

To: Maeda Corporation Hong Kong Branch
Room 1602-1605
New East Ocean Centre
9 Science Meuseum Road
Tsim Sha Tsui East, Kowloon
Hong Kong.

**ARCADIS DESIGN &
ENGINEERING LIMITED**
17/F, Two Harbour Square,
180 Wai Yip Street, Kwun Tong,
Kowloon, Hong Kong

Tel +852 2911 2000
Fax +852 2911 2002

Attention Mr. Artie Wong (Project Manager)

arcadis.com

Subject: MTRCL Contract C3840-13C
Tsim Sha Tsui Station Carnarvon Road Subway and
Entrances Modification Works
Environmental Permit No. EP-440/2012
Certification of Fixed Plant Noise Audit Report
(Report No. 17341-12 dated 19 June 2018)

By E-mail

Our ref: EB001340-A/THW18-39196
Date: 13 August 2018

Dear Sirs,

Pursuant to condition 2.8 of Part C of the Environmental Permit No. EP-440/2012, we herewith certify the Fixed Plant Noise Audit Report (Report No. 17341-12 dated 19 June 2018) issued by Wilson Acoustics Limited, that the maximum sound power levels complied with Project Profile (PP-462/2012) and free of characteristics of tonality, impulsiveness and intermittency.

Yours faithfully,
For and on behalf of
Arcadis Design & Engineering Limited



WONG Fu Nam
Environmental Team Leader

Your Ref:

Our Ref: 60453136.40032976/2018000416E

By Email and Post

MTR Corporation Limited
Fo Tan Railway House
No. 9, Lok King Street, Fo Tan
Shatin, N.T.,
Hong Kong

Attn.: Mr. Alfa Liu

10 August 2018

Dear Sirs,

**Consultancy Agreement A130-13
Independent Environmental Checker for CRS and LTS
CRS - Verification for Fixed Plant Noise Audit Report
(Report No.: 17341-12)**

We refer to the captioned updated Fixed Plant Noise Audit Report received on 10 August 2018.
We have no comment and have verified the report (Report No.: 17341-12).

Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully

AECOM Consulting Services Ltd



Y. W. Fung
Independent Environmental Checker

LLMC/wwsc

cc Arcadis Design & Engineering Limited
Maeda Corporation

(Attn.: Mr. F. N. Wong) via email
(Attn.: Ms. Cecilia Lee) via email

**MTR CONTRACT C3840-13C
CARNARVON ROAD SUBWAY
AT TSIM SHA TSUI STATION
FIXED PLANT NOISE AUDIT REPORT**

Report No.: 17341-12

For

Maeda Corporation Hong Kong Branch,
Rooms 1602-1605,
New East Ocean Centre,
9 Science Museum Road,
T.S.T.East, Kowloon, Hong Kong

Approved by:



Morgan Cheng
MHKIOA, MIOA, PMHKIQEP, BEAM Pro (NB)

Prepared by:

CL/MC


19 June 2018



Table of Contents

1.	Introduction	2
2.	Noise Audit Criteria	4
2.1	Maximum Allowable Sound Power Levels of Fixed Noise Sources	4
2.2	Fixed Plant Noise Criteria at Representative NSRs	4
3.	Noise Measurement Dates and Conditions	5
4.	Noise Measurement Methodology	5
4.1	Sound Power Level Measurement of Fixed Noise Sources	5
4.2	Background and Impact Noise Measurement	7
5.	Measurement Instrumentation.....	8
6.	Noise Audit Results	8
7.	Conclusion	13

Appendix A SWL Measurement Points of Louvres

Appendix B Photographic Record of Measurement Setup

Appendix C Calibration Certificates



1. Introduction

According to Condition 2.8 in part C of Environmental Permit (EP- 440/2012) and Clause 2.3.1 of the Project Profile 462/2012, Wilson Acoustics Limited (WAL) is commissioned by Maeda Corporation Hong Kong Branch to carry out noise measurement for the fixed plants at Carnarvon Road Subway of Tsim Sha Tsui (TST) Station.

Maeda Corporation Hong Kong Branch, the Main Contractor; to carry out the noise measurement for the fixed plant for the Project "*MTR Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works*".

The noise audit is to verify if operational noise impact of the fixed noise sources i.e. ventilation louvres associated with the operations of Building Service (BS) equipment would comply with the noise criteria identified in Project Profile. The detailed measurement locations are shown below in **Figure 1** and objective of two noise measurements are shown in **Table 1**.

This report includes two measurements as listed below:

Table 1: Types of Measurements, Locations and Objectives

	Type of noise measurement	Location	Objective
1.	Sound Power Level (SWL) measurement	near three louvres	<ul style="list-style-type: none">To check compliance with the maximum allowable SWLs in Table 2.6 of the Project Profile.
2.	Background and impact noise measurement	at / near three representative Noise Sensitive Receivers (NSRs)	<ul style="list-style-type: none">To verify the noise criteria (by background noise measurement)To check if correction of tonality, intermittency and impulsiveness is applicable.

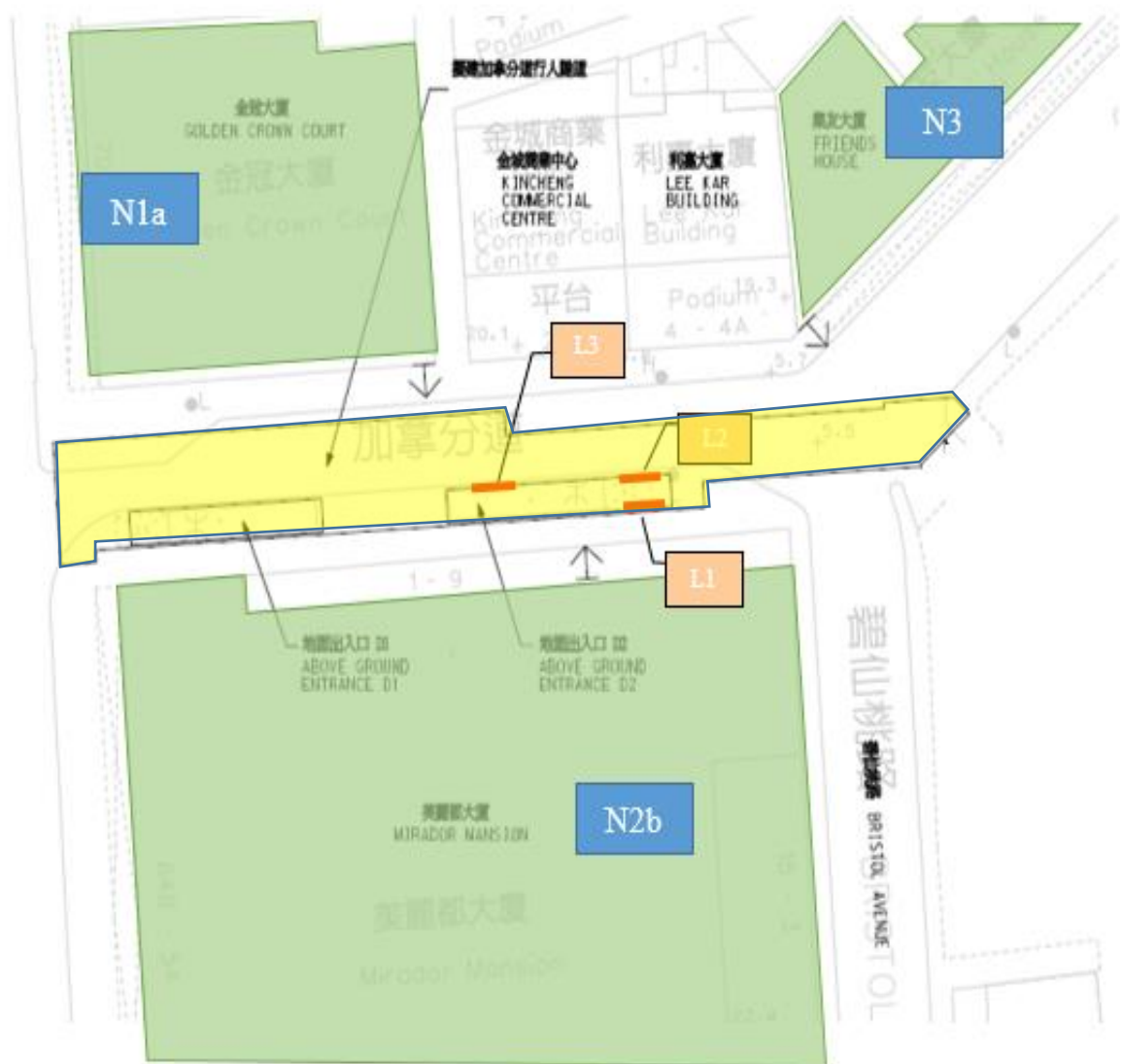


Figure 1: Locations of Fixed Noise Sources and Representative NSRs

Remark:

The yellow area is the construction site, measurement of NSR N1a was measured inside the site due to the accessibility.



2. Noise Audit Criteria

2.1 Maximum Allowable Sound Power Levels of Fixed Noise Sources

The maximum allowable Sound Power Levels (SWLs) for these 3 fixed plant noise sources (i.e. louvres) are stipulated in the project profile and are shown in **Table 2** below.

Table 2: Maximum Allowable SWLs of Fixed Plant Noise Sources

Louvre ID	Maximum Allowable SWL, dB(A) Day time and evening time	Maximum Allowable SWL, dB(A) Night time
L1	82	72
L2	86	76
L3	86	76

2.2 Fixed Plant Noise Criteria at Representative NSRs

As stipulated in Annex 5 of the EIAO-TM, the noise standard for planning purposes for fixed noise should be either (a) 5 dB(A) below the appropriate Acceptable Noise Level (ANL) or (b) the prevailing background noise levels. As identified in the project profile, the existing environment was found to be dominated by the road traffic noise. It is expected that the background noise level in the area are not likely lower than ANL-5dB(A) and hence 5 dB(A) below the appropriate ANL has been adopted.

As verified by background noise measurement results presented in **Table 9**, the existing environment was found to be dominated by the road traffic noise, air conditioner from surrounding building and noise from pedestrian. The background noise level in the area were higher than ANL-5dB(A) and hence 5 dB(A) below the appropriate ANL has been adopted as the fixed plant noise criterion, i.e. 50dB(A) in night period as the worst case scenario as shown in **Table 3** below.

Table 3: Fixed Plant Noise Criteria at Representative NSRs

NSR No.	NSR Name	Area Sensitivity Rating (ASR)	Fixed Plant Noise Criterion, ANL-5, dB(A) at Night (2300-0700 hrs) for the worst-case scenario ⁽¹⁾
N1a	Golden Crown Court	B	50
N2b	Mirador Mansion	B	50
N3	Friends House	B	50

Remark:

(1) In any event, the ASRs assumed in this report are only indicative and they are used for assessment only. It should be noted that fixed plant noise is controlled under section 13 of the NCO. Therefore, the Noise Control Authority shall determine fixed plant noise impact on the basis of prevailing legislation and practices being in force, and taking account of contemporary conditions / situations of adjoining land uses. The assessment of fixed plant noise in this report shall not bind the Noise Control Authority in the context of law enforcement against any of the fixed noise sources being assessed.



3. Noise Measurement Dates and Conditions

SWL measurements, background and impact noise measurements were conducted from, 11:00pm to 05:00am on 18th May 2018 to 19th May 2018 and 11:00pm to 04:30am on 23th May 2018 to 24th May 2018. The weather conditions were fine and there were no construction activities during the measurement.

4. Noise Measurement Methodology

4.1 Sound Power Level Measurement of Fixed Noise Sources

Sound Power Level (SWL) measurements were conducted with reference to *ISO 3746: "Acoustics – Determination of sound power levels and sound energy levels of noise sources using sound pressure-survey method using an enveloping measurement surface over a reflecting plane"* (ISO 3746). Each measurement point of the fixed noise sources i.e. the louvres was measured in terms of the A-weighted equivalent continuous for 1 minute with a measurement distance (d) of 0.5m. The worse-case operation mode of L1 and L2 is free-cooling mode while the worse-case operation mode of L3 is fire mode.

The number of measurement points depends on the dimensions of the louvres, which are shown in **Table 4**.

Table 4: Measurement Plan for Louvres

Louvre ID	Length (mm)	Width (mm)	Measurement Distance (m)	Measurement Point Layout	Measurement descriptor	Worst-case Operation Mode	Associated fixed plants
L1	2760	730	0.5	Appendix A	L _{Aeq, 1min}	Free Cooling Mode	AHU-001
L2	2760	730				Free Cooling Mode	
L3	4305	1150				Fire Mode	SEF-01/02

Remark:

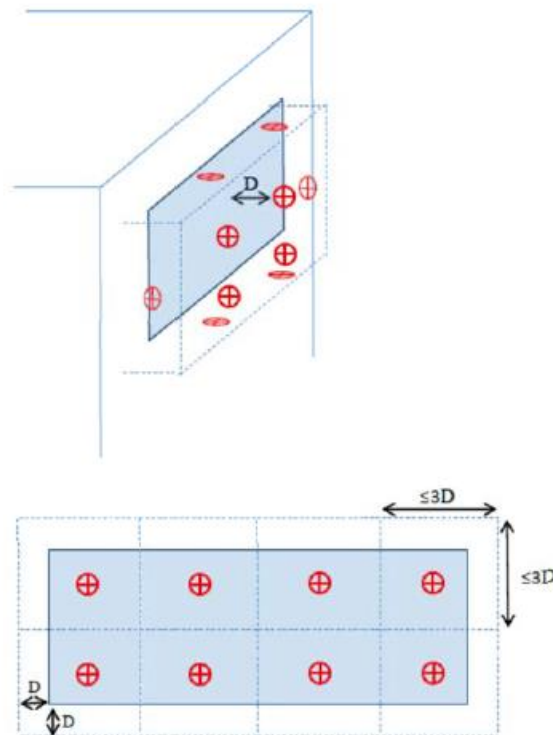
The dimension of the louvres had been updated as built in the latest methodology (17341-7).

Background noise level of each measurement point will be measured for 1 minute continuously with data logged in 1s interval to determine the background correction (K_{1A}). Extraneous event which will significantly affect the noise measurement (e.g. Noise due to heavy vehicle pass by) will be eliminated. If the difference between the background noise and the measured noise level is less than 3.0 dB, K_{1A} should be capped to 3.0 dB. If the corrected result show a deviation from the noise criteria, a re-measurement with reduced measurement distance, D, shall be conducted according to *ISO3746* in order to increase the measurement accuracy.


SWL= Mean L_{Aeq} over all measurement points + 10 log (total surface area over the measurement box) + K_{1A}+ K_{2A}


K_{1A} refers to background noise correction factor

K_{2A} refers to environment correction for sound absorption and reflection



D: Measurement distance

 Louver opening

 Measurement box


 Proposed measurement point (microphone pointing perpendicular to the louvre)

Figure 2: Sample Testing Method for Louvre

The SWL measurement procedures are as follows:

- I. Immediately prior to the noise measurement, the accuracy of the Sound Level Meter (SLM) was checked using an acoustic calibrator. Measurements were accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB. In order to obtain conservative assessment results, environmental correction (i.e. reverberation time) were excluded.
- II. Microphones were set based on a measurement distance (d) of 0.5m. The amount of measurement points and locations were determined with reference to *ISO 3746*. Wind shields were used to reduce the effect of wind and air movement across the microphone, which might affect the measurement results;
- III. The noise levels from the louvres due to the operations of the corresponding fixed plants were measured continuously for 1 minute with noise data logged in 1 second interval at each measurement point. If the noise level was significantly affected by extraneous event (e.g. high noise level due to pass-by of vehicles), the measurement results were discarded;



- IV. After the measurement of the first louvre, the measurement equipment were moved to the next louvre and steps II and III repeated until measurements for all the louvres were finished; and
- V. Background noise for each louvre was measurement for 1 minute continuously with noise data logged in 1 second interval. If the noise level was significantly affected by extraneous event (e.g. high noise level due to pass-by of vehicles), the measurement results were discarded.

The measurement points for the louvres are shown in **Appendix A**. The photos of measurement setup are shown in **Appendix B**.

4.2 Background and Impact Noise Measurement

With reference to *IND-TM*, measurements of impact noise levels at NSRs, in terms of the A-weighted equivalent continuous Sound Pressure Levels (SPLs) over 30 minutes ($L_{eq,30min}$) in one-third octave bands under the worst-case scenarios, were conducted. Noise source were operated in the worst case mode during the measurement (free-cooling mode for louvre L1 and L2, and fire mode for louvre L3). The measurement details for NSRs are shown in **Table 5**. The measurement locations and setup at NSRs are shown in **Appendix B**.

One set of background noise measurement for 5 minutes, $L_{eq,5min}$, in one-third octave bands was conducted at each NSR when all the fixed plants were shut down during night-time period (i.e. 2300-0700 hours) without extraneous noise. The measurement procedures are listed below:

- I. A microphone with a pre-amplifier was fixed to a carbon fiber rod and connected to a SLM. The microphone was set at a position of 1m from the external façade of each NSR and the height was set to simulate the lowest affected floor as far as practicable.
- II. Immediately prior to the noise measurement, the accuracy of the SLM was checked using an acoustic calibrator generating SPL of 94.0dB(A) at frequency octave of 1000Hz. Measurements were accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB;
- III. Background noise levels for each NSR in $L_{eq,5min}$, in one-third octave bands, were measured when all the fixed plants of the project were shut down. If the noise level was significantly affected by extraneous event (e.g. high noise level due to pass-by of vehicles), the measurement results were discarded;
- IV. Impact noise levels in $L_{eq,30min}$, in one-third octave bands, were logged in 1 second interval for each NSR for the entire noise measurement period. The fixed noise sources were operated steadily and continuously. The characteristics of tonality, intermittency and impulsiveness would be recorded, and determined in accordance with *IND-TM* by measurement.



Table 5: Measurement Details for NSRs

NSR No.	NSR Name	Measurement Location	Measurement Point Layout	Measurement descriptor
N1a	Golden Crown Court	3m from external façade	Appendix B	Impact: L _{Aeq,30mins} ; Background: L _{Aeq, 5mins}
N2b	Mirador Mansion			
N3	Friends House	1m from external façade		

Remark: a) The measurement location of the microphone change from 1m façade to 3m façade in Golden Crown Court and Mirador Mansion due to the accessibility of the microphone, façade correction was applied in section 6 calculation; b) Noise measurement at 1m from the external facade of N1a was not accessible as the measurement location were blocked by the construction material in the construction site; c) Noise measurement at 1m from the external facade of N2b was not accessible as the 1m from external façade location was covered by billboard and electric wire, also, it may cause an obstruction and safety problem to the pedestrian.

5. Measurement Instrumentation

Sound level meters (SLMs), microphones and an acoustic calibrator were deployed as shown in **Table 6**.

Table 6: Measurement Instrumentation

Equipment	Manufacturer	Model	Serial Number
4-Channel Sound & Vibration Analyzer	Svantek	SVAN958	20890
Sound & Vibration Analyzer	Svantek	SVAN959	11228
Acoustic Calibrator	Svantek	SV30A	29088

The SLM complies with the International Electrotechnical Commission (IEC) Publications 61672 (Class 1). On site calibration before and after measurement by the acoustic calibrator can ensure no significant shift on the sensitivity of the SLM at the calibration level and frequency. The SLM and the calibrator had undergone regular laboratory calibration (*IEC 61260 and IEC 60942*) and the calibrations were traceable to international standards. The calibration certificates are shown in **Appendix C**.

6. Noise Audit Results

The SPL and SWL assessment results for each louvre under the tested operation scenario are summarized in **Tables 7 and 8** respectively. The measured SWLs of L1, L2 and L3 are 71, 69 and 73 dB (A) respectively.

Background and impact noise measurement results at NSRs are summarized in **Table 9** and **Table 10**. The noise environment in the vicinity was dominated by the road traffic noise, air conditioner from the surrounding building and noise from pedestrian. As the differences between impact noise levels and background noise levels are less than 3.0dB(A), the fixed noise sources of Carnarvon Road subway at Tsim Sha Tsui Station are not considered as



significant noise sources to the NSRs. Meanwhile, according to *IND-TM*, no appropriate characteristics due to tonal, impulsive or intermittent were found under investigation of measurement result.

Based on the above findings, the Resultant SPL at Friends House, Golden Crown Court and Mirador Mansion were found to be 40, 46 and 48dB(A) respectively, all comply with the fixed source noise criterion of 50dB(A). The fixed plant noise audit results in **Table 11** below showed that there was no adverse noise impact at the NSRs due to fixed noise sources of the project.



Table 7: Louvre SPL Measurement Results

Louvre ID	Measured Noise Level, $L_{eq,1min}$, dB(A)																				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Average
L1	61.3	61.3	65.5	66.0	64.1	61.3	59.5	59.5	59.9	60.1	60.1	61.1	66.5	62.5	62.1	61.3	-	-	-	-	62.7
L2	61.6	62.1	61.0	61.0	60.5	61.7	61.6	60.6	61.1	60.5	61.3	62.1	62.6	61.0	61.5	61.0	-	-	-	-	61.4
L3	63.0	63.7	63.9	64.2	63.8	63.5	63.8	63.4	63.3	63.5	63.9	62.0	62.6	62.4	63.0	63.9	62.9	62.9	63.2	63.0	63.3

Table 8: Louvre SWL Audit Results

Louvre ID	Length	Width	Test Dist.	Scenario	Average Measured SPL	Measured B/G	ΔL_p A	K_1 A	B/G Corr. SPL	a	b	c	Total Surface Area (S)	Area Correction (10logS)	K_{2A}	Measured SWL	SWL Criteria	Compliance (Y/N)
L1	2760	730	0.5	Free-cooling Mode	62.7	61.6	1.1	3.0	59.7	1.9	0.9	0.5	12.0	10.8	0.0	71	72	Yes
L2	2760	730	0.5	Free-cooling Mode	61.4	61.9	-0.5	3.0	58.4	1.9	0.9	0.5	12.0	10.8	0.0	69	76	Yes
L3	4305	1150	0.5	Fire Mode	63.3	63.0	0.3	3.0	60.3	2.7	1.1	0.5	18.9	12.8	0.0	73	76	Yes

Remark:

- a) Equation of ISO 3746: $S = 4(ab + bc + ca)$, where $a = 0.5 l_1 + d$, $b = 0.5 l_2 + d$, $c = l_3 + d$, in which l_1 , l_2 and l_3 are the length, width and height, respectively, of the reference box;
- b) $SWL = \text{Mean } L_{Aeq} \text{ over all measurement points} + 10 \log(\text{total surface area over the measurement box}) + K_{1A} + K_{2A}$;
- c) In order to obtain conservative assessment results, environmental correction (K_{2A}) were assumed to be zero.



Table 9: Background and Impact Measurement Result and Applicability of Corrections for Tonality, Intermittency and Impulsiveness (L1, L2 Free-cooling Mode)

NSR Name	Impact Noise Level, $L_{eq,30min}$, dB(A)	Background Noise Level, $L_{eq,5min}$, dB(A)	Difference between Impact Noise Level and Average Background Noise Level, (<3.0 or>=3.0 dB(A))	Applicability of Corrections for Tonality, Intermittency and Impulsiveness (Yes/No)
Mirador Mansion	66.6	63.7	<3.0	No
Golden Crown Court	64.7	63.1	<3.0	No
Friends House	65.4	62.6	<3.0	No

Table 10: Background and Impact Measurement Result and Applicability of Corrections for Tonality, Intermittency and Impulsiveness (L3 Fire Mode)

NSR Name	Impact Noise Level, $L_{eq,30min}$, dB(A)	Background Noise Level, $L_{eq,5min}$, dB(A)	Difference between Impact Noise Level and Average Background Noise Level, (<3.0 or>=3.0 dB(A))	Applicability of Corrections for Tonality, Intermittency and Impulsiveness (Yes/No)
Mirador Mansion	64.3	63.4	<3.0	No
Golden Crown Court	65.9	63.2	<3.0	No
Friends House	64.6	61.7	<3.0	No

Remark:

a) The Impact Noise level at Mirador Mansion and Golden Crown Court were measured at 3 m from the external façade, while the impact noise level were measured at 1 m from the external façade.



Table 11: Fixed Plant Noise Audit Results

NSR	Source ID	Source Height (mPD)	SWL dB(A)	Receiver Height (mPD)	Horizontal Distance (m)	Slant Distance (m)	Distance Attenuation dB (A)	Tonality Correction dB (A)	#Screening Correction dB (A)	Façade Correction dB (A)	SPL $L_{Aeq,30min}$, dB (A)	Resultant SPL, $L_{Aeq,30mins}$, dB (A)	Noise Criteria, dB (A) (Night Time)	Compliance (Yes/No)
Mirador Mansion	L1	9.3	71	15.3	5	8	-26	0	0	3	48	48	50	Yes
	L2	9.3	69	15.3	9	11	-29	0	-10	3	33			
	L3	9.3	73	15.3	12	14	-31	0	-10	3	35			
Golden Crown Court	L1	9.3	71	18.1	19	21	-35	0	-10	3	29	46	50	Yes
	L2	9.3	69	18.1	17	19	-34	0	0	3	38			
	L3	9.3	73	18.1	11	14	-31	0	0	3	45			
Friends House	L1	9.3	71	12.5	27	27	-37	0	-10	3	27	40	50	Yes
	L2	9.3	69	12.5	25	25	-36	0	0	3	36			
	L3	9.3	73	12.5	32	32	-38	0	0	3	38			

Remark:

- a) While the sources fall within the view angle of the NSR but with no direct line of sight to the opening, a 10 dB (A) attenuation would be applied.
- b) In order to get a conservative result, L1, L2 and L3 were assumed to operate simultaneously according to the EIA.



7. Conclusion

Fixed plant noise audit was conducted for the project of Carnarvon Road Subway at Tsim Sha Tsui Station. SWL measurements of fixed noise sources, background and impact noise measurement at representative NSRs under worst-case operation were conducted.

The measured SWLs of L1, L2 and L3 are 71, 69 and 73 dB (A) respectively. The maximum allowable SWLs identified in the Project Profile is 72 dB (A) for L1, and 76 dB (A) for L2 and L3, the measured SWL results fulfill the maximum allowable SWLs.

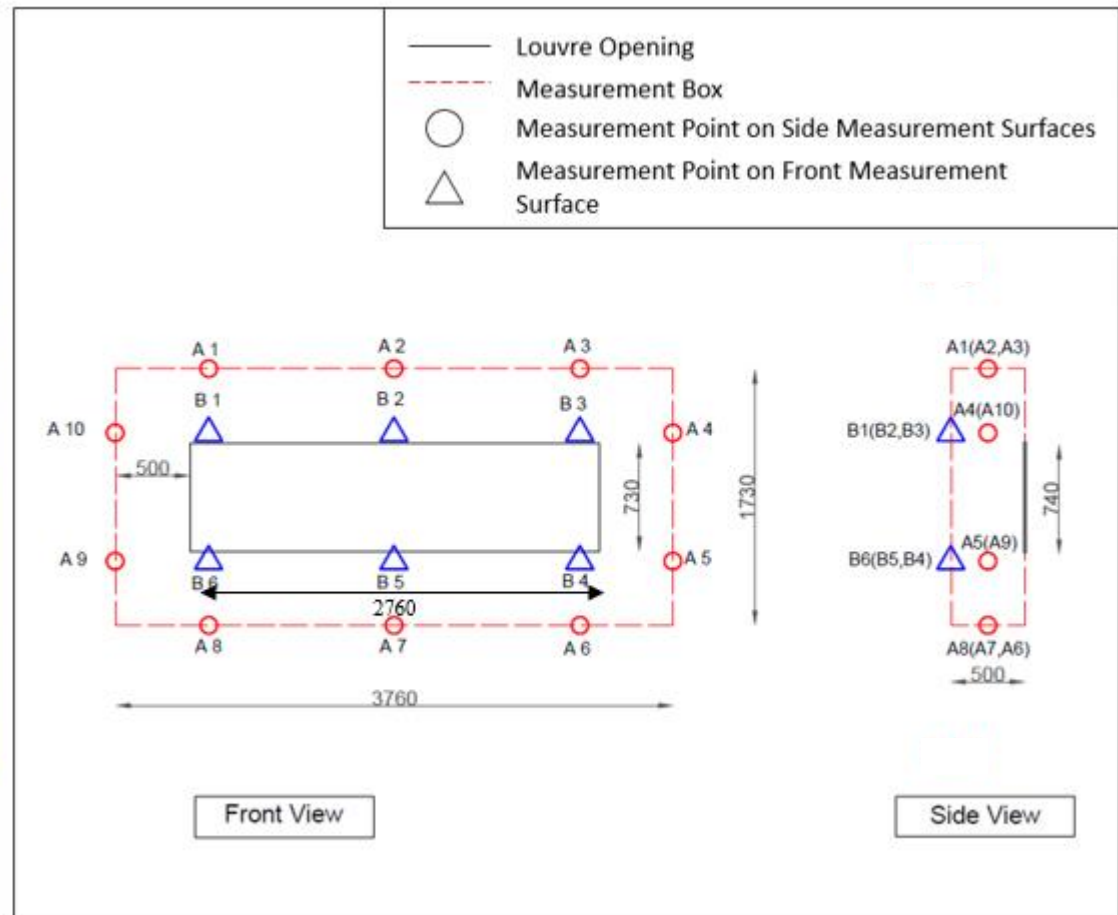
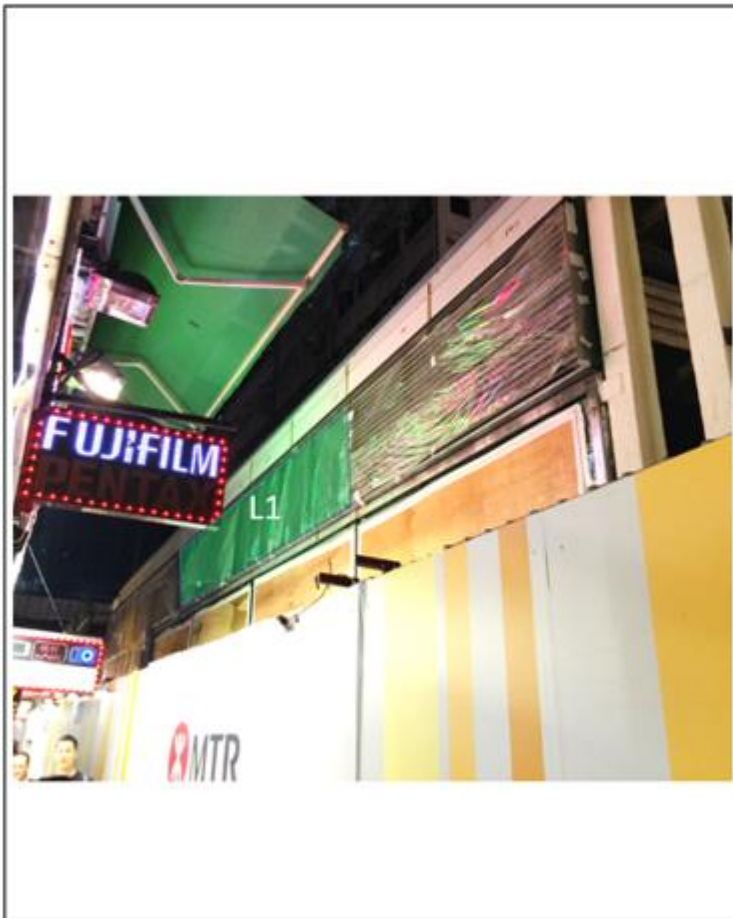
The fixed plant noise criterion at representative NSRs, ANL-5, dB(A) at night time is 50, according to the above findings, the resultant SPL at Friends House, Golden Crown Court and Mirador Mansion were found to be 40, 46 and 48dB(A) respectively, which comply with the 50dB(A) criteria.

For background and impact noise measurement, the differences between measured noise level and background noise level at each NSR were less than 3.0dB(A). Hence, the fixed noise sources of the project are not considered as significant noise sources. No correction of tonality, impulsiveness or intermittency were determined by IND-TM. It was found that there was no adverse noise impact at the NSRs due to fixed noise sources of the project.

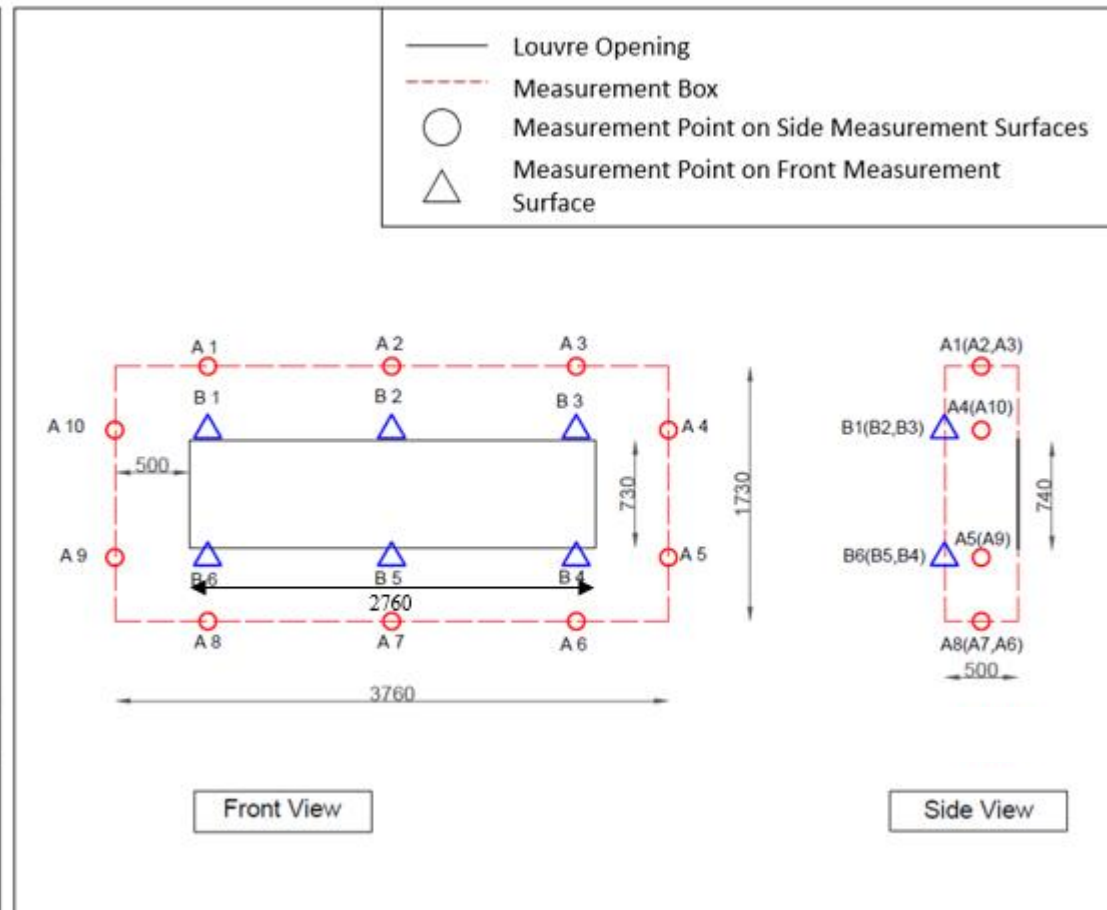
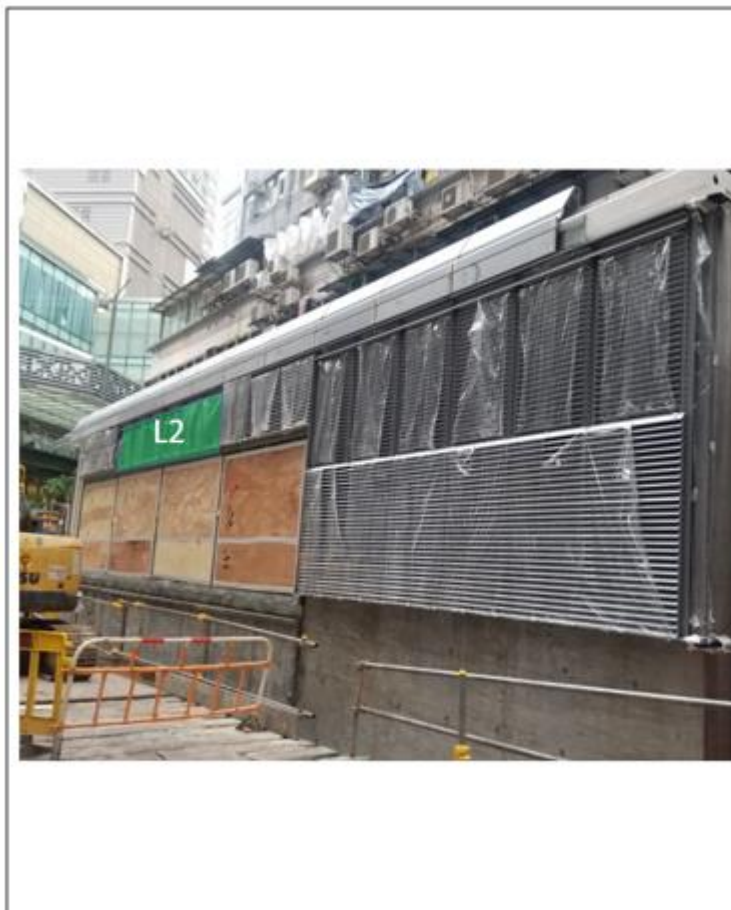


Appendix A

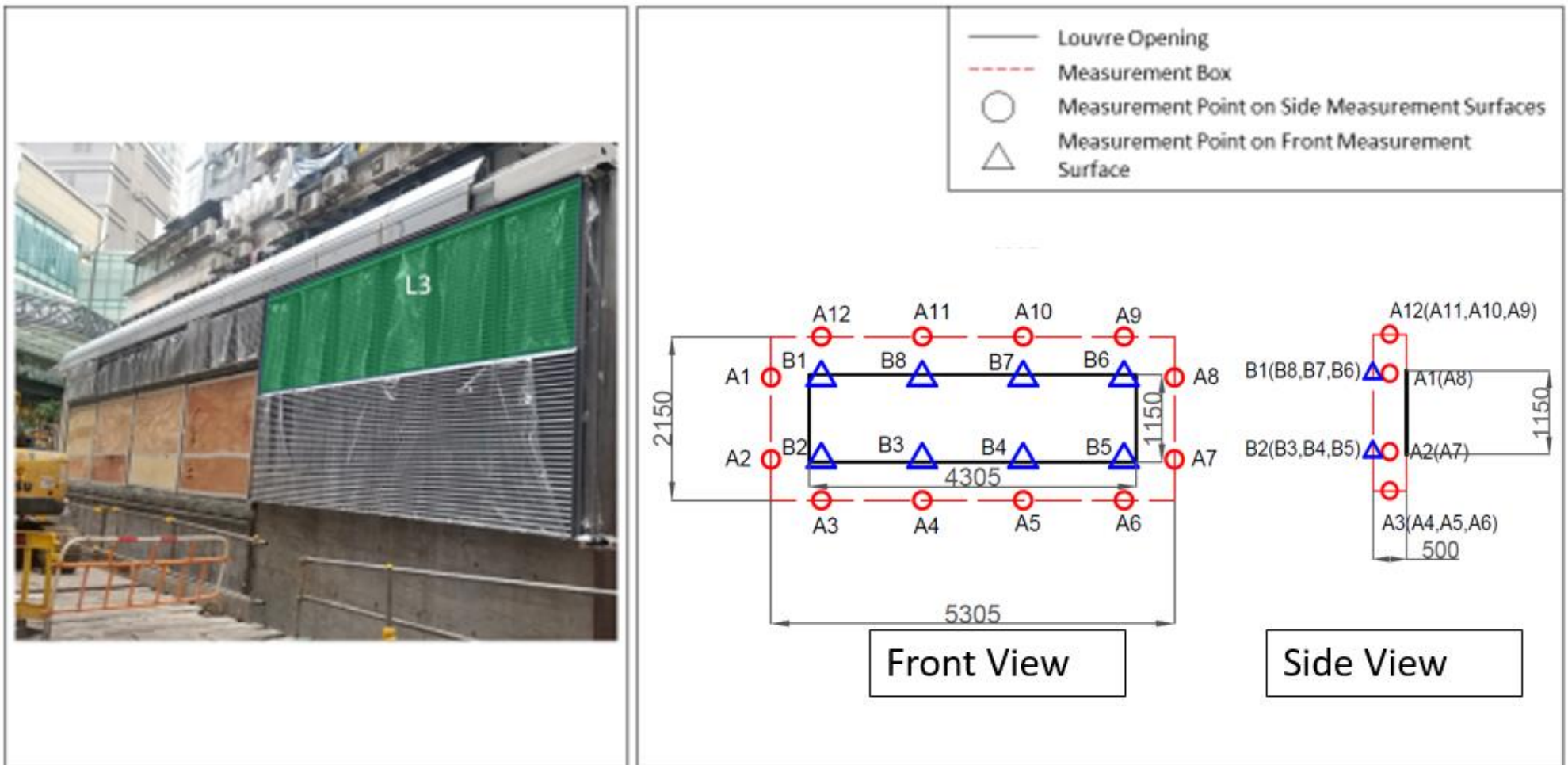
SWL Measurement Points of Louvres



Appendix A1: Measurement Points of Louvre L1



Appendix A2: Measurement Points of Louvre L2



Remark: Measurement distance change from 1m to 0.5m in order to reduce the effect of ambient noise.

Appendix A3: Measurement Points of Louvre L3



Appendix B

Photographic Record of Measurement Setup



Photo B1: Measurement Setup at L1 (Point B2)



Photo B2: Measurement Setup at L2 (Point A5)



Photo B3: Measurement Setup at L3 (Point B1)

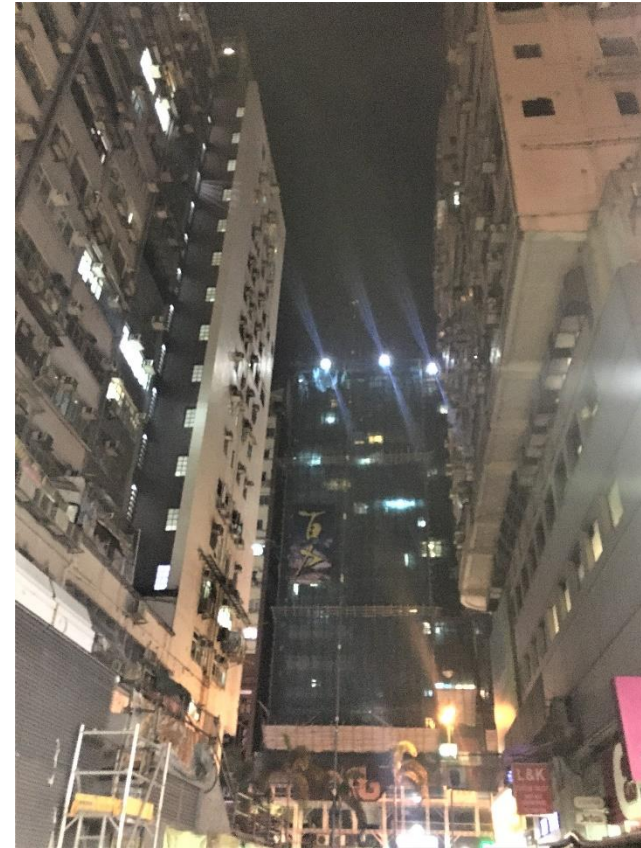


Photo B4: Measurement Setup at Golden Crown Court



Photo B5: Measurement Setup at Mirador Mansion

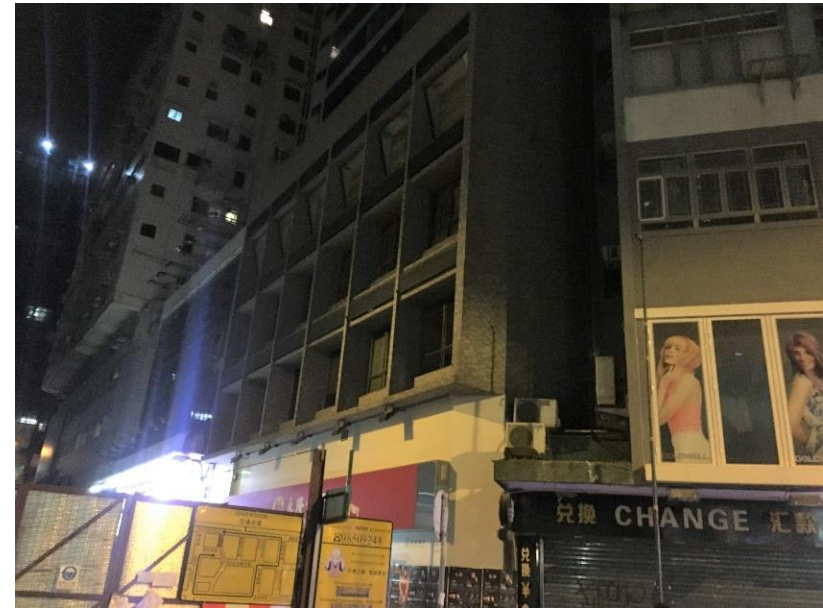


Photo B6: Measurement Setup at Friends House



Appendix C

Calibration Certificates



Cert 1 Calibration Certificate for Sound Level Meter Svantek SVAN958 (SN:20890)



CALIBRATION CERTIFICATE

<i>Certificate Information</i>			
Date of Issue	23-Jun-2017		Certificate Number MLCN171137S
<i>Customer Information</i>			
Company Name	Wilson Accoustics Limited		
Address	Unit 601, Block A, Shatin Industrial Centre, Yuen Shun Circuit, Shatin, N. T., Hong Kong		
<i>Equipment-under-Test (EUT)</i>			
Description	Sound & Vibration Analyser		
Manufacturer	Svantek		
Model Number	SVAN 958		
Serial Number	20890		
Equipment Number	--		
<i>Calibration Particular</i>			
Date of Calibration	23-Jun-2017		
Calibration Equipment	4231(MLTE008) / PA160059 / 20-May-2018		
Calibration Procedure	MLCG00, MLCG15		
Calibration Conditions	Laboratory	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	EUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Power Supply	Internal battery
Calibration Results	Calibration data were detailed in the continuation pages.		
<i>Approved By & Date</i>			
			K.O. Lo 23-Jun-2017
<i>Statements</i>			
<ul style="list-style-type: none"> * Calibration equipment used for this calibration are traceable to national / international standards. * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement. * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT. * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited. 			



Certificate No.MLCN171137S

Calibration Data						
Channel / Mode	Filter / Detector	Range	EUT Reading	Standard Reading	EUT Error	Calibration Uncertainty
CH4 / Sound	A / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / FAST (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	94.1 dB	94.0 dB	0.1 dB	0.2 dB
			114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	LIN / SLOW (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	A / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
		130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB
	C / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB
130 dB		114.1 dB	114.0 dB	0.1 dB	0.2 dB	
LIN / IMPULSE (1 kHz Input)	105 dB	94.0 dB	94.0 dB	0.0 dB	0.2 dB	
	130 dB	114.1 dB	114.0 dB	0.1 dB	0.2 dB	

- END -

Calibrated By : Patrick
Date : 23-Jun-2017

Checked By : K.O. Lo
Date : 23-Jun-2017

Page 2 of 2

萬儀校正中心有限公司
MaxLab Calibration Centre Limited


香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室
Unit B2, 9/F., Boldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk



Cert 2 Calibration Certificate for Sound Level Meter Svantek SVAN959



CALIBRATION CERTIFICATE

Certificate Information																
Date of Issue	7-May-2018															
Certificate Number	MLCN180789S															
Customer Information																
Company Name	Wilson Acoustics Limited															
Address	Unit 601, Block A, Shatin Industrial Centre, Yuen Shun Circuit, Shatin, N. T., Hong Kong															
Equipment-under-Test (EUT)																
Description	Sound & Vibration Analyser															
Manufacturer	Svantek															
Model Number	SVAN 959															
Serial Number	11228															
Equipment Number	--															
Calibration Particular																
Date of Calibration	7-May-2018															
Calibration Equipment	4231(MLTE008) / PA160059 / 20-May-2018															
Calibration Procedure	MLCG00, MLCG15															
Calibration Conditions	<table border="1"> <tr> <td>Laboratory</td> <td>Temperature</td> <td>23 °C ± 5 °C</td> </tr> <tr> <td></td> <td>Relative Humidity</td> <td>55% ± 25%</td> </tr> <tr> <td>EUT</td> <td>Stabilizing Time</td> <td>Over 3 hours</td> </tr> <tr> <td></td> <td>Warm-up Time</td> <td>10 minutes</td> </tr> <tr> <td></td> <td>Power Supply</td> <td>Internal battery</td> </tr> </table>	Laboratory	Temperature	23 °C ± 5 °C		Relative Humidity	55% ± 25%	EUT	Stabilizing Time	Over 3 hours		Warm-up Time	10 minutes		Power Supply	Internal battery
Laboratory	Temperature	23 °C ± 5 °C														
	Relative Humidity	55% ± 25%														
EUT	Stabilizing Time	Over 3 hours														
	Warm-up Time	10 minutes														
	Power Supply	Internal battery														
Calibration Results	Calibration data were detailed in the continuation pages. All calibration results were within EUT specification.															
Approved By & Date																
	 K.O. Lo 7-May-2018															
Statements																
<ul style="list-style-type: none"> * Calibration equipment used for this calibration are traceable to national / international standards. * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement. * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT. * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited. 																

Page 1 of 2

萬儀校正中心有限公司
MaxLab Calibration Centre Limited

香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室

Unit B2, 9/F., Baldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk



Certificate No. MLCN180789S

Calibration Data						
Weighting / Time	Range	EUT Reading	Standard Reading	EUT Error	Calibration Uncertainty	EUT Specification
A / FAST (1 kHz Input)	LOW	93.9 dB	94.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
	HIGH	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
C / FAST (1 kHz Input)	LOW	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
	HIGH	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
Z / FAST (1 kHz Input)	LOW	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
	HIGH	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
		113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
A / SLOW (1 kHz Input)	LOW	93.9 dB	94.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
	HIGH	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
C / SLOW (1 kHz Input)	LOW	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
	HIGH	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
Z / SLOW (1 kHz Input)	LOW	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
	HIGH	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
A / IMPULSE (1 kHz Input)	LOW	93.9 dB	94.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
	HIGH	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
C / IMPULSE (1 kHz Input)	LOW	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
	HIGH	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB
Z / IMPULSE (1 kHz Input)	LOW	94.0 dB	94.0 dB	0.0 dB	0.2 dB	± 0.7 dB
	HIGH	113.9 dB	114.0 dB	-0.1 dB	0.2 dB	± 0.7 dB

- END -

Calibrated By :
Date :

Dan
7-May-2018

Checked By :
Date :

K.O. Lo
7-May-2018

Page 2 of 2

萬儀校正中心有限公司
MaxLab Calibration Centre Limited

香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室

Unit B2, 9/F., Baldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk



Cert 3 Calibration Certificate for Acoustic Calibrator Svantek SV30A (SN:29088)



CALIBRATION CERTIFICATE

Certificate Information		
Date of Issue	5-Mar-2018	Certificate Number MLCN180297S
Customer Information		
Company Name	Wilson Accoustics Limited	
Address	Unit 601, Block A, Shatin Industrial Centre, Yuen Shun Circuit, Shatin, N. T., Hong Kong	
Equipment-under-Test (EUT)		
Description	Acoustic Calibrator	
Manufacturer	Svantek	
Model Number	SV 30A	
Serial Number	29088	
Equipment Number	--	
Calibration Particular		
Date of Calibration	5-Mar-2018	
Calibration Equipment	4231(MLTE008) / PA160059 / 20-May-18 1351(MLTE049) / MLEC17/06/02 / 6-Jun-18	
Calibration Procedure	MLCG00, MLCG15	
Calibration Conditions	Laboratory	Temperature 23 °C ± 5 °C Relative Humidity 55% ± 25%
	EUT	Stabilizing Time Over 3 hours Warm-up Time Not applicable Power Supply Internal battery
Calibration Results	Calibration data were detailed in the continuation pages. All calibration results were within EUT specification.	
Approved By & Date		
		K.O. Lo 5-Mar-2018
Statements		
<ul style="list-style-type: none"> * Calibration equipment used for this calibration are traceable to national / international standards. * The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the EUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement. * MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the EUT. * The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited. 		



Certificate No. MLCN180297S

<i>Calibration Data</i>					
EUT Setting		Standard Reading	EUT Error	Calibration Uncertainty	EUT Specification
94	dB	93.7 dB	0.3 dB	0.15 dB	± 0.3 dB
114	dB	113.7 dB	0.3 dB	0.15 dB	± 0.3 dB

- END -

Calibrated By : Patrick
Date : 5-Mar-18

Checked By : K.O. Lo
Date : 5-Mar-18

Page 2 of 2

萬儀校正中心有限公司
MaxLab Calibration Centre Limited

香港新界葵涌華星街 16-18 號保盈工業大廈 9 樓 B2 室

Unit B2, 9/F., Baldwin Industrial Bldg., 16-18 Wah Sing Street, Kwai Chung, N.T., Hong Kong Tel: (852) 2116 1380 Fax: (852) 2264 6480 Email: info@maxlab.com.hk