

Acuity Sustainability Consulting Limited

Unit 1908, Nos. 301-305 Castle Peak Road, Kwai Chung, N.T. O: 2333-6823 | F: 2333-1316 | E: general@acuityhk.com | www.acuityhk.com



Contract No. 13/WSD/16

Mainlaying in Tseung Kwan O

Baseline Noise Monitoring Report

June 2018

(Rev. 2)

	Prepared by:	Certified by:	
Name	Nelson Tsui	Jacky Leung	
Position	Environmental Team	Environmental Team Leader	
Signature	Z		
Date:	9/7/2018	9/7/2018	



Revision History

0	1 st Submission	27/6/2018
1	2 nd Submission	3/7/2018
Rev.	DESCRIPTION OF MODIFICATION	DATE



CONTENT

E	XECUT	IVE SUMMARY	4
1	INTF	RODUCTION	6
	1.1	Background	6
	1.2	Purpose of the Baseline Monitoring Report	8
	1.3	Report Structure	8
2	NOIS	SE MONITORING	9
	2.1	Monitoring Requirements	9
	2.2	Noise Monitoring Parameters, Time, Frequency and Duration	9
	2.3	Noise Monitoring Locations	9
	2.4	Baseline Monitoring Methodology	. 11
	2.5	Monitoring Equipment	. 11
	2.6	Results and Observations	. 12
	2.7	Action and Limit Levels	. 12
3	CON	CLUSION	. 14

List of Appendix Appendix A: Construction Programme Appendix B: Monitoring Scheulde Appendix C: Noise Monitoring Equipment Calibration Certificates Appendix D: Baseline Monitoring Data (Noise)



EXECUTIVE SUMMARY

The proposed Desalination Plant at Tseung Kwan O (DPTKO) will produce potable water with an initial capacity of 135 million liters per day (MLD), expandable to an ultimate capacity of 270 Mld in the future to provide a secure and alternative fresh water resource complying with the World Health Organization (WHO) standards. The plant will adopt the Seawater Reverse Osmosis (SWRO) technology, which dominates the market due to its reliability and progressive reduction in cost as the technology advances.

In accordance with the approved Environmental Monitoring and Audit Manual (EM&A Manual) for the Project, baseline environmental monitoring for noise impact should be conducted prior to the commencement of construction works. Pursuant to EP Condition 3.4, Baseline Monitoring Report shall be submitted to the Director of Environmental Protection at least 2 weeks before the commencement of construction of the Project. Baseline monitoring for noise impact was conducted according to the EM&A Manual before the commencement of construction works at selected locations at Tseung Kwan O (TKO).

Monitoring on 7/6/2018 & 8/6/2018 were cancelled due to typhoon (Strong Wind Signal, No. 3) and the adverse weather (i.e. strong wind and heavy rain) it brought along; monitoring on 12/6/2018 was cancelled due to amber rainstorm warning. Thus, additional monitoring on 12/6/2018, 13/6/2018 were scheduled, and the monitoring on 12/6/2018 was further postponed to 14/6/2018.

Daily baseline noise monitoring for A-weighted levels L_{eq} , L_{10} and L_{90} were conducted in a sample period of 30 minutes during daytime (0700 – 1900 hrs). Details of the methodology, locations and results are presented in the report.

The baseline monitoring noise measured levels $L_{Aeq(30min.)}$ on daytime (0700-1900 hrs) for the three Noise Sensitive Receivers (NSRs) range from 57.6 dB(A) – 72.6 dB(A). The baseline average levels, NSRs ID and Location are summarized as below. The baseline noise quality monitoring measurement and the result are recorded in Appendix D.

Daytime (0700-1900 hrs) L _{Aeq} (30min.)						
Location	L_{Aeq} (dB(A))	$L_{10}(dB(A))$	$L_{90} dB(A)$			
Creative						
Secondary	70.0	72.8	63.3			
School						
PLK Laws		74.4	60.3			
Foundation	72.0					
College						
School of						
Continuing and	61.6	61.9	56.0			
Professional	01.0	04.8	50.0			
Studies - CUHK						
	Location Creative Secondary School PLK Laws Foundation College School of Continuing and Professional	LocationL_Aeq(dB(A))CreativeSecondary70.0SchoolPLK Laws72.0CollegeSchool ofContinuing and Professional61.6	LocationLAeq(dB(A))L10(dB(A))Creative70.072.8Secondary70.072.8School72.074.4College72.074.4School of61.664.8			

The baseline average levels as follows:

Remarks: *Free field correction +3dB(A) has been made for NSR24



Action and Limit Level Determination for Noise

Results of the baseline noise monitoring data are processed to provide Action Levels ["AL"] and Limit Levels ["LL"] as per the table below:

Time Period	Action	NSR ID	Location	Type of sensitive receiver(s)	Measurement Type	Limit (dB(A))
(0700-	When one	NSR4	Creative Secondary School	Educational	Facade	
1900 hrs)	documented	NSR24	PLK Laws Foundation College	Educational	Free-field	70 dB(A), 65
on normal working day	complaint is received	NSR31	School of Continuing and Professional Studies - CUHK	Educational	Facade	dB(A) during examination



1. INTRODUCTION

1.1 Background

- 1.1.1 Penta-Ocean-Concentric Joint Venture ["POCJV"] is contracted to carry out the Mainlaying works for the development of Desalination Plant at Tseung Kwan O (DPTKO) under Contract No. 13/WSD/16 (hereinafter known as "the Project"). In line with the requirements stated in the Project EM&A Manual, POCJV is required to conduct the noise monitoring.
- 1.1.2 Acuity Sustainability Consulting Limited. ["ASCL"] is commissioned by POCJV to assist POCJV to carry out the Noise Monitoring in fulfillment of the EPD's EM&A Requirements.
- 1.1.3 Pursuant to the Environmental Impact Assessment Ordinance (EIAO), the Director of Environmental Protection granted the further Environmental Permit (No. EP-503/2015/A) to Water Supplies Department (WSD) for this project.
- 1.1.4 The overall view of alignment of the Project is shown in **Figure 1.1**



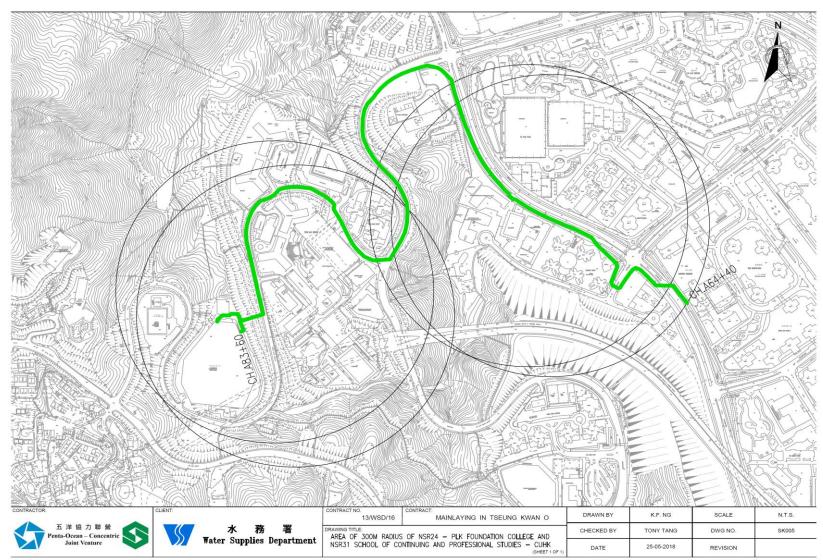


Figure 1.1 Overview of DPTKO



- 1.1.5 The updated construction programme is shown in Appendix A
 - 1.2 Purpose of the Baseline Monitoring Report
- 1.2.1 The purposes of this Baseline Monitoring Report are to:
 - Summarise the findings of baseline noise monitoring; and
 - Establish the AL and LL in accordance with the EM&A Manual for the subsequent impact monitoring during the construction stage.
- 1.2.2 In accordance with the EM&A Manual, environmental baseline noise monitoring was carried out at three monitoring stations along the proposed alignment of the mainlaying works. This Baseline Monitoring Report contains baseline findings of these three monitoring stations.
 - 1.3 Report Structure
- 1.3.1 This Baseline Monitoring Report comprises the following sections:
 - Section 1 introduces the background of the Project and purpose of this Report;
 - Section 2 presents the baseline monitoring methodologies, requirements, results, influencing factors, as well as determination of the AL and LL of noise; and
 - Section 3 concludes the findings of baseline monitoring.



2. NOISE MONITORING

- 2.1 Monitoring Requirements
- 2.1.1 To ensure no adverse noise impact, noise monitoring is recommended to be carried out at the nearby NSRs during the construction phase.
- 2.1.2 In accordance with the EM&A Manual, baseline noise monitoring should be conducted for at least two weeks to obtain background noise levels prior to the commissioning of major construction works.
 - 2.2 Noise Monitoring Parameters, Time, Frequency and Duration
- 2.2.1 The construction noise level shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq},L_{10},L_{90}) . At each designated monitoring location, measurements of 5-minutes A-weighted equivalent sound pressure level [" $L_{eq 5min}$ "] between 0700-1900 hrs shall be carried out. These measured " $L_{eq 5min}$ " shall be then combined into equivalent sound pressure level for 30-minutes period [" $L_{eq 30min}$ "] for comparison with the Noise Control Ordinance (NCO) criteria. **Table 2.1** summarizes the monitoring parameters, frequency and duration of the baseline noise monitoring. The monitoring schedule is provided in **Appendix B**.

Tabla	21	Noico	Monitoring	Paramatara	Time	Fragmones	and Duration
I able	4.	110156	wronntoring	I al ameters,	, 1 mie,	riequency	anu Durauon

Time	Frequency	Duration	Parameters
Daytime: 0700-1900 hrs	Daily for at least 14 days	$\begin{array}{c} \text{Continuously in} \\ L_{eq\;5min}/L_{eq\;30min} \\ (average\;of\;6 \\ \text{consecutive}\;L_{eq\;5min}) \end{array}$	$L_{eq}, L_{10} \& L_{90}$

2.3 Noise Monitoring Locations

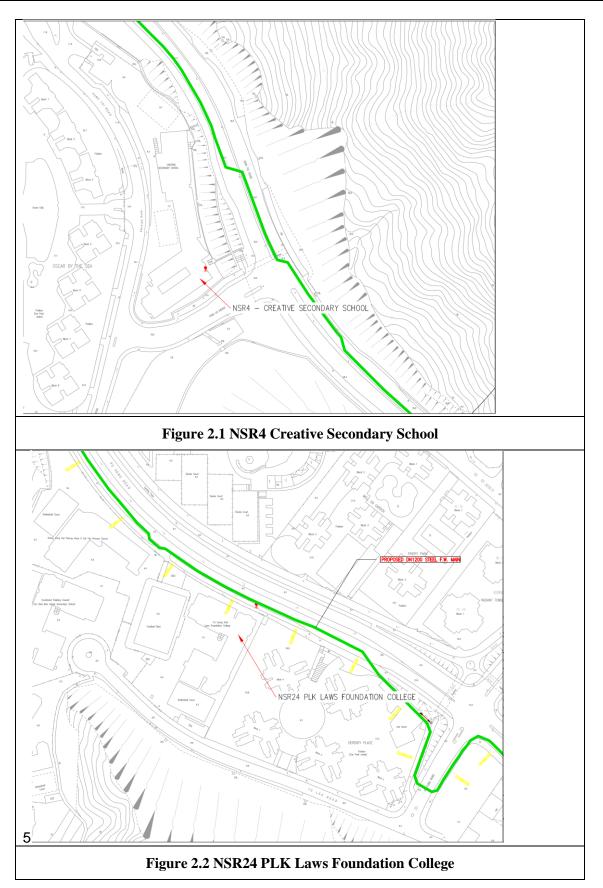
2.3.1 According to the environmental findings detailed in the EIA report, the designated locations for the construction noise monitoring are listed in **table 2.2**.

Table 2.2 Noise Sensitive Receivers	
-------------------------------------	--

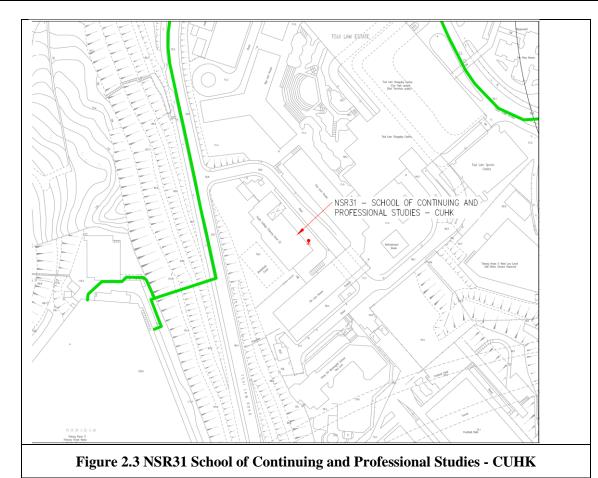
NSR ID	Noise Sensitive Receivers Monitoring Location		Position
NSR 4	Creative Secondary School	Roof Floor	1 m from facade
NSR 24	PLK Laws Foundation College	Pedestrian Road on Ground Floor	Free-field
NSR 31	School of Continuing and Professional Studies - CUHK	Roof Floor	1 m from facade

- 2.3.2 The monitoring locations should normally be made at a point 1m from the exterior of the NSRs building façade and be at a position 1.2m above the ground. A correction of +3dB(A) should be made to the free-field measurements.
- 2.3.3 Three practicable noise monitoring locations for noise measurement are proposed at the sensitive receivers as shown as in **Figures 2.1 2.3** below:









- 2.4 Baseline Monitoring Methodology
- 2.4.1 Baseline noise monitoring will be conducted for 14 consecutive days (Monday to Sunday). At each designated monitoring location, measurement of 30 minutes A-weighted equivalent sound pressure level [" $L_{eq}(30min)$, L_{10} , L_{90} "] should be carried out between 0700 and 1900 hrs for daytime measurements. Six measured " $L_{eq}(5min)$ will then be condensed into equivalent sound pressure level for 30-minutes period [" $L_{eq}(30min)$ "] for comparison with the NCO criteria.
- 2.4.2 During the baseline monitoring, there shall not be any construction activities in the vicinity of the monitoring locations and in the project site. Any non-project related construction activities in the vicinity of the monitoring stations during the baseline monitoring shall be noted and the source and location of such activities should be recorded. In accordance to current good practice for drafting of the Environmental Management Plan (EMP), the LL for school should be 70 dB(A) and 65 dB(A) during examination period.
 - 2.5 Monitoring Equipment
- 2.5.1 Integrated sound level meter shall be used for the noise monitoring. The meter shall be in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications. Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a



known frequency. Measurements may be accepted as valid only if the calibration level before and after the noise measurements agree to within 1.0 dB(A). Calibration certificates of the instruments used are presented in **Appendix C**.

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

Equipment	Brand and Model	Detection Limit
Sound Level Meter	Nti XL2	30-130 dB(A)
Sound Level Meter Calibrator	Rion NC-74	Nil
Pocket Wind Meter Anemometer	Kestrel 1000 Wind Meter	Nil

Table 2.3 Baseline Noise Monitoring Equipment

- 2.6 Results and Observations
- 2.6.1 Baseline monitoring for noise impact was conducted from 29/5/2018 to 14/6/2018. The baseline noise levels at Noise Monitoring Stations at TKO (i.e. NSR 4, 24 and 31) are summarized in Tables 2.4. Details of noise monitoring results are presented in Appendix D.

Table 2.4	Summary	of Baseline No	oise Monitoring	Results
	Summary	or Dusenne 140	noe meenieering	Itesuits

			Noise ii	n dB(A)		
NSR ID		Average			Range	
	L _{eq} 30min	L ₁₀ 30min	L ₉₀ 30min	L _{eq} 30min	L ₁₀ 30min	L ₉₀ 30min
NSR 4	70.0	72.8	63.3	68.8-72.6	71.3-75.6	59.9-68.7
NSR 24*	72.0	74.4	60.3	68.8-74.9	70.9-77.0	56.5-64.6
NSR 31	61.6	64.8	56.0	57.6-69.1	60.0-72.2	51.4-60.5

Remarks: *Free field correction +3dB(A) has been made for NSR24

- 2.6.2 No construction activity was observed during the baseline monitoring. The major noise source at the monitoring station included the traffic noise and school activities. These noise sources are expected to exist in near future and throughout the construction period of the Project.
- 2.6.3 Monitoring on 7/6/2018 & 8/6/2018 were cancelled due to typhoon (Strong Wind Signal, No. 3) and the adverse weather (i.e. strong wind and heavy rain) it brought along; monitoring on 12/6/2018 was cancelled due to amber rainstorm warning. Thus, additional monitoring on 12/6/2018,13/6/2018 were scheduled, and the monitoring on 12/6/2018 was further postponed to 14/6/2018.
 - 2.7 Action and Limit Levels
- 2.7.1 The AL and LL in line with the criteria of Practice Note for Professional Persons (ProPECC PN 2/93) "Noise from Construction Activities Non-statutory Controls", Technical Memorandum on Environmental Impact Assessment Process issued by HKSAR Environmental Protection Department ["EPD"] under the



Environmental Impact Assessment Ordinance, Cap 499, S.16 and EM&A Manual are presented in **Table 2.4**.

Time Period	Action	Limit (dB(A))
0700-1900 hrs on normal weekdays	When one documented complaint is received from any one of the noise sensitive receivers or 75 dB(A) recorded at the monitoring station	 70 dB(A) for school and 65 dB(A) during examination period
Notes: (a) Limits specified in the GV respectively.	V-TM and IND-TM for construct	tion and operation noise,

Table 2.4 Action and Limit Levels for Noise



3. CONCLUSION

- 3.1 Baseline noise monitoring was carried out from 29/5/2018 to 14/6/2018 at three monitoring stations at TKO. All monitoring stations as specified in EM&A Manual were accessible and thus there is no revision for inclusion in the EM&A Manual.
- 3.2 At NSR31, the averaged baseline daytime noise monitoring results were below the criteria of 70dB(A) for educational premises. At NSR4 and NSR24, the averaged baseline daytime noise monitoring results were above criteria of 70dB (A) for educational premises. The measured level during impact monitoring will be adjusted by the below equation when exceeded the baseline level:

Adjusted Measure Level = 10^* Log ($10^{(Measured Level *0.1)}$ - $10^{(Baseline Level *0.1)}$)

- 3.3 Traffic noise and school activities were observed as the major noise sources affecting the noise background at the three monitoring stations.
- 3.4 The Action Level of construction noise is based on documented valid complaints received, while the Limit Level for each monitoring location is set at a specific limit according to EIAO-TM and the EM&A Manual. The high background noise level of NSR4 and NSR24 recorded from the baseline study will be taken into account for the future EM&A programme during impact monitoring at construction phase.



Appendix A: Construction Programme

Contract No. 13/WSD/16 Mainlaying for Desalination Plant at Tseung Kwan O Baseline Monitoring Report



13/WSD/16 - Mainlaying in Tseung Kwan O

Outline Construction Programme

MXRH PJ-ID ROAD		1	2021)20	20										2019								8	201					mo			LOCATION			YEAR
Section Al Open-trench) - Wan Po Road 0 362 Image: Constraint of the	9 10 11	7 8	6 7	5	4	2 3	1	12	0 11	9 10	8	7	6	1 5	4	2 3	1 2	12	11	10 1	9	8	6 7	5	3 4	2	2 1	11 1	10	8 9	7 8	6	5	3 4	2	1	TO	OM	7 F	ROAD	J - ID	PJ - II	MONTH
Section Al (Open-trench) - Wan Po Road 362 -																																											
A Wan Po Road 362 530 Image: State of the st																																											Section A (TKO137 to Wan Po Road)
Section A3 (Open-trench) - Wan Po Road 530 1379 2 0 <td></td> <td>362</td> <td>0</td> <td></td> <td>Wan Po Road</td> <td>-</td> <td>-</td> <td>Section Al (Open-trench)</td>																																					362	0		Wan Po Road	-	-	Section Al (Open-trench)
Section Af (Pipe-Jacking) B Wan Po Road 1379 2268 4113 C																																					530	62	1	Wan Po Road	A	A	Section A2 (Pipe-Jacking)
Section A5 (Open-trench) - Van Po Road 2268 4113 - <td></td> <td>1379</td> <td>30</td> <td></td> <td>Wan Po Road</td> <td>-</td> <td>-</td> <td>Section A3 (Open-trench)</td>																																					1379	30		Wan Po Road	-	-	Section A3 (Open-trench)
Section B (Po Yap Road to Po Hong Road) - <td></td> <td>2268</td> <td>379</td> <td>1</td> <td>Wan Po Road</td> <td>В</td> <td>В</td> <td>Section A4 (Pipe-Jacking)</td>																																					2268	379	1	Wan Po Road	В	В	Section A4 (Pipe-Jacking)
Section BI (Pipe-Jacking) C Po Yap Road 4113 4200 Section BI (Pipe-Jacking) C Po Yap Road 4113 4200 Section BI (Pipe-Jacking) C Po Yap Road 4200 SS00 C C C Po Yap Road 4200 SS00 C C C C C C Po Yap Road 4200 SS00 C <thc< th=""> C <thc< th=""></thc<></thc<>																																					4113	268	2	Wan Po Road	-		Section A5 (Open-trench)
Section BI (Pipe-Jacking) C Po Yap Road 4113 4200 Section BI (Pipe-Jacking) C Po Yap Road 4113 4200 Section BI (Pipe-Jacking) C Po Yap Road 4200 SS00 C C C Po Yap Road 4200 SS00 C C C C C C Po Yap Road 4200 SS00 C <thc< th=""> C <thc< th=""></thc<></thc<>																																											
Section B2 (Open-trench) - Po Yap & Po Hong Rd 4200 5500 500 -				\square																																							Section B (Po Yap Road to Po Hong Road)
Section B1 (Pipe-Jacking) D1 & D2 P0 Hong & Ling Hong Rd 5500 5600 C </td <td></td> <td>4200</td> <td>13</td> <td>4</td> <td>Po Yap Road</td> <td>С</td> <td>C</td> <td>Section B1 (Pipe-Jacking)</td>																																					4200	13	4	Po Yap Road	С	C	Section B1 (Pipe-Jacking)
Section B4 (Open-trench) - Ling Hong Road 5600 5799 Section B3 (Pipe-Jacking) E Po Hong Road 5799 S838 Image: Section B3 (Pipe-Jacking) E Po Hong Road 5838 Image: Section B3 (Pipe-Jacking) E Po Hong Road 5838 Image: Section B3 (Pipe-Jacking) E Po Hong Road 5838 Image: Section B3 (Pipe-Jacking) E Image: Section B3 (Pipe-Jacking) E Po Hong Road 6254 6368 Image: Section B3 (Pipe-Jacking) Image: Section B3 (Pipe-J			_	\square																																	5500	200	4	Po Yap & Po Hong Rd		-	Section B2 (Open-trench)
Section B5 (Pipe-Jacking) E Po Hong Road 5799 5838 C<																																					5600	500	5	Po Hong & Ling Hong Rd	& D2	D1 & 1	Section B3 (Pipe-Jacking)
Section B6 (Open-trench) - Po Hong Road 5838 6254 - </td <td></td> <td></td> <td></td> <td>\square</td> <td></td> <td>5799</td> <td>500</td> <td>5</td> <td>Ling Hong Road</td> <td>-</td> <td>-</td> <td>Section B4 (Open-trench)</td>				\square																																	5799	500	5	Ling Hong Road	-	-	Section B4 (Open-trench)
Section B7 (Pipe-Jacking) F Po Hong Road 6254 6368 C <thc< th=""> C <thc< th=""> C C <thc< td="" th<=""><td></td><td></td><td></td><td>\square</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>5838</td><td>799</td><td>5</td><td>Po Hong Road</td><td>E</td><td>E</td><td>Section B5 (Pipe-Jacking)</td></thc<></thc<></thc<>				\square																																	5838	799	5	Po Hong Road	E	E	Section B5 (Pipe-Jacking)
Section B8 (Open-trench) Po Hong Road 6368 7250 Image: Control of the control of				\square																																	6254	338	5	Po Hong Road	-	-	Section B6 (Open-trench)
Section C (Po Lam Road to Tsui Lam to TKOFWPSR*)				\square																																	6368	254	6	Po Hong Road	F	F	Section B7 (Pipe-Jacking)
																																					7250	368	6	Po Hong Road	-	-	Section B8 (Open-trench)
				\square				П																																			
				\square)	Section C (Po Lam Road to Tsui Lam to TKOFWPSR*)
Section Cl (Open-trench) - Po Lam Road 7250 7740																																					7740	250	7	Po Lam Road	-	r	Section Cl (Open-trench)
Section C2 (Pipe-Jacking) G Tsui Lam Road 7740 7770 I I I I I I I I I I I I I I I I I			_																																		7770	740	7	Tsui Lam Road	G	G	
Section C3 (Open-trench) - Tsui Lam Road 7770 8300																																					8300	770	7	Tsui Lam Road	-	-	
Section C4 (Slope) - TKOFWPSR 8300 8376																																					8376	300	8	TKOFWPSR	-	-	
			-																																								

*TKOFWPSR - Tseung Kwan O Fresh Water Primiary Service Reservoir **Remaining 1581m within TKO137 with site possession from Nov 2019



Appendix B: Monitoring Scheulde



Baseline Noise Monitoring Schedule

			Noise Monitoring
	Date and		Minimum 30-minutes
	Monitoring Pe	eriod	monitoring period during
			(0700 – 1900 hrs)
		09:00 - 12:00	
Tue	29/5/2018	(14:30 for	L _{eq(30min)} , L ₁₀ , L ₉₀
		NSR4)	
Wed	30/5/2018	09:00 - 12:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Thu	31/5/2018	09:00 - 12:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Fri	1/6/2018	09:00 - 12:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Sat	2/6/2018	12:00 - 15:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Sun	3/6/2018	12:00 - 15:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Mon	4/6/2018	12:00 - 17:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Tue	5/6/2018	12:00 - 17:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Wed	6/6/2018	15:00 - 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Thu	7/6/2018	15:00 - 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Fri	8/6/2018	15:00 - 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Sat	9/6/2018	15:00 - 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Sun	10/6/2018	09:00 - 12:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Mon	11/6/2018	13:30 - 16:30	L _{eq(30min)} , L ₁₀ , L ₉₀
Tue	12/6/2018	15:00 – 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Wed	13/6/2018	15:00 - 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀
Thu	14/6/2018	15:00 - 18:00	L _{eq(30min)} , L ₁₀ , L ₉₀

Remark:

1. Monitoring on 7/6/2018 & 8/6/2018 were cancelled due to typhoon (Strong Wind Signal, No. 3) and the adverse weather (i.e. strong wind and heavy rain) it brought along; monitoring on 12/6/2018 was cancelled due to amber rainstorm warning. Thus, additional monitoring on 12/6/2018,13/6/2018 were scheduled, and the monitoring on 12/6/2018 was further postponed to 14/6/2018.



Appendix C: Noise Monitoring Equipment Calibration Certificates



	on and Testi	neering Limite ng Laboratory	d				
	of Ca	alibratio	on				C17614
ription / 儀器名和 facturer / 製造商 el No. / 型號 l No. / 編號	時 : Audi j : NTi : XL2 : A2A : Acur	o Analyzer -09696-E0 nen Environment	al Engineerin	g and Technolog			October 201
perature / 溫度	$(23 \pm 2)^{\circ}$	Ċ		Relative H	umidity / 柞	目對濕度 :	(55 ± 20)
oration check							
F RESULTS / 漢 results apply to th results do not exc results are detaile test equipment us e Government of jlent Technologi hde & Schwarz I	1試結果 ne particular u ceed manufact d in the subso ed for calibra The Hong K ess / Keysight Laboratory, G	init-under-test on urer's specificatio quent page(s). tion are traceable ong Special Adm Technologies ermany	ly. on. e to National S		Calibratio	n Laboratory	
	:	K C/Lee Engineer					
	: <u>Chen</u>	H C Chan Engineer	£	Date of Issue 簽發日期		7 Novembe	r 2017
	二言登 書 M TESTED / 送林 ription / 儀器名満 facturer / 製造商 el No. / 型號 lied By / 委託者 T CONDITION: perature / 温度 Voltage / 電歴 T SPECIFICAT partion check T OF TEST / 決 results apply to th results do not exc results are detaile test equipment us te Government of gilent Technologio bide & Schwarz I	三記書書 MTESTED / 送檢項目 (Job ription / 儀器名稱 : Audi ifacturer / 製造商 : NTi el No. / 型號 : XL2 l No. / 細號 : A2A lied By / 委託者 : Acur Lot I T CONDITIONS / 測試條件 perature / 溫度 : (23 ± 2)° Voltage / 電壓 : T SPECIFICATIONS / 測試 oration check TE OF TEST / 測試日期 : T RESULTS / 測試結果 results apply to the particular u results do not exceed manufact results apply to the particular u results are detailed in the subset test equipment used for calibra test equipment test equipment used f	E 記書 M TESTED / 送檢項目 (Job No. / 序引編號 ription / 儀器名稱 : Audio Analyzer ifacturer / 製造商 : NTi el No. / 型號 : XL2 l No. / 編號 : A2A-09696-E0 lied By / 委託者 : Acumen Environment Lot 11, Tam Kon Sha T CONDITIONS / 測試條件 perature / 溫度 : (23 ± 2)°C Voltage / 電壓 : T SPECIFICATIONS / 測試規範 oration check T RESULTS / 測試結果 results apply to the particular unit-under-test on results do not exceed manufacturer's specification results are detailed in the subsequent page(s). test equipment used for calibration are traceable the Government of The Hong Kong Special Adm gilent Technologies / Keysight Technologies while & Schwarz Laboratory, Germany ake Everett Service Center, USA ed By : K C/Lee Engineer ified By : Mathematical Adm gilent By H C Chan	M TESTED / 送檢項目 (Job No. / 序引編號: IC17-1542) ription / 儀器名稱 : Audio Analyzer facturer / 製造商 : NTi el No. / 型號 : XL2 l No. / 經號 : A2A-09696-E0 lied By / 委託者 : Acumen Environmental Engineering Lot 11, Tam Kon Shan Road, North T CONDITIONS / 測試條件 perature / 溫度 : (23 ± 2)°C Voltage / 電壓 : T SPECIFICATIONS / 測試規範 oration check TE OF TEST / 測試日期 : 3 November 2017 T RESULTS / 測試結果 results apply to the particular unit-under-test only. results are detailed in the subsequent page(s). test equipment used for calibration are traceable to National S is Government of The Hong Kong Special Administrative Reg illent Technologies / Keysight Technologies shide & Schwarz Laboratory, Germany ake Everett Service Center, USA ed By : Keylet iffied By : Mathing iffied By :	王 設 書 M TESTED / 送檢項目 (Job No. / 序引編號: IC17-1542) Date of R ription / 儀器名稱 : Audio Analyzer ifacturer / 製造商 : NTi el No. / 塑號 : XL2 I No. / 繩號 : A2A-09696-E0 lied By / 委託者 : Acumen Environmental Engineering and Technolog Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T. T CONDITIONS / 測試條件 perature / 溫度 : (23 ± 2)°C Relative He Voltage / 電壓 : T SPECIFICATIONS / 測試規範 pration check T OF TEST / 測試日期 : 3 November 2017 T RESULTS / 測試結果 results apply to the particular unit-under-test only. results and the subsequent page(s). test equipment used for calibration are traceable to National Standards via : te Government of The Hong Kong Special Administrative Region Standard & gilent Technologies / Keysight Technologies whee Schwarz Laboratory, Germany uke Everett Service Center, USA ed By K K C/Lee Engineer iffied By K H Chan Date of Issue ※發日期	E 證書 M TESTED / 送檢項目 (Job No. / 序引編號: IC17-1542) Date of Receipt / 收 ription / 儀器名稱 : Audio Analyzer ufacturer / 製造商 : NTi el No. / 編號 : XL2 I No. / 編號 : A2A-09696-E0 lied By / 委託者 : Acumen Environmental Engineering and Technologies Co., Lt Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T. T CONDITIONS / 測試條件 perature / 溫度 : (23 ± 2)°C Relative Humidity / 세 Voltage / 電壓 : T SPECIFICATIONS / 測試規範 pration check TE OF TEST / 測試日期 : 3 November 2017 T RESULTS / 測試結果 results apply to the particular unit-under-test only. results do not exceed manufacturer's specification. results apply to the particular unit-under-test only. results do not exceed manufacturer's specification. results are detailed in the subsequent page(s). test equipment used for calibration are traceable to National Standards via : ee Government of The Hong Kong Special Administrative Region Standard & Calibratio jilent Technologies / Keysight Technologies bide & Schwarz Laboratory, Germany uke Everett Service Center, USA ed By	E證書 嚴曹編號 M TESTED /送檢項目 (Job No. / 序引編號: IC17-1542) Date of Receipt / 收件日期: 26 C ription / 儀器名稱 : Audio Analyzer findcturer /製造商 : NTi el No. / 塑號 : XL2 INo. / 編號 : A 2A-09696-E0 lied By / 委託者 : Acumen Environmental Engineering and Technologies Co., Ltd. Lot 11, Tam Kon Shan Road, North Tsing Yi, N.T. T CONDITIONS / 測試條件 perature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 :: Voltage / 電歷 : T SPECIFICATIONS / 測試規範 rration check T OF TEST / 測試日期 : 3 November 2017 T RESULTS / 測試結果 results apply to the particular unit-under-test only. results and chailed in the subsequent page(s). test equipment used for calibration are traceable to National Standards via : e Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory jilent Technologies / Keysight Technologies bide & Schwarz Laboratory, Germany ake Everett Service Center, USA ed By : KCLee Engineer ified By : Mark Mark Date of Issue : 7 November at the Chan

e'o 香港海界屯門與安里一號青山海俄挪門懷 Telr絕溢: 2927 2606 Fax/傳真: 2744 8986 E-mail/遭難; callab@suncreation.com Website/翦扯: www.suncreation.com



輝創工程有限公司 程 Sun Creation Engineering Limited **Calibration and Testing Laboratory** Certificate of Calibration Certificate No. : C176148 校正證書 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 the laboratory acoustic calibrator was performed before the test from 6.1.1.2 to 6.3.2. The results presented are the mean of 3 measurements at each calibration point. 3. 4 Test equipment : Certificate No. Equipment ID Description CL280 40 MHz Arbitrary Waveform Generator C170048 CL281 Multifunction Acoustic Calibrator PA160023 5. Test procedure : MA101N. 6 Results : 6.1 Sound Pressure Level **Reference Sound Pressure Level** 6.1.1 6.1.1.1 Before Self-calibration Applied Value UUT Setting UUT Time Reading Freq. Range Frequency Weighting Weighting (dB) (dB) (dB) (kHz) 30 - 130 94.00 93.9 FAST A 6.1.1.2 After Self-calibration

	UUT Setting		Applie	d Value	UUT	IEC 61672
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)	Class 1 (dB)
30 - 130	A	FAST	94.00	1	94.0	± 1,1

6.1.2 Linearity

	UUT Setting		Applied	I Value	UUT
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	Reading (dB)
30 - 130	A	FAST	94.00	1	94.0 (Ref.)
	10.00		104.00		104.0
		F	114.00		114.0

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

Sun Creation Engineering Limited – Calibration & Testing Laboratory e/o 4/E, Esing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong 河南门 20 百萬公司— 依定又後海道領部行 e/o 香港派书是山門線安坦——梁貴山區最优限理機 Tel/電話: 2927 2006 Fax/樹真: 2744 8986 E-mail/電郵: callab@sunceation.com Website/ E-mail/范寧: callab@suncreation.com Website/钢址: www.suncreation.com

Page 2 of 4

The test equipment used for calibration are naceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior eal of this labe 本證書所載校正用之測試器材均可測源至國際標準。局部被印本證書需先幾本實驗所書面批准。





輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No. : C176148 證書編號

Time Weighting 6.2

THIC WOIGH	ing					
	UUT Setting	,	Applied	d Value	UUT	IEC 61672
Range	Frequency	Time	Level	Freq.	Reading	Class 1 Spec.
(dB)	Weighting	Weighting	(dB)	(kHz)	(dB)	(dB)
30 - 130	A	FAST	94.00	1	94.0	Ref.
		SLOW			94.0	± 0.3

6.3 Frequency Weighting

A.Weighti 6.3.1

	UUT Setting		Appli	ed Value	UUT	IEC 61672
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Class 1 Spec. (dB)
30 - 130	A	FAST	94.00	63 Hz	67.7	-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	$+1.2 \pm 1.6$
				4 kHz	95.0	$+1.0 \pm 1.6$
				8 kHz	92.9	-1.1 (+2.1; -3.1)
				12.5 kHz	89.7	-4.3 (+3.0; -6.0)

6.3.2 C-Weighting

	UUT Setting		Appli	ed Value	UUT	IEC 61672
Range (dB)	Frequency Weighting	Time Weighting	Level (dB)	Freq.	Reading (dB)	Class 1 Spec. (dB)
30 - 130	С	FAST	94.00	63 Hz	93.1	-0.8 ± 1.5
		1 1		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		1 kHz	94.0	Ref.
				2 kHz	93.8	-0.2 ± 1.6
	1			4 kHz	93.2	-0.8 ± 1.6
				8 kHz	91.0	-3.0 (+2.1; -3.1)
				12.5 kHz	87.7	-6.2 (+3.0; -6.0)

The test equipment used for ealibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior ritten approval of this laboratory

本證書所載校正用之測試器村均可溯源至國際標準。局部復印本證書當先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory e'o 4/E. Tsing Shan Wan Exchange Building. I Hing On Lane, Tuen Mun, New Territories, Hong Kong 續何工程在同步之间 - 使正及後測實驗所 e'o 香港術昇屯門販安里一號青山討機援四機 Tel:電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: eatlab@suncreation.com Website/

E-mail/電郵: eallab@suncreation.com Website/彻此: www.suncreation.com

Page 3 of 4





Certificate of Calibration 校正證書

Certificate No. : C176148 證書編號

Remarks : - Mfr's Spec. : IEC 61672 Class 2

TT	01 10	(0.11 10.6.11	
- Uncertainties of Applied Value :	94 dB		: ± 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)

- UUT Microphone Model No. : MA220 (ACO7052) & S/N : 62324

- 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.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior val of this laborate 本證書所載技正用之測試器材均可溯源至國際標準。局部復印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited Calibration & Testing Laboratory e/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Man, New Territories, Hong Kong 峰創工器有限公司 --按正及後調理繁新 e/o 清港新算是可谓g文型, 樂習口指常後裏四股 Tel/電話: 2927 2606 Fax(傳貨: 2744 8986 E-mail/電郵: callab@suncreation.com Website/御比: www.suncreation.com



Sun Creation Engineering 程	輝創工程有限公司 Sun Creation Engineering Limited Calibration and Testing Laboratory		
Certific 校正證	cate of Calibration 書	1	Certificate No. : C17483 證書編號
ITEM TESTE Description / 億 Manufacturer / Model No. / 型 Serial No. / 編 Supplied By / 續	製造商 : Rion 號 : NC-74 號 : 34615222	gineering and Technologie	ecceipt / 收件日期: 10 August 201 s Co., Ltd.
TEST CONDI Temperature / Line Voltage /		Relative Hur	nidity / 相對濕度 : (55 ± 20)
Calibration che	eck		
DATE OF TE TEST RESUL The results app The results do	ST / 測試日期 : 26 August 2017 .TS / 測試結果 oly to the particular unit-under-test only. not exceed manufacturer's specification.		
DATE OF TE TEST RESUL The results app The results do The results are The test equipu - The Governu - Agilent Tecl - Rohde & Scl	ST / 測試日期 : 26 August 2017 LTS / 測試結果 ply to the particular unit-under-test only.		alibration Laboratory
DATE OF TE TEST RESUL The results app The results do The results are The test equipu - The Governu - Agilent Tecl - Rohde & Scl	ST / 測試日期 : 26 August 2017 JTS / 測試結果 bly to the particular unit-under-test only. not exceed manufacturer's specification. detailed in the subsequent page(s). ment used for calibration are traceable to N ment of The Hong Kong Special Administr nologies / Keysight Technologies hwarz Laboratory, Germany		alibration Laboratory





Certificate of Calibration 校正證書

Certificate No. : C174832 證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement 1. of the test.
- The results presented are the mean of 3 measurements at each calibration point. 2.
- 3. Test equipment :

Equipment ID CL130 CL281 **TST150A**

Description Universal Counter Multifunction Acoustic Calibrator Measuring Amplifier

Certificate No. C173864 PA160023 C161175

- 4. Test procedure : MA100N.
- 5. Results :
- 5.1 Sound Level Accuracy

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

5.2 Frequency Accuracy

UUT Nominal Value	Measured Value	Mfr's	Uncertainty of Measured Value
(kHz)	(kHz)	Spec.	(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.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory. 本證書所載按正用之測試器材均可測源至國際標準。局部復印本證書需先獲本實驗所書面批准。

Sun Creation Engineering Limited – Calibration & Testing Laboratory e'o 4/F, Tsing Shani Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong 歸創上已程有規公司 - 校正及後謝實驗解 e'o 書證證解理和世界與是一級將計出讀機像四機 Tel/電話: 2927 2606 Fax/伊真: 2744 8986 E-mail/電解: callab@suncreation.com Website/

E-mail/電郵: callab/@suncreation.com Website/網址:: www.suncreation.com







This instrument was produced under rigorous factory production control and documented standard procedures. It was individually visually inspected, leak tested and function tested for display, backlight, button and software performance. The accuracy of each of its primary measurements was individually calibrated and/or tested against standards traceable to the National Institute of Standards and Technology ("NIST") or calibrated intermediary standards. This instrument is certified to have performed at the time of manufacture in compliance with the following specifications as they apply to this meter's specific model, measurements and features.

Methods Used in Calibration and Testing

Wind Speed:

The Kestrel Weather & Environmental Meter impeller installed in this unit was individually tested in a subsonic wind tunnel operating at approximately 300 fpm (1.5 m/s) and 1200 fpm (6.1 m/s) monitored by a Gill Instruments Model 1350 ultrasonic time-of-flight anemometer. The Standard's maximum combined uncertainty is +/-1.04% within the airspeed range 706.6 to 3923.9 fpm (3.59 to 19.93 m/s), and +/-1.66% within the airspeed range 166.6 to 706.6 fpm (0.85 to 3.59 m/s).

Temperature:

Temperature response is verified in comparison with a Eutechnics 4600 Precision Thermometer or a standard Kestrel 4000 Weather & Environmental Meter calibrated weekly against the Eutechnics 4600. The Eutechnics 4600 is calibrated annually and is traceable to NIST with a system accuracy of +/- 0.05 °C.

Direction / Heading

The sensitivity of the magnetic directional sensor is verified at the component level by applying a magnetic field to the sensor and measuring the signal output at 4 points, as well as after assembly by orienting the unit to the cardinal directions and measuring the magnetic field output. In both cases, the compass output must be accurate to within +/-5 degrees.

Relative Humidity:

Relative humidity receives a two-point calibration in humidity and temperature controlled chambers at 75.3% RH and 32.8% RH at 25° C. The calibration tanks are monitored with an Edgetech Model 2002 DewPrime II Standard Chilled Mirror Hygrometer. Following calibration, performance is further verified at an RH of approximately 43.2% against the Edgetech Hygrometer. The Edgetech Hygrometer is calibrated annually and is traceable to NIST with a maximum relative expanded uncertainty of +/- 0.2% RH.

Barometric Pressure:

Pressure response is verified against a Vaisala PTB210A Digital Barometer or a standard Kestrel 4000 Weather & Environmental Meter calibrated weekly against the Vaisala Barometer. The Vaisala Barometer is calibrated annually and is traceable to NIST with an accuracy of +/-0.15 hPa at +20°C defined as the root sum of the squares (RSS) of end point non-linearity, hysteresis error, repeatability error and calibration uncertainty at room temperature.

Approved By:

The enclosed Kestrel Weather & Environmental Meter was manufactured by Nielsen-Kellerman Co. at its facilities located at 21 Creek Circle, Boothwyn, PA 19061 USA.

Michael Naughton, Engineering Manager



										SENSO	70/12 - Markey Strategy	SPECIFICATION	COLOR STREET	
000 2500 3	3600	3609	3500 OT	4005	4200	4268	4300	4500	Boll latter	ACCURACY (+/-)*	RESOLUTION	RANGE	RANGE	NOTES
											C.1 m/s \$15/min	0,6 % 40,0 m/s 118 to 7,874 ft/min	0.6 to 60-0 m/s 116 to 11,61 i f/m in	1 insh 25 mm diameter impoler with precision axia and low(fitzion Zytel® beerings, Sta spaced sisted as lower limit, reactings may be taken down to 0.4 mis 79 f/min 1.5 km/r
• •								ø		Larger of 3% of reading, least	0.1 krath 0.1 mah	2.2 to 144.0 km/h 1.3 to 80.5 moh	2.2 lb 216.0 km/b 1.3 ke 134.2 mph	mph .5 kt after impelier statup. Of axis accuracy -1% & 5" off-axis: -2% & 10"; -3% & Calibration chit - 1% effect 100 hours use at 16 MPH 7 m/s, Reptacement impelier (NK
-	-	-	-	-	-		-	,	-	sign®icarit digit or 20 Rimin	0.1 knots 1 B*	1.2 to 77.8 knots 9 to 12 B*	1.2 to 116,6 knots 0 to 12 8*	0601) field inetals without tools (US Patent 5,753,753). Who speed calibration and test should be done with blangle on Impeter located at the top front face of the Kestrel,
											9.1 17/8*	2-131.2*	2-196.9 F/S'	*F/S only in Ballistics units. Besulari not available in Ballistics units.
					:			:						Hermotically scaled, precision thermistor mounted externally and Brounally isolated (US
										0.9.*	0.1 *F	-20.0 as 156.0 ° F	14.9.9 to 131.0 °F	Patent 5,939,945) for rapid response. Aliflow of 2.2 mph/1 m/s or greater provides faste response and reduction of insolation affect. Calibration drift negligible. The mission may a
• •		•	•	· *	•		•	٠		0.6 0	0.5 °C	-29.0 to 70.0 *C	-10,0 to 55,0 °C	be used to moscure temperature of water or snow by submerging thermistor portion international control of the statement of
														sensor membrane is free of liquid water prior to taking humidity-based measurements a submension.
							•			+				Polymer tapaciliyo humidity consor mounted in this-welled chamber actestral to case for
										3.0 %RH	0.1 %RH	5 10 95%	6 to 100%	replit accurate response (US Patent 6,207,074). To achieve stated eccuracy, unit must permitted to equilibrate to external temperature when exposed to large, replit temperatu
			0			v				2.4 200	4.1 ANA	non-condensing	and rub is	changes and be kept out of direct cunlight. Calibration drift 4- 2% over 2d months. Hum sansor may be recalibrated at factory or in Beld using Kestrel Humidity Catibration Kit (h
													0.30 to 48.87 mHa	(2080
										03 inHg	0.91 InHg	6.56 to 32.49 In Hig 300.0 to 1100.0 h Poimba	10.0 to 1664 7	Pressure centror may be recalizated at factory or in Reid. Adjustable reference a bluck display of station prossure or benchmarks pressure connected to MSL. Kestrel 4200 displa
•		•	a	ъ	3		•	a	•	1.0 hPalmbar	0.1 hPolmbar	4.35 to 15.95 PS1 and	0,54 to 24.00 PSt	station preasure on a dedicated solvers. Kestrol 2500 and 3500 display continuously up
										0.01 PSI	0.01 PS	32.0 to 185.0 °F 0.0 to 85.0 °C	add 14.9 to 131.0 ° F	Bimacheur barenteirle pressure trend indicator: rising rapidly, rising, steady, falli septity. Kestrel 4060 series displays pressure trend through graphing function. PSI clap
								:					-10.0 to 55.0 °C	Kestrel 4900 sories only. Z-avis solid-state magnetoresistive sonsor mounted perpendicular to unit plane. Accura
										. 5*	1* 1/16th Cordinal	0 10 360*	C to 360	seman dependent upper units vertical position. Self-calibration routine eliminates magne error from battaries or unit and must be turn offer every ful power-down (cottery remaine
											Scale	4.0.360	0 18 360.	change). Readout indicates direction to which the back of the unk is pointed when held
06899200	815788		899W		an san san sa	Note	2000	seise		LATED MEA	CONTRACT	-		vertical orientation. Deel nalion/variation adjustable for True North readoul.
	906) 		3500	686	9999	8.02		sectored and		nai o tradicio de activitation	an a	SPECIFICATION	SENSORS	
2590	3000	3500	ът	4000	4200	4260	4300	4500	Ball istics	ACCURACY (++-)*	RESOLUTION	RANGE	EMPLOYED Temperature	ADTES .
										0.0002 RAT ³ 0.0033 kg/m ²	0.001 (bs/ff* 0.904 kg/m ²	Refer to Ranges for Gensors Employed	Relative Humidity Pressure	Mass of sit per unit volume
										-	1 dm			
										0,0671	artčen F eničen t	Refer to Ranges for Sensors Employed	Air Flow User Input (Duet	Volume of all flowing through an opening, Automatically calculated from Air Volucity representation of user-specified duct shape (circle or rectangle) and dimensions (units
											0.1m²/s 14/s	omavia tripicyet	Shape & Size)	ft; cm or m). Maximum duct dimension input: 258.0 In (21.5.6) 655.2 cm 6.55 m
										typical: 23.6 R 7.2 m	310	typical: 750 ki (100 mBar	Prossure	Height above Mean Soa Lovel ('NSL'). Temperature compensated pressure (serometri allimeter requires accurate reference barometic pressure (o produco maximum obselu
•		۰	a		•	•	٠	8	2	max:46.2 € 14.7 m	1 m	max: 300 to 750 mBar	User leput (Reference Pressure)	accuracy. Both accuracy spece corresponds to a reference pressure anywhere from 85 1100 mBar.
										0.07 loHg	0.01 kHg	Roley to Rangos for	Pressure	Air pressure that would be present in identival canditions at MSL. Station pressure
۰		۰	a	8	•.	P	٠	۰		2.4 hPolmbor 0.03 PSI	0,1 hPalmbar 0.01 PSh	Sensors Employed	User Input (Reference Attitude)	 compensated for /coal elevation provided by reference attitude. Requires accurate refer a titude to produce maximum absolute accuracy.
										· ·	t mph 1 Bhrnig			-
								8	•	0.071	D.1 km/h	Relea to Ranges for Sensors Employed	Wind Speed Compase	Effective wind relative to a larget or based direction. Avto-switching headwind/foliwind indisation.
											0,1 m/s 0.1 knots			
										3.2 °F 1.9 °C	0.1 °F	Refer to Ranges for Sensors Employed	Temperaturo Reistro Humidity	Difference between dry bulb temperature and wet bulb temperature. When spraying, in exaposition rate and empirit Batma. Sate range for posticide spraying is 4 to 16 \pm 1 $_{\odot}$
													Prossure Temperature	10.
				۰	٠	8	٠	۰	•	225 m 89 m	1 /2 1 m	Refer to Ranges for Senaora Émpleyad	Relative Hurridity Pressure	Local air density converted to equivalent alevation above sea lavel in a uniform fayer consisting of the international Standard Atmosphere.
					-		-	-		5.4 *F	D.1 "F	15 to 95 % FH Refer to Range for	Temporaturo	Temperature that a volume of air must be cooled to at constant pressure for the water a present to constance lists data and form on a colid surface. Can also be considered to b
	۰.	° .	a	8			•		•	1.9 °C	0.1 °C	Temperature Sensor	Relative Humidity	veter-to-air acturation temperatura.
													Wind Spaed Temperature	The rate at which moisture is test from the surface of curing concrete. Requires user measurement and only of concrete temperature obtained with an assurate IR or probe
							٠			0.01 tistebhr 0.05 kg/m2/hr	0.01 int ¹ 89 0.01 kg/m ³ /hr	Refer is Ranges for Genaura Employed	Relative Humidity Pressure	theorements: ("Fior "C, not included). Readings should be taken 20 inches shows pour method with the theorem included and assessed for #10 represent when half is present.
													User Input (Convert Temperature)	function.
	8	•		9			3	ø		7.("F 4.0"D	0.1 TF	Refer to Ranges for Sensors Employed	Temporalulé Relative Humidity	Perceived temperature resulting from the combined effect of temperature and relative turnicity, Calculated based on NWS Heat Index (HS tables. Massurement varge limited
													Temperature	estions of published tables.
					٠	۰				.3 gpp .04 g/kg	0.1 gpp 0.01 g/kg	Refer to Ranges for Sensors Employed	Relative Humidity Pressure	Mass of water vaper in a mass of sir.
1.1												Refer to Ranges for	Temporaturo	The ratio, expressed as a percentage, of measured air density to the stridensity of a ste
						•				0.0026	0.004	Sensors Employed	Relative Humidity Pressure	atmosphere as defined by the ICAO.
													Temperature	Temparature indicated by a sling psychromotor. Due to nature of the psychrometric rate
		٠	٠	٠		•	٠	٩	•	1.8 'C	0.1 10	Refer to Ranges for Bersons Employed	Relative Humidity Pressure	water-sir system, this approximates the the modynamic wel-cub temperature. The the modynamic web built temperature is the temperature a parcel of air would have if or
														adis baticolly to saturation temperature via water evaporating into \boldsymbol{x} .
										1.6 °F	0.1 76	Refer to Ranges for	Wind Speed	Parcained temperature resulting from combined effect of wind speed and temperature. Debuilated tassed on the WWS Wind Chill Temperature (WDT) index, revised 2001, with
. •	8	•		۰	9	•	*	٠	•	0.9*0	0.1 °C	Sensors Employed	Temperature	apped adjusted by a factor of 1.5 to yield equivalent results to wind speed measured at
					an that the			and the second				and a second		sbeye ground, Measurement range limited by extent of published tables.
			5015						ADDIT	ONAL SPE			Statistics of	
·	8													cklight, Menual octivation with auto-off. V modele only/ electratuminescent backlight, Manual activation with auto-off.
·· •	**				÷.			•••				-		red (NV models only) electroluminescent becklight. Automatic or manual activation.
					•			•		MURRENERGON, MURRAN	n vilotiocitectae acc	ensera aspay. Cenada er a	viaben grean er visitte	realitive inspects any discussion intersume decligit. Actometry of marcally and the
	• '							a						end. Relative hum/dity and all enseavements which include RH is their estoulation may re Display updates every 1 second.
		-										Gust and Average Wind m		
	•													ng af other values, along with all other wind-related functions; air valoaity, crosswind,
				•	•	•	•	•	•	headwind/tallwind, win	d chill, WBGT, TWI	L, ovaperation reta,		
				4000	a 3700	8 3200	9-385-0	2900	2500	Min/Max/Avg History m	ray be reset indepo	ndontly, Auto-store interval	d for every measured ' settable from 2 second	value. Large capacity data logger with grophical display. Manuel and auto data storage. Is to 12 hours, overwrite en or off. Loga even when display off except for 2 and 5 second
				prents	points	points	points	points	points	intervala (cade version	4.18 and leter). De	sto copecity shown. (S-232) or Bluetoeth data tr		
				•	a		٠	· • ·		Bluetoeth Date Trans	for Option: Adjue:	table power consumption ar	nd radio range from up	to 38 ft Simetons, Individual Unit ID and 4 digit Pitil code preprogrammed for easy identi-
		•								Real time hours:minute	s dock.	nitting. Employs Divolooih (Gota Garbirod(34).
				٠		٠	٠	· •			es:saconde elació, e	colondor, automatic teap-yea	ar adjustment.	
	.*	•	-	•	۰.	à.		6.63		Usar-selectable 15 d	r 60 minutes with r	to key presses or disabled.		
	o	•	•	8		9					WEEE compliant	ind indually tested to NIST-		witten certificate of tests available at additional charge),
	a	•	٠	•	۰		•		•	Designed and manufact Oritorion 8.	tured in the USA fi	rom US and Imported comp	enorita. Cemplies with	Regional Value Contant and Terlif Code Transformation requirements for NAFTA Profess
	8	.•	٠								. Average life, 300	hours. Bettary life reduced	by backlight use in 200	20 to 3500 models.
•.						a	٥	9	9	1000 Berles Models: /	AA Lithium, two, ir	ojuded, Average life, 400 h	ours of use, raduced b	y backlight or filicetooth radio transmission use.
•	a	•	۰				•	a				6.5 Procedure IV: unit only:	knipactimoy domage i	repla cashle impeller.
•			•	•	•				•	Waterproof dP07 and 14" F to 131" F -10 "		amants may be taken bovo	ed the firsts of the one	rational temperature range of the display and batteries by maintaining, the unit within the
•							8				in the second se	TOTA OF BOARD DELADORON /	of the minimum time of	ocessary to take reading.
*	9 9	a			č	č	-		-					
1 0 11 11 11 11 11 11 11 11 11 11 11 11 11	8 9 9	a a	9 9 0		4	•	•	٩	•	22.0 °F to 140.0 °F (4.9 × 1.9 × 1.1 in / 12.1	30.0 °C to 60.6 °C x 4,8 x 2.8 cm, 3,6	6 oz / 102 g (including silp-s		
	9 9 9	8 0 3	9 9 0		9 8	•	•	e a	9 5	22.0 °F le 140.0 °F	30.0 °C to 60.6 °C y 4,8 x 2.8 cm, 3,6 y 4.6 x 2.8 cm, 3,6	6 cz / 102 g (including silp-s 6 cz / 102 g.		



Appendix D: Baseline Monitoring Data (Noise)



NSR ID:	NSR4
Baseline monitoring period:	29/5/2018 to 14/6/2018
Parameter :	L _{eq} 30min, L ₁₀ 30min ,L ₉₀ 30min
Major Site Activities	No construction works were conducted in the vicinity during the
	monitoring period.
Major dust source	Nearby traffic and school activities
Other Factors	NA

Date	Time	Weather			L-30min,	L ₁₀ -30min,	L _{90-30min} ,				
Date		weather	Reading (1)	Reading (2)	Reading (3)	Reading (4)	Reading (5)	Reading (6)	dB(A)	dB(A)	dB(A)
29/5/2018	14:37-15:07	sunny	72.1	72.3	72.9	73.3	72.4	72.7	72.6	75.6	68.7
30/5/2018	9:53-10:23	sunny	68.7	69.0	68.6	69.6	68.8	69.4	69.0	72.3	61.0
31/5/2018	9:18-9:48	sunny	68.9	68.2	68.7	68.8	68.4	70.9	69.1	72.0	59.9
1/6/2018	15:20-15:50	sunny	69.4	72.7	68.7	69.5	70.1	69.1	70.1	73.0	62.3
2/6/2018	13:59-14:29	Fine	69.5	70.8	68.2	70.6	71.4	70.7	70.3	72.5	61.8
3/6/2018	13:53-14:23	Fine	69.1	69.4	68.0	68.8	70.1	69.5	69.2	72.4	62.0
4/6/2018	15:42-14:12	cloudy	70.1	71.6	71.8	70.3	70.5	71.4	71.0	72.9	63.0
5/6/2018	12:28-12:58	cloudy	69.4	68.7	69.9	70.2	71.5	70.6	70.1	72.1	62.8
6/6/2018	16:54-17:24	Cloudy	70.3	71.1	71.8	72.1	71.4	70.9	71.3	73.2	62.1
7/6/2018				cancelle	d due to typhoc	n and the adve	rse weather				
8/6/2018				cancelle	d due to typhoc	n and the adve	rse weather				
9/6/2018	14:26-14:56	fine	68.1	67.4	69.5	69.8	70.4	70.1	69.3	71.5	62.2
10/6/2018	14:16-14:46	Fine	68.3	69.0	68.6	69.4	68.7	69.0	68.8	71.3	61.9
11/6/2018	13:40-14:10	fine	69.8	68.3	69.2	69.0	69.2	67.9	68.9	72.3	61.6
12/6/2018	cancelled due to typhoon and the adverse weather										
13/6/2018	15:14-15:44	Fine	68.4	69.3	68.7	69.1	69.6	70.3	69.3	73.5	63.6
14/6/2018	15:02-15:35	Fine	68.7	69.3	69.2	68.3	69.4	69.5	69.1	72.4	64.8



NSR ID:	NSR24
Baseline monitoring period:	29/5/2018 to 14/6/2018
Parameter :	L _{eq} 30min, L ₁₀ 30min ,L ₉₀ 30min
Major Site Activities	No construction works were conducted in the vicinity during the monitoring period.
Major dust source	Nearby traffic and school activities
Other Factors	NA

	Time	Weather	L _{eq} -5min, dB(A)									Free-field Correction	Free-field Correction	Free-field Correction
Date			Reading (1)	Reading (2)	Reading (3)	Reading (4)	Reading (5)	Reading (6)	L _{-30min} , dB(A)	L _{10 -30min} , dB(A)	L _{90 -30min} , dB(A)	L _{-30min} , dB(A)		L ₉₀ -30min, dB(A)
29/5/2018	10:18-10:48	sunny	67.9	71.1	66.2	68.3	68.7	67.8	68.6	70.5	55.4	71.6	73.5	58.4
30/5/2018	11:10-11:40	sunny	68.6	67.5	69.1	68.4	68.8	67.3	68.3	70.4	56.5	71.3	73.4	59.5
31/5/2018	10:35-11:05	sunny	69.2	68.6	67.1	68.9	68.6	68.6	68.5	72.0	55.9	71.5	75.0	58.9
1/6/2018	13:50-14:20	sunny	66.3	65.4	69.6	65.1	69.2	69.1	67.8	69.9	54.9	70.8	72.9	57.9
2/6/2018	12:57-13:27	Fine	68.6	67.8	69.0	68.3	68.5	69.3	68.6	70.8	56.3	71.6	73.8	59.3
3/6/2018	16:28-16:58	Fine	69.5	68.2	68.3	69.7	68.8	69.4	69.0	71.2	55.8	72.0	74.2	58.8
4/6/2018	16:55-17:25	cloudy	72.6	71.8	70.5	71.3	72.2	72.8	71.9	74.0	58.4	74.9	77.0	61.4
5/6/2018	13:34-14:04	cloudy	69.4	71.1	71.5	72.3	70.4	70.6	71.0	73.0	61.6	74.0	76.0	64.6
6/6/2018	14:06-14:36	Cloudy	71.5	69.3	68.8	70.4	71.0	69.6	70.2	72.4	59.4	73.2	75.4	62.4
7/6/2018					canc	elled due to	typhoon an	d the advers	e weather					
8/6/2018					canc	elled due to	typhoon an	d the advers	e weather					
9/6/2018	15:24-15:54	fine	64.3	65.2	65.8	67.1	66.4	65.3	65.8	67.9	59.7	68.8	70.9	62.7
10/6/2018	15:25-15:55	Fine	68.3	67.9	69.1	68.6	67.8	68.0	68.3	70.3	55.8	71.3	73.3	58.8
11/6/2018	14:49-15:19	fine	67.7	65.2	69.2	66.5	67.5	67.3	67.4	70.0	54.1	70.4	73.0	57.1
12/6/2018					canc	elled due to	typhoon an	d the advers	e weather					
13/6/2018	15:50-16:20	Fine	68.3	68.1	68.9	67.5	67.8	67.1	68.0	71.6	55.7	71.0	74.6	58.7
14/6/2018	17:06-17:31	Fine	70.4	66.2	70.6	69.6	68.4	61.0	68.6	72.6	53.5	71.6	75.6	56.5

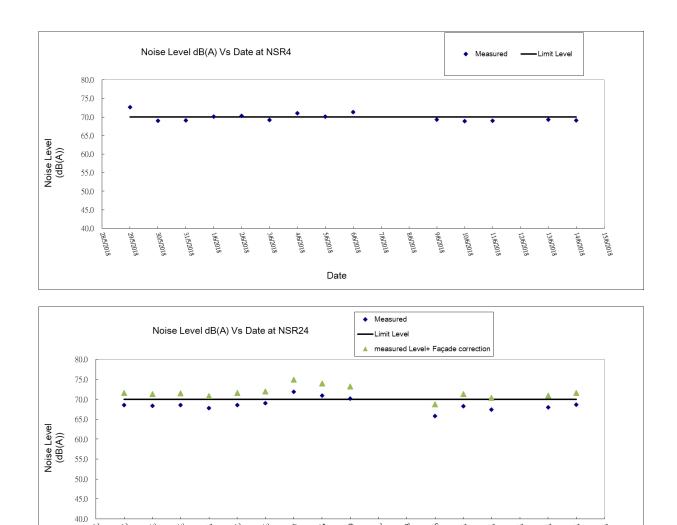
Remarks: Free-field correction +3dB(A) has been made for NSR24

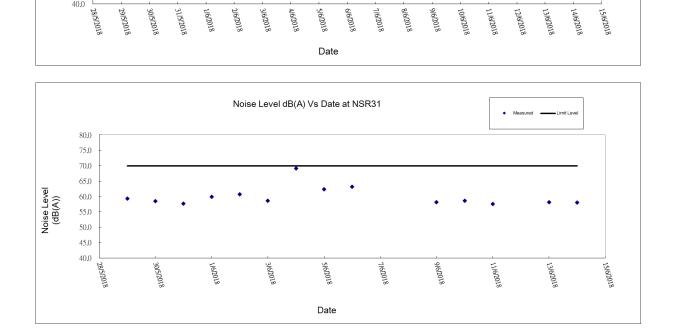


NSR ID:	NSR31
Baseline monitoring period:	29/5/2018 to 14/6/2018
Parameter :	L _{eq} 30min, L ₁₀ 30min ,L ₉₀ 30min
Major Site Activities	No construction works were conducted in the vicinity during the monitoring period.
Major dust source Other Factors	Nearby traffic and school activities NA

Dete	Time	We ath an			L _{-30min} ,	L ₁₀ -30min,	L _{90 -30min} ,				
Date		Weather	Reading (1)	Reading (2)	Reading (3)	Reading (4)	Reading (5)	Reading (6)	dB(A)	dB(A)	dB(A)
29/5/2018	11:26-11:56	sunny	58.4	58.8	59.9	60.0	60.3	58.2	59.3	63.3	52.5
30/5/2018	12:16-13:46	sunny	58.8	54.7	57.3	60.9	58.7	58.1	58.5	60.7	53.7
31/5/2018	12:13-12:43	sunny	56.7	58.2	56.5	57.2	57.4	59.5	57.7	61.1	52.1
1/6/2018	12:06-12:36	sunny	59.9	61.6	59.3	60.1	58.2	59.3	59.9	62.8	55.8
2/6/2018	11:44-12:34	Fine	63.2	60.8	59.7	59.4	60.3	59.8	60.7	62.4	55.5
3/6/2018	15:19-15:49	Fine	59.7	58.5	57.9	57.3	59.0	58.8	58.6	60.4	52.8
4/6/2018	14:29-14:59	cloudy	67.9	68.3	69.9	69.1	69.4	69.6	69.1	72.2	60.5
5/6/2018	14:27-14:57	cloudy	60.4	61.3	61.5	62.2	64.1	63.2	62.3	64.4	58.3
6/6/2018	15:14-15:44	Cloudy	62.4	64.0	64.8	63.6	61.5	62.1	63.2	65.2	59.3
7/6/2018				cancelle	d due to typhoc	on and the adver	rse weather				
8/6/2018				cancelle	d due to typhoc	on and the adver	rse weather				
9/6/2018	16:22-16:52	fine	58.8	57.5	57.9	58.4	58.6	57.6	58.2	60.0	53.6
10/6/2018	16:10-16:40	Fine	59.1	57.9	58.3	58.7	57.8	59.3	58.6	60.1	52.7
11/6/2018	15:34-16:04	fine	58.0	59.3	57.2	56.6	56.6	57.0	57.6	60.8	51.9
12/6/2018				cancell	ed due to typho	on and the adv	erse weather				
13/6/2018	16:27-16:57	Fine	57.6	57.9	58.1	57.6	58.3	58.9	58.1	61.0	51.4
14/6/2018	16:04-16:34	Fine	57.4	58.7	57.8	59.2	57.0	57.7	58.0	67.5	58.8

Contract No. 13/WSD/16 Mainlaying for Desalination Plant at Tseung Kwan O **Baseline Monitoring Report**





61612018

716/2018

516/2018