lux/light intensity as to what is currently present is utilised. Furthermore, as a precautionary measure, it is suggested that deflectors are fixed to the back of the street lights to prevent additional light reaching the marsh and causing adverse impacts to fireflies. 	Reduce light pollution and impact on the nearby habitats and their associated wildlife groups, particularly nocturnal fireflies.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO
S9.7.4.9 – S9.7.4.9	<p>The increase in visitors to the columbarium allows greater public access to the upland grassland of Sandy Ridge and in turn, the potential for hill fires is also increased. Fires may emanate from discarded cigarettes and from specific practices during festivals or grave-sweeping.</p> <p>In order to reduce the risk of hill fires, sufficient educational signage should be displayed throughout the columbarium warning people of the risks of fire and strictly prohibits practices that could cause hill fires. This will require input in the detailed design phase.</p>	Minimise the risk of hill fires.	Detailed Design/ Consultant/ Operator	The whole Project area	Detailed Design phase/Operational phase	• TM-EIAO

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
Fisheries						
S10.5.1.1	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.	-	-	-	-	-

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
<i>Landscape & Visual</i>						
S11.8.1.3, Table 11.9	CM1 – The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape, and the reliance on off-site construction.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM3 – Screening of construction works by hoardings/noise barriers around works area in visually unobtrusive colours and to screen construction works. It is proposed that screening be compatible with the surrounding environment and non-reflective, recessive colours be used. Hoarding should be taken down at the end of the construction period.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM4 – Dust and Erosion Control for Exposed Soil - Excavation works and demolition of existing building blocks shall be well planned with precautions to suppress dust. Exposed soil shall be covered or watered often. Areas that are expected to be left with bare soil for a long period of time after excavation shall be properly covered with suitable protective fabric. Suitable drainage shall be provided around construction sites to avoid discharge of contaminants and sediments into sensitive water-based habitat.	Minimise indirect landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-
S11.8.1.3, Table 11.9	CM5 – Control night-time lighting and glare by hooding all lights.	Minimise visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	-

Environmental Mitigation Implementation Schedule – Sandy Ridge

EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	CM6 – Tree Protection and Preservation – Woodland, plantation and other vegetation within the Study Area will be protected and preserved as far as possible in accordance with ETWB TCW No. 29/2004 - Registration of Old and Valuable Trees, and Guidelines for their Preservation and DEVB TCW No.07/2015 – Tree Preservation. Detailed Design Considerations are made to avoid impacts to trees, e.g. proper viaduct/ bridge design routing to avoid majority of the woodland, locating the columbarium buildings in areas with less trees and ensuring design of the buildings has as small a footprint as practical.	Minimise landscape impact and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB
S11.8.1.3, Table 11.9	CM7 – Tree Transplantation – Tree(s) will be affected according to the Tree Preservation and Removal Proposal to be carried out in a later stage. Established trees of value are to be re-located where practically feasible.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	<ul style="list-style-type: none"> • ‘Guidelines for Tree Risk Management and Assessment Arrangement on an Area Basis and on a Tree Basis’, issued January 2011, Greening, Landscape and Tree Management (GLTM) Section, DevB • Latest recommended horticultural practices from GLTM Section, DevB

Environmental Mitigation Implementation Schedule – Sandy Ridge

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S11.8.1.3, Table 11.9	CM8 - Implementing precautionary control measures during construction stage accordingly to ETWB TCW No. 5/2005 – Protection of natural streams/ rivers from adverse impacts arising from construction works to avoid direct or indirect impacts any watercourses and good site practices.	Minimize landscape impact	Funded by CEDD and implemented by Contractor	Work site/ during construction	Design and Construction phase	<ul style="list-style-type: none"> • ETWB TCW No. 5/2005 – Protection of natural streams/ rivers from adverse impacts arising from construction works
S11.8.1.3, Table 11.9	OM1 – Compensatory Woodland Planting - The arrangement of compensatory planting (e.g. areas of woodland to be compensated and space to be allowed within the Project Site) will be subject to detailed engineering design, landscape design and planting plan, and is recommended to be implemented prior to the construction activities as far as practical.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Prior to Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features

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EIA Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Agent	Location / Timing	Implementation Stage	Requirements and / or standards to be achieved
S11.8.1.3, Table 11.9	OM2 – Compensatory Tree Planting for Plantation and Other Vegetated Areas - Compensatory planting should be provided in accordance with DEVB TCW No. 07/2015 to compensate for those trees felled. According to the preliminary design, compensatory trees will be planted on the cut/fill slopes, along new roads and in car parks. The selection of planting species shall be made with reference to the species identified in the future Detailed Tree Survey and be native to Hong Kong or the South China region.	Compensate the loss of landscape greenery and enhance the overall visual value of the site.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	<ul style="list-style-type: none"> • DEVB TC(W) 07/2015 – Tree Preservation • Latest recommended horticultural practices from Greening, Landscape and Tree Management (GLTM) Section, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
S11.8.1.3, Table 11.9	OM3 – Amenity Planting and aesthetic streetscape design of hard landscaping for Pedestrian Walkway, Roadside - Roadside amenity planting should be provided along Sha Ling Road, Lin Ma Hang Road, as well as the internal road within Sandy Ridge columbarium and crematorium site; to enhance the landscape quality of the existing and proposed transport routes. Climbers are proposed to cover vertical, hard surfaces of the piers of the proposed viaducts, and also the newly formed retaining wall within the site. Shade tolerant plants will be planted, where light is sufficient, to improve aesthetic value of areas under viaducts.	Minimise visual impact and also enhance landscape.	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	<ul style="list-style-type: none"> • Guidelines on Greening of Noise Barriers, issued April 2012, GLTMS, DevB • DEVB TCW No. 06/2015 – Maintenance of Vegetation and Hard Landscape Features
S11.8.1.3, Table 11.9	OM4 – Greening Works and Contour Grading Works on Cut/ Fill Slopes - Greening works such as hydroseeding/ terraces of shrub or tree planting will be provided where slope gradient allows, according to Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.	Minimise landscape and visual impact	Funded by CEDD and implemented by Contractor	Within Project Site	Construction phase	Geotechnical Engineering Office (GEO) Publication No.1/2011 Technical Guidelines on Landscape Treatment for Slopes.

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S11.8.1.3, Table 11.9	OM5 – Landscape design treatment to be provided by relevant government department.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-
S11.8.1.3, Table 11.9	OM6 – Architectural and chromatic treatment of the hard architectural and engineering structures and facilities.	Mitigate the loss of greenery and enhance the overall landscape and visual value	Funded by FEHD and implemented by Contractor	Within Project Site	After handover to the relevant department	-
S11.8.1.3, Table 11.9	OM7 – Aesthetic design of the proposed noise barriers.	Mitigate the visual impact	Funded by CEDD and implemented by Contractor	Along Sha Ling Road and Lin Ma Hang Road	Construction phase	<ul style="list-style-type: none"> • WBTC No. 36/2004 - ACABAS - submission is required to ACABAS for approval of any bridges and associated structures within the public highway system.
S11.8.1.3, Table 11.9	OM8 - Silt traps should also be incorporated into design of road gullies for the natural water stream(s).	Minimise the landscape impact on natural stream	Funded by CEDD and implemented by Contractor	Within Project Site	Construction Phase	

Notes:

- (a) A detailed Tree Survey Report showing all identified valuable trees and OVT will be undertaken in a separate Tree Preservation and Removal Proposal.
- (b) Wood resulting from tree removal should be recycled as mulch or soil conditioner for re-use within the Project or in other projects as far as possible e.g. for the construction of soft landscape work, were practical.
- (c) Contractor is responsible for landscaping during the agreed establishment and maintenance period. Other designated management and maintenance agents to take up maintenance and management of landscaping after end of agreed period.
- (d) Highways Department (HyD) is responsible for maintenance and management of landscaping of public road side slope, Leisure and Cultural Services Department (LCSD) is responsible for the management and maintenance of soft landscapes along non-expressway public roads outside Country Park and Food and Environmental Hygiene Department (FEHD) is responsible for maintenance and management of landscaping of other areas allocated to FEHD.
- (e) The landscape mitigation treatment of the future development site shall follow the below frameworks:
 - Buffer planting shall be provided to soften the edge of the site.
 - Aesthetic landscape treatment including both soft and hard landscape features shall be provided.
 - Vertical greening shall be provided as far as practicable.
 - At-grade tree planting shall be provided as far as possible while planting space is allowed, to enhance the overall environment.
 - Architectural design shall blend in with the surrounding environment.
 - Overall greening ratio shall comply with TC(W) No.3/2012 Site coverage of Greenery for Government Building Projects.

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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.						

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<i>EM&A Project</i>						
S13.1.1.1, S13.2.1.2	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Highways Department	All construction sites	Construction phase	<ul style="list-style-type: none"> • EIAO Guidance Note No.4/2010 • TM-EIAO
S13.2.1.1 – S13.4.1.2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Highways Department / Contractor	All construction sites	Construction phase	<ul style="list-style-type: none"> • EIAO Guidance Note No.4/2010 • TM-EIAO

Appendix O

Implementation of Water Quality Mitigation Measures

Water Quality Mitigation Measures under CV/2016/10 (Contract 1)



Temporary drainage was provided to prevent runoff going through site surface.



Provided earth bunds and barriers to minimize muddy runoff.

Water Quality Mitigation Measures under CV/2016/10 (Contract 1)



Hydro-seeding was applied on the slope to minimize muddy runoff.



Hydro-seeding was applied on the slope to minimize muddy runoff.

Water Quality Mitigation Measures under CV/2016/10 (Contract 1)



Hydro-seeding was applied on the slope to minimize muddy runoff.

Water Quality Mitigation Measures under CV/2017/02 (Contract 2)



Provided earth bunds and barriers to minimize muddy runoff.



Exposed slopes surface was paved by cement mortar to minimize muddy runoff.

Water Quality Mitigation Measures under CV/2017/02 (Contract 2)



Hydro-seeding was applied on the slope to minimize muddy runoff.



Hydro-seeding was applied on the slope to minimize muddy runoff.