JOB NO.: TCS01102/20

CEDD CONTRACT CV/2016/08 QUEEN'S HILL DEVELOPMENT - SEWAGE PUMPING STATION WORKS

PRE-OPERATIONAL NOISE COMPLIANCE TEST REPORT

PREPARED FOR
CHINA GEO-ENGINEERING CORPORATION

Quality Index

Date	Reference No.	Prepared By	Approval By
21 April 2021	TCS01102/20/600/R0007v5	Martin Li (Environmental Consultant)	T.W. Tam (Environmental specialist)

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1. INTRODUCTION

1.1 China Geo-Engineering Corporation (CGC) has been awarded the CEDD Contract CV/2016/08 Queen's Hill Development - Sewage Pumping Station Works (hereinafter "the Contract").

1.2 Pursuant to Condition 2.4 of EP-506/2016, a Noise Compliance Test Report should be prepared to demonstrate the operation noise of the proposed Queen's Hill Sewage Pumping Station (QHSPS) would not exceed the noise criteria at the nearby noise sensitive receivers (NSRs). The Compliance Test Report should be submitted to EPD at least two months before the operation of the Project. Necessary noise mitigation measures were identified in this report.

1.3 This report was prepared to fulfill the requirement under Condition 2.4 of EP-506/2016, as demonstrating compliance with the noise criteria as described in the Project Profile (Register No.: PP-529/2015)

1.4 CGC employed Action-United Environmental Services and Consulting (AUES) to conduct the pre-operational noise measurement to demonstrate the QHSPS operational noise meet the noise criteria and prepare a Compliance Testing Report for submission to EPD for endorsement.

1.5 Pre-operational noise measurement of the QHSPS was conducted between 21:00 of 27 November 2020 and 01:00 of 28 November 2020. During the measurement, the QHSPS was under full operation mode which is representative of the future typical operation mode upon population intake of the proposed developments at Queen's Hill development site.

1.6 This report presents the measurement method and the result of the pre-operational noise measurement.

Report Structure

1.7 The Compliance Testing Report is structured into the following sections:-

Section 1 Introduction
Section 2 Requirement and Methodology
Section 3 Pre-operation Noise Measurement Results
Section 4 Conclusions and Recommendation

2. PRE-OPERATIONAL NOISE MEASUREMENT REQUIREMENT AND METHODOLOGY

PRE-OPERATIONAL NOISE MEASUREMENT REQUIREMENT

2.1 Pursuant to Figure 3.1 of the Project Profile, a total of four (4) potential **Noise Sensitive Receivers** (NSRs) are identified at the vicinity of the proposed QHSPS. Site survey was conducted before the noise measurement to review the surrounding noise sensitive uses. No update is required for the identified NSRs according to the site survey. The photo record of the site survey at the identified NSRs is provided in ***Appendix B***. The details of the identified NSRs are listed in ***Table 2-1*** and the locations are shown in ***Appendix A***.

Table 2-1 Identified Noise Sensitive Receivers (NSRs)

NSR ID	Description	Situation of identified NSR
N1	Ming Yiu Yuen	Located at East of the SPS and no land use change was observed.
N2	Church of Jesus Christ of Latter-day Saints	Located at Southeast of the SPS and no land use change was observed.
N3	No. 43 Hai Wing Road	Located at South of the SPS and no land use change was observed.
PN1	Proposed Primary School at Lung Ma Road	Located at Southwest of the SPS. The construction of proposed Primary School is yet to commence. Nevertheless, the measurement point is considered representative for the existing NSR at the proposed primary school site as well.

2.2 During site survey, it was observed that Ming Yiu Yuen is surrounded by boundary wall structures and access into Ming Yiu Yuen was not granted. Considering NSR N1 is a two-storey village house, measurement location at N1 was then relocated near boundary wall of Ming Yiu Court with sufficient height above ground such that the measurement point has direct line-of-sight to QHSPS and could reflect a similar noise environment at NSR N1.

2.3 The monitoring locations at the identified NSRs for the QHSPS pre-operational noise measurement are shown in ***Appendix A*** and presented in ***Table 2-2***.

Table 2-2 Monitoring location for the Pre-Operational Noise Measurement

Measurement ID	Location
N1	Near boundary wall structure of Ming Yiu Yuen at Hai Wing Road
N2	Church of Jesus Christ of Latter-day Saints
N3	No. 43 Hai Wing Road
PN1	Proposed Primary School at Lung Ma Road

NOISE MEASUREMENT METHODOLOGY

Measurement Equipment

2.4 Equipment used for Pre-operational Noise Measurement are listed in ***Table 2-3*** and are complied with the *International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1)* specifications.

Table 2-3 Noise Measurement Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2250 & Rion NL-52
Calibrator	Rion NC-74
Portable Wind Speed Indicator	AZ Thermo Anemometer 8908

2.5 The acoustic calibrator and sound level meter were calibrated yearly. The calibration certificates are provided in ***Appendix C***.

Monitoring Procedure

2.6 With reference to IND-TM, noise measurements were taken in terms of the A-weighted equivalent sound pressure level (L_{eq}) measured in decibels dB(A) over 30 minutes (Leq,30min) in one-third octave bands during the operation of QHSPS. Characteristics of tonality, intermittency and impulsiveness were recorded. During the measurement, the QHSPS was under full operation mode which is representative of the future typical operation mode upon population intake of the proposed developments at Queen's Hill development site.

2.7 One set of 5 minutes background noise measurement (Leq5min), in one-third octave bands was conducted at each NSR when all the fixed plants were shut down without extraneous noise. The background measurement result was used to determine the actual noise level generated from the QHSPS during operation. If the noise level was significantly affected by extraneous event (e.g. high noise level due to pass-by vehicles or dog barking), the measurement results were discarded.

2.8 The noise measurements were conducted during (i) daytime and evening time (07:00 to 23:00) and (ii) nighttime (23:00 to 07:00) respectively. For daytime and evening time period (07:00 to 23:00), the noise measurement was conducted at late evening to avoid extraneous event. For night-time period (23:00 – 07:00), the noise measurement was carried out randomly throughout the periods since there should not be any other significant noise source that could affect the monitoring result.

2.9 For monitoring location PN1, N2 and N3, the sound level meter was mounted on a tripod at a height of 1.2 m and oriented such that the microphone fixed with a windshield was pointed to the QHSPS. For N1, since the access to N1 Ming Yiu Yuen was not granted, the microphone was set near boundary wall of Ming Yiu Yuen at a height of 2.8m with direct line-of-sight.

2.10 For the monitoring location N1 and N2, the noise measurement were carried out in free-field situation while the noise measurement at N3 and PN1 were conducted at 1 m from the exterior of the building façade. The photo record of noise measurements at identified NSRs was provided in ***Appendix B***.

2.11 Immediately prior to and following each noise measurement the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Sound pressure level was detected within 1.0dB at before and after the noise measurement.

2.12 During noise measurement, wind speed was checked with a portable wind speed meter. Steady speed exceeding 5m/s or wind with gusts exceeding 10m/s was not detected. No fog and rain were encountered during the measurement.

NOISE CRITERIA OF NSRS

2.13 According to the Project Profile ((Register No.: PP-529/ 2015) and EIAO-TM, the noise levels of fixed noise sources should not exceed 5dB(A) below the appropriate Acceptable Noise Levels (ANL-5) or the prevailing background noise level. Therefore, background noise measurement was carried out by the project proponent on April 2015 to determine the prevailing background noise level at each NSR. According to the Project Profile (Register No.: PP-529/ 2015) ***Figure 3.1***, the noise criteria for each identified NSR is shown below:

Table 2-4 Noise criteria for each identified NSR

NSR ID	Address	Noise Criteria (dB(A))	
		Daytime & Evening	Nighttime
N1	Ming Yiu Yuen	55	42
N2	The Church of Jesus Christ of Latter-day Saints	55	42
N3	No. 43 Hai Wing Road	55	43
PN1	Proposed Primary School at Lung Ma Road	55	45

3. PRE-OPERATION NOISE MEASURMENT RESULTS

3.1 The QHSPS pre-operational noise measurement were carried out between 21:00 of 27 November 2020 and 01:00 of 28 November 2020 for (i) daytime and evening period (07:00-23:00) and (ii) nighttime period (23:00-07:00). The summary of measurement result with the applicability of correction for tonality, intermittency, and impulsiveness is presented in ***Table 3-1***. The spectral analysis for tonality correction of the noise measurement data is shown in ***Appendix D***. No correction for intermittency and impulsiveness is found required.

3.2 As observed during the noise measurement, the noise environment in the vicinity was dominated by the community noise. Extraneous events such as high noise level due to pass-by vehicles and dog barking (near NSR N1) were noted during the noise measurement and the relevant noise results were discarded.

3.3 Tonality correction for noise measurement data obtained at N1 Daytime and Evening Time period, N2 Nighttime period, and PN1 Nighttime period were found required. No characteristics of impulsive or intermittent was found.

3.4 According to the measurement results, the Corrected Noise Levels (CNLs) received at the identified NSRs are complied with the noise criteria at both daytime and evening time period, and nighttime period. As there is no significant differences between the impact noise levels and background noise levels, the operational noise generated by the QHSPS is not considered as significant noise sources to the NSRs.

OPERATION NOISE WITH THE SEWAGE PUMP OPERATION

3.5 During the impact monitoring of the pre-operation noise measurement at the identified NSRs, the QHSPS was under full operation mode which is representative of the future typical operation mode upon population intake of the proposed developments at Queen's Hill development site.

3.6 In order to carry out the pre-operation noise measurement, a certain amount of water is required for the operation of the sewage pump in order to avoid any damage done to the sewage pump due to dry running. Owing to the limited capacity of the storage tank available and the fixed pump capacity of the QHSPS, the sewage pump can only be fully operated for about two minutes and cannot last for a few hours for the pre-operation noise measurement.

3.7 In light of the above and in order to include the full operation of sewage pump to the noise measurement, the full operation of the sewage pump was splitted into four sections and each last for thirty seconds such that the noise generated from the ventilation system, transformer in addition to full operation of sewage pump can be recorded by the noise measurement at each of the monitoring locations during both daytime and evening time period, and night-time period.

Table 3-1 Summary of Measurement Result and Application of Corrections

Location	Period	Background Noise Level, Leq5min, dB(A) (ii)	Impact Noise Level, Leq30min, dB(A) (i)	Actual Operation Noise Level, dB(A) (ii-i)	Tonality Correction , dB(A)	Impulsiveness Correction, dB(A)	Intermittency Correction, dB(A)	Façade Correction, dB(A)	Corrected Noise Level, dB(A)	Noise Criterion, dB(A)	Compliance (Yes/No)
N1	Daytime and Evening	46.2	46.6	36.0	6	0	NA	3	45.0	55	Yes
	Night-time	40.1	41.5	35.9	0	0	0		38.9	42	Yes
N2	Daytime and Evening	43.6	44.3	36.0	3	0	NA	3	42.0	55	Yes
	Night-time	40.4	41.1	32.8	6	0	0		41.8	42	Yes
N3	Daytime and Evening	40.1	40.7	31.8	0	0	NA	0	31.8	55	Yes
	Night-time	39.5	40.1	31.2	0	0	0		31.2	43	Yes
PN1	Daytime and Evening	49.1	49.7	40.8	3	0	NA	0	43.8	55	Yes
	Night-time	46.5	47.2	38.9	0	0	0		38.9	45	Yes

3.8 Based on result shown in Table 3-1, there is no significant difference in noise level with the operation of QHSPS received at NSRs compared to background noise. It is considered the noise generated by the operation of QHSPS was well-mitigated and the operation of the QHSPS would not contribute adverse noise impact to the NSRs.

NOISE MITIGATION MEASURE DURING OPERATION OF QHSPS

3.9 According to Condition 2.3 of EP-506/2016, the following noise mitigation measures should be implemented during the operation of the QHSPS:

(i) All the fixed plant equipment shall be housed inside reinforced concrete structure with soundproof door;

(ii) Silencers or other acoustic treatment equipment shall be installed at the outlet of the air extraction fans.

3.10 During the pre-operational noise measurement, the noise mitigation measures were properly implemented. All the fixed plant equipment was housed inside reinforced concrete structure with roller shutters/doors installed. In addition, acoustic louvres were installed at the outlet of the air extraction fans.

3.11 As the measurement result are well-below the noise criteria, it is considered the noise mitigation measures implemented are necessary measures and it is recommended to implement these necessary measures throughout the operation stage. The reasons are as below:

(a) All the fixed plant were housed inside reinforced concrete structure with soundproof door which provides a screening effect to reduce the noise impact generated from the fixed plants;

(b) The acoustic louvres mitigates the noise generated from the fixed plants from the outlet of the air extraction fans.

3.12 These noise mitigation measures will be fully implemented and properly maintained through the operation of the Project. An implementation schedule for the recommended mitigation measures during operation phase was provided in ***Appendix E***. In addition, location plan and photo record of these implemented mitigation measures were provided in ***Appendix E***.

4. CONCLUSIONS AND RECOMMENDATIONS

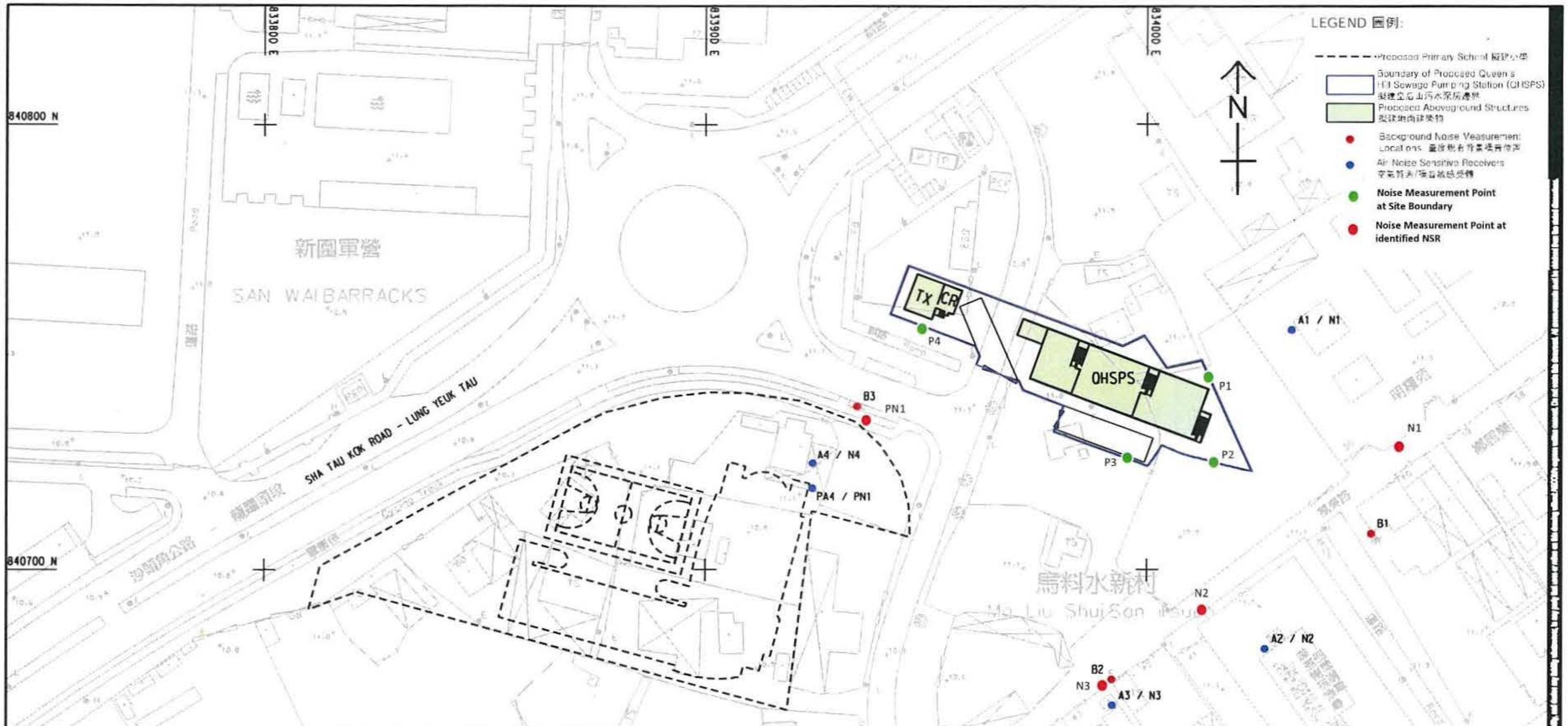
4.1 The QHSPS pre-operational noise measurement was carried out between 21:00 of 27 November 2020 and 01:00 of 28 November 2020 for (i) daytime and evening time (07:00 to 23:00) and (ii) nighttime (23:00 to 07:00) respectively. The noise measurement was carried at the identified NSR to determine the compliance with noise criteria during the operation of QHSPS.

4.2 According to the result, the operational noise arises from QHSPS to the identified NSRs is complied with the noise criteria at both daytime and evening time period (07:00-23:00), and nighttime period (23:00 – 07:00). It was found that there was no adverse noise impact at the NSRs caused by the operation of the QHSPS.

4.3 Since the pre-operational noise measurement result are complied with the noise criteria, the noise mitigation measures implemented were considered effective to reduce the operational noise generated from QHSPS and were recommended as necessary measures.

Appendix A

Location of Noise Sensitive Receivers and Measurement Points (Extracted from the approved Project Profile)



Summary of Measured Prevailing Background Noise Levels and Fixed Noise Criteria
現有背景噪音級別以及固定噪音標準

NSR (1) 噪音敏感受體(1)	Time Period 時間	Prevailing Noise Level, dB(A) (2) 現有背景噪音聲級，分貝(A) (2) (a)	Measurement Location 量度位置	Area Sensitivity Rating 地區對噪音感應程度的級別	ANL-5 可接受的噪音級別低 5 分貝(A) (b)	Criteria, dB(A) Min. of (a) & (b) 標準，分貝(A) (a) 和 (b) 的最小
Ming Yiu Yuen 明耀苑 (N1)	Daytime & Evening 日間及晚間	55	B1	A	55	55
	Night-time 夜間	42		A	45	42
The Church of Jesus Christ of Latter-day Saints 耶穌基督後期聖徒教會 (N2)	Daytime & Evening 日間及晚間	55	B1	A	55	55
	Night-time 夜間	42		A	45	42
No. 43 Hai Wing Road 凱榮路 43 號 (N3)	Daytime & Evening 日間及晚間	55	B2	A	55	55
	Night-time 夜間	43		A	45	43
Proposed Primary School at Lung Ma Road 擬建於龍馬路的小學 (PN1)	Daytime & Evening 日間及晚間	59	B3	A	55	55
	Night-time 夜間	52		A	45	45

Notes
(1) N4 is not considered as a NSR during the operational phase because it will be removed during the operational phase of the Project
由於 N4 將於營運階段拆卸，因此 N4 不是營運階段的噪音敏感受體。
(2) Noise Measurements were conducted in April 2015 and include a +3 dB(A) façade correction.
現有背景噪音於 2015 年 4 月量度，並加上 3 分貝(A)的外牆修正系數。

AECOM

PROJECT
Infrastructural Works for Proposed Developments at Queen's Hill, Fanling – Investigation, Design and Construction
粉嶺皇后山發展之基礎設施工程 — 勘查研究、設計及建造

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土木工程拓展署
CEDD Civil Engineering and Development Department

CONSULTANT
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SUB-CONSULTANTS

ISSUE/REVISION

ISSUE	DATE	DESCRIPTION	CHK.

STATUS

SCALE: A1 1:500
DIMENSION UNIT: METRES

KEY PLAN

PROJECT NO.: 60340456
CONTRACT NO.: CE 63/2014 (CE)

SHEET TITLE
Locations of Representative Air and Noise Sensitive Receivers and Background Noise Measurements
代表性空氣及噪音敏感受體以及量度現有背景噪音位置

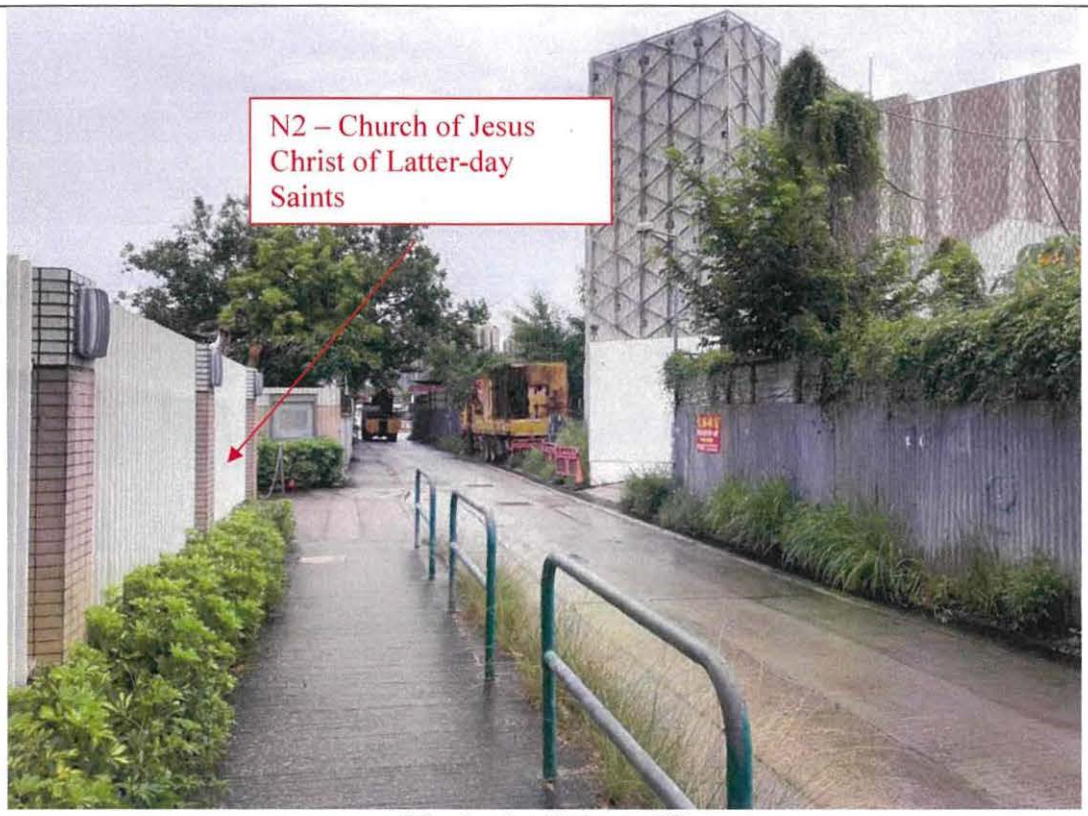
SHEET NUMBER
60340456/PP/FIGURE 3.1
圖3.1

Appendix B

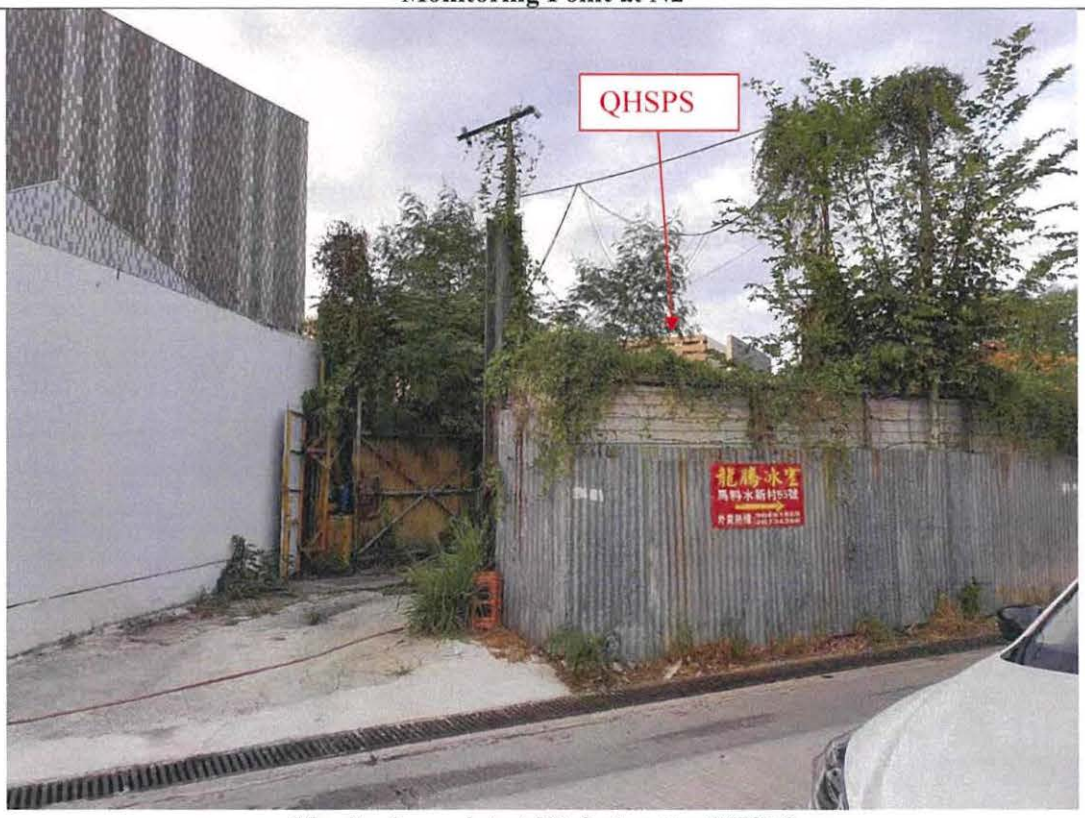
Photo Record of Identified NSRs and Noise Measurement at Identified NSRs

Photo Record for Monitoring Location at NSRs

Ming Yiu Court and Monitoring point N1



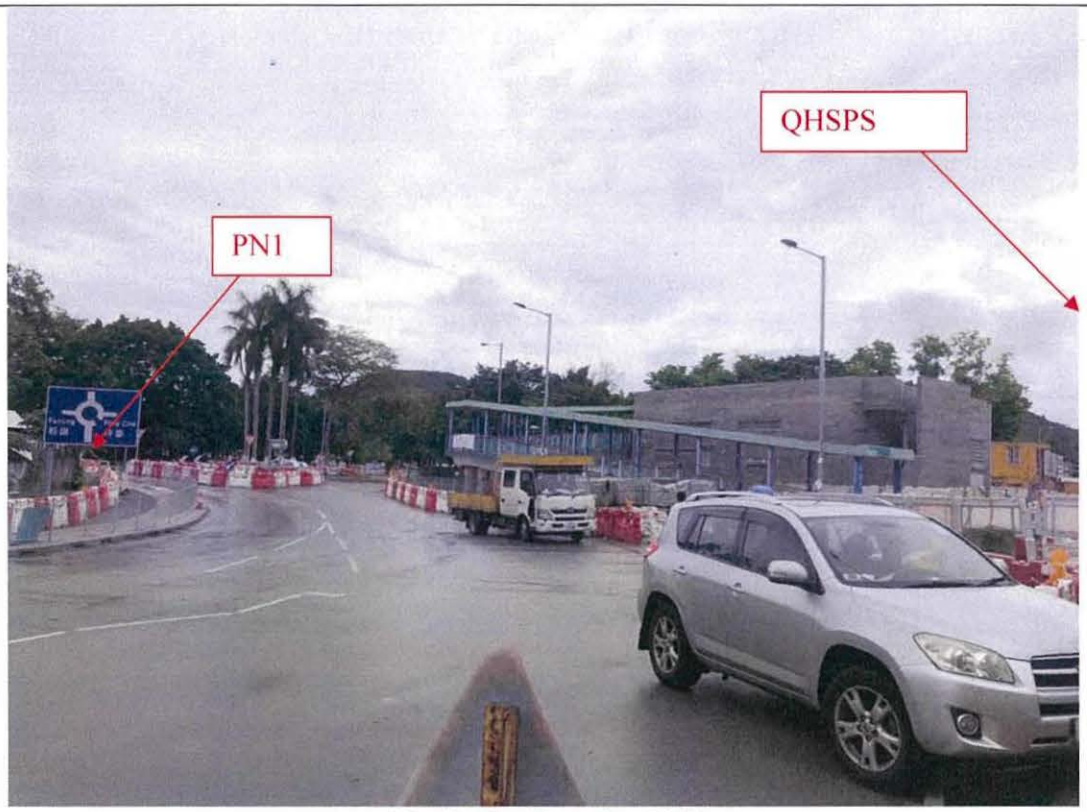
Monitoring Point at N2



Monitoring point at N2 facing the QHSPS

Monitoring Point N3

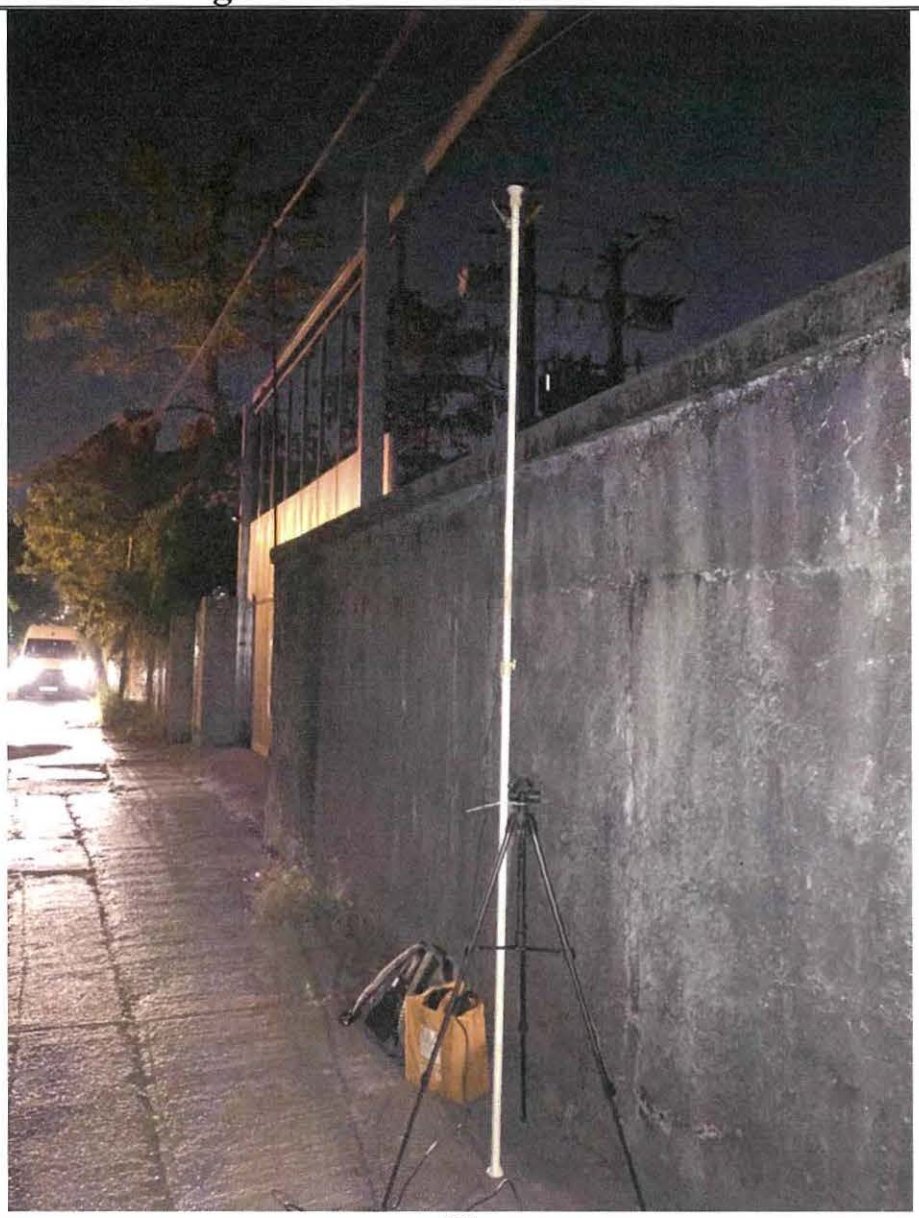
Monitoring point N3 facing the QHSPS



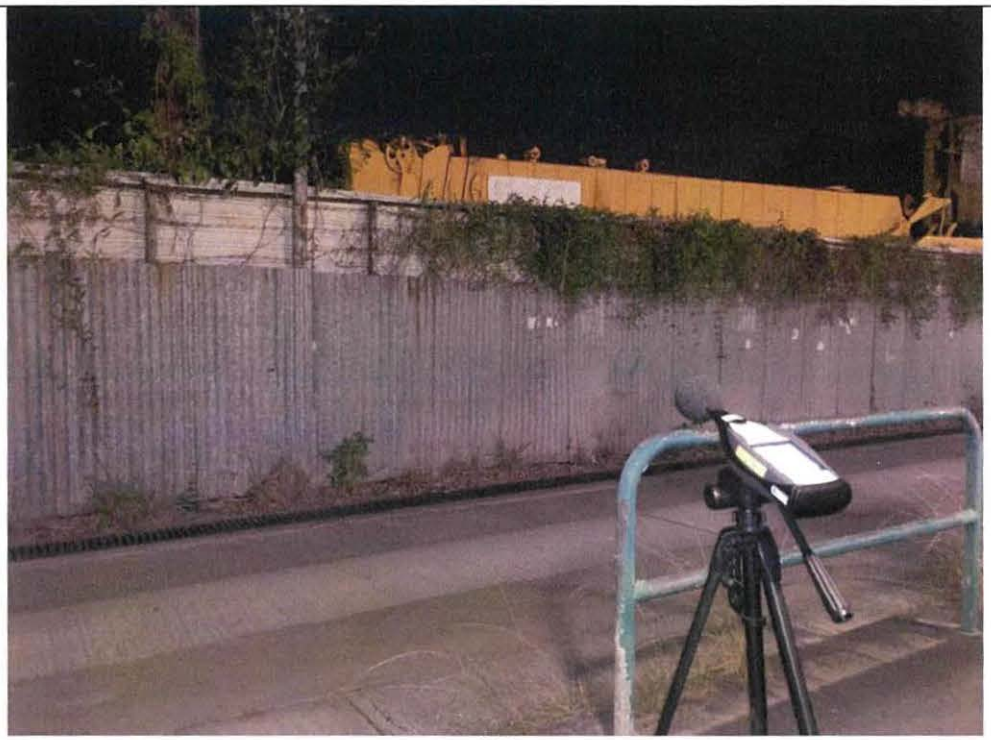
Monitoring Location PN1

Monitoring location PN1 facing the QHSPS

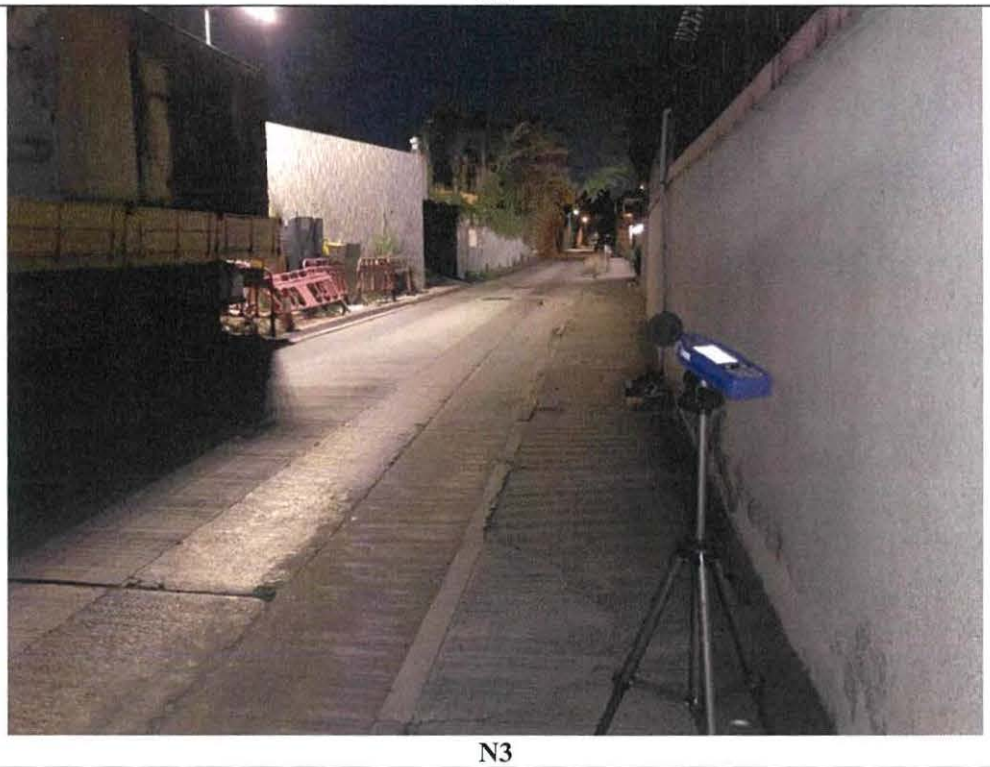
Photo Record during Noise Measurement



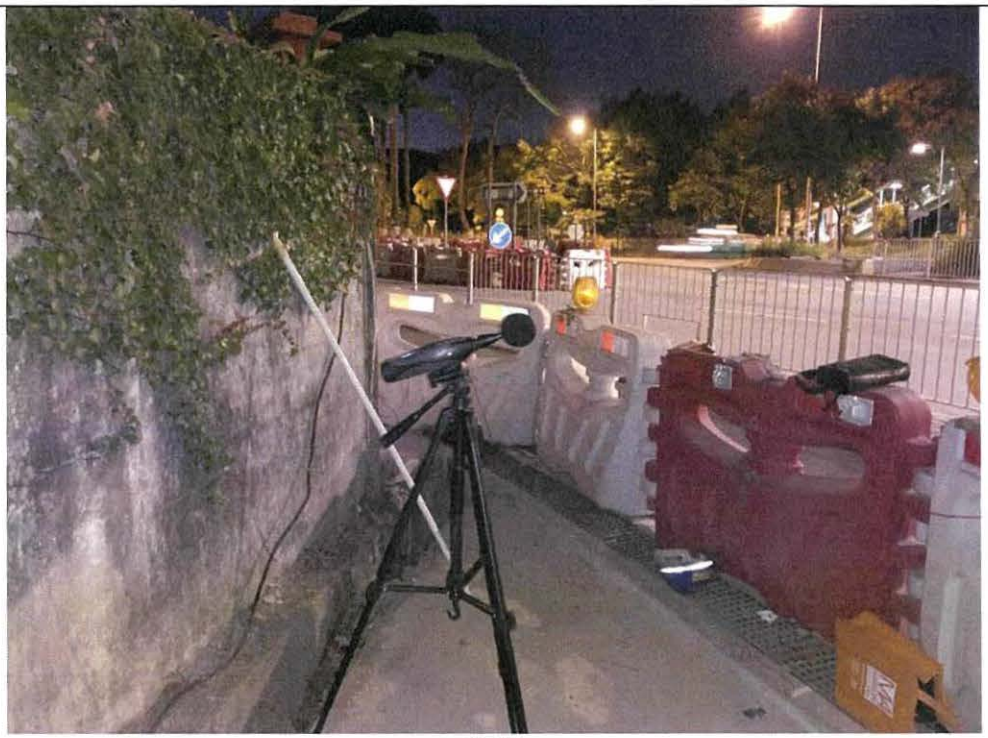
N1



N2



N3



PN1

Appendix C

Calibration Certificates of Monitoring Equipment

輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C204290
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC20-1324) Date of Receipt / 收件日期 : 30 July 2020

Description / 儀器名稱 : Sound Calibrator (EQ083)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NC-74
Serial No. / 編號 : 34246492
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 August 2020

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Assistant Engineer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 3 August 2020

Sun Creation Engineering Limited Calibration & Testing Laboratory
1/F., 3 Hing On Lane, Tuen Mun, New Territories, Hong Kong
香港新界屯門興安里3號1樓
Tel/電話: (852) 2927 2606 Fax/傳真: (852) 2744 8986 E-mail/電郵: calibration@suncreation.com Website/網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C204290
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C203952
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C201309

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.0	± 0.3	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.002	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
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Tel 電話: (852) 2927 2606 Fax 傳真: (852) 2744 8986 E-mail 電郵: calab@suncreation.com Website 網址: www.suncreation.com

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Description / 儀器名稱	:	Sound Calibrator (EQ086)
Manufacturer / 製造商	:	Rion
Model No. / 型號	:	NC-74
Serial No. / 編號	:	34657230
Supplied By / 委託者	:	Action-United Environmental Services and Consulting Unit A, 20/F., Gold King Industrial Building, 35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C   Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 2 August 2020

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong, Assistant Engineer

Certified By 核證 : K C Lee, Engineer

Date of Issue 簽發日期 : 3 August 2020

輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C204289
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C203952
CL281	Multifunction Acoustic Calibrator	CDK1806821
TST150A	Measuring Amplifier	C201309

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.1	± 0.3	± 0.2

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	1.002	1 kHz ± 1 %	± 1

Remark : The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Sun Creation Engineering Limited - Calibration & Testing Laboratory
c/o 4/F, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 - 校正及檢測實驗所
c/o 香港新界屯門興安里一號四樓
Tel電話: (852) 2927 2606 Fax傳真: (852) 2744 8986 E-mail電郵: callab@suncreation.com Website網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C205832
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC20-1324) Date of Receipt / 收件日期 : 29 September 2020

Description / 儀器名稱 : Sound Level Meter (EQ016)
Manufacturer / 製造商 : Rion
Model No. / 型號 : NL-52
Serial No. / 編號 : 00464681
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 21 October 2020

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : K C Lee
Engineer

Certified By 核證 : H C Chan
Engineer

Date of Issue 簽發日期 : 21 October 2020

Sun Creation Engineering Limited Calibration & Testing Laboratory
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1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C200258
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT	IEC 61672
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Class 1 Spec. (dB)
30 - 130	L_A	A	Fast	94.00	1	93.8	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)
30 - 130	L_A	A	Fast	94.00	1	93.8 (Ref.)
				104.00		103.8
				114.00		113.8

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT	IEC 61672
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Class 1 Spec. (dB)
30 - 130	L_A	A	Fast	94.00	1	93.8	Ref.
			Slow			93.8	± 0.3

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Certificate of Calibration
校正證書

Certificate No. : C205832
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_A	A	Fast	94.00	63 Hz	67.5	-26.2 ± 1.5
					125 Hz	77.5	-16.1 ± 1.5
					250 Hz	85.1	-8.6 ± 1.4
					500 Hz	90.5	-3.2 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	95.0	+1.2 ± 1.6
					4 kHz	94.8	+1.0 ± 1.6
					8 kHz	92.7	-1.1 (+2.1 ; -3.1)
					12.5 kHz	89.3	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range (dB)	Function	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
30 - 130	L_C	C	Fast	94.00	63 Hz	92.9	-0.8 ± 1.5
					125 Hz	93.5	-0.2 ± 1.5
					250 Hz	93.7	0.0 ± 1.4
					500 Hz	93.8	0.0 ± 1.4
					1 kHz	93.8	Ref.
					2 kHz	93.6	-0.2 ± 1.6
					4 kHz	93.0	-0.8 ± 1.6
					8 kHz	90.8	-3.0 (+2.1 ; -3.1)
					12.5 kHz	87.4	-6.2 (+3.0 ; -6.0)

輝創工程有限公司
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Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C205832
證書編號

Remarks : - UUT Microphone Model No. : UC-59 & S/N : 17434

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	: 63 Hz - 125 Hz	: ± 0.35 dB
	250 Hz - 500 Hz	: ± 0.30 dB
	1 kHz	: ± 0.20 dB
	2 kHz - 4 kHz	: ± 0.35 dB
	8 kHz	: ± 0.45 dB
	12.5 kHz	: ± 0.70 dB
104 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	: 1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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輝創工程有限公司
Sun Creation Engineering Limited
Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C203702
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC20-1324) Date of Receipt / 收件日期 : 19 June 2020

Description / 儀器名稱 : Sound Level Meter (EQ017)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2250
Serial No. / 編號 : 3012330
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (50 ± 25)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 4 July 2020

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- The Bruel & Kjaer Calibration Laboratory, Denmark
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA

Tested By 測試 : H T Wong
Assistant Engineer

Certified By 核證 : K C Lee
Engineer

Date of Issue 簽發日期 : 7 July 2020

Certificate of Calibration
校正證書

Certificate No. : C203702
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration using laboratory acoustic calibrator was performed before the test 6.1.1.2 to 6.3.2.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C200258
CL281	Multifunction Acoustic Calibrator	CDK1806821

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.1

6.1.1.2 After Self-calibration

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)	Spec. (dB)
20 - 140	LAF (SPL)	94.00	1	94.0	± 1.1

6.1.2 Linearity

UUT Setting		Applied Value		UUT Reading
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)
20 - 140	LAF (SPL)	94.00	1	94.0 (Ref.)
		104.00		104.0
		114.00		114.0

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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Certificate of Calibration
校正證書

Certificate No. : C203702
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6.2 Time Weighting

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1
Range (dB)	Main	Level (dB)	Freq. (kHz)	(dB)	Spec. (dB)
20 - 140	LAF (SPL)	94.00	1	94.0	Ref.
	LAS (SPL)			94.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Main	Level (dB)	Freq.	(dB)	(dB)
20 - 140	LAF (SPL)	94.00	63 Hz	67.8	-26.2 ± 1.5
			125 Hz	77.8	-16.1 ± 1.5
			250 Hz	85.3	-8.6 ± 1.4
			500 Hz	90.7	-3.2 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	95.2	+1.2 ± 1.6
			4 kHz	95.0	+1.0 ± 1.6
			8 kHz	92.9	-1.1(+2.1 ; -3.1)
			12.5 kHz	89.3	-4.3(+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting		Applied Value		UUT Reading	IEC 61672 Class 1 Spec.
Range (dB)	Main	Level (dB)	Freq.	(dB)	(dB)
20 - 140	LCF (SPL)	94.00	63 Hz	93.2	-0.8 ± 1.5
			125 Hz	93.8	-0.2 ± 1.5
			250 Hz	94.0	0.0 ± 1.4
			500 Hz	94.0	0.0 ± 1.4
			1 kHz	94.0	Ref.
			2 kHz	93.8	-0.2 ± 1.6
			4 kHz	93.2	-0.8 ± 1.6
			8 kHz	91.0	-3.0 (+2.1 ; -3.1)
			12.5 kHz	87.4	-6.2 (+3.0 ; -6.0)

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Calibration & Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C203702
證書編號

Remarks : - UUT Microphone Model No. : 4189 & S/N : 3130396

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

94 dB	:	63 Hz - 125 Hz	: ± 0.35 dB
		250 Hz - 500 Hz	: ± 0.30 dB
		1 kHz	: ± 0.20 dB
		2 kHz - 4 kHz	: ± 0.35 dB
		8 kHz	: ± 0.45 dB
		12.5 kHz	: ± 0.70 dB
104 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)
114 dB	:	1 kHz	: ± 0.10 dB (Ref. 94 dB)

- The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

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Appendix D

Spectral analysis for tonality correction

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
N1 Ming Yiu Yuen Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.2	16.8	22.2	23.9	25.8	26.6	27.9	28.4	29.0	31.3	37.7	40.2	33.7	36.0	35.9	35.9	34.5	33.5	31.4	31.2	30.0	29.0	25.8	23.2	19.8	14.6	10.9	5.8
Correction for tonality																												
Correction (a)												MAX =	40.2															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.2	16.8	22.2	23.9	25.8	26.6	27.9	28.4	29.0	31.3	37.7	40.2	33.7	36.0	35.9	35.9	34.5	33.5	31.4	31.2	30.0	29.0	25.8	23.2	19.8	14.6	10.9	5.8
	NA	NA	NA	NA	25.8	26.6	27.9	28.4	29.0	31.3	37.7	40.2	33.7	36.0	35.9	35.9	34.5	33.5	31.4	31.2	30.0	29.0	25.8	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**40.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	**3.0**	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. **3 dB(A)**

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
N1 Ming Yiu Yuen Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.2	16.8	22.2	23.9	25.8	26.6	27.9	28.4	29.0	31.3	37.7	40.2	33.7	36.0	35.9	35.9	34.5	33.5	31.4	31.2	30.0	29.0	25.8	23.2	19.8	14.6	10.9	5.8
Correction for tonality																												
Correction (a)												MAX =	40.2															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.2	16.8	22.2	23.9	25.8	26.6	27.9	28.4	29.0	31.3	37.7	40.2	33.7	36.0	35.9	35.9	34.5	33.5	31.4	31.2	30.0	29.0	25.8	23.2	19.8	14.6	10.9	5.8
Ave. LAeq of pair	16.0	19.5	23.0	24.8	26.2	27.3	28.2	28.7	30.1	34.5	39.0	37.0	34.8	35.9	35.9	35.2	34.0	32.4	31.3	30.6	29.5	27.4	24.5	21.5	17.2	12.7	8.3	0.0
	NA	NA	NA	NA	26.2	27.3	28.2	28.7	30.1	34.5	39.0	37.0	34.8	35.9	35.9	35.2	34.0	32.4	31.3	30.6	29.5	27.4	NA	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	39.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	6.5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	6.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 6 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
N1 Ming Yiu Yuen Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	11.9	14.3	20.2	20.6	20.5	21.1	21.0	22.5	23.4	25.7	27.1	27.4	30.0	30.5	33.0	34.0	31.9	30.6	28.4	26.5	25.7	26.1	23.2	20.8	17.6	13.2	7.9	2.9
Correction for tonality																												
Correction (a)												MAX =	34.0															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	11.9	14.3	20.2	20.6	20.5	21.1	21.0	22.5	23.4	25.7	27.1	27.4	30.0	30.5	33.0	34.0	31.9	30.6	28.4	26.5	25.7	26.1	23.2	20.8	17.6	13.2	7.9	2.9
	NA	NA	20.2	20.6	20.5	21.1	21.0	22.5	23.4	25.7	27.1	27.4	30.0	30.5	33.0	34.0	31.9	30.6	28.4	26.5	25.7	26.1	23.2	20.8	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
N1 Ming Yiu Yuen Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	11.9	14.3	20.2	20.6	20.5	21.1	21.0	22.5	23.4	25.7	27.1	27.4	30.0	30.5	33.0	34.0	31.9	30.6	28.4	26.5	25.7	26.1	23.2	20.8	17.6	13.2	7.9	2.9
Correction for tonality																												
Correction (a)												MAX =	34.0															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	11.9	14.3	20.2	20.6	20.5	21.1	21.0	22.5	23.4	25.7	27.1	27.4	30.0	30.5	33.0	34.0	31.9	30.6	28.4	26.5	25.7	26.1	23.2	20.8	17.6	13.2	7.9	2.9
Ave. LAeq of pair	13.1	17.3	20.4	20.5	20.8	21.1	21.8	23.0	24.6	26.4	27.3	28.7	30.2	31.8	33.5	33.0	31.2	29.5	27.5	26.1	25.9	24.6	22.0	19.2	15.4	10.5	5.4	0.0
	NA	NA	20.4	20.5	20.8	21.1	21.8	23.0	24.6	26.4	27.3	28.7	30.2	31.8	33.5	33.0	31.2	29.5	27.5	26.1	25.9	24.6	22.0	19.2	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
N2 The Church of Jesus Christ of Latter-day Saints — Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.4	20.7	23.7	25.6	25.3	25.3	27.2	30.0	30.5	29.6	31.0	31.9	33.1	32.7	34.1	34.4	33.4	32.6	31.8	30.2	29.3	29.1	26.0	28.5	28.7	20.4	16.7	9.6
Correction for tonality																												
Correction (a)												MAX =	34.4															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.4	20.7	23.7	25.6	25.3	25.3	27.2	30.0	30.5	29.6	31.0	31.9	33.1	32.7	34.1	34.4	33.4	32.6	31.8	30.2	29.3	29.1	26.0	28.5	28.7	20.4	16.7	9.6
	NA	20.7	23.7	25.6	25.3	25.3	27.2	30.0	30.5	29.6	31.0	31.9	33.1	32.7	34.1	34.4	33.4	32.6	31.8	30.2	29.3	29.1	26.0	28.5	28.7	20.4	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
N2 The Church of Jesus Christ of Latter-day Saints Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.4	20.7	23.7	25.6	25.3	25.3	27.2	30.0	30.5	29.6	31.0	31.9	33.1	32.7	34.1	34.4	33.4	32.6	31.8	30.2	29.3	29.1	26.0	28.5	28.7	20.4	16.7	9.6
Correction for tonality																												
Correction (a)												MAX =	34.4															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	15.4	20.7	23.7	25.6	25.3	25.3	27.2	30.0	30.5	29.6	31.0	31.9	33.1	32.7	34.1	34.4	33.4	32.6	31.8	30.2	29.3	29.1	26.0	28.5	28.7	20.4	16.7	9.6
Ave. LAeq of pair	18.0	22.2	24.7	25.5	25.3	26.3	28.6	30.2	30.0	30.3	31.5	32.5	32.9	33.4	34.2	33.9	33.0	32.2	31.0	29.7	29.2	27.6	27.3	28.6	24.5	18.5	13.2	0.0
	NA	22.2	24.7	25.5	25.3	26.3	28.6	30.2	30.0	30.3	31.5	32.5	32.9	33.4	34.2	33.9	33.0	32.2	31.0	29.7	29.2	27.6	27.3	28.6	24.5	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**28.6**	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.4**	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**5.4**	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0

Tonal CORR. 3 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
N2 The Church of Jesus Christ of Latter-day Saints Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	9.6	16.0	21.6	23.5	23.7	24.8	23.0	23.6	22.7	25.5	27.1	26.0	30.5	29.0	31.7	31.8	30.4	29.8	28.4	26.4	25.2	25.8	22.2	26.1	27.0	14.2	10.1	5.7
Correction for tonality																												
Correction (a)												MAX =	31.8															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	9.6	16.0	21.6	23.5	23.7	24.8	23.0	23.6	22.7	25.5	27.1	26.0	30.5	29.0	31.7	31.8	30.4	29.8	28.4	26.4	25.2	25.8	22.2	26.1	27.0	14.2	10.1	5.7
	NA	NA	21.6	23.5	23.7	24.8	23.0	23.6	22.7	25.5	27.1	26.0	30.5	29.0	31.7	31.8	30.4	29.8	28.4	26.4	25.2	25.8	22.2	26.1	27.0	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	**24.8**	NA	NA	NA	NA	**27.1**	NA	**30.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	**1.5**	NA	NA	NA	NA	**1.4**	NA	**3.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**3.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonal CORR.	**3 dB(A)**																											

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
N2 The Church of Jesus Christ of Latter-day Saints Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	9.6	16.0	21.6	23.5	23.7	24.8	23.0	23.6	22.7	25.5	27.1	26.0	30.5	29.0	31.7	31.8	30.4	29.8	28.4	26.4	25.2	25.8	22.2	26.1	27.0	14.2	10.1	5.7
Correction for tonality																												
Correction (a)												MAX =	31.8															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	9.6	16.0	21.6	23.5	23.7	24.8	23.0	23.6	22.7	25.5	27.1	26.0	30.5	29.0	31.7	31.8	30.4	29.8	28.4	26.4	25.2	25.8	22.2	26.1	27.0	14.2	10.1	5.7
Ave. LAeq of pair	12.8	18.8	22.5	23.6	24.3	23.9	23.3	23.1	24.1	26.3	26.5	28.2	29.8	30.4	31.7	31.1	30.1	29.1	27.4	25.8	25.5	24.0	24.2	26.6	20.6	12.1	7.9	0.0
	NA	18.8	22.5	23.6	24.3	23.9	23.3	23.1	24.1	26.3	26.5	28.2	29.8	30.4	31.7	31.1	30.1	29.1	27.4	25.8	25.5	24.0	24.2	26.6	20.6	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**26.6**	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**8.3**	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**8.3**	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	**6**	0	0	0	0

Tonal CORR. **6 dB(A)**

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
N3 No. 43 Hai Wing Road Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	13.7	17.2	23.6	24.9	22.4	23.0	22.6	22.1	23.1	25.5	26.8	26.8	29.4	29.5	31.5	32.8	31.2	29.6	27.6	25.3	23.7	23.6	19.5	17.5	14.8	10.1	7.2	3.1
Correction for tonality																												
Correction (a)												MAX =	32.8															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	13.7	17.2	23.6	24.9	22.4	23.0	22.6	22.1	23.1	25.5	26.8	26.8	29.4	29.5	31.5	32.8	31.2	29.6	27.6	25.3	23.7	23.6	19.5	17.5	14.8	10.1	7.2	3.1
	NA	NA	23.6	24.9	22.4	23.0	22.6	22.1	23.1	25.5	26.8	26.8	29.4	29.5	31.5	32.8	31.2	29.6	27.6	25.3	23.7	23.6	19.5	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	**24.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**32.8**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	**2.0**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
N3 No. 43 Hai Wing Road Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	13.7	17.2	23.6	24.9	22.4	23.0	22.6	22.1	23.1	25.5	26.8	26.8	29.4	29.5	31.5	32.8	31.2	29.6	27.6	25.3	23.7	23.6	19.5	17.5	14.8	10.1	7.2	3.1
Correction for tonality																												
Correction (a)												MAX =	32.8															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	13.7	17.2	23.6	24.9	22.4	23.0	22.6	22.1	23.1	25.5	26.8	26.8	29.4	29.5	31.5	32.8	31.2	29.6	27.6	25.3	23.7	23.6	19.5	17.5	14.8	10.1	7.2	3.1
Ave. LAeq of pair	15.4	20.4	24.3	23.7	22.7	22.8	22.3	22.6	24.3	26.2	26.8	28.1	29.5	30.5	32.2	32.0	30.4	28.6	26.4	24.5	23.6	21.5	18.5	16.2	12.5	8.6	5.2	0.0
	NA	20.4	24.3	23.7	22.7	22.8	22.3	22.6	24.3	26.2	26.8	28.1	29.5	30.5	32.2	32.0	30.4	28.6	26.4	24.5	23.6	21.5	18.5	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
N3 No. 43 Hai Wing Road Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	10.8	16.2	22.2	24.2	22.8	22.4	21.8	22.7	22.3	24.2	26.0	25.7	27.5	28.6	31.0	32.3	30.8	29.0	27.1	25.0	23.8	23.8	19.8	17.8	15.0	12.1	6.4	4.1
Correction for tonality																												
Correction (a)												MAX =	32.3															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	10.8	16.2	22.2	24.2	22.8	22.4	21.8	22.7	22.3	24.2	26.0	25.7	27.5	28.6	31.0	32.3	30.8	29.0	27.1	25.0	23.8	23.8	19.8	17.8	15.0	12.1	6.4	4.1
	NA	NA	22.2	24.2	22.8	22.4	21.8	22.7	22.3	24.2	26.0	25.7	27.5	28.6	31.0	32.3	30.8	29.0	27.1	25.0	23.8	23.8	19.8	17.8	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	**24.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**32.3**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	**1.7**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**1.4**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
N3 No. 43 Hai Wing Road Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	10.8	16.2	22.2	24.2	22.8	22.4	21.8	22.7	22.3	24.2	26.0	25.7	27.5	28.6	31.0	32.3	30.8	29.0	27.1	25.0	23.8	23.8	19.8	17.8	15.0	12.1	6.4	4.1
Correction for tonality																												
Correction (a)												MAX =	32.3															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	10.8	16.2	22.2	24.2	22.8	22.4	21.8	22.7	22.3	24.2	26.0	25.7	27.5	28.6	31.0	32.3	30.8	29.0	27.1	25.0	23.8	23.8	19.8	17.8	15.0	12.1	6.4	4.1
Ave. LAeq of pair	13.5	19.2	23.2	23.5	22.6	22.1	22.3	22.5	23.2	25.1	25.8	26.6	28.0	29.8	31.7	31.6	29.9	28.0	26.1	24.4	23.8	21.8	18.8	16.4	13.6	9.3	5.2	0.0
	NA	19.2	23.2	23.5	22.6	22.1	22.3	22.5	23.2	25.1	25.8	26.6	28.0	29.8	31.7	31.6	29.9	28.0	26.1	24.4	23.8	21.8	18.8	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
PN1 Proposed Primary School at Lung Ma Road Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	19.9	27.1	34.5	35.9	32.3	32.0	31.5	33.4	35.4	36.2	36.3	36.4	38.4	39.2	40.0	40.9	39.4	38.2	36.3	34.1	31.9	29.5	26.5	27.7	20.3	12.1	7.5	3.5
Correction for tonality																												
Correction (a)												MAX =	40.9															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	19.9	27.1	34.5	35.9	32.3	32.0	31.5	33.4	35.4	36.2	36.3	36.4	38.4	39.2	40.0	40.9	39.4	38.2	36.3	34.1	31.9	29.5	26.5	27.7	20.3	12.1	7.5	3.5
	NA	27.1	34.5	35.9	32.3	32.0	31.5	33.4	35.4	36.2	36.3	36.4	38.4	39.2	40.0	40.9	39.4	38.2	36.3	34.1	31.9	29.5	26.5	27.7	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	**35.9**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**27.7**	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	**2.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.3**	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	**4.3**	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	0

Tonal CORR. **3 dB(A)**

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
PN1 Proposed Primary School at Lung Ma Road Daytime and Evening Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	19.9	27.1	34.5	35.9	32.3	32.0	31.5	33.4	35.4	36.2	36.3	36.4	38.4	39.2	40.0	40.9	39.4	38.2	36.3	34.1	31.9	29.5	26.5	27.7	20.3	12.1	7.5	3.5
Correction for tonality																												
Correction (a)												MAX =	40.9															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	19.9	27.1	34.5	35.9	32.3	32.0	31.5	33.4	35.4	36.2	36.3	36.4	38.4	39.2	40.0	40.9	39.4	38.2	36.3	34.1	31.9	29.5	26.5	27.7	20.3	12.1	7.5	3.5
Ave. LAeq of pair	23.5	30.8	35.2	34.1	32.1	31.7	32.4	34.4	35.8	36.2	36.4	37.4	38.8	39.6	40.5	40.2	38.8	37.2	35.2	33.0	30.7	28.0	27.1	24.0	16.2	9.8	5.5	0.0
	NA	30.8	35.2	34.1	32.1	31.7	32.4	34.4	35.8	36.2	36.4	37.4	38.8	39.6	40.5	40.2	38.8	37.2	35.2	33.0	30.7	28.0	27.1	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	**35.2**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	**5.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	**5.5**	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. **0 dB(A)**

Appendix D

Tonal Correction for Mesured 1/3 Octave Noise Levels:
PN1 Proposed Primary School at Lung Ma Road Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	17.8	23.7	28.4	30.9	27.4	27.1	29.2	32.9	32.0	33.5	34.5	34.0	37.2	37.5	37.5	38.4	36.7	35.3	33.4	31.5	30.4	28.8	26.7	26.8	19.5	15.5	11.2	6.7
Correction for tonality																												
Correction (a)												MAX =	38.4															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	17.8	23.7	28.4	30.9	27.4	27.1	29.2	32.9	32.0	33.5	34.5	34.0	37.2	37.5	37.5	38.4	36.7	35.3	33.4	31.5	30.4	28.8	26.7	26.8	19.5	15.5	11.2	6.7
	NA	23.7	28.4	30.9	27.4	27.1	29.2	32.9	32.0	33.5	34.5	34.0	37.2	37.5	37.5	38.4	36.7	35.3	33.4	31.5	30.4	28.8	26.7	26.8	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	30.9	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	3.0	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Tonal CORR. 0 dB(A)

Appendix D

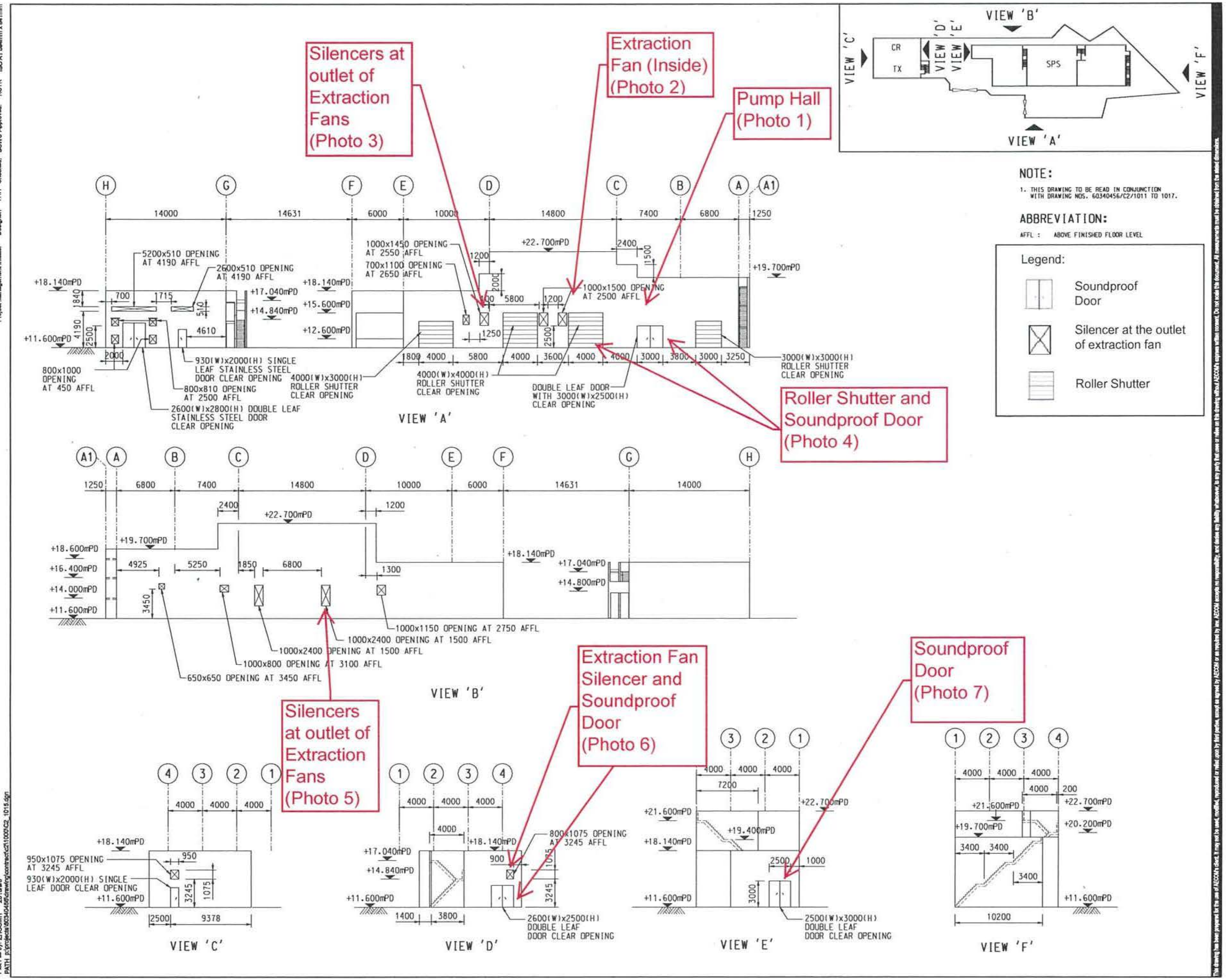
Tonal Correction for Mesured 1/3 Octave Noise Levels - Pair of Bands:
PN1 Proposed Primary School at Lung Ma Road Night Time

Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	17.8	23.7	28.4	30.9	27.4	27.1	29.2	32.9	32.0	33.5	34.5	34.0	37.2	37.5	37.5	38.4	36.7	35.3	33.4	31.5	30.4	28.8	26.7	26.8	19.5	15.5	11.2	6.7
Correction for tonality																												
Correction (a)												MAX =	38.4															
Max - X <15																												
Freq, Hz	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1 k	1.25 k	1.6 k	2 k	2.5 k	3.15 k	4 k	5 k	6.3 k	8 k	10 k	12.5 k	16 k
A-WT LAeq,dB	17.8	23.7	28.4	30.9	27.4	27.1	29.2	32.9	32.0	33.5	34.5	34.0	37.2	37.5	37.5	38.4	36.7	35.3	33.4	31.5	30.4	28.8	26.7	26.8	19.5	15.5	11.2	6.7
Ave. LAeq of pair	20.8	26.0	29.6	29.1	27.2	28.2	31.0	32.4	32.7	34.0	34.3	35.6	37.3	37.5	38.0	37.6	36.0	34.4	32.4	30.9	29.6	27.7	26.8	23.2	17.5	13.3	8.9	0.0
	NA	26.0	29.6	29.1	27.2	28.2	31.0	32.4	32.7	34.0	34.3	35.6	37.3	37.5	38.0	37.6	36.0	34.4	32.4	30.9	29.6	27.7	26.8	NA	NA	NA	NA	NA
Correction (b)																												
X-adjacent bands >1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Correction (c)																												
X-mean of adjacent bands ≥3																												
	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
F_{tone}	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tonal Correction																												
dB(A)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonal CORR.	0 dB(A)																											

Appendix E

Implementation schedule and layout plan for the recommended mitigation measures during operation phase

Mitigation Measures	Fixed plant equipment housed inside reinforced concrete structure with soundproof door	Silencers or other acoustic treatment equipment installed at the outlet of air extraction fans
Responsible parties for implementation and maintenance	Drainage Service Department Building/Civil Maintenance Team	
Compliance requirements of the recommended mitigation measures	All the fixed plant equipment were house inside reinforce concrete structure with soundproof doors installed *(Refer to layout plan and Photo 1, 4, 6 & 7 in Appendix E)*	Silencers or other acoustic treatment equipment were installed at the outlet of air extraction fans and operated properly *(Refer to layout plan and Photo 2, 3 & 5 in Appendix E)*
Specific location of mitigation measure	QHSPS *(Refer to site boundary shown in Appendix A)*	At the outlet of air extraction fans of QHSPS *(Refer to layout plan in Appendix E)*
Implementation and completion timing of mitigation measures	The mitigation measures should be installed before operation and maintained properly throughout the operation stage.	
Reason for recommendation (Section 3.12 of the Report)	Provides a screening effect to reduce the noise impact generated from the fixed plants *(Section 3.12 (a) of the Report)*	Mitigates the noise generated from the fixed plants from the outlet of the air extraction fans *(Section 3.12 (b) of the Report)*



AECOM

PROJECT

INFRASTRUCTURAL WORKS FOR PROPOSED DEVELOPMENTS AT QUEEN'S HILL, FANLING - INVESTIGATION, DESIGN AND CONSTRUCTION

CONTRACT TITLE

QUEEN'S HILL DEVELOPMENT - SEWAGE PUMPING STATION WORKS

CLIENT

土木工程拓展署 CEDD Civil Engineering and Development Department

CONSULTANT

AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

REV	DATE	DESCRIPTION	CHK.
-	SEP. 16	TENDER DRAWING	SCWC

STATUS

SCALE A1 1:200

DIMENSION UNIT MILLIMETRES

KEY PLAN

PROJECT NO. 60340456

CONTRACT NO. CV/2016/08

SHEET TITLE

SEWAGE PUMPING STATION AND TRANSFORMER/CONTROL ROOM ELEVATION

SHEET NUMBER

60340456/C2/1015

Photo 1- Pump Hall

(Fixed plant equipment was housed inside reinforce concrete structure)

Photo 2 – Extraction Fan (Inside)

Photo 3 –Silencer installed at the outlet of extraction fans (View A)

Photo 4 – Roller Shutter and Soundproof Door

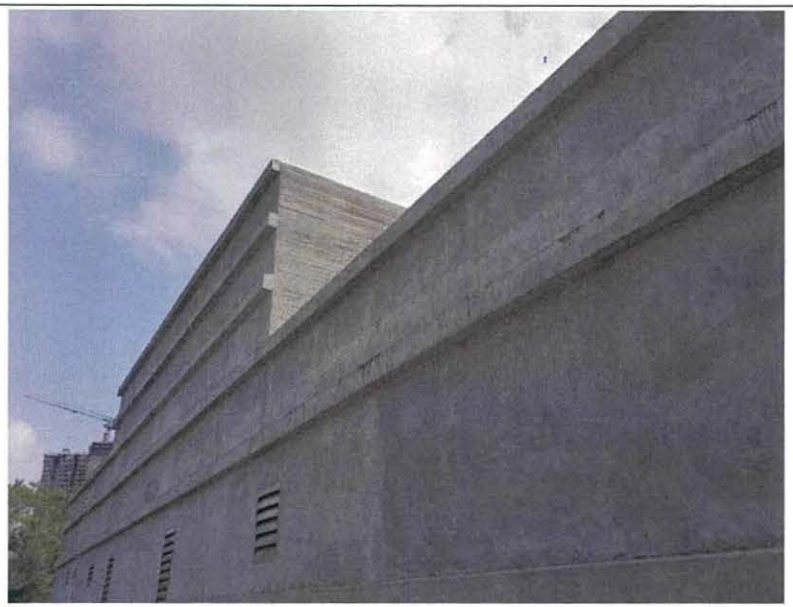


Photo 5 – Silencer installed at outlet of extraction fans (View B)

Photo 6 – Silencer at outlet of extraction fan and Soundproof Door

Photo 7 – Soundproof Door