Appendix 4.1A Prevailing Background Noise Measurement

1 INTRODUCTION

- 1.1 In accordance with Table 1A of the EIAO-TM, noise criteria for planned fixed plant sources should be determined as follows:
 - 5 dB(A) below the appropriate ANL set out in the IND-TM; or
 - prevailing background noise level where the prevailing background noise level is 5 dB(A) below the appropriate ANL (i.e. ANL 5 dB(A)).
- 1.2 Prevailing background noise measurements were conducted to determine the noise criteria for fixed plant noise assessment. This appendix presents the details of the prevailing background noise measurement, and the results of the measurement were summarized in Section 4.3.9 of the EIA Report.

2 DETAILS OF NOISE MEASUREMENT

Measurement Location and Date

2.1 The prevailing background noise measurement were conducted at three locations in Tuen Mun South Area for a continuous period of 48 hours, including weekday and weekend. The measurement locations are shown in Figure No. C1502/C/TME/ACM/M52/101. The details of noise measurement are presented in Table 2.1 below. Photographs taken during the measurement are presented in Appendix A.

Measurement Point ID	Location	Measurement Condition	Measurement Date	
M01	Block 14, Lung Mun Oasis (Roof Level)	1m from building facade	16 th & 17 th May 2021	
M02	Tower 1, Oceania Heights (Podium Level)	1m from building facade	2 nd & 3 rd May 2021	
M03	Roof Level of Yan Chai Hospital Law Chan Chor Si Primary School	1m from building facade	16 th & 17 th May 2021	

 Table 2.1
 Measurement Locations and Dates

Measurement Equipment

2.2 In accordance with the *Technical Memorandum for the Assessment of Noise from Places Other Than Domestic Premises, Public Places or Construction Sites* (IND-TM), sound level meter in compliance with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications was used for carrying out the noise measurement. Immediately prior to and following each noise measurement, the accuracy of sound level meter was checked using an acoustic calibrator generating 94dB at 1000 Hz. Measurement was considered to be valid with the calibration level from before and after the noise measurement within 1.0 dB. **Table 2.2** summarizes the equipment used in the noise measurement.

Table 2.2 Noise Measurement Equipment

Equipment	Model ⁽¹⁾	
Integrating Sound Level Meter	 B&K 2250 (Serial No. 3001291) NTi XL2 (Serial No. A2A-17440-E0) 	
Calibrator	 B&K 4231 (Serial No. 3006428) 	
Note:		

(1) Calibration certificates are provided in Appendix B.

Measurement Procedures

- 2.3 During the noise measurement, the following procedures were followed:
 - Parameters such as frequency weighting, the time weighting and the duration of measurement were set as follows:
 - Frequency weighting : A
 - Time weighting : Fast
 - Duration of measurement : 48 hours (with data being logged at every one second)
 - Prior to and after each noise measurement, the sound level meter was calibrated using the Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB (A), the measurement is considered invalid and repeat of noise measurement should be required after repair or re-calibration of the equipment.
 - All the measurement data within the sound level meter system were downloaded through the computer software. All these data were then checked and reviewed properly.
 - Noise measurement was conducted in the absence of fog, rain, and wind with a steady speed lower than 5 m/s, or wind with gusts lower than 10 m/s.

Appendix A

Measurement Photos





Appendix B

Calibration Certificates

Cert 1: Calibration Certificate of Integrated Sound Level Meter B&K 2250 (SN: 3001291)



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CERTIFICATE OF CALIBRATION

Description:	Sound Level Met	ter (Type 1)	Microphone	Preamp
Manufacturer:	B & K		B & K	B&K
Serial/Equipment No :	2250		4950	ZC0032
Adaptors used:	-		-	-
Item submitted by				
Customer Name:	AECOM ASIA CO	O LIMITED		
Address of Customer:	-			
Request No.: Date of receipt:	- 10 Oct 2020			
Date of receipt.	19-Oct-2020			
Date of test:	22-Oct-2020			
Reference equipment u	used in the calil	bration		
Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	23-Aug-2021	CIGISMEC
Signal generator	DS 360	61227	24-Dec-2020	CEPREI
Ambient conditions				
Temperature:	22 ± 1 °C			
Relative humidity:	55 ± 10 %			
Air pressure:	1005 ± 5 hPa			
Test specifications				
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1, The Sound Level Met	ter has been calibra	ated in accordance with	the requirements as spec	cified in BS 7580: Part 1:
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CERTIFICATE OF CALIBRATION

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 Certificate No.:
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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.

			Expanded	Coverage
Test:	Subtest:	Status:	Uncertanity (dB)	Factor
Self-generated noise	А	Pass	0.3	
	С	Pass	0.8	
	Lin	Pass	1.6	
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	
	С	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	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 ³ at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass	0.3	
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	
			0.1	

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	Expanded Uncertanity (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

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.

	Λ	- End -	(
Calibrated by:	$1 \sim 1$	Checked by:	R
Date:	22-Oct-2020	Date:	Feng Junqi 23-Oct-2020

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

HKAS has accredited this laboratory (Reg. No. HOKLAS 028) under 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. The results relate only to the item(s) calibrated. This certificate shall not be reproduced except in full without approval of the laboratory.

N/A



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CERTIFICATE OF CALIBRATION Certificate No.: 20CA0520 02-01 Page of 2 1 Item tested Description: Sound Level Meter (Type 1) Microphone Preamp Manufacturer: Type/Model No.: Nti Nti Andio Nti Andio XL2 MC230A MA220 Serial/Equipment No.: A2A-17440-EO A18423 9087 Adaptors used: Item submitted by Customer Name: AECOM Address of Customer: Request No.: Date of receipt: 20-May-2020 Date of test: 23-May-2020 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 24-Dec-2020 CEPREI Ambient conditions Temperature: 21 ± 1 °C Relative humidity: 55 + 10 % 1000 ± 5 hPa Air pressure: **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

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2. replaced by an equivalent capacitance within a tolerance of ±20%. The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference

3. between the free-field and pressure responsess of the Sound Level Meter

Test results

1.

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:

Company Chop: 25-May-2020



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.

Date:

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Form No CARP152-1/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.



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CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 20CA0520 02-01 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.

			Expanded	Coverage
Test:	Subtest:	Status:	Uncertanity (dB)	Factor
Self-generated noise	А	Pass	0.3	
	G	Pass	0.8	21
	Lin	Pass	1.6	2.1
Linearity range for Leg	At reference range Step 5 dB at 4 kHz	Pass	0.3	2.2
	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	
. , , , ,	С	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	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 ³ at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 ⁴ at 4kHz	Pass	0.3	
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	Expanded Uncertanity (dB)	Coverage Factor
Acoustic response	Weighting A at 125 Hz Weighting A at 8000 Hz	Pass Pass	0.3 0.5	

Response to associated sound calibrator

Fung Chi Yip

23-May-2020

N/A

3,

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.

Calibrated by: Date:

End TAMA Checked by: Shek Kwo Tat Date: 25-May-2020

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.

Soils & Materials Engineering Co., Ltd

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.

Cert 3: Calibration Certificate of Calibrator B&K 4321 (SN: 3006428)



綜合試驗有限公司 SOILS & MATERIALS ENGINEERING CO., LTD. 香港新界葵涌永基路 2 2 - 2 4 號好 爸 爸 創 科 大 廈 Good Ba Ba Hitech Building, Nos. 22-24 Wing Kei Road, Kwai Chung, New Territories, Hong Kong Tel: (852) 2873 6860 Fax: (852) 2555 7533 E-mail: smec@cigismec.com Website: www.cigismec.com



CERTIFICATE OF CALIBRATION					
Certi	ficate No.:	21CA0401 02		Page:	1 of 2
Item	tested				
Desc Manu Type/ Seria Adap	ription: ifacturer: /Model No.: //Equipment No.: tors used:	Acoustical Calibrat B & K 4231 3006428	or (Class 1)		
Item	submitted by				
Curst Addre Requ Date	omer: ess of Customer: est No.: of receipt:	AECOM - - 01-Apr-2021			
Date	of test:	05-Apr-2021			
Refe	erence equipment	used in the calib	ration		
Desc Lab s Prean Meas Signa Digita Audio Unive	ription: tandard microphone mplifier I generator I multi-meter analyzer rsal counter	Model: B&K 4180 B&K 2673 B&K 2610 DS 360 34401A 8903B 53132A	Serial No. 2412857 2743150 2346941 33873 US36087050 GB41300350 MY40003662	Expiry Date: 11-May-2021 03-Jun-2021 03-Jun-2021 19-May-2021 19-May-2021 18-May-2021 18-May-2021	Traceable to: SCL CEPREI CEPREI CEPREI CEPREI CEPREI CEPREI
Temp Relati Air pre	erature: ve humidity: essure:	22 ± 1 °C 55 ± 10 % 1010 ± 5 hPa			
Test	specifications				
1, 2, 3,	The Sound Calibrator and the lab calibration The calibrator was te The results are round pressure of 1013.25 f changes.	r has been calibrated in procedure SMTP00- sted with its axis verti- led to the nearest 0.0° hectoPascals as the n	in accordance with the 4-CA-156. cal facing downwards a 1 dB and 0.1 Hz and ha naker's information indi	requirements as specific at the specific frequency ave not been corrected fi cates that the instrumer	ed in IEC 60942 1997 Annex B using insert voltage technique. or variations from a reference ti is insensitive to pressure
Test	results				
This is test w	to certify that the sound ca as performed. This doe	alibrator conforms to the as not imply that the so	requirements of annex B bund calibrator meets I	of IEC 60942: 1997 for the EC 60942 under any oth	conditions under which the er conditions.
Details	s of the performed mea	surements are preser	nted on page 2 of this o	certificate.	SUS ENGINEERINE
Appro	oved Signatory:	24-	Date: 07-Apr-2	2021 Company Ch	op: 「新合試驗 有限公司 」
	_	r eng spindt			0105 * 01

Comments: The results reported in this certificate refer to the conditon of the instrument on the date of calibration and carry no implication regarding the long term stability of the instrument. The results apply to the item as received.

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

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21CA0401 02



2

CERTIFICATE OF CALIBRATION

(Continuation Page)

2 Page: of

1. Measured Sound Pressure Level

Certificate No.:

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	Output Sound Pressure	Measured Output	Estimated Expanded
Shown	Level Setting	Sound Pressure Level	Uncertainty
Hz	dB	dB	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 = 0.016 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 = 999.95 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 = 0.3 %
Estimated expanded uncertainty	0.7 %

Estimated expanded uncertainty

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.

	1	- End -	A 1
Calibrated by:	1	Checked by:	Jack
Date:	Fung Chi Yip 05-Apr-2021	Date:	Chan Yuk Yiu 07-Apr-2021

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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