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# Proposal for Reducing Odour Monitoring Frequency

0026/22/ED/0152 03 |

**Contract No. CM/2021/11 Expansion of Sha Tau Kok Sewage Treatment Works**



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

Your reference:

Our reference: HKDSD206/50/108589

Date: 13 February 2023

Attention: Mr Lam Tack Ho, Alex

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

Dear Sirs

Agreement No.: CM 14/2018  
Independent Environmental Checker Services for  
Expansion of Sha Tau Kok Sewage Treatment Works  
Proposal for Odour Monitoring Frequency

We refer to the email of 10 February 2023 from Fugro Technical Services Limited, attaching the revised Proposal for Odour Monitoring Frequency.

We have no comment and hereby verify the captioned Proposal in accordance with Clause 3.1 of the Environmental Permit no. EP-517/2017/A.

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

Yours faithfully  
ANEWR CONSULTING LIMITED

James Choi  
Independent Environmental Checker

CPSJ/LCCR/YCFM/lsm

cc DSD – Mr Alex Leung (email: alexleung\_dsd@dc1803.com.hk)  
Binnies – Mr Alaster Chan (email: are\_em2@dc1803.com.hk)  
Fugro – Mr Calvin Leung (email: c.leung@fugro.com)



FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre  
5 Lok Yi Street, Tai Lam  
Tuen Mun, NT  
Hong Kong

Date 16 February 2023

Our Ref. MCL/ED/0088/2023/C

Consultants Management Division,  
Drainage Service Department  
42/F., Revenue Tower,  
5 Gloucester Road,  
Wanchai, Hong Kong.

BY HAND

Attn.: Mr. Alex Lam

Dear Sir,

**Contract No. CM/2021/11 Expansion of Sha Tau Kok Sewage Treatment Works**

**Environmental Permits: EP-517/2017/A**

**Submission of Proposal for Reducing Odour Monitoring Frequency (0026/22/ED/0152 03)**

Pursuant to EP-517/2017/A Condition 3.1 and EM&A Manual Section 3.3.2, we hereby submit the certified Proposal for Reducing Odour Monitoring Frequency (0026/22/ED/0152 03) for your onward submission to EPD for approval. This proposal has been verified by IEC accordingly.

Thank you for your attention, should there be any comments or queries, please contact our Mr. Roy Cheung at 3565-1002 or the undersigned at 3565-4441.

Yours faithfully,  
for and on behalf of  
FUGRO TECHNICAL SERVICES LIMITED

Calvin Leung  
Environmental Team Leader

CY/cl

c.c. DSD  
Binnies  
ANEWR  
Build king – Kum Shing JV

Attn: Mr. Kevin Cheung, Mr. Alex Lam, Mr. Gary Poon  
Attn: Mr. Kevin Chan, Mr. CY Ip, Mr. Kendrick Wong  
Attn: Mr. James Choi, Mr. Ricky Lau  
Attn: Mr. Tim Tan

By email (w/o)  
By email (w/o)  
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Encl.

# Document Control

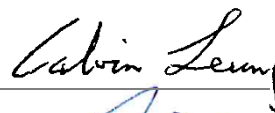
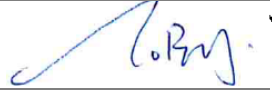

## Document Information

Project Title	Expansion of Sha Tau Kok Sewage Treatment Works (Contract No. CM/2021/11)
Document Title	Proposal for Reducing Odour Monitoring Frequency
Fugro Project No.	0026/22
Fugro Document No.	0026/22/ED/0152
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## Client Information

Client	Drainage Services Department
Client Address	42/F, Revenue Tower, 5 Gloucester Road, Wan Chai, Hong Kong
Client Contact	Mr. Alex Lam

## Environmental Team

Initials	Name	Role	Signature
MP	Calvin M.P. Leung	Environmental Team Leader	
KH	Toby K.H. Wan	Environmental Consultant	
WC	Roy W.C. Cheung	Assistant Environmental Consultant	

# 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 seabed of Starling Inlet.
- 1.1.3 The project proponent was the Drainage Services Department (DSD). Binnies Hong Kong Limited was commissioned by DSD as the Engineer for the Project. Build King – Kum Shing Joint Venture was appointed as the main contractor for the construction works under the Contract No. DC/2018/03. Fugro Technical Services Limited was appointed as the Environmental Team (ET) by DSD to implement the EM&A programme for the project.

## 1.2 Purpose of this Proposal

- 1.2.1 In accordance with section 3.3.2 of the EM&A Manual, the project proponent may propose and seek approval with EPD to reduce monitoring frequency throughout the year for subsequent years when the monitoring for the first two years (October 2020 to July 2022) shows that compliance can be achieved consistently.
- 1.2.2 Due to the 2<sup>nd</sup> year operation odour monitoring was completed in July 2022, no non-compliance was recorded during the monitoring period. Reduce odour monitoring frequency is proposed under Condition 3.1 of EP-517/2017/A and Section 3.3.2 of the EM&A Manuals.

## 2. ODOUR MONITORING

2.1.1 In accordance with the EM&A Manual (AEIAR-207/2017) , as there is no non-compliance was recorded during the weekly odour monitoring in the first two months (August and September 2020), monitoring frequency is recommended to reduce from weekly to monthly in the subsequent four months (October 2020 to January 2021) and further reduce to quarterly in the remaining six months (February to July 2021) of the first year of the TSTP operation if no non-compliance is found. The 1st year operation odour monitoring was completed in July 2021. The summary results of the 1st year odour are present in **Table 2.1**

**Table 2.1** Summary of the 1<sup>st</sup> year odour monitoring results

Location	Ambient		Exhaust				
	Temp., °C	Wind speed, m/s	Temp., °C	Air velocity, m/s	Average Air flow rate, m <sup>3</sup> /s	H2S conc., ppm	H2S Conc. Expressed in Odour Unit (*), OU/m <sup>3</sup>
Exhaust of TSTP No.1	20.0 – 33.0	0.75 – 2.21	25.1 – 35.7	7.01 – 8.42	2.00 – 2.37	<0.003	6.4
Exhaust of TSTP No.2	25.1 – 35.0	0.44 – 1.98	24.9 – 36.5	5.25 – 15.34	1.57 – 4.3	<0.003	6.4

Remarks: A non-compliance on the exhaust flow rate was noted in July 2020, operator was reminded to inspect the deodorization facility frequently.

2.1.2 The commencement of the 2nd year of operation odour monitoring was in August 2021, a total of 5 monitoring was conducted during the monitoring period. The summary results of the 2nd year odour are present in **Table 2.2**.

**Table 2.2** Summary of the 2<sup>nd</sup> year odour monitoring results

Date	Time	Ambient		Exhaust				
		Temp., °C	Wind speed, m/s	Temp., °C	Air velocity, m/s	Average Air flow rate, m <sup>3</sup> /s	H2S conc., ppm	H2S Conc. Expressed in Odour Unit (*), OU/m <sup>3</sup>
29-Oct-21	9:45	27.0	1.7	29.4	8.1	2.3	<0.003	6.4
	9:50			29.5	8.2		<0.003	6.4
	9:55			29.6	8.1		<0.003	6.4
05-Jan-21	11:20	29.0	0.7	30.6	8.1	2.2	0.003	6.4
	11:25			30.7	7.9		0.004	8.5
	11:30			30.7	7.8		0.004	8.5
21-Apr-22	11:00	29.1	0.1	27.8	3.9	1.5	0.005	10.6
	11:05			27.8	3.8		0.006	12.8
	11:10			27.8	3.9		<0.003	6.4
13-Jul-22	11:00	36.2	1.4	35.0	7.7	1.6	<0.003	6.4
	11:05			35.0	7.5		<0.003	6.4
	11:10			35.2	7.5		0.004	8.5
21-Oct-22	11:00	31.2	0.5	30.6	2.0	1.5	0.004	8.5
	11:05			30.6	2.1		0.003	6.4
	11:10			30.8	2.0		0.007	14.9
<b>Average</b>							0.004	8.2
<b>Min</b>							0.003	6.4
<b>Max</b>							0.007	14.9

2.1.3 In accordance with section 2.2.2 of the environmental review report of deodorisation system for temporary sewage treatment plant, no non-compliance was recorded compared with the design parameter of exhaust stack and odour emission rate of TSTP. The design parameter of the exhaust stack and odour emission rate of TSTP is presented in **Table 2.3**.

**Table 2.3** Design Parameter of Exhaust Stack and Odour Emission Rate of TSTP

Design Parameter	Unit	TSTP		TSTP	
		EIA's Design Stage		Actual Design	
Location	-	No.1	No.2	No.1	No.2
No. of emission points	-	2		2	
Building height	m above ground	14.3	14.3	8	8
Stack height	m above ground	16.3	16.3	12.24	12.24
Equivalent stack radius	m	0.15	0.25	0.3	0.3
Exit temperature		Ambient	Ambient	Ambient (±10 °C)	Ambient (±10 °C)
Total flowrate @exit temp.	m <sup>3</sup> hr <sup>-1</sup>	3952	9293	10178	10178
	m <sup>3</sup> s <sup>-1</sup>	1.1	2.58	2.83	2.83
Exit velocity	ms <sup>-1</sup>	15.53	13.15	<10	<10
Maximum H <sub>2</sub> S emission concentration at inlet	ppm	10	50	10.5	10.5
% of odour removal	%	99.5	99.8	99.5	99.5
Mitigated H <sub>2</sub> S emission concentration at exhaust	ppm	0.05	1	0.053	0.053
Mitigated odour emission concentration at exhaust	OUm <sup>-3</sup>	106.4	212.8	112.8	112.8
Mitigated odour emission rate	OUs <sup>-1</sup>	116.8	549.2	318.9	318.9

Note:

[1] Equivalent detection threshold criterion: 10U = 0.00047ppm of H<sub>2</sub>S.

[2] H<sub>2</sub>S emission concentration at inlet and the design parameters of the chimneys were extracted from Table 2.2 of Odour commissioning Test Report for TSTP.

2.1.4 Reduce odour monitoring frequency is proposed under Condition 3.1 of EP-517/2017/A and Section 3.3.2 of the EM&A Manuals, due to the monitoring for the first two years (October 2020 to July 2022) shows that compliance can be achieved consistently.

2.1.5 The method for odour monitoring and proposed monitoring frequency is presented in **Table 2.4** and **Table 2.5** respectively.

**Table 2.4** Odour Monitoring Methodology

Measurement	Parameter	Equipment
At the Exhaust of TSTP No.1 and TSTP No.2	<ul style="list-style-type: none"> <li>Exhaust air flow rate</li> <li>Temperature of exhaust</li> <li>H<sub>2</sub>S Concentration (ppm)</li> </ul>	H <sub>2</sub> S Analyzer Anemometer

**Table 2.5** Proposed Monitoring Parameters, Frequency

Measurement Parameters	Frequency
15-minute H <sub>2</sub> S Measurement (every 5 minutes measure one reading) - Average value of the three 5-minute readings will be used.  Exhaust air flow rate, ambient temperature, temperature of exhaust, weather condition and wind speed will be recorded.	Subsequent years of TSTP operation <ul style="list-style-type: none"> <li>Every six-month basis (in between January 2023 to March 2024)</li> </ul>



### 3. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

- 3.1.1 No related complaint was received after the commissioning of the TSTP in July 2020.
- 3.1.2 If there is any non-compliance, the deodorizing unit will be inspected, consider change of filter materials and replacing the deodorizing unit. The odour concentration at deodorizing inlet and outlet will be measured to ensure at least 99.5% odour removal efficiency and the frequency of odour monitoring will be resumed back to quarterly.

## 4. CONCLUSION

- 4.1.1 Based on the findings, every six-month basis of odour monitoring is proposed and is considered a suitable monitoring frequency.