



The EIA Ordinance Register Office
Environmental Protection Department
27th floor, Southorn Centre
130 Hennessy Road
Wanchai
Hong Kong

Your reference:

Our reference: HKDSD201/50/107434

Date: 26 July 2021

BY HAND

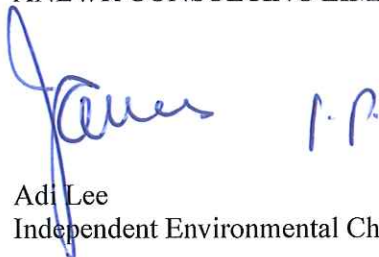
Dear Sirs

Agreement No. SP 01/2015
Environmental Monitoring and Audit for Advance Works for
Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A
Final EM&A Report

On behalf of Drainage Services Department, we are pleased to submit herewith three hard copies and two electronic copies of the captioned report in accordance with Section 17.4 of the Environmental Monitoring and Audit Manual.

Should you have any queries, please do not hesitate to contact the undersigned or our Ms Karen Po on 2618 2831.

Yours faithfully
ANewR CONSULTING LIMITED



Adi Lee
Independent Environmental Checker

LYMA/CWKK/PKWK/lsm

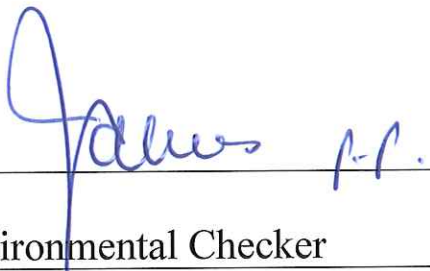
Encl.

cc DSD – Ms Konica Cheung (email: wycheung@dsd.gov.hk) – w/ encl.
DSD – Mr Fong Mo (email: mfong@dsd.gov.hk) – w/o encl.
Wellab – Dr Priscilla Choy (email: priscilla.choy@wellab.com.hk) – w/o encl.

Drainage Services Department
**Advance Works for Shek Wu Hui Sewage
Treatment Works – Further Expansion Phase 1A**

Final EM&A Report

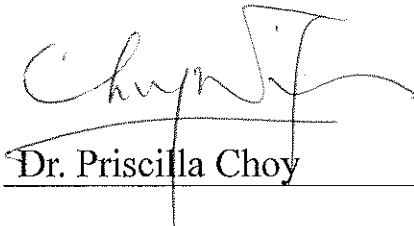
(July 2021)

Verified by : Mr. Adi Lee 
Position : Independent Environmental Checker
Date : 2 July 2021

Drainage Services Department
**Advance Works for Shek Wu Hui Sewage
Treatment Works – Further Expansion Phase 1A**

Final EM&A Report

(July 2021)

Certified by : 

Position : Environmental Team Leader of
Contract No. DE/2014/01

Date : 2 July 2021

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1. EXECUTIVE SUMMARY

This is the Final EM&A Report for the Project which summarises the EM&A works undertaken by the Contractor's ET of Contract Nos. DC/2013/09 and DE/2014/01 under FEP No. FEP-02/474/2013 between October 2015 and November 2019.

According to the information from Contractor, the construction works of Contract No. DC/2013/09 was completed in August 2018 and the construction works of Contract No. DE/2014/01 was completed in November 2019. Therefore, there was no construction activities after November 2019 under Contract Nos. DC/2013/09 and DE/2014/01.

1.1 Summary of Major Construction Works taken in the Whole EM&A Period

1.1.1 In the whole EM&A period, the major construction works being undertaken by the respective Contractors under the Project are summarized in the below table.

Works Contract	Contract Title	Major Construction Works
DC/2013/09	Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A and Sewerage Works at Ping Che Road	<ul style="list-style-type: none"> • Demolition of the existing Inlet Works and construction of the new Inlet Works, including inlet pumping station, screening and degritting facilities; • Demolition of 4 existing circular Primary Sedimentation Tanks (PSTs) and construction of new rectangular PSTs; • Construction of new pre-membrane screens; • Modification of existing Bioreactor (BR) 1 and 2 to suit the proposed membrane bioreactor (MBR) process; • Construction of a new standby Bioreactor; • Demolition of 4 existing circular Final Sedimentation Tanks (FSTs) and construction of new Membrane Tanks and Membrane Facility Building; • Reconstruction of sludge treatment facilities, including thickening, anaerobic digestion, biogas handling, sludge holding and dewatering facilities; and • Modification of BR1, through upgrading of electrical and mechanical (E&M) equipment and minor civil works, to suit the proposed MBR process; • Demolition of FSTs 1 and 2 and construction of Membrane Tanks and the first phase of Membrane Facility Building; • Tree felling and transplanting, to facilitate timely construction of the new Inlet Works during the implementation of Main Works (under review); and • Other ancillary works.
DE/2014/01	Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South	<ul style="list-style-type: none"> • Installation of the T&C for MBR Pre-treatment Screen Chamber; • Installation of the T&C for Bioreactor No. 1 (BR1); • Installation of the T&C for Membrane Filtration System (MFS1); • Installation of the T&C for Flowmeter Chamber; • Installation of the T&C for Penstocks, Actuators and Stoplogs; • Installation of the T&C for Building Services and Fire Services; • Installation of the T&C of HV Switchgear, Transformer,

Works Contract	Contract Title	Major Construction Works
	Road Sewage Pumping Station	LV Switchgear, LV Control Gear for MBR Facilities Building and BR1's Vicinity Area; • Installation of the T&C of Lifting Appliance for Pre-Treatment Screen Chamber, BR1, MBR Facilities Building, MFS1; • Installation of the T&C of Cabling, Earthing and Lightning Protection System for MBR Facilities Building and Plant's Vicinity Areas; • Installation of the T&C of Deodourising System for MBR Facilities Building; • Installation of the T&C for Maintenance Platform & Covers; and • Installation of the T&C for SCADA.

1.2 Environmental Monitoring and Audit Activities

1.2.1 The environmental monitoring activities under the EM&A programme are summarized in the table below. No Action and Limit Level exceedance of air quality and construction noise monitoring was recorded during the whole EM&A period.

Work Contract	Environmental Issue	Environmental Monitoring Parameters / Inspection	Action Level Exceedance	Limit Level Exceedance
DC/2013/09	Air Quality	1-hour TSP	0	0
		24-hour TSP	0	0
	Construction Noise	L _{Aeq(30min)} Daytime	0	0
DE/2014/01	Air Quality	1-hour TSP	0	0
		24-hour TSP	0	0
	Construction Noise	L _{Aeq(30min)} Daytime	0	0

1.3 Environmental Complaint

1.3.1 No environmental complaint, notification of summons or successful prosecutions were received during the whole EM&A period. It is summarized in the table below.

Works Contract	Environmental Complaints	Notification of Summons	Successful Prosecutions	Status / Follow-up Actions
DC/2013/09	0	0	0	N/A
DE/2014/01	0	0	0	N/A

1.4 Site Inspection

1.4.1 Joint site inspections to evaluate the site environmental performance by the RE, the ET and the Contractor were carried out on the following dates during the whole EM&A period.

Contract No. DC/2013/09: 33 no. of site inspection was carried out in the whole EM&A period
 Contract No. DE/2014/01: 26 no. of site inspection was carried out in the whole EM&A period

1.5 Reporting Changes

- 1.5.1 The EM&A Programme of Contract No. DC/2013/09 was handed over to the ET of Contract No. DE/2014/01 since August 2018. Thus, the Monthly EM&A Report starting from September 2018 onwards presented the EM&A works undertaken by the ET of Contract No. DE/2014/01.

2. INTRODUCTION

2.1 Background

- 2.1.1 The existing Shek Wu Hui Sewage Treatment Works (SWHSTW) is operated and maintained by the Drainage Services Department (DSD). It provides secondary level treatment to sewage collected from Sheung Shui, Fanling and adjacent areas, with design capacity of 93,000m³/day at ADWF.
- 2.1.2 To cope with the latest population growth and new developments in the catchment, further expansion of SWHSTW is planned to be carried out in three phases, namely Phases 1A, 1B and 2. Further Expansion Phase 1A is to cope with the forecast increase in sewage flow from local developments and extension of village sewerage in Sheung Shui, Fanling and adjacent areas. The scope of the Phase 1A Project comprises the followings:
- 2.1.3 the construction of proposed treatment facilities to increase the treatment capacity of SWHSTW by at least 40,000m³/day with tertiary treatment level, with suitable allowance to cater for a further increase of treatment capacity by 20,000m³/day in Phase 1B; and
- 2.1.4 modification/upgrading of the existing facilities of SWHSTW.
- 2.1.5 To cope with the projected sewage flow buildup and meet the tight implementation programme, Advance Works for SWHSTW Further Expansion Phase 1A (hereinafter referred as “the Project”) are proposed to be carried out between 2015 and 2018. The Phase 1A Advance Works comprise a civil works contract and an Electrical & Mechanical (E&M) works contract. The civil works Contract No. DC/2013/09 “Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A and Sewerage Works at Ping Che Road” is supervised by the Sewerage Projects Division (SPD) of DSD. The E&M works Contract No. DE/2014/01 “Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station” is supervised by the Electrical & Mechanical Projects Division (E&MPD) of DSD.
- 2.1.6 The scope of Phase 1A Advance Works comprises the followings:
- 2.1.7 the conversion of one existing bioreactor (BR1) and two existing final sedimentation tanks (FST1 and FST2) into one membrane bioreactor; and the ancillary works.
- 2.1.8 This Project is a part of designated project under item F.2 of Part 1, Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance. The EIA for the further expansion of SWHSTW Phases 1A, 1B and 2 is covered under the EIA Report of NENT NDAs (Register No. AEIAR-175-2013).
- 2.1.9 An Environment Permit (EP) No. EP-474/2013 for the further expansion of SWHSTW Phases 1A, 1B and 2 was issued by EPD to CEDD on 21 November 2013. On 23 January 2014, Further Environmental Permit (FEP) No. FEP-01/474/2013 was issued by EPD to DSD for the further expansion of SWHSTW Phase 1A works. On 15 February 2018, FEP No. FEP-02/474/2013 was issued by EPD to DSD covering the upgrading works of SWHSTW Phases 1A, 1B and 2.
- 2.1.10 With the issue of FEP No. FEP-02/474/2013, DSD has surrendered FEP No. FEP-01/474/2013 on 15 August 2018 which covering Phase 1A works only.

2.2 Project Programme

Two construction works contracts of the Project, i.e. civil works and E&M works, were commenced in October 2015 and October 2017 respectively. The major construction works under Contract No. DC/2013/09 has been certified as substantially completed by DSD and the remaining work was completed by the end of July 2018. The works of Contract No. DE/2014/01 has been certified by DSD and the works was completed by the end of November 2019. **Table 2.1** summarises the information of the awarded Works Contracts.

Table 2.1 Summary of Awarded Works Contracts

Works Contract	Description	Construction Start Date	Contractor	Environmental Team
DC/2013/09	Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A and Sewerage Works at Ping Che Road	October 2015	Tsun Yip Waterworks Construction Co Ltd (Tsun Yip)	Action-United Environmental Services & Consulting (AUES)
DE/2014/01	Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station	October 2017	Jardine Engineering Corporation Limited (JEC)	Wellab Limited (Wellab)

2.3 Purpose of the Report

The Environmental Monitoring and Audit (EM&A) programme for Contract No. DC/2013/09 and No. DE/2014/01 commenced in October 2015 and October 2017 respectively. This is the Final EM&A Report for the Project which summarises the EM&A works undertaken by the Contractor’s ET of Contract No. DC/2013/09 and DE/2014/01 between October 2015 and November 2019 (the whole EM&A period).

2.4 Project Organization

Organization structure and contact details of relevant parties with respect to on-site environmental management are shown in **Table 2.2** below.

Table 2.2 Key Project Contacts

Works Contract	Organization	Role	Name	Tel No.
DC/2013/09	DSD	Resident Engineer	Ms. Konica Cheung	2594 7463
	ANewR Consulting Limited	Independent Environmental Checker	Mr. Adi Lee	2618 2836
		Tsun Yip	Site Agent	Mr. Ken Wong
			Environmental Officer	Mr. M. T. Ho
	AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059
DE/2014/01	DSD	Resident Engineer	Mr. Fong Mo	2594 7329
	ANewR Consulting Limited	Independent Environmental Checker	Mr. Adi Lee	2618 2831
		JEC	Project Manager	Mr. Kim Hung Lau
			Environmental Officer	Mr. George Ng
	Wellab	Environmental Team Leader	Dr. Priscilla Choy	2151 2089

3. ENVIRONMENTAL MONITORING AND AUDIT

The Project has been divided into two construction works contracts which are covered by EP No. EP-474/2013 and FEP No. FEP-02/474/2013. As per the EP Conditions, the Final EM&A Report for Works Contract No. DE/2014/01 prepared by the Contractor’s ET is provided in *Appendix A*.

The EM&A Report provides details of the project information, EM&A requirements, impact monitoring and audit results for the corresponding Contracts.

As the major construction works under Contract No. DC/2013/09 has been certified as substantially completed by DSD and the remaining work was completed by the end of July 2018. Air quality, construction noise monitoring and site inspections have been handed over to the ET of Contract No. DE/2014/01.

A summary of the major construction activities undertaken by the respective Contractors of various Works Contracts during the whole EM&A period are presented in Table 3.1.

Impact monitoring for air quality and construction noise were conducted in accordance with the updated EM&A Manual in the whole EM&A period. The monitoring results conducted by the ET of Contract No. DC 2013/09 and Contract No. DE/2014/01 for this reporting month are summarised in *Tables 3.2 to 3.7*. Details of the monitoring requirements, locations, equipment, methodology and QA/QC procedures are presented in the Final EM&A Report of Contract No. DE/2014/01 as provided in *Appendix A*.

Table 3.1 Summary of Major Construction Activities in the Whole EM&A Period

Works Contract	Contract Title	Major Construction Works
DC/2013/09	Advance Works for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A and Sewerage Works at Ping Che Road	<ul style="list-style-type: none"> • Demolition of the existing Inlet Works and construction of the new Inlet Works, including inlet pumping station, screening and degritting facilities; • Demolition of 4 existing circular Primary Sedimentation Tanks (PSTs) and construction of new rectangular PSTs; • Construction of the new pre-membrane screens; • Modification of the existing Bioreactor (BR) 1 and 2 to suit the proposed membrane bioreactor (MBR) process; • Construction of a new standby Bioreactor; • Demolition of 4 existing circular Final Sedimentation Tanks (FSTs) and construction of new Membrane Tanks and Membrane Facility Building; • Reconstruction of sludge treatment facilities, including thickening, anaerobic digestion, biogas handling, sludge holding and dewatering facilities; • Modification of BR1, through upgrading of electrical and mechanical (E&M) equipment and minor civil works, to suit the proposed MBR process; • Demolition of FSTs 1 and 2 and construction of Membrane Tanks and the first phase of Membrane Facility Building; and • Tree felling and transplanting, to facilitate timely construction of the new Inlet Works during the

Works Contract	Contract Title	Major Construction Works
		implementation of Main Works (under review); and <ul style="list-style-type: none"> • Other ancillary works.
DE/2014/01	Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station	<ul style="list-style-type: none"> • Installation of the T&C for MBR Pre-treatment Screen Chamber; • Installation of the T&C for Bioreactor No. 1 (BR1); • Install, T&C for Membrane Filtration System (MFS1); • Installation of the T&C for Flowmeter Chamber; • Installation of T&C for Penstocks, Actuators and Stoplogs; • Installation of the T&C for Building Services and Fire Services; • Installation of the T&C of HV Switchgear, Transformer, LV Switchgear, LV Control Gear for MBR Facilities Building and BR1’s Vicinity Area; • Installation of the T&C of Lifting Appliance for Pre-Treatment Screen Chamber, BR1, MBR Facilities Building, MFS1; • Installation of the T&C of Cabling, Earthing and Lightning Protection System for MBR Facilities, Building and Plant’s Vicinity Areas; • Installation of the T&C of Deodorising System for MBR Facilities Building; • Installation of the T&C for Maintenance Platform & Covers; and • Installation of the T&C for SCADA.

3.1 Air Quality

Impact monitoring for air quality was conducted in accordance with the updated EM&A Manual for Contract No. DC/2013/09 and Contract No. DE/2014/01. Both 1-hour and 24-hour TSP monitoring were conducted to monitor the air quality.

3.1.1 Monitoring Locations

The details of the locations of the air quality monitoring locations are listed in *Table 3.2* and the corresponding position of the monitoring stations are indicated in *Figure 2* of *Appendix A*.

Table 3.2 Locations for Air Quality Monitoring

Contract No.	Station ID	Location	Parameter
DC/2013/09	AM1	No. 31 Wai Loi Tsuen	1-hour and 24-hour TSP
	AM2	Fu Tei Au	1-hour TSP
	AM2a	RE’s Site Office	24-hour TSP
DE/2014/01	AM1 ⁽¹⁾	No. 31 Wai Loi Tsuen	1-hour and 24-hour TSP
	AM2	Fu Tei Au	1-hour TSP
	AM1a ⁽¹⁾	Southeast Side of SWHSTW site boundary	24-hour TSP
	AM2a ⁽²⁾	RE’s Site Office	
	AM2b ⁽²⁾	Northeast side of SWHSTW site boundary	

Remark:

(1): The 24-hour TSP monitoring station at AM1 – No.31 Wai Loi Tsuen has been disrupted on 20th August 2018 due to electrical

problems and disagreement with the electricity supplier. The monitoring works were resumed at AM1a-Southeast Side of SWHSTW site boundary on 19th September 2018.

- (2): The 24-hour TSP monitoring station at AM2a- RE's Site Office was relocated to AM2b-Northeast Side of SWHSTW site boundary on 9th September 2019 due to the removal of RE's Site Office.

3.1.2 Monitoring Results

The summary of the monitoring results of 1-hour TSP and 24-hour TSP for both contracts are show in **Table 3.3** to **Table 3.6**. No Action and Limit Level exceedance of air quality monitoring was recorded during the whole EM&A period.

1-Hour TSP Monitoring Results in the whole EM&A period

Table 3.3 Summary of 1-hr TSP air quality monitoring Results of Contract No. DC/2013/09

Monitoring Station ID	Location	TSP Concentration (mg/m ³)	Action Level (mg/m ³)	Limit Level (mg/m ³)	Exceedance due to the Project Construction (Yes/No)
AM1	No. 31 Wai Loi Tsuen	13 – 271	286	500	No
AM2	Fu Tei Au	15 – 218	276		No

Table 3.4 Summary of 1-hr TSP Air Quality Monitoring Results of Contract No. DE/2014/01

Monitoring Station ID	Location	TSP Concentration (mg/m ³)	Action Level (mg/m ³)	Limit Level (mg/m ³)	Exceedance due to the Project Construction (Yes/No)
AM1	No. 31 Wai Loi Tsuen	20 – 193	286	500	No
AM2	Fu Tei Au	20 – 238	276		No

Note:

- (1): The environmental monitoring works of the Project were conducted by the Environmental Team of Contract No. DE/2014/01 in accordance with the Updated EM&A Manual.

24-Hour TSP Monitoring Results in the Whole EM&A period

Table 3.5 Summary of 24-hr TSP Air Quality Monitoring Results of Contract No. DC/2013/09

Monitoring Station ID	Location	TSP Concentration (mg/m ³)	Action Level (mg/m ³)	Limit Level (mg/m ³)	Exceedance due to the Project Construction (Yes/No)
AM1	No. 31 Wai Loi Tsuen	8 – 133	147	260	No
AM2a	RE's Site Office	10 – 139	155		No

Table 3.6 Summary of 24-hr TSP Air Quality Monitoring Results of Contract No. DE/2014/01

Monitoring Station ID	Location	TSP Concentration (mg/m ³)	Action Level (mg/m ³)	Limit Level (mg/m ³)	Exceedance due to the Project Construction (Yes/No)
AM1	No. 31 Wai Loi Tsuen	13 – 17	147	260	No
AM1a	SWHSTW site boundary	10 – 138			No
AM2a	RE's Site Office	9 – 124	155	260	No
AM2b	Northeast Side of SWHSTW site boundary	48 – 154			No

Note:

(1): The environmental monitoring works of the Project were conducted by the Environmental Team of Contract No. DE/2014/01 in accordance with the Updated EM&A Manual.

3.2 Construction Noise Monitoring

Two noise monitoring stations, namely NM1 and NM2 were designated in the updated EM&A Manual for impact monitoring.

3.2.1 Monitoring Location

The same noise monitoring locations were used in both Contract No. DC/2013/09 and DE/2014/01. The detail of the construction noise monitoring locations is listed in **Table 3.7**.

Table 3.7 Locations for Construction Noise Monitoring

Monitoring Station ID	Location
NM1	No. 31 Wai Loi Tsuen
NM2	Fu Tei Au

3.2.2 Monitoring Results

The summary of the construction noise monitoring for both contracts are shown in **Table 3.8** and **3.9**. No Action and Limit Level exceedance of construction noise monitoring was recorded during the whole EM&A period.

Table 3.8 Summary of Construction Noise Monitoring Results of Contract No. DC/2013/09

Monitoring Station ID	Location	Noise Level (LAeq,30mins, dB(A))	Action Level (dB(A))	Limit Level (dB(A))	Exceedance due to the Project Construction (Yes/No)
NM1	No. 31 Wai Loi Tsuen	48 – 68	When one documented complaint is received	>75*	No
NM2	Fu Tei Au	41 – 65		>75*	No

Remark:

(*): 70dB(A) and 65dB(A) for schools during normal teaching periods and school examination periods, respectively.

Table 3.9 Summary of Construction Noise Monitoring Results of Contract No. DE/2014/01

Monitoring Station ID	Location	Noise Level (LAeq,30mins, dB(A))	Action Level (dB(A))	Limit Level (dB(A))	Exceedance due to the Project Construction (Yes/No)
NM1	No. 31 Wai Loi Tsuen	51.4 – 58.2	When one documented complaint is received	>75*	No
NM2	Fu Tei Au	44.1 – 52.4			No

Note:

(1): The environmental monitoring works of the Project were conducted by the Environmental Team of Contract No. DE/2014/01 in accordance with the Updated EM&A Manual.

Remark:

(*): 70dB(A) and 65dB(A) for schools during normal teaching periods and school examination periods, respectively.

3.3 Environmental complaint, notification of summons or successful prosecutions

3.3.1 No environmental complaint, notification of summons or successful prosecutions were received during the whole EM&A period. Log for environmental complaints, notification of summons and successful prosecutions are provided in *Table 3.10*.

Table 3.10 Log for Environmental Complaints, Notification of Summons and Successful Prosecutions for the Reporting Month

Works Contract	Environmental Complaints	Notification of Summons	Successful Prosecutions
DC/2013/09	0	0	0
DE/2014/01	0	0	0

3.4 Site Inspection

3.4.1 Regular site inspections were conducted by the Contractor's ET on a weekly basis to check the implementation of environmental pollution control and mitigation measures for the Project. No non-compliance was identified in the whole EM&A period. No environmental non-compliance was identified in the whole EM&A period.

4. WASTE MANAGEMENT

- 4.1 Waste management was carried out by on-site Environmental Officer or an Environmental Supervisor of the Contractor from time to time.
- 4.2 The quantities of waste for disposal in this Whole EM&A period are summarized in *Tables 4.1* and *4.2* and the Monthly Summary Waste Flow Table of Contract No. DE/2014/01 is presented in the EM&A Report as provided in *Appendix A*. Whenever possible, materials were reused on-site as far as practicable.

Table 4.1 Summary of Quantities of Inert C&D Materials and C&D Wastes of Contract No. DC/2013/09

Type of Waste	Quantity	Disposal Location
Total C&D Materials (Inert) (in '000m ³)	24	Tuen Mun 38
Hard Rock and Large Broken Concrete (Inert) (in '000m ³)	2.26	Tuen Mun 38
Reused in this Project (Inert) (in '000m ³)	3.67	--
Reused in other Projects (Inert) (in '000m ³)	2.23	CV/2015/03*
Disposal as Public Fill (Inert) (in '000m ³)	15.93	Tuen Mun 38
Metals (in '000kg)	142.00	Licensed Collector
Paper / Cardboard Packing (in '000kg)	0.07	Paper Recyclers
Plastics (in '000kg)	0	--
Chemical Wastes (in '000kg)	0	--
General Refuses (in '000m ³)	1.19	NENT

Remark: The figures were rounded off to two decimal places.

* Contract No. CV/2015/03 Site Formation and Infrastructural Works near Tong Hang Road and Tsz Tin Road in Area 54, Tuen Mun

Table 4.2 Summary of Quantities of Inert C&D Materials and C&D Wastes of Contract No. DE/2014/01

Type of Waste	Quantity	Disposal Location
Total C&D Materials (Inert) (in '000m ³)	0	--
Hard Rock and Large Broken Concrete (Inert) (in '000m ³)	0	--
Reused in this Project (Inert) (in '000m ³)	0	--
Reused in other Projects (Inert) (in '000m ³)	0	--
Disposal as Public Fill (Inert) (in '000m ³)	0	--
Metals (in '000kg)	0	--
Paper / Cardboard Packing (in '000kg)	0.373	Lau Choi Kee Papers Co. Ltd (35Po Wan Road, Sheung Shui, NT)
Plastics (in '000kg)	0	--
Chemical Wastes (in '000kg)	0	--
General Refuses (in tonne)	380.26	NENT

Remark: The figures were rounded off to two decimal places.

5. IMPLEMENTATION STATUS ON THE ENVIRONMENTAL PROTECTION REQUIREMENTS

5.1 The Contractor has implemented all mitigation measures and requirements as stated in the EIA Reports, EM&A Manuals, EP No. EP-474/2013 and FEP No. FEP-02/474/2013. Summary of the relevant permits, licenses, and/or notifications on environmental protection for this Project in this whole EM&A period are summarised in *Tables 5.1* and *5.2*.

Table 5.1 Summary of Environmental Licenses and Permits for Contract No. DC/2013/09

Item	Valid License/Permit	License/Permit Number
1	Further Environmental Permit	FEP-02/474/2013 (Valid from 15 February 2018)
2	Air Pollution Control (Construction Dust) Regulation	N/A
3	Chemical Waste Producer Registration	WPN5213-624-T3148-04
4	Water Pollution Control Ordinance	WT00022503-2015
5	Billing Account for Disposal of Construction Waste	Account Number: 7022898

Table 5.2 Summary of Environmental Licenses and Permits for Contract No. DE/2014/01

Item	Valid License/Permit	License/Permit Number
1	Further Environmental Permit	FEP-02/474/2013 (Valid from 15 February 2018)
2	Chemical Waste Producer Registration	WPN5213-624-T3685-01
3	Billing Account for Disposal of Construction Waste	Account Number: 7024165

6. CONCLUSION AND RECOMMENDATION

6.1 Conclusion

- 6.1.1 This is the Final EM&A Report for the Project which summarises the EM&A works undertaken by the Contractor's ET of Contract Nos. DC/2013/09 and DE/2014/01 in October 2015 to November 2019 (the whole EM&A period).
- 6.1.2 The EM&A Programme of Contract No. DC/2013/09 was handed over to the ET of Contract No. DE/2014/01 since August 2018. Thus, the Monthly EM&A Report starting from September 2018 onwards will present the EM&A works undertaken by the ET of Contract No. DE/2014/01.
- 6.1.3 No Action and Limit Level exceedance of 1-hour and 24-hour TSP monitoring was recorded during the whole EM&A period.
- 6.1.4 No Action and Limit Level exceedance of construction noise monitoring was recorded during the whole EM&A period.
- 6.1.5 Joint site inspections to evaluate the site environmental performance by the RE, the ET and the Contractors were carried out on the following dates during the whole EM&A period.

Contract No. DC/2013/09: 33 site inspection was carried out in the whole EM&A period

Contract No. DE/2014/01: 26 site inspection was carried out in the whole EM&A period

- 6.1.6 No documented complaint, notification of summons or successful prosecution was received during the whole EM&A period.

6.2 Recommendation

- 6.2.1 The EM&A programme was found to be effective and efficient in monitoring impacts arising from the Project. The deterioration of the environment caused by the Project was cost-effectively identified and mitigation measures were implemented promptly and effectively to avoid unacceptable impacts.
- 6.2.2 The environmental mitigation measures provided were generally acceptable apart from some minor deficiencies which were rectified after reminding the Contractor. In conclusion, the Project was environmentally acceptable.

APPENDIX A

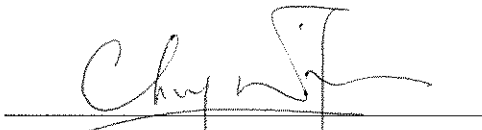
FINAL EM&A REPORT FOR CONTRACT NO. DE/2014/01

Jardine Engineering Corporation, Limited

**Contract No. DE/2014/01
Provision of Electrical and Mechanical Facilities
for Shek Wu Hui Sewage Treatment Works –
Further Expansion Phase 1A –
Advance Works and Ng Chow South Road
Sewage Pumping Station**

Final EM&A Report

(Version 1.0)

Certified By 
(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

WELLAB accepts no responsibility for changes made to this report by third parties

WELLAB LTD
Room 1714, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong
Tel: (852) 2898 7388 Fax: (852) 2898 7076
Website: www.wellab.com.hk

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ABBREVIATION AND ACRONYM

AL Levels	Action and Limit Levels
DSD	Drainage Services Department
E / ER	Engineer/Engineer's Representative
EIA	Environmental Impact Assessment
EM&A	Environmental Monitoring and Audit
EMIS	Environmental Mitigation Implementation Schedule
EP	Environmental Permit
EPD	Environmental Protection Department
ET	Environmental Team
IEC	Independent Environmental Checker
RE	Resident Engineer
SWHSTW	Shek Wu Hui Sewage Treatment Works

EXECUTIVE SUMMARY

Introduction

1. This is the Final Environmental Monitoring and Audit (EM&A) Report prepared by Wellab Limited for DSD Contract No. DE/2014/01 “Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Future Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station” (hereinafter called “the Project”). This report documents the key information of EM&A and environmental monitoring works at the Shek Wu Hui Sewage Treatment Works under Phase 1A with Environmental Permit (Permit No. FEP-02/474/2013) from 1st October 2017 to 29th November 2019.
2. As informed by the Contractor (Jardine Engineering Corporation, Limited), the major construction works under Contract No. DE/2014/01 have been substantially completed on 15th November 2019 and certified by DSD on 28th November 2019. Thus, the EM&A works under DE/2014/01 were ceased at the end of November 2019. The EM&A works under the same FEP will be continued by others under the Main Works Contract starting in December 2019.

Summary of Site Activities undertaken during the Construction Period

3. The major construction activities undertaken in the construction period included:
 - Install, T&C for MBR Pre-treatment Screen Chamber;
 - Install, T&C for Bioreactor No. 1 (BR1);
 - Install, T&C for Membrane Filtration System (MFS1);
 - Install, T&C for Flowmeter Chamber;
 - Install, T&C for Penstocks, Actuators and Stoplogs;
 - Install, T&C for Building Services and Fire Services;
 - Install, T&C of HV Switchgear, Transformer, LV Switchgear, LV Control Gear for MBR Facilities Building and BR1’s Vicinity Area;
 - Install, T&C of Lifting Appliance for Pre-Treatment Screen Chamber, BR1, MBR Facilities Building, MFS1;
 - Install, T&C of Cabling, Earthing and Lightning Protection System for MBR Facilities Building and Plant’s Vicinity Areas;
 - Install, T&C of Deodorising System for MBR Facilities Building;
 - Install, T&C for Maintenance Platform & Covers; and
 - Install, T&C for SCADA.

Environmental Monitoring Works

4. The environmental monitoring works of the Project were conducted by the ET of Contract DC/2013/09 at the SWHSTW under Phase 1A with same Environmental Permit in accordance with the updated EM&A Manual for Contract DE/2014/01 which has been submitted and verified by IEC. The impact monitoring methodology conducted by DC/2013/09 under the requirements of the updated EM&A Manual are also applicable for the installation work of DE/2014/01 since the two Contracts have shared the same site areas and executed their works under the same EP. The impact monitoring data under DC/2013/09 was adopted for the Project from October 2017.
5. From August 2018 onward, the environmental monitoring works of the Project were conducted by the ET of Contract No. DE/2014/01, which took over all the monitoring

stations from Contract No. DC/2013/09 under the same FEP. The impact monitoring methodology conducted by DE/2014/01 will follow the requirements of the updated EM&A Manual for Shek Wu Hui Sewage Treatment Works.

6. Summary of the non-compliance of the construction phrase of this Project is tabulated in **Table I**.

Table I Summary Table for Non-compliance (Exceedances) Recorded Due to the Project

Monitored By	Monitoring Station	Parameter	No. of Exceedance		No. of Exceedance Due to the Project		Total No. of Exceedance Due to the Project
			Action Level	Limit Level	Action Level	Limit Level	
DE/2014/01	AM1	1-hr TSP	0	0	0	0	0
	AM1 ⁽¹⁾	24-hr TSP	0	0	0	0	0
	AM1a ⁽¹⁾		0	0	0	0	0
	AM2	1-hr TSP	0	0	0	0	0
	AM2a ⁽²⁾	24-hr TSP	0	0	0	0	0
	AM2b ⁽²⁾		0	0	0	0	0
	NM1	Noise	0	0	0	0	0
	NM2		0	0	0	0	0

Remark:

(1): The 24-hour TSP monitoring station at AM1 – No.31 Wai Loi Tsuen has been disrupted on 20th August 2018 due to electrical problems and disagreement with the electricity supplier. The monitoring works were resumed at AM1a – Southeast Side of SWHSTW site boundary on 19th September 2018.

(2): The 24-hour TSP monitoring station at AM2a – RE's Site Office was relocated to AM2b – Northeast Side of SWHSTW site boundary on 9th September 2019 due to the removal of RE's Site Office.

1-hour TSP Monitoring

7. All 1-hour TSP monitoring was conducted as scheduled during the construction period. No Action/Limit Level exceedance was recorded for 1-hour TSP monitoring due to the Project throughout the whole construction period.

24-hour TSP Monitoring

8. 24-hour TSP monitoring at AM2a was cancelled due to power failure on 7, 13 and 28 March 2019. 24-hour TSP monitoring was conducted as scheduled during the construction period. No Action/Limit Level exceedance was recorded for 24-hour TSP monitoring due to the Project throughout the whole construction period.

Construction Noise Monitoring

9. All construction noise monitoring was conducted as scheduled during the construction period. No Action/Limit Level exceedance was recorded for noise monitoring due to the Project throughout the whole construction period.

Implementation Status of Environmental Mitigation Measures

10. Site audits were conducted once per week. The implementation of the environmental mitigation measures, Event Action Plans and environmental complaint handling procedures were also checked. No non-compliance was recorded during the site audits throughout the construction period.

Summary of Complaints, Prosecutions, Reporting Changes and Notification of Summons

11. No environmental complaint, prosecution, reporting changes and notification of summons were received or reported since the commencement of this Project.

Conclusion

12. The EM&A programme were found to be effective and efficient in monitoring impacts arising from the Project. The findings of the environmental monitoring program suggest that no adverse impacts on sensitive receivers at the designated monitoring locations were brought about by the Project. The environmental mitigation measures provided by the Contractor were generally acceptable apart from some minor deficiencies which were rectified timely by the Contractor.
13. In conclusion, the Project was environmentally acceptable.

1. INTRODUCTION

Background

- 1.1 The Project ‘Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station’ under Contract No: DE/2014/01 mainly comprises the Design, manufacture, supply, delivery, installation, inspection, testing and commissioning of E&M installations for the Advance Works in the SWHSTW. The general location plan of the Project is shown in **Figure 1**.
- 1.2 The Project is under North East New Territories New Development Areas and is part of the designated project with Register No. : AEIAR-175/2013. The Environmental Permit (Permit No. FEP-01/474/2013) was issued on 23rd January 2014 by the Environmental Protection Department (hereinafter called EPD) to the Drainage Services Department (hereinafter called the DSD) as the Permit Holder. Pursuant to Section 10 and 12 of the Environmental Impact Assessment Ordinance (EIAO), the Director of Environmental Protection (the Director) grants the Further Environmental Permit (Permit No. FEP-02/474/2013) based on the Application No.: FEP-179/2018 to DSD as the Permit Holder. The Further Environmental Permit was issued on 15th February 2018.
- 1.3 The Jardine Engineering Corporation, Limited (the Contractor) was commissioned by the DSD to undertake the construction of the Contract No. DE/2014/01 “Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station”.
- 1.4 Wellab Limited (Wellab) was commissioned and appointed by the Contractor on 1st January 2019 to undertake the role of the Environmental Team (ET) and the Environmental Monitoring and Audit (EM&A) works for the Contract No. DE/2014/01 under Condition 2.1 of the FEP.
- 1.5 As informed by the Contractor, the major construction works under Contract No. DE/2014/01 have been substantially completed on 15th November 2019 and certified by DSD on 28th November 2019. The EM&A works under DE/2014/01 were ceased at the end of November 2019. The EM&A works under the same FEP will be continued by others under the Main Works Contract starting in December 2019. Therefore, this is the Final Environmental Monitoring and Audit (EM&A) report summarizing the EM&A works for the Project during the construction period from 1st October 2017 to 28th November 2019.

Site Activities undertaken during the Reporting Period

- 1.6 The major construction activities undertaken in the construction period included:
- Install, T&C for MBR Pre-treatment Screen Chamber;
 - Install, T&C for Bioreactor No. 1 (BR1);
 - Install, T&C for Membrane Filtration System (MFS1);
 - Install, T&C for Flowmeter Chamber;
 - Install, T&C for Penstocks, Actuators and Stoplogs;
 - Install, T&C for Building Services and Fire Services;
 - Install, T&C of HV Switchgear, Transformer, LV Switchgear, LV Control Gear for

MBR Facilities Building and BR1's Vicinity Area;

- Install, T&C of Lifting Appliance for Pre-Treatment Screen Chamber, BR1, MBR Facilities Building, MFS1;
- Install, T&C of Cabling, Earthing and Lightning Protection System for MBR Facilities Building and Plant's Vicinity Areas;
- Install, T&C of Deodorising System for MBR Facilities Building;
- Install, T&C for Maintenance Platform & Covers; and
- Install, T&C for SCADA.

Project Organizations

- 1.7 The contacts of the Project are shown in **Table 1.1** and the Project Organization Chart is shown in **Figure 4**.

Table 1.1 Key Project Contacts

Party	Role	Name	Position	Phone No.
Drainage Service Department	Resident Site Engineer	Mr. Fong Mo	Resident Engineer	2594 7329
Wellab	Environmental Team	Dr. Priscilla Choy	ET Leader	2151 2089
ANewR	Independent Environmental Checker	Mr. Adi Lee	Independent Environmental Checker	2618 2836
The Jardine Engineering Corporation, Limited	Contractor	Mr. Kim Hung Lau	Project Manager	2947 1125
		Mr. George Ng	Environmental Officer	2947 1125

Summary of EM&A Requirements

- 1.8 The EM&A programme requires construction phase monitoring for air quality and construction noise, landscape and visual and environmental site audit. The EM&A requirements for each parameter are described in the following sections, including:
- All monitoring parameters;
 - Action and Limit levels for all environmental parameters;
 - Event Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA study final report; and
 - Environmental requirements in contract documents.
- 1.9 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in **Section 4** of this report.
- 1.10 This report represents the monitoring results, observation and locations of the required monitoring parameter, namely air quality, noise and audit works conducted for the Project in the construction period between 1st October 2017 and 28th November 2019.

2. AIR QUALITY

Monitoring Requirements

- 2.1 In accordance with the updated EM&A Manual, 1-hour and 24-hour TSP monitoring were conducted to monitor the air quality. Impact 1-hour TSP monitoring was conducted for at least three times in every six days, while impact 24-hour TSP monitoring was conducted for at least once every 6 days. **Appendix A** shows the established Action/Limit Levels for the environmental monitoring works.
- 2.2 Should non-compliance of the criteria occur, action in accordance with the Action Plan in **Appendix E** shall be carried out.

Baseline Condition

- 2.3 Baseline air quality monitoring was conducted at the designated monitoring stations by the ET of Contract No. DC/2013/09 under the same FEP. The baseline data was used for the Project to derive the Action and Limit Level. **Appendix A** shows the established Action and Limit Levels for the environmental monitoring works.
- 2.4 The baseline average TSP levels and the Limit Levels at each designated air monitoring stations are presented in **Table 2.1**.

Table 2.1 Baseline Average TSP level and Limit Level for Monitoring Stations

Monitoring Station	Average TSP Level		
	Average TSP Level, µg/m ³ (Range)	Action Level, µg/m ³	Limit Level, µg/m ³
1-hour TSP			
AM1 – No. 31 Wai Loi Tsuen	55 (15 - 175)	286	500
AM2 – Fu Tei Au	40 (11 – 137)	276	500
24-hour TSP			
AM1 – No. 31 Wai Loi Tsuen	27 (13-41)	147	260
AM1a ⁽¹⁾ – Southeast Side of SWHSTW site boundary	27 (13 - 41)	147	260
AM2a – RE’s Site Office	39 (28 – 64)	155	260
AM2b ⁽²⁾ – Northeast Side of SWHSTW site boundary	39 (28 – 64)	155	260

Remark:

(1): The 24-hour TSP monitoring station at AM1 – No.31 Wai Loi Tsuen has been disrupted on 20th August 2018 due to electrical problems and disagreement with the electricity supplier. The monitoring works were resumed at AM1a – Southeast Side of SWHSTW site boundary on 19th September 2018.

(2): The 24-hour TSP monitoring station at AM2a – RE’s Site Office was relocated to AM2b – Northeast Side of SWHSTW site boundary on 9th September 2019 due to the removal of RE’s Site Office.

Monitoring Locations

- 2.5 Impact dust monitoring were conducted at the air quality monitoring stations, AM1 – No. 31 Wai Loi Tsuen, AM2 – Fu Tei Au, AM1a – Southeast Side of SWHSTW site boundary, AM2a RE’s Site Office and AM2b – Northeast Side of SWHSTW site boundary.
- 2.6 The 24-hour TSP monitoring station at AM1 has been disrupted on 20th August 2018 due to electrical problems and disagreement with the electricity supplier. An alternative monitoring station (AM1a) has been proposed and 24-hour TSP monitoring was resumed at AM1a on 19th September 2018;
- 2.7 The 24-hour TSP monitoring station at RE’s Site Office (AM2a) was relocated to the alternative monitoring station (AM2b) on 9th September 2019 due to the removal of RE’s Site Office.
- 2.8 **Table 2.2** describes the air quality monitoring locations and **Figure 2** indicated their positions in relation to the site boundary.

Table 2.2 Locations for Air Quality Monitoring

Monitoring Station	Monitored by	Location of Measurement	Monitoring Parameter
AM1 ⁽¹⁾	DE/2014/01	No. 31 Wai Loi Tsuen	1-hour TSP & 24-hour TSP
AM2		Fu Tei Au	1-hour TSP
AM1a ⁽¹⁾		Southeast Side of SWHSTW site boundary	24-hour TSP
AM2a ⁽²⁾		RE’s Site Office	
AM2b ⁽²⁾		Northeast Side of SWHSTW site boundary	

Remark:

(1): The 24-hour TSP monitoring station at AM1 – No.31 Wai Loi Tsuen has been disrupted on 20th August 2018 due to electrical problems and disagreement with the electricity supplier. The monitoring works were resumed at AM1a – Southeast Side of SWHSTW site boundary on 19th September 2018.

(2): The 24-hour TSP monitoring station at AM2a – RE’s Site Office was relocated to AM2b – Northeast Side of SWHSTW site boundary on 9th September 2019 due to the removal of RE’s Site Office.

Monitoring Parameters, Frequency and Duration

- 2.9 **Table 2.3** summarizes the monitoring parameters and frequencies of impact dust monitoring for the whole construction period.

Table 2.3 Impact Dust Monitoring Parameters, Frequency and Duration

Parameters	Frequency
1-hour TSP	Three times every 6 days
24-hour TSP	once every 6 days

Results and Observations

- 2.10 The impact air quality monitoring work was conducted by the ET of Contract DC/2013/09 at the SWHSTW under Phase 1A with same Environmental Permit in

accordance with the updated EM&A Manual for Contract DE/2014/01 which has been submitted and verified by IEC. The impact monitoring methodology conducted by DC/2013/09 under the requirements of the updated EM&A Manual are also applicable for the Project since the two Contracts have shared the same site areas and executed their works under the same EP. The impact monitoring data under DC/2013/09 was adopted for the Project from October 2017.

- 2.11 From August 2018 onward, the impact air quality monitoring was conducted by the ET of Contract No. DE/2014/01, which took over all the monitoring stations from Contract No. DC/2013/09 under the same FEP. The impact monitoring methodology conducted by DE/2014/01 will follow the requirements of the updated EM&A Manual. Impact air quality monitoring was conducted by the ET of Contract No. DE/2014/01 during the construction period between August 2018 and November 2019. The EM&A works under the same FEP will be continued by others under the Main Works Contract starting in December 2019.
- 2.12 A summary of the impact air quality monitoring results in the construction period is given in **Table 2.4**.

Table 2.4 Summary of 1-hour and 24-hour TSP Monitoring Results in the Construction Period

Monitoring Stations	Average $\mu\text{g}/\text{m}^3$	Maximum $\mu\text{g}/\text{m}^3$	Minimum $\mu\text{g}/\text{m}^3$	Action Level $\mu\text{g}/\text{m}^3$	Limit Level $\mu\text{g}/\text{m}^3$
1-hour TSP					
AM1	88	193	20	286	500
AM2	84	238	20	276	
24-hour TSP					
AM1	15	17	13	147	260
AM1a ⁽¹⁾	49	138	10		
AM2a	50	124	9	155	
AM2b ⁽²⁾	96	154	48		

- 2.13 All 1-hour TSP monitoring was conducted as scheduled during the construction period. No Action/Limit Level exceedance was recorded for 1-hour TSP monitoring due to the Project throughout the whole construction period. Summary of exceedance is presented in **Appendix D**.
- 2.14 24-hour TSP monitoring at AM2a was cancelled due to power failure on 7, 13 and 28 March 2019. 24-hour TSP monitoring was conducted as scheduled during the construction period. No Action/Limit Level exceedance was recorded for 24-hour TSP monitoring due to the Project throughout the whole construction period. Summary of exceedance is presented in **Appendix D**.
- 2.15 The monitoring data and graphical presentations of 1-hour and 24-hour TSP monitoring results during construction period are shown in **Appendix B**.
- 2.16 According to field observations during site inspection, identifiable dust emission sources near the monitoring stations were vehicles movement on Chuk Wan Street.

3. NOISE

Monitoring Requirements

- 3.1 Two noise monitoring stations, namely NM1 and NM2 were designated in the updated EM&A Manual for impact monitoring. Impact noise monitoring was conducted for at least once per week during the construction phase of the Project. **Appendix A** shows the established Action and Limit Levels for the environmental monitoring works.
- 3.2 Should non-compliance of the criteria occur, action in accordance with the Action Plan in **Appendix E** shall be carried out.

Baseline Condition

- 3.3 Baseline noise monitoring was conducted at the designated monitoring stations by the ET of Contract No. DC/2013/09 under the same FEP. The baseline data was used for the Project to derive the Action and Limit Level. **Appendix A** shows the established Action and Limit Levels for the environmental monitoring works.
- 3.4 The baseline noise level and the Noise Limit Level at each designated noise monitoring station are presented in **Table 3.1**.

Table 3.1 Baseline Noise Level and Limit Level for Monitoring Stations

Monitoring Stations	Normal day (Monday to Saturday): Daytime 0700-1900, dB(A) L_{eq} (30 min.)			Action Level	Limit Level, dB(A) L_{eq} (30 min.)
	Min	Mean	Max		
NM1	51.4	54.5	58.2	When one documented complaint is received	>75* dB(A)
NM2	44.1	48.8	52.4		

Notes: If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.

(*) 70 dB(A) and 65 dB(A) for schools during normal teaching periods and school examination periods, respectively.

Monitoring Locations

- 3.5 Noise monitoring was conducted at two designed monitoring stations as listed in **Table 3.2** and **Figure 3** indicated their positions in relation to the site boundary.

Table 3.2 Locations for Noise Monitoring Stations

Monitoring Station(s)	Monitored By	Location of Measurement
NM1	DE/2014/01	No. 31 Wai Loi Tsuen
NM2		Fu Tei Au

Monitoring Parameters, Frequency and Duration

- 3.6 Table 3.3 summarizes the monitoring parameters, frequency and total duration of monitoring.

Table 3.3 Noise Monitoring Parameters, Frequency and Duration

Monitoring Stations	Parameter	Period	Frequency
NM1	L ₁₀ (30 min.) dB(A)	0700-1900 hrs on normal weekdays	Once per week
NM2	L ₉₀ (30 min.) dB(A)		
	L _{eq} (30 min.) dB(A)		

Results and Observations

- 3.7 The impact noise monitoring work was conducted by the ET of Contract DC/2013/09 at the SWHSTW under Phase 1A with same Environmental Permit in accordance with the updated EM&A Manual for Contract DE/2014/01 which has been submitted and verified by IEC. The impact monitoring methodology conducted by DC/2013/09 under the requirements of the updated EM&A Manual are also applicable for the Project since the two Contracts have shared the same site areas and executed their works under the same EP. The impact monitoring data under DC/2013/09 was adopted for the Project from October 2017.
- 3.8 From August 2018 onward, the impact noise monitoring was conducted by the ET of Contract No. DE/2014/01, which took over all the monitoring stations from Contract No. DC/2013/09 under the same FEP. The impact monitoring methodology conducted by DE/2014/01 will follow the requirements of the updated EM&A Manual. Impact noise monitoring was conducted by the ET of Contract No. DE/2014/01 during the construction period between August 2018 and November 2019. The EM&A works under the same FEP will be continued by others under the Main Works Contract starting in December 2019.
- 3.9 A summary of the noise monitoring results in the construction period is given in **Table 3.4**.

Table 3.4 Summary of Noise Monitoring Results in the Construction Period

0700-1900 hrs. during weekdays			
Noise Monitoring Station	Range, dB(A) L _{eq} (30 min.)	Action Level	Limit Level, dB(A) L _{eq} (30 min.)
NM1	49.5 – 66.5	When one documented complaint is received	75.0
NM2	44.7 – 65.6		75.0

- 3.10 All construction noise monitoring was conducted as scheduled during the construction period. No Action/Limit Level exceedance was recorded for noise monitoring due to the Project throughout the whole construction period. Summary of exceedance is presented in **Appendix D**.
- 3.11 Noise monitoring results and graphical presentations are shown in **Appendix C**.
- 3.12 The major noise source identified at the designated noise monitoring stations was vehicles movement on Chuk Wan Street.

4. ENVIRONMENTAL AUDIT

Site Audits

- 4.1 Site audits were carried out by representative of the Contractor, Engineer and Contractor's ET on weekly basis to observe the aspect of water quality, noise, air quality, landscape, waste and chemical management. Reminders and recommendation were given to the Contractor, and the Contractor rectified and implemented environmental management practices and mitigation measures timely and properly in the Project site. The representative of the IEC joined the site inspection once per month. For details of site audits finding, please refer to respective monthly EM&A Reports.

Implementation Status of Environmental Mitigation Measures

- 4.2 The mitigation measures detailed in the updated EM&A Manual were implemented throughout the whole construction period. A summary of the EMIS is provided in **Appendix F**.
- 4.3 No non-compliance was recorded during the site audits throughout the construction period. Observation and recommendations recorded during the site audits were summarized in each of the Monthly EM&A Reports.

Review of Environmental Monitoring Procedures

- 4.4 The monitoring works conducted by the monitoring team were inspected regularly. The following observations have been recorded for the monitoring works:

Air Quality Monitoring

- The Monitoring team recorded all observations around the monitoring stations, within and outside the construction site.
- The monitoring team recorded the temperature and weather conditions on the monitoring days.

Noise Monitoring

- The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring result.
- Major noise sources were identified and recorded. Other intrusive noise attributing to the result was trimmed off by pausing the monitoring temporarily.

Status of Waste Management

- 4.5 Waste generated from this Project includes non-inert C&D materials which are made up of general refuse and recyclable waste like paper / cardboard packaging. The amount of wastes generated by the activities of this Project during the construction period is shown in **Appendix H**.
- 4.6 Most of the necessary mitigation measures have been implemented and recommended follow-up actions have been discharged by the Contractor regarding to waste management in the reporting period. Observation and recommendations recorded during the site audits were summarized in each of the Monthly EM&A Reports.

5. ENVIRONMENTAL NON-CONFORMANCE

Summary of Exceedances

- 5.1 The Event Action Plans for air quality, noise are presented in **Appendix E**.
- 5.2 No exceedance of the Action and Limit Levels of construction noise, 1-hour TSP and 24-hour TSP monitoring was recorded during the construction period. Summary of exceedance is presented in **Appendix D**.

Summary of Environmental Non-Compliance

- 5.3 No environmental non-compliance was recorded in the construction period. The observations and recommendations made in each individual site audit session were attached in the Monthly EM&A Reports.

Summary of Complaint, Prosecutions, Reporting Changes and Notification of Summons

- 5.4 No environmental complaint, prosecution, reporting changes and notification of summons were received or reported since the commencement of this Project. The summary of complaint, prosecutions, reporting changes and notification of summons is presented in **Appendix G**.

6. COMMENT, CONCLUSIONS AND RECOMMENDATIONS

Comment on Overall EM&A Programme

- 6.1 The EM&A Programme requires construction phase monitoring for air quality, air-borne construction noise and environmental site audit. Timely implementation of mitigation measures were carried out according to the environmental data obtained during construction phase. According to the information from RE and Contractor, the major construction activities under Contract No. DE/2014/01 have been substantially completed on 15th November 2019 and certified by DSD on 28th November 2019. Thus, The EM&A works under DE/2014/01 were ceased at the end of November 2019. The EM&A works under the same FEP will be continued by others under the Main Works Contract starting in December 2019.
- 6.2 Therefore, there was no major construction activities after 15th November 2019 and the future environmental concerns under Contract No. DE/2014/01. The weekly site audits were effective to ensure the implementation and efficiency of the mitigation measures. As a result, environmental nuisance to the public could be reduced to a minimal.
- 6.3 Therefore, the overall performance of the monitoring methodology adopted and environmental management system in this Project was effective

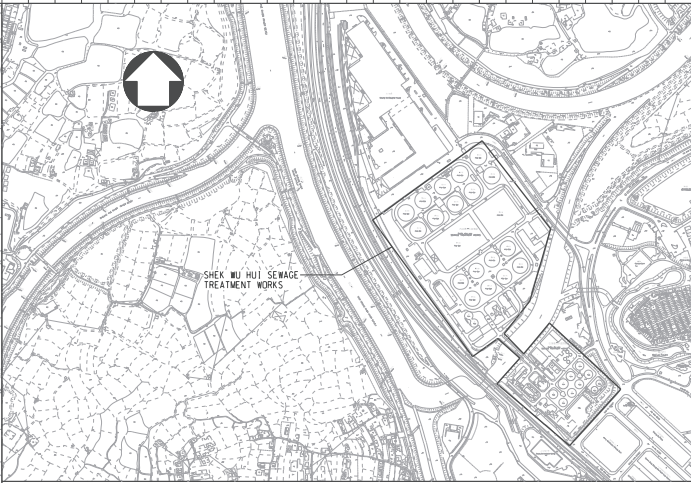
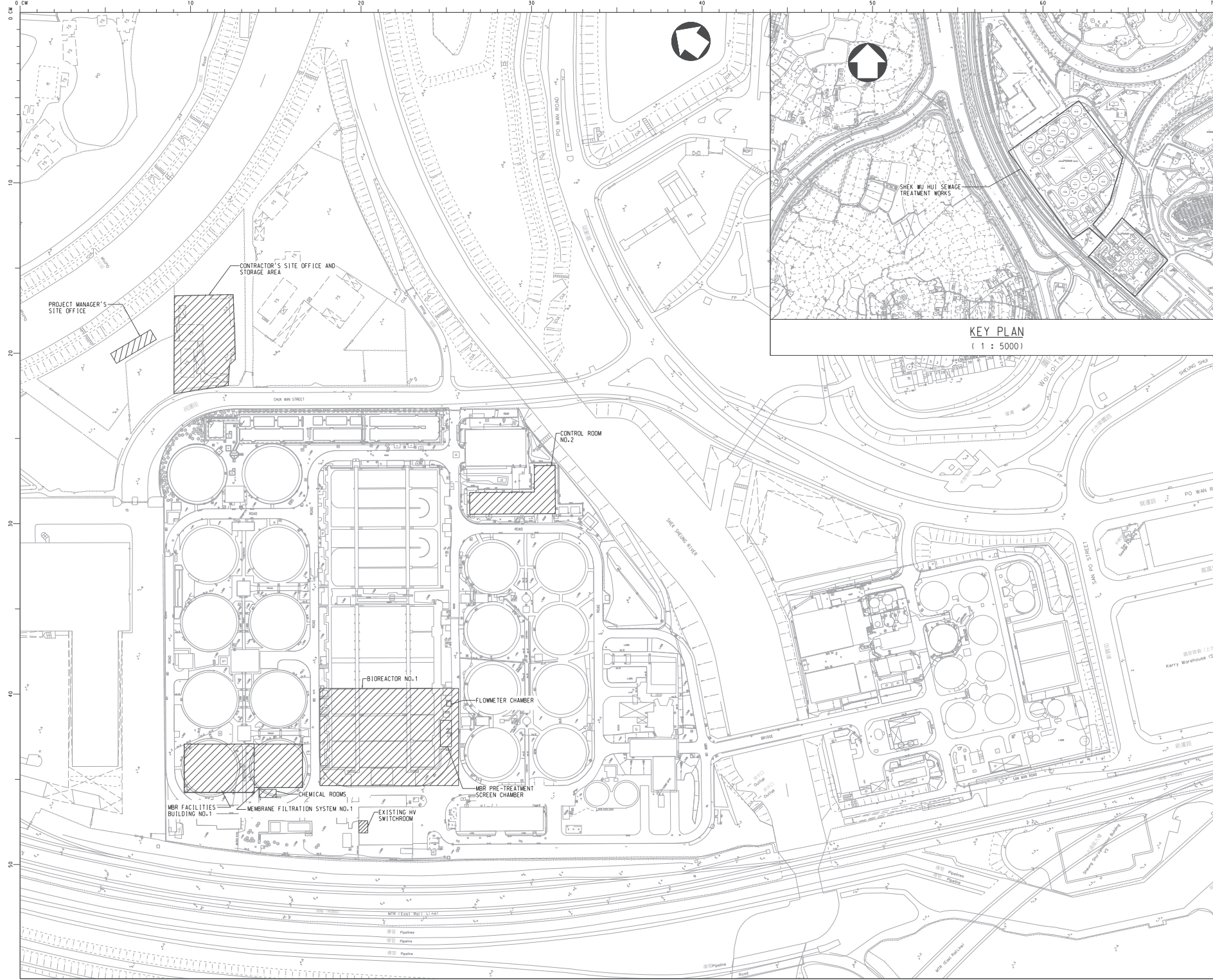
Overall EM&A Data

- 6.4 Impact air quality and noise monitoring were carried out according to the requirements in the EM&A Manual. No exceedance of the Action and Limit Levels of air quality and noise monitoring was recorded at the designated monitoring stations during the whole construction period.

Recommendations and Conclusions

- 6.5 The EM&A programme was found to be effective and efficient in monitoring impacts arising from the Project. The findings of the environmental monitoring program suggest that no adverse impacts on sensitive receivers were brought about by the Project. The environmental mitigation measures provided by the Contractor were generally acceptable apart from some minor deficiencies, which were rectified timely by the Contractor. In conclusion, the Project was environmentally acceptable.
- 6.6 With the success of the overall EM&A programme, the deterioration of the environment caused by the Project was cost-effectively identified and necessary prompt effective mitigation measures were implemented to avoid any unacceptable impacts.

FIGURES



KEY PLAN
(1 : 5000)

NOTES :

1. GENERAL NOTES REFER TO DRAWING NO. DEM1619/M01 UNLESS OTHERWISE SPECIFIED.
2. LEGEND REFER TO DRAWING NO. DEM1619/M04.
3. CONTRACT COMPUTER FACILITIES AND FURNITURE FOR PROJECT MANAGER'S SITE OFFICE SHALL BE PROVIDED BY THE EAM CONTRACTOR.

WORKING AREA OF ADVANCE WORKS

no.	date	description	name	initial
REVISION				
			name	date
designed			Y Y WONG	22 APR 2015
drawn			C Y CHEUNG	22 APR 2015
checked			C S CHOI	22 APR 2015
counter checked			Y L CHAN	22 APR 2015
vetted			M C FUNG	22 APR 2015

approved RICKY LI
CE/EAM 23 APR 2015
Date

contract no. DE/2014/01

file no.

project no. 440605 AND 50330R

contract

PROVISION OF ELECTRICAL AND MECHANICAL FACILITIES FOR SHEK WU HUI SEWAGE TREATMENT WORKS - FURTHER EXPANSION PHASE 1A - ADVANCE WORKS AND NG CHOW SOUTH ROAD SEWAGE PUMPING STATION

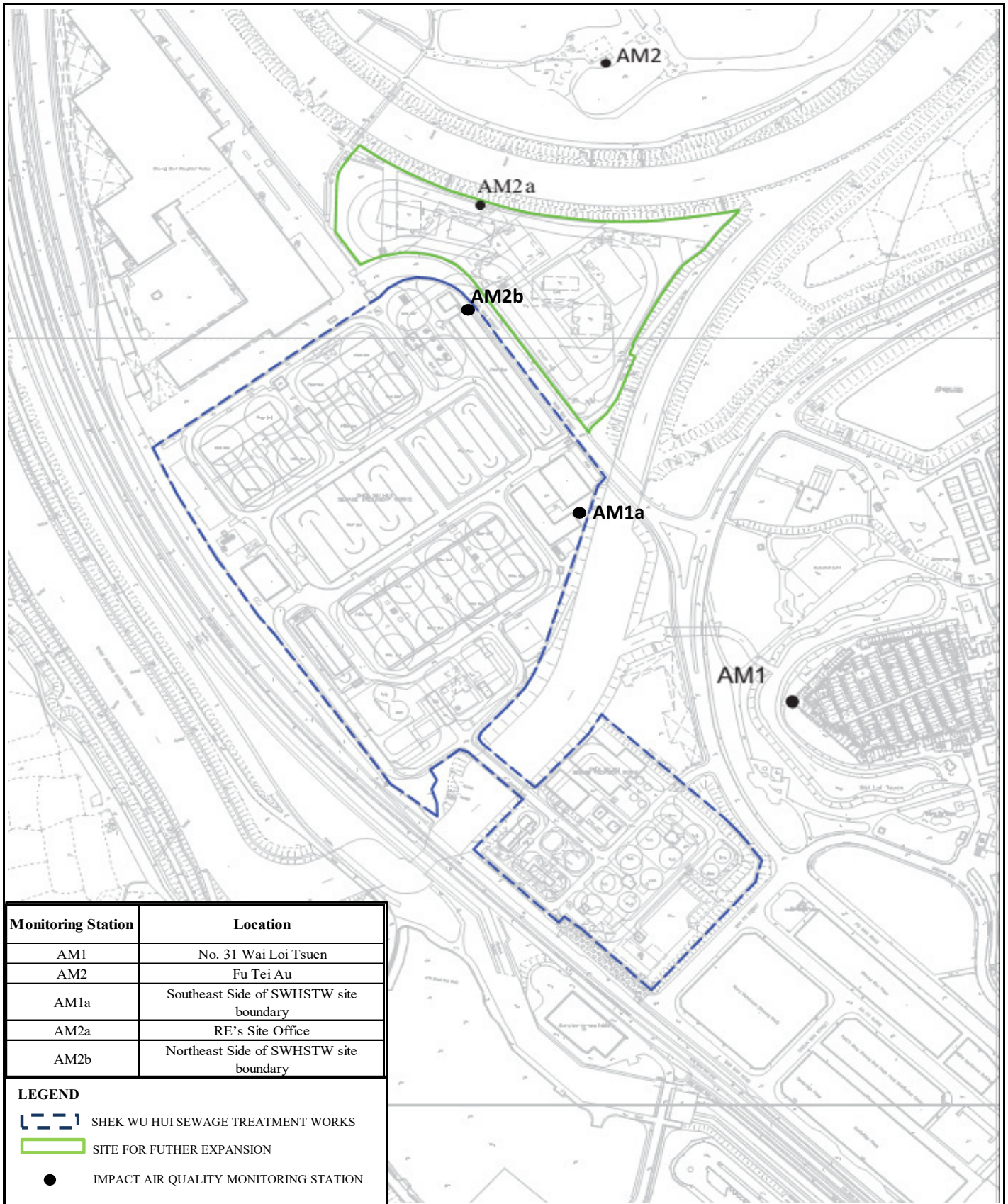
drawing title

KEY PLAN AND LOCATION PLAN

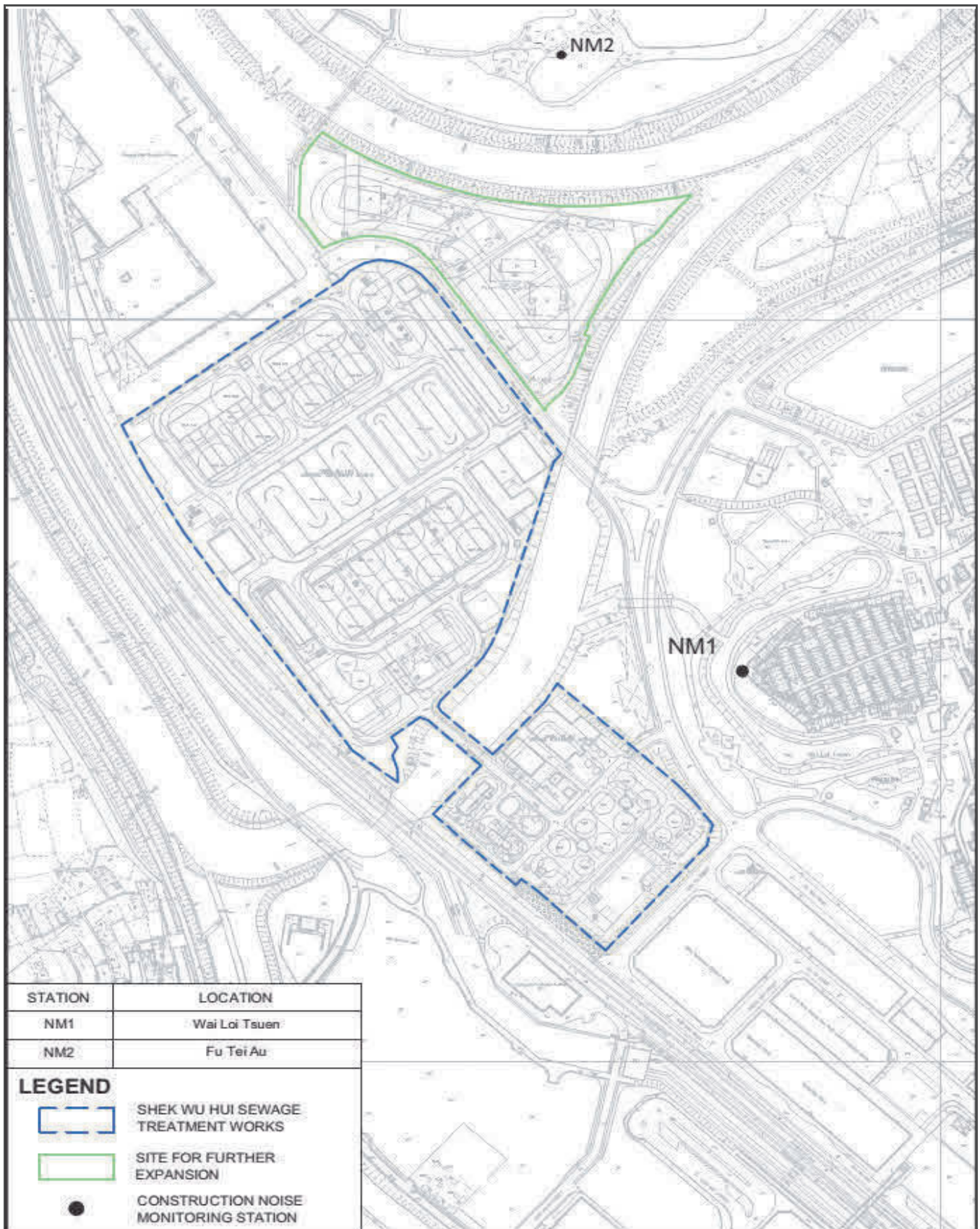
drawing no.	scale
DEM1619/M02	1 : 1000 OR AS SHOWN


office
ELECTRICAL AND MECHANICAL PROJECTS DIVISION

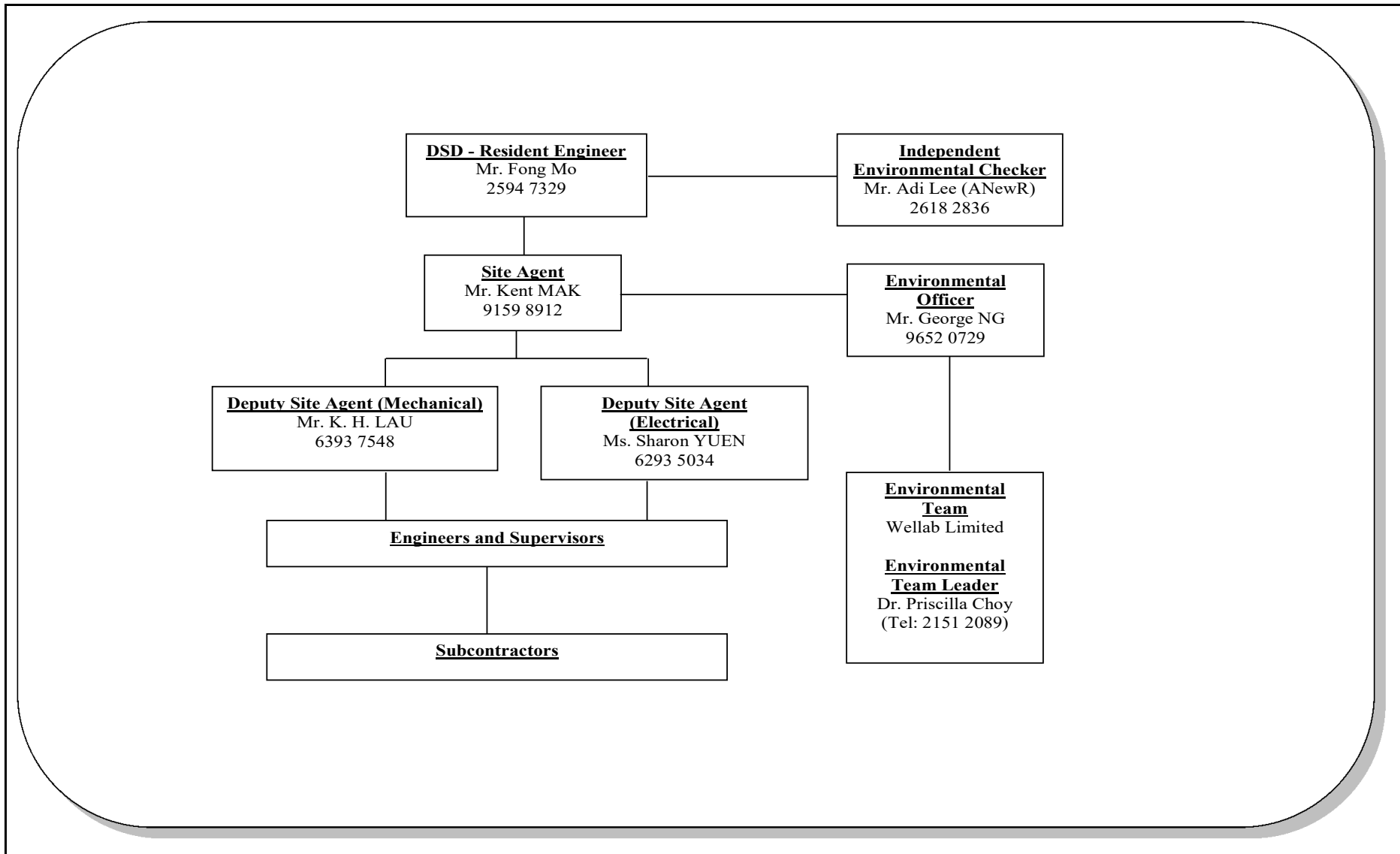
DRAINAGE SERVICES DEPARTMENT
GOVERNMENT OF THE HONG KONG
SPECIAL ADMINISTRATIVE REGION




Title	Contract No. DE/2014/01 Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station	Scale	Project No.	 consulting . testing . research
	Locations of Impact Air Quality Monitoring Stations	Date	Figures	
		N.T.S	MA16002	
		Apr-20	2	



Title	Contract No. DE/2014/01 Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station	Scale	Project No.	 consulting . testing . research
	Locations of Impact Noise Monitoring Stations	Date	Figures	
		N.T.S	MA16002	
		Oct-17	3	



Title	Contract No. DE/2014/01 Provision of Electrical and Mechanical Facilities for Shek Wu Hui Sewage Treatment Works – Further Expansion Phase 1A – Advance Works and Ng Chow South Road Sewage Pumping Station Project Organization Chart	Scale	N.T.S	Project No.	MA16002	 consulting . testing . research
		Version	v.1	Figure	4	

**APPENDIX A
ACTION AND LIMIT LEVELS FOR AIR
QUALITY AND NOISE**

Appendix A Action and Limit Levels for Air Quality and Noise

Table A-1 Action and Limit Levels for 1-Hour TSP and 24-Hour TSP

Monitoring Stations	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour	24-hour	1-hour	24-hour
AM1	286	147	500	260
AM1a	N/A	147	N/A	260
AM2	276	N/A	500	N/A
AM2a	N/A	155	N/A	260
AM2b	N/A	155	N/A	260

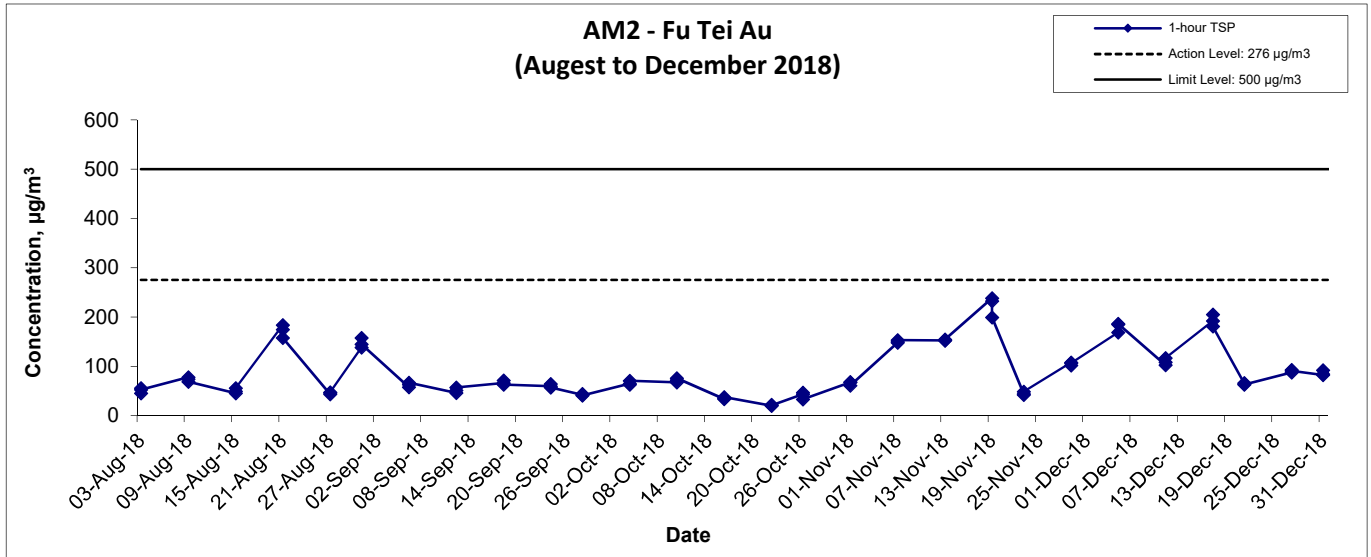
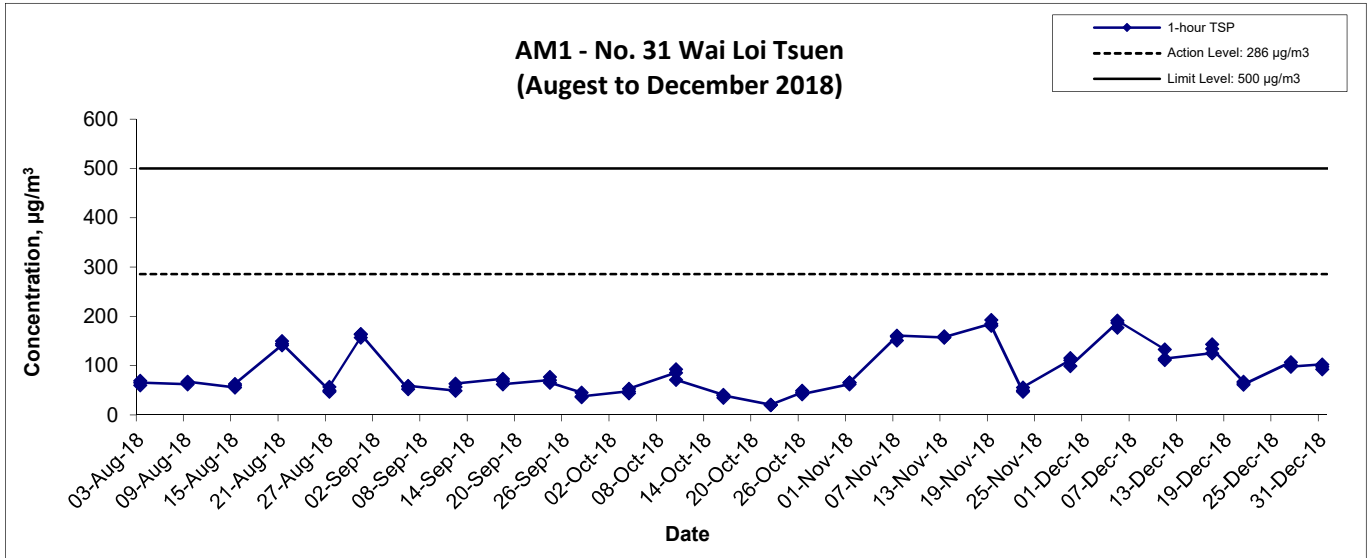
Table A-2 Action and Limit Level for Construction Noise


Monitoring Stations	Time Period	Action Level	Limit Level in dB(A)
NM1	0700-1900 hours on normal weekdays	When one documented complaint is received	>75*
NM2			

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

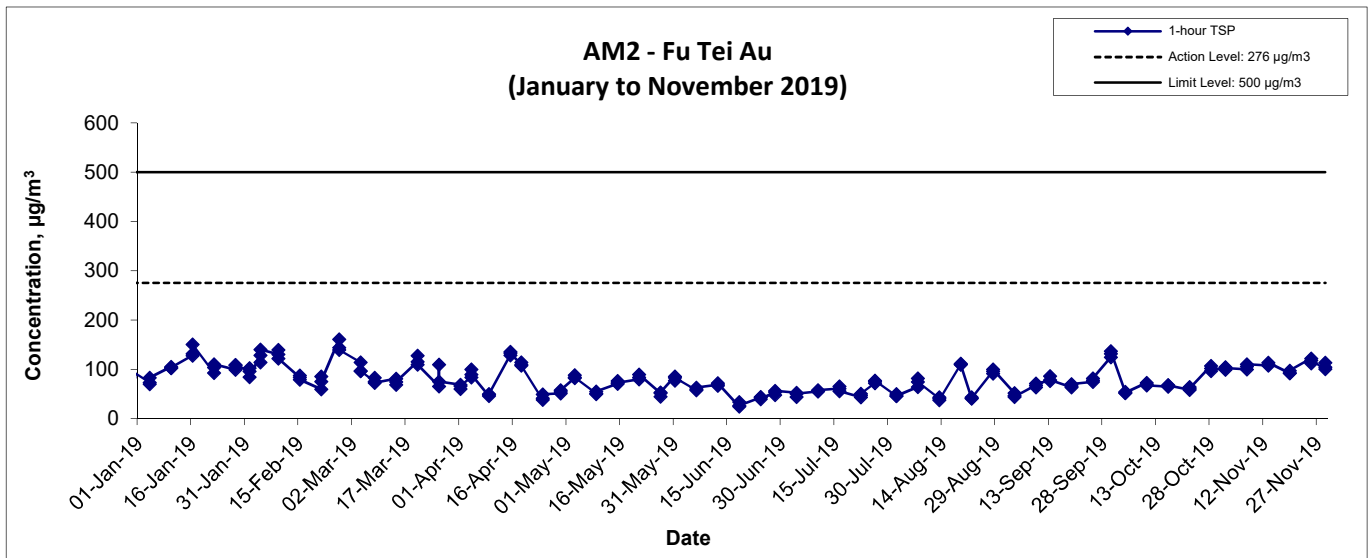
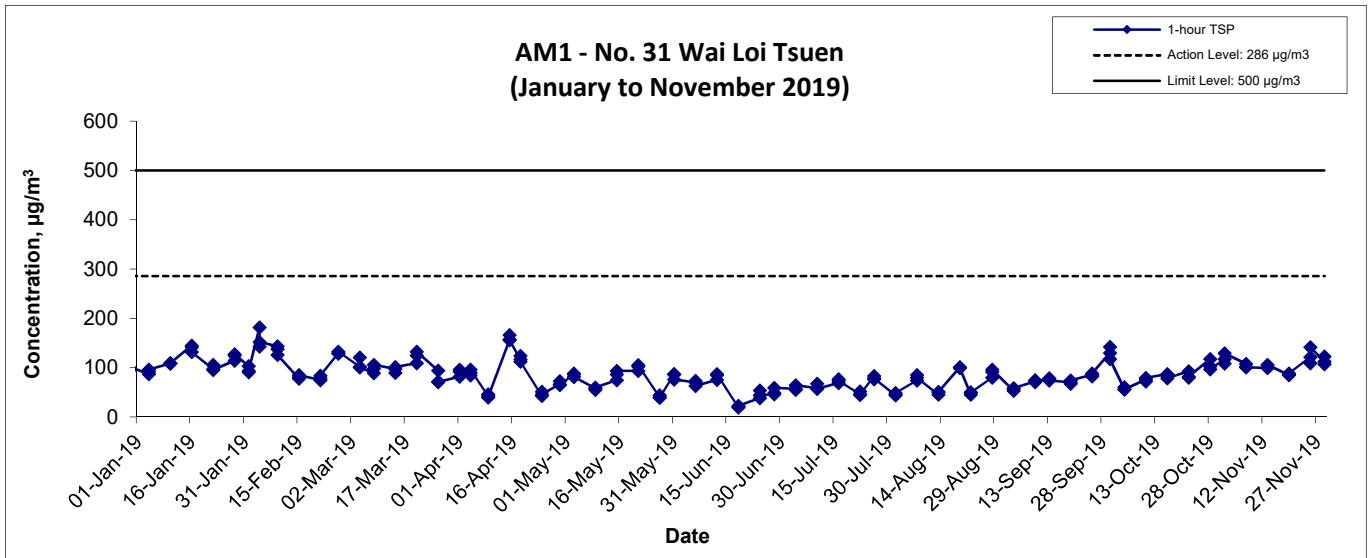
**APPENDIX B
1-HOUR AND 24-HOUR TSP MONITORING
RESULTS AND GRAPHICAL
PRESENTATIONS**

1-hr TSP Concentration Levels



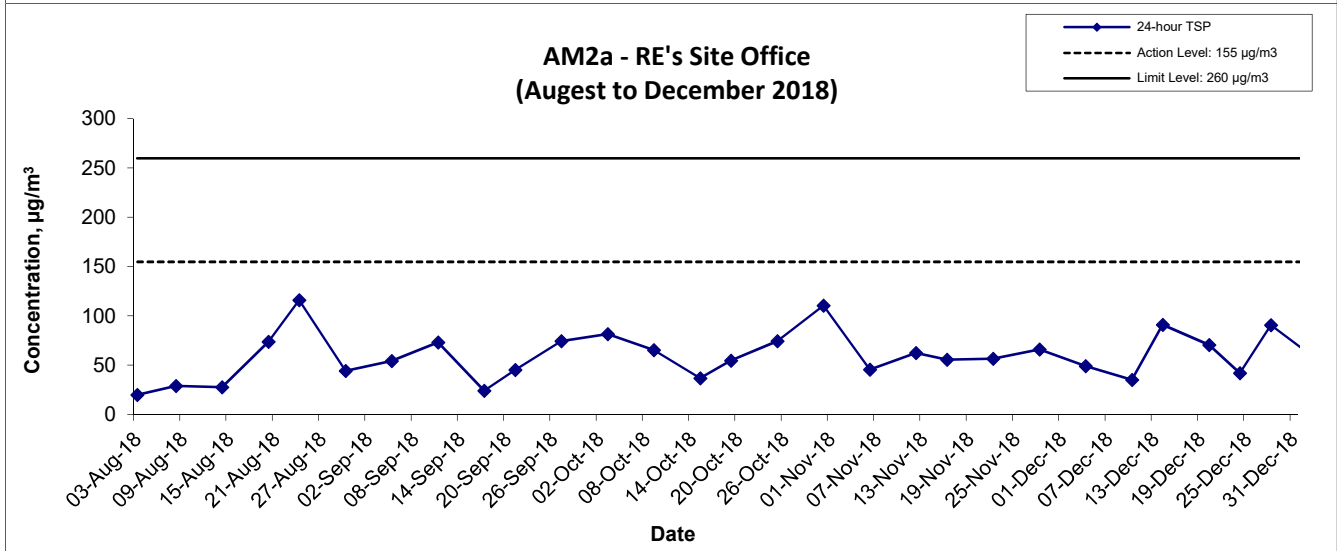
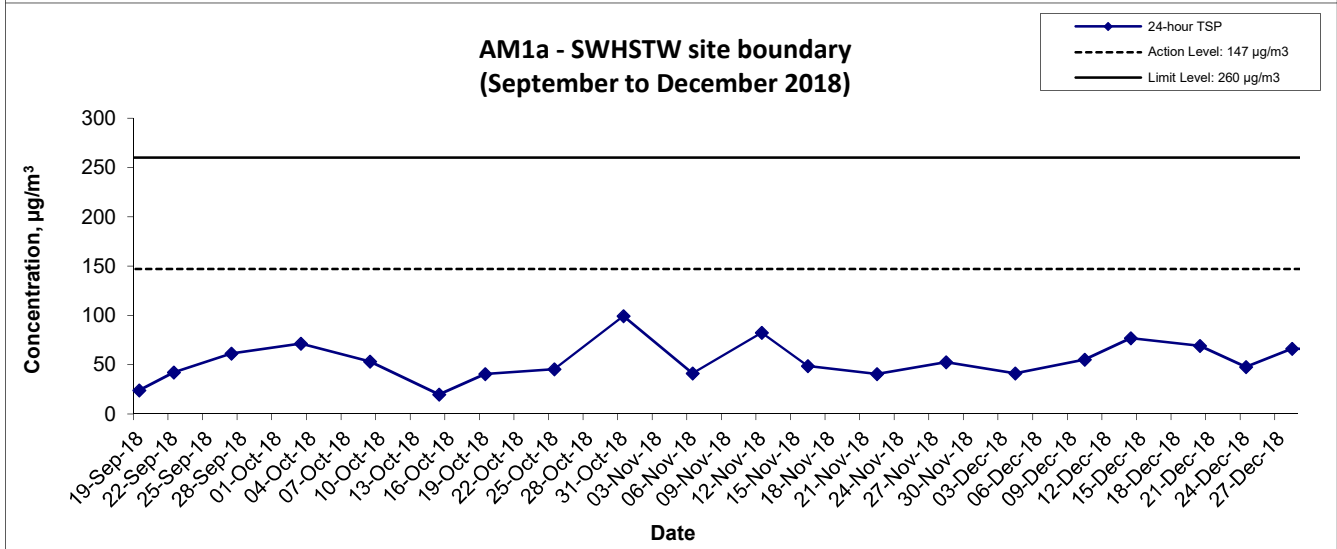
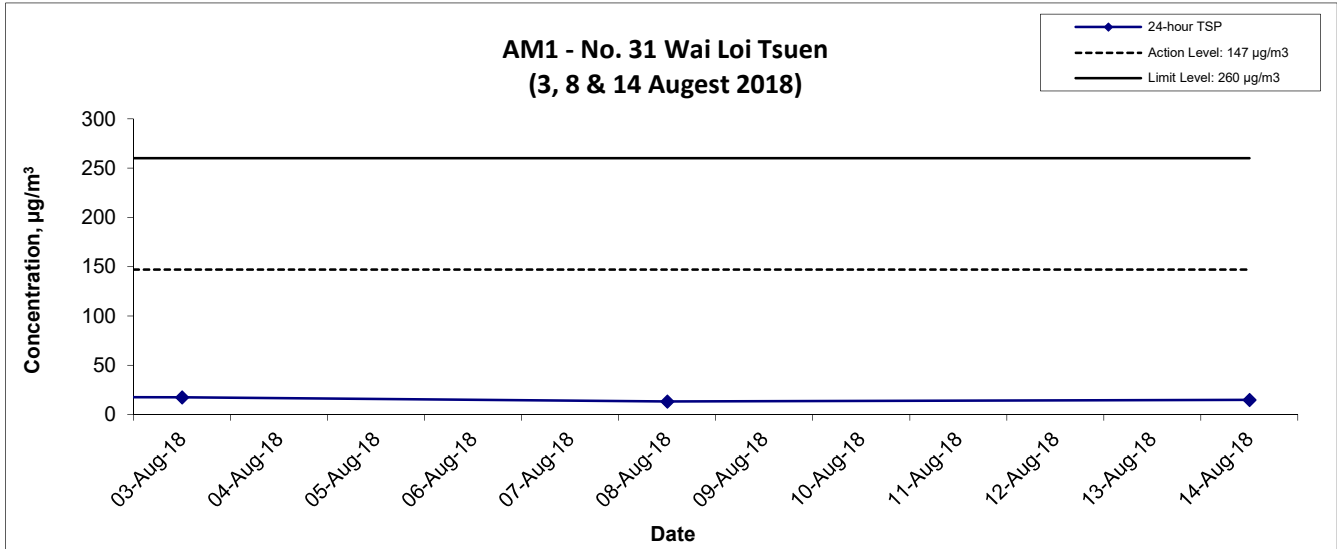
Title Contract No. DE/2014/01 Provision of Electrical and Mechanical and Facilities for Shek Wu Hui Sewage Treatment Works Graphical Presentation of 1-hour TSP Monitoring Results	Scale N.T.S	Project No. MA16002	 consulting . testing . research
	Date Feb-20	Appendix B	

1-hr TSP Concentration Levels



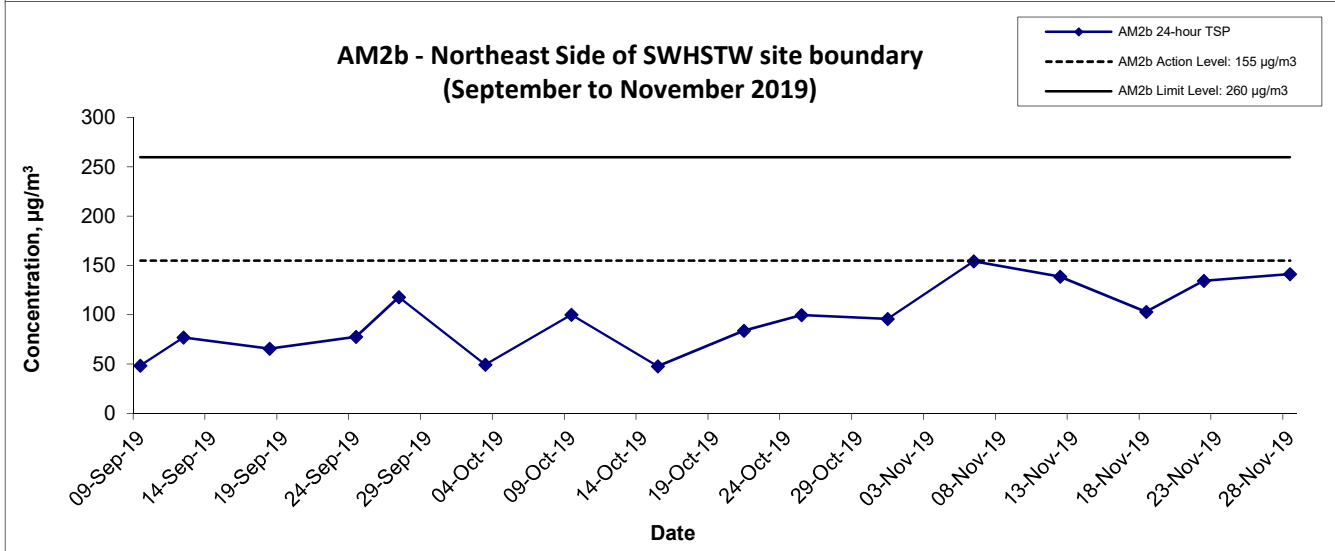
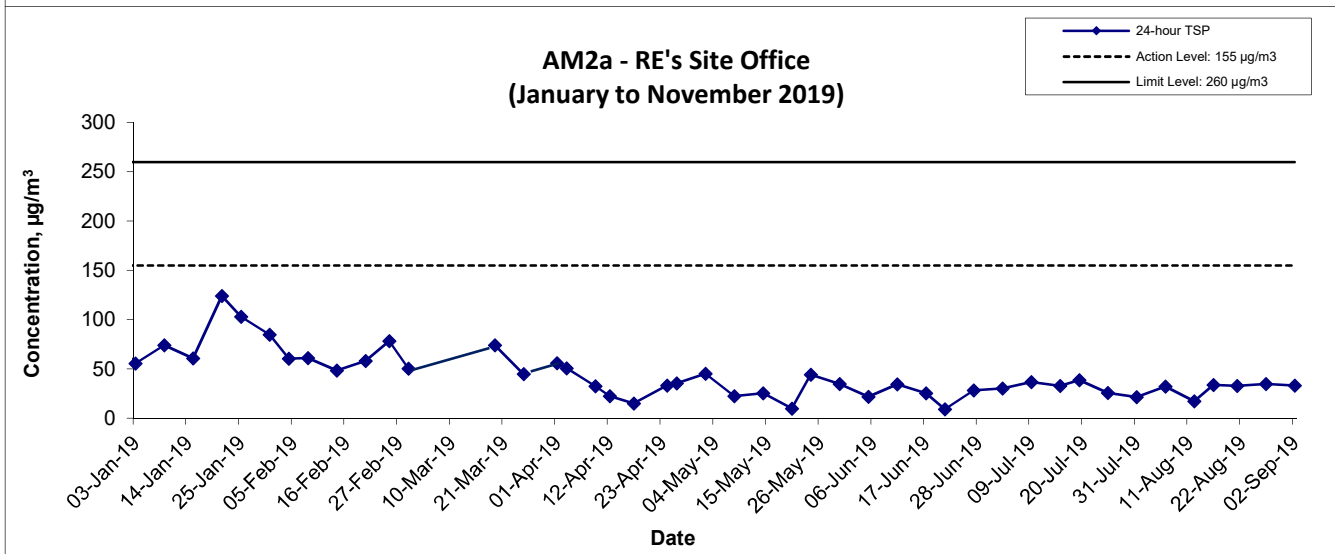
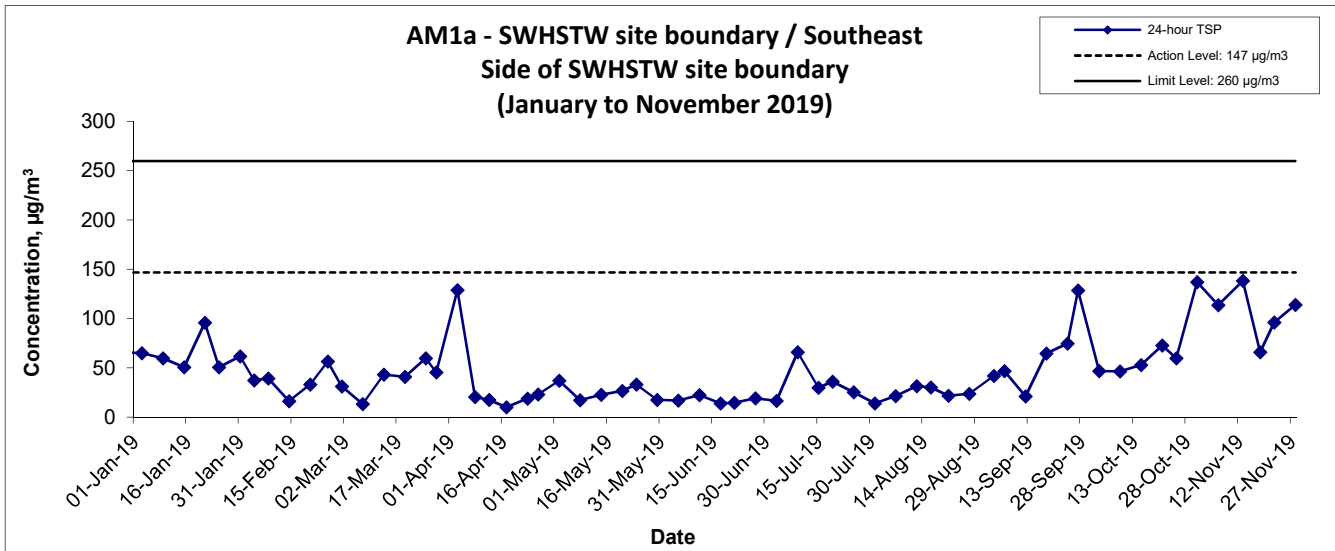
Title Contract No. DE/2014/01 Provision of Electrical and Mechanical and Facilities for Shek Wu Hui Sewage Treatment Works Graphical Presentation of 1-hour TSP Monitoring Results	Scale N.T.S	Project No. MA16002	
	Date Feb-20	Appendix B	

24-hr TSP Concentration Levels



Title Contract No. DE/2014/01 Provision of Electrical and Mechanical and Facilities for Shek Wu Hui Sewage Treatment Works Graphical Presentation of 24-hour TSP Monitoring Results	Scale N.T.S	Project No. MA16002	
	Date Feb-20	Appendix B	

24-hr TSP Concentration Levels



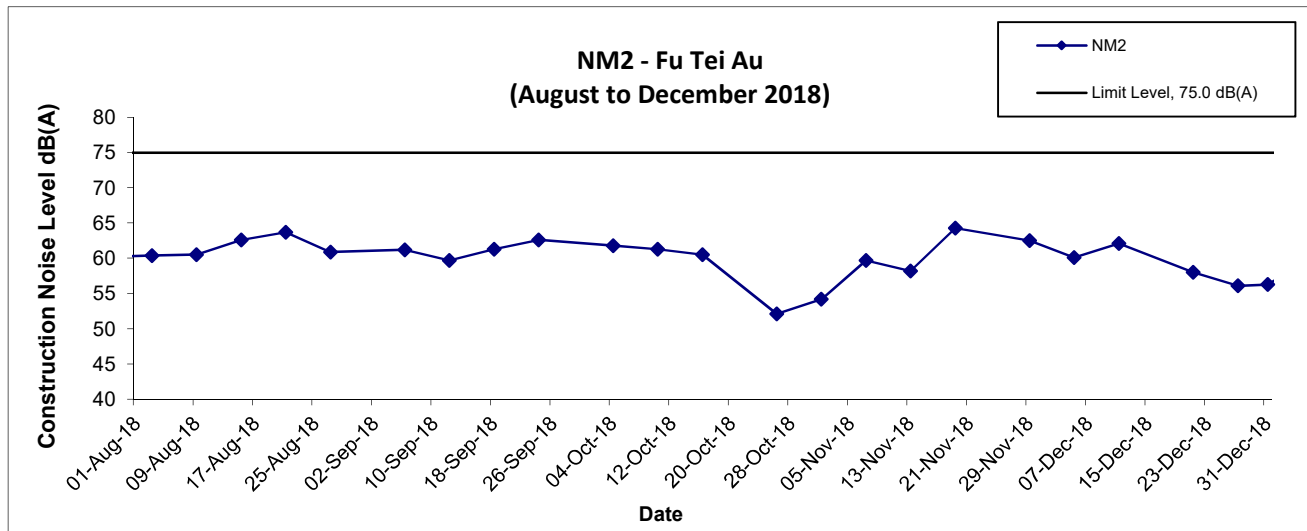
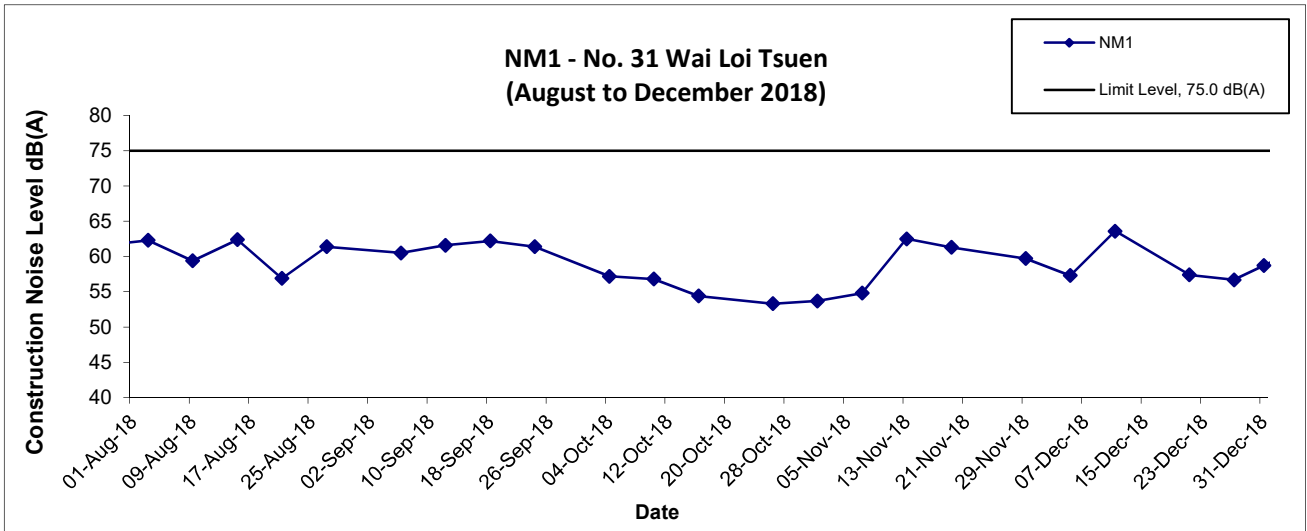
Remarks:

- 24hr TSP Monitoring at AM2a was cancelled due to power failure on 7, 13 and 28 March 2019.

Title Contract No. DE/2014/01 Provision of Electrical and Mechanical and Facilities for Shek Wu Hui Sewage Treatment Works Graphical Presentation of 24-hour TSP Monitoring Results	Scale N.T.S	Project No. MA16002	consulting . testing . research
	Date Feb-20	Appendix B	

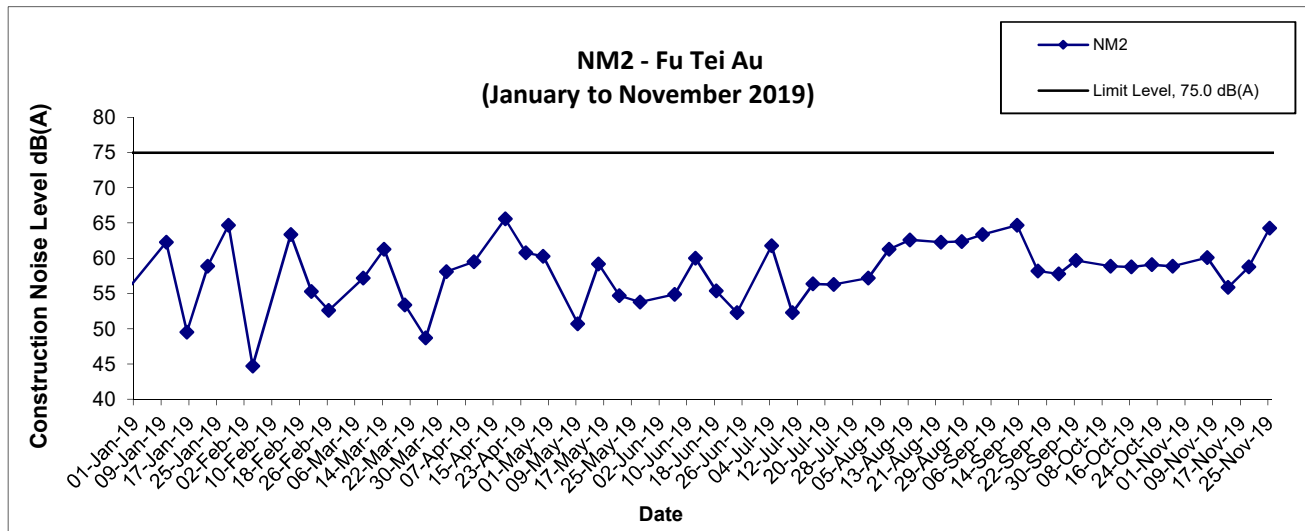
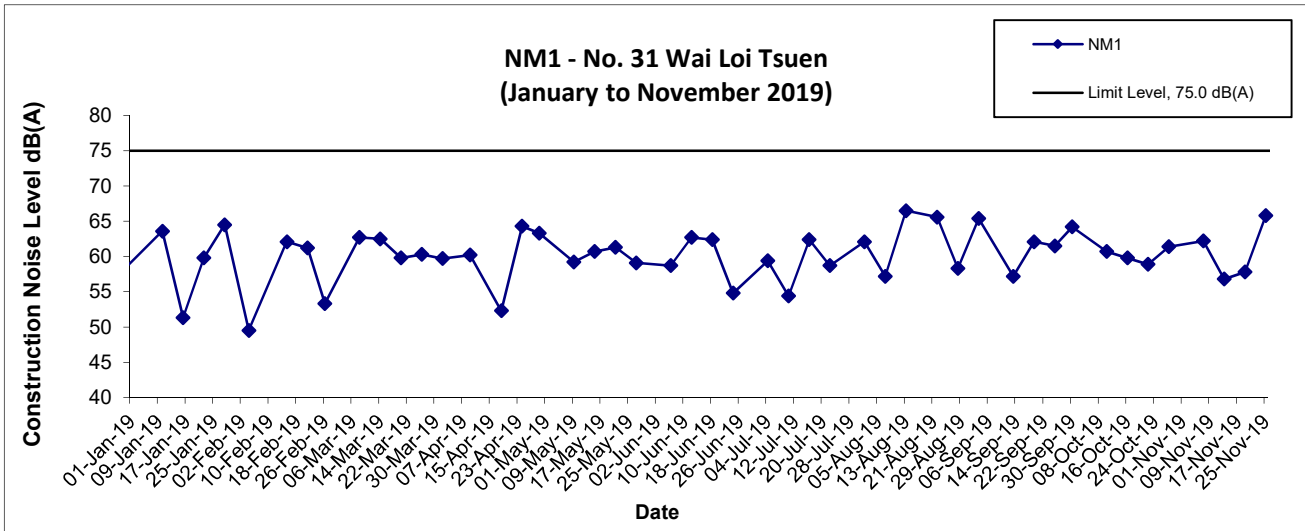
**APPENDIX C
NOISE MONITORING RESULTS AND
GRAPHICAL PRESENTATIONS**

Noise Levels



Title Contract No. DE/2014/01 Provision of Electrical and Mechanical and Facilities for Shek Wu Hui Sewage Treatment Works Graphical Presentation of Noise Monitoring Results	Scale	N.T.S	Project No.	MA16002	WELLAB 匯力 consulting . testing . research
	Date	Feb-20	Appendix	C	

Noise Levels



Title Contract No. DE/2014/01 Provision of Electrical and Mechanical and Facilities for Shek Wu Hui Sewage Treatment Works Graphical Presentation of Noise Monitoring Results	Scale	N.T.S	Project No.	MA16002
	Date	Feb-20	Appendix	C



APPENDIX D
SUMMARY OF EXCEEDANCE

APPENDIX D – SUMMARY OF EXCEEDANCE

- a) Exceedance Report for 1-hr TSP (NIL throughout the whole construction period)**
- b) Exceedance Report for 24-hr TSP (NIL throughout the whole construction period)**
- c) Exceedance Report for Construction Noise (NIL throughout the whole construction period)**

APPENDIX E
EVENT / ACTION PLANS

APPENDIX E – Event / Action Plans

Table E-1 Event / Action Plan For Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by ET; 2. Check Contractor’s working method.	1. Notify Contractor.	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring	1. Check monitoring data submitted by ET; 2. Check Contractor’s working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of exceedance writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented	1. Submit proposals for remedial actions to IEC within three working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
LIMIT LEVEL				
1. Exceedance for one sample	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; 5. Assess effectiveness of Contractor’s remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor’s working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor’s working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor’s remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of exceedance in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues,	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	<p>taken;</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring</p>		<p>consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</p>	<p>the ER until the exceedance is abated</p>

Table E-2 Event / Action Plan For Construction Noise

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

**APPENDIX F
ENVIRONMENTAL MITIGATION
IMPLEMENTATION SCHEDULE (EMIS)**

APPENDIX F

IMPLEMENTATION SCHEDULE OF ENVIRONMENTAL MITIGATION MEASURES (EMIS)

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures	Who to implement the measures?	Location of the measure	When to implement the measures?	Requirements / Relevant Legislations
A	Air Quality					
S2.4.1.3	<p>Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices:</p> <ul style="list-style-type: none"> • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty material remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extended beyond the pedestrian barriers, fencing or traffic cones; • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverized fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; • Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the 	To minimize the dust impact	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Air Pollution Control Ordinance (APCO) and Air Pollution Control (Construction Dust) Regulation

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures	Who to implement the measures?	Location of the measure	When to implement the measures?	Requirements / Relevant Legislations
	material filling line and no overfilling is allowed; <ul style="list-style-type: none"> • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system. 					
B	Noise					
S3.4.1.1	Use of movable barrier, enclosure, acoustic mat and quiet plant. Use of wooden frames barrier with a small-cantilevered upper portion of superficial density not less than 14kg/m ² on a skid footing with 25mm thick internal sound absorptive lining.	To minimize construction noise impact arising from the Project at the affected noise sensitive receivers (NSRs)	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM,
S3.4.1.2	Good Site Practice: <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 utilized 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. • Material stockpiles and other structures should be effectively utilized, wherever practicable, in screening noise from on-site construction activities. 	To minimize construction noise impact arising from the Project at the affected NSRs	Contractor	Work Sites	Construction period of Advance Works and Main Works of Phase 1A	EIAO-TM, NCO
C	Ecological Impact					
S4.2.1.2	Avoid unnecessary lighting.	Minimize mortality impacts on birds.	Design/ Contractor/ Plant Operator	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM
S4.2.1.3	Good construction site practice to minimise dust generation should be followed on all construction sites. Measures to avoid, minimise and mitigate impacts on air quality are detailed in this schedule	Minimize dust generation from construction sites.	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures	Who to implement the measures?	Location of the measure	When to implement the measures?	Requirements / Relevant Legislations
S4.2.1.4	<p>The following measures to avoid, minimise and mitigate impact on water quality during construction phase shall be implemented</p> <ul style="list-style-type: none"> • Temporary sewerage and drainage to be designed and installed to collect wastewater and prevent it from entering water bodies; • Proper locations well away from nearby water bodies should be used for temporary storage of materials (i.e. equipment, filling materials, chemicals and fuel) and temporary stockpiles of construction debris and spoil, and these should be identified before commencement of works; • To prevent muddy water entering nearby water bodies, work sites close to nearby water bodies should be isolated, using such items as sandbags or silt curtains with lead edge at bottom and properly supported props. Other protective measures should also be taken to ensure that no pollution or siltation occurs to the water gathering grounds of the work sites; • Construction debris and spoil should be covered and/or properly disposed of as soon as possible to avoid these being washed into nearby water bodies; • Proper locations for discharge outlets of temporary wastewater treatment facilities well away from sensitive receivers should be identified; • Adequate lateral support should be erected where necessary in order to prevent soil/mud from slipping into water bodies; • Site boundaries should be clearly marked and any works beyond the boundary strictly prohibited; • Regular water monitoring and site audit should be carried out at adequate points along any watercourses where construction works are underway upstream within their catchments and also on the Ng Tung, Sheung Yue and Shek Sheung Rivers. If the monitoring and audit results show that pollution occurs, adequate measures including temporarily cessation of works should be considered; • Excavation profiles should be properly designed and executed with attention to the relevant requirements for environment, health and safety; • Where soil to be excavated is situated beneath the groundwater table, it may be necessary to lower the groundwater table by installing well points or similar means; • Stockpiling sites should be lined with impermeable sheeting and bunded. Stockpiles should be properly covered by impermeable sheeting to reduce dust emission during dry season or contaminated run-off during rainy season. Watering should be avoided on stockpiles of contaminated soil to minimize contaminated runoff and construction materials should be properly covered and located away from nearby 	Avoid, minimise and mitigate impact on water quality	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures	Who to implement the measures?	Location of the measure	When to implement the measures?	Requirements / Relevant Legislations
	<p>water bodies; and</p> <ul style="list-style-type: none"> • Supply of suitable clean backfill material after excavation, if required. • Vehicles containing any excavated materials should be suitably covered to limit potential dust emissions or contaminated run-off, and truck bodies and tailgates should be sealed to prevent discharge during transport or during wet season; • Speed control for the trucks carrying contaminated materials should be enforced; • Vehicle wheel washing facilities at construction sites' exit points should be established and used, where necessary; and • Other measures as detailed in this schedule. 					
D	Water Quality Impact					
S5.2.2.1	Construction Site Runoff Practices and measures provided in the Practice Note for Professional Persons on Construction Site Drainage, (PROPECC PN1/94) should be followed where applicable.	Control construction runoff	Contractors	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM, WPCO, EIAO
S5.2.2.2– S5.2.2.3	<p>Sewage from Workforce</p> <ul style="list-style-type: none"> • Portable chemical toilets and sewage holding tanks should be provided for handling the construction sewage generated by the workforce. A licensed Contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance. • Notices should be posted at conspicuous locations to remind the workers not to discharge any sewage or wastewater into the nearby environment during the construction phase of the Project. Regular environmental audit on construction site should be conducted in order to provide an effective control of any malpractices and achieve continual improvement of environmental performance on site. It is anticipated that sewage generation during the construction phase of the Project would not cause water quality impact after undertaking all required measures 	Handling of site sewage	Contractors	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	EIAO-TM, WPCO, EIAO
E	Waste Management					
S6.2.2.1	<p>Good Site Practices and Waste Reduction Measures:</p> <ul style="list-style-type: none"> • Nomination of an approved person, such as a site manager, to be responsible for the implementation of good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; • Training of site personnel in site cleanliness, appropriate waste management procedures and concepts of waste reduction, reuse and recycling; 	Minimize waste Generation during construction	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Waste Disposal Ordinance (WDO)

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures	Who to implement the measures?	Location of the measure	When to implement the measures?	Requirements / Relevant Legislations
	<ul style="list-style-type: none"> Provision of sufficient waste disposal points and regular collection for disposal; Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers; Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors; An Environmental Management Plan (EMP) should be prepared by the contractor and submitted to the Engineer for approval. 					
S6.2.3.1	<p>Waste Reduction Measures:</p> <ul style="list-style-type: none"> Segregate and store different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; Proper storage and site practices to minimize the potential for damage and contamination of construction materials; Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste; Sort out demolition debris and excavated materials from demolition works to recover reusable/recyclable portions (i.e. soil, broken concrete, metal etc.); and Provide training to workers on the importance of appropriate waste management procedures, including waste reduction, reuse and recycling. 	Reduce waste generation	Contractor	Work Sites	Prior to the commencement of construction of Advance Works and Main Works of Phase 1A	WDO
S6.2.4.1 - S6.2.4.2	<p>Storage, Collection and Transportation of Waste Should any temporary storage or stockpiling of waste is required, recommendations to minimize 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 minimizing the potential of pollution; Stockpiling area should be provided with covers 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. Remove waste in timely manner; Employ the trucks with cover or enclosed containers for waste transportation; Obtain relevant waste disposal permits from the appropriate authorities; and Disposal of waste should be done at licensed waste disposal facilities. 	Minimize waste impacts arising from waste storage	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	WDO
S6.2.5.3	<p>C&D Material from Buildings Demolition and New Building Construction</p> <ul style="list-style-type: none"> The Contractor should recycle as much as possible of the C&DM on-site. Public fill and C&DM waste should be segregated and stored in 	Minimize waste impacts from building demolition and new	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Land (Miscellaneous Provisions) Ordinance, WDO,

EM&A Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures	Who to implement the measures?	Location of the measure	When to implement the measures?	Requirements / Relevant Legislations
	<p>different containers or skips to enhance reuse or recycling of materials and their proper disposal. For example, concrete and masonry can be crushed and used as fill, and steel reinforcing bar can be used by scrap steel mills. Different areas of the work sites should be designated for such segregation and storage.</p> <ul style="list-style-type: none"> • The use of wooden hoardings shall not be allowed. An alternative material, such as metal, aluminium or alloy etc, could be used. • Government has developed a charging policy for the disposal of waste to landfill at present. It will provide additional incentive to reduce the volume of generated waste and ensure proper segregation to allow reuse of the inert material on site when implemented. • In order to minimize the impacts of the demolition works, the generated wastes must be cleared as quickly as possible after demolition. Therefore, the demolition and clearance works should be undertaken simultaneously. • To facilitate proper segregation of inert and non-inert C&D material arising from demolition works, selective demolition method should be adopted. 	building construction				ETWB TCW No. 19/2005
S6.2.5.4	<p>Chemical Waste</p> <ul style="list-style-type: none"> • If chemical wastes are produced at the construction site, the Contractors should register with EPD as chemical waste producers. • Chemical wastes should be stored in appropriate containers and collected by a licensed chemical waste contractor. Chemical wastes (e.g. spent lubricant oil) should be recycled at an appropriate facility as far as possible, while the chemical waste that cannot be recycled should be disposed of at either the Chemical Waste Treatment Centre, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation 	Control the chemical waste and ensure proper storage, handling and disposal	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Waste Disposal (Chemical Waste General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Waste
S6.2.5.5	<p>General Refuse</p> <ul style="list-style-type: none"> • General refuse should be stored in enclosed bins separately from construction and chemical wastes. • Recycling bins should also be placed to encourage recycling. • Preferably enclosed and covered areas should be provided for general refuse collection and routine cleaning for these areas should also be implemented to keep areas clean. • A reputable waste collector should be employed to remove general refuse on a daily basis. 	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	Work Sites	Construction phase of Advance Works and Main Works of Phase 1A	Waste Disposal (Chemical Waste General) Regulation, Code of Practice on the Packaging, Labelling and Storage of Chemical Waste

**APPENDIX G
SUMMARY OF COMPLAINTS,
PROSECUTIONS, REPORTING CHANGES,
AND NOTIFICATION OF SUMMONS**

APPENDIX G – SUMMARY OF COMPLAINTS, PROSECUTIONS, REPORTING CHANGES AND NOTIFICATION OF SUMMONS

Environmental Complaint Log

Log Ref.	Location	Received Date	Details of Complaint	Investigation/Mitigation Action	Status
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Log for Notification of Summons

Log Ref.	Location	Received Date	Subject	Status	Total no. Received since project commencement
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

Log for Successful Prosecutions

Log Ref.	Location	Received Date	Subject	Status	Total no. Received since project commencement
N.A.	N.A.	N.A.	N.A.	N.A.	N.A.

**APPENDIX H
SUMMARY OF AMOUNT OF WASTE
GENERATED**

Name of Department: Drainage Services Department

Contract No. : DE/2014/01

Monthly Summary Waste Flow Table for 2017

Month	Annual Quantities of Inert C&D Materials Generated Monthly						Annual Quantities of C&D Materials Generated Monthly				
	Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemicals Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in tonne)
Jan											
Feb											
Mar											
Apr											
May											
June											
Sub-total											
July											
Aug											
Sept											
Oct	0	0	0	0	0	0	0	0	0	0	0
Nov	0	0	0	0	0	0	0	0	0	0	0
Dec	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0

Forecast of Total Quantities of C&D Materials to be Generated from the Contractor										
Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemicals Waste	Others, e.g. general refuse
(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m ³)
0	0	0	0	0	0	0	1	1	0.5	1

- Notes: (1) The performance targets are given in PS Clause 6.21.8(14).
 (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (PS Clause 6.21.7(4)(b) refers).

Name of Department: Drainage Services Department

Contract No. : DE/2014/01

Monthly Summary Waste Flow Table for 2018

Month	Annual Quantities of Inert C&D Materials Generated Monthly						Annual Quantities of C&D Materials Generated Monthly				
	Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemicals Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)
Jan	0	0	0	0	0	0	0	0	0	0	0
Feb	0	0	0	0	0	0	0	0	0	0	1.00
Mar	0	0	0	0	0	0	0	0	0	0	0
Apr	0	0	0	0	0	0	0	0	0	0	7.16
May	0	0	0	0	0	0	0	0	0	0	5.31
Jun	0	0	0	0	0	0	0	0	0	0	8.24
Sub-total	0	0	0	0	0	0	0	0	0	0	21.71
Jul	0	0	0	0	0	0	0	0	0	0	4.63
Aug	0	0	0	0	0	0	0	0.022	0	0	2.98
Sep	0	0	0	0	0	0	0	0.026	0	0	6.01
Oct	0	0	0	0	0	0	0	0.009	0	0	7.96
Nov	0	0	0	0	0	0	0	0	0	0	5.30
Dec	0	0	0	0	0	0	0	0.032	0	0	7.20
Total	0	0	0	0	0	0	0	0.089	0	0	55.79

Forecast of Total Quantities of C&D Materials to be Generated from the Contractor										
Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemicals Waste	Others, e.g. general refuse
(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)
0	0	0	0	0	0	0	1	0.5	0.5	70

- Notes: (1) The performance targets are given in PS Clause 6.21.8(14).
 (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (PS Clause 6.21.7(4)(b) refers).

Name of Department: Drainage Services Department

Contract No. : DE/2014/01

Monthly Summary Waste Flow Table for 2019

Month	Annual Quantities of Inert C&D Materials Generated Monthly						Annual Quantities of C&D Materials Generated Monthly				
	Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemicals Waste	Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)
Jan	0	0	0	0	0	0	0	0.016	0	0	4.06
Feb	0	0	0	0	0	0	0	0.009	0	0	2.63
Mar	0	0	0	0	0	0	0	0.028	0	0	3.99
Apr	0	0	0	0	0	0	0	0.015	0	0	9.58
May	0	0	0	0	0	0	0	0	0	0	6.91
Jun	0	0	0	0	0	0	0	0.025	0	0	24.61
Sub-total	0	0	0	0	0	0	0	0.093	0	0	51.78
Jul	0	0	0	0	0	0	0	0.021	0	0	2.89
Aug	0	0	0	0	0	0	0	0.035	0	0	3.63
Sep	0	0	0	0	0	0	0	0.062	0	0	263.28
Oct	0	0	0	0	0	0	0	0.031	0	0	1.01
Nov	0	0	0	0	0	0	0	0.042	0	0	1.88
Dec	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0.284	0	0	324.47

Forecast of Total Quantities of C&D Materials to be Generated from the Contractor										
Total Quantity Generated	Hard Rock & Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemicals Waste	Others, e.g. general refuse
(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 m ³)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 kg)
0	0	0	0	0	0	0	0.5	0.5	0.5	340

- Notes: (1) The performance targets are given in PS Clause 6.21.8(14).
 (2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
 (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (PS Clause 6.21.7(4)(b) refers).