



CONTRACT NO. SPW 25/2018

**ENVIRONMENTAL TEAM FOR
RELOCATION OF SHA TIN SEWAGE TREATMENT
WORKS TO CAVERNS – SITE PREPARATION
AND ACCESS TUNNEL CONSTRUCTION**

UNDER ENVIRONMENTAL PERMIT NO. EP-533/2017

**QUARTERLY ENVIRONMENTAL MONITORING &
AUDIT SUMMARY REPORT**

- SEPTEMBER 2019 TO NOVEMBER 2019 -

CLIENTS:

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Sha Tin Cavern Sewage Treatment Works

Environmental Permit No. EP-533/2017

**Contract No. DC/2018/05 Relocation of Sha Tin Sewage Treatment Works to
Caverns – Site Preparation and Access Tunnel Construction**

Quarterly EM&A Summary Report (September – November 2019)

23 December 2019

By Email

Dear Sir,

I refer to the letter dated 23 December 2019 (ref: LES/J2019-02/CS/L040) from the Environmental Team Leader certifying the captioned Quarterly EM&A Summary Report for September – November 2019 pursuant to Section 13.5 of the EM&A Manual for the captioned Project.

I have no comment on the captioned report and hereby verify it in accordance with Condition 2.10(ii) of Environmental Permit No. EP-533/2017.

Should you have any queries regarding the captioned or require any further information, please contact the undersigned at 2828 5875.

Yours faithfully

for MOTT MACDONALD HONG KONG LIMITED

Brandon Wong
Independent Environmental Checker
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Encl.

c.c. DSD
Lam Environmental Services Limited
China State Joint Venture

Mr. Kenneth Poon By Email
Mr. Derek Lo By Email
Mr. F M Chung By Email



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EXECUTIVE SUMMARY

- i. This is the Quarterly Environmental Monitoring and Audit (EM&A) Summary Report – **September 2019 to November 2019** of Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction under Environmental Permit no. EP-533/2017 (Hereafter as “the Project”). The report presenting the environmental monitoring findings and information recorded during the period of **1 September 2019 to 30 November 2019**.

Construction activities for the reporting period

During this reporting period, the principal work activities are included as follow:

September 2019	October 2019	November 2019
<ul style="list-style-type: none"> • Site Clearance • Construction of site office • Hoarding erection • Hand dig trial pit excavation • Root pruning and transplantation • Site entrance construction • Ground investigation • Excavation for temporary haul road construction • Construction of cycle track • Soil nail • Retaining wall construction • Piling works 	<ul style="list-style-type: none"> • Site Clearance • Construction of site office • Hoarding erection • Hand dig trial pit excavation • Root pruning and transplantation • Site entrance construction • Ground investigation • Excavation for temporary haul road construction • Construction of cycle track • Soil nail • Retaining wall construction • Piling works • Construction of noise barrier 	<ul style="list-style-type: none"> • Site Clearance • Construction of site office • Hoarding erection • Hand dig trial pit excavation • Root pruning and transplantation • Site entrance construction • Ground investigation • Excavation for temporary haul road construction • Construction of cycle track • Soil nail • Retaining wall construction • Piling works • Construction of noise barrier • Drainage works • Watermain installation

Air Quality Monitoring

- ii. 1-hour Total Suspended Particulates (TSP) monitoring would be conducted at five monitoring stations. The sampling frequency is 3 times in every 6 days.
- iii. Air quality monitoring for the stations AM1 and AM2 were commenced on 12 April 2019 while station AM5 was commenced on 18 April 2019. Air quality monitoring for the station AM4 was commenced on 3 May 2019. AM3(A) is under liaison for approval.
- iv. No action or limit level exceedance was determined in the reporting period for the stations of AM1, AM2, AM4 and AM5.



Noise Monitoring

- v. Noise monitoring would be conducted at five noise monitoring stations once per week.
- vi. Noise monitoring for stations CM4 and CM5 were commenced on 13 April 2019 and 18 April 2019 respectively. Noise monitoring for stations CM1 and CM3 were commenced on 2 May 2019. CM2(A) is under liaison for approval.
- vii. No action or limit level exceedance was determined in the reporting period for the stations of CM1, CM3, CM4 and CM5.

Site Inspection and Audit

- viii. Within this reporting period, weekly environmental site audits, bi-weekly landscape site audits and monthly ecology site audits were conducted by Environmental Team, ER and the Contractor, IEC attended the joint site inspection on 26 September, 31 October and 28 November 2019.

Complaints, Notifications of Summons and Successful Prosecutions

- ix. No environmental complaint was received in the reporting period.
- x. No notification of summons and successful prosecutions was received in the reporting period.

1 Introduction

1.1 Scope of the Report

- 1.1.1. Lam Environmental Services Limited (LES) has been appointed to work as the Environmental Team (ET) under Environmental Permit (EP) no. EP-533/2017 to implement the Environmental Monitoring and Audit (EM&A) programme as stipulated in the EM&A Manual of the approved Environmental Impact Assessment (EIA) Report for Relocation of Sha Tin Sewage Treatment Works to Caverns – Site Preparation and Access Tunnel Construction (Register No.: AEIAR-202/2016).
- 1.1.2. This report documents the finding of EM&A works for this project and during the period of [1 September 2019 to 30 November 2019](#).
- 1.1.3. In accordance with Section 13.5 of the Project EM&A Manual, the Quarterly EM&A Summary Report should be prepared and submitted to the IEC, the ER and EPD.

1.2 Structure of the Report

Section 1 **Introduction** – details the scope and structure of the report.

Section 2 **Project Background** – summarizes background and scope of the project, site description, project organization and contact details of key personnel during the reporting period.

Section 3 **Monitoring Requirements** – summarizes all monitoring parameters, monitoring locations, monitoring frequency, criteria and respective event and action plan and monitoring programmes.

Section 4 **Monitoring Results** – summarizes the monitoring results obtained in the reporting period.

Section 5 **Compliance Audit** – summarizes the auditing of monitoring results, all exceedances environmental parameters.

Section 6 **Complaints, Notification of summons and Prosecution** – summarizes the cumulative statistics on complaints, notification of summons and prosecution

Section 7 **Conclusion**

2 Project Background

2.1 Background

- 2.1.1. The Relocation of Sha Tin Sewage Treatment Works (STSTW) to Caverns (the Project) is implemented so as to release the existing site, of a size about 28 hectares, for other uses.
- 2.1.2. In May 2012, Drainage Services Department (DSD), the Project Proponent commenced a detailed feasibility study on “Relocation of Sha Tin Sewage Treatment Works to Caverns” (the Feasibility Study). The findings of Feasibility Study affirmed that relocating the STSTW to caverns to be constructed at Nui Po Shan of A Kung Kok is technically feasible and financially viable.
- 2.1.3. The Project is a Designated Project (DP) under the Environmental Impact Assessment Ordinance (EIAO). An application for an Environmental Impact Assessment (EIA) Study Brief under section 5(1)(a) of the EIAO was submitted on 12 May 2014 with a Project Profile (No. PP-508/2014) for the Project. An EIA Study Brief (No. ESB-273/2014) was issued in September 2014. An EIA for the Project was then undertaken, as part of the Assignment, in accordance with this EIA Study Brief and the Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM). The location of the Project is shown [Figure 2.1](#).

2.2 Scope of the Project and Site Description

- 2.2.1. The Project covers the following DP elements as specified in Schedule 2 of the EIAO (Cap.499), **Table 2.1** summarises the DPs under this Project.

Table 2.1 Schedule 2 Designated Projects under this Project

Item	Designated Project	EIAO Reference
DP1	Sewage treatment works with an installed capacity of more than 15,000 m3 per day under Item F.1	Schedule 2, Part I,
DP2	Sewage treatment works under Item F.2 <ul style="list-style-type: none"> • With an installed capacity of more than 5,000 m3 per day; and • A boundary of which is less than 200m from the nearest boundary of an existing or planned residential area, educational institution and health care institution. 	Schedule 2 Part I
DP3	An activity for the reuse of treated sewage effluent from a treatment plant under Item F.4	Schedule 2 Part I

DP4	Underground rock caverns under Item Q.2	Schedule 2 Part I
DP5	An explosives depot in a stand-alone, purpose built building under Item K.10	Schedule 2 Part I;
DP6	Decommissioning of an explosives depot under Item 11	Schedule 2 Part II

2.3 Project Organization and Contact Personnel

2.3.1 Drainage Services Department is the overall project controllers for the Project. For the construction phase of the Project, Project Engineer, Contractor(s), Environmental Team and Independent Environmental Checker are appointed to manage and control environmental issues.

2.3.2 The proposed project organization and lines of communication with respect to environmental protection works are shown in [Figure 2.2](#). Key personnel and contact particulars are summarized in **Table 2.2**:

Table 2.2 Contact Details of Key Personnel

Party	Role	Post	Name	Contact No.	Contact Fax
AECOM	Engineer's Representative	Chief Resident Engineer	Mr .Leung Chi Man, Simon	6393 8645	3914 5888
China State Joint Venture	Contractor	Site Agent	Mr. KONG Ming, Elvis	9186 2081	2672 2501
		Environmental Officer	Ms. CHIU Mei Yu, Gloria	9224 2413	
Mott MacDonald Hong Kong Limited	Independent Environmental Checker (IEC)	Independent Environmental Checker (IEC)	Mr. Brandon Wong	2828 5875	2827 1823
Lam Environmental Services Limited	Environmental Team (ET)	Environmental Team Leader (ETL)	Mr. Derek Lo	2882 3939	2882 3331
Hotline telephone number for the public to make enquiries:				3142 2256	

2.4 Construction Activities

2.4.1 In the reporting period, the principal work activities conducted are as follow.



September 2019	October 2019	November 2019
<ul style="list-style-type: none"> • Site Clearance • Construction of site office • Hoarding erection • Hand dig trial pit excavation • Root pruning and transplantation • Site entrance construction • Ground investigation • Excavation for temporary haul road construction • Construction of cycle track • Soil nail • Retaining wall construction • Piling works 	<ul style="list-style-type: none"> • Site Clearance • Construction of site office • Hoarding erection • Hand dig trial pit excavation • Root pruning and transplantation • Site entrance construction • Ground investigation Excavation for temporary haul road construction • Construction of cycle track • Soil nail • Retaining wall construction • Piling works • Construction of noise barrier 	<ul style="list-style-type: none"> • Site Clearance • Construction of site office • Hoarding erection • Hand dig trial pit excavation • Root pruning and transplantation • Site entrance construction • Ground investigation • Excavation for temporary haul road construction • Construction of cycle track • Soil nail • Retaining wall construction • Piling works • Construction of noise barrier • Drainage works • Watermain installation

2.4.2 Mitigation measures according to the environmental mitigation implementation schedule and the EIA were generally implemented by the Contractor in this reporting period. The Environmental Mitigation Implementation Schedule (EMIS) such as air quality, construction noise, water quality, Ecological, Landscape & Visual Impact and wastes management is presented in [Appendix 2.1](#)

3 Monitoring Requirements

3.1 Air Monitoring

AIR QUALITY MONITORING STATIONS

3.1.1. Air monitoring stations AM1 and AM2 were setup and commencement of monitoring on 12 April 2019 while AM5 was setup and commencement of monitoring on 18 April 2019. Air quality monitoring for the station AM4 was commenced on 3 May 2019. AM3(A) is under liaison for approval, no monitoring for AM3(A) was conducted in the reporting period.

3.1.2. The air monitoring stations for the Project are listed and shown in **Table 3.1** and **Figure 3.1**.

Table 3.1 Air Monitoring Station

Monitoring Station ID	Monitoring Location	Level (in terms of no. of floor)
AM1	Ah Kung Kok Fishermen Village	G/F
AM2	Block H, Kam Tai Court	Roof
AM3(A)	Kowloon City Baptist Church Hay Nien Primary School	G/F (tentative)
AM4	Wellborn Kindergarten	G/F
AM5	The Neighbourhood Advice-Action Council Harmony Manor	Roof

AIR MONITORING PARAMETERS, FREQUENCY AND DURATION

3.1.3. One-hour TSP levels should be measured to indicate the impacts of construction dust on air quality.

3.1.4. The sampling frequency of at least three times in every six-days should be undertaken when the highest dust impact occurs.

3.2 Noise Monitoring

NOISE MONITORING STATIONS

3.2.1. Noise monitoring stations CM4 and CM5 were setup and commencement of monitoring on 13 April 2019 and 18 April 2019 respectively. Noise monitoring for stations CM1 and CM3 were commenced on 2 May 2019. CM2(A) is under liaison for approval, no monitoring for CM2(A) was conducted in the reporting period.

3.2.2. The noise monitoring stations for the Project are listed and shown in **Table 3.2** and **Figure 3.1**.

Table 3.2 Noise Monitoring Station

Monitoring Station ID	Monitoring Location	Measurement Type	Level (in terms of no. of floor)
CM1	Wellborn Kindergarten	Free field	G/F
CM2(A)	Kowloon City Baptist Church Hay Nien Primary School	Free field (tentative)	G/F (tentative)
CM3	S.K.H. Ma On Shan Holy Spirit Primary School	Façade	Roof
CM4	Ah Kung Kok Fishermen Village	Free field	G/F
CM5	The Neighbourhood Advice-Action Council Harmony Manor	Façade	Roof

NOISE MONITORING PARAMETERS, FREQUENCY AND DURATION

3.2.3. Noise monitoring shall be carried out at all the designated monitoring stations. The monitoring frequency shall depend on the scale of the construction activities. The following is an initial guide on the regular monitoring frequency for each station on a weekly basis when noise generating activities are underway:

- One set of measurements between 0700-1900 hours on normal weekdays;
- One set of measurements between 1900-2300 hours;
- One set of measurements between 2300-0700 hours of next day; and
- One set of measurements between 0700-2300 hours on holidays (three consecutive Leq/5min readings).

3.2.4. If construction works are extended to include works during the hours of 1900-0700, additional weekly impact monitoring shall be carried out during evening and night-time works for the latter 3 sets of measurements specified in Section 3.2.3 above, one set of measurements shall at least include 3 consecutive Leq (5min) results.

3.2.5. Supplementary information for data auditing, statistical results such as L10 and L90 shall also be obtained for reference.



- 3.2.6. If a school exists near the construction activity, noise monitoring shall be carried out at the monitoring stations for the schools during the examination periods. The ET leader shall liaise with the school's personnel and the examination authority to ascertain the exact dates and times of all examination periods during the course of the contract.

4. Monitoring Results

4.0.1 The environmental monitoring will be implemented based on the division of works areas of each designed projects. Overall layout showing work areas and monitoring stations is shown in [Figure 2.1](#) and [Figure 3.1](#) respectively.

4.1 Air Monitoring Results

4.1.1 1-hour TSP monitoring was conducted at AM1, AM2, AM4 and AM5 in the reporting period. No 1-hour TSP monitoring was scheduled at AM3(A) due to approval of monitoring station is still under liaison.

4.1.2 No action or limit level exceedance was determined in the reporting period at stations of AM1, AM2, AM4 and AM5

4.1.3 Air quality monitoring results measured in this reporting period for AM1, AM2, AM4 and AM5 are reviewed and summarized. Details of air monitoring results and graphical presentation can be referred in [Appendix 4.1](#).

4.2 Noise Monitoring Results

4.2.1 Noise monitoring was conducted at CM1, CM3, CM4 and CM5 in the reporting period. No noise monitoring was scheduled at CM2(A) due to approval of monitoring station is still under liaison.

4.2.2 No action or limit level exceedance was determined in the reporting period at stations of CM1, CM3, CM4 and CM5.

4.2.3 Noise monitoring results measured in this reporting period for CM1, CM3, CM4 and CM5 are reviewed and summarized. Details of noise monitoring results and graphical presentation can be referred in [Appendix 4.2](#).

4.3 Waste Management

4.3.1 The quantities of waste for disposal in the Reporting Period are summarized in **Table 4.1**. The updated Monthly Summary waste Flow Table is shown in [Appendix 4.3](#). Whenever possible, materials were reused on-site as far as practicable.

Table 4.1 Details of Waste Disposal for Contract no. DC/2018/05

Waste Type	Quantity this report period	Cumulative Quantity-to-Date	Disposal / Dumping Grounds
Inert C&D materials disposed, m ³	1398	1465	Fill Bank at Tuen Mun Area 38
	1022	1022	Tai Po Area 9 under HKHA's Contract No.20160310 (Alternative Disposal Ground)
Inert C&D materials recycled, m ³	0	108.9	Fill Bank at Tuen Mun Area 38



Waste Type	Quantity this report period	Cumulative Quantity-to-Date	Disposal / Dumping Grounds
Non-inert C&D materials disposed, tonne	108.57	255.48	NENT
Non-inert C&D materials recycled, kg	0	0	
Chemical waste disposed, L	0	0	
Asbestos waste disposed, Kg	0	0	



5 Compliance Audit

5.0.1 The Event Action Plan for construction noise, air quality are presented in [Appendix 5.1](#).

5.1 Air Monitoring

5.1.1 No action or limit level exceedance was determined in the reporting period at stations of AM1, AM2, AM4 and AM5. No 1hr TSP monitoring was scheduled at stations of AM3(A) due to approval of monitoring station is still under liaison.

5.2 Noise Monitoring

5.2.1 No action or limit level exceedance was determined in the reporting period at stations of CM1, CM3, CM4 and CM5, No noise monitoring was scheduled at stations of CM2(A) due to approval of monitoring station is still under liaison.

5.3 Review of the Reasons for and the Implications of Non-compliance

5.3.1 No environmental non-compliance was recorded in the reporting period.

5.4 Summary of action taken in the event of and follow-up on non-compliance

5.4.1 There was no particular action taken since no non-compliance was recorded in the reporting period.

6 Complaints, Notification of Summons and Prosecution

- 6.0.1 No environmental complaint was received in the reporting period.
- 6.0.2 No notification of summons and successful prosecutions was received in the reporting period.
- 6.0.3 The details of cumulative complaint log and updated summary of complaints are presented in [Appendix 6.1](#).
- 6.0.4 Cumulative statistic on complaints and successful prosecutions are summarized in [Table 6.1](#) and [Table 6.2](#) respectively.

Table 6.1 Cumulative Statistics on Complaints

Reporting Period	No. of Complaints
September 2019 to November 2019	0
Total	1

Table 6.2 Cumulative Statistics on Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Successful Prosecutions in this reporting period (Offence Date)	Cumulative No. Project-to-Date
Air	-	0	0
Noise	-	0	0
Waste	-	0	0
Total	-	0	0

7 Conclusion

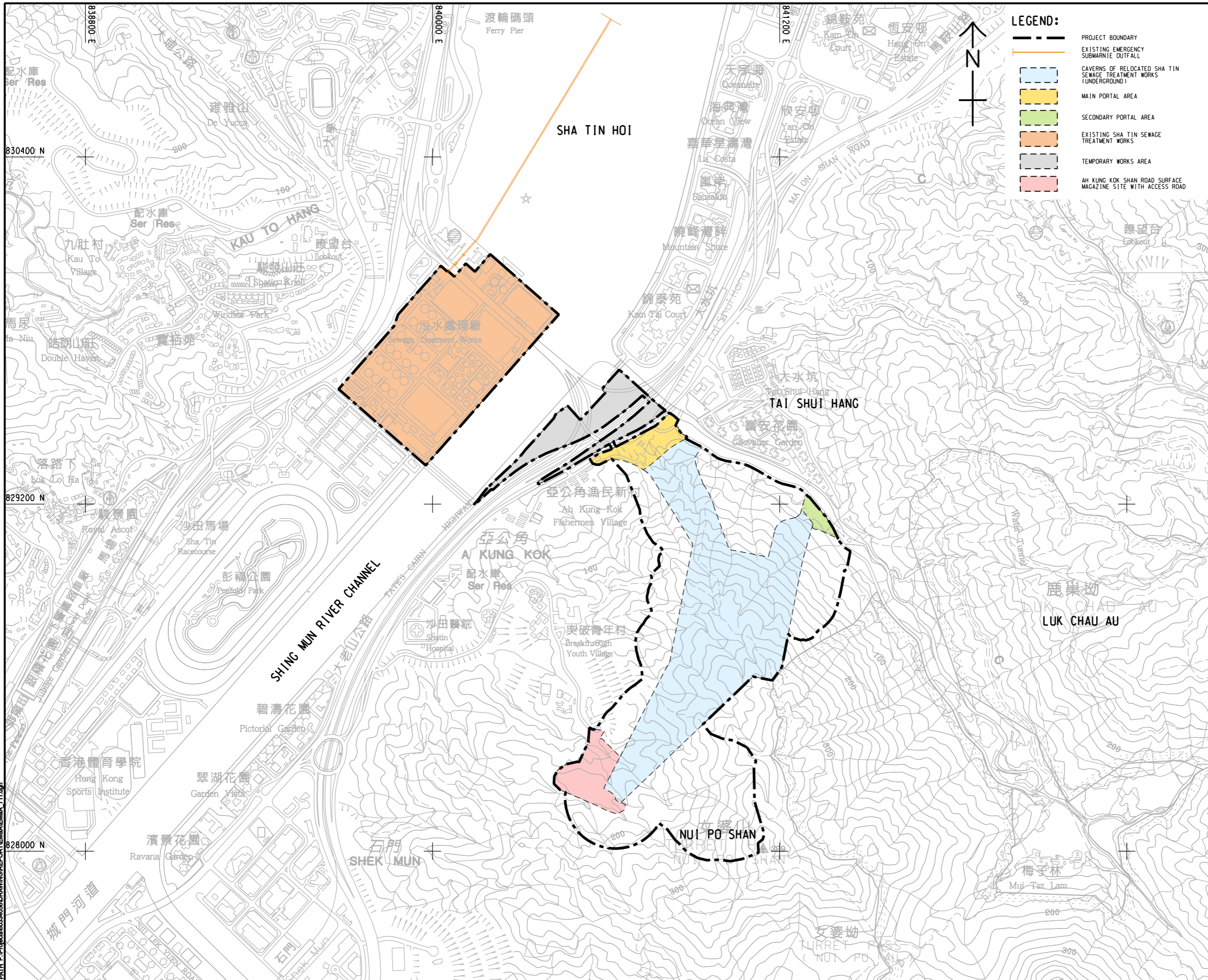
- 7.0.1 The EM&A programme was carried out in accordance with the EM&A Manual requirements, minor alterations to the programme proposed were made in response to changing circumstances.
- 7.0.2 No non-compliances were noted and no prosecutions were received during the reporting period.
- 7.0.3 Mitigation measures according to the environmental mitigation implementation schedule and the EIA were generally implemented by the Contractor in this reporting period. Weekly environmental site audits, bi-weekly landscape site audits and monthly ecology site audits were conducted by Environmental Team, ER and the Contractor and no cumulative environmental impact was identified in the reporting period. Hence, the EM&A programme was considered effective and shall be maintained.
- 7.0.4 The construction programmes of individual contracts are provided in [Appendix 7.1](#)



Figure 2.1

Project Layout

Pd File by: PENGM 2016/02/24
 PATH: P:\proj\60334056\DRAWING\REPORT\EM&A\EM&A_711.dgn
 ISO A1 594mm x 841mm
 Approved:
 Checked:
 Designer:
 Project Management Initials:



LEGEND:

- PROJECT BOUNDARY
- EXISTING EMERGENCY SUBMARINE OUTFALL
- CAVERNS OF RELOCATED SHA TIN SEWAGE TREATMENT WORKS (UNDERGROUND)
- MAIN PORTAL AREA
- SECONDARY PORTAL AREA
- EXISTING SHA TIN SEWAGE TREATMENT WORKS
- TEMPORARY WORKS AREA
- AH KUNG KOK SHAN ROAD SURFACE MAGAZINE SITE WITH ACCESS ROAD

AECOM

PROJECT
 項目
RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS: CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

CLIENT
 業主
渠務署
 Drainage Services Department

CONSULTANT
 工程顧問公司
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS
 分判工程顧問公司

ISSUE/REVISION
 修訂

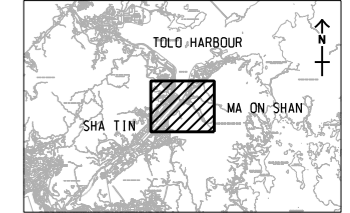
NO.	DATE	DESCRIPTION	CHK.

STATUS
 階段

SCALE
 比例
 A3 1: 12000

DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN A3 1: 50000
 索引圖



PROJECT NO.
 項目編號
 60334056

CONTRACT NO.
 合約編號
 CE 30/2014 (DS)

SHEET TITLE
 圖名
 LOCATION PLAN OF THE PROJECT

SHEET NUMBER
 圖號
 60334056/EM&A/1.01

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Figure 2.2
Project Organization Chart



Project Organization Chart

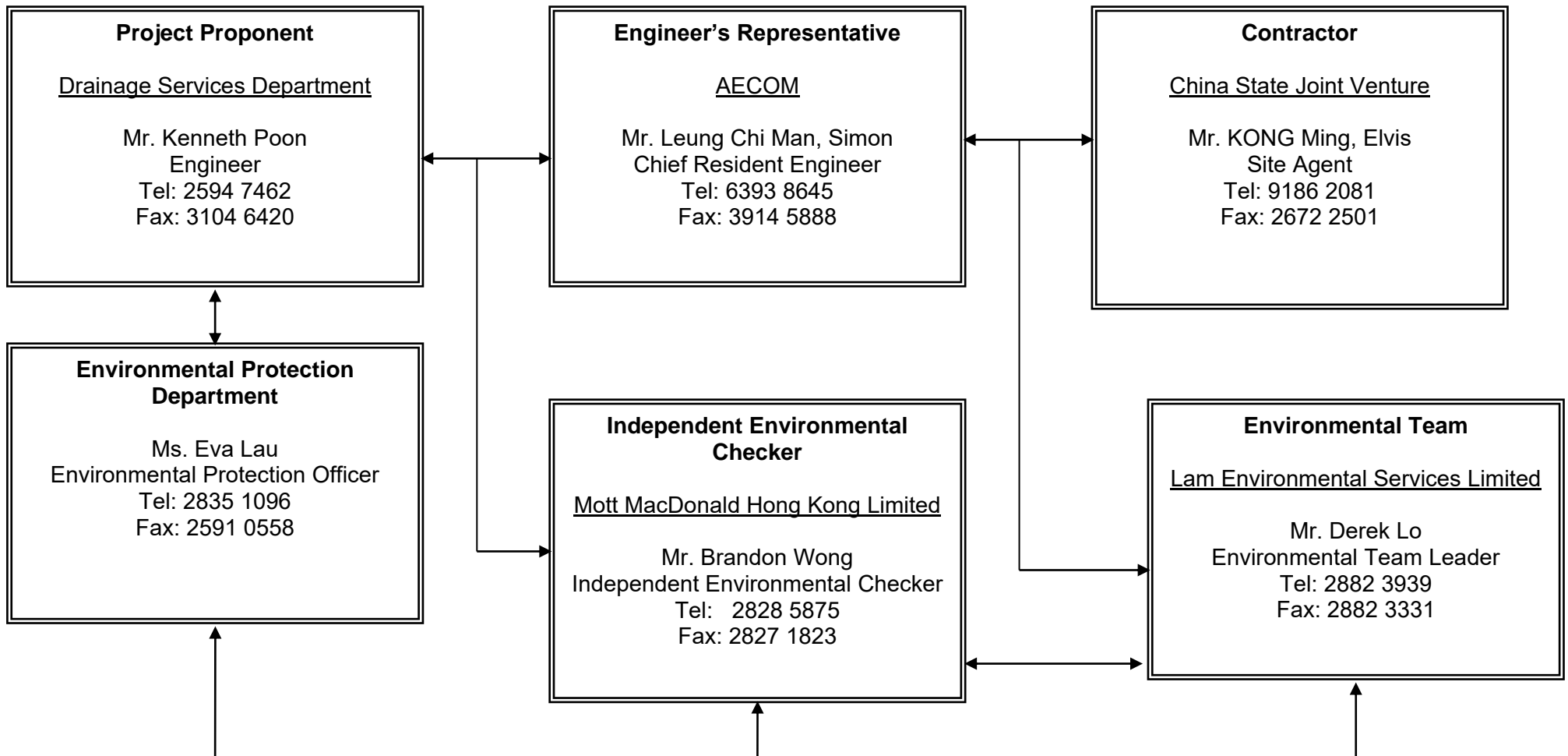


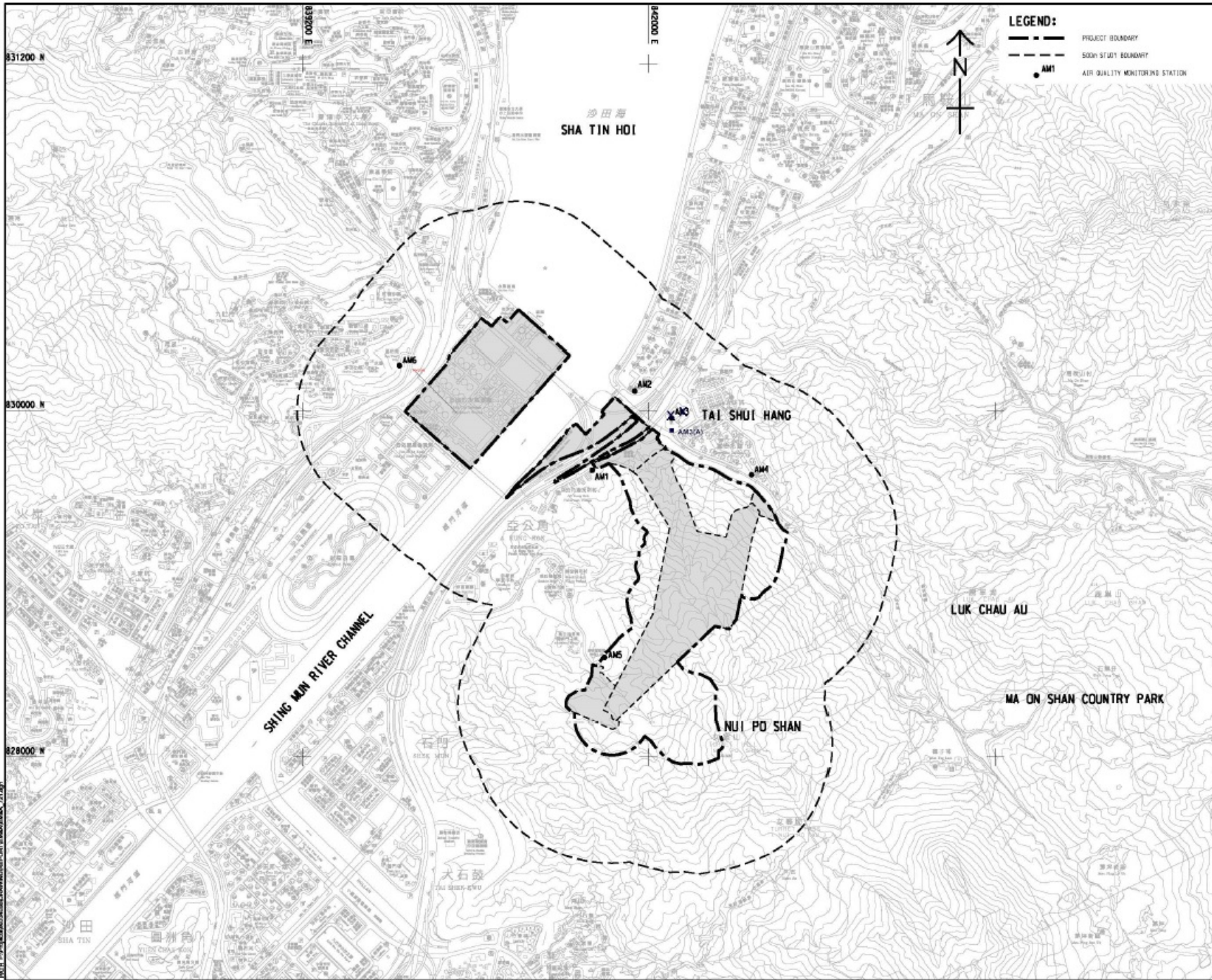
Figure 2.2



Figure 3.1

Locations of Environmental Monitoring Station

Issue Date: 2014/05/20
 Project Management (Title): Designer:
 Checker:
 Approver:
 Issue Date: 2014/05/20
 Project Management (Title): Designer:
 Checker:
 Approver:



LEGEND:

- PROJECT BOUNDARY
- STUDY BOUNDARY
- AM1
- AIR QUALITY MONITORING STATION



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PROJECT
 RELOCATION OF SHA TIN SEWAGE TREATMENT WORKS TO CAVERNS AND SEWAGE TREATMENT WORKS - INVESTIGATION, DESIGN AND CONSTRUCTION

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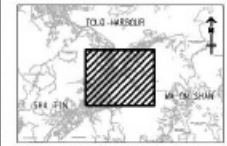
ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.

STATUS

SCALE
 AS 1 : 10000

KEY PLAN AS 1 : 40000



PROJECT NO.
 80334058

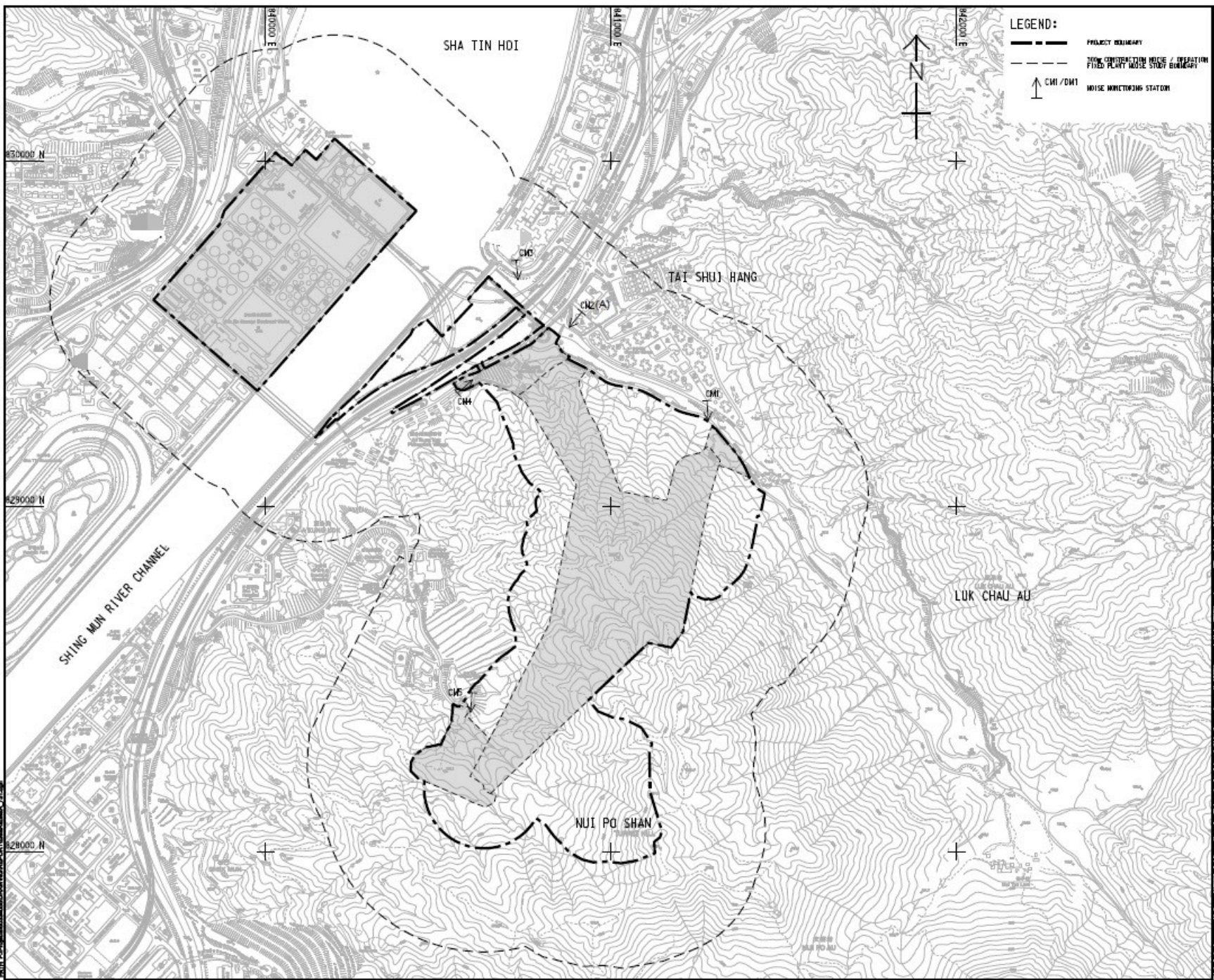
CONTRACT NO.
 CE 30/2014 (DS)

SHEET TITLE
 LOCATION OF AIR QUALITY MONITORING STATION DURING CONSTRUCTION PHASE

SHEET NUMBER
 80334058/EM&A/2.01

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BOA/1/16/2014/16/2014
Approval
Checklist
Design
Project Management & Admin



AECOM

PROJECT
**RELOCATION OF SHA TIN
SEWAGE TREATMENT
WORKS TO CAVERNS:
CAVERNS AND SEWAGE
TREATMENT WORKS -
INVESTIGATION, DESIGN
AND CONSTRUCTION**

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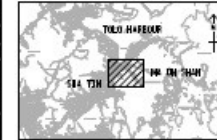
REVISION

NO.	DATE	REVISION	BY

STATUS

SCALE
AS 1: 5000
METRES

KEY PLAN AS 1: 50000



PROJECT NO.
60334056

CONTRACT NO.
CE 30/2014 (DB)

DRAWING TITLE
**LOCATION OF CONSTRUCTION
PHASE TRAFFIC NOISE
MONITORING STATION**

DRAWING NUMBER
60334056/EM&A/3.01



Appendix 2.1

Environmental Mitigation Implementation Schedule

APPENDIX C IMPLEMENTATION SCHEDULE OF RECOMMENDED MITIGATION MEASURES

C.1 Introduction

C.1.1 This section presents the implementation schedule of mitigation measures for the Project. **Table C.1** summarises the details of the recommended mitigation measures for all works areas. For each recommended mitigation measures, both the location and timing for the measure have clearly been identified as well as the parties responsible for implementing the measure and for maintenance (where applicable).

Table C.1 Implementation Schedule of Recommended Mitigation Measures

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	C	O	Dec	
Air Quality Impact									
Construction Phase									
Table 3.5	2.4.1	The rock crushing plant is configured as an enclosed system. Dust collector with dust removal efficiency of 99% will be provided at the exhaust of the rock crusher during rock crushing. Watering will be provided to maintain material in wet condition. Vehicles would be required to pass through the wheel washing facilities provided at site exit.	Rock Crushing Plant / Construction Phase	Contractor	√	√		√	Air Pollution Control Ordinance (APCO)
3.8.1	2.4.1	Watering eight times a day on active works areas, exposed areas and unpaved haul roads to reduce dust emission by 87.5%.	All active works areas, exposed areas and unpaved haul roads	Contractor		√		√	APCO

¹ Des = Design; C = Construction; O = Operation; Dec = Decommissioning

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3.8.1	2.4.1	<p>Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices:</p> <ul style="list-style-type: none"> • Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. • Use of frequent watering for particularly dusty construction areas and areas close to ASRs. • Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering shall be applied to aggregate fines. • Open stockpiles shall be avoided or covered. Where possible, prevent placing dusty material storage piles near ASRs. • Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. • Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. • Provision of wind shield and dust extraction units or similar dust mitigation measures at the loading area of barging point, and use of water sprinklers at the loading area 	Construction Sites	Contractor		√		√	APCO and Air Pollution Control (Construction Dust) Regulation

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		<p>where dust generation is likely during the loading process of loose material, particularly in dry seasons/ periods.</p> <ul style="list-style-type: none"> • Provision of not less than 2.4m high hoarding from ground level along site boundary where adjoins a road, streets or other accessible to the public except for a site entrance or exit. • Imposition of speed controls for vehicles on site haul roads. • Where possible, routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. • Every stock of more than 20 bags of cement or dry PFA should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides. • Instigation of an environmental monitoring and auditing program to monitor the construction process in order to enforce controls and modify method of work if dusty conditions arise. 							

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	Operation Phase								
3.5.2	-	Sludge tanks with totally enclosed design proven by DSD should be deployed for transporting sludge. With thorough cleaning practice and regular condition test of the sludge tanks, odour emission and leachate leakage during storage and transportation are not anticipated.	Cavern Sewage Treatment Works (CSTW) / Operation Phase	Project Proponent / Operator	√		√		-
3.6.2, 3.7.2	2.4.2	All treatment units with potential odour emission will be covered and the exhausted air will be conveyed to the deodouriser (with 80 – 97% odour removal efficiency) for treatment before discharge to the environment.	CSTW / Operation Phase	Design team / Project Proponent / Operator	√		√		-
3.7.2	2.4.2	The following appropriate odour control measures would be implemented. (i) Adopting the advantage of caverns as natural barriers for odour control; (ii) Covering up of odour sources; (iii) Preventing odour leakage through the access tunnels by applying negative pressure inside caverns; (iv) Installing deodourizing units to clean up the collected foul air; (v) Discharging exhausted air at height to further enhance the dilution effect; and (vi) Enhancing the odour management of the sludge transportation.	CSTW / Operation Phase	Design team / Project Proponent / Operator	√		√		-

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3.10.2	2.3.1	Odour monitoring at the inlet and outlet of the deodourizing units is proposed to be conducted for first three years of the operation of CSTW, quarterly in the first year, and once every 6 months in the second and third years if monitoring results remain below the limit levels.	CSTW / Operation Phase	Project Proponent / Operator	√		√		-
3.10.2	2.3.2	An Odour Complaint Registration System is also proposed in the EM&A programme to check whether the deodorizing units can fulfill the recommended odour removal performance.	CSTW / Operation Phase	Operator			√		-
3.10.2	-	Any unexpected leakage from tanks could be observed with monitoring equipment. Monitoring equipment would be installed in the CSTW to monitor the concentration of H ₂ S, CO and CO ₂ and methane. Investigation and repair works would be carried out immediately if abrupt increase of these concentrations are reported. Emergency Plan would be established for these upset conditions.	CSTW / Operation Phase	Project Proponent / Operator	√		√		-
	Noise Impact								
	Construction Phase								
4.5.1.6	-	Re-provision of 220m length noise barrier with 10mPD on temporary access haul road to replace the existing 150m length noise barrier with 9.2mPD to 10mPD on Ma On Sha Road. The	Proposed temporary access / Construction Phase	Contractor		√			Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM), Noise Control Ordinance (NCO)

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		location of the relocated noise barrier is shown in Figure No. 60334056/EIA/4.02 and Appendix 4.07 . Once the construction work for the CSTW is completed, the temporary access roads would be demolished and the relevant section of Ma On Shan Road and associated noise barrier would be recovered as before.							
4.8.1	3.8.1	The use of quiet plant associated with the construction works is prescribed in British Standard "Code of practice for noise and vibration control on construction and open sites, BS5228" which contains the SWLs for specific quiet PME.	All Construction Work Sites	Contractor		√		√	EIAO-TM, NCO
4.8.1	3.8.1	To alleviate the construction noise impact on the affected NSRs, movable noise barrier for Air Compressor, Bar Bender and Cutter, Breaker, Chisel, Saw, Compactor, Mixers, Pump, Crane, Desander, Drilling Rig, Dump Truck, Excavator, Generator, Grab, Lorry, Paver, Poker and Roller are proposed.	All Construction Work Sites	Contractor		√		√	EIAO-TM, NCO
4.8.1	3.8.1	Provision of noise barrier/acoustic mats for Drilling Jumbo so as to have screening effecting with 10 dB(A) noise attenuation	Drilling Jumbo operate outside the portal and within 20m inside the portal	Contractor		√			EIAO-TM, NCO
4.8.1	3.8.1	To further alleviate the construction noise impact on the Neighbourhood Advice-Action Council Harmony	Construction Site for access road for	Contractor		√		√	EIAO-TM, NCO

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					Des	C	O	Dec	
		Manor, it is proposed to limit the number of on-time operating PMEs within 120m of this NSR during construction of access road.	magazine at A Kung Kok Road						
4.9.1	3.8.1	<p>In addition to the above-mentioned mitigation measures, good site practices listed below shall be adopted by all the contractors to further ameliorate the noise impacts.</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 program. • Silencers or mufflers on construction equipment should be utilised and should be properly maintained during the construction program. • Mobile plant, if any, should be sited as far away from NSRs as possible. • Machines and plant (such as trucks) that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum. • Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs. 	All Construction Work Sites	Contractor		√		√	EIAO-TM, NCO

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					Des	C	O	Dec	
		<ul style="list-style-type: none"> Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities. 							
	Operation Phase								
4.7.4	3.8.2	The maximum allowable sound power levels for the ventilation shaft, ventilation buildings at main portal and emergency portal, ventilation fan for chiller plant room and cooling tower at the administration building as presented in Table 4.16 of the EIA Report should be achieved such that the nearest affected NSRs can be in compliance with the noise criteria	Ventilation Shaft, Administration Building and Ventilation Buildings/ Operation Phase	Project Proponent	√		√		EIAO-TM, NCO
4.11.2	3.8.2	Prior to the operational phase of the Project, a commissioning test for the ventilation buildings, the ventilation shaft, ventilation fan for chiller plant room at administration building and cooling tower at the administration building would be conducted to ensure compliance with the relevant allowable maximum sound power levels.	Ventilation Shaft, Administration Building and Ventilation Buildings/ Operation Phase	Contractor			√		EIAO-TM, NCO

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					Des	C	O	Dec	
Water Quality Impact									
Construction Phase									
5.7.2	4.10	Water used in ground boring and drilling for site investigation or rock / soil anchoring should as far as practicable be re-circulated after sedimentation. When there is a need for final disposal, the wastewater should be discharged into storm drains via silt removal facilities.	Construction Sites / Construction Phase	Contractor		√			Water Pollution Control Ordinance (WPCO), EIAO-TM
5.7.2	4.10	All vehicles and plant should be cleaned before they leave a construction site to minimise the deposition of earth, mud, debris on roads. A wheel washing bay should be provided at every site exit if practicable and wash-water should have sand and silt settled out or removed before discharging into storm drains. The section of construction road between the wheel washing bay and the public road should be paved with backfill to reduce vehicle tracking of soil and to prevent site run-off from entering public road drains.	Construction Sites / Construction Phase	Contractor		√			Professional Persons Environmental Consultative Committee (ProPECC) Practice Note (PN) 1/94, WPCO, Waste Disposal Ordinance (WDO)
5.7.2	4.10	Good site practices should be adopted to remove rubbish and litter from construction sites so as to prevent the rubbish and litter from spreading from the site area. It is recommended to clean the construction sites on a regular basis.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM

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5.7.2	4.10	The site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed where applicable to minimise surface run-off and the chance of erosion.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, ProPECC PN 1/94
5.7.2	4.10	There is a need to apply to EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality must meet the requirements specified in the discharge licence. All the runoff and wastewater generated from the works areas should be treated so that it satisfies all the standards listed in the Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters (TM-DSS). The beneficial uses of the treated effluent for other on-site activities such as dust suppression, wheel washing and general cleaning etc., can minimise water consumption and reduce the effluent discharge volume. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the relevant WPCO licence which is under the ambit of RO of EPD.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, (TM-DSS)
5.7.2	4.10	Contractor must register as a chemical waste producer if chemical wastes would be produced from the	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, WDO

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					Des	C	O	Dec	
		construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation, should be observed and complied with for control of chemical wastes.							
5.7.2	4.10	Any service shop and maintenance facilities should be located on hard standings within a bonded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM
5.7.2	4.10	Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published under the Waste Disposal Ordinance should be followed to avoid leakage or spillage of chemicals.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, WDO
5.7.2	4.10	Sufficient chemical toilets should be provided in the works areas. A licensed waste collector should be deployed to clean the chemical toilets on a regular basis.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM

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5.7.2	4.10	Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the surrounding environment.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM
5.7.2	4.10	The practices outlined in ETWB TC (Works) No. 5/2005 "Protection of natural streams/rivers from adverse impacts arising from construction works" should also be adopted where applicable to minimise the water quality impacts upon any natural streams or surface water systems.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, ETWB TC (Works) No. 5/2005
5.7.2	4.10	Appropriate measures during the construction of the cavern construction should be implemented to minimise the groundwater infiltration.	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM
5.7.2	4.10	No directly discharge of groundwater from contaminated areas should be adopted. Prior to any excavation works within the potentially contaminated areas at the existing STSTW site, the baseline groundwater quality in these areas should be reviewed based on the relevant SI data and any additional groundwater quality measurements to be performed with reference to <i>Guidance Note for Contaminated Land Assessment and Remediation</i> and the review results should be submitted to EPD for examination. If the review results indicated that the groundwater to be generated from the excavation	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, Guidance Note for Contaminated Land Assessment and Remediation

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		works would be contaminated, this contaminated groundwater should be either properly treated or properly recharged into the ground in compliance with the requirements of the TM-DSS. If wastewater treatment is to be deployed for treating the contaminated groundwater, the wastewater treatment unit shall deploy suitable treatment processes (e.g. oil interceptor / activated carbon) to reduce the pollution level to an acceptable standard and remove any prohibited substances (such as TPH) to an undetectable range. All treated effluent from the wastewater treatment plant shall meet the requirements as stated in TM-DSS and should be either discharged into the foul sewers or tankered away for proper disposal.							
5.7.2	4.10	If deployment of wastewater treatment is not feasible for handling the contaminated groundwater, groundwater recharging wells should be installed as appropriate for recharging the contaminated groundwater back into the ground. The recharging wells should be selected at places where the groundwater quality will not be affected by the recharge operation as indicated in section 2.3 of the TM-DSS. The baseline groundwater quality should be determined prior to the selection of the recharge wells, and submit a working plan to EPD for agreement. Pollution	Construction Sites / Construction Phase	Contractor		√			WPCO, EIAO-TM, TM-DSS

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		levels of groundwater to be recharged shall not be higher than pollutant levels of ambient groundwater at the recharge well. Groundwater monitoring wells should be installed near the recharge points to monitor the effectiveness of the recharge wells and to ensure that no likelihood of increase of groundwater level and transfer of pollutants beyond the site boundary. Prior to recharge, free products should be removed as necessary by installing the petrol interceptor. The Contractor should apply for a discharge licence under the WPCO through the Regional Office of EPD for groundwater recharge operation or discharge of treated groundwater							
5.7.2	4.10	THEES connection works should be synchronized with the THEES maintenance, for a duration not longer than 4 weeks each outside the algae blooming season (January to May) and frequency of THEES maintenance shall be no more than once per year during the construction phase of the Project.	Tolo Harbour / Construction Phase	Project Proponent / Contractor	√	√			EIAO-TM
Construction and Operation Phases									
5.10.2	4.10	Shutdown of the THEES for maintenance should be shortened as far as possible. It is recommended that the maintenance of the THEES tunnel should be avoided during the algae blooming season (January to May).	Tolo Harbour / Construction and Operation Phase	Project Proponent		√	√		WPCO, EIAO-TM

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5.10.2	4.10	Relevant government departments including EPD, WSD, AFCD as well as the key stakeholders for mariculture and fisheries in Tolo Harbour should be informed of the maintenance event prior to any discharge.	Tolo Harbour / Construction and Operation Phase	Project Proponent		√	√		WPCO, EIAO-TM
5.10.3	4.2-4.5	An event and action plan and a water quality monitoring programme (as presented in the EM&A Manual) should be implemented for the THEES maintenance discharge	Tolo Harbour / Construction and Operation Phase	Project Proponent		√	√		WPCO, EIAO-TM
5.10.1	4.10	Silt screen may be installed at the flushing water intakes during the THEES maintenance discharge should it appear necessary. Close communication between DSD and WSD should be maintained to minimize any impact on the flushing water intakes due to THEES maintenance discharge.	WSD flushing water intakes / Construction and Operation Phase	WSD / Project Proponent		√	√		WPCO, EIAO-TM
Design and Operation Phases									
5.8.3	4.6	In case adverse impact on KTN is identified based on the result of the three-month monitoring programme after commissioning of the project, the operation conditions of the treatment and THEES system should be investigated, and corrective and remedial action should be implemented to improve the effluent discharge from the CSTW. Furthermore, DSD should extend the water quality monitoring	Project site / Design and Operation Phases	Project Proponent			√		WPCO, EIAO-TM

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					Des	C	O	Dec	
		programme for at least three months or as agreed by the Director of Environmental Protection.							
5.11.2	4.10	Dual power supply or ring main supply from CLP Power Hong Kong Ltd. CLP should be provided for the CSTW to prevent the occurrence of power failure. In addition, standby facilities for the main treatment units and standby equipment parts / accessories should also be provided in order to minimise the chance of emergency discharge. CLP should be consulted in order to ascertain the power supply for normal plant operation within the caverns. It is recommended that government departments including EPD, WSD and AFCD as well as the key stakeholders for mariculture and fisheries in Tolo Harbour should be informed as soon as possible in case of any emergency discharge so that appropriate actions can be taken.	Project site / Design and Operation Phases	Project Proponent	√		√		WPCO, EIAO-TM
5.11.2	4.10	In case of emergency discharge, the plant operators of CSTW should carry out necessary follow-up actions according to the procedures of the current contingency plan formulated for the existing STSTW to minimise the water quality impact.	Project site / Operation Phase	Project Proponent			√		WPCO, EIAO-TM
5.11.2	4.10	WSD may also consider, should it appear necessary, to shut down the Sha Tin seawater pumping station for a short period of time in case of	Sha Tin seawater pumping station / Operation Phase	WSD / Project Proponent			√		WPCO, EIAO-TM

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					Des	C	O	Dec	
		emergency discharge in order to minimize any adverse impacts.							
5.13.2	4.10	<p>Best Management Practices to reduce storm water and non-point source pollution are also proposed as follows:</p> <p><u>Design Measures</u></p> <ul style="list-style-type: none"> Exposed surface shall be avoided within the road and portal sites to minimise soil erosion. The access road and the portal areas shall be either hard paved or covered by landscaping area where appropriate. Streams near the Project site will be retained to maintain the original flow path. The drainage system will be designed to avoid flooding. Green areas / planting etc. should be introduced alongside the access road and within the portal areas, as far as possible, to minimise runoff pollution. <p><u>Devices/ Facilities to Control Pollution</u></p> <ul style="list-style-type: none"> Screening facilities such as standard gully grating and trash grille, with spacing which is capable of screening off large substances such as fallen leaves and rubbish should be provided at the inlet of drainage system. Road gullies with standard design and silt traps should be provided to 	Project site / Design and Operation Phase	Project Proponent	√		√		WPCO, ProPECC PN 5/93

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		remove particles present in stormwater runoff, where appropriate. <u>Administrative Measures</u> <ul style="list-style-type: none"> • Good management measures such as regular cleaning and sweeping of road surface/ open areas are suggested. The road surface/ open area cleaning should also be carried out prior to occurrence rainstorm. • Manholes, as well as stormwater gullies, ditches provided at the Project site should be regularly inspected and cleaned (e.g. monthly). Additional inspection and cleansing should be carried out before forecast heavy rainfall. 							
Land Contamination									
6.7.1	-	Further site walkover and/or detailed land contamination assessment will be required for sites that are inaccessible or currently in operation / yet to be constructed (i.e. existing STSTW, David Camp and part of existing Sha Tin VDC, and proposed A Kung Kok Shan Road surface magazine site within the Project boundary). The site walkover, detailed land contamination assessment and if necessary, remediation works should be carried out after decommissioning of the sites	Existing STSTW, David Camp and VDC / Construction Phase	Project Proponent / Contractor		√		√ (for existing STS TW)	Guidance Note for Contaminated Land Assessment and Remediation, Practice Guide for Investigation and Remediation of Contaminated Land, Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

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		<p>but prior to re-development and should include the following:</p> <ul style="list-style-type: none"> • Prior to the commencement of the SI works, review the CAP to confirm whether the proposed SI works (e.g. sampling locations, testing parameters etc.) are still valid and to confirm the appropriate RBRGs land use scenario for the development; • Submit supplementary CAP(s), presenting the findings of the above review for EPD endorsement. If land contamination issues were identified within David Camp or part of existing VDC / proposed A Kung Kok Shan Road surface magazine site within the Project boundary in the further site walkover, findings of the site walkover and the proposal for SI works should also be presented in the supplementary CAP(s); • Carry out SI works according to the supplementary CAP endorsed by EPD; • Submit CAR(s), detailing findings of the SI works and nature/extent of any soil/groundwater contamination, and, if contaminated identified, RAP(s), discussing the appropriate remedial methods and mitigation 							

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		measures, for the identified contamination, for EPD agreement; and <ul style="list-style-type: none"> Carry out soil/groundwater remediation works according to EPD agreed RAP and submit RR(s) afterwards for EPD agreement. The remediation works and agreement of RR should be completed prior to re-development. 							
6.7.2	-	If contamination were identified, mitigation measures as recommended in the RAP should be followed and should include the following: <ul style="list-style-type: none"> Excavation profiles must be properly designed and executed with attention to the relevant requirements for environment, health and safety; Excavation shall be carried out during dry season as far as possible to minimise contaminated runoff from contaminated soils; Supply of suitable clean backfill material (or treated soil) after excavation; Stockpiling site(s) shall be lined with impermeable sheeting and bunded. Stockpiles shall be fully covered by impermeable sheeting to reduce dust emission. If this is not practicable due to frequent 	Project Site / Construction Phase	Contractor		√		√ (for existing STS TW)	Guidance Note for Contaminated Land Assessment and Remediation, Practice Guide for Investigation and Remediation of Contaminated Land, Guidance Manual for Use of Risk-based Remediation Goals for Contaminated Land Management

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		<p>usage, regular watering shall be applied. However, watering shall be avoided on stockpiles of contaminated soil to minimise contaminated runoff.</p> <ul style="list-style-type: none"> • Vehicles containing any excavated materials shall be suitably covered to limit potential dust emissions or contaminated wastewater run-off, and truck bodies and tailgates shall be sealed to prevent any discharge during transport or during wet conditions; • Speed control for the trucks carrying contaminated materials shall be enforced; • Vehicle wheel and body washing facilities at the site's exist points shall be established and used; and • Pollution control measures for air emissions (e.g. from biopile blower and handling of cement), noise emissions (e.g. from blower or earthmoving equipment), and water discharges (e.g. runoff control from treatment facility) shall be implemented and complied with relevant regulations and guidelines. 							

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					Des	C	O	Dec	
Hazard to Life									
Construction Phase									
7.14.1	6.2.2	<p>The following recommendations are justified to be implemented to meet the EIAO-TM requirements:</p> <ul style="list-style-type: none"> The truck should be designed to minimise the amount of combustible in the cabin. The fuel carried in the fuel tank should also be minimised to reduce the duration of any fire; The accident involvement frequency of the explosives delivery truck should be minimised through implementation of several administrative measures, such as providing training programme to the driver, regular "tool box" briefing session, implementing a defensive driving attitude, selecting driver with good safety record, and providing regular medical checks for the driver; Avoidance of returning unused explosives to the magazine, only the required quantity of explosives for a particular blast should be transported; Maintain a minimum headway of 10 minutes between two 	Explosives delivery route / Construction Phase	Contractor	√	√			EIAO-TM

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		consecutive truck convoys whenever practicable; and <ul style="list-style-type: none"> The fire involvement frequency should be minimised by carrying better types of fire extinguishers and with bigger capacity onboard of the explosives delivery truck. Emergency plans and trainings could also be provided to make sure that the fire extinguishers are used adequately. 							
7.14.2	6.2.3	The magazine should be designed, built, operated and maintained in accordance with Mines Division's guidelines and appropriate industry best practice. In addition, the following recommendations should be implemented: <ul style="list-style-type: none"> The security plan should address different alert security level to reduce opportunity for arson or deliberate initiation of explosives; Emergency plan should be developed to address uncontrolled fire in magazine area, and drill of the emergency plan should be regularly carried out; Suitable work control system should be set-up, such as an operational manual including Permit-to-Work system, to ensure that work activities undertaken 	Magazine Site/ Construction Phase	Contractor	√	√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		during operation of the magazine are properly controlled; <ul style="list-style-type: none"> • Good house-keeping within the magazine to ensure no combustible materials are accumulated; • Good house-keeping outside the magazine stores to ensure no combustible materials are accumulated; and • Regular checking of the magazine store to ensure no water seepage through the roof, walls or floor. 							
7.14.3	6.2.4	The following recommendations should be implemented: <ul style="list-style-type: none"> • Emergency plan should be developed to address uncontrolled fire during transport. Case of fire near an explosive delivery truck in jammed traffic should be included in the plan. Activation of fuel and battery isolation switches on vehicle when fire breaks out should also be included in the emergency plan to reduce likelihood of prolonged fire leading to explosion; • Working guideline should be developed to define procedure for explosives transport during adverse weather such as thunderstorm; 	To and from Magazine Site / Construction Phase	Contractor	√	√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		<ul style="list-style-type: none"> • Detonators should be transported separately from other Class 1 explosives. Separation of vehicles should also be maintained through the trip; • Develop procedure to ensure the availability of parking space on site for the explosives delivery truck. Delivery should not be commenced if parking space on site is not secured; • Hot work or other activities should be banned in the vicinity of the explosives offloading or charging activities; • Lining should be provided within the transportation box on the vehicle; • Fire screen should be used between cabin and the load on the vehicle; • Ensure packaging of detonators remains intact until handed over at blasting site; • Ensure that cartridged emulsion packages are not damaged before every trip; and • Use experienced driver with good safety record. 							

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7.14.4	6.2.5	<p>The following recommendations should be implemented for the safe use of explosives:</p> <ul style="list-style-type: none"> • Blast Charge Weight should be within MIC as specified for the given blast face; • Temporary mitigation measures such as blast doors or heavy duty blast curtains should be installed at the portals or shafts and at suitable locations underground to prevent flyrock and control the air overpressure; • Multiple faces blasting will be carried out for the construction of cavern in this project. Good communication and control will need to be adopted in ensuring that the works are carried out safely; • It is not intended to carry out complete evacuation of the construction areas and secure refuge areas should be identified to workers in the areas; • A Chief Shotfirer and a Blasting Engineer shall be employed in addition to the normal blasting personnel to ensure that the works are safe and coordinated between blasting areas; • Shotfirer to be provided with a lightning detector, and appropriate 	CSTW / Construction Phase	Contractor	√	√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		control measures should be in place; <ul style="list-style-type: none"> • Speed limit for the diesel vehicle truck and bulk emulsion truck in the access tunnel and cavern should be imposed. The truck may be escorted while underground to ensure route is clear from hazards and obstructions; and • Hot work should be suspended during passage of the diesel vehicle truck and bulk emulsion truck in the access tunnel and cavern. • A boulder survey should be undertaken based on the likely PPV values that would result from the blasting process. Those boulders subject to the vibration higher than the allowable limit should be strengthened, removed, or constructed with boulder fence, prior to the commencement of blasting. 							
	Operation Phase								
		Nil							

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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Ecological Impact (Terrestrial and Marine)									
Construction Phase									
8.8.2	7.2.1	Construction of access roads and other temporary works should be carefully designed (e.g. elevated road for crossing streams) to avoid / minimise habitat loss and fragmentation.	Project site – areas access road / Pre-Construction Phase	Design team / Project Proponent	√				-
8.8.3	7.2.2	Minimise habitat loss to nearby habitats and associated wildlife by implementing the following mitigation measures: - <ul style="list-style-type: none"> • confining the works within the site boundary; • controlling access of site staff to avoid damage to the vegetation in surrounding areas; and • placement of equipment or stockpile in the existing disturbed / urbanised land within the site boundary of the Project to minimise disturbance to vegetated areas; 	Project site / Construction Phase	Contractor		√			-
8.8.3	7.2.2	Reinstatement planting should be implemented upon the completion of construction works to minimise the ecological impact arising from the temporary habitat loss	Project Site (Main Portal Area / Secondary Portal Area / Access Road / Temporary Works Area) /Construction Phase	Project Proponent	√	√		√	

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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8.8.2, 8.8.3 & 8.10	7.2.2	<p>Detailed Vegetation Survey shall be conducted by a suitably qualified botanist / ecologist within the works area requiring vegetation clearance prior to commencement of works to identify plant species of conservation importance.</p> <p>The potentially affected individuals shall be tagged and fenced off for preservation, and in the case of unavoidable loss, for transplantation to nearby suitable habitat(s).</p>	Proposed works areas (Main Portal, Secondary Portal, Access Road) / Pre-Construction Phase	Project Proponent / Qualified botanist or ecologist		√			
8.8.2, 8.8.3 & 8.10	7.3.1	<p>A Protection and Transplantation Proposal including the subsequent monitoring visit for the affected plant species should be prepared and conducted by a suitably qualified local ecologist. The Proposal should be submitted for approval at least one month before works commencement.</p> <p>To review the performance of the transplantation exercise, monitoring of transplanted flora should be conducted monthly after the transplantation throughout the construction phase. The parameters to be monitored should include the health condition and survival rate of the transplanted flora and presence of weedy species. Any observations and recommendations should be reported in monthly EM&A reports</p>	Recipient Site for transplanted species / Construction Phase	Project Proponent / Qualified botanist or ecologist		√			

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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8.8.3	7.2.2	<p>Mitigation measures should be implemented to control runoff from the construction site, as well as the adopting guidelines and good site practices for handling and disposal of construction discharges in order to minimise the potential indirect impact on the streams (particularly S2) resulting from site runoff.</p> <p>Precautionary measures should also be implemented to minimise indirect impacts to the streams, such as isolating the work site by placing sandbags and silt curtains, covering up construction materials, debris and spoil to avoid being washed into the stream, and properly collecting and treating construction effluent and sewage.</p>	Access Road on Nui Po Shan / Construction Phase	Contractor		√			ETWB TCW No. 5/2005
8.8.3	7.2.2	<p>Implement good site practice to further minimise impacts from disturbance such as noise, air quality and water quality issues, such as: -</p> <ul style="list-style-type: none"> • the use of quiet plant and EPD's QPME and the availability of British Standards 5228 has been considered; • the use of movable noise barrier; • the use of temporary noise screening structures or purpose-built temporary noise barriers; 	Project site / Construction Phase	Contractor		√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		<ul style="list-style-type: none"> install site hoarding as temporary noise barrier where construction works are undertaken; only well-maintained plant should be operated on site and plant should be serviced regularly during the construction programme; Mitigation measures stipulated in the ProPECC PN 1/94 "Construction Site Drainage" should be complied to minimise water quality impact; Installation of stand-by pump, emergency power supply and telemetry system to avoid sewage overflow and surcharge to sewerage system due to power/equipment failure. 							
8.8.3	7.2.2	<p>Minimise groundwater infiltration during cavern construction with the following water control strategies:-</p> <ul style="list-style-type: none"> Probing Ahead: As a normal practice, the Contractor will undertake rigorous probing of the ground ahead of excavation works to identify zones of significant water inflow. The probe drilling results will be evaluated to determine specific grouting requirements in line with the tunnel / cavern advance. In such zones of significant water inflow that could occur as a result of discrete, permeable features, the intent 	Project site / Construction Phase	Contractor		√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		<p>would be to reduce overall inflow by means of cut-off grouting executed ahead of the tunnel / cavern advance;</p> <ul style="list-style-type: none"> • Pre-grouting: Where water inflow quantities are excessive, pre-grouting will be required to reduce the water inflow into the tunnel / cavern. The pre-grouting will be achieved via a systematic and carefully specified protocol of grouting; • In principle, the grout pre-treatment would be designed on the basis of probe hole drilling ahead of the tunnel / cavern face; • The installation of waterproof lining would also be adopted after the formation of the tunnels and caverns. 							
8.8.3	7.2.2	<p>In the event of excessive infiltration being observed as a result of the tunnelling or excavation works even after incorporation of the water control strategies, post-grouting should be applied as far as practicable as described below:</p> <ul style="list-style-type: none"> • Post-grouting: Groundwater drawdown will be most likely due to inflows of water into the tunnel / cavern that have not been sufficiently controlled by the pre-grouting measures in high permeability area. Where this 	Project site / Construction Phase	Contractor		√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		<p>occurs post grouting will be undertaken before the lining is installed. Whilst unlikely to be required in significant measure, such a contingency should be allowed for reduction in permeability of the tunnel / cavern surround (by grouting) to limit inflow to acceptable levels.</p> <p>The practical groundwater control measures stated above are proven technologies and have been extensively applied in other past projects. These measures or other similar methods, as approved by the Engineer to suit the works condition shall be applied to minimise the groundwater infiltration.</p>							
8.8.3	7.2.2	<p>In case seepage of groundwater occurs, groundwater should be pumped out from works areas and discharged to the storm system via silt trap. Uncontaminated groundwater from dewatering process should also be discharged to the storm system via silt removal facilities.</p>	Project site / Construction Phase	Contractor		√			-

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8.8.3	7.2.2	<p>Mitigation measures recommended in the water quality impact assessment for controlling water quality impact will also serve to protect marine ecological resources from indirect impacts and ensure no unacceptable impact on marine ecological resources.</p> <p>Relevant government departments including EPD, WSD and AFCD as well as key stakeholders for mariculture and fisheries in Tolo Harbour should be informed of the THEES maintenance / emergency discharge event prior to any discharge.</p> <p>It is recommended that the temporary effluent bypass event and the THEES maintenance period should be shortened as far as possible.</p>	Tolo Harbour / Construction Phase	Contractor and Operator		√			-
Construction and Operation Phase									
8.8.3	7.2.2	<p>Overall reduction of glare during both construction and operation phase should be considered. A balance between lighting for safety, and avoiding excessive lighting can be achieved through the use of directional lighting to avoid light spill into sensitive areas, and control/timing of lighting periods of some facilities, particularly at the secondary portal which lies approximately 200 m northwest of Ma On Shan Country Park.</p>	Project site / Construction and Operation Phase	Contractor and Operator		√	√		-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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8.8.3	7.2.2	During the decommissioning and demolition of the existing STSTW, the direction and lighting periods should be controlled during ardeid breeding season (March to August) to minimise the potential indirect impact on Penfold Park Egrettry and the ardeids flying over the existing STSTW.	Existing STSTW / Decommissioning / March to August	Contractor				√	-
8.10	7.3	It is anticipated that the construction of rock caverns would not have adverse impacts on groundwater in Nui Po Shan. Nonetheless, surface water level or groundwater level near the caverns will be closely monitored during the construction and operation stage.	Project site / Construction and Operation Phase	Contractor and Operator		√	√		-
Compensatory Planting									
8.8.4& 8.10.1	7.2.3	Compensatory planting would be provided at main and secondary portal areas, and along the access road.	Main portal, secondary portal, and along access road	Project Proponent	√	√			DEVB TC(W) No. 7/2015
8.8.4 & 8.10.1	7.2.3	To facilitate successful planting, a detailed Woodland Compensation Plan should be prepared by local ecologists with at least 10 years relevant experience to form the basis of the proposed compensatory planting. The Woodland Compensation Plan should include implementation details, management requirement, as well as monitoring requirements (e.g. frequency and parameters) of the	Compensatory planting area (Main portal, secondary portal, and along access road) / pre-construction	Project Proponent	√	√			

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		compensatory planting area. Approval of the Plan should be obtained from EPD at least three months before the prior to commencement of compensatory woodland planting.							
8.8.4 & 8.10.1	7.2.3	Upon the completion of planting, monitoring of the woodland compensation areas should be implemented, with maintenance works (e.g. irrigation, weeding, pruning, control of pests and diseases, replacement planting, repair of damage, etc.) conducted as necessary.	Compensatory planting area (Main portal, secondary portal, and along access road) / Operation	Project Proponent / CSTW Operator			√		
Fisheries Impact									
9.6	8.2	Potential impacts on fisheries resources and fishing operations arising from the Project have been avoided and minimised by construction of a connection pipes to the existing emergency outfall of STSTW by trenchless method underneath Shing Mun River with the least water quality impact. In addition, the temporary effluent bypass event for THEES connection work would be synchronized within regular THEES maintenance. Therefore, additional water quality impact and fisheries impact from changes of water quality have been avoided. Furthermore, the THEES maintenance discharge would avoid the blooming season of algae (i.e. January to May) to minimise the potential water quality impacts. It is	Tolo Harbour /Construction and Operation Phase	Project Proponent / Contractor	√	√			-

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
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		recommended that any THEES maintenance period should be shortened as far as possible.							
9.6	8.2	Mitigation measures recommended in the water quality impact assessment for controlling water quality impact will also serve to protect fisheries from indirect impacts and ensure no unacceptable impact on fisheries resources and operations. For more detailed mitigation measures regarding water quality refer to Sections 5.7.2 and 5.13.2 of the EIA Report.	Construction and Operation Phase	Contractor and Operator		√	√		-
9.6	8.2	Relevant government departments including EPD, WSD and AFCD as well as key stakeholders for mariculture and fisheries in Tolo Harbour should be informed prior to the THEES maintenance / emergency discharge events.	Tolo Harbour / Construction and Operation Phase	Project Proponent		√	√		
Landscapes and Visual Impact									
Table 10.10	-	CM1 - Preservation of Existing Vegetation	Construction Sites/ Construction Phase	Project Proponent	√	√		√	DEVB TCW No. 7/2015 and latest Guidelines on Tree Preservation during Development issued by GLTM Section of DEVB
Table 10.10	-	CM2 - Transplanting of Affected Trees	Construction Sites/ Construction Phase	Project Proponent	√	√		√	DEVB TCW No. 7/2015 and the latest Guidelines on Tree Transplanting issued by GLTM Section of DEVB

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Table 10.10	-	CM3 - Compensatory Tree Planting	Construction Sites/ Construction Phase	Project Proponent	√	√		√	DEVB TCW No. 7/2015
Table 10.10	-	CM4 - Control of Night-time Lighting Glare	Construction Sites/ Construction Phase	Project Proponent	√	√		√	
Table 10.10	-	CM5 - Erection of Decorative Screen Hoarding	Construction Sites/ Construction Phase	Project Proponent	√	√		√	
Table 10.10	-	CM6 - Management of Construction Activities and Facilities	Construction Sites/ Construction Phase	Project Proponent	√	√		√	
Table 10.10	-	CM7 - Reinstatement of Temporarily Disturbed Landscape Areas	Construction Sites/ Construction Phase	Project Proponent	√	√		√	
Table 10.11	-	OM1 - Tree and Shrub Planting at the Temporary Project Magazine Site after Completion of Engineering Works	Temporary Project Magazine Site / Operation Phase	Project Proponent	√	√	√		
Table 10.11	-	OM2 - Aesthetically pleasing design of Aboveground Structures	Tunnel Portals, Administration Building, Ventilation Buildings, Electrical Substations and Ventilation Shaft / Operation Phase	Project Proponent	√	√	√		

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Table 10.11	-	OM3 - Aesthetically pleasing design of Highways Structures	Access Road to Ventilation Shaft / Operation Phase	Highways Department	√	√	√		
Table 10.11	-	OM4 - Reprovision of Cycle Track	Cycle track / Operation Phase	Highways Department	√	√	√		
Table 10.11	-	OM5 - Provision of Green Roof	Administration Building and Ventilation Buildings / Operation Phase	Project Proponent	√	√	√		
Table 10.11	-	OM6 - Provision of Buffer Planting	Main and Secondary Portal Areas / Operation Phase	Project Proponent	√	√	√		
Table 10.11	-	OM7 - Hydroseeding on the disturbed ground surface after demolition works prior to future redevelopment of the existing STSTW	Existing STSTW / Operation Phase	Lands Department (LandsD) or future development agent in existing STSTW	√	√	√		
Table 10.11	-	OM8 - Woodland Mix Planting on Soil Slopes	Soil Slopes / Operation Phase	Project Proponent	√	√	√		

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Cultural Heritage Impact									
11.5.1.1	10.1.1	No potential direct or indirect impact to cultural heritage resource is anticipated, and therefore no mitigation measures are required.	N/A	N/A					EIAO EIAO-TM Antiquities and Monuments Ordinance Guidelines for Cultural Heritage Impact Assessment
Wastes Management Implications									
12.6.2	11.2.2	<p>Appropriate waste handling, transportation and disposal methods for all waste arising generated during the construction works for the Project should be implemented to ensure that construction wastes do not enter the nearby streams or drainage channel.</p> <p>It is anticipated that adverse impacts would not arise on the construction site, provided that good site practices are strictly followed. Recommendations for good site practices during the construction activities include:</p> <ul style="list-style-type: none"> Nomination of approved personnel, such as a site manager, to be responsible for good site practices, and making arrangements for collection of all wastes generated at the site and effective disposal to an appropriate facility. 	Project Site Area / Construction Phase	Contractor		√		√	Waste Disposal Ordinance

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		<ul style="list-style-type: none"> • Training of site personnel in proper waste management and chemical waste handling procedures. • Provision of sufficient waste reception/ disposal points, of a suitable vermin-proof design that minimises windblown litter. • Arrangement for regular collection of waste for transport off-site and final 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 recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be proposed. • A Waste Management Plan should be prepared and should be submitted to the Engineer for approval. One may make reference to ETWB TCW No. 19/2005 for details. <p>In order to monitor the disposal of C&D material at landfills and public filling areas, as appropriate, and to control fly tipping, a trip-ticket system should be included as one of the contractual</p>							

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		requirements to be implemented by an Environmental Team undertaking the Environmental Monitoring and Audit work. One may make reference to DEVB TCW No.6/2010 for details.							
12.6.3	11.2.3	<p>Good management and control of construction site activities / processes can minimise the generation of waste. Waste reduction is best achieved at the planning and design stage, as well as by ensuring the implementation of good site practices. Recommendations to achieve waste reduction include:</p> <ul style="list-style-type: none"> • Segregate and store different types of construction related waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal. • Provide separate labelled bins to segregate recyclable waste such as aluminium cans from other general refuse generated by the work force, and to encourage collection by individual collectors. • Any unused chemicals or those with remaining functional capacity shall be recycled. • Maximising the use of reusable steel formwork to reduce the amount of C&D material. • Prior to disposal of C&D waste, it is recommended that wood, steel 	Project Site Area / Construction Phase	Contractor		√		√	Waste Disposal Ordinance

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		<p>and other metals shall be separated for re-use and / or recycling to minimise the quantity of waste to be disposed of to landfill.</p> <ul style="list-style-type: none"> On-site crushing and sorting facilities are being considered to reduce the rock size to fulfill the size requirements from relevant waste collection / transfer / disposal facilities; Adopt proper storage and site practices to minimise the potential for damage to, or contamination of, construction materials. Plan the delivery and stock of construction materials carefully to minimise the amount of surplus waste generated. Adopt pre-cast construction method instead of cast-in-situ method for construction of concrete structures as much as possible; and Minimise over ordering of concrete, mortars and cement grout by doing careful check before ordering. <p>In addition to the above measures, other specific mitigation measures are recommended below to minimise environmental impacts during handling, transportation and disposal of wastes.</p>							

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12.6.4	11.2.4	<p>Storage of materials on site may induce adverse environmental impacts if not properly managed, recommendations to minimise the impacts include:</p> <ul style="list-style-type: none"> Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution; Maintain and clean storage areas routinely; Stockpiling area should be provided with covers as much as practicable and water spraying system to prevent materials from wind-blown or being washed away; and Different locations should be designated to stockpile each material to enhance reuse. 	Project Site Area / Construction Phase	Contractor		√		√	-
12.6.4	11.2.4	<p>Licensed waste haulers should be employed for the collection and transportation of waste generated. The following measures should be enforced to minimise the potential adverse impacts:</p> <ul style="list-style-type: none"> Remove waste in timely manner; Waste collectors should only collect wastes prescribed by their permits; Impacts during transportation, such as dust and odour, should be 	Project Site Area / Construction Phase	Contractor		√		√	<p>Waste Disposal Ordinance</p> <p>Waste Disposal (Charges for Disposal of Construction Waste) Regulation</p> <p>Land (Miscellaneous Provisions) Ordinance</p>

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		mitigated by the use of covered trucks or in enclosed containers; <ul style="list-style-type: none"> Obtain relevant waste disposal permits from the appropriate authorities, in accordance with the Waste Disposal Ordinance (Cap. 354), Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 345) and the Land (Miscellaneous Provisions) Ordinance (Cap. 28); Waste should be disposed of at licensed waste disposal facilities; and Maintain records of quantities of waste generated, recycled and disposed. 							
12.6.4	11.2.4	Land transport will be used for transportation of excavated and stockpile materials. It is expected there will be 1260 vehicles per day for transporting waste during peak construction phase. The tentative transportation routings for the disposal of various types of wastes are shown in Table 12.4. The transportation routing may be changed subject to the traffic conditions. Nevertheless, it is anticipated that there is no adverse impact from the waste during transportation with the implementation of appropriated measures (e.g. using water-tight containers and covered trucks).	Transportation Route of Waste / Construction Phase	Contractor		√			-

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					Des	C	O	Dec	
12.6.4	11.2.4	In order to monitor the disposal of C&D materials at PFRFs and landfills and to control fly-tipping, a trip-ticket system should be established in accordance with DEVB TCW No. 6/2010. A recording system for the amount of waste generated, recycled and disposed, including the disposal sites, should also be set up. Warning signs should be put up to remind the designated disposal sites. Close-circuited television should be installed at the vehicular entrance and exit of the site as additional measures to prevent fly-tipping.	Project Site Area / Construction Phase	Contractor		√		√	DEVB TCW No. 6/2010
12.6.4	11.2.5	In addition to the above general measures, other specific mitigation measures on handling the C&D materials and materials generated from site formation and demolition work are recommended below, which should form the basis of the WMP to be prepared by the contractor(s) in construction phase.	Project Site Area / Construction Phase	Contractor		√		√	Technical Circular (Works) No. 19/2005 Environmental Management on Construction Site
12.6.5	11.2.5	In order to minimise the impact resulting from collection and transportation of C&D materials for off-site disposal, the excavated material arising from site formation and foundation works should be reused on-site as backfilling material and for landscaping works as far as practicable. Other mitigation requirements are listed below:	Project Site Area / Construction Phase	Contractor		√		√	Waste Disposal Ordinance ETWB TCW No.19/2005 DEVB TCW No. 6/2010

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		<ul style="list-style-type: none"> A WMP, which becomes part of the EMP, should be prepared in accordance with ETWB TCW No.19/2005; A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be adopted for easy tracking; and In order to monitor the disposal of C&D materials at public filling facilities and landfills and to control fly-tipping, a trip-ticket system should be adopted (refer to DEVB TCW No. 6/2010). <p>It is recommended that specific areas should be provided by the Contractors for sorting and to provide temporary storage areas (if required) for the sorted materials.</p>							
12.6.5	11.2.5	The Contactor should prepare and implement an EMP in accordance with ETWB TCW No.19/2005, which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from construction activities. Such a management plan should incorporate site specific factors, such as the designation of areas for segregation and temporary storage of reusable and recyclable materials. The EMP should	Project Site Area / Construction Phase	Contractor		√			ETWB TCW No.19/2005

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		be submitted to the Engineer for approval. The Contractor should implement waste management practices in the EMP throughout the construction stage of the Project. The EMP should be reviewed regularly and updated by the Contractor, preferably on a monthly basis.							
12.6.5	11.2.5	All surplus C&D materials arising from or in connection with construction works should become the property of the Contractor when it is removed unless otherwise stated. The Contractor would be responsible for devising a system to work for on-site sorting of C&D materials and promptly removing all sorted and process materials arising from the construction activities to minimise temporary stockpiling on-site. The system should be included in the EMP identifying the source of generation, estimated quantity, arrangement for on-site sorting, collection, temporary storage areas and frequency of collection by recycling Contractors or frequency of removal off-site.	Project Site Area / Construction Phase	Contractor		√		√	-
12.6.6	11.2.6	The practices of good housekeeping for CSTW listed below should be followed to ameliorate any odour impact from handling, collection, transportation and disposal of sludge:	Operation Phases	Operator			√		Waste Disposal Ordinance

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		<ul style="list-style-type: none"> • Screens should be cleaned regularly to remove any accumulated organic debris • Grit and screening transfer systems should be flushed regularly with water to remove organic debris and grit • Grit and screened materials should be transferred to closed containers • Scum and grease collection wells and troughs should be emptied and flushed regularly to prevent putrefaction of accumulated organics • Skim and remove floating solids and grease from primary clarifiers regularly • Frequent sludge withdrawal from tanks is necessary to prevent the production of gases • Sludge should be transported to the STF by water-tight containers to avoid Hydrogen Sulphide (H₂S)/odour emission and ingress of water into the containers which would lower the sludge dryness during transportation • Sludge cake should be transferred to closed containers • Sludge containers should be flushed with water regularly 							

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		<ul style="list-style-type: none"> Sludge trucks and containers should be washed thoroughly before leaving the CSTW to avoid any odour nuisance during transportation 							
12.6.6	11.2.6	In addition, all wastewater generated from the sludge dewatering process and all contaminated water from the cleaning operations recommended for odour control will be diverted to the relocated STSTW for proper treatment.	Operation Phases	Operator			√		Waste Disposal Ordinance
12.6.7	11.2.7	If chemical wastes are produced at the construction site or during operation, the Contractor during construction or the operator during operation will be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Good quality containers compatible with the chemical wastes should be used, and incompatible chemicals should be stored separately. Appropriate labels should be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidising, irritant, toxic, harmful, corrosive, etc. The Contractor shall use a licensed collector to transport and dispose of the chemical wastes, to the licensed Chemical Waste Treatment Centre, or other	Construction and Operation Phases	Contractor / Operator		√	√		Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes

EIA Ref.	EM&A Log Ref.	Environmental Protection Measures	Location / Duration of Measures / Timing of Completion of Measures	Implementation Agent	Implementation Stage ¹				Relevant Legislation & Guidelines
					Des	C	O	Dec	
		licensed facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.							
12.6.8	11.2.8	Recycling of waste paper, aluminium cans and plastic bottles should be encouraged, it is recommended to place clearly labelled recycling bins at designated locations which could be accessed conveniently. Other general refuse should be separated from chemical and industrial waste by providing separated bins for storage to maximise the recyclable volume.	Construction and Operation Phases	Contractor / Operator		√	√		Public Health and Municipal Services Ordinance (Cap.132)
12.6.8	11.2.8	A reputable licensed waste collector should be employed to remove general refuse on a daily basis to minimise odour, pest and litter impacts.	Construction and Operation Phases	Contractor / Operator		√	√		Public Health and Municipal Services Ordinance (Cap. 132)
Health Impact									
-	-	Not applicable.							



Appendix 3.1

Action and Limit Level

Action and Limit Level

Action and Limit Level for Noise Monitoring

Monitoring Station	Action Level	Limit Level (dB(A))		
		0700-1900 hrs on normal weekdays	0700-2300 hrs on holidays (including Sundays); and 1900-2300 hrs on all days ²	2300-0700 hrs of all days ²
CM1	When one documented complaint is received	65 / 70 ¹	60 / 65 / 70 ³	45 / 50 / 55 ³
CM2(A)		65 / 70 ¹		
CM3		65 / 70 ¹		
CM4		75		
CM5		75		

Remark 1: Limit level of CM1, CM2(A) and CM3 reduce to 65 dB (A) during examination periods if any.

Remark 2: Construction noise during restricted hours is under the control of Noise Control Ordinance Limit Level to be selected based on Area Sensitivity Rating.

Remark 3: Limit Level for restricted hour monitoring shall act as reference level only. Investigation would be conducted on CNP compliance if exceedance recorded during restricted hour noise monitoring period.

Action and Limit Level for Air Quality Monitoring

Monitoring Locations	1-hour TSP Level in µg/m ³	
	Action Level	Limit Level
AM1	294	500
AM2	325	500
AM3(A)	360	500
AM4	297	500
AM5	349	500



Appendix 4.1

Air Quality Monitoring Results and Graphical Presentations

Report on 1-hour TSP monitoring at AM1 - Ah Kung Kok Fishermen Village

Action Level ($\mu\text{g}/\text{m}^3$) - 294
 Limit Level ($\mu\text{g}/\text{m}^3$) - 500

Date	Weather Condition	Time	Mass Concentration ($\mu\text{g}/\text{m}^3$)
2-Sep-19	Fine	13:00	20
2-Sep-19	Fine	14:01	26
2-Sep-19	Fine	15:02	22
6-Sep-19	Fine	08:23	13
6-Sep-19	Fine	09:24	30
6-Sep-19	Fine	10:25	19
12-Sep-19	Fine	08:31	17
12-Sep-19	Fine	09:32	17
12-Sep-19	Fine	10:33	20
18-Sep-19	Fine	13:00	99
18-Sep-19	Fine	14:01	99
18-Sep-19	Fine	15:02	91
24-Sep-19	Fine	08:30	27
24-Sep-19	Fine	09:31	24
24-Sep-19	Fine	10:32	21
30-Sep-19	Fine	09:30	102
30-Sep-19	Fine	10:31	66
30-Sep-19	Fine	13:00	56
5-Oct-19	Fine	08:25	122
5-Oct-19	Fine	09:26	149
5-Oct-19	Fine	10:27	81
11-Oct-19	Fine	08:34	183
11-Oct-19	Fine	09:35	132
11-Oct-19	Fine	10:36	137
15-Oct-19	Fine	13:00	21
15-Oct-19	Fine	14:01	16
15-Oct-19	Fine	15:02	19
18-Oct-19	Fine	08:31	95
18-Oct-19	Fine	09:32	101
18-Oct-19	Fine	10:33	98
24-Oct-19	Fine	08:30	135
24-Oct-19	Fine	09:31	129
24-Oct-19	Fine	10:32	135
30-Oct-19	Fine	08:37	42
30-Oct-19	Fine	09:38	38
30-Oct-19	Fine	10:39	43
5-Nov-19	Fine	13:00	61
5-Nov-19	Fine	14:01	62
5-Nov-19	Fine	15:02	59
11-Nov-19	Fine	13:00	37
11-Nov-19	Fine	14:01	37
11-Nov-19	Fine	15:02	33
16-Nov-19	Fine	08:06	53
16-Nov-19	Fine	09:07	48
16-Nov-19	Fine	10:08	44
22-Nov-19	Fine	08:36	48
22-Nov-19	Fine	09:37	42
22-Nov-19	Fine	10:38	36
28-Nov-19	Fine	08:49	20
28-Nov-19	Fine	09:50	20
28-Nov-19	Fine	10:51	20

Report on 1-hour TSP monitoring at AM2 - Block H, Kam Tai Court

Action Level ($\mu\text{g}/\text{m}^3$) - 325
 Limit Level ($\mu\text{g}/\text{m}^3$) - 500

Date	Weather Condition	Time	Mass Concentration ($\mu\text{g}/\text{m}^3$)
2-Sep-19	Fine	13:00	17
2-Sep-19	Fine	14:01	19
2-Sep-19	Fine	15:02	18
6-Sep-19	Fine	08:48	12
6-Sep-19	Fine	09:49	12
6-Sep-19	Fine	10:50	18
12-Sep-19	Fine	08:52	34
12-Sep-19	Fine	09:53	16
12-Sep-19	Fine	10:54	26
18-Sep-19	Fine	13:00	40
18-Sep-19	Fine	14:01	40
18-Sep-19	Fine	15:02	44
24-Sep-19	Fine	08:58	37
24-Sep-19	Fine	09:59	35
24-Sep-19	Fine	11:00	31
30-Sep-19	Fine	08:58	137
30-Sep-19	Fine	09:59	134
30-Sep-19	Fine	11:00	127
5-Oct-19	Fine	08:48	29
5-Oct-19	Fine	09:49	20
5-Oct-19	Fine	10:50	16
11-Oct-19	Fine	08:57	40
11-Oct-19	Fine	09:58	45
11-Oct-19	Fine	10:59	47
15-Oct-19	Fine	08:25	27
15-Oct-19	Fine	09:26	37
15-Oct-19	Fine	10:27	26
18-Oct-19	Fine	08:58	36
18-Oct-19	Fine	09:59	38
18-Oct-19	Fine	11:00	36
24-Oct-19	Fine	08:57	44
24-Oct-19	Fine	09:58	41
24-Oct-19	Fine	10:59	37
30-Oct-19	Fine	09:24	82
30-Oct-19	Fine	10:25	87
30-Oct-19	Fine	13:00	84
5-Nov-19	Fine	13:00	66
5-Nov-19	Fine	14:01	60
5-Nov-19	Fine	15:02	64
11-Nov-19	Fine	13:00	65
11-Nov-19	Fine	14:01	60
11-Nov-19	Fine	15:02	61
16-Nov-19	Fine	08:58	60
16-Nov-19	Fine	09:59	49
16-Nov-19	Fine	11:00	49
22-Nov-19	Fine	09:25	33
22-Nov-19	Fine	10:26	28
22-Nov-19	Fine	13:00	19
28-Nov-19	Fine	09:08	22
28-Nov-19	Fine	10:09	29
28-Nov-19	Fine	13:00	47



Report on 1-hour TSP monitoring at AM4 - Wellborn Kindergarten

Action Level ($\mu\text{g}/\text{m}^3$) - 297
Limit Level ($\mu\text{g}/\text{m}^3$) - 500

Date	Weather Condition	Time	Mass Concentration ($\mu\text{g}/\text{m}^3$)
2-Sep-19	Fine	13:00	10
2-Sep-19	Fine	14:01	13
2-Sep-19	Fine	15:02	10
6-Sep-19	Fine	08:20	8
6-Sep-19	Fine	09:21	18
6-Sep-19	Fine	10:22	12
12-Sep-19	Fine	08:41	28
12-Sep-19	Fine	09:42	26
12-Sep-19	Fine	10:43	25
18-Sep-19	Fine	13:00	30
18-Sep-19	Fine	14:01	32
18-Sep-19	Fine	15:03	33
24-Sep-19	Fine	08:23	91
24-Sep-19	Fine	09:24	97
24-Sep-19	Fine	10:25	86
30-Sep-19	Fine	09:59	84
30-Sep-19	Fine	11:00	61
30-Sep-19	Fine	13:00	51
5-Oct-19	Fine	08:20	59
5-Oct-19	Fine	09:42	63
5-Oct-19	Fine	10:43	56
11-Oct-19	Fine	08:25	115
11-Oct-19	Fine	09:26	110
11-Oct-19	Fine	10:27	106
15-Oct-19	Fine	08:23	74
15-Oct-19	Fine	09:24	95
15-Oct-19	Fine	10:25	60
18-Oct-19	Fine	13:00	101
18-Oct-19	Fine	14:01	98
18-Oct-19	Fine	15:02	133
24-Oct-19	Fine	08:18	51
24-Oct-19	Fine	09:19	49
24-Oct-19	Fine	10:20	51
30-Oct-19	Fine	08:41	103
30-Oct-19	Fine	09:42	103
30-Oct-19	Fine	10:43	110
5-Nov-19	Fine	13:00	32
5-Nov-19	Fine	14:01	34
5-Nov-19	Fine	15:02	34
11-Nov-19	Fine	13:00	24
11-Nov-19	Fine	14:01	26
11-Nov-19	Fine	15:01	25
16-Nov-19	Fine	08:19	62
16-Nov-19	Fine	09:20	58
16-Nov-19	Fine	10:21	51
22-Nov-19	Fine	08:25	40
22-Nov-19	Fine	09:26	33
22-Nov-19	Fine	10:27	31
28-Nov-19	Fine	08:54	18
28-Nov-19	Fine	09:55	20
28-Nov-19	Fine	10:56	18

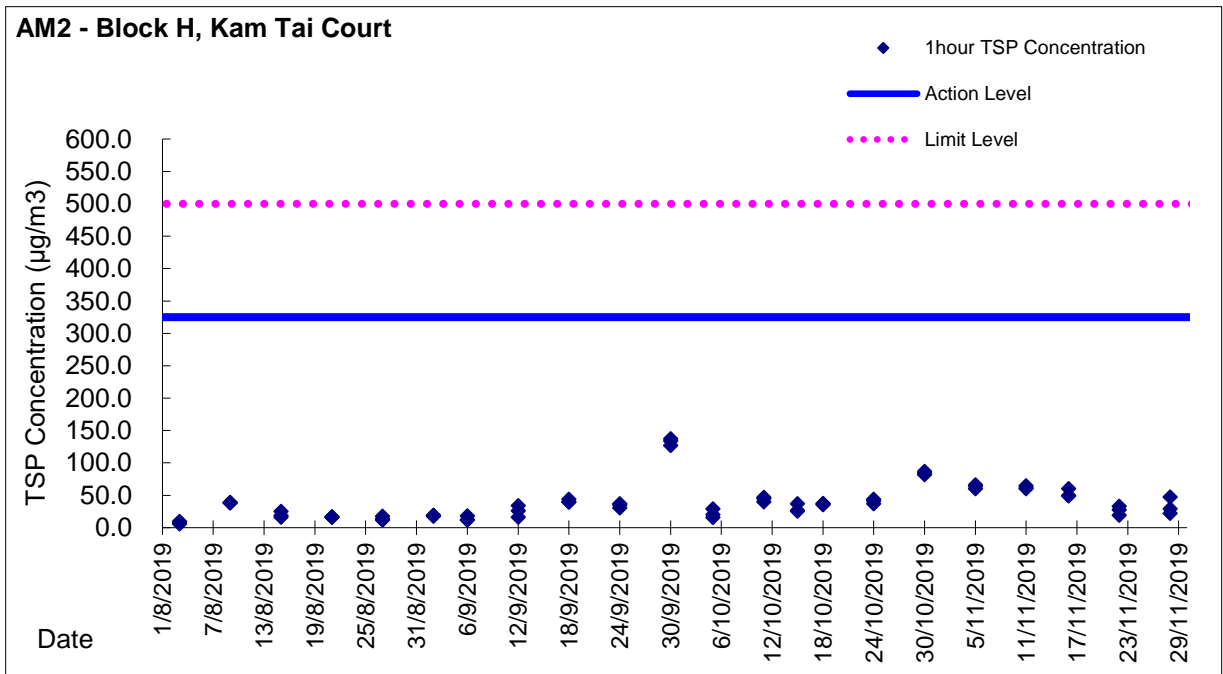
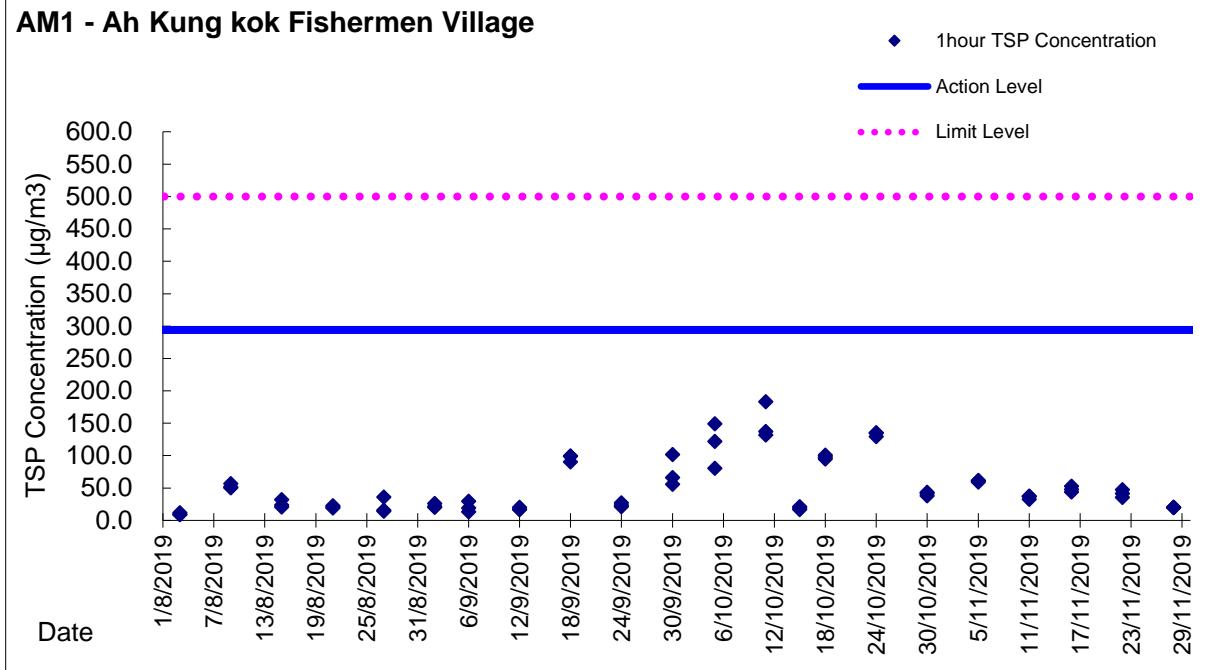
Report on 1-hour TSP monitoring at AM5 - The NAAC Harmony Manor

Action Level ($\mu\text{g}/\text{m}^3$) - 349
 Limit Level ($\mu\text{g}/\text{m}^3$) - 500

Date	Weather Condition	Time	Mass Concentration ($\mu\text{g}/\text{m}^3$)
2-Sep-19	Fine	13:00	18
2-Sep-19	Fine	14:01	19
2-Sep-19	Fine	15:02	19
6-Sep-19	Fine	13:09	27
6-Sep-19	Fine	14:10	27
6-Sep-19	Fine	15:11	27
12-Sep-19	Fine	08:40	25
12-Sep-19	Fine	09:41	16
12-Sep-19	Fine	10:42	14
18-Sep-19	Fine	13:00	86
18-Sep-19	Fine	14:01	77
18-Sep-19	Fine	15:02	82
24-Sep-19	Fine	08:16	52
24-Sep-19	Fine	09:17	50
24-Sep-19	Fine	10:18	52
30-Sep-19	Fine	09:54	56
30-Sep-19	Fine	10:55	53
30-Sep-19	Fine	13:00	53
5-Oct-19	Fine	8:15	37
5-Oct-19	Fine	9:16	22
5-Oct-19	Fine	10:17	20
11-Oct-19	Fine	8:17	66
11-Oct-19	Fine	9:18	67
11-Oct-19	Fine	10:19	66
15-Oct-19	Fine	8:30	73
15-Oct-19	Fine	9:31	74
15-Oct-19	Fine	10:32	71
18-Oct-19	Fine	8:21	92
18-Oct-19	Fine	9:22	90
18-Oct-19	Fine	10:23	93
24-Oct-19	Fine	8:23	56
24-Oct-19	Fine	9:24	69
24-Oct-19	Fine	10:25	70
30-Oct-19	Fine	13:40	64
30-Oct-19	Fine	14:41	60
30-Oct-19	Fine	15:42	63
5-Nov-19	Fine	13:00	43
5-Nov-19	Fine	14:01	47
5-Nov-19	Fine	15:02	49
11-Nov-19	Fine	13:00	35
11-Nov-19	Fine	14:01	34
11-Nov-19	Fine	15:02	35
16-Nov-19	Fine	8:00	69
16-Nov-19	Fine	9:01	68
16-Nov-19	Fine	10:02	42
22-Nov-19	Fine	8:34	26
22-Nov-19	Fine	9:35	23
22-Nov-19	Fine	10:36	20
28-Nov-19	Fine	9:30	11
28-Nov-19	Fine	10:31	13
28-Nov-19	Fine	13:00	12

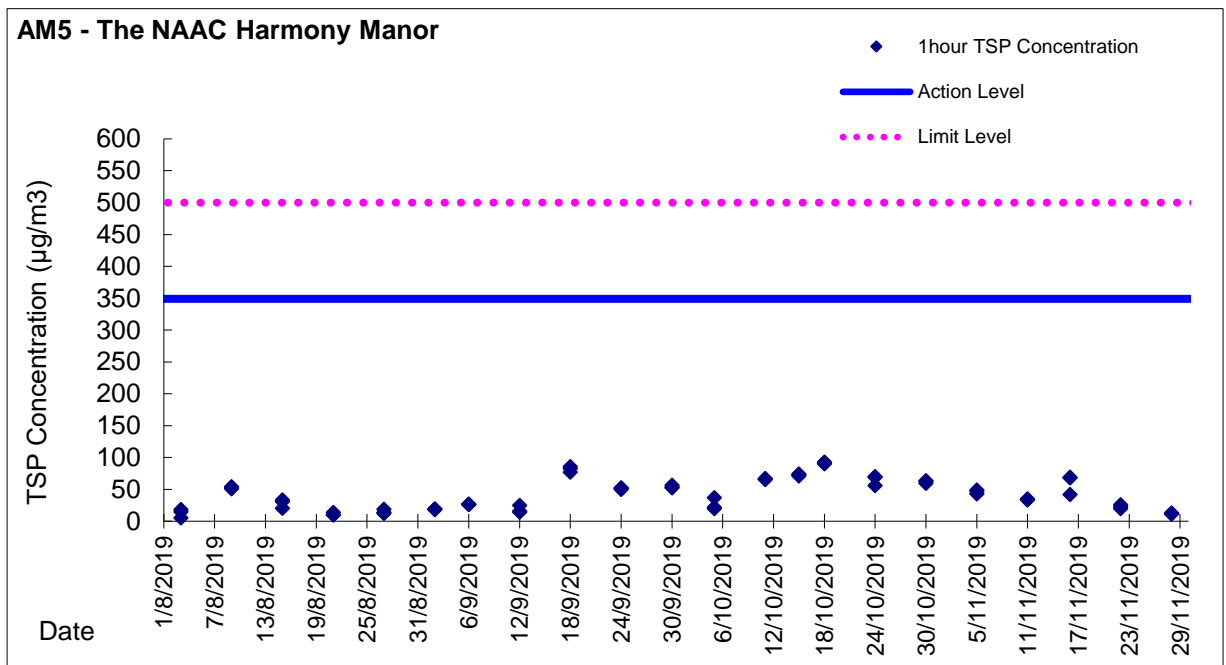
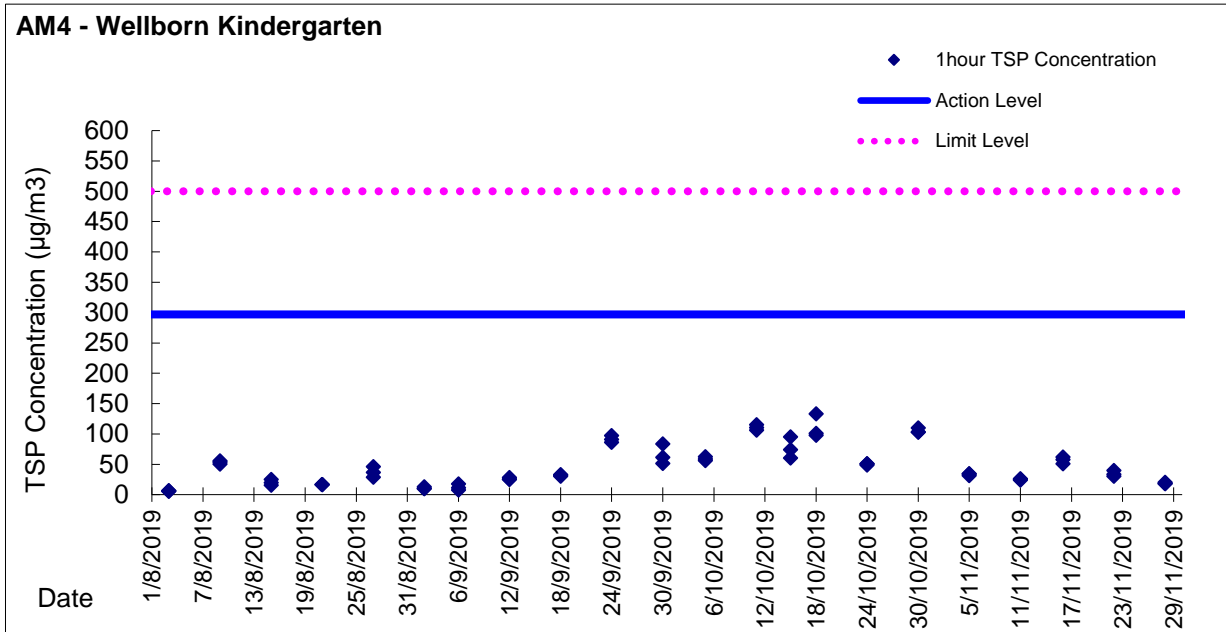


Graphic Presentation of TSP Result





Graphic Presentation of TSP Result





Appendix 4.2

Noise Monitoring Results and Graphical Presentations



Noise Monitoring Result

Day Time (0700 - 1900hrs on normal weekdays)

Location: CM1 - G/F, Wellborn Kindergarten

Date	Time	Weather	Wind Speed (m/s)	Measurement Noise Level			Limit Level
				Leq	L10	L90	Leq
Unit: dB(A), (30min)							
03/09/2019	15:18	Fine	0.0	62.3	66.1	57.7	70
12/09/2019	10:15	Fine	0.0	54.8	57.5	49.0	70
19/09/2019	14:50	Fine	0.2	65.4	69.5	51.0	70
24/09/2019	10:00	Fine	0.0	54.1	56.5	47.0	70
03/10/2019	10:25	Fine	0.1	61.5	64.5	55.0	70
11/10/2019	08:15	Fine	0.0	51.0	53.0	47.0	70
15/10/2019	10:40	Fine	0.0	60.4	62.5	57.0	70
24/10/2019	10:00	Fine	0.0	56.5	57.5	47.0	70
30/10/2019	08:30	Fine	0.2	52.0	53.5	47.0	70
05/11/2019	13:30	Fine	0.2	69.5	71.0	57.0	70
11/11/2019	13:00	Fine	0.0	52.4	54.5	47.0	70
22/11/2019	11:10	Fine	0.0	60.4	62.0	57.5	70
28/11/2019	13:00	Fine	0.0	50.2	55.0	43.5	70

* Limit level of noise monitoring station CM1 was adjusted to 65dB(A) during examination period.

Location: CM3 - R/F, S.K.H. Ma On Shan Holy Spirit Primary School

Date	Time	Weather	Wind Speed (m/s)	Measurement Noise Level			Limit Level
				Leq	L10	L90	Leq
Unit: dB(A), (30min)							
03/09/2019	16:06	Fine	0.4	61.9	63.6	57.6	70
12/09/2019	09:40	Fine	0.0	60.7	62.5	58.0	70
19/09/2019	15:40	Fine	0.0	61.9	63.5	59.0	70
24/09/2019	09:25	Fine	0.5	62.0	64.0	59.0	70
03/10/2019	15:20	Fine	0.0	61.5	63.0	58.5	70
11/10/2019	09:50	Fine	0.0	65.0	66.5	61.5	70
15/10/2019	09:15	Fine	0.0	61.8	63.5	58.5	70
24/10/2019	09:20	Fine	0.0	63.5	65.5	60.0	70
31/10/2019	08:55	Fine	0.0	61.7	63.5	59.0	65
04/11/2019	08:55	Fine	0.0	61.5	63.0	58.5	65
11/11/2019	13:45	Fine	0.1	61.9	64.0	57.5	70
22/11/2019	09:45	Fine	0.2	62.8	65.5	58.5	70
28/11/2019	15:25	Fine	0.3	63.4	64.3	60.0	70

* Limit level of noise monitoring station CM3 was adjusted to 65dB(A) during examination period.

Location: CM4 - G/F, Ah Kung Kok Fishermen Village

Date	Time	Weather	Wind Speed (m/s)	Measurement Noise Level			Limit Level
				Leq	L10	L90	Leq
Unit: dB(A), (30min)							
03/09/2019	16:41	Fine	0.0	59.8	61.3	56.5	75
12/09/2019	10:50	Fine	0.0	60.8	62.0	58.5	75
19/09/2019	13:44	Fine	0.0	63.2	64.5	61.0	75
24/09/2019	10:35	Fine	0.0	60.4	62.1	57.8	75
03/10/2019	09:00	Fine	0.0	63.5	64.0	60.5	75
11/10/2019	10:30	Fine	0.0	62.4	63.5	59.0	75
15/10/2019	11:20	Fine	0.0	63.1	66.5	61.5	75
24/10/2019	09:00	Fine	0.5	62.4	64.1	59.9	75
30/10/2019	10:50	Fine	0.5	64.7	67.5	61.5	75
05/11/2019	16:10	Fine	0.0	65.8	69.5	57.5	75
11/11/2019	15:15	Fine	0.0	63.8	66.5	56.0	75
22/11/2019	08:45	Fine	0.0	64.7	67.5	60.5	75
28/11/2019	14:10	Fine	0.0	61.3	63.0	58.2	75

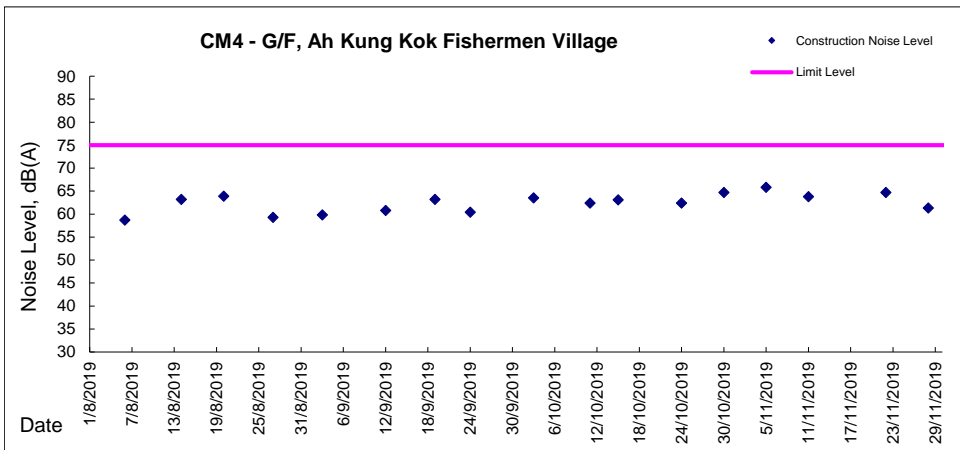
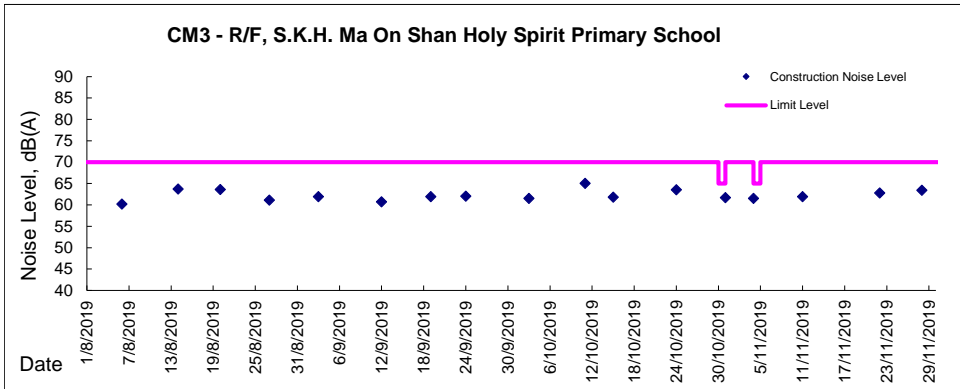
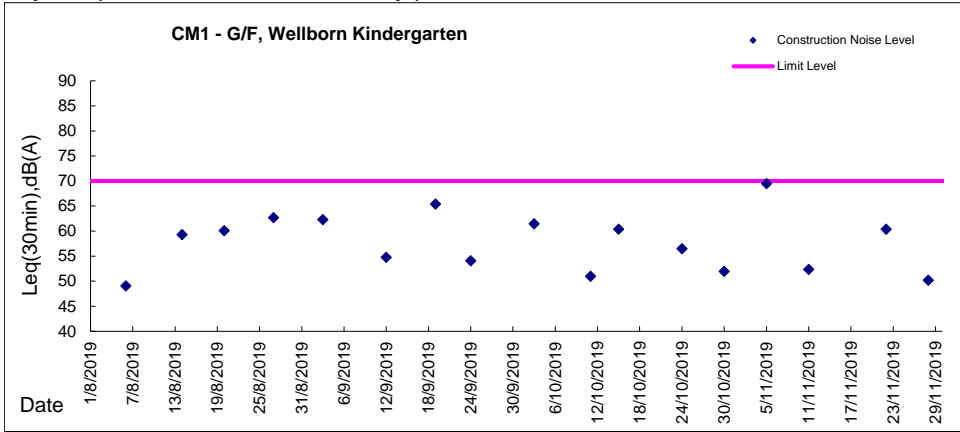
Location: CM5 - R/F, The Neighbourhood Advice-Action Council Harmony Manor

Date	Time	Weather	Wind Speed (m/s)	Measurement Noise Level			Limit Level
				Leq	L10	L90	Leq
Unit: dB(A), (30min)							
03/09/2019	17:26	Fine	0.3	62.5	66.8	58.2	75
12/09/2019	11:30	Fine	0.0	54.4	56.5	52.5	75
19/09/2019	13:00	Fine	0.0	58.2	60.5	54.5	75
24/09/2019	11:15	Fine	0.0	61.8	63.5	57.5	75
03/10/2019	09:45	Fine	0.2	63.9	65.5	58.0	75
11/10/2019	14:35	Fine	0.0	63.4	65.5	58.5	75
15/10/2019	13:00	Fine	0.3	62.7	65.0	58.5	75
24/10/2019	10:40	Fine	0.0	63.9	66.0	54.5	75
30/10/2019	14:50	Fine	0.0	55.2	57.0	51.5	75
05/11/2019	15:30	Fine	0.3	59.6	62.0	56.0	75
11/11/2019	14:30	Fine	0.2	56.3	59.5	50.0	75
22/11/2019	14:30	Fine	0.1	61.4	64.0	55.5	75
28/11/2019	14:50	Fine	0.0	68.6	72.5	53.6	75

* Free field correction (Additional 3dB(A)) was made on CM1&CM4 measurement result

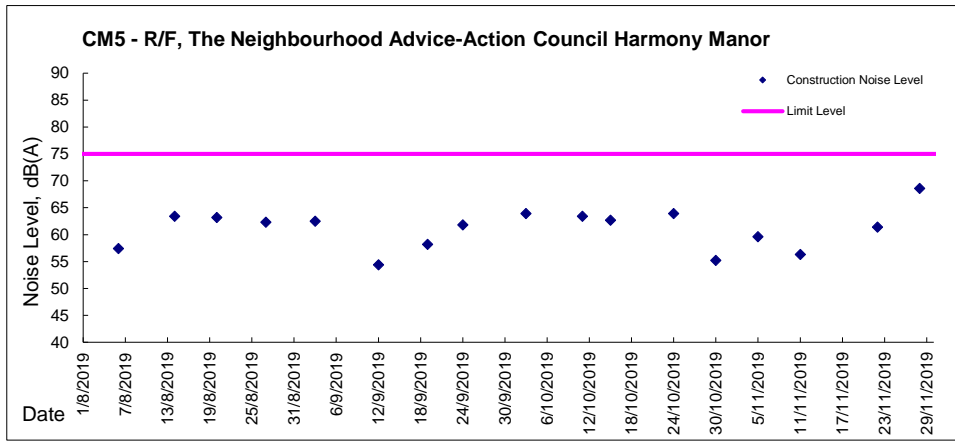


Graphic Presentation of Noise Monitoring Result
Day Time (0700 - 1900hrs on normal weekdays)





Graphic Presentation of Noise Monitoring Result
Day Time (0700 - 1900hrs on normal weekdays)





Appendix 4.3

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: Drainage Services Department

Contract No.: DC/2018/05

Monthly Summary Waste Flow Table for November 2019 [to be submitted not later than the 15th day of each month following reporting month]

(All quantities shall be rounded off to 3 decimal places.)

Month	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of C&D Wastes Generated Monthly				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Broken Concrete (see Note 3)	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed as Public Fill	(f) Metals	(g) Paper/cardboard packaging	(h) Plastics (see Note 2)	(i) Chemical Waste	(j) Others, e.g. general refuse disposed at Landfill
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in L)	(in tonne)
Feb-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.00
Mar-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.00
Apr-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	0.00
May-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0	5.20
Jun-19	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	41.18
Jul-19	0.055	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	89.55
Sub-total	0.055	0.055	0.000	0.000	0.000	0.000	0.000	0.000	0.000	135.93
Aug-19	0.121	0.054	0.000	0.000	0.067	0.000	0.000	0.000	0.000	10.98
Sep-19	0.049	0.000	0.000	0.000	0.049	0.000	0.000	0.000	0.000	60.49
Oct-19	1.014	0.000	0.000	0.000	1.014	0.000	0.000	0.000	0.000	15.87
Nov-19	1.357	0.000	0.000	1.022	0.335	0.000	0.000	0.000	0.000	32.21
Total	2.596	0.109	0.000	1.022	1.465	0.000	0.000	0.000	0.000	255.48

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 - (2) Plastics refer to plastics bottles/containers, plastic sheets/foam from packaging material.
 - (3) Broken concrete for recycling into aggregates.
 - (4) If necessary, use the conversion factor: 1 full load of dumping truck being equivalent to 5 m³ by volume.
 - (5) Conversion factors for reporting purpose:
Excavated: rock = 2.0 tonnes/m³, soil = 1.8 tonnes/m³, broken concrete and bitumen = 2.4 tonnes/m³, Slurry = 2.8 tonnes/m³



Appendix 5.1

Event and Action Plans



Event and Action Plan for Construction Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Action level being exceedance by one sampling	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform Contractor, IEC and ER; 3. Repeat measurement to confirm finding; and 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; and 3. Review and advise the ET and ER on the effectiveness of the proposed remedial measures.	1. Notify Contractor.	1. Identify source(s), investigate the causes of exceedance and propose remedial measures; 2. Implement remedial measures; and 3. Amend working methods agreed with the ER as appropriate
2. Action level being exceeded by two or more consecutive sampling	1. Identify source; 2. Inform Contractor, IEC and ER; 3. Advise the Contractor and 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 Contractor, 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, ER and Contractor on possible remedial measures; 4. Advise the ET and ER on the effectiveness of the proposed remedial measures; and 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 4. 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. Identify source and investigate the causes of exceedance; 2. Submit proposals for remedial measures to the ER with a copy to ET and IEC within three working days of notification; 3. Implement the agreed proposals; and 4. Amend proposal as appropriate.



Event and Action Plan for Construction Air Quality (Con't)

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
LIMIT LEVEL				
1. Limit level exceedance by one sampling	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform Contractor, IEC, ER, and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; and 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. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 4. Supervise implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Identify source(s) and investigate the causes of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to ER with a copy to ET and IEC within three working days of notification; 4. Implement the agreed proposals; and 5. Amend proposal if appropriate.
2. Limit level exceedance by two or more consecutive sampling	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; and 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET; 2. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 3. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 4. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. In consultation with the ET and IEC, agree with the Contractor on the remedial measures to be implemented; 3. Supervise the implementation of remedial measures; and 4. 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. Identify source(s) and investigate the causes of exceedance; 2. Take immediate action to avoid further exceedance; 3. Submit proposals for remedial measures to the ER with a copy to the IEC and ET within three working days of notification; 4. Implement the agreed proposals; 5. Revise and resubmit proposals if problem still not under control; and 6. Stop the relevant portion of works as determined by the ER until the exceedance is abated.



Event and Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	<ol style="list-style-type: none"> 1. Notify IEC 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; and 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; and 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; and 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; and 2. Implement noise mitigation proposals.
Limit Level	<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 Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; and 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 analysed noise problem; 4. Ensure remedial measures properly implemented; and 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 and ER within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposal if problem still not under control; and 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.



Appendix 6.1

Complaint Log



Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From and Received By	Location of Complainant	Nature of Complaint	Outcome	Status
190808	29 July 2019	DSD	Construction site area Portion 6	Exposed slope surface without any covering was observed at Portion 6	<p>A public complaint regarding construction dust received by DSD on 29 July 2019 was subsequently referred to ET on 6 August 2019. The complainant reported that exposed slope surface without any covering at Portion 6. Based on the information provided by the Contractor, the concerned area was under slope cutting and filling works for temporary haul road construction.</p> <p>Based on the observation on 6 August 2019 and weekly site inspection on 7 August 2019, the concerned slope was observed covered with the tarpaulin sheets to alleviate the potential dust impact to the surroundings.</p> <p>Upon review on the monitoring data, no exceedances were recorded at the air quality monitoring stations AM2 - Block H, Kam Tai Court and AM4 - Wellborn Kindergarten (located nearest to the concerned slope) during the 1hr TSP monitoring on 23 July 2019 and 29 July 2019 respectively.</p> <p>Follow up site inspection was conducted by the Environmental Team on 07 August 2019 and it was observed that the slope at Portion 6 was properly covered.</p> <p>Nevertheless, in view of the public concern, the Contractor of DC/2018/05 was reminded to enhance the dust suppression measure by providing adequate watering to any exposed surface during cutting slope and fill works to avoid potential dust impact to the surroundings.</p>	Interim investigation report was issued on 16 August 2019



Appendix 7.1

Construction Programme of Individual Contracts

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Late Start	Late Finish	2019						2020				
								Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
Relocation of Sha Tin Sewage Treatment Works to Caverns - Site Preparation & Access Tunnel																		
Preliminary Works																		
Preliminary Works																		
Preliminary Works																		
A11980	Preservation and Protection of Existing Trees	836	28-Feb-19 A	28-Dec-21	0	28-Dec-21	28-Dec-21											
A12340	Establishment Works to landscape softworks (Section 7)	719	23-Jul-19 A	28-Dec-21	0	23-Jul-19	28-Dec-21											
Access Road to Main Portal Area																		
Tree Treatment																		
Tree Treatment																		
A11032	Tree transplant (Portion 4)	70	09-Sep-19 A	31-Dec-19	115	01-Apr-20	28-May-20											
A15290	Tree felling & protection (Mui Ts z Lam Road realignment)	27	08-Nov-19 A	09-Dec-19	534	02-Sep-21	06-Oct-21											
A15300	Tree transplant (Mui Tsz Lam Road realignment)	96	01-Nov-19 A	29-Feb-20	472	21-Jun-21	06-Oct-21											
Steel Bridge																		
North Tower of Steel Bridge																		
A10290	Footings at North Ramp (5 nos)	57	03-Oct-19 A	30-Nov-19	47	06-Jan-20	04-Feb-20											
A10293	Abutment (North Ramp)	30	08-Nov-19	12-Dec-19	37	21-Dec-19	04-Feb-20											
A10295	Steel Piers & deck fabrication (North Tower & Ramp)	60	21-Oct-19 A	31-Dec-19	3	12-Nov-19	04-Jan-20											
A10300	Steel Piers & deck erection (North Tower)	35	02-Jan-20	18-Feb-20	3	06-Jan-20	21-Feb-20											
A10303	Steel Piers & deck erection (North Ramp)	60	02-Jan-20	18-Mar-20	23	05-Feb-20	18-Apr-20											
South Tower of Steel Bridge																		
A10320	Piling (pre-bored H, 15no)	52	17-Sep-19 A	22-Nov-19	8	18-Nov-19	02-Dec-19											
A10330	Pile test	26	23-Nov-19	23-Dec-19	8	03-Dec-19	04-Jan-20											
A10340	Abutment (South Ramp)	45	24-Dec-19	24-Feb-20	15	14-Jan-20	12-Mar-20											
A10345	Steel Piers & deck fabrication (South Tower & Ramp)	60	21-Oct-19 A	31-Dec-19	3	12-Nov-19	04-Jan-20											
A10350	Steel Piers & deck erection (South Tower)	35	02-Jan-20	18-Feb-20	3	06-Jan-20	21-Feb-20											
Noise Barrier																		
Design																		
A15020	Noise Barrier Design approval (NB1 & NB3)	119	09-Jul-19 A	14-Nov-19	605	06-Jul-21	11-Jul-21											
NB1																		
A10780	Excavation - NB1 (0-75m)	13	04-Oct-19 A	12-Nov-19	469	18-Jun-21	22-Jun-21											
A10790	Footing & wall structure - NB1 (0-75m)	75	09-Oct-19 A	22-Nov-19	475	25-Jun-21	10-Jul-21											
A10795	Backfill - NB1 (0-75m)	15	23-Nov-19	10-Dec-19	574	08-Nov-21	24-Nov-21											
A10800	NB post installation - NB1 (0-75m)	13	11-Dec-19	27-Dec-19	574	25-Nov-21	09-Dec-21											
A10810	NB panel installation - NB1 (0-75m)	13	28-Dec-19	13-Jan-20	574	10-Dec-21	24-Dec-21											
A10830	Excavation - NB1 (75-150m)	15	12-Nov-19	29-Nov-19	469	23-Jun-21	10-Jul-21											
A10840	Footing & wall structure - NB1 (75-150m)	75	29-Nov-19	06-Mar-20	469	12-Jul-21	08-Oct-21											
Water Mains Diversion																		
Preliminary Works																		

- Remaining Level of Effort
- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
- Milestone
- Crit. Milestone

Project ID: MP005 (1911)
 Layout: 3 Month Rolling Programme
 Data Date: 08-Nov-19
 Page 1 of 7
 Primavera Systems, Inc.

Contract No. DC/2018/05
Relocation of Sha Tin Sewage Treatment Works to Caverns -
Site Preparation and Access Tunnel Construction
3 Month Rolling Programme



Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Late Start	Late Finish	2019						2020				
								Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
A13130	TTA submission & approval	37	13-Nov-19*	27-Dec-19	291	09-Nov-20	22-Dec-20											
DN600 Water Main																		
A10550	Jacking pit at CHA80.2(Portion 4)	36	28-Dec-19	15-Feb-20	291	22-Dec-20	05-Feb-21											
DN450 Water Main																		
A10660	ELS (CHB 0 - 37)	15	28-Dec-19	15-Jan-20	313	20-Jan-21	06-Feb-21											
A10670	Excavation (CHB 0 - 37)	21	16-Jan-20	15-Feb-20	313	06-Feb-21	10-Mar-21											
Drainage Works																		
Mui Tsz Lam Road Realignment																		
A10400	TTA submission & approval	37	13-Nov-19*	27-Dec-19	16	02-Dec-19	16-Jan-20											
A10990	Drainage work from SMH1009 (3mh ~6m depth)(TTA)	50	28-Dec-19	03-Mar-20	365	29-Mar-21	01-Jun-21											
A10995	Drainage work from SMH2010 to 2011 (2mh ~6 to 7.5m depth)	90	28-Dec-19	23-Apr-20	16	17-Jan-20	14-May-20											
A13230	Jacking pit in portion 6 for 1350 dia pipe jacking	28	02-Jan-20	10-Feb-20	49	05-Mar-20	08-Apr-20											
A13240	Jacking pit in portion 4 for 1350 dia pipe jacking	28	06-Nov-19 A	31-Dec-19	49	07-Jan-20	05-Mar-20											
Road Works																		
PMI-010: Additional RW along Cycle Track and Footpath in Portion 1																		
A16860	Footing & wall structure - Cycle track RW (Bay 1- 3, 0-19m)	57	23-Sep-19 A	29-Nov-19	11	21-Nov-19	12-Dec-19											
A16870	Backfill - Cycle track RW (Bay 1- 3, 0-19m) (Coarse fill)	6	12-Dec-19	18-Dec-19	11	27-Dec-19	03-Jan-20											
A16910	Backfill - Cycle track RW (Bay 4-6, 19- 42-m) (Coarse fill)	6	08-Nov-19	14-Nov-19	40	27-Dec-19	03-Jan-20											
A16920	Miradrain & pipe sleeve installation - Cycle track RW (Bay 1- 3, 0-19m)	10	30-Nov-19	11-Dec-19	11	13-Dec-19	24-Dec-19											
A16940	Cycle track RW backfilling complete	0		18-Dec-19	11		03-Jan-20											
A16950	cycle track site formation work other than RW section	12	19-Dec-19	04-Jan-20	11	04-Jan-20	17-Jan-20											
A16960	Pavement work	18	06-Jan-20	01-Feb-20	11	18-Jan-20	14-Feb-20											
A16970	Railing installation	15	03-Feb-20	19-Feb-20	11	15-Feb-20	03-Mar-20											
Haul Road Under Ma On Shan Rail																		
A11936	Haul Road Design preparation	41	02-Oct-19A	30-Nov-19	55	15-Jan-20	13-Feb-20											
A11938	Haul Road Design approval	21	30-Nov-19	21-Dec-19	75	14-Feb-20	05-Mar-20											
Construction Access connecting Ma On Shan Road																		
A13340	Construction Access Connecting Ma On Shan Road construction at Portion 4	18	08-Nov-19	28-Nov-19	141	08-May-20	28-May-20											
Main Portal Area																		
Tree Treatment																		
Tree Treatment																		
A11041	Tree felling & protection (Portion 6) - remaining	71	05-Aug-19 A	29-Nov-19	629	29-Dec-21	20-Jan-22											
Site Formation for Main Portal																		
Slope SMP 2																		
A12670	Soil Nail at 45.8mpd (An1-24)- 24nos	6	08-Nov-19 A	14-Nov-19	165	04-Jun-20	11-Jun-20											
A12680	Soil Nail at 43.8mpd (Am1-25 & TN6)- 26nos	7	15-Nov-19	22-Nov-19	165	11-Jun-20	19-Jun-20											
A12690	Excavation (45.8- 42.8mpd)	3	23-Nov-19	26-Nov-19	165	19-Jun-20	23-Jun-20											
A12700	Form temp working platform for soil nail (after temp access formation)	3	27-Nov-19	29-Nov-19	165	23-Jun-20	27-Jun-20											
A12710	Soil Nail at 42.3mpd (Ak1-30)- 30nos	8	30-Nov-19	09-Dec-19	165	27-Jun-20	08-Jul-20											
A12720	Soil Nail at 40.3mpd (Ap1-32 & TN5)- 33nos	9	10-Dec-19	19-Dec-19	165	08-Jul-20	18-Jul-20											
A12730	Excavation (42.8 - 40.3mpd)	3	20-Dec-19	23-Dec-19	165	18-Jul-20	22-Jul-20											
A12740	Form temp working platform for soil nail	3	24-Dec-19	28-Dec-19	165	22-Jul-20	25-Jul-20											
A12750	Soil Nail at 38.3mpd (Ah1-34 & TN4)- 35nos	9	30-Dec-19	09-Jan-20	165	25-Jul-20	05-Aug-20											
A12760	Soil Nail at 36.3mpd (Ag1-35)- 35nos	9	10-Jan-20	20-Jan-20	187	31-Aug-20	10-Sep-20											

18-Dec-19 ♦ Cycle track RW backfilling complete

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Late Start	Late Finish	2019						2020				
								Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
A12770	Excavation (40.3 - 35.3mpd)	3	21-Jan-20	23-Jan-20	187	10-Sep-20	14-Sep-20											
A12780	Form temp working platform for soil nail	3	24-Jan-20	03-Feb-20	187	14-Sep-20	17-Sep-20											
A12790	Soil Nail at 32.5mpd (Af1-65 & TN3)- 66nos	17	04-Feb-20	22-Feb-20	187	17-Sep-20	09-Oct-20											
Temp Site Formation at SMP2 +23mpd Portal Area																		
A16060	Excavation & Form temp working platform for soil nail at 21mpd	2	26-Nov-19	27-Nov-19	37	10-Jan-20	13-Jan-20											
A16070	GFRP Soil Nail at 21mpd - 15nos (assume)	4	28-Nov-19	02-Dec-19	37	13-Jan-20	17-Jan-20											
A16090	GFRP Soil Nail at 19.5mpd - 14nos (assume)	4	03-Dec-19	06-Dec-19	37	17-Jan-20	22-Jan-20											
A16100	Excavation & Form temp working platform for soil nail at 18mpd	2	12-Dec-19	13-Dec-19	33	22-Jan-20	24-Jan-20											
A16110	GFRP Soil Nail at 18mpd - 15nos (assume)	4	14-Dec-19	18-Dec-19	33	24-Jan-20	05-Feb-20											
A16130	GFRP Soil Nail at 16.5mpd - 14nos (assume)	4	19-Dec-19	23-Dec-19	33	05-Feb-20	10-Feb-20											
A16140	Excavation & Form temp working platform for soil nail at 15mpd	2	04-Jan-20	06-Jan-20	26	10-Feb-20	12-Feb-20											
A16150	GFRP Soil Nail at 15mpd - 15nos (assume)	4	07-Jan-20	10-Jan-20	26	12-Feb-20	17-Feb-20											
A16170	GFRP Soil Nail at 13.5mpd - 14nos (assume)	4	11-Jan-20	15-Jan-20	26	17-Feb-20	21-Feb-20											
A16180	Excavation & Form temp working platform for soil nail at 11mpd	2	22-Jan-20	23-Jan-20	21	21-Feb-20	24-Feb-20											
A16190	GFRP Soil Nail at 11mpd - 15nos (assume)	4	24-Jan-20	04-Feb-20	21	24-Feb-20	28-Feb-20											
A16210	GFRP Soil Nail at 9.5mpd - 14nos (assume)	4	05-Feb-20	08-Feb-20	21	28-Feb-20	04-Mar-20											
Retaining Wall for Main Portal																		
Retaining Wall RMP3																		
A13160	Temp access road formation	12	28-Dec-19	11-Jan-20	81	09-Apr-20	27-Apr-20											
A13170	Erect temp working platform for piling	24	13-Jan-20	15-Feb-20	81	27-Apr-20	27-May-20											
Retaining Wall RMP2																		
A13260	Temp access road formation	12	28-Dec-19	11-Jan-20	105	13-May-20	27-May-20											
A13270	Erect temp working platform for piling	24	13-Jan-20	15-Feb-20	105	27-May-20	24-Jun-20											
Retaining Wall RMP6 - CSD																		
A15320	CSD approval period (CSD)	134	01-Jun-19A	12-Nov-19	838	23-Feb-22	27-Feb-22											
A15330	Piling (pre-bored H, 15no, 23mpd) - CSD RMP6	38	02-Oct-19A	21-Nov-19	16	26-Nov-19	10-Dec-19											
A15350	Excavation & Form temp working platform for soil nail at 21mpd - CSD RMP6	3	22-Nov-19	25-Nov-19	16	10-Dec-19	13-Dec-19											
A15360	GFRP Soil Nail at 20.5mpd - 8nos	4	26-Nov-19	29-Nov-19	16	13-Dec-19	18-Dec-19											
A15370	Welding soil nail head to H pile and testing	10	30-Nov-19	11-Dec-19	16	18-Dec-19	02-Jan-20											
A15380	Testing for test nail at 20.5mpd	10	30-Nov-19	11-Dec-19	33	10-Jan-20	22-Jan-20											
A15390	Excavation & Form temp working platform for soil nail at 17.5mpd - CSD RMP6	3	12-Dec-19	14-Dec-19	16	02-Jan-20	06-Jan-20											
A15400	GFRP Soil Nail at 17.5mpd - 7nos	4	16-Dec-19	19-Dec-19	16	06-Jan-20	10-Jan-20											
A15410	Welding soil nail head to H pile and testing	10	20-Dec-19	03-Jan-20	16	10-Jan-20	22-Jan-20											
A15420	Testing for test nail at 17.5mpd	10	20-Dec-19	03-Jan-20	16	10-Jan-20	22-Jan-20											
A15430	Excavation & Form temp working platform for soil nail at 14.5mpd - CSD RMP6	3	04-Jan-20	07-Jan-20	16	22-Jan-20	01-Feb-20											
A15440	GFRP Soil Nail at 14.5mpd - 8nos	4	08-Jan-20	11-Jan-20	16	01-Feb-20	06-Feb-20											
A15450	Welding soil nail head to H pile and testing	8	13-Jan-20	21-Jan-20	16	06-Feb-20	15-Feb-20											
A15460	Testing for test nail at 14.5mpd	8	13-Jan-20	21-Jan-20	16	06-Feb-20	15-Feb-20											
A15462	Excavation & Form temp working platform for soil nail at 11.5mpd - CSD RMP6	2	22-Jan-20	23-Jan-20	16	15-Feb-20	18-Feb-20											
A15464	GFRP Soil Nail at 11.5mpd - 6nos	4	24-Jan-20	04-Feb-20	16	18-Feb-20	22-Feb-20											
A15466	Welding soil nail head to H pile and testing	8	05-Feb-20	13-Feb-20	16	22-Feb-20	03-Mar-20											
A15468	Testing for test nail at 11.5mpd	8	05-Feb-20	13-Feb-20	16	22-Feb-20	03-Mar-20											
Retaining Wall RMP5 - CSD (Tunnel Portal Area)																		

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Late Start	Late Finish	2019						2020		
								Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
A15560	CSD approval period (CSD)	134	01-Jun-19A	12-Nov-19	838	23-Feb-22	27-Feb-22	[Gantt bar: Oct to Nov 2019]								
A15570	Piling (pre-bored H, 16no, 23mpd)(P34-49) - CSD RMP5 (Tunnel Portal Area)	43	30-Sep-19 A	25-Nov-19	16	26-Nov-19	13-Dec-19	[Gantt bar: Oct to Nov 2019]								
A16240	Excavation & Form temp working platform for soil nail at 21mpd - CSD RMP5 (Tunnel Portal Area)	3	26-Nov-19	28-Nov-19	39	13-Jan-20	16-Jan-20							[Gantt bar: Nov 2019]		
A16250	GFRP Soil Nail at 21mpd - 8nos	4	29-Nov-19	03-Dec-19	39	16-Jan-20	21-Jan-20							[Gantt bar: Dec 2019]		
A16260	Welding soil nail head to H pile and testing	10	04-Dec-19	14-Dec-19	39	21-Jan-20	08-Feb-20							[Gantt bar: Dec 2019]		
A16270	Testing for test nail at 21mpd	10	04-Dec-19	14-Dec-19	39	21-Jan-20	08-Feb-20							[Gantt bar: Dec 2019]		
A16280	Excavation & Form temp working platform for soil nail at 18mpd - CSD RMP5 (Tunnel Portal Area)	3	16-Dec-19	18-Dec-19	39	08-Feb-20	12-Feb-20							[Gantt bar: Dec 2019]		
A16290	GFRP Soil Nail at 18mpd - 2nos	1	19-Dec-19	19-Dec-19	39	12-Feb-20	13-Feb-20							[Gantt bar: Dec 2019]		
A16300	Welding soil nail head to H pile and testing	10	20-Dec-19	03-Jan-20	39	13-Feb-20	25-Feb-20							[Gantt bar: Dec 2019]		
A16310	Testing for test nail at 18mpd	10	20-Dec-19	03-Jan-20	39	13-Feb-20	25-Feb-20							[Gantt bar: Dec 2019]		
A16360	Excavation from 18 to 14mpd - CSD RMP5 (Tunnel Portal Area)	3	04-Jan-20	07-Jan-20	39	25-Feb-20	28-Feb-20							[Gantt bar: Jan 2020]		
A16370	Excavation from 14 to 11.5mpd - CSD RMP5 (Tunnel Portal Area)	3	22-Jan-20	24-Jan-20	27	28-Feb-20	03-Mar-20							[Gantt bar: Jan 2020]		
Retaining Wall RMP5 - CSD																
A15800	CSD approval period (CSD)	145	01-Jun-19A	23-Nov-19	827	12-Feb-22	27-Feb-22	[Gantt bar: Oct to Nov 2019]								
A15810	Piling (pre-bored H, 17no, 23mpd)(P1-17) - CSD RMP5	56	21-Oct-19A	27-Dec-19	81	20-Feb-20	09-Apr-20	[Gantt bar: Oct to Nov 2019]								
A15820	Piling (pre-bored H, 16no, 23mpd)(P18-33) - CSD RMP5	48	21-Oct-19A	27-Dec-19	81	20-Feb-20	09-Apr-20	[Gantt bar: Oct to Nov 2019]								
A16460	Excavation & Form temp working platform for soil nail at 21mpd - CSD RMP5 (Tunnel Portal Area)	1	28-Dec-19	28-Dec-19	355	17-Mar-21	18-Mar-21							[Gantt bar: Dec 2019]		
A16470	GFRP Soil Nail at 21mpd - 17nos	3	30-Dec-19	02-Jan-20	355	18-Mar-21	22-Mar-21							[Gantt bar: Dec 2019]		
A16480	Welding soil nail head to H pile and testing	3	03-Jan-20	06-Jan-20	355	22-Mar-21	25-Mar-21							[Gantt bar: Dec 2019]		
A16490	Testing for test nail at 21mpd	3	03-Jan-20	06-Jan-20	362	30-Mar-21	06-Apr-21							[Gantt bar: Dec 2019]		
A16500	Excavation & Form temp working platform for soil nail at 18mpd - CSD RMP5 (Tunnel Portal Area)	1	07-Jan-20	07-Jan-20	355	25-Mar-21	26-Mar-21							[Gantt bar: Dec 2019]		
A16510	GFRP Soil Nail at 18mpd - 16nos	3	08-Jan-20	10-Jan-20	355	26-Mar-21	30-Mar-21							[Gantt bar: Dec 2019]		
A16520	Welding soil nail head to H pile and testing	3	11-Jan-20	14-Jan-20	355	30-Mar-21	06-Apr-21							[Gantt bar: Dec 2019]		
A16530	Testing for test nail at 18mpd	3	11-Jan-20	14-Jan-20	363	12-Apr-21	15-Apr-21							[Gantt bar: Dec 2019]		
A16540	Excavation & Form temp working platform for soil nail at 16.5mpd - CSD RMP5 (Tunnel Portal Area)	1	15-Jan-20	15-Jan-20	355	06-Apr-21	07-Apr-21							[Gantt bar: Dec 2019]		
A16550	GFRP Soil Nail at 16.5mpd - 22nos	4	16-Jan-20	20-Jan-20	355	07-Apr-21	12-Apr-21							[Gantt bar: Dec 2019]		
A16560	Welding soil nail head to H pile and testing	3	21-Jan-20	23-Jan-20	355	12-Apr-21	15-Apr-21							[Gantt bar: Dec 2019]		
A16570	Testing for test nail at 16.5mpd	3	21-Jan-20	23-Jan-20	356	13-Apr-21	16-Apr-21							[Gantt bar: Dec 2019]		
A16580	Excavation from 16.5 to 14mpd - CSD RMP5 (Tunnel Portal Area)	1	24-Jan-20	24-Jan-20	355	15-Apr-21	16-Apr-21							[Gantt bar: Dec 2019]		
A16590	Excavation from 14 to 8mpd - CSD RMP5 (Tunnel Portal Area)	1	01-Feb-20	01-Feb-20	355	16-Apr-21	17-Apr-21							[Gantt bar: Dec 2019]		
A16600	Retaining Wall base (42m) - CSD RMP5	12	03-Feb-20	15-Feb-20	355	17-Apr-21	03-May-21							[Gantt bar: Feb 2020]		
A16610	Retaining Wall wall structure to 7.5mpd - CSD RMP5	18	07-Feb-20	27-Feb-20	355	22-Apr-21	14-May-21							[Gantt bar: Feb 2020]		
Tunnel																
Preliminary Works																
A11810	TTA submission and approval during blasting works	75	14-Nov-19*	19-Feb-20	171	17-Jun-20	15-Sep-20	[Gantt bar: Nov 2019]								
A11820	Update BAR (Blasting Assessment Report) - preparation and submission	71	06-Sep-19 A	27-Dec-19	210	29-Jul-20	15-Sep-20	[Gantt bar: Oct to Nov 2019]								
A11825	Blasting door design	32	29-Nov-19	08-Jan-20	201	08-Aug-20	15-Sep-20	[Gantt bar: Nov 2019]								
A11830	Blasting Permit/License - Preparation and submission	50	09-Jan-20	13-Mar-20	201	15-Sep-20	16-Nov-20	[Gantt bar: Dec 2019]								
Rigid Barriers																
Rigid Barrier BMP1																
A13430	Temp. Access Road Formation	38	20-Nov-19*	06-Jan-20	167	18-Jun-20	04-Aug-20	[Gantt bar: Nov 2019]								
A13440	Form temp working platform for soil nail	5	07-Jan-20	11-Jan-20	167	04-Aug-20	10-Aug-20							[Gantt bar: Jan 2020]		
A13450	Soil Nail at 33.6mpd (Rows D & TN2) - 25nos	15	13-Jan-20	05-Feb-20	167	10-Aug-20	27-Aug-20							[Gantt bar: Jan 2020]		

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Late Start	Late Finish	2019						2020					
								Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun			
A13460	Soil Nail at 32.1mpd (Rows C)- 25nos	15	06-Feb-20	22-Feb-20	167	27-Aug-20	14-Sep-20												
Rigid Barrier BMP2																			
A13570	Form temp working platform for soil nail - BMP2	5	10-Jan-20	15-Jan-20	165	05-Aug-20	11-Aug-20												
A13580	Soil Nail at 38mpd (Cd1-6 & TN2)- 7nos - BMP2	6	16-Jan-20	22-Jan-20	165	11-Aug-20	18-Aug-20												
A13590	Soil Nail at 36mpd (Cc1-5)- 5nos - BMP2	5	23-Jan-20	04-Feb-20	165	18-Aug-20	24-Aug-20												
A13600	Soil Nail at 34mpd (Cb1-5 & TN1)- 6nos - BMP2	5	05-Feb-20	10-Feb-20	165	24-Aug-20	29-Aug-20												
A13810	Soil Nail at 46mpd (Df1-9)- 9nos	7	07-Nov-19 A	14-Nov-19	333	23-Dec-20	02-Jan-21												
A13820	Soil Nail at 44mpd (De1-9)- 9nos	7	15-Nov-19	22-Nov-19	333	02-Jan-21	11-Jan-21												
A13830	Soil Nail at 42mpd (Dd1-10)- 10nos	7	23-Nov-19	30-Nov-19	333	11-Jan-21	19-Jan-21												
A13840	Soil Nail at 40mpd (Dc1-9)- 9nos	7	02-Dec-19	09-Dec-19	333	19-Jan-21	27-Jan-21												
A13850	Soil Nail at 38mpd (Db1-9)- 9nos	7	10-Dec-19	17-Dec-19	333	27-Jan-21	04-Feb-21												
A13860	Soil Nail at 36mpd (Da1-9 & TN4)- 10nos	7	18-Dec-19	27-Dec-19	333	04-Feb-21	19-Feb-21												
Access Road to Portion 12 - Phase 1																			
Preliminary Works																			
Temporary Access																			
A11118	Temp access to RMZ2	14	01-Nov-19 A	16-Nov-19	17	28-Nov-19	06-Dec-19												
Tree Treatment																			
Tree Treatment																			
A11070	Tree felling & protection (Portion 11)	104	25-Jun-19 A	28-Nov-19	7	16-Nov-19	06-Dec-19												
A11078	Tree felling (Portion 12)	32	29-Nov-19	08-Jan-20	270	02-Nov-20	08-Dec-20												
Bridge A																			
Piling																			
A11100	Piling (mini-pile, 6nos) - Pier A2-1	6	08-Nov-19	14-Nov-19	5	14-Nov-19	20-Nov-19												
A11120	Piling (mini-pile, 6nos) - Pier A2-2	6	15-Nov-19	21-Nov-19	5	21-Nov-19	27-Nov-19												
A11140	Piling (mini-pile, 6nos) - Pier A3-2	6	22-Nov-19	28-Nov-19	5	28-Nov-19	04-Dec-19												
A11160	Piling (mini-pile, 6nos) - Pier A4-1	6	29-Nov-19	05-Dec-19	5	05-Dec-19	11-Dec-19												
A11180	Piling (mini-pile, 4nos) - Pier A4-2	4	06-Dec-19	10-Dec-19	5	12-Dec-19	16-Dec-19												
A11210	Pile Test	26	11-Dec-19	13-Jan-20	10	23-Dec-19	24-Jan-20												
Abutment A1																			
A11230	Excavation - AbutmentA1	31	22-Oct-19 A	30-Nov-19	71	10-Feb-20	03-Mar-20												
A11240	Base slab - AbutmentA1	13	02-Dec-19	16-Dec-19	71	04-Mar-20	18-Mar-20												
A11250	Abutment Wall - Abutment A1	31	17-Dec-19	24-Jan-20	71	19-Mar-20	28-Apr-20												
A11260	Backfill (~9m) - Abutment A1 (Coarse fill)	12	01-Feb-20	14-Feb-20	71	29-Apr-20	14-May-20												
Pier A2																			
A11340	ELS - Pier A2-1	12	14-Jan-20	03-Feb-20	16	08-Feb-20	21-Feb-20												
A11350	Excavation - Pier A2-1	12	04-Feb-20	17-Feb-20	16	22-Feb-20	06-Mar-20												
A11370	ELS - Pier A2-2	13	04-Feb-20	18-Feb-20	21	28-Feb-20	13-Mar-20												
Pier A3																			
A11430	ELS - Pier A3-1	13	11-Dec-19	27-Dec-19	35	24-Jan-20	14-Feb-20												
A11440	Excavation - Pier A3-1	12	28-Dec-19	11-Jan-20	35	15-Feb-20	28-Feb-20												
A11450	Pile cap - Pier A3-1	18	13-Jan-20	08-Feb-20	35	29-Feb-20	20-Mar-20												
A11460	ELS - Pier A3-2	13	14-Jan-20	04-Feb-20	33	28-Feb-20	13-Mar-20												
A11470	Excavation - Pier A3-2	12	05-Feb-20	18-Feb-20	33	14-Mar-20	27-Mar-20												
Pier A4																			

Activity ID	Activity Name	Original Duration	Start	Finish	Total Float	Late Start	Late Finish	2019						
								Oct	Nov	Dec	Jan	Feb	Mar	
Cut Slope SMZ6														
A14460	Excavation (162 - 156 mpd) - SMZ6	11	07-Jan-20	18-Jan-20	50	12-Mar-20	24-Mar-20							
A14470	Form temp working platform for soil nail - SMZ6	4	20-Jan-20	23-Jan-20	50	25-Mar-20	28-Mar-20							
A14480	Soil Nail at 154mpd (D1-9 & TN4)- 10nos - SMZ6	6	24-Jan-20	06-Feb-20	50	30-Mar-20	06-Apr-20							
A14490	Soil Nail at 152mpd (C1-9 & TN3)- 10nos - SMZ6	6	07-Feb-20	13-Feb-20	50	07-Apr-20	16-Apr-20							
Cut Slope SMZ8														
A14600	Excavation - Cut Slope SMZ8	19	29-Nov-19	20-Dec-19	94	28-Mar-20	23-Apr-20							
A14610	Slope formation - Cut Slope SMZ8	31	21-Dec-19	05-Feb-20	211	12-Sep-20	20-Oct-20							
A14810	Maintenance staircase & stepped channel - SMZ8	25	06-Feb-20	05-Mar-20	316	04-Mar-21	01-Apr-21							
Road Works														
Road Work from A Kung Kok Shan Road to Bridge A														
A14860	400 dia concrete pipe around the road besides SMZ2	19	16-Jan-20	13-Feb-20	113	10-Jun-20	03-Jul-20							
Access Road to Portion 12 - Phase 2														
Road Works														
Road work at A Kung Kok Shan Road Roundabout														
A15230	Demolish existing footpath at A Kung Kok Shan Road Roundabout	6	08-Nov-19	14-Nov-19	413	10-Apr-21	16-Apr-21							
A15240	Demolish existing planter at Cul-De-Sac	6	15-Nov-19	21-Nov-19	413	17-Apr-21	23-Apr-21							
Other Works Area														
Tree Treatment														
Tree Treatment														
A11052	Tree transplant (Portion 8)	91	08-Nov-19	03-Mar-20	260	26-Sep-20	16-Jan-21							
A11060	Tree felling & protection (Portion 10)	61	29-Nov-19	18-Feb-20	181	17-Jul-20	25-Sep-20							
Community Liaison Centre														
Design														
A16720	Community Liaison Centre Design approval (Architectural)	50	27-Aug-19 A	15-Nov-19	109	25-Feb-20	03-Mar-20							
A16740	Community Liaison Centre Design approval (Drainage & E&M)	21	09-Oct-19 A	15-Nov-19	116	03-Mar-20	10-Mar-20							
A16750	Community Liaison Centre Design Preparation (Landscape)	22	09-Oct-19 A	15-Nov-19	86	27-Feb-20	05-Mar-20							
A16760	Community Liaison Centre Design approval (Landscape)	21	16-Nov-19	06-Dec-19	111	06-Mar-20	26-Mar-20							
Community Liaison Centre														
A10140	Excavation	12	14-Oct-19 A	18-Nov-19	76	15-Feb-20	25-Feb-20							
A10150	G/F slab	12	19-Nov-19	02-Dec-19	76	26-Feb-20	10-Mar-20							
A10152	Shop Drawing Preparation & submission	18	11-Nov-19*	30-Nov-19	0	11-Nov-19	30-Nov-19							
A10154	Shop Drawing approval	21	23-Nov-19	13-Dec-19	0	23-Nov-19	13-Dec-19							
A10160	Off-site factory fabrication	60	14-Dec-19	03-Mar-20	0	14-Dec-19	03-Mar-20							