

# FUGRO TECHNICAL SERVICES LIMITED

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## ENVIRONMENTAL MONITORING & AUDIT MONTHLY REPORT

September 2019

**Client** : Drainage Services Department

**Contract Name** : Expansion of Sha Tau Kok Sewate Treatment Works –  
Environmental Team Services for Baseline Phase –  
Additional Services for Environmental Team Services at  
Early Stage of Construction Phase

**Contract No.** : CM 8/2018

**EP No.** : EP-517/2017

**Report No.** : 0118/18/ED/0364

Prepared by: Wingo H. W. So

Reviewed by: Cyrus C. Y. Lai

Certified by:

A handwritten signature in black ink, appearing to read "Calvin Leung", written over a horizontal line.

Calvin M. P. Leung  
Environmental Team Leader  
Fugro Technical Services Limited



Drainage Services Department  
42/F, Revenue Tower  
5 Gloucester Road  
Wan Chai  
Hong Kong

Your reference:

Our reference: HKDSD206/50/106068

Date: 10 October 2019

Attention: Mr K K Leung

**BY EMAIL & POST**  
**(email: kkleung04@dsd.gov.hk)**

Dear Sirs

Agreement No.: CM 14/2018  
Independent Environmental Checker Services for  
Expansion of Sha Tau Kok Sewage Treatment Works  
Environmental Monitoring and Audit Monthly Report (September 2019)

We refer to emails of 8 and 10 October 2019 from Fugro Technical Services Limited attaching the Environmental Monitoring and Audit Monthly Report (September 2019).

We have no comment and hereby verify the captioned Report in accordance with Clause 3.4 of the Environmental Permit no. EP-517/2017.

Should you have any queries, please do not hesitate to contact the undersigned or our Mr Adi Lee at 2618 2831.

Yours faithfully  
ANEWR CONSULTING LIMITED

James Choi  
Independent Environmental Checker

CPSJ/LYMA/CYYH/csyz

cc DSD – Mr Gary Poon (email: gchpoon@dsd.gov.hk)  
Black & Veatch Hong Kong Limited – Mr Anthony Leung (email: re\_em2@dc1803.com.hk)  
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## EXECUTIVE SUMMARY

### i. Introduction

This is the 4<sup>th</sup> EM&A Report prepared by FTS for the Expansion of Sha Tau Kok Sewage Treatment Works. This report summarized the monitoring results and audits findings of the EM&A programme under the issued EP (EP No.: EP-517/2017) and in accordance with the EM&A Manual during the reporting period from 01/09/2019 to 30/09/2019.

### ii. Summary of Main Works Undertaken and Key Measures Implemented

The main works undertaken during the reporting period are as follows:

- Construction of pad footing, pile caps and RC structures

Implementation of the key mitigation measures during the reporting period are as follow:

- All construction plants / machineries should be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission.
- All C&D materials generated should be transported and stored at temporary storage area. Cover should be provided during transportation of dusty materials. Suitable materials should be sorted for reuse on-site. Only non-inert C&D material should be disposed off-site to NENT Landfill.
- All dump trucks should be equipped with mechanical covers to prevent the dust emission during transportation when necessary.
- Dust control measures, such as water spraying, should be provided during demolition works when necessary.
- Maintaining of wet surface on access road and keep slow speed in the site.
- Wastewater to be treated by wastewater treatment facilities before discharge.
- Conditions in the Environmental Permit and Discharge License should be followed.
- Fueling of equipment should be conducted carefully on-site by mobile tanker to avoid storage of fuel and oil spillage.
- Provision of drip trays for equipment likely cause spillage of chemical / fuel, and provide routine maintenance.
- Predict required quantity of concrete accurately and collect the unused fresh concrete at designated locations in the site for subsequent disposal.
- Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.

### iii. Summary of Exceedances, Investigation and Follow-up

No Action or Limit Level Exceedance was recorded in the reporting period.

### iv. Complaint Handling, Prosecution and Public Engagement

No complaints, notification of summons and prosecutions were received in the reporting period.

No public engagement activities were conducted in the reporting period.

### v. Reporting Change

There were no reporting changes during the reporting month.

### vi. Future Key Issues

The main works will be anticipated in the next reporting period are as follow:

- Construction of RC superstructures



The corresponding mitigation measures to be implemented in the next reporting period are as follow:

- All construction plants / machineries should be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission.
- All C&D materials generated should be transported and stored at temporary storage area. Cover should be provided during transportation of dusty materials. Suitable materials should be sorted for reuse on-site. Only non-inert C&D material should be disposed off-site to NENT Landfill.
- All dump trucks should be equipped with mechanical covers to prevent the dust emission during transportation when necessary.
- Dust control measures, such as water spraying, should be provided during demolition works when necessary.
- Maintaining of wet surface on access road and keep slow speed in the site.
- Wastewater to be treated by wastewater treatment facilities before discharge.
- Conditions in the Environmental Permit and Discharge License should be followed.
- Fueling of equipment should be conducted carefully on-site by mobile tanker to avoid storage of fuel and oil spillage.
- Provision of drip trays for equipment likely cause spillage of chemical / fuel, and provide routine maintenance.
- Predict required quantity of concrete accurately and collect the unused fresh concrete at designated locations in the site for subsequent disposal.
- Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.

The following EP submissions (EP No.: EP-517/2017) were submitted during the reporting month:

Condition 3.4:

The 3<sup>rd</sup> Monthly EM&A Report (August 2019) was submitted to EPD on 11 September 2019.



## 1. INTRODUCTION

### 1.1 Background

- 1.1.1 The Project in Sha Tau Kok mainly comprises of the following items:
- i) Increase the treatment capacity of Sha Tau Kok Sewage Treatment Works (STKSTW) to 5,000 m<sup>3</sup>/day at Average Dry Weather Flow (ADWF) in Phase 1, with suitable allowance to cater for a further increase of treatment capacity to 10,000 m<sup>3</sup>/day at ADWF in Phase 2;
  - ii) Construct a Temporary Sewage Treatment Plant (TSTP);
  - iii) Demolish the existing Sha Tau Kok Sewage Pumping Station (STKSPS) and decommission the rising main between STKSPS and STKSTW;
  - iv) Construct a new gravity sewer; and
  - v) Decommission the existing submarine outfall and construct a new one.
- 1.1.2 The Project site will be within the existing STKSTW while the construction of the gravity sewers and demolition of STKSPS will be carried out in Sha Tau Kok Town. The proposed submarine outfall will be constructed by Horizontal Directional Drilling (HDD) method under the sea bed of Starling Inlet.
- 1.1.3 Fugro Technical Services Limited (FTS) has been appointed to work as the additional services for Environmental Team services at early stage of construction phase to implement the Environmental Monitoring and Audit (EM&A) programme for the Environmental Permit No. EP-517/2017 - Expansion of Sha Tau Kok Sewage Treatment Works.
- 1.1.4 The EM&A programme of this project shall be implemented in accordance with the requirements and procedures set out in the EM&A Manual (AEIAR-207/2017) and the Environmental Permit No. EP-517/2017.
- 1.1.5 A baseline noise monitoring work was conducted between 25 February 2019 and 11 March 2019 and an Environmental Monitoring Report (Noise) Report (Report No.: 0118/18/ED/0259D) had submitted to EPD on 2 April 2019.
- 1.1.6 A baseline water quality monitoring was conducted between 26 February 2019 and 23 Mar 2019 and an Environmental Monitoring Report (Water) Report (Report No.: 0118/18/ED/0307E) had submitted to EPD on 14 Jun 2019.
- 1.1.7 The construction phase and EM&A programme of the Project commenced on 27 May 2019.
- 1.1.8 This is the 4<sup>th</sup> EM&A Report prepared by FTS for the Expansion of Sha Tau Kok Sewage Treatment Works. This report summarized the monitoring results and audits findings of the EM&A programme under the issued EP (EP No.: EP-517/2017) and in accordance with the EM&A Manual during the reporting period from 01/09/2019 to 30/09/2019.
- ### 1.2 Project Organization
- 1.2.1 The Project Organization structure is shown in **Appendix B**. The key personnel contact names and numbers are summarized in **Table 1.1**.

**Table 1.1 Contact Information of Key Personnel**

Party	Position	Name	Telephone
Drainage Services Department, HKSAR (DSD)	Engineer	Mr. Gary Leung	2594 7594
Black & Veatch Hong Kong Limited (B&V)	Resident Engineer	Mr. Anthony Leung	2946 8708
ANewR Consulting Limited (ANEWR)	IEC	Mr. James Choi	2618 2836
Contractor (BK-KS JV)	Environmental Officer	Mr. Justin Cheng	6845 0692
Fugro Technical Services Limited (FTS)	ET Leader	Mr. Calvin Leung	3565 4441

**1.3 Construction Programme and Activities**

1.3.1 The construction phase of the Project under the EP commenced on 27 May 2019.

1.3.2 The construction programme of the Project is shown in **Appendix A**.


**1.4 Works undertaken during the month**

1.4.1 The main works undertaken during the reporting period are as follows:

- Construction of pad footing, pile caps and RC structures

1.4.2 Illustrations of works undertaken during the reporting period are shown in **Table 1.2**:

**Table 1.2 Works undertaken Illustrations**

	<p>Construction of pad footing, pile caps and RC structures</p>
---	---

**1.5 Status of Environmental Licences, Notification and Permits**

1.5.1 A summary of the relevant permits, licences and/or notifications on environmental protection for this Contract is presented in **Table 1.3**.

**Table 1.3 Environmental Licences, Notification and Permits Summary**

Permit / Notification / License	Ref No	Valid From	Valid Till
Environmental Permit	EP-517/2017	15/02/2017	N/A
Wastewater Discharge Licence	WT00033567-2019	02/05/2019	31/05/2024
Registration as a Chemical Waste Producer	5213-652-B2548-01	14/12/2018	N/A
Billing Account	WFG19965	02/01/2019	N/A



## 2. ENVIRONMENTAL MONITORING

### Noise

#### 2.1 Monitoring Methodology & Criteria

2.1.1 In accordance with the EM&A Manual, The impact noise monitoring should be carried out at all the designated monitoring stations when there are project-related construction activities undertaken within a radius of 300m from the monitoring stations. Monitoring of Leq(30min) should be carried out at each station at 0700-1900 hours on normal weekdays at a frequency of once a week when construction activities are underway.

2.1.2 The monitoring and the QA/QC procedures are as follows:

- The monitoring station will set at a point 1m from the exterior of the sensitive receivers building façade and set at a position 1.2m above the ground.
- The battery condition was checked to ensure good functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time will set as follows:
  - frequency weighting : A
  - time weighting : Fast
  - measurement time : 30 minutes
- Prior to and after noise measurement, the meter shall be calibrated using the calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB, the measurement will considered invalid and repeat of noise measurement is required after re-calibration or repair of the equipment.
- The wind speed at the monitoring station shall be checked with the portable wind meter. Noise monitoring should be cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.
- Noise measurement should be paused during periods of high intrusive noise if possible and observation shall be recorded when intrusive noise is not avoided.
- At the end of the monitoring period, the Leq, L10 and L90 shall be recorded. In addition, site conditions and noise sources should be recorded on a standard record sheet.

#### Maintenance / Calibration

- The microphone head of the sound level meter and calibrator should be cleaned with a soft cloth at quarterly intervals.
- The sound level meter and calibrator should be calibrated annually by a HOKLAS laboratory or the manufacturer.
- Relevant calibration certificates are provided in **Appendix C**.

#### 2.2 Monitoring Equipment and Detection Limits

2.2.1 As referred to in the Technical Memorandum (TM) issued under the NCO, sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency.





Measurements should be accepted as valid only if the calibration level from before and after the noise measurement agrees to within 1.0 dB.

2.2.2 Noise measurements should not be made in fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

2.2.3 The ET is responsible for the provision of the monitoring equipment to ensure that sufficient noise measuring equipment and associated instrumentation are available for carrying out the baseline monitoring, regular impact monitoring and ad hoc monitoring. All the equipment and associated instrumentation shall be clearly labelled.

2.2.4 **Table 2.1** summarizes the noise monitoring equipment model used for this project.

Table 2.1 Noise Monitoring Equipment

Manufacturer/ Brand	Model	Equipment	Serial Number
Casella	CEL-63X Series	Sound Level Meter	1488269
			4181587
	CEL-120/1	Sound Calibrator	2383687
			5230736

### 2.3 Monitoring Parameters and Frequency

2.3.1 **Table 2.2** presents the noise monitoring parameters and frequencies.

Table 2.2 Monitoring Parameters and Frequencies of Noise Monitoring

Parameter	Frequency and Period
LAeq (30min)  L10 and L90 will be recorded for reference	At each station at 0700-1900 hours on normal weekdays at a frequency of once a week

**2.4 Monitoring Locations**

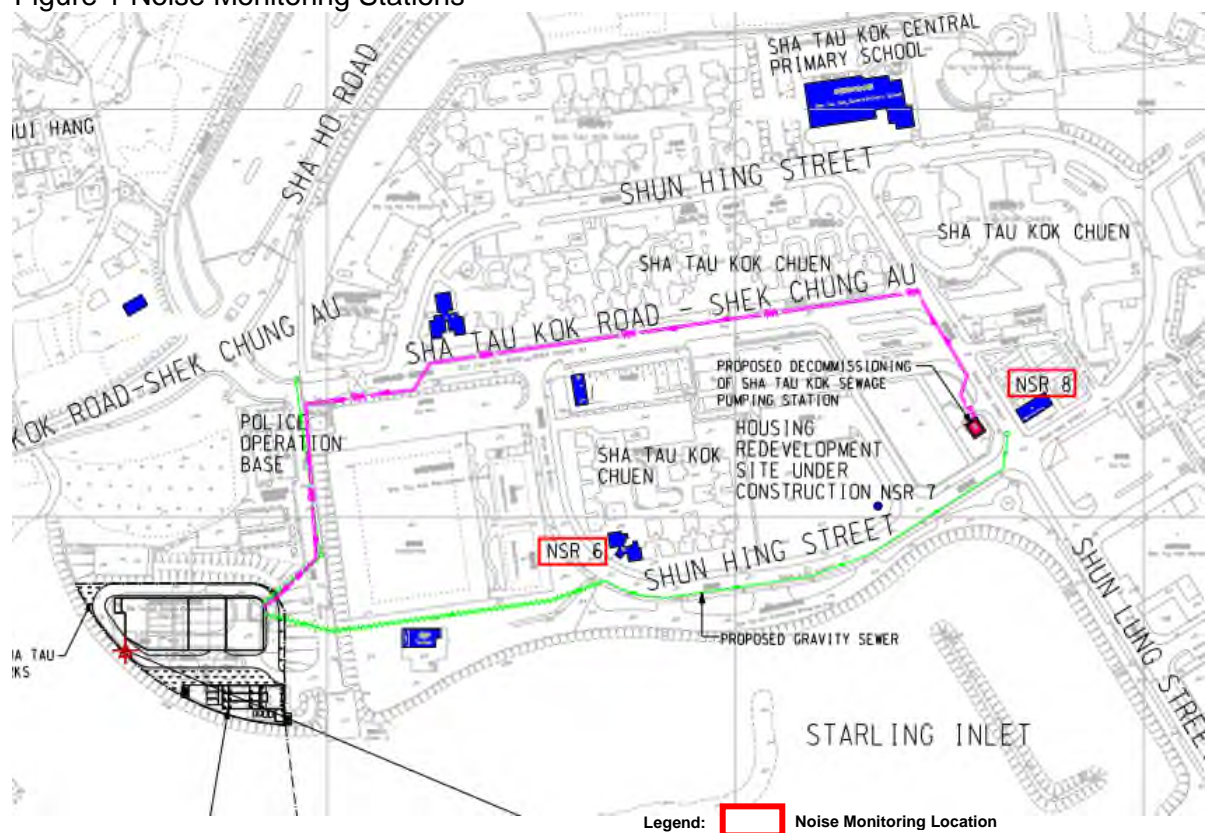
2.4.1 Noise monitoring was conducted at two designated monitoring stations as described in **Table 2.3** and the monitoring locations are shown in **Figure 1**.

Table 2.3 Location of noise monitoring stations

ID	Noise Sensitive Receivers (NSR)	Description	Type of Measurement*
NM1	NSR 6	Block 45, Sha Tau Kok Chuen	Free-field
NM2	NSR 8	Building along Shun Lung Street	Free-field

Note: \*For Free-field measurement, +3dB(A) should be added to the measured results

Figure 1 Noise Monitoring Stations





**2.5 Results and Observations**

2.5.1 The schedule of noise monitoring in reporting period is provided in **Appendix D**.

2.5.2 The adopted Action and Limit Levels for noise impact monitoring are presented in **Table 2.4**.

Table 2.4 Action and Limit Levels for Construction Noise

Monitoring Location No.	Description	Action Level	Limit Level
NM1	Block 45, Sha Tau Kok Chuen	When one documented complaint is received from any one of the noise sensitive receivers	75 dB(A)*
NM2	Building along Shun Lung Street		

Note: \*75 dB(A) for residential premises.

2.5.3 The noise monitoring data are summarized in **Table 2.5**. Detailed monitoring data are presented in **Appendix E**.

Table 2.5 Summary of Noise Impact Monitoring Results

Monitoring Station	Construction Noise Level Leq (30min), dB(A)	Baseline Level, dB(A)	Limit Level, dB(A)
NM1	53.5-62.9	65	75
NM2	54.8-62.7	65	75

Note: Leq (30min) was measured at day-time (0700-1900) on normal weekdays.

2.5.4 The Event and Action Plan for noise is given in **Appendix H**.

2.5.5 No Action or Limit Level Exceedance was recorded in the reporting period.

**Other factor influencing the monitoring results**

2.5.6 There were no other noticeable external factors generally affecting the monitoring results in this reporting period.



---

**Water Quality**

- 2.5.7 In accordance with the recommendations of the EIA, water quality EM&A is required during the installation, maintenance and removal of sheetpiles and sediment removal works for construction of diffuser and, during operation of the TSTP and expanded STKSTW.
- 2.5.8 No construction of diffuser and water quality monitoring in the reporting period.

**Waste Management**

- 2.5.9 Auditing of waste management practices during regular site inspections will confirm that the waste generated during construction are properly, stored, handled and disposed of. The construction Contractor(s) will be responsible for the implementation of any mitigation measures to reduce waste or redress issues arising from the waste materials.
- 2.5.10 The summary of site audited and the implemented environmental mitigation measures in the reporting period are summarized in **Appendix G** and **Appendix I**.
- 2.5.11 Monthly summary of waste flow table is detailed in **Appendix K**.



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### **3. ENVIRONMENTAL SITE INSPECTION AND AUDIT**

#### **3.1 Site Inspection**

- 3.1.1 Regular site inspections will be carried out by the ET once per week during construction phase.
- 3.1.2 In the reporting period, site inspections were carried out on 4, 11, 18 and 25 September 2019. The joint site inspection with IEC was conducted on 25 September 2019.
- 3.1.3 The summary of the site audits are given in **Appendix G**.

### **4. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE**

#### **4.1 Complaint Handling, Prosecution and Public Engagement**

- 4.1.1 No complaints, notification of summons and prosecutions were received in the reporting period.
- 4.1.2 No public engagement activities were conducted in the reporting period.
- 4.1.3 Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions and public engagement activities are presented in **Appendix F**.

### **5. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES**

#### **5.1 Implementation Status**

- 5.1.1 The Contractor has implemented environmental mitigation measures and requirements as stated in the EIA Reports, the EP and the EM&A Manuals. The implementation status of the mitigation measures during the reporting period is summarized in **Appendix I**.



## **6. FUTURE KEY ISSUES**

### **6.1 Construction Works for the Coming Month**

6.1.1 During the coming reporting period, the principal work activities within the site included:

- Construction of RC superstructures

### **6.2 Key Issues for the Coming Month**

6.2.1 Potential environmental impacts due to the construction activities, including air quality, noise, water quality, waste, landscape and visual, will be monitored or reviewed. The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirement. The recommended environmental mitigation measures shall be implemented on site and regular inspections as required will be carried out to ensure that the environmental conditions are acceptable.

6.2.2 The anticipated impact of principal work activities within the site and the recommended mitigation measures are shown in **Appendix J**.

### **6.3 Monitoring Schedules for the Coming Months**

6.3.1 The tentative schedules for environmental monitoring in the coming months are provided in **Appendix D**.

## **7. CONCLUSIONS**

7.1.1 No Action or Limit Level Exceedance was recorded in the reporting period.

7.1.2 No complaints, notification of summons or successful prosecutions were received in the reporting period.

7.1.3 There was no reporting change required in the reporting period.

7.1.4 Potential environmental impacts due to the construction activities, including air quality, noise, water quality, waste, landscape and visual, will be monitored or reviewed. The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirements. The recommended environmental mitigation measures shall be implemented on site and regular inspections as required will be carried out to ensure that the environmental conditions are acceptable.

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### **Figure 2**

### **Project Boundary**

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### **Appendix A**

### **Construction Programme**



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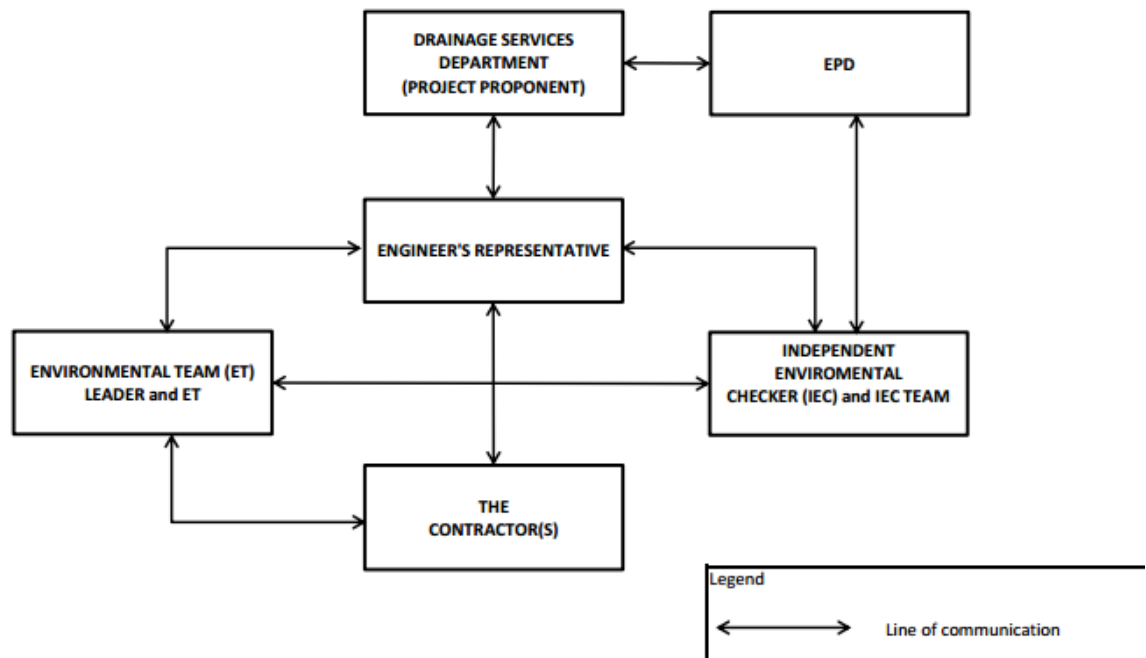
## Appendix B

### Project Organization Chart

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Note: Detailed key personnel contact names and telephone numbers refer to **Table 1.1**.

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### **Appendix C**

#### **Calibration Certificates of Monitoring Equipment**

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www.casellasolutions.com

CASELLA

## Certificate of Conformity and Calibration

**Instrument Model:-** CEL-633A  
**Serial Number** 1488269  
**Firmware revision** V006-03  
**Microphone Type:-** CEL-251  
**Serial Number** 2869  
**Preamplifier Type:-** CEL-495  
**Serial Number** 004065  
**Instrument Class/Type:-** 1



**Applicable standards:-**

IEC 61672: 2002 / EN 60651 (Electroacoustics - Sound Level Meters)  
 IEC 60651 1979 (Sound Level Meters), ANSI S1.4: 1983 (Specifications For Sound Level Meters)

**Note:-** The test sequences performed in this report are in accordance with the current Sound level meter Standard - IEC61672. The combination of tests performed are considered to confirm the products electro-acoustic performance to all applicable standards including superceeded Sound Level Meter Standards - IEC60651 and IEC60804.

**Test Conditions:-** 30 °C  
 58 %RH  
 1003 mBar  
**Test Engineer:-** Chris Taylor  
**Date of Issue:-** September 7, 2018

**Declaration of conformity:-**

This test certificate confirms that the instrument specified above has been successfully tested to comply with the manufacturer's published specifications. Tests are performed using equipment traceable to national standards in accordance with Casella's ISO 9001:2008 quality procedures. This product is certified as being compliant to the requirements of the CE Directive.

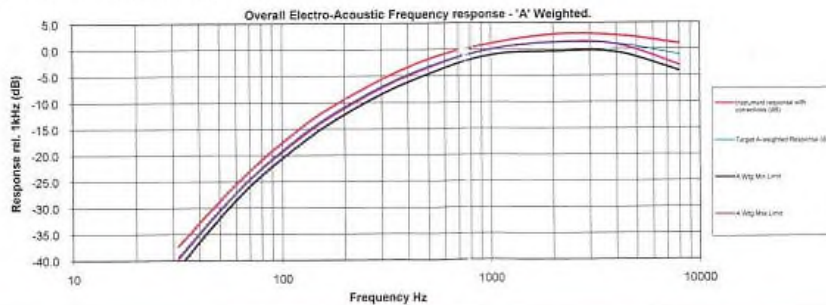
**Test Summary:-**

Self Generated Noise Test	<b>All Tests Pass</b>
Electrical Signal Test Of Frequency Weightings	<b>All Tests Pass</b>
Frequency & Time Weightings At 1 kHz	<b>All Tests Pass</b>
Level Linearity On The Reference Level Range	<b>All Tests Pass</b>
Toneburst Response Test	<b>All Tests Pass</b>
C-peak Sound Levels	<b>All Tests Pass</b>
Overload Indication	<b>All Tests Pass</b>
Acoustic Tests	<b>All Tests Pass</b>

**Combined Electro-Acoustic Frequency Response - A Weighted**

Combined Electro-Acoustic Frequency Response - A Weighted (IEC 61672-3:2006)

The following A-Weighted frequency response graph shows this instruments overall frequency response based upon the application of multi-frequency pressure field calibrations. The microphones Pressure to Free field correction coefficients are applied to pressure response. Reference level taken at 1kHz.



<b>Casella UK</b> Regent House, Wolcovey Road, Hampson, Bedford MK42 7JY United Kingdom Tel: +44 (0) 1234 844100 Fax: +44(0) 1234 091490 E-mail: info@casellasolutions.com	<b>Casella USA</b> 415 Lawrence Hill Drive, Unit 4 Buffalo, NY 14201, USA Toll Free (800) 566-2986 Tel: +1 (716) 276 3040 E-mail: info@casellausa.com	<b>Casella India</b> Ideal Industries India Pvt.Ltd. 229-230, Sparshide, Tower-B Sol-ra Road, Sector-47, Gurgaon-122001, Haryana, India Tel: +91 124 4495100 E-mail: casella.sales@casellaindianes.in	<b>Casella China</b> Ideal Industries China Room 305, Building 1, No 1270, Chuangqiao Rd, Pudong New District, Shanghai, China Tel: +86-21-21207188 Fax: +86-21-61003909 Email: info@casellachina.com.cn	<b>Casella Australia</b> Ideal Industries (Aust) PTY. LTD Unit 17, 35 Dunlop Rd, Mulgrave, Vic. 3170, Australia. Email: australia@casellasolutions.com
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Tested to CEL-63X test sheet TP444 revision 01-00

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Tel: (852) 2873 6860  
Fax: (852) 2555 7533



## CERTIFICATE OF CALIBRATION

Certificate No.: 19CA0905 03-01

Page 1 of 2

### Item tested

Description:	Sound Level Meter (Type 1)	,	Microphone
Manufacturer:	CASELLA	,	-
Type/Model No.:	CEL-63X	,	CEL-251
Serial/Equipment No.:	4181587	,	02781
Adaptors used:	-	,	-

### Item submitted by

Customer Name: Fugro Technical Services Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 05-Sep-2019

Date of test: 09-Sep-2019

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	23-Aug-2020	CIGISMEC
Signal generator	DS 360	61227	26-Dec-2019	CEPREI

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $1000 \pm 5$  hPa

### Test specifications

- The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of  $\pm 20\%$ .
- The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure response of the Sound Level Meter.

### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

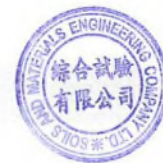
Actual Measurement data are documented on worksheets.

Approved Signatory:

Feng Junqi

Date: 10-Sep-2019

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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Form No CARP152-1/Issue 1/Rev.C/01/02/2007

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## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 19CA0905 03-01 Page 2 of 2

### 1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertainty (dB) / Coverage Factor	
Self-generated noise	A	Pass	0.3	
	C	Pass	0.8	2.1
	Lin	Pass	1.6	2.2
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
Linearity range for SPL	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Frequency weightings	A	Pass	0.3
Time weightings	C	Pass	0.3	
	Lin	Pass	0.3	
	Single Burst Fast	Pass	0.3	
Peak response	Single Burst Slow	Pass	0.3	
	Single 100µs rectangular pulse	Pass	0.3	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass	0.3	
	Single burst 10 ms at 4 kHz	Pass	0.4	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
	Overload indication	SPL	Pass	0.3
	Leq	Pass	0.4	

### 2, Acoustic tests

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertainty (dB) / Coverage Factor	
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

### 3, Response to associated sound calibrator

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by:		Checked by:	
Date:	09-Sep-2019	Date:	10-Sep-2019

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP152-2/Issue 1/Rev C/01/02/2007

Hong Kong Accreditation Service (HKAS) has accredited this laboratory (Reg. No. HOKLAS 028) under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) for specific calibration activities as listed in the HOKLAS directory of accredited laboratories. The results shown in this certificate are traceable to the International System of Units (SI) or recognised measurement standards. This certificate shall not be reproduced except in full.





**Certificate of  
Conformance and Calibration for**

**CEL-120 Acoustic Calibrator**

Applicable Standards :- IEC 60942: 2003 & ANSI S1.40: 2006

CEL-120/1 Class 1

CEL-120/2 Class 2

Serial No: 2393687

Firmware: 04

Temperature: 19 °C Pressure: 1013 mb %RH 46

Frequency = 1.00kHz ± 2Hz T.H.D. = < 1%	Calibration Level
SPL @ 114.0dB Setting	<u>114.01</u> dB
SPL @ 94.0dB Setting (CEL-120/1 only)	<u>93.97</u> dB/N.A

Engineer :- Atte Date :- 17 OCT 2018

Company test equipment and acoustic working standards, used for conformance testing, are subject to periodic calibration, traceable to UK national standards, in accordance with the company's ISO9001 Quality System.

**DECLARATION OF CONFORMITY**

This certificate confirms that the instrument specified above has been produced and tested to comply with the manufacturer's published specifications and the relevant European Community CE directives.

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E-mail: info@casellacel.com  
Web: www.casellameasurement.com

198032A/01

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## CERTIFICATE OF CALIBRATION

Certificate No.: 19CA0905 03-04

Page: 1 of 2

### Item tested

Description: Acoustical Calibrator (Class 1)  
Manufacturer: CASELLA  
Type/Model No.: CEL-120/1  
Serial/Equipment No.: 5230736 / N-18  
Adaptors used: -

### Item submitted by

Customer: Fugro Technical Services Limited  
Address of Customer: -  
Request No.: -  
Date of receipt: 05-Sep-2019

Date of test: 09-Sep-2019

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2341427	03-May-2020	SCL
Preamplifier	B&K 2673	2239857	17-May-2020	CEPREI
Measuring amplifier	B&K 2810	2346941	05-Jun-2020	CEPREI
Signal generator	DS 360	61227	10-May-2020	CEPREI
Digital multi-meter	34401A	US36087050	08-May-2020	CEPREI
Audio analyzer	8903B	GB41300350	13-May-2020	CEPREI
Universal counter	53132A	MY40003662	10-May-2020	CEPREI

### Ambient conditions

Temperature:  $21 \pm 1$  °C  
Relative humidity:  $55 \pm 10$  %  
Air pressure:  $1000 \pm 5$  hPa

### Test specifications

- The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

### Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

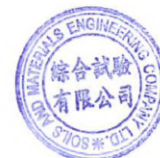
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Feng Junqi

Date: 09-Sep-2019

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

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Form No CARP156-1/Issue 1/Rev.D/01/03/2007

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## CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 19CA0905 03-04

Page: 2 of 2

### 1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	(Output level in dB re 20 µPa)
			Estimated Expanded Uncertainty dB
1000	94.00	94.23	0.10

### 2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.019 dB  
Estimated expanded uncertainty 0.005 dB

### 3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz Actual Frequency = 1000.0 Hz  
Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

### 4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.8 %  
Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by:   
Date: 09-Sep-2019

Checked by:   
Date: 09-Sep-2019

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

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Form No.CARP156-2/Issue 1/Rev C/01/05/2005

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### **Appendix D**

#### **Environmental Monitoring Schedules**

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### Project: CM 8/2018 Expansion of Sha Tau Kok Sewage Treatment Works

#### Impact Monitoring Schedule (September 2019)

Sun	Mon	Tue	Wed	Thu	Fri	Sat
1	2	3	4 Noise Impact Monitoring	5	6	7
8	9	10 Noise Impact Monitoring	11	12	13	14
15	16 Noise Impact Monitoring	17	18	19	20	21
22	23	24	25	26	27 Noise Impact Monitoring	28
29	30					

#### Remarks

1. Noise Impact Monitoring at NM1 and NM2.

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### Project: CM 8/2018 Expansion of Sha Tau Kok Sewage Treatment Works

#### Tentative Impact Monitoring Schedule (October 2019)

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

#### Remarks

- Noise monitoring will be carried out at NM1 and NM2.
- Actual monitoring schedule may be subjected to change due to any safety concern or adverse weather condition.

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### **Appendix E**

#### **Noise Monitoring Data and Graphical Presentations**

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### NM1 Block 45, Sha Tau Kok Chuen

Date	Start Time	Measured Noise Level (MNL)			Baseline (BNL)	Limit Level	Construction Noise Level (CNL)#	Weather	Remark	
		L <sub>eq</sub> *	L <sub>90</sub>	L <sub>10</sub>						
Unit: dB(A) 30 Mins										
04-Sep-19	11:18	61.6	55.0	61.0	65	75	61.6	Measured ≤ Baseline	Cloudy	-
10-Sep-19	11:11	62.9	57.0	63.0	65	75	62.9	Measured ≤ Baseline	Sunny	-
16-Sep-19	11:22	65.3	58.0	64.0	65	75	53.5		Sunny	-
27-Sep-19	10:55	57.3	40.0	52.0	65	75	57.3	Measured ≤ Baseline	Sunny	-

### NM2 Building along Shun Lung Street

Date	Start Time	Measured Noise Level (MNL)			Baseline (BNL)	Limit Level	Construction Noise Level (CNL)#	Weather	Remark	
		L <sub>eq</sub> *	L <sub>90</sub>	L <sub>10</sub>						
Unit: dB(A) 30 Mins										
04-Sep-19	13:11	65.4	56.0	64.5	65	75	54.8		Cloudy	-
10-Sep-19	13:12	66.3	58.0	65.0	65	75	60.4		Sunny	-
16-Sep-19	13:09	67.0	59.0	66.0	65	75	62.7		Sunny	-
27-Sep-19	11:31	55.7	48.0	53.5	65	75	55.7	Measured ≤ Baseline	Sunny	-

Note: \*Correction of +3dB(A) for Free-field Measurement.

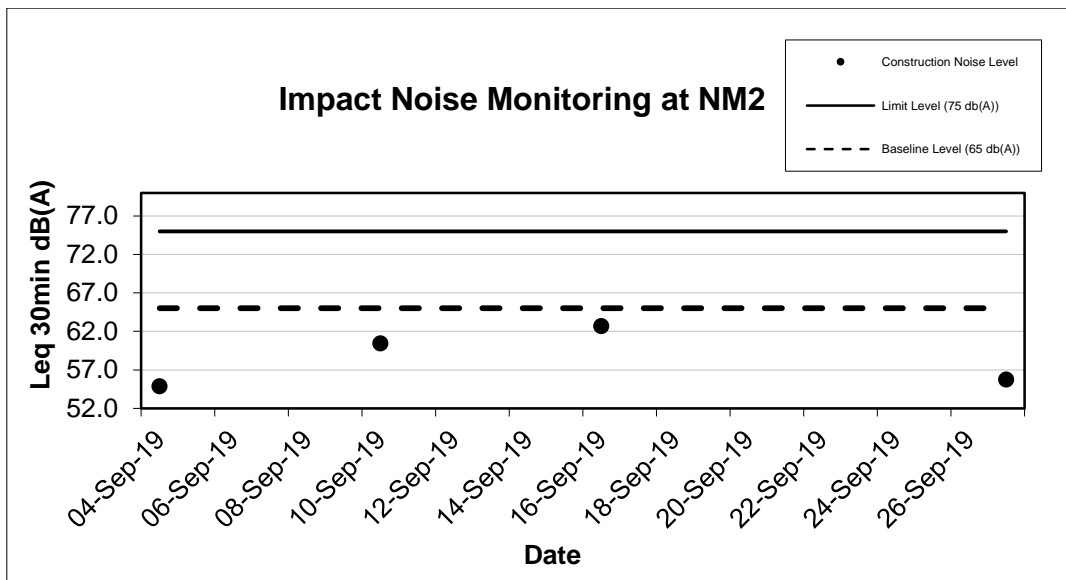
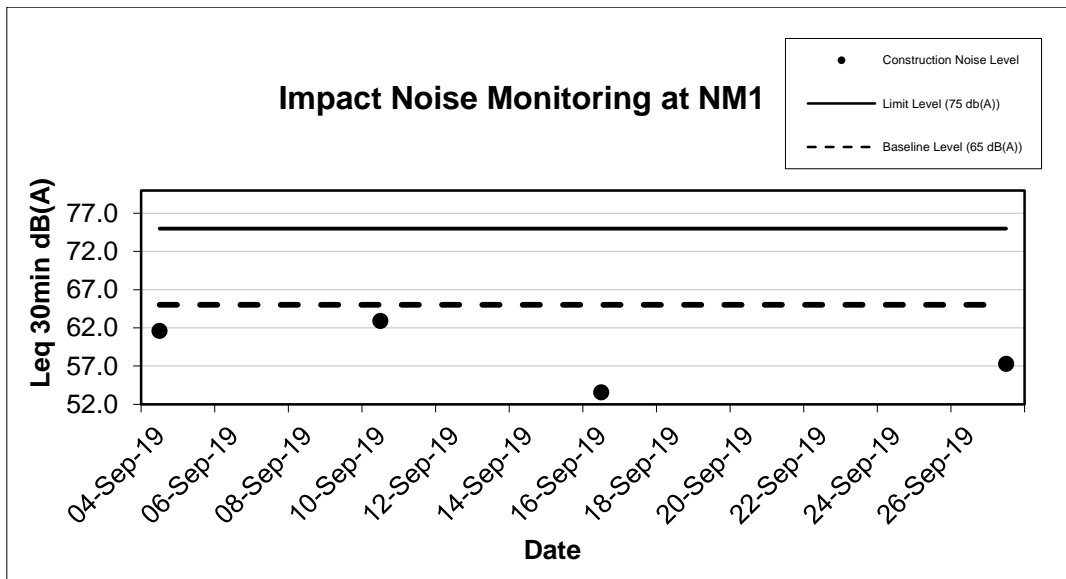
$$\# \text{ CNL} = 10 \log (10^{\text{MNL}/10} - 10^{\text{BNL}/10})$$



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**Note:**

- 1) The QA/QC procedures and detection Limits refer to section 2.1 and 2.2.
- 2) The other factors influencing the monitoring results refer to section 2.5.6.

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### **Appendix F**

#### **Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions**

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### Environmental Complaints Log

Complaint Log No.	Date of Complaint	Received From	Received By	Nature of Complaint	Investigation/Mitigation Action	Status
Nil	-	-	-	-	-	-

Remark:

\* No Complaints, Notifications of Summons or Successful Prosecutions was received in the reporting period.

### Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions and Public Engagement Activities

Reporting Period	Complaints	Notifications of Summons and Prosecutions	Public Engagement Activities
This Month	0	0	0
Cumulative Project-to-Date	0	0	0

### Cumulative Statistics on Monitoring Exceedance

Monitoring Parameter	Month/Year	No. of Exceedance	
		Action	Limit
Noise (LAeq (30min))	No. of Exceedance This Month	0	0
	Cumulative Project-to-Date	0	0

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### **Appendix G**

#### **Site Audit Summary**

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**Summary of Site Audit**

<b>Inspection Date</b>	<b>Observation/ Comment</b>	<b>Follow Up Action</b>	<b>Completion Date</b>
Follow Up action(s) of last reporting month	The discharge duct carrying the treated wastewater from the wet sep tank should be redesigned to avoid the treated water passing the silted channel.	Surface water is diverted to be treated by wet sep before discharge.	31/08/2019
04/09/2019	Leakage of surface runoff was found outside the gate of DSD existing STKSTW. The Contractor was reminded to provide earth bunds or sand bags to properly direct the surface runoff to silt removal facilities. The stain of leakage should be cleaned up properly.	The surface runoff in the site was directed to silt removal facilities. The stain of leakage had been cleaned up properly.	10/09/2019
11/09/2019	No particular observation was found during the site inspection.	N.A	N.A
18/09/2019	The Contractor was reminded to keep enclosing the general refuse bin. Removal of waste from the site should be arranged more frequently to minimise any potential odour impacts and the presence of pests and vermin.	Waste have been removed from the site immediately and the general refuse bin has been kept enclosing.	19/09/2019
	The Contractor was reminded to shut down the crane or any machines that were not used to minimize noise and gaseous emission.	Crane has been shut down when not in use.	19/09/2019
25/09/2019	The Contractor was reminded to desilt the discharge effluent U-channel, the discharge point of wastewater treatment plant.	The U-channel at the discharge point of wastewater treatment plant has been desilted and this measure will be continued in regular basis.	27/09/2019

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### **Appendix H**

#### **Events and Action Plan**

# FUGRO TECHNICAL SERVICES LIMITED

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## Event and Action Plan for Construction Noise Monitoring

EVENT	ACTION			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Carry out investigation to identify the source and cause of the complaint/exceedance(s)</li> <li>2. Notify IEC, ER, and Contractor and report the results of investigation to the Contractor, ER and the IEC</li> <li>3. Discuss with the Contractor and IEC for remedial measures required</li> <li>4. If the complaint is related to the Project, conduct additional monitoring for checking mitigation effectiveness and report the findings and results to the IEC, ER and the Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analyzed results submitted by the ET.</li> <li>2. Review the proposed remedial measures by the Contractor and advise the ER accordingly.</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of Exceedance in writing.</li> <li>2. Require Contractor to propose remedial measures for the analyzed noise problem.</li> <li>3. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals, if required, to the IEC and ER</li> <li>2. Implement noise mitigation proposals</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Carry out investigation to identify the source and cause of the exceedance</li> <li>2. Notify IEC, ER, Project Proponent, EPD and Contractor</li> <li>3. Repeat measurements to confirm findings</li> <li>4. Provide investigation report to IEC, ER, EPD and Contractor of the exceedances</li> <li>5. If the exceedance is related to the Project, assess effectiveness by additional monitoring.</li> <li>6. Report the remedial action implemented and the additional monitoring results to IEC, EPD, ER and Contractor</li> <li>7. If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analyzed results submitted by the ET</li> <li>2. Discuss the potential remedial measures with ER, ET Leader and Contractor</li> <li>3. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly</li> <li>4. Supervise the implementation of remedial measures</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of Exceedance in writing.</li> <li>2. Require the Contractor to propose remedial measures for the analyzed noise problem.</li> <li>3. Ensure remedial measures are properly implemented.</li> <li>4. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor, in agreement with the Project Proponent, to stop that activity of work until the exceedance is abated.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial actions to IEC and RE within 3 working days of notification.</li> <li>3. Implement the agreed proposals.</li> <li>4. Resubmit proposals if problem still not under control.</li> <li>5. Stop the relevant activity of works as determined by the Project Proponent until the exceedance is abated.</li> </ol>

Notes:

ET – Environmental Team, IEC – Independent Environmental Checker; ER = Engineering Representatives

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### **Appendix I**

#### **Implementation Status of Environmental Mitigation Measures (Construction Phase)**



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EIA Ref	Objective & Address	Stage (D/C/O)	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status in Construction Phase
<b>Air Quality</b>				
<b>S3.7.1</b>	Land site/ During Construction	C	- Dust control measures stipulated in the Air Pollution Control (Construction Dust) Regulation shall be implemented during the construction of the Project to control potential fugitive dust emissions.	^
			- Regular water spraying on exposed area.	^
			- Vehicle wheel-washing and body washing facilities shall be provided at the site entrance.	^
			- Shielding or covering with impervious sheet of stockpiled materials or exposed area when it is not used to reduce dust nuisance	^
			- Site practices such as regular maintenance and checking of the diesel-driven PMEs should be adopted to avoid any black smoke emissions and to reduce gaseous emissions	^
<b>S3.6.1</b>			- Open trench construction of the gravity sewers, each work front should be around 20m to 30m in length to control potential dust emission.	N.O
<b>S3.6.1</b>			- The existing sewage pumping station and rising mains should be cleaned and flushed out properly to clear away any remaining potential sources of odour emission, such as sewage sludge from the facilities. <del>The decommissioning including removal of the pumping station and rising mains should take place after the cleaning and flushing out.</del>	N.O Remark: No decommissioning including removal of the pumping station and rising mains in reporting period.)
<b>S3.9.1</b>			- Regular site inspections on a weekly basis shall be carried out in order to confirm that the mitigation and control measures are properly implemented and are working effectively to ensure proper control of construction dust and gaseous emissions.	^
<b>Noise</b>				
<b>S4.8</b>	Noise Control / During construction	C	- Use of quiet PME / quiet construction method	^
			- Movable noise barriers of 3 m in height with skid footing should be used and located within a few metres of stationary plant and mobile plant such that the line of sight to the NSR is blocked by the barriers. The length of the barrier should be at least five times greater than its height. The noise barrier material should have a superficial surface density of at least 7 kg m <sup>-2</sup> and have no openings or gaps.	N.O
			- Only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction phase;	^
			- Silencers or mufflers on construction equipment should be utilised and properly maintained during the construction phase;	^
			- Mobile plant, if any, should be sited as far away from NSRs as possible;	^

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EIA Ref	Objective & Address	Stage (D/C/O)	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status in Construction Phase
			- Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum	^
			- Plant known to emit noise strongly in one direction should, wherever possible, be orientated so that the noise is directed away from the nearby NSRs; and	^
			- Material stockpiles and other structures should be effectively utilised, wherever practicable, in screening noise from on-site construction activities.	N.O
			- The construction activities should be planned and carried out in sequence rather than simultaneously at each location. Therefore, only one unit of each type of equipment should be operated at any one time.	^
			- Open trench construction of the gravity sewers, each work front should be around 20m to 30m in length.	N.O
<b>S4.11</b>	During construction	C	- Designated monitoring stations as defined in EM&A Manual/During construction phase	^
<b>Water Quality</b>				
<b>S5.9.2</b>			- The trenchless HDD construction of outfall pipeline should proceed from the landside. Also, the construction of diffuser should be conducted after the dry excavation of marine sediment in the cofferdam.	N.A
<b>S5.9.3</b>	Marine Dredging/ During construction	C	- Furthermore, a number of standard measures and good site practices should be implemented to avoid / minimize the potential impacts from marine construction. These measures include: <ul style="list-style-type: none"> <li>• All vessels should be well maintained and inspected before use to limit any potential discharges to the marine environment;</li> <li>• All vessels must have a clean ballast system;</li> <li>• No soil waste is allowed to be disposed overboard.</li> </ul>	N.A
<b>S5.9.3</b>	Marine Dredging/ During construction	C	- No discharge of sewage/grey wastewater should be allowed. Wastewater from potentially contaminated area on working vessels should be minimized and collected. These kinds of wastewater should be brought back to port and discharged at appropriate collection and treatment system	N.A

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EIA Ref	Objective & Address	Stage (D/C/O)	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status in Construction Phase
S5.9.4	Land site & drainage/ During construction	C	<b>General Construction Activities</b>	^
			- Standard site practices outlined in ProPECC PN 1/94 "Construction Site Drainage" should be followed as far as practicable in order to reduce surface runoff, minimize erosion, and also to retain and reduce any SS prior to discharge.	
			- Silt removal facilities such as silt traps or sedimentation facilities should be provided to remove silt particles from runoff to meet the requirements of the TM standard under the WPCO. The design of silt removal facilities should be based on the guidelines provided in ProPECC PN 1/94.	
			- All drainage facilities and erosion and sediment control structures should be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be removed regularly.	
			- Earthworks to form the final surfaces should be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.	
			- Appropriate surface drainage should be designed and provided where necessary.	
			- The precautions to be taken at any time of year when rainstorms are likely together with the actions to be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in Appendix A2 of ProPECC PN 1/94.	
S5.9.4	Land site & drainage/ During construction	C	- Oil interceptors should be provided in the drainage system where necessary and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.	^
			- Temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge, if any, should be adequately designed for the controlled release of storm flows. The temporary diverted drainage, if any, should be reinstated to the original condition when the construction work has finished or when the temporary diversion is no longer required.	
S5.9.5	Land site & drainage/ During construction	C	- Appropriate infiltration control, such as cofferdam wall, should be adopted to limit groundwater inflow to the excavation works areas in the Project site. Groundwater pumped out from excavation area should be discharged into the storm system via silt removal facilities.	N.O
S5.9.6	Land site & drainage/ During	C	- If needed, appropriate numbers of portable toilets shall be provided by a licensed contractor to serve the construction workers over the construction site to prevent direct disposal of sewage into the water environment.	^

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EIA Ref	Objective & Address	Stage (D/C/O)	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status in Construction Phase
S5.9.7	construction		<p><b>Spillage of Chemicals</b></p> <ul style="list-style-type: none"> <li>- Site drainage should be well maintained and good construction practices should be observed to ensure that oil, fuels, solvents and other chemicals are managed, stored and handled properly and do not enter the nearby streams or marine water.</li> </ul>	^
S5.12.1	Marine Dredging/ During construction	C	<ul style="list-style-type: none"> <li>- Marine water quality monitoring at selected WSRs is recommended for installation, maintenance and removal of sheetpile and sediment removal works under this Project. Site audit would also be conducted throughout the marine and land-based construction under this Project. Details environmental monitoring procedures and audit requirements are provided in the standalone EM&amp;A manual.</li> </ul>	N.A
<b>Waste Management &amp; Land Contamination</b>				
S6.6.1	During construction	C	<ul style="list-style-type: none"> <li>- An Environmental Management Plan (EMP) in accordance with ETWB TCW No. 19/2005 – “Environmental Management on Construction Sites” should be prepared by the main Contractor of each construction contract upon appointment. The EMP should describe the arrangements for avoidance, reduction, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities.</li> </ul>	^
S6.6.3	During construction	C	<ul style="list-style-type: none"> <li>- An appropriate person, such as site agent or environmental officer should be nominated, to be responsible for good site practices, arrangement for collection and effective disposal of all wastes generated at the site to an approved facility. Training of construction staff should be undertaken by the Contractor about the concept of site cleanliness and appropriate waste management procedures. Requirements for staff training should be included in the EMP.</li> </ul>	^
S6.6.4	During construction	C	<ul style="list-style-type: none"> <li>- Good planning and site management practices should be employed to eliminate over ordering or mixing of construction materials to reduce wastage. Regular cleaning and maintenance of the waste storage area should be provided.</li> </ul>	^
S6.6.5	During construction	C	<ul style="list-style-type: none"> <li>- A recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) should be implemented in accordance with DEVB TCW No. 6/2010. In order to monitor the disposal of C&amp;D materials and solid wastes at public fill reception facilities and landfills and to control fly-tipping, a trip-ticket system should be included.</li> </ul>	^
S6.6.6	During construction	C	<ul style="list-style-type: none"> <li>- Imported soft fill and rocks, if required, should be sourced from CEDD’s fill bank, other projects or other approved sources instead of using new materials. Approval from the Engineer and all other relevant parties should be obtained by the Contractor before importation of the fill materials.</li> </ul>	N.O

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S6.6.7	During construction	C	- All waste materials should be segregated into categories covering: <ul style="list-style-type: none"> <li>• inert C&amp;D materials suitable for public filling facilities;</li> <li>• recyclable materials / waste</li> <li>• remaining non-inert C&amp;D materials for landfill;</li> <li>• spent bentonite for public filling facilities;</li> <li>• chemical waste; and</li> <li>• general refuse for landfill</li> </ul>	^
S6.6.9	During construction	C	- Proper segregation and disposal of construction waste should be implemented. Separate containers should be provided for inert and non-inert wastes.	^
S6.6.11	During construction	C	- The reuse of inert C&D materials such as soil, rock and broken concrete should be maximised. Waste should be separated into fine, soft and hard materials.	N.A
S6.6.12	During construction	C	- Prior to export of material from the site, the potential for it to be reused should be assessed. Most C&D materials can easily be reused with minimum processing. Waste separation methods should be followed to ensure that C&D waste is separated at source. Suitable soft materials should be used for landscaping and grading of embankments. Fine material should be separated out and used as topsoil.	N.A
S6.6.13	During construction	D & C	- Use of recycled aggregates whenever possible	N.A
S6.6.14, S6.6.30	During construction	C	- All C&D materials should be sorted on-site into inert and non-inert components by the Contractor. Non-inert C&D materials (C&D waste) such as wood, glass and plastic should be reused and recycled before disposal to a designated landfill as a last resort. Inert C&D materials (public fill) should be reused onsite or in other projects approved by relevant parties before disposed of at public fill reception facilities. Steel and other metals if any should be recovered from C&D materials and recycled.	^
S6.6.15	During construction	C	- Good quality reusable topsoil should be stockpiled for later landscaping works. Stockpiles should be less than 2m in height, formed to a safe angle of repose and hydroseeded or covered with tarpaulin to prevent erosion during the rainy season and to minimise dust generation.	N.O
S6.6.16	During construction	C	- Control measures for temporary stockpiles on-site should be taken in order to minimize the noise, generation of dust, pollution of water and visual impact.	^
S6.6.17	During construction	C	- The public fill to be disposed to public fill reception facilities must consist entirely of inert construction materials. Disposal of C&D waste to landfill must not have more than 50% by weight of inert material.	^

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			The C&D waste delivered for landfill disposal should contain no free water and the liquid content should not exceed 70% by weight.	
S6.6.18	During construction	C	- In order to avoid dust or odour impacts, any vehicles leaving a works area carrying C&D waste or public fill should have their load covered up before leaving the construction site.	^
S6.6.20	During construction	C	- With reference to the Sediment Quality Report in the EIA, only Category L sediment was identified. In accordance with ETWB TCW No. 34/2002, Type 1 – Open Sea Disposal should be adopted for the disposal of 3,040 m <sup>3</sup> excavated sediment during construction of the proposed outfall diffuser. The location of marine disposal site should be sought with MFC/CEDD. The Contractor shall obtain a Marine Dumping Permit in accordance with the Dumping at Sea Ordinance. The Contractor should provide separate submissions (e.g. Sediment Sampling and Testing Plan / Sediment Quality Report) to EPD / DASO authority when applying for the marine dumping permit under the Dumping at Sea Ordinance.	N.A
S6.6.21	During construction	C	- Bentonite slurry used in the drilling works should be treated and recycled at the works area in STKSTW. Any bentonite that is not suitable for recycling should be suitably dewatered before disposed of at public fill reception facilities.	N.A
S6.6.22 & S6.6.37	During construction and operation	C & O	- Where the construction/ operation processes produce chemical waste, the Contractor must register with EPD as a chemical waste producer. Wastes classified as chemical wastes are listed in the Waste Disposal (Chemical Waste) (General) Regulation. These wastes are subject to stringent disposal routes. EPD requires information on the particulars of the waste generation processes including the types of waste produced, their location, quantities and generation rates. A nominated contact person must be registered with EPD.	^
S6.6.23 & S6.6.37	During construction	C	- Storage, handling, transport and disposal of chemical waste should be arranged in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes published by EPD, and should be collected by a licensed chemical waste collector.	^
S6.6.24 & S6.6.37	During construction	C	- Suitable containers should be used for specific types of chemical wastes, containers should be properly labelled (English and Chinese in accordance with instructions prescribed in Schedule 2 of the Regulations), resistance to corrosion, safely stored and securely closed. Stored volume should not be kept more than 450 liters unless the specification has been approved by the EPD. Storage area should be enclosed by three sides by a wall, partition of fence that is at least 2 m height or height of tallest container with adequate ventilation and space.	^
S6.6.25	During	C	- Hard standing, impermeable surfaces draining via oil interceptors should be provided in works	^

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EIA Ref	Objective & Address	Stage (D/C/O)	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status in Construction Phase
<b>&amp; S6.6.37</b>	construction		area compounds. Interceptors should be regularly emptied to prevent release of oils and grease into the surface water drainage system after accidental spillages. The interceptor should have a bypass to prevent flushing during periods of heavy rain. Oil and fuel bunkers should be bunded and/or enclosed on three sides to prevent discharge due to accidental spillages or breaches of tanks. Bunding should be of sufficient capacity to accommodate 110% of the volume of the largest container or 20% of the total volume of waste, whichever is largest. Waste collected from any grease traps should be collected and disposed of by a licensed contractor.	
<b>S6.6.26 &amp; S6.6.37</b>	During construction	C	- Lubricants, waste oils and other chemical wastes are likely to be generated during the maintenance of vehicles and mechanical equipment. Used lubricants should be collected and stored in individual containers which are fully labelled in English and Chinese and stored in a designated secure place. If possible, such waste should be sent to oil recycling companies, and the empty oil drums collected by appropriate companies for reuse or refill.	^
<b>S6.6.27</b>	During construction	C	- The registered chemical waste producer (i.e. the Contractor) has to arrange for the chemical waste to be collected by licensed collectors. The licensed collector should regularly take chemical waste to a licensed chemical waste treatment facility (such as the Chemical Waste Treatment Centre in Tsing Yi). A trip ticket system operates to control the movement of chemical wastes.	^
<b>S6.6.28</b>	During construction	C	- No lubricants, oils, solvents or paint products should be allowed to discharge into water courses, either by direct discharge, or as contaminants carried in surface water runoff from the construction site.	^
<b>S6.6.29</b>	During construction	C	- All wooden materials used on-site should be kept separate from other wastes to avoid damage and to facilitate reuse. Timber which cannot be reused should be sorted out from other waste and stored separately from all inert waste before being disposed of to landfill.	^
<b>S6.6.32</b>	During construction	C	- General refuse generated on-site should be stored in enclosed bins or skips and collected separately from other construction and chemical wastes and disposed of at designated landfill. A temporary refuse collection point should be set up by the Contractor at the works area to facilitate the collection of refuse by licensed waste collector. The removal of waste from the site should be arranged on a daily or at least on every second day by the Contractor to minimise any potential odour impacts, minimise the presence of pests, vermin and other scavengers and prevent unsightly accumulation of waste.	^
<b>S6.6.33</b>	During	C	- The recyclable component of the municipal waste generated by the workforce, such as	^

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	construction		aluminium cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials.	
<b>Ecology</b>				
S7.7.3	All area / During construction	C	- Erect fences along the boundary of the works area before the commencement of works to prevent vehicle movements and encroachment of personnel onto adjacent areas.	^
			- Regularly check the work site boundaries to ensure that they are not breached and that damage does not occur to surrounding areas.	^
			- Avoid any damage and disturbance, particularly those caused by filling and illegal dumping, to the surrounding habitats through proper management of waste disposal.	^
			- To avoid/ minimise the potential disturbance on the Night Roosting Site for Great Egret if confirmed to be continuing their usage before the construction activities, major noisy works such as concrete breaking should not be undertaken within an area of 100m from the Night Roosting Site after 16:00 under normal working hours. (i.e. 16:00 to 07:00 of the following day).	N.O
			- Strong artificial lighting should not be used in the area at night to avoid disturbance to the roosting ardeids.	N.O
<b>Landscape &amp; Visual</b>				
Table 9.6 of EM&A Manual	To protect existing landscape resources during construction stage	C	<b>Preservation of Existing Vegetation:</b> <ul style="list-style-type: none"> <li>- Existing trees designated to be retained in-situ should be properly protected. Tree protection measures to be undertake shall be in accordance with DEVB TC(W) 7/2015 on "Tree Preservation" and Guidelines on Tree Preservation during Development" by DEVB. This may include the clear demarcation and fencing-off of tree protection zones, tight site supervision and monitoring to prevent tree damage by construction activities, and periodic arboricultural inspection and maintenance to uphold tree health. A total of around 108 nos. of trees should be retained in-situ within the tree survey area.</li> <li>- Under current proposal, no tree is recommended to be transplanted since the trees in conflict with the proposed works are not suitable to be transplanted. However, should transplantation be proposed in the detailed design stage after an update tree survey, the recommended final recipient sites should be adjacent to their current locations. Enough time should be reserved for tree transplantation works to increase the survival rate of the transplanting trees. To ensure the</li> </ul>	^



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			survival of transplanted trees, protection work should be considered. The tree transplantation proposal shall be submitted to relevant authorities for approval together with the formal tree removal application. Tree transplanting works shall be undertaken in accordance with Guidelines on Tree Transplanting by DEVB.	
	To reduce construction disturbance during construction stage	C	<p><b>Control of Site Construction Activities:</b></p> <ul style="list-style-type: none"> <li>- Construction site controls shall be enforced, where possible, to ensure that the landscape and visual impacts arising from the construction phase activities are minimised. These construction site controls should include but not limited to the following: <ul style="list-style-type: none"> <li>• Storage of materials should be carefully arranged to minimise potential landscape and visual impact.</li> <li>• The location and appearance of site accommodation should be carefully designed to minimize potential landscape and visual impact.</li> <li>• Site lighting should be carefully designed to prevent light spillage,</li> <li>• Extent of the works area and construction period should be minimised as far as practicable.</li> <li>• Screen hoarding with compatible design to blend into the surrounding natural environmental should be considered (Screen hoarding may not be practicable for works of upgrading existing rising mains due to the spatial constraints of the works area along the Shun Hing Street).</li> <li>• Temporary works areas should be reinstated at the earliest possible opportunity.</li> </ul> </li> </ul>	^
<b>Table 9.7of EM&amp;A Manual</b>	To reduce landscape and visual impact during construction	D & C	<p><b>Suitable design of the proposed TSTP:</b></p> <ul style="list-style-type: none"> <li>- Colour of natural tones and non-reflective building materials shall be used for any outward facing building facades to avoid visual and glare disturbance</li> <li>- Responsive lighting design <ul style="list-style-type: none"> <li>• Directional and full cut off lighting is recommended within the boundaries of STKSTW to minimise light spillage to the surroundings;</li> <li>• Minimise geographical spread of lighting, only applying for safety at the key access points of the STKSTW; and</li> </ul> </li> <li>- Limited lighting intensity to meet the minimum safety and operation requirement.</li> </ul>	N.A
<b>Cultural Heritage</b>				
<b>S10.3.50</b>	During construction	C	- Undertake trenchless excavation in the vicinity of the Tin Hau Temple and provide a buffer zone of 10m between the works area for the open cut section and the Tin Hau Temple.	N.O

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EIA Ref	Objective & Address	Stage (D/C/O)	Recommended Environmental Protection Measures/ Mitigation Measures	Implementation Status in Construction Phase
S10.3.51			- A condition survey and vibration impact assessment should be undertaken and if construction vibration monitoring and structural strengthening measures are required.	N.A
S10.3.52			- Vibration and settlement monitoring should also be undertaken during the construction works to ensure that safe levels of vibration are not exceeded, if it is recommended in the condition survey report.	N.A
S10.3.53			- If the maximum level is exceeded all works must stop and the structure must be examined to determine if it has been damaged. The contractor must also take measures, such as using smaller pneumatic drills to ensure that the levels are reduced to acceptable limits.	N.A
S10.3.54			- If at any time during the construction period the foundation of the structure is affected by the works; the works shall be immediately suspended and the AMO notified. If the works cause any damage to the structures, the proponent should be responsible for the restoration and repair at their own cost. A method statement should be submitted to AMO for comment and the works should be under AMO's supervision.	N.O
S10.3.55			- Protective covering should be provided as an additional mitigation measure to the Tin Hau Temple.	N.O

Remarks: ^ Compliance of mitigation measure  
/ Recommendation was made during site audit but not improved/ rectified by the Contractor in reporting period.  
x Non-compliance of mitigation measure  
N.A Not Applicable at this stage as no such site activities were conducted in the reporting period  
N.O Not Observed during site inspection in the reporting period.

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### **Appendix J**

#### **Proactive Environmental Protection Proforma**

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Reporting Period	Construction Works	Anticipated Impacts	Corresponding Mitigation Measures
01/09/2019 - 30/09/2019	<ul style="list-style-type: none"> <li>Construction of pad footing, pile caps and RC structures.</li> </ul>	Dust, Noise and water quality impact.	<ul style="list-style-type: none"> <li>All construction plants / machineries will be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission.</li> <li>All C&amp;D materials generated will be transported and stored at temporary storage area. Cover will be provided during transportation of dusty materials. Suitable materials will be sorted for reuse on-site. Only non-inert C&amp;D material will be disposed off-site to NENT Landfill.</li> <li>All dump trucks will be equipped with mechanical covers to prevent the dust emission during transportation when necessary.</li> <li>Dust control measures, such as water spraying, will be provided during demolition works when necessary.</li> <li>Maintaining of wet surface on access road and keep slow speed in the site.</li> <li>Wastewater to be treated by wastewater treatment facilities before discharge.</li> <li>Conditions in the Environmental Permit and Discharge License should be followed.</li> <li>Fueling of equipment will be conducted carefully on-site by mobile tanker to avoid storage of fuel and oil spillage.</li> <li>Provision of drip trays for equipment likely cause spillage of chemical / fuel, and provide routine maintenance.</li> <li>Predict required quantity of concrete accurately and collect the unused fresh concrete at designated locations in the site for subsequent disposal.</li> <li>Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.</li> </ul>

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Coming Month	Construction Works	Anticipated Impacts	Corresponding Mitigation Measures
01/10/2019 - 31/10/2019	<ul style="list-style-type: none"> <li>Construction of RC superstructures</li> </ul>	Dust, Noise and water quality impact.	<ul style="list-style-type: none"> <li>All construction plants / machineries will be checked / serviced on a regular basis during the courses of construction to minimize the emission of noise generation and eliminate dark smoke emission.</li> <li>All C&amp;D materials generated will be transported and stored at temporary storage area. Cover will be provided during transportation of dusty materials. Suitable materials will be sorted for reuse on-site. Only non-inert C&amp;D material will be disposed off-site to NENT Landfill.</li> <li>All dump trucks will be equipped with mechanical covers to prevent the dust emission during transportation when necessary.</li> <li>Dust control measures, such as water spraying, will be provided during demolition works when necessary.</li> <li>Maintaining of wet surface on access road and keep slow speed in the site.</li> <li>Wastewater to be treated by wastewater treatment facilities before discharge.</li> <li>Conditions in the Environmental Permit and Discharge License should be followed.</li> <li>Fueling of equipment will be conducted carefully on-site by mobile tanker to avoid storage of fuel and oil spillage.</li> <li>Provision of drip trays for equipment likely cause spillage of chemical / fuel, and provide routine maintenance.</li> <li>Predict required quantity of concrete accurately and collect the unused fresh concrete at designated locations in the site for subsequent disposal.</li> <li>Provide sufficient mitigation measures as recommended in approved EIA Manual requirement.</li> </ul>

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### **Appendix K**

#### **Waste Flow Table**

## Monthly Summary Waste Flow Table for 2019 (year)

Name of Person completing the record: Justin Cheng (EO)

Project : Expansion of Sha Tau Kok Sewage Treatment Works Phase 1 and Village Sewerage in Tong To

Contract No.: DC/2018/03

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	Others, e.g. general refuse
	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000 kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 m <sup>3</sup> )
Jan	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Feb	0.014	0.005	0.000	0.000	0.014	0.000	0.000	0.000	0.000	0.000	0.010
Mar	0.017	0.000	0.000	0.000	0.017	0.000	0.000	0.000	0.000	0.000	0.009
Apr	0.008	0.000	0.000	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.007
May	0.022	0.000	0.000	0.000	0.022	0.000	0.000	0.000	0.000	0.000	0.007
Jun	0.738	0.000	0.000	0.000	0.738	0.000	0.000	0.000	0.000	0.000	0.006
Sub-total	0.799	0.005	0.000	0.000	0.799	0.000	0.000	0.000	0.000	0.000	0.039
Jul	0.414	0.000	0.000	0.000	0.414	0.000	0.000	0.000	0.000	0.000	0.007
Aug	0.360	0.000	0.000	0.000	0.360	0.000	0.000	0.000	0.000	0.000	0.021
Sep	0.036	0.000	0.000	0.000	0.036	0.000	0.000	0.000	0.000	0.000	0.015
Oct											
Nov											
Dec											
Total	1.609	0.005	0.000	0.000	1.609	0.000	0.000	0.000	0.000	0.000	0.082

- Notes:
- (1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
  - (2) Plastics refer to plastic bottles/containers, plastic sheets/ foam from packaging materials.
  - (3) Broken concrete for recycling into aggregates.