Highways Department

Agreement CE72/98 – Route 8 between Tsing Yi and Cheung Sha Wan – Design and Construction

Operational Noise Monitoring Programme – 2nd Operational Noise Monitoring

Certified by Environmental Team Leader
Mr. Coleman Ng

Verified by Independent Environmental Checker
Mr. Y T Tang

Highways Department

Agreement CE72/98 – Route 8 between Tsing Yi and Cheung Sha Wan – Design and Construction

Operational Noise Monitoring Programme – Final Operational Noise Monitoring Report

Certified by Environmental Team Leader
Mr. Coleman Ng

Verified by Independent Environmental Checker
Mr. Y T Tang

Highways Department

Agreement CE72/98 – Route 8 between Tsing Yi and Cheung Sha Wan – Design and Construction

Operational Noise Monitoring Programme – Final Operational Noise Monitoring Report

October 2010

Ove Arup & Partners Hong Kong Ltd
Level 5, Festival Walk, 80 Tat Chee Avenue, Kowloon Tong, Kowloon, Hong Kong
Tel +852 2528 3031 Fax +852 2268 3954
www.arup.com

Job number 23192

Contents

Tables

Figures

Appendices

1 INTRODUCTION

1.1 Background

An Environmental Permit (EP-085/2000/E) was granted to Highways Department by the Environmental Protection Department (EPD) for the construction and operation of Route 8 Project between Tsing Yi and Cheung Sha Wan (R8T). The R8T project comprises of four civil contracts, namely Phase 1 – Ngong Shuen Chau Viaduct, Phase 2a – Nam Wan Tunnel and West Tsing Yi Viaduct, Phase 2b – East Tsing Yi Viaduct and Phase 3 – Stonecutters Bridge.

The three civil contracts of Phase 1, Phase 2a and Phase 2b were substantially completed on 21st August 2007, 7th November 2007 and 23rd October 2008 respectively. While the last civil Contract, i.e. Phase 3, was completed on 12nd November 2009, the entire R8T was fully operational from 20th December 2009.

In accordance with the Environmental Impact Assessment (EIA) Report for Route 9 between Tsing Yi and Cheung Sha Wan (ref: EIA-025/1999) (the EIA Report) and Section 9.1.2 of the Environmental Monitoring and Audit (EM&A) Manual, operational noise monitoring is required during the first year operation of the R8T.

1.2 Operational Noise Monitoring Programme (ONMP)

In accordance with Condition 5.1 of the Environmental Permit (EP) of the R8T project, a monitoring plan for the Operational Noise Monitoring Programme (ONMP) was deposited to EPD on 11th September 2009. A baseline monitoring to be conducted upon completion of construction works and before the full operation of R8T as well as 2 operational traffic noise monitoring to be conducted within first year after the commencement of the road operation were proposed. EPD subsequently responded with no adverse comment in their reply letter, ref. (4) in Ax (1) to EP2/N3/A/28 Pt.47, dated 14th October 2009.

The baseline, first and second operational traffic noise monitoring were conducted. This final report presents the baseline, first and second operational noise monitoring details and results as well as a comparison between the actual noise levels and the predicted levels based on the EIA Report (ref: EIA-025/1999) and Supplementary EIA Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999) in order to assess the accuracy of traffic noise predictions.

2 TRAFFIC NOISE MONITORING

2.1 Monitoring Requirements

Baseline and operational noise monitoring in A-weighted $L_{10\ (peak\ hour)}$ are required to be conducted at the selected sensitive receiver locations. At the same time, traffic flow and heavy vehicle percentage counts would be conducted for R8T. These measurements were carried out upon completion of construction work but prior to the road opening for baseline monitoring and would be conducted twice during the first year of operation.

2.2 Monitoring Locations

Figures 2.1 and **2.2** show the selected monitoring locations including HK Institute of Vocational Education-Tsing Yi - Fok Ying Tung Hall of Residence (i.e. M1 and M2) and Mei Foo Sun Chuen (i.e. M3). **Table 2.1** summarises the noise prediction results at these monitoring locations based on the mitigated scenario of the approved EIA Report and Supplementary EIA Information on Noise Barriers Review at Ramp C/D.

Table 2.1: Details of traffic noise monitoring locations and EIA/VEP noise prediction results

Location I.D.	Location	Floor	Predicted Noise Level, L_{10} dB(A)			Noise Standard L_{10} (peak hour)
			Existing Roads	R8 Tsing Yi	All Roads	
M1	HK Institute of Vocational Education-Tsing Yi - Fok Ying Tung Hall of Residence [1]	1/F	61	67	68	70 dB(A)
M2		3/F	62	70	70	
M3	Mei Foo Sun Chuen [2]	R/F	72	61	73[3]	

[1] Based on Supplementary EIA Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999) for Year 2021.

[2] Based on the approved EIA Report (ref: EIA-025/1999) for Year 2021.

[3] Based on the approved EIA Report (ref: EIA-025/1999), the major traffic noise contribution is from existing roads such as Route 3 and West Kowloon Highway.

2.3 Monitoring Parameters, Data and Duration

In accordance with Section 2.4 of the ONMP, the noise measurement would be carried out during the AM peak traffic hours on normal weekdays as referring to the latest Annual Traffic Census. The measurements would be made in terms of A-weighted L_{10} noise levels over three 30-minute periods during the AM peak traffic hours. Noise level in A-weighted $L_{10\ (30\ minutes)}$ at the monitoring locations was therefore measured for the baseline and operational traffic noise monitoring. Relevant information including the monitoring dates and time are summarized in **Table 2.2**.

Table 2.2: Noise monitoring schedule

Noise Monitoring Type	Data	Monitoring Locations	Duration
Baseline Monitoring [1]	25th November 2009	M1 and M2	08:30-10:00
	11th December 2009	M3	08:30-10:00
First Operational Monitoring	14th January 2010	M1 and M2	08:25-09:55
	13rd January 2010	M3	08:30-10:00
Second Operational Monitoring [2]	26th August 2010	M1 and M2	08:25-09:55
	18th August 2010	M3	08:30-10:00

[1] Noise monitoring was conducted immediately before the opening of R8T.

[2] The second operational noise monitoring was postponed to mid August 2010 due to the breakdown of noise monitoring equipment and inclement weather conditions.

2.4 Monitoring Equipment

An integrated Sound Level Meter and a Sound and Vibration Analyser were used for the noise monitoring. Both meter and analyser used comply with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications. An acoustical calibrator in compliance with IEC 942:1988 (Type 1) was used to calibrate the sound level meter before and after each set of measurements to confirm the data drift was less than 1 dB(A). The instrumentation used for the noise monitoring is given in **Table 2.3** and the calibration certificates of these equipments are attached in **Appendix A**.

Table 2.3: Instrumentation for noise monitoring

Instruments	Description	Serial Number	Monitoring
Integrating Sound Level Meter	B&K 2238	2562752	Baseline, 1st and 2nd Operational
Integrating Sound Level Meter	B&K 2238	2562757	Baseline and 1st Operational
Sound and Vibration Analyser	SVAN957	15369	2nd Operational
Calibrator	B&K 4231	2605971	Baseline
Calibrator	Pulsar Model 100B	035213	1st and 2nd Operational

2.5 Monitoring Methodology and QA/QC Procedures

2.5.1 Noise Monitoring Methodology and QA/QC Procedures

The noise monitoring methodology and QA/QC procedures are listed as follows:

i. The Sound Level Meter / Sound and Vibration Analyser was mounted and set on a tripod.

ii. The noise measurement point was at a point 1m from the exterior of the sensitive receivers building façade facing the bridge alignment.

iii. The battery condition was checked to ensure the correct functioning of the meter.

iv. Parameters such as frequency weighting, time weighting and measurement time were set as follows:

- frequency weighting : A
- time weighting : Fast
- time measurement : 30 minutes

v. Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.

vi. The wind speed was frequently checked with a portable wind meter.

vii. At the end of the monitoring period, the L_{10}, L_{90}, L_{eq}, L_{max} and L_{min} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.

viii. Noise measurement was paused during periods of high intrusive noise if possible and observation was recorded when intrusive noise could not be avoided.

ix. Noise monitoring was conducted without the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

2.5.2 Traffic Counts

During the noise measurement, traffic counts with percentage heavy vehicles (vehicles over 1,525kg unladen weight) were conducted for the far-side and near-side of each bound of the road carriageways and the nearby existing road network. The average vehicle speed for each bound of the roads was measured and recorded. Particular landmarks, e.g. lamp-post, are pre-selected for the purpose of assessing the vehicle speed. The distance in between land marks was determined at the start of the traffic count. During the traffic count, time required for vehicles traveling through the landmarks was recorded. The average of the vehicle speed was obtained. 10% of measured traffic flow or at least 15 nos. of vehicles (the highest one) were randomly selected for the calculation of traveling time during each

15-minute period for each type of vehicles (heavy vehicles and light vehicles). The weighted average of traffic speed (taking into account of % of heavy vehicles) was calculated and adopted for the noise analysis work in the following section.

2.6 Methodology of Noise Level Comparison

2.6.1 Data Interpretation

Based on the on-site observations and the EIA/VEP Report, the major road traffic noise sources in the vicinity of the selected monitoring locations include nearby existing and new roads. Traffic counts of the roads were therefore conducted. **Table 2.4** summarised the existing and new roads in the vicinity of each monitoring location. **Figures 2.1** and **2.2** show the locations.

Table 2.4: Major road traffic noise sources

Monitoring Locations	Major Road Traffic Noise Sources	
	Existing Roads	New Roads
M1	• Tsing Yi Road – 1 (next to Mei King Playground); and • Tsing Yi Road - 2 (near Tai Tung Industrial Building)	• Ramp C and Ramp D
M2		
M3	• West Kowloon Highway (WKH) S/B; and • WKH N/B	• Ngong Shuen Chau Viaduct (NSCV) W/B; • NSCV E/B; • Ramp G and Ramp H; and • R8K Mainline

In accordance with the approved EIA Report (ref: EIA-025/1999) and Supplementary Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999), only the noise level breakdown of 'existing road' and 'new road (Route 8)' was provided. Therefore, a more practical approach is adopted for noise analysis. The methodology used for the noise level breakdown is summarised in **Appendix B**.

2.6.2 Noise Level Comparison

According to Section 3.3 of the ONMP, $L_{10\ (1\ hour)}$ at the selected monitoring locations in Year 2021 should be predicted based on the surveyed traffic counts, percentage of heavy vehicles and vehicle speed. The measured noise levels would be corrected based on the difference between the current traffic flow and the EIA predicted traffic flow. The corrected noise levels would then be compared with the predicted noise levels in the approved EIA Report (ref: EIA-025/1999) and Supplementary Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999).

However, since the noise contributions from the new roads at current traffic condition are insignificant to the existing noise environment (refer to Section 3.3 below for details), the above-mentioned approach of comparison is found to be inappropriate in this situation. An alternative approach is therefore adopted and the details are described in Section 4 of this report.

3 NOISE MONITORING RESULTS AND OBSERVATIONS

3.1 Baseline Noise Monitoring

Baseline noise measurement was carried out at the selected sensitive receivers including Fok Ying Tung Hall of Residence and Mei Foo Sun Chuen on 25th November and 11th December 2009 respectively. No intrusive noise was recorded during the noise monitoring.

Details of the measured noise levels are presented in **Appendix C** and a summary of the results is given in **Table 3.1**.

Table 3.1: Baseline noise monitoring results

Monitoring Locations	Measured Noise Level, L_{10} dB(A) [1]			Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [2]
	1st 30 mins	2nd 30 mins	3rd 30 mins	
M1	65	65	65	65
M2	66	66	66	66
M3	66	67	68	66

[1] Presented in integers.

[2] The measured noise data for the first 60 minutes were selected to represent the $L_{10\ (1\ hour)}$ dB(A).

3.2 First Operational Noise Monitoring

First operational noise monitoring was conducted at the selected sensitive receivers, Mei Foo Sun Chuen (M3) and Fok Ying Tung Hall of Residence (M1 and M2) on 13rd January and 14th January 2010 respectively. No intrusive noise was recorded during the noise monitoring. The detailed noise monitoring results are presented in **Appendix C** and a summary of the measured noise results is given in **Table 3.2**.

Table 3.2: First operational noise monitoring results

Monitoring Locations	Measured Noise Level, L_{10} dB(A) [1]			Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [2]
	1st 30 mins	2nd 30 mins	3rd 30 mins	
M1	66	65	66	66
M2	68	68	68	68
M3	67	67	67	67

[1] Presented in integers.

[2] The measured noise data for the first 60 minutes were selected to represent the $L_{10\ (1\ hour)}$ dB(A).

3.3 Second Operational Noise Monitoring

Second operational noise monitoring was conducted at the selected sensitive receivers, Mei Foo Sun Chuen (M3) and Fok Ying Tung Hall of Residence (M1 and M2) on 18th August and 26th August 2010 respectively. No intrusive noise was recorded during the noise monitoring. The detailed noise monitoring results are presented in **Appendix C** and a summary of the measured noise results is given in **Table 3.3**.

Table 3.3: Second operational noise monitoring results

Monitoring Locations	Measured Noise Level, L_{10} dB(A) [1]			Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [2]
	1st 30 mins	2nd 30 mins	3rd 30 mins	
M1	65	65	64	65
M2	68	68	68	68
M3	67	66	67	67

[1] Presented in integers.

[2] The measured noise data for the first 60 minutes were selected to represent the $L_{10\ (1\ hour)}$ dB(A).

Concurrent traffic counts with percentage heavy vehicles and traffic speed were also carried out for the road segments which were selected based on the EIA/VEP prediction. The locations of road segments for traffic counts are shown in **Figures 2.1** and **2.2**. The measured traffic flow and average speed are summarised in **Appendix C**.

3.4 Comparison of Baseline and Operational Noise Monitoring Results

The measured noise levels ($L_{10\ (1\ hour)}$ dB(A)) at the three monitoring locations during the baseline, first and second operational noise measurement were in the range of 65 to 68 dB(A) as summarized in **Table 3.4** and they were found to be within the noise standard of 70 dB(A).

Table 3.4: Comparison of baseline, first and second operational noise measurement results

Monitoring Locations	Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [1]		
	Baseline Measurement	1st Operational Measurement	2nd Operational Measurement
M1	65	66	65
M2	66	68	68
M3	66	67	67

[1] Presented in integers.

The differences between the baseline noise levels and the first operational noise levels at M1, M2 and M3 were 0.7 dB(A), 1.6 dB(A) and 0.5 dB(A) respectively. The differences between the baseline noise levels and the second operational noise levels at M1, M2 and M3 were 0.3 dB(A), 1.6 dB(A) and 0.2 dB(A) respectively. This suggests that the traffic noise from the road is not a dominant source of the noise environment.

4 COMPARSION OF MEASURED AND PROJECTED NOISE LEVELS

4.1 Methodology

It can be seen from **Table 3.4** that the noise levels in terms of $L_{10\ (1\ hour)}$ measured during the baseline noise monitoring were very close to those measured in the first and second operational noise measurements at the respective sensitive receivers, it suggests that the noise contribution from the new roads (R8T) for current traffic condition is not a dominant source of the noise environment. In addition, based on the site observations during the noise monitoring, the background noise levels at M1 and M2 were found to be dominated by the operation of container terminals. Given the dominance of background noise from other sources, a more practical approach is therefore adopted for noise estimation and comparison of the monitoring and prediction results. The measured operational noise levels at the designated locations are compared with the projected noise levels (sum of the contribution of existing and new roads) based on the EIA/VEP Report for the current traffic condition. In case discrepancies are observed, the measured and projected noise levels are reviewed and explanation is given to justify the discrepancies. Details are given in Section 4.2 below.

4.2 Results Interpretation

The individual noise level contributions of major existing roads and new roads for Year 2021 are estimated based on the equations as shown in **Appendix B**. The individual noise levels for both existing and new roads are then corrected with the current traffic volume, percentage of heavy vehicles and traffic speed by applying the equations. The results of determination and prediction of individual noise levels are presented in **Appendix D**. The comparison of the projected traffic noise levels (sum of the contribution of existing and new roads) for the current traffic condition and the measured noise levels are summarized in **Table 4.1**.

Table 4.1: Comparison of the projected noise levels and measured noise levels

Monitoring Locations	EIA/VEP Predicted Noise Level in Year 2021[1], dB(A)	First Operational measurement		Second Operational measurement	
		Projected Noise Level for Current Traffic Condition [2], dB(A)	Measured Noise Level, dB(A) [3]	Projected Noise Level for Current Traffic Condition [2], dB(A)	Measured Noise Level, dB(A) [3]
M1	68	62	66	63	65
M2	70	65	68	65	68
M3	73	67	67	67	67

[1] Predicted Noise Levels for Year 2021 for roads were based on the EIA Report (ref: .EIA-025/1999) and the Supplementary Information on Noise Barrier Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999).

[2] Projected noise levels for current traffic condition are calculated in accordance with CRTN methods and the results are summarized in **Appendix D**.

[3] The first and second operational measured noise levels in **Table 3.4** were rounded off for comparison with the prediction.

The measured noise levels at Fok Ying Tung Hall of Residence (M1 and M2) were found higher than the projected noise levels which were calculated based on the traffic count results in the first and second operational noise monitoring. As the locations of M1 and M2 are close to the container terminals, the measured noise levels were mainly affected by the background noise from the operation of the container terminals. Site observation also indicated that the background noise level was dominated by the operation of container terminals. Therefore, given the influence by the operation of container terminals, the projected noise levels at M1 and M2 were lower than the measured values.

For the monitoring station at Mei Foo Sun Chuen (M3), the projected noise levels for current traffic condition were found to be the same as the measured results during the first and second operational noise measurement in 2010. This suggests that the traffic noise prediction in the approved EIA Report (ref: EIA-025/1999) should be reasonably close to the measured noise level.

5 CONCLUSION

Baseline noise measurement was carried out at the selected sensitive receivers, Fok Ying Tung Hall of Residence (M1 and M2) and Mei Foo Sun Chuen (M3) on 25th November and 11th December 2009 respectively. The first operational noise monitoring at the same monitoring locations was conducted on 14th January and 13th January 2010 respectively, whilst the second operational noise monitoring at the same monitoring locations was conducted on 26th August and 18th August 2010 respectively. The traffic conditions, including traffic flow, percentage of heavy and light vehicles as well as traffic speeds were recorded during each monitoring event.

All the measured $L_{10\ (1\ hour)}$ levels at the monitoring station were below the noise standard of 70 dB(A). The measured noise levels at Fok Ying Tung Hall of Residence (M1 and M2) were found higher than the projected noise levels for current traffic condition. The background noise level at Fok Ying Tung Hall of Residence was however dominated and affected by the operation of container terminals due to close proximity. At Mei Foo Sun Chuen (M3), the projected noise level for current traffic condition was found to be the same as the measured results.

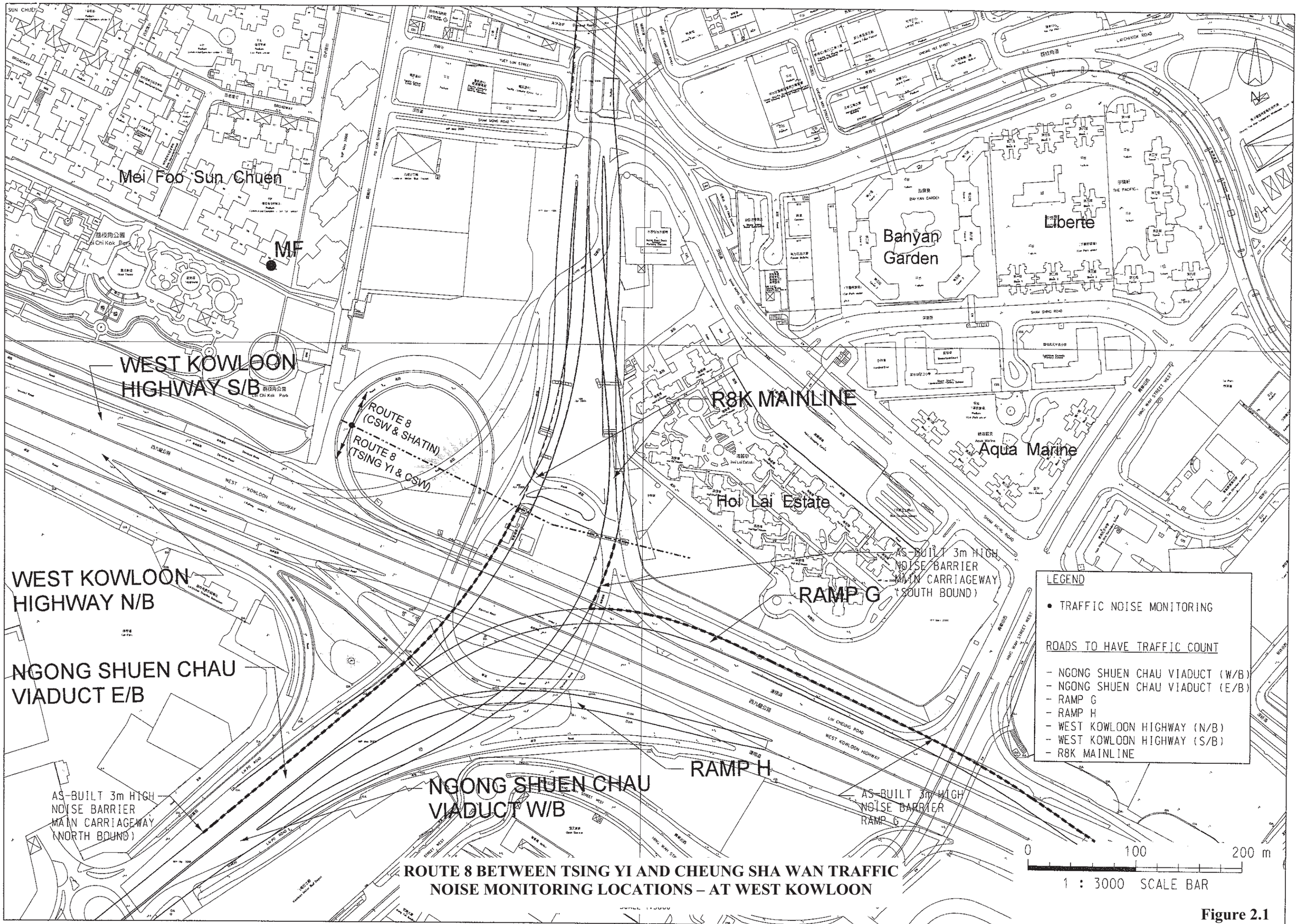
6 REFERENCE

[1] Route 9 between Tsing Yi and Cheung Sha Wan - Final Environmental Impact Assessment Report (EIA-025/1999), Atkins China Ltd., August 1999.

[2] Route 9 between Tsing Yi and Cheung Sha Wan – Supplementary EIA Information on the Modified Scheme, Ove Arup & Partners Hong Kong Limited, January 2000.

[3] Route 8 Tsing Yi and Cheung Sha Wan – Design and Construction – Supplementary Information on Noise Barrier Review at Ramp C/D, Ove Arup & Partners Hong Kong Limited, November 2008.

FIGURES



ROUTE 8 BETWEEN TSING YI AND CHEUNG SHA WAN TRAFFIC NOISE MONITORING LOCATIONS – AT WEST KOWLOON

Figure 2.1

Legend

- Traffic Noise Monitoring

Road to Have Traffic Count

- Ramp C
- Ramp D
- Tsing Yi Road

Ramp D

Ramp C

Tsing Hung Road

Tsing Yi Road -1

Tsing Yi Road -2

500m

SAI SHAN

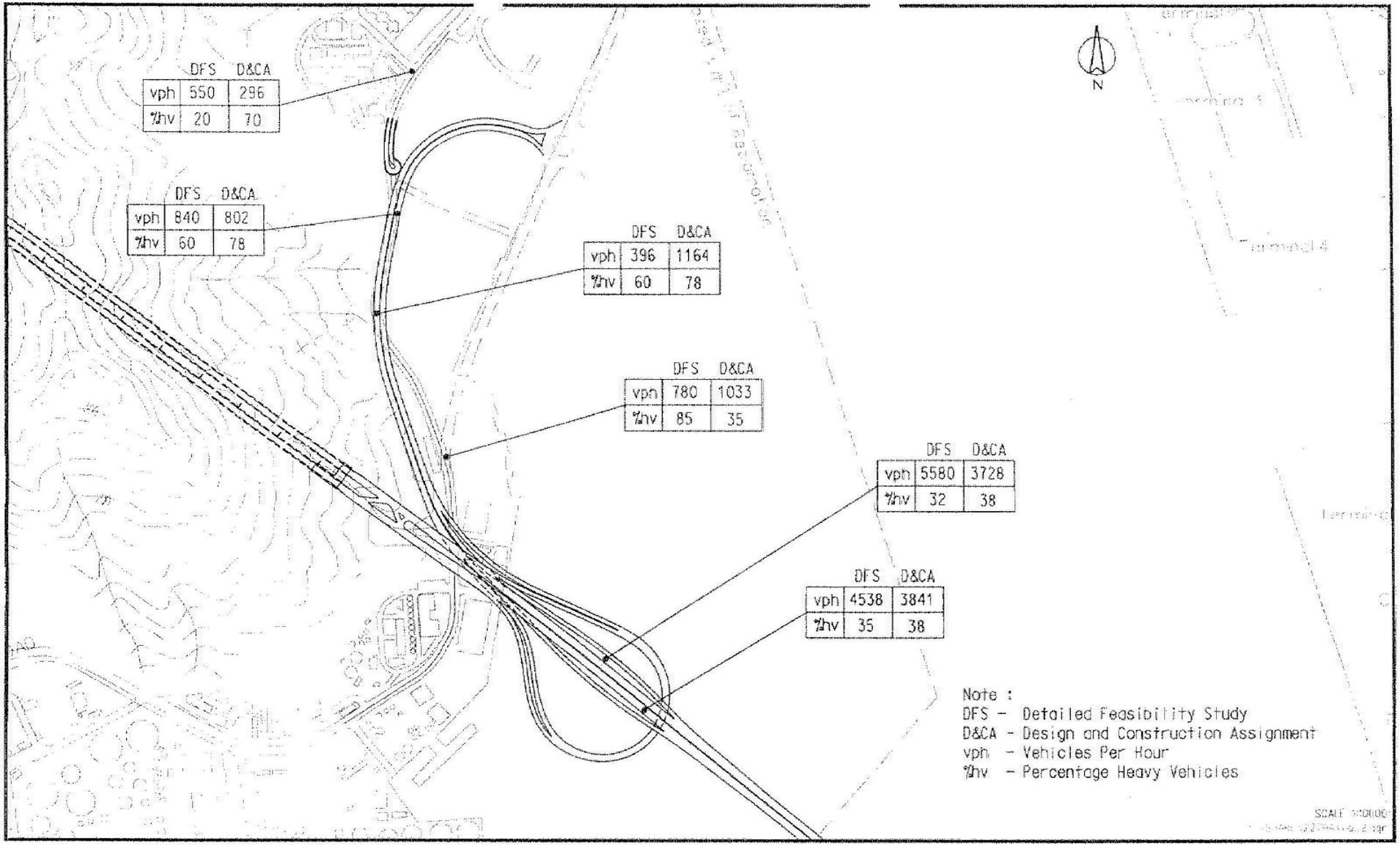
0 20 40 60 80 100
METRES
1 : 3500

ROUTE 8 BETWEEN TSING YI AND CHEUNG SHA WAN TRAFFIC NOISE MONITORING LOCATIONS – AT TSING YI ISLAND

SCALE 1:3500

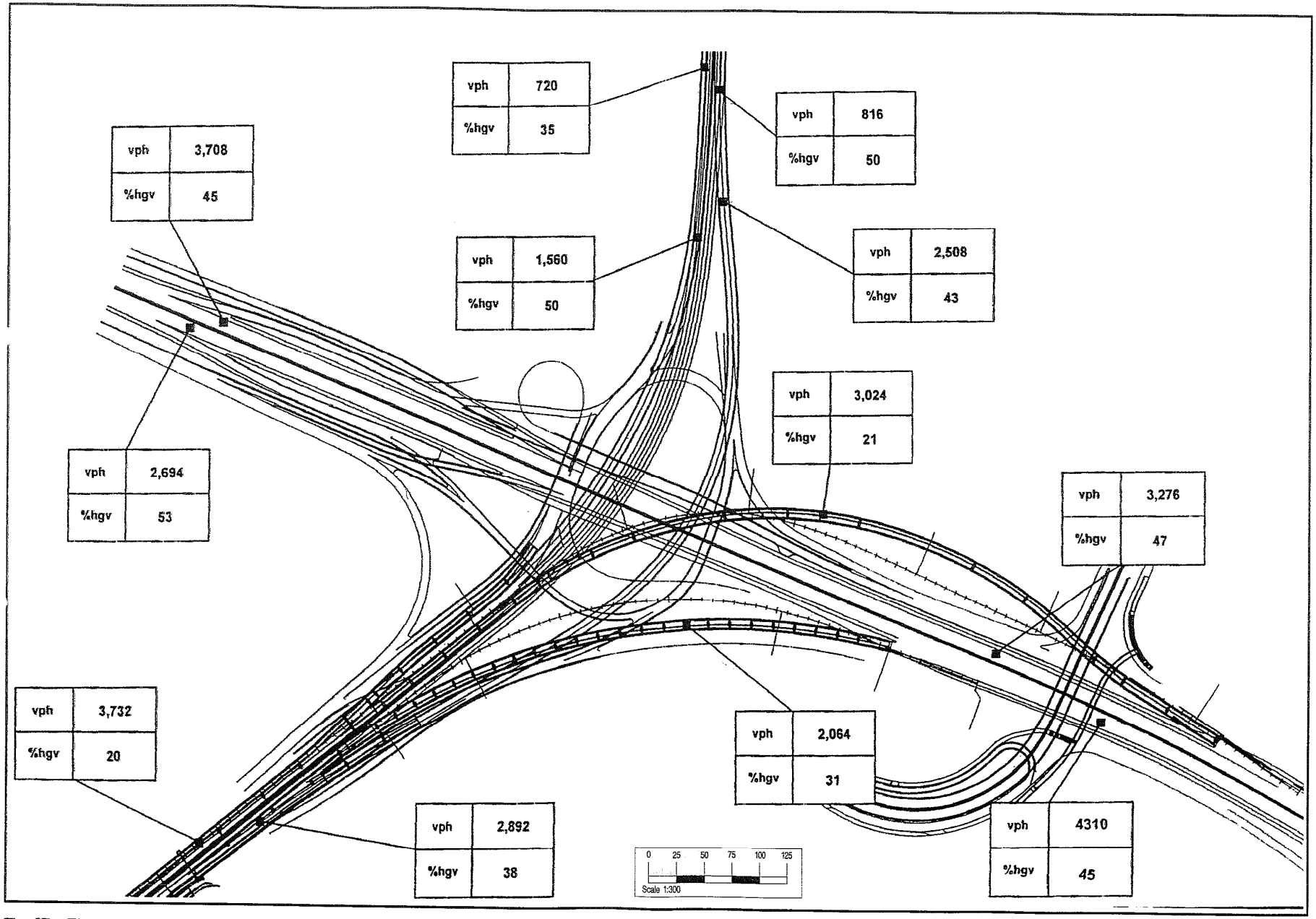
Figure 2.2

..\InHouseRequest\Figure1 1.dgn 7/5/2009 9:14:50



Traffic Flows and % Heavy Vehicles for CT9 Links for Year 2021 AM Peak

Figure 3.1 |



Traffic Flows and % Heavy Goods Vehicles for Lai Wan Interchange

Figure 3.2

Appendix A

Calibration Certificates

Calibration Certificates
(Baseline Monitoring)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M S. Castle Peak Road
Tai Lam, Tuen Mun, N T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com hk
Website : www.materialab.com hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Maeda-Hitachi-Yokogawa-Hsin Chong JV
Address : PO Box No 80330, Cheung Sha Wan Post Office
Project : Calibration Services
Calibration Item -

Description	:	Sound level meter
Model No	:	Bruel & Kjaer (Type 2238)
Serial No.	:	2565848 (Microphone), 2562752 (Sound level meter)
Next Calibration Due Date	:	16/Dec/2009

Laboratory Information

Calibrating Equipment -

Description	:	B & K Acoustic Multifunction Calibrator 4226
Serial No	:	2546175
Date of Calibration	:	16/Dec/2008
Ambient Temperature	:	20±2 °C
Specification Limit	:	EN 60651: 1994 Type 1

Calibration Results :

(1) Frequency response
(Reference SPL: 94dB & Range setting: 50 - 130dB at traditional free field)

Table 1: Summary of frequency response (A - weighting)

Frequency (Hz)	Measured Value (dB)	Specification Limit (dB)		
31.5	-38.6	-40.9	to	-37.9
63	-25.8	-27.7	to	-24.7
125	-16.0	-17.1	to	-15.1
250	-8.6	-9.6	to	-7.6
500	-3.3	-4.2	to	-2.2
1000(ref.)	0.0	-1.0	to	1.0
2000	1.2	0.2	to	2.2
4000	0.9	-2.0	to	2.5
8000	-2.0	-4.1	to	0.4
12500	-6.3	-10.3	to	-1.3
16000	-9.8	$-\infty$	to	-3.6

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

(2) Level range control
(Reference SPL: 94dB, Reference frequency: 1kHz & Reference range setting : 50 - 130dB)

Table 2: Summary of level range control accuracy

Level range (dB)	Measured deviation (dB)	Specification limit (dB)
50-130 (Ref.)	NA	NA
20-100	0.0	± 0.5
30-110	0.0	± 0.5
40-120	0.0	± 0.5
60-140	0.0	± 0.5

(3) Differential level linearity
(Reference SPL: 94dB, Reference frequency: 1kHz & Primary indicator range: 50 - 130dB)

Table 3: Summary of differential level linearity

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
94	NA	NA
104	0.0	± 0.4
114	0.0	± 0.4

(4) Crest factor
(C F : 3, Test frequency: 2kHz, Test range: 50 - 130dB & Test SPL: 106dB)

Table 4: Crest factor

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
106	0.3	± 0.5

Remarks :
1. The equipment used in this calibration is traceable to recognized National Standards.
2. The above calibration results does comply with the Type 1 specification requirement.

Checked by : _____ Date : 18-12-08 Certified by : _____ Date : 18 Dec, 2008
C K So (Engineer)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M S. Castle Peak Road
Tai Lam Tuen Mun N.T. Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Maeda-Hitachi-Yokogawa-Hsin Chong JV
Address : PO Box No 80330, Cheung Sha Wan Post Office
Project : Calibration Services
Calibration Item -

Description	:	Sound level meter
Model No.	:	Bruel & Kjaer (Type 2238)
Serial No.	:	2565853 (Microphone), 2562757 (Sound level meter)
Next Calibration Due Date	:	16/Dec/2009

Laboratory Information

Calibrating Equipment -

Description	:	B & K Acoustic Multifunction Calibrator 4226
Serial No	:	2546175
Date of Calibration	:	16/Dec/2008
Ambient Temperature	:	20±2 °C
Specification Limit	:	EN 60651: 1994 Type 1

Calibration Results :

(1) Frequency response
(Reference SPL: 94dB & Range setting: 50 - 130dB at traditional free field)

Table 1: Summary of frequency response (A - weighting)

Frequency (Hz)	Measured Value (dB)	Specification Limit (dB)		
31.5	-38.8	-40.9	to	-37.9
63	-26.0	-27.7	to	-24.7
125	-16.1	-17.1	to	-15.1
250	-8.7	-9.6	to	-7.6
500	-3.4	-4.2	to	-2.2
1000(ref.)	-0.1	-1.0	to	1.0
2000	1.1	0.2	to	2.2
4000	0.7	-2.0	to	2.5
8000	-2.4	-4.1	to	0.4
12500	-6.3	-10.3	to	-1.3
16000	-9.2	$-\infty$	to	-3.6

FUGRO TECHNICAL SERVICES LIMITED
MaterialLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road
Tai Lam, Tuen Mun N.T. Hong Kong
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

(2) Level range control
(Reference SPL: 94dB, Reference frequency: 1kHz & Reference range setting : 50 - 130dB)

Table 2: Summary of level range control accuracy

Level range (dB)	Measured deviation (dB)	Specification limit (dB)
50-130 (Ref.)	NA	NA
20-100	0.0	± 0.5
30-110	0.0	± 0.5
40-120	0.0	± 0.5
60-140	0.0	± 0.5

(3) Differential level linearity
(Reference SPL: 94dB, Reference frequency: 1kHz & Primary indicator range: 50 - 130dB)

Table 3: Summary of differential level linearity

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
94	NA	NA
104	0.0	± 0.4
114	0.0	± 0.4

(4) Crest factor
(C F.: 3, Test frequency: 2kHz, Test range: 50 - 130dB & Test SPL: 106dB)

Table 4: Crest factor

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
106	0.2	± 0.5

Remarks :
1. The equipment used in this calibration is traceable to recognized National Standards
2. The above calibration results does comply with the Type 1 specification requirement.

Checked by : _____ Date : 18-12-08 Certified by : _____ Date : 18 Dec. 2008
C K So (Engineer)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M S. Castle Peak Road
Tai Lam, Tuen Mun, N T. Hong Kong

Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

MateriaLab

Report No : 041333CA82714(5)

CALIBRATION CERTIFICATE OF SOUND LEVEL CALIBRATOR

Client Supplied Information

Client : Maeda-Hitachi-Yokogawa-Hsin Chong JV
Address : PO Box No. 80330, Cheung Sha Wan Post Office
Project : Calibration Services
Calibration Item -

Description	:	Bruel & Kjaer Sound Level Calibrator
Model No.	:	Type 4231
Serial No	:	2605971
Next Calibration Due Date	:	16-Dec-2009

Laboratory Information

Calibrating Equipment -

Description	:	B & K Acoustic Multifunction Calibrator 4226
Serial No.	:	2546175
Date of Calibration	:	16-Dec-2008
Ambient Temperature	:	20±2 °C
Specification Limit	:	±0.5dB

Calibration Result :

(1) At 94dB reading
Correction of UUT (at 94dB & 1kHz) : +0.0dB

(2) At 114dB reading
Correction of UUT (at 114dB & 1kHz) : +0.0dB

Remarks :
1. The equipment used in this calibration is traceable to recognized National Standards
2. The above calibration results does comply with the specification requirement.
3. Serial number of sound level meter (microphone) used is 2562752 (2565848). Settings of SLM are 50-130dB range, A weighting and F response

Checked by : _____ Date : 18-12-08 Certified by : _____ Date : 18 Dec. 2008
C K So (Engineer)

Calibration Certificates (First Operational Noise Monitoring)

FUGRO TECHNICAL SERVICES LIMITED
MaterialLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MaterialLab

Report no.: 061265CA100018

REPORT ON CALIBRATION OF SOUND LEVEL METER

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Level Meter
Manufacturer : Bruel & Kjaer (Model no. 2238 (meter), 4188 (microphone))
Serial No. : 2562752 (meter), 2565848 (microphone)
Next Calibration Date : 07-Jan-2011
Specification Limit : EN 60651: 1994 Type 1

Laboratory Information

Description : B & K Acoustic Multifunction Calibrator 4226
Equipment ID. : R-108-1
Date of Calibration : 07-Jan-2010 Ambient Temperature : 22 °C
Calibration Location : Calibration Laboratory of MaterialLab
Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighing frequency response	16000Hz	-9.4	-3.6 to -∞
	12500Hz	-6.4	-1.3 to -10.3
	8000Hz	-2.0	0.4 to -4.1
	4000Hz	1.0	2.0 to 0.0
	2000Hz	1.2	2.2 to 0.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	-3.3	-2.2 to -4.2
	250Hz	-8.6	-7.6 to -9.6
	125Hz	-16.0	-15.1 to -17.1
	63Hz	-25.8	-24.7 to -27.7
	31.5Hz	-38.7	-37.9 to -40.9
C-weighing frequency response	16000Hz	-11.3	-5.5 to -∞
	12500Hz	-8.2	-3.2 to -12.2
	8000Hz	-4.0	-1.5 to -6.0
	4000Hz	-0.8	0.2 to -1.8
	2000Hz	-0.1	0.8 to -1.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	0.0	1.0 to -1.0
	250Hz	0.1	1.0 to -1.0
	125Hz	0.0	0.8 to -1.2
	63Hz	-0.4	0.7 to -2.3
	31.5Hz	-2.2	-1.5 to -4.5
Level range control	20dB-100dB	0.0	± 0.5
	30dB-110dB	0.1	± 0.5
	50dB-130dB	0.1	± 0.5
	60dB-140dB	0.1	± 0.5
Differential level linearity	94dB-104dB	0.1	± 0.4
	104dB-114dB	-0.1	± 0.4

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For frequency response: Reference SPL is 94dB, range setting is 40-120dB & time weighing is fast
4. For differential level linearity: range setting is 40-120dB & time weighing is fast
5. The equipment does comply with EN 60651: 1994 Type 1 sound level meter for the above measurement.

Checked by : Sunny Date : 9 Jan 2010 Certified by : _____ Date : 09 Jan, 2010
So Chi Kuen (Engineer)

CA-R-297 (22/07/2009)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MateriaLab

Report no.: 061265CA100018(1)

REPORT ON CALIBRATION OF SOUND LEVEL METER

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Level Meter
Manufacturer : Bruel & Kjaer (Model no. 2238 (meter), 4188 (microphone))
Serial No. : 2562757 (meter), 2565853 (microphone)
Next Calibration Date : 07-Jan-2011
Specification Limit : EN 60651: 1994 Type 1

Laboratory Information

Description : B & K Acoustic Multifunction Calibrator 4226
Equipment ID. : R-108-1
Date of Calibration : 07-Jan-2010 Ambient Temperature : 22 °C
Calibration Location : Calibration Laboratory of MateriaLab
Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighing frequency response	16000Hz	-9.3	-3.6 to -∞
	12500Hz	-6.5	-1.3 to -10.3
	8000Hz	-2.5	0.4 to -4.1
	4000Hz	0.8	2.0 to 0.0
	2000Hz	1.1	2.2 to 0.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	-3.4	-2.2 to -4.2
	250Hz	-8.7	-7.6 to -9.6
	125Hz	-16.1	-15.1 to -17.1
	63Hz	-26.0	-24.7 to -27.7
	31.5Hz	-38.8	-37.9 to -40.9
C-weighing frequency response	16000Hz	-11.5	-5.5 to -∞
	12500Hz	-8.4	-3.2 to -12.2
	8000Hz	-4.4	-1.5 to -6.0
	4000Hz	-0.9	0.2 to -1.8
	2000Hz	-0.2	0.8 to -1.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	-0.1	1.0 to -1.0
	250Hz	0.0	1.0 to -1.0
	125Hz	0.0	0.8 to -1.2
	63Hz	-0.5	0.7 to -2.3
	31.5Hz	-2.3	-1.5 to -4.5
Level range control	20dB-100dB	-0.1	± 0.5
	30dB-110dB	0.0	± 0.5
	50dB-130dB	0.0	± 0.5
	60dB-140dB	0.0	± 0.5
Differential level linearity	94dB-104dB	0.0	± 0.4
	104dB-114dB	-0.1	± 0.4

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For frequency response: Reference SPL is 94dB, range setting is 40-120dB & time weighing is fast
4. For differential level linearity: range setting is 40-120dB & time weighing is fast
5. The equipment does comply with EN 60651: 1994 Type 1 sound level meter for the above measurement.

Checked by : Sunny Date : 9 Jan 2010 Certified by : So Chi Kuen (Engineer) Date : 09 Jan, 2010

CA-R-297 (22/07/2009)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MateriaLab

Report no.: 061265CA92364(1)

REPORT ON CALIBRATION OF SOUND CALIBRATOR

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Address : PO Box No. 80330, Cheung Sha Wan Post Office

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	:	Sound Calibrator
Manufacturer	:	Pulsar Instruments Inc. (Model no. 100B)
Serial No.	:	035213
Next Calibration Date	:	11-Nov-2010
Specification Limit	:	±0.5dB

Laboratory Information

Description	:	B & K Acoustic Multifunction Calibrator 4226
Equipment ID.	:	R-108-1
Date of Calibration :	11-Nov-2009	Ambient Temperature : 22 °C
Calibration Location :	Calibration Laboratory of MateriaLab	
Method Used	:	By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.1dB	±0.5dB
104dB	-0.1dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. Sound level meter used is client sound level meter (S/N: 110453 / T220553) with range setting, time weighing and frequency weighing at 30 - 130dB, fast & A respectively.
4. The equipment does comply with specification limit.

Checked by : Sunny Date : 13 Nov 2009 Certified by : So Chi Kuen (Engineer) Date : 13 Nov 2009

CA-R-297 (22/07/2009)

Calibration Certificates (Second Operational Noise Monitoring)

FUGRO TECHNICAL SERVICES LIMITED
MaterialLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MaterialLab

Report no.: 061265CA100018

REPORT ON CALIBRATION OF SOUND LEVEL METER

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Level Meter
Manufacturer : Bruel & Kjaer (Model no. 2238 (meter), 4188 (microphone))
Serial No. : 2562752 (meter), 2565848 (microphone)
Next Calibration Date : 07-Jan-2011
Specification Limit : EN 60651: 1994 Type 1

Laboratory Information

Description : B & K Acoustic Multifunction Calibrator 4226
Equipment ID. : R-108-1
Date of Calibration : 07-Jan-2010 Ambient Temperature : 22 °C
Calibration Location : Calibration Laboratory of MaterialLab
Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighing frequency response	16000Hz	-9.4	-3.6 to -∞
	12500Hz	-6.4	-1.3 to -10.3
	8000Hz	-2.0	0.4 to -4.1
	4000Hz	1.0	2.0 to 0.0
	2000Hz	1.2	2.2 to 0.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	-3.3	-2.2 to -4.2
	250Hz	-8.6	-7.6 to -9.6
	125Hz	-16.0	-15.1 to -17.1
	63Hz	-25.8	-24.7 to -27.7
	31.5Hz	-38.7	-37.9 to -40.9
C-weighing frequency response	16000Hz	-11.3	-5.5 to -∞
	12500Hz	-8.2	-3.2 to -12.2
	8000Hz	-4.0	-1.5 to -6.0
	4000Hz	-0.8	0.2 to -1.8
	2000Hz	-0.1	0.8 to -1.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	0.0	1.0 to -1.0
	250Hz	0.1	1.0 to -1.0
	125Hz	0.0	0.8 to -1.2
	63Hz	-0.4	0.7 to -2.3
	31.5Hz	-2.2	-1.5 to -4.5
Level range control	20dB-100dB	0.0	± 0.5
	30dB-110dB	0.1	± 0.5
	50dB-130dB	0.1	± 0.5
	60dB-140dB	0.1	± 0.5
Differential level linearity	94dB-104dB	0.1	± 0.4
	104dB-114dB	-0.1	± 0.4

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For frequency response: Reference SPL is 94dB, range setting is 40-120dB & time weighing is fast
4. For differential level linearity: range setting is 40-120dB & time weighing is fast
5. The equipment does comply with EN 60651: 1994 Type 1 sound level meter for the above measurement.

Checked by : Sunny Date : 9 Jan 2010 Certified by : _____ Date : 09 Jan, 2010
So Chi Kuen (Engineer)

CA-R-297 (22/07/2009)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MateriaLab

Report no.: 061265CA92364(1)

REPORT ON CALIBRATION OF SOUND CALIBRATOR

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Address : PO Box No. 80330, Cheung Sha Wan Post Office

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	:	Sound Calibrator
Manufacturer	:	Pulsar Instruments Inc. (Model no. 100B)
Serial No.	:	035213
Next Calibration Date	:	11-Nov-2010
Specification Limit	:	±0.5dB

Laboratory Information

Description	:	B & K Acoustic Multifunction Calibrator 4226
Equipment ID.	:	R-108-1
Date of Calibration :	11-Nov-2009	Ambient Temperature : 22 °C
Calibration Location :	Calibration Laboratory of MateriaLab	
Method Used	:	By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.1dB	±0.5dB
104dB	-0.1dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. Sound level meter used is client sound level meter (S/N: 110453 / T220553) with range setting, time weighing and frequency weighing at 30 - 130dB, fast & A respectively.
4. The equipment does comply with specification limit.

Checked by : Sunny Date : 13 Nov 2009 Certified by : So Chi Kuen (Engineer) Date : 13 Nov 2009

CA-R-297 (22/07/2009)

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

Certificate No. : C103994

Certificate of Calibration

This is to certify that the equipment

Description : Sound & Vibration Analyser

Manufacturer : Svantek

Model No. : SVAN957

Serial No. : 15369

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C103994.

The equipment is supplied by

Co Name : Maeda-CREC-SELI Joint Venture

Address : 3B Hoi Kok Street, Tsuen Wan, N.T.

Date of Issue : 23 July 2010

Certified by : K C Lee

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

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

Report No : C103994

Calibration Report

ITEM TESTED

DESCRIPTION : Sound & Vibration Analyser
MANUFACTURER : Svantek
MODEL NO. : SVAN957
SERIAL NO : 15369

TEST CONDITIONS

AMBIENT TEMPERATURE : (23 ± 2)°C RELATIVE HUMIDITY : (55 ± 20)%
LINE VOLTAGE : ---

TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 23 July 2010 ***JOB NO.*** : IC10-1835

TEST RESULTS

The results apply to the particular unit-under-test only
All results are within 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
- Agilent Technologies, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany
- The Bruel & Kjaer Calibration Laboratory, Denmark

Tested by *L L Cheung* *Date* *23 July 2010*

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building 1 Hing On Lane, Tuen Mun, New Territories Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Report No. : C103994

Calibration Report

1 The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 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	C100067
CL179	Acoustic Calibrator	C095223

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 (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq (kHz)	
HIGH	SPL	A	Fast	114.00	1	113.8

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
HIGH	SPL	A	Fast	114.00	1	114.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
HIGH	SPL	A	Fast	114.00	1	114.0 (Ref.)
				94.00		93.9

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

Report No : C103994

Calibration Report

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
HIGH	SPL	A	Fast	114.00	1	114.0	Ref.
			Slow			114.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
HIGH	SPL	A	Fast	114.00	63 Hz	87.8	-26.2 ± 1.5
					125 Hz	97.8	-16.1 ± 1.5
					250 Hz	105.3	-8.6 ± 1.4
					500 Hz	110.7	-3.2 ± 1.4
					1 kHz	114.0	Ref.
					2 kHz	115.2	+1.2 ± 1.6
					4 kHz	115.0	+1.0 ± 1.6
					8 kHz	113.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	109.7	-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	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
HIGH	SPL	C	Fast	114.00	63 Hz	113.2	-0.8 ± 1.5
					125 Hz	113.8	-0.2 ± 1.5
					250 Hz	114.0	0.0 ± 1.4
					500 Hz	114.0	0.0 ± 1.4
					1 kHz	114.0	Ref.
					2 kHz	113.8	-0.2 ± 1.6
					4 kHz	113.2	-0.8 ± 1.6
					8 kHz	111.1	-3.0 (+2.1 ; -3.1)
					12.5 kHz	107.8	-6.2 (+6.0 ; -∞)

Report No. : C103994

Calibration Report

Remarks : - Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

114 dB :	63 Hz - 125 Hz	: ± 0.45 dB
	250 Hz - 500 Hz	: ± 0.40 dB
	1 kHz	: ± 0.30 dB
	2 kHz	: ± 0.45 dB
	4 kHz	: ± 0.45 dB
	8 kHz	: ± 0.55 dB
	12.5 kHz	: ± 0.80 dB
	1 kHz	: ± 0.10 dB (Ref 94 dB)
94 dB :	1 kHz	: ± 0.30 dB

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

Note :
The values given in this Calibration Report 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

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building 1 Hing On Lane, Tuen Mun New Territories Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Appendix B

Methodology for Noise Level Determination and Correction

'Existing Road' and 'New Road' Noise Level Determination

The contribution of major existing roads and new roads for each monitoring station has been identified and summarized in **Table 2.4**. It was noted that some of the monitoring stations are affected by more than one road noise source. As only one single value of 'existing road' and 'new road' was presented in the EIA report separately, the individual noise level contributions of major existing road and new road noise sources are estimated by solving the following equation (1) and (2) in accordance with CRTN method taking two road noise sources as an example. The same principles are applied for three or more road noise sources.

$$Exisitng\ Noise = 10\log\left(10^{\frac{L_{P1}}{10}} + 10^{\frac{L_{P2}}{10}}\right) \quad (1)$$

$$L_{P1} - L_{P2} = 10\log\left(\frac{Q_1}{Q_2}\right) + 33\log\left(\frac{V_1 + 40 + 500/V_1}{V_2 + 40 + 500/V_2}\right) + 10\log\left(\frac{1 + 5p_1/V_1}{1 + 5p_2/V_2}\right) - 10\log\left(\frac{d_1}{d_2}\right) + 10\log\left(\frac{\theta_1}{\theta_2}\right) \quad (2)$$

where

L_{P1} and L_{P2} are sound pressure levels of major road 1 and 2 respectively,

Q_1 and Q_2 are traffic flows of major road 1 and 2 respectively,

V_1 and V_2 are traffic speeds of major road 1 and 2 respectively,

p_1 and p_2 are heavy vehicle percentages of major road 1 and 2 respectively,

d_1 and d_2 are distances from noise monitoring locations to the major road 1 and 2 respectively, and

θ_1 and θ_2 are angles of view for major road 1 and 2 respectively.

Individual Noise Level Correction

The individual noise level contributions for both existing roads and new roads are then readjusted by applying the following correction factor to account for the measured traffic data at the roads mentioned in **Table 2.4.** The calculation of correction factor is shown below:

EIA Predicted Noise Level in Year 2021 – Current Projected Noise Level = Correction Factor (3)

$$CorrectionFactor = 10\log\left(\frac{Q'}{Q}\right) + 33\log\left(\frac{V'+40+500/V'}{V+40+500/V}\right) + 10\log\left(\frac{1+5p'/V'}{1+5p/V}\right)$$

where

Q' is predicted traffic flow by using the CRTN noise model,

V' is predicted traffic speed by using the CRTN noise model,

p' is predicted percentage heavy vehicle by using the CRTN noise model,

Q is measured traffic flow during the traffic noise monitoring event,

V is measured traffic speed during the traffic noise monitoring event, and

p is measured percentage heavy vehicle during the traffic noise monitoring event.

Appendix C

Noise Monitoring and Traffic Count Results

Appendix C
Noise Monitoring and Traffic Count Results

Baseline Traffic Noise Monitoring

M1 (1/F, Fok Ying Tung Hall of Residence)

25th November 2009	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	64.9
	L_{90} dB(A)	61.8
	L_{eq} dB(A)	63.8
	L_{max} dB(A)	78.4
	L_{min} dB(A)	58.3
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	65.1
	L_{90} dB(A)	62.2
	L_{eq} dB(A)	63.9
	L_{max} dB(A)	75.6
	L_{min} dB(A)	58.9
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	64.9
	L_{90} dB(A)	62.3
	L_{eq} dB(A)	64.1
	L_{max} dB(A)	77.7
	L_{min} dB(A)	59.2

M2 (3/F, Fok Ying Tung Hall of Residence)

25th November 2009	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	65.9
	L_{90} dB(A)	62.2
	L_{eq} dB(A)	64.6
	L_{max} dB(A)	79.3
	L_{min} dB(A)	59.2
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.3
	L_{90} dB(A)	62.2
	L_{eq} dB(A)	64.6
	L_{max} dB(A)	76.4
	L_{min} dB(A)	59.4
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	66.2
	L_{90} dB(A)	62.4
	L_{eq} dB(A)	64.7
	L_{max} dB(A)	79.3
	L_{min} dB(A)	59.9

Appendix C
Noise Monitoring and Traffic Count Results

Baseline Traffic Noise Monitoring

M3 (Mei Foo Sun Chuen, State 8, Block No. 112,, Rooftop)

11st December 2009	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	65.9
	L_{90} dB(A)	63.0
	L_{eq} dB(A)	64.8
	L_{max} dB(A)	70.2
	L_{min} dB(A)	60.0
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.9
	L_{90} dB(A)	64.3
	L_{eq} dB(A)	65.8
	L_{max} dB(A)	71.5
	L_{min} dB(A)	61.6
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	67.7
	L_{90} dB(A)	65.5
	L_{eq} dB(A)	66.8
	L_{max} dB(A)	72.6
	L_{min} dB(A)	63.7

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Noise Monitoring (Summary)

Traffic Flow

For Location M1 & M2: - Fok Ying Tung Hall of Residence				
	Measured Value [1]		EIA prediction [2]	
Traffic Count Location	Total Flow (vph)	% of HV	Total Flow (vph)	% of HV
Tsing Yi Road – 1 (next to Mei King Playground)	176	41.3	296	70
Tsing Yi Road - 2 (near Tai Tung Industrial Building)	259	79.2	1,033	35
Ramp C	256	78.9	802	78
Ramp D	249	69.5	1,164	78
For Location M3: - Mei Foo Sun Chuen				
	Measured Value [1]		EIA prediction [3]	
Traffic Count Location	Total Flow (vph)	% of HV	Total Flow (vph)	% of HV
WKH S/B	2,300	27.1	3,708	45
WKH N/B	1,020	19.7	2,694	53
NSCV Ramp G	892	22.0	3,024	21
NSCV Ramp H	438	17.0	2,064	31
NSCV W/B	641	26.5	2,892	38
NSCV E/B	1,065	24.3	3,732	20
R8K W/B [4]	203	47.0	816	50
R8K E/B [5]	173	36.2	720	35

[1] The total traffic flow and % of heavy vehicles refer to the averaged traffic flow and averaged % of heavy vehicles for the whole monitoring period (i.e. 1.5 hours).

[2] The traffic forecast for Year 2021 in the Supplementary EIA Information on the Modified Scheme dated 28 January 2000 and Supplementary Information on Noise Barriers Review ar Ramp C/D in November 2008 has been adopted.

[3] The traffic forecast for Year 2021 in the approved EIA report for Route 9 between Tsing Yi and Cheung Sha Wan (ref: EIA-025/1999) has been adopted.

[4] The traffic flow is derived from the difference in the traffic volumes between Ngong Shuen Chau Viaduct Mainline W/B and Ramp H.

[5] The traffic flow is derived from the difference in the traffic volumes between Ngong Shuen Chau Viaduct Mainline E/B and Ramp G.

Traffic Speed Measurement

For Location M1 & M2: - Fok Ying Tung Hall of Residence		
Traffic Count Location	Measured Speed (km/hr) [1]	Traffic Speed (km/hr) [2]
Tsing Yi Road – 1 (next to Mei King Playground)	33.6	50
Tsing Yi Road - 2 (near Tai Tung Industrial Building)	40.4	50
Ramp C	40.9	50
Ramp D	47.4	50
For Location M3: - Mei Foo Sun Chuen		
Traffic Count Location	Measured Speed (km/hr) [1]	Traffic Speed (km/hr) [2]
WKH S/B	91.2	100
WKH N/B	88.8	100
NSCV Ramp G	79.0	80
NSCV Ramp H	74.1	80
NSCV W/B	88.8	80
NSCV E/B	86.1	80
R8K W/B [3]	88.8	80
R8K E/B [4]	86.1	80

[1] The measured speed is shown as weighted average of traffic speed (taking into account of % of heavy vehicles).

[2] For existing roads (e.g. Tsing Yi Road and West Kowloon Highway), the traffic speeds are the existing speed limits imposed by the Transport Department. For new roads (i.e. Ramp C/D, Ngong Shuen Chau Viaduct), the traffic speeds refer to the design road speed limits of the concerned roads.

[3] The weighted speed is taken to be the same as the speed along Ngong Shuen Chau Viaduct Mainline W/B.

[4] The weighted speed is taken to be the same as the speed along Ngong Shuen Chau Viaduct Mainline E/B.

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M1
Monitoring location address	1/F, Fok Ying Tung Hall of Residence
Date of Monitoring	14-Jan-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^{o}C)	14
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562757	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): Tsing Yi Road – 1 (next to Mei King Playground)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	21	29	4.19	3.48	30.1	36.2	33.6
8:40 – 8:55	14	31	3.82	3.08	33.0	40.9	38.4
8:55 – 9:10	23	37	4.7	3.93	26.8	32.1	30.0
9:10 – 9:25	20	26	3.66	3.69	34.4	34.1	34.3
9:25 – 9:40	16	13	4.1	3.23	30.7	39.0	34.4
9:40 – 9:55	15	19	4.29	3.96	29.4	31.8	30.7

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 176
Heavy Vehicle % = 41.3
Measured speed (km/hr) = 33.6

Raw Data – Road (Name & Direction): Tsing Yi Road – 2 (near Tai Tung Industrial Building)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	49	16	3.10	2.38	40.6	52.9	43.7
8:40 – 8:55	42	16	3.49	2.91	36.1	43.3	38.1
8:55 – 9:10	57	11	3.34	3.35	37.7	37.6	37.7
9:10 – 9:25	61	11	3.03	2.82	41.6	44.7	42.1
9:25 – 9:40	49	9	3.25	3.2	38.8	39.4	38.9
9:40 – 9:55	50	18	3.15	2.65	40.0	47.5	42.0

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 259
Heavy Vehicle % = 79.2
Measured speed (km/hr) = 40.4

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ramp C

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	54	14	3.14	2.54	40.1	49.6	42.1
8:40 – 8:55	52	13	2.64	2.66	47.7	47.4	47.7
8:55 – 9:10	51	14	3.52	2.39	35.8	52.7	39.4
9:10 – 9:25	50	14	3.28	3.06	38.4	41.2	39.0
9:25 – 9:40	49	9	3.1	2.48	40.6	50.8	42.2
9:40 – 9:55	47	17	4.05	2.74	31.1	46.0	35.1

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 256
Heavy Vehicle % = 78.9
Measured speed (km/hr) = 40.9

Raw Data – Road (Name & Direction): Ramp D

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	46	17	3.05	1.46	41.3	86.3	53.5
8:40 – 8:55	39	16	2.98	2.01	42.3	62.7	48.2
8:55 – 9:10	48	24	2.93	2.52	43.0	50.0	45.3
9:10 – 9:25	45	13	2.7	2.61	46.7	48.3	47.0
9:25 – 9:40	38	17	3.01	2.82	41.9	44.7	42.7
9:40 – 9:55	44	27	2.83	2.37	44.5	53.2	47.8

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 249
Heavy Vehicle % = 69.5
Measured speed (km/hr) = 47.4

M1 (1/F, Fok Ying Tung Hall of Residence)

14th January 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:25	L_{10} dB(A)	65.9
	L_{90} dB(A)	63.3
	L_{eq} dB(A)	64.9
	L_{max} dB(A)	71.9
	L_{min} dB(A)	61.7
Measurement Results (2nd 30 mins) Start at 08:55	L_{10} dB(A)	65.4
	L_{90} dB(A)	62.8
	L_{eq} dB(A)	64.4
	L_{max} dB(A)	70.0
	L_{min} dB(A)	61.4
Measurement Results (3rd 30 mins) Start at 09:25	L_{10} dB(A)	66.2
	L_{90} dB(A)	63.1
	L_{eq} dB(A)	64.9
	L_{max} dB(A)	71.5
	L_{min} dB(A)	61.6

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M2
Monitoring location address	3/F, Fok Ying Tung Hall of Residence
Date of Monitoring	14-Jan-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^{o}C)	14
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562752	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): Tsing Yi Road – 1 (next to Mei King Playground)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	21	29	4.19	3.48	30.1	36.2	33.6
8:40 – 8:55	14	31	3.82	3.08	33.0	40.9	38.4
8:55 – 9:10	23	37	4.7	3.93	26.8	32.1	30.0
9:10 – 9:25	20	26	3.66	3.69	34.4	34.1	34.3
9:25 – 9:40	16	13	4.1	3.23	30.7	39.0	34.4
9:40 – 9:55	15	19	4.29	3.96	29.4	31.8	30.7

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 176
Heavy Vehicle % = 41.3
Measured speed (km/hr) = 33.6

Raw Data – Road (Name & Direction): Tsing Yi Road – 2 (near Tai Tung Industrial Building)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	49	16	3.10	2.38	40.6	52.9	43.7
8:40 – 8:55	42	16	3.49	2.91	36.1	43.3	38.1
8:55 – 9:10	57	11	3.34	3.35	37.7	37.6	37.7
9:10 – 9:25	61	11	3.03	2.82	41.6	44.7	42.1
9:25 – 9:40	49	9	3.25	3.2	38.8	39.4	38.9
9:40 – 9:55	50	18	3.15	2.65	40.0	47.5	42.0

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 259
Heavy Vehicle % = 79.2
Measured speed (km/hr) = 40.4

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ramp C

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted
	HV	LV	HV	LV	HV	LV	Speed (km/h)
8:25 – 8:40	54	14	3.14	2.54	40.1	49.6	42.1
8:40 – 8:55	52	13	2.64	2.66	47.7	47.4	47.7
8:55 – 9:10	51	14	3.52	2.39	35.8	52.7	39.4
9:10 – 9:25	50	14	3.28	3.06	38.4	41.2	39.0
9:25 – 9:40	49	9	3.1	2.48	40.6	50.8	42.2
9:40 – 9:55	47	17	4.05	2.74	31.1	46.0	35.1

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 256
Heavy Vehicle % = 78.9
Measured speed (km/hr) = 40.9

Raw Data – Road (Name & Direction): Ramp D

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted
	HV	LV	HV	LV	HV	LV	Speed (km/h)
8:25 – 8:40	46	17	3.05	1.46	41.3	86.3	53.5
8:40 – 8:55	39	16	2.98	2.01	42.3	62.7	48.2
8:55 – 9:10	48	24	2.93	2.52	43.0	50.0	45.3
9:10 – 9:25	45	13	2.7	2.61	46.7	48.3	47.0
9:25 – 9:40	38	17	3.01	2.82	41.9	44.7	42.7
9:40 – 9:55	44	27	2.83	2.37	44.5	53.2	47.8

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 249
Heavy Vehicle % = 69.5
Measured speed (km/hr) = 47.4

M2 (3/F, Fok Ying Tung Hall of Residence)

14th January 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:25	L_{10} dB(A)	67.8
	L_{90} dB(A)	64.3
	L_{eq} dB(A)	66.4
	L_{max} dB(A)	72.6
	L_{min} dB(A)	63.2
Measurement Results (2nd 30 mins) Start at 08:55	L_{10} dB(A)	67.5
	L_{90} dB(A)	64.1
	L_{eq} dB(A)	66.1
	L_{max} dB(A)	72.2
	L_{min} dB(A)	62.9
Measurement Results (3rd 30 mins) Start at 09:25	L_{10} dB(A)	68.0
	L_{90} dB(A)	64.3
	L_{eq} dB(A)	66.6
	L_{max} dB(A)	74.0
	L_{min} dB(A)	63.2

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M3
Monitoring location address	Mei Foo Sun Chuen, State 8, Block No. 112, Rooftop
Date of Monitoring	13-Jan-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^{o}C)	13
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562757	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): West Kowloon Highway S/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	194	517	12.54	10.3	76.7	93.3	88.8
8:45 – 9:00	159	445	12.61	9.43	76.2	101.9	95.2
9:00 – 9:15	158	429	12.67	9.88	75.9	97.3	91.5
9:15 – 9:30	133	368	12.43	9.8	77.3	98.1	92.6
9:30 – 9:45	149	384	12.86	10.02	74.7	95.9	90.0
9:45 – 10:00	143	371	12.81	10.15	75.0	94.7	89.2

**Distance in between land marks (m) = 267
Total hourly vehicle (vph) = 2300
Heavy Vehicle % = 27.1
Measured speed (km/hr) = 91.2

Raw Data – Road (Name & Direction): West Kowloon Highway N/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	53	200	12.46	10.53	77.1	91.3	88.3
8:45 – 9:00	52	186	12.34	10.49	77.9	91.6	88.6
9:00 – 9:15	62	200	13.85	10.18	69.4	94.4	88.5
9:15 – 9:30	39	208	12.8	10.37	75.1	92.7	89.9
9:30 – 9:45	57	217	13.15	11.14	73.1	86.3	83.5
9:45 – 10:00	39	217	12.57	9.93	76.5	96.8	93.7

**Distance in between land marks (m) = 267
Total hourly vehicle (vph) = 1020
Heavy Vehicle % = 19.7
Measured speed (km/hr) = 88.8

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Ramp G

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	46	234	4.77	4.22	67.9	76.8	75.3
8:45 – 9:00	71	209	4.51	4.18	71.8	77.5	76.1
9:00 – 9:15	50	154	4.97	3.57	65.2	90.8	84.5
9:15 – 9:30	41	169	3.75	3.48	86.4	93.1	91.8
9:30 – 9:45	40	169	5.03	4.28	64.4	75.7	73.5
9:45 – 10:00	46	109	4.75	4.33	68.2	74.8	72.9

**Distance in between land marks (m) = 90
Total hourly vehicle (vph) = 892
Heavy Vehicle % = 22.0
Measured speed (km/hr) = 79.0

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Ramp H

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	17	111	5.92	4.68	60.8	76.9	74.8
8:45 – 9:00	27	92	6.05	4.87	59.5	73.9	70.7
9:00 – 9:15	10	83	5.32	4.83	67.7	74.5	73.8
9:15 – 9:30	14	103	4.82	4.57	74.7	78.8	78.3
9:30 – 9:45	28	73	5.72	5.15	62.9	69.9	68.0
9:45 – 10:00	16	83	5.66	4.37	63.6	82.4	79.3

**Distance in between land marks (m) = 100
Total hourly vehicle (vph) = 438
Heavy Vehicle % = 17.0
Measured speed (km/hr) = 74.1

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Mainline W/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	28	153	10.27	9.92	92.9	96.2	95.7
8:45 – 9:00	39	126	12.21	10.41	78.1	91.6	88.4
9:00 – 9:15	46	101	11.23	10.99	85.0	86.8	86.2
9:15 – 9:30	66	118	12.46	9.53	76.6	100.1	91.7
9:30 – 9:45	35	106	12.43	11.04	76.7	86.4	84.0
9:45 – 10:00	41	102	11.55	10.78	82.6	88.5	86.8

**Distance in between land marks (m) = 265
Total hourly vehicle (vph) = 641
Heavy Vehicle % = 26.5
Measured speed (km/hr) = 88.8

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Mainline E/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	60	259	11.23	9.92	80.5	91.1	89.1
8:45 – 9:00	74	236	13.13	10.37	68.8	87.1	82.8
9:00 – 9:15	62	183	11.85	9.88	76.3	91.5	87.6
9:15 – 9:30	61	187	12.41	10.33	72.8	87.5	83.9
9:30 – 9:45	64	178	11.85	9.79	76.3	92.3	88.1
9:45 – 10:00	67	167	10.26	10.76	88.1	84.0	85.1

**Distance in between land marks (m) = 251
Total hourly vehicle (vph) = 1065
Heavy Vehicle % = 24.3
Measured speed (km/hr) = 86.1

Appendix C
Noise Monitoring and Traffic Count Results

First Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): R8K Mainline W/B

Time (15 min each)	Traffic data [1]		Weighted Speed (km/h) [2]
	HV	LV	
8:30 – 8:45	11	42	95.7
8:45 – 9:00	12	34	88.4
9:00 – 9:15	36	18	86.2
9:15 – 9:30	52	15	91.7
9:30 – 9:45	7	33	84.0
9:45 – 10:00	25	19	86.8

Total hourly vehicle (vph) = 203
Heavy Vehicle % = 47.0
Measured speed (km/hr) = 88.8

[1] The traffic flow is derived from the differences in the traffic volumes between Ngong Shuen Chau Viaduct Mainline W/B and Ramp H.

[2] The weighted speed is taken to be the same as the speed along Ngong Shuen Chau Viaduct Mainline W/B.

Raw Data – Road (Name & Direction): R8K Mainline E/B

Time (15 min each)	Traffic data [1]		Weighted Speed (km/h) [2]
	HV	LV	
8:30 – 8:45	14	25	89.1
8:45 – 9:00	3	27	82.8
9:00 – 9:15	12	29	87.6
9:15 – 9:30	20	18	83.9
9:30 – 9:45	24	9	88.1
9:45 – 10:00	21	58	85.1

Total hourly vehicle (vph) = 173
Heavy Vehicle % = 36.2
Measured speed (km/hr) = 86.1

[1] The traffic flow is derived from the differences in the traffic volumes between Ngong Shuen Chau Viaduct Mainline E/B and Ramp G.

[2] The weighted speed is taken to be the same as the speed along Ngong Shuen Chau Viaduct Mainline E/B.

M3 (Mei Foo Sun Chuen, State 8, Block No. 112, Rooftop)

13rd January 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	67.1
	L_{90} dB(A)	65.2
	L_{eq} dB(A)	66.3
	L_{max} dB(A)	69.1
	L_{min} dB(A)	64.5
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.7
	L_{90} dB(A)	64.8
	L_{eq} dB(A)	65.9
	L_{max} dB(A)	68.7
	L_{min} dB(A)	64.0
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	66.8
	L_{90} dB(A)	64.8
	L_{eq} dB(A)	66.0
	L_{max} dB(A)	69.9
	L_{min} dB(A)	63.9

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Noise Monitoring (Summary)

Traffic Flow

For Location M1 & M2: - Fok Ying Tung Hall of Residence				
	Measured Value [1]		EIA prediction [2]	
Traffic Count Location	Total Flow (vph)	% of HV	Total Flow (vph)	% of HV
Tsing Yi Road – 1 (next to Mei King Playground)	236	24.3	296	70
Tsing Yi Road - 2 (near Tai Tung Industrial Building)	238	81.5	1,033	35
Ramp C	312	83.3	802	78
Ramp D	245	71.4	1,164	78
For Location M3: - Mei Foo Sun Chuen				
	Measured Value [1]		EIA prediction [3]	
Traffic Count Location	Total Flow (vph)	% of HV	Total Flow (vph)	% of HV
WKH S/B	2,079	27.4	3,708	45
WKH N/B	840	20.1	2,694	53
NSCV Ramp G	1,330	23.1	3,024	21
NSCV Ramp H	523	17.9	2,064	31
NSCV W/B	697	21.0	2,892	38
NSCV E/B	1,439	25.5	3,732	20
R8K W/B	175	30.5	816	50
R8K E/B	109	54.6	720	35

[1] The total traffic flow and % of heavy vehicles refer to the averaged traffic flow and averaged % of heavy vehicles for the whole monitoring period (i.e. 1.5 hours).
[2] The traffic forecast for Year 2021 in the Supplementary EIA Information on the Modified Scheme dated 28 January 2000 and Supplementary Information on Noise Barriers Review ar Ramp C/D in November 2008 has been adopted.
[3] The traffic forecast for Year 2021 in the approved EIA report for Route 9 between Tsing Yi and Cheung Sha Wan (ref: EIA-025/1999) has been adopted.

Traffic Speed Measurement

For Location M1 & M2: - Fok Ying Tung Hall of Residence		
Traffic Count Location	Measured Speed (km/hr) [1]	Traffic Speed (km/hr) [2]
Tsing Yi Road – 1 (next to Mei King Playground)	37.7	50
Tsing Yi Road - 2 (near Tai Tung Industrial Building)	47.1	50
Ramp C	39.1	50
Ramp D	38.0	50
For Location M3: - Mei Foo Sun Chuen		
Traffic Count Location	Measured Speed (km/hr) [1]	Traffic Speed (km/hr) [2]
WKH S/B	87.9	100
WKH N/B	88.1	100
NSCV Ramp G	81.1	80
NSCV Ramp H	79.2	80
NSCV W/B	95.4	80
NSCV E/B	92.4	80
R8K W/B	85.9	80
R8K E/B	88.4	80

[1] The measured speed is shown as weighted average of traffic speed (taking into account of % of heavy vehicles).
[2] For existing roads (e.g. Tsing Yi Road and West Kowloon Highway), the traffic speeds are the existing speed limits imposed by the Transport Department. For new roads (i.e. Ramp C/D, Ngong Shuen Chau Viaduct), the traffic speeds refer to the design road speed limits of the concerned roads.

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M1
Monitoring location address	1/F, Fok Ying Tung Hall of Residence
Date of Monitoring	26-Aug-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^oC)	28
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562752	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): Tsing Yi Road – 1 (next to Mei King Playground)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	15	34	3.61	3.42	34.9	36.8	36.2
8:40 – 8:55	14	35	3.59	3.38	35.1	37.3	36.7
8:55 – 9:10	10	50	3.89	3.23	32.4	39.0	37.9
9:10 – 9:25	11	54	3.75	3.32	33.6	38.0	37.2
9:25 – 9:40	19	41	3.66	2.95	34.4	42.7	40.1
9:40 – 9:55	17	54	3.51	3.26	35.9	38.7	38.0

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 236
Heavy Vehicle % = 24.3
Measured speed (km/hr) = 37.7

Raw Data – Road (Name & Direction): Tsing Yi Road – 2 (near Tai Tung Industrial Building) .

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	45	9	2.57	2.67	49.0	47.2	48.7
8:40 – 8:55	48	10	2.77	2.45	45.5	51.4	46.5
8:55 – 9:10	61	9	2.96	2.86	42.6	44.1	42.8
9:10 – 9:25	56	11	2.68	2.38	47.0	52.9	48.0
9:25 – 9:40	39	17	2.75	2.47	45.8	51.0	47.4
9:40 – 9:55	42	10	2.65	2.30	47.5	54.8	48.9

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 238
Heavy Vehicle % = 81.5
Measured speed (km/hr) = 47.1

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ramp C

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	60	11	3.23	3.14	39.0	40.1	39.2
8:40 – 8:55	56	8	3.38	2.61	37.3	48.3	38.7
8:55 – 9:10	80	14	3.60	2.77	35.0	45.5	36.6
9:10 – 9:25	65	17	3.53	3.08	35.7	40.9	36.8
9:25 – 9:40	71	20	2.87	2.49	43.9	50.6	45.4
9:40 – 9:55	58	8	3.34	3.03	37.7	41.6	38.2

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 312
Heavy Vehicle % = 83.3
Measured speed (km/hr) = 39.1

Raw Data – Road (Name & Direction): Ramp D

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	54	15	3.50	3.28	36.0	38.4	36.5
8:40 – 8:55	47	23	3.57	3.37	35.3	37.4	36.0
8:55 – 9:10	39	24	3.47	3.26	36.3	38.7	37.2
9:10 – 9:25	37	14	3.62	3.02	34.8	41.7	36.7
9:25 – 9:40	45	17	3.17	2.68	39.7	47.0	41.7
9:40 – 9:55	40	12	3.30	2.78	38.2	45.3	39.8

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 245
Heavy Vehicle % = 71.4
Measured speed (km/hr) = 38.0

M1 (1/F, Fok Ying Tung Hall of Residence)

26th August 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:25	L_{10} dB(A)	64.7
	L_{90} dB(A)	61.8
	L_{eq} dB(A)	63.6
	L_{max} dB(A)	71.9
	L_{min} dB(A)	60.9
Measurement Results (2nd 30 mins) Start at 08:55	L_{10} dB(A)	64.7
	L_{90} dB(A)	60.7
	L_{eq} dB(A)	63.2
	L_{max} dB(A)	73.2
	L_{min} dB(A)	59.8
Measurement Results (3rd 30 mins) Start at 09:25	L_{10} dB(A)	64.3
	L_{90} dB(A)	60.4
	L_{eq} dB(A)	62.6
	L_{max} dB(A)	70.7
	L_{min} dB(A)	59.5

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M2
Monitoring location address	3/F, Fok Ying Tung Hall of Residence
Date of Monitoring	26-Aug-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^oC)	28
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	SVAN 957	15369	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): Tsing Yi Road – 1 (next to Mei King Playground)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	15	34	3.61	3.42	34.9	36.8	36.2
8:40 – 8:55	14	35	3.59	3.38	35.1	37.3	36.7
8:55 – 9:10	10	50	3.89	3.23	32.4	39.0	37.9
9:10 – 9:25	11	54	3.75	3.32	33.6	38.0	37.2
9:25 – 9:40	19	41	3.66	2.95	34.4	42.7	40.1
9:40 – 9:55	17	54	3.51	3.26	35.9	38.7	38.0

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 236
Heavy Vehicle % = 24.3
Measured speed (km/hr) = 37.7

Raw Data – Road (Name & Direction): Tsing Yi Road – 2 (near Tai Tung Industrial Building)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	45	9	2.57	2.67	49.0	47.2	48.7
8:40 – 8:55	48	10	2.77	2.45	45.5	51.4	46.5
8:55 – 9:10	61	9	2.96	2.86	42.6	44.1	42.8
9:10 – 9:25	56	11	2.68	2.38	47.0	52.9	48.0
9:25 – 9:40	39	17	2.75	2.47	45.8	51.0	47.4
9:40 – 9:55	42	10	2.65	2.30	47.5	54.8	48.9

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 238
Heavy Vehicle % = 81.5
Measured speed (km/hr) = 47.1

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ramp C

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted
	HV	LV	HV	LV	HV	LV	Speed (km/h)
8:25 – 8:40	60	11	3.23	3.14	39.0	40.1	39.2
8:40 – 8:55	56	8	3.38	2.61	37.3	48.3	38.7
8:55 – 9:10	80	14	3.60	2.77	35.0	45.5	36.6
9:10 – 9:25	65	17	3.53	3.08	35.7	40.9	36.8
9:25 – 9:40	71	20	2.87	2.49	43.9	50.6	45.4
9:40 – 9:55	58	8	3.34	3.03	37.7	41.6	38.2

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 312
Heavy Vehicle % = 83.3
Measured speed (km/hr) = 39.1

Raw Data – Road (Name & Direction): Ramp D

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted
	HV	LV	HV	LV	HV	LV	Speed (km/h)
8:25 – 8:40	54	15	3.50	3.28	36.0	38.4	36.5
8:40 – 8:55	47	23	3.57	3.37	35.3	37.4	36.0
8:55 – 9:10	39	24	3.47	3.26	36.3	38.7	37.2
9:10 – 9:25	37	14	3.62	3.02	34.8	41.7	36.7
9:25 – 9:40	45	17	3.17	2.68	39.7	47.0	41.7
9:40 – 9:55	40	12	3.30	2.78	38.2	45.3	39.8

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 245
Heavy Vehicle % = 71.4
Measured speed (km/hr) = 38.0

M2 (3/F, Fok Ying Tung Hall of Residence)

26th August 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:25	L_{10} dB(A)	67.8
	L_{90} dB(A)	64.5
	L_{eq} dB(A)	66.4
	L_{max} dB(A)	73.4
	L_{min} dB(A)	63.3
Measurement Results (2nd 30 mins) Start at 08:55	L_{10} dB(A)	67.5
	L_{90} dB(A)	63.4
	L_{eq} dB(A)	66.0
	L_{max} dB(A)	75.3
	L_{min} dB(A)	62.3
Measurement Results (3rd 30 mins) Start at 09:25	L_{10} dB(A)	67.5
	L_{90} dB(A)	63.1
	L_{eq} dB(A)	65.7
	L_{max} dB(A)	72.4
	L_{min} dB(A)	62.8

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M3
Monitoring location address	Mei Foo Sun Chuen, State 8, Block No. 112, Rooftop
Date of Monitoring	18-Aug-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^{o}C)	27
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562752	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): West Kowloon Highway S/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	176	356	12.95	10.21	74.2	94.1	87.6
8:45 – 9:00	142	410	12.62	10.68	76.2	90.0	86.4
9:00 – 9:15	172	455	13.23	10.50	72.7	91.5	86.4
9:15 – 9:30	95	328	13.78	10.01	69.8	96.0	90.1
9:30 – 9:45	136	385	12.56	10.06	76.5	95.5	90.6
9:45 – 10:00	134	329	13.30	10.46	72.3	91.9	86.2

**Distance in between land marks (m) = 267
Total hourly vehicle (vph) = 2079
Heavy Vehicle % = 27.4
Measured speed (km/hr) = 87.9

Raw Data – Road (Name & Direction): West Kowloon Highway N/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	26	134	13.19	10.23	72.9	94.0	90.5
8:45 – 9:00	34	156	12.97	10.52	74.1	91.4	88.3
9:00 – 9:15	54	173	13.45	10.54	71.5	91.2	86.5
9:15 – 9:30	38	163	12.62	10.69	76.2	89.9	87.3
9:30 – 9:45	60	194	13.27	10.10	72.4	95.2	89.8
9:45 – 10:00	41	187	12.89	10.82	74.6	88.8	86.3

**Distance in between land marks (m) = 267
Total hourly vehicle (vph) = 840
Heavy Vehicle % = 20.1
Measured speed (km/hr) = 88.1

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Ramp G

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	100	295	4.16	3.81	77.9	85.0	83.2
8:45 – 9:00	122	284	4.41	4.08	73.5	79.4	77.6
9:00 – 9:15	72	281	4.30	3.78	75.3	85.7	83.6
9:15 – 9:30	72	263	4.27	4.00	75.9	81.0	79.9
9:30 – 9:45	47	235	4.24	3.85	76.4	84.2	82.9
9:45 – 10:00	48	176	4.26	4.04	76.1	80.2	79.3

**Distance in between land marks (m) = 90
Total hourly vehicle (vph) = 1330
Heavy Vehicle % = 23.1
Measured speed (km/hr) = 81.1

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Ramp H

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	25	135	4.95	4.66	72.7	77.3	76.5
8:45 – 9:00	26	105	4.94	4.35	72.9	82.8	80.8
9:00 – 9:15	14	115	5.24	4.36	68.7	82.6	81.1
9:15 – 9:30	28	95	5.11	4.29	70.5	83.9	80.9
9:30 – 9:45	21	93	4.98	4.44	72.3	81.1	79.5
9:45 – 10:00	26	101	5.04	4.61	71.4	78.1	76.7

**Distance in between land marks (m) = 100
Total hourly vehicle (vph) = 523
Heavy Vehicle % = 17.9
Measured speed (km/hr) = 79.2

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Mainline W/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	36	177	10.92	9.76	87.4	97.7	96.0
8:45 – 9:00	41	141	10.79	9.62	88.4	99.2	96.7
9:00 – 9:15	19	149	11.11	9.91	85.9	96.3	95.1
9:15 – 9:30	48	119	10.54	9.85	90.5	96.9	95.0
9:30 – 9:45	38	121	10.52	9.89	90.7	96.5	95.1
9:45 – 10:00	38	119	10.42	9.96	91.6	95.8	94.8

**Distance in between land marks (m) = 265
Total hourly vehicle (vph) = 697
Heavy Vehicle % = 21.0
Measured speed (km/hr) = 95.4

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Mainline E/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	113	302	11.35	9.36	79.6	96.5	91.9
8:45 – 9:00	133	297	10.52	9.24	85.9	97.8	94.1
9:00 – 9:15	95	296	10.51	8.92	86.0	101.3	97.6
9:15 – 9:30	88	280	10.24	9.61	88.2	94.0	92.6
9:30 – 9:45	62	244	11.96	9.98	75.6	90.5	87.5
9:45 – 10:00	59	189	11.43	9.56	79.1	94.5	90.8

**Distance in between land marks (m) = 251
Total hourly vehicle (vph) = 1439
Heavy Vehicle % = 25.5
Measured speed (km/hr) = 92.4

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): R8K Mainline W/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	11	42	11.18	9.78	80.8	92.4	90.0
8:45 – 9:00	15	36	11.30	9.87	80.0	91.6	88.1
9:00 – 9:15	5	34	12.10	10.38	74.7	87.1	85.5
9:15 – 9:30	20	24	11.43	10.17	79.1	88.8	84.4
9:30 – 9:45	17	28	11.30	10.13	80.0	89.2	85.7
9:45 – 10:00	12	18	11.52	10.76	78.4	84.0	81.8

**Distance in between land marks (m) = 265
Total hourly vehicle (vph) = 175
Heavy Vehicle % = 30.5
Measured speed (km/hr) = 85.9

Raw Data – Road (Name & Direction): R8K Mainline E/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	13	7	10.90	9.29	82.9	97.3	87.9
8:45 – 9:00	11	13	10.83	9.44	83.4	95.7	90.1
9:00 – 9:15	23	15	10.65	9.45	84.8	95.6	89.1
9:15 – 9:30	16	17	10.50	9.60	86.1	94.1	90.2
9:30 – 9:45	15	9	11.07	9.56	81.6	94.5	86.5
9:45 – 10:00	11	13	11.13	9.88	81.2	91.5	86.7

**Distance in between land marks (m) = 251
Total hourly vehicle (vph) = 109
Heavy Vehicle % = 54.6
Measured speed (km/hr) = 88.4

M3 (Mei Foo Sun Chuen, State 8, Block No. 112, Rooftop)

18th August 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	66.7
	L_{90} dB(A)	64.6
	L_{eq} dB(A)	65.8
	L_{max} dB(A)	69.0
	L_{min} dB(A)	63.8
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.4
	L_{90} dB(A)	64.4
	L_{eq} dB(A)	65.6
	L_{max} dB(A)	68.9
	L_{min} dB(A)	63.7
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	66.6
	L_{90} dB(A)	64.6
	L_{eq} dB(A)	65.7
	L_{max} dB(A)	69.2
	L_{min} dB(A)	63.7

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix D

Summary of Noise Level Breakdown

Appendix D
Summary of Noise Level Breakdown

Correction Factor for Traffic Flow Projection and Comparison of Predicted Noise Level and Projected Noise Level (First Operational Noise Monitoring)

Monitoring Station	Traffic Count Location				Noise Level, L_{10} dB(A)						
			Distance (m)	Angle of View (Degree)	1st Operational Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A)	EIA Predicted Noise Level in Year 2021, dB(A)	EIA Predicted Noise Level (existing road / R8T) in Year 2021, dB(A)	Correction Factor	Current Traffic Condition Projected Noise Level (existing road / R8T), dB(A)	Current Traffic Condition Projected Noise Level (Total impact), dB(A)	EIA Predicted Noise Level (Total impact), dB(A)
M1	Existing Roads	Tsing Yi Road – 1 (next to Mei King Playground)	157	19	66	61	53.2	4.5	48.7	62	68
		Tsing Yi Road - 2 (near Tai Tung Industrial Building)	311	95			60.2	3.3	56.9		
	R8 (Tsing Yi)	Ramp C	55	148		67	62.6	5.2	57.4		
		Ramp D	45	148			65.1	7.2	57.9		
M2	Existing Roads	Tsing Yi Road – 1 (next to Mei King Playground)	157	30	68	62	55.7	4.5	51.2	65	70
		Tsing Yi Road - 2 (near Tai Tung Industrial Building)	311	98			60.8	3.3	57.5		
	R8 (Tsing Yi)	Ramp C	56	148		70	65.6	5.2	60.4		
		Ramp D	46	148			68.1	7.2	60.9		
M3	Existing Roads	WKH S/B	192	175	67	72	69.6	4.1	65.5	67	73
		WKH N/B	211	175			68.3	7.7	60.6		
	R8 (Tsing Yi)	NSCV Ramp G	397	34		61	50.8	5.3	45.5		
		NSCV Ramp H	429	31			49.4	8.7	40.7		
		NSCV W/B	392	40			53.0	7.0	46.0		
		NSCV E/B	366	62			54.6	4.5	50.1		
		R8K W/B	315	157			55.3	5.7	49.6		
		R8K E/B	268	136			53.7	5.7	48.0		

Appendix D
Summary of Noise Level Breakdown

Correction Factor for Traffic Flow Projection and Comparison of Predicted Noise Level and Projected Noise Level (Second Operational Noise Monitoring)

Monitoring Station	Traffic Count Location				Noise Level, L_{10} dB(A)						
			Distance (m)	Angle of View (Degree)	2nd Operational Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A)	EIA Predicted Noise Level in Year 2021, dB(A)	EIA Predicted Noise Level (existing road / R8T) in Year 2021, dB(A)	Correction Factor	Current Traffic Condition Projected Noise Level (existing road / R8T), dB(A)	Current Traffic Condition Projected Noise Level (Total impact), dB(A)	EIA Predicted Noise Level (Total impact), dB(A)
M1	Existing Roads	Tsing Yi Road – 1 (next to Mei King Playground)	157	19	65	61	53.2	5.1	48.1	63	68
		Tsing Yi Road - 2 (near Tai Tung Industrial Building)	311	95			60.2	3.4	56.8		
	R8 (Tsing Yi)	Ramp C	55	148		67	62.6	4.1	58.5		
		Ramp D	45	148			65.1	7.4	57.7		
M2	Existing Roads	Tsing Yi Road – 1 (next to Mei King Playground)	157	30	68	62	55.7	5.1	50.6	65	70
		Tsing Yi Road - 2 (near Tai Tung Industrial Building)	311	98			60.8	3.4	57.4		
	R8 (Tsing Yi)	Ramp C	56	148		70	65.6	4.1	61.5		
		Ramp D	46	148			68.1	7.4	60.7		
M3	Existing Roads	WKH S/B	192	175	67	72	69.6	4.7	64.9	67	73
		WKH N/B	211	175			68.3	8.5	59.8		
	R8 (Tsing Yi)	NSCV Ramp G	397	34		61	50.8	3.2	47.6		
		NSCV Ramp H	429	31			49.4	7.4	42.0		
		NSCV W/B	392	40			53.0	6.7	46.3		
		NSCV E/B	366	62			54.6	2.6	52.0		
		R8K W/B	315	157			55.3	7.8	47.5		
		R8K E/B	268	136			53.7	6.3	47.4		

Highways Department

Agreement CE72/98 – Route 8 between Tsing Yi and Cheung Sha Wan – Design and Construction

Operational Noise Monitoring Programme – 2nd Operational Noise Monitoring

October 2010

Ove Arup & Partners Hong Kong Ltd
Level 5, Festival Walk, 80 Tat Chee Avenue, Kowloon Tong, Kowloon, Hong Kong
Tel +852 2528 3031 Fax +852 2268 3954
www.arup.com

Job number 23192

Contents

Tables

Figures

Appendices

1 INTRODUCTION

1.1 Background

An Environmental Permit (EP-085/2000/E) was granted to Highways Department by the Environmental Protection Department (EPD) for the construction and operation of Route 8 Project between Tsing Yi and Cheung Sha Wan (R8T). The R8T project comprises of four civil contracts, namely Phase 1 – Ngong Shuen Chau Viaduct, Phase 2a – Nam Wan Tunnel and West Tsing Yi Viaduct, Phase 2b – East Tsing Yi Viaduct and Phase 3 – Stonecutters Bridge.

The three civil contracts of Phase 1, Phase 2a and Phase 2b were substantially completed on 21st August 2007, 7th November 2007 and 23rd October 2008 respectively. While the last civil Contract, i.e. Phase 3, was completed on 12nd November 2009, the entire R8T was fully operational from 20th December 2009.

In accordance with the Environmental Impact Assessment (EIA) Report for Route 9 between Tsing Yi and Cheung Sha Wan (ref: EIA-025/1999) (the EIA Report) and Section 9.1.2 of the Environmental Monitoring and Audit (EM&A) Manual, operational noise monitoring is required during the first year operation of the R8T.

1.2 Operational Noise Monitoring Programme (ONMP)

In accordance with Condition 5.1 of the Environmental Permit (EP) of the R8T project, a monitoring plan for the Operational Noise Monitoring Programme (ONMP) was deposited to EPD on 11th September 2009. A baseline monitoring to be conducted upon completion of construction works and before the full operation of R8T as well as 2 operational traffic noise monitoring to be conducted within first year after the commencement of the road operation were proposed. EPD subsequently responded with no adverse comment in their reply letter, ref. (4) in Ax (1) to EP2/N3/A/28 Pt.47, dated 14th October 2009.

The baseline and first operational traffic noise monitoring were conducted in November/December 2009 and January 2010 respectively. The First Operational Noise Monitoring Report summarized all findings and conclusion was compiled and submitted to EPD in July 2010 with a verification of IEC. The second operational traffic noise monitoring has been conducted in August 2010. This report presents the second operational noise monitoring details and results as well as a comparison between the actual noise levels and the predicted levels based on the EIA Report (ref: EIA-025/1999) and Supplementary EIA Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999) in order to assess the accuracy of traffic noise predictions.

2 TRAFFIC NOISE MONITORING

2.1 Monitoring Requirements

Baseline and operational noise monitoring in A-weighted $L_{10\ (peak\ hour)}$ are required to be conducted at the selected sensitive receiver locations. At the same time, traffic flow and heavy vehicle percentage counts would be conducted for R8T. These measurements were carried out upon completion of construction work but prior to the road opening for baseline monitoring and would be conducted twice during the first year of operation.

2.2 Monitoring Locations

Figures 2.1 and **2.2** show the selected monitoring locations including HK Institute of Vocational Education-Tsing Yi - Fok Ying Tung Hall of Residence (i.e. M1 and M2) and Mei Foo Sun Chuen (i.e. M3). **Table 2.1** summarises the noise prediction results at these monitoring locations based on the mitigated scenario of the approved EIA Report and Supplementary EIA Information on Noise Barriers Review at Ramp C/D.

Table 2.1: Details of traffic noise monitoring locations and EIA/VEP noise prediction results

Location I.D.	Location	Floor	Predicted Noise Level, L_{10} dB(A)			Noise Standard L_{10} (peak hour)
			Existing Roads	R8 Tsing Yi	All Roads	
M1	HK Institute of Vocational Education-Tsing Yi - Fok Ying Tung Hall of Residence [1]	1/F	61	67	68	70 dB(A)
M2		3/F	62	70	70	
M3	Mei Foo Sun Chuen [2]	R/F	72	61	73[3]	

[1] Based on Supplementary EIA Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999) for Year 2021.

[2] Based on the approved EIA Report (ref: EIA-025/1999) for Year 2021.

[3] Based on the approved EIA Report (ref: EIA-025/1999), the major traffic noise contribution is from existing roads such as Route 3 and West Kowloon Highway.

2.3 Monitoring Parameters, Data and Duration

In accordance with Section 2.4 of the ONMP, the noise measurement would be carried out during the AM peak traffic hours on normal weekdays as referring to the latest Annual Traffic Census. The measurements would be made in terms of A-weighted L_{10} noise levels over three 30-minute periods during the AM peak traffic hours. Noise level in A-weighted $L_{10\ (30\ minutes)}$ at the monitoring locations was therefore measured for the second operational traffic noise monitoring while the baseline monitoring results measured immediately before the opening of R8T would be used. Relevant information including the monitoring dates and time are summarized in **Table 2.2**.

Table 2.2: Noise monitoring schedule

Noise Monitoring Type	Data	Monitoring Locations	Duration
Baseline Monitoring [1]	25th November 2009	M1 and M2	08:30-10:00
	11th December 2009	M3	08:30-10:00
Second Operational Monitoring [2]	26th August 2010	M1 and M2	08:25-09:55
	18th August 2010	M3	08:30-10:00

[1] Noise monitoring was conducted immediately before the opening of R8T.

[2] The second operational noise monitoring was postponed to mid August 2010 due to the breakdown of noise monitoring equipment and inclement weather conditions.

2.4 Monitoring Equipment

An integrated Sound Level Meter and a sound and vibration analyzer were used for the noise monitoring. The sound level meter / sound and vibration analyzer used comply with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications. An acoustical calibrator in compliance with IEC 942:1988 (Type 1) was used to calibrate the sound level meter before and after each set of measurements to confirm the data drift was less than 1 dB(A). The instrumentation used for the noise monitoring is given in **Table 2.3** and the calibration certificates of these equipments are attached in **Appendix A**.

Table 2.3: Instrumentation for noise monitoring

Instruments	Description	Serial Number	Monitoring
Integrating Sound Level Meter	B&K 2238	2562752	Baseline and 2nd Operational
Integrating Sound Level Meter	B&K 2238	2562757	Baseline
Sound and Vibration Analyser	SVAN957	15369	2nd Operational
Calibrator	B&K 4231	2605971	Baseline
Calibrator	Pulsar Model 100B	035213	2nd Operational

2.5 Monitoring Methodology and QA/QC Procedures

2.5.1 Noise Monitoring Methodology and QA/QC Procedures

The noise monitoring methodology and QA/QC procedures are listed as follows:

i. The Sound Level Meter/ Sound and Vibration Analyser was mounted and set on a tripod.

ii. The noise measurement point was at a point 1m from the exterior of the sensitive receivers building façade facing the bridge alignment.

iii. The battery condition was checked to ensure the correct functioning of the meter.

iv. Parameters such as frequency weighting, time weighting and measurement time were set as follows:

- frequency weighting : A
- time weighting : Fast
- time measurement : 30 minutes

v. Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.

vi. The wind speed was frequently checked with a portable wind meter.

vii. At the end of the monitoring period, the L_{10}, L_{90}, L_{eq}, L_{max} and L_{min} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.

viii. Noise measurement was paused during periods of high intrusive noise if possible and observation was recorded when intrusive noise could not be avoided.

ix. Noise monitoring was conducted without the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

2.5.2 Traffic Counts

During the noise measurement, traffic counts with percentage heavy vehicles (vehicles over 1,525kg unladen weight) were conducted for the far-side and near-side of each bound of the road carriageways and the nearby existing road network. The average vehicle speed for each bound of the roads was measured and recorded. Particular landmarks, e.g. lamp-post, are pre-selected for the purpose of assessing the vehicle speed. The distance in between land marks was determined at the start of the traffic count. During the traffic count, time required for vehicles traveling through the landmarks was recorded. The average of the vehicle speed was obtained. 10% of measured traffic flow or at least 15 nos. of vehicles (the highest one) were randomly selected for the calculation of traveling time during each 15-minute period for each type of vehicles (heavy vehicles and light vehicles). The

weighted average of traffic speed (taking into account of % of heavy vehicles) was calculated and adopted for the noise analysis work in the following section.

2.6 Methodology of Noise Level Comparison

2.6.1 Data Interpretation

Based on the on-site observations and the EIA/VEP Report, the major road traffic noise sources in the vicinity of the selected monitoring locations include nearby existing and new roads. Traffic counts of the roads were therefore conducted. **Table 2.4** summarises the existing and new roads in the vicinity of each monitoring location. **Figures 2.1** and **2.2** show the locations.

Table 2.4: Major road traffic noise sources

Monitoring Locations	Major Road Traffic Noise Sources	
	Existing Roads	New Roads
M1	• Tsing Yi Road – 1 (next to Mei King Playground); and • Tsing Yi Road - 2 (near Tai Tung Industrial Building)	• Ramp C and Ramp D
M2		
M3	• West Kowloon Highway (WKH) S/B; and • WKH N/B	• Ngong Shuen Chau Viaduct (NSCV) W/B; • NSCV E/B; • Ramp G and Ramp H; and • R8K Mainline

In accordance with the approved EIA Report (ref: EIA-025/1999) and Supplementary Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999), only the noise level breakdown of 'existing road' and 'new road (Route 8)' was provided. Therefore, a more practical approach is adopted for noise analysis. The methodology used for the noise level breakdown is summarised in **Appendix B**.

2.6.2 Noise Level Comparison

According to Section 3.3 of the ONMP, $L_{10\ (1\ hour)}$ at the selected monitoring locations in Year 2021 should be predicted based on the surveyed traffic counts, percentage of heavy vehicles and vehicle speed. The measured noise levels would be corrected based on the difference between the current traffic flow and the EIA predicted traffic flow. The corrected noise levels would then be compared with the predicted noise levels in the approved EIA Report (ref: EIA-025/1999) and Supplementary Information on Noise Barriers Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999).

However, since the noise contributions from the new roads at current traffic condition are insignificant to the existing noise environment (refer to Section 3.3 below for details), the above-mentioned approach of comparison is found to be inappropriate in this situation. An alternative approach is therefore adopted and the details are described in Section 4 of this report.

3 NOISE MONITORING RESULTS AND OBSERVATIONS

3.1 Baseline Noise Monitoring

Baseline noise measurement was carried out at the selected sensitive receivers including Fok Ying Tung Hall of Residence and Mei Foo Sun Chuen on 25th November and 11th December 2009 respectively. No intrusive noise was recorded during the noise monitoring. Details of the measured noise levels are presented in **Appendix C** and a summary of the results is given in **Table 3.1**.

Table 3.1: Baseline noise monitoring results

Monitoring Locations	Measured Noise Level, L_{10} dB(A) [1]			Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [2]
	1st 30 mins	2nd 30 mins	3rd 30 mins	
M1	65	65	65	65
M2	66	66	66	66
M3	66	67	68	66

[1] Presented in integers.

[2] The measured noise data for the first 60 minutes were selected to represent the $L_{10\ (1\ hour)}$ dB(A).

3.2 Second Operational Noise Monitoring

Second operational noise monitoring was conducted at the selected sensitive receivers, Mei Foo Sun Chuen (M3) and Fok Ying Tung Hall of Residence (M1 and M2) on 18th August and 26th August 2010 respectively. No intrusive noise was recorded during the noise monitoring. The detailed noise monitoring results are presented in **Appendix C** and a summary of the measured noise results is given in **Table 3.2**.

Table 3.2: Second operational noise monitoring results

Monitoring Locations	Measured Noise Level, L_{10} dB(A) [1]			Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [2]
	1st 30 mins	2nd 30 mins	3rd 30 mins	
M1	65	65	64	65
M2	68	68	68	68
M3	67	66	67	67

[1] Presented in integers.

[2] The measured noise data for the first 60 minutes were selected to represent the $L_{10\ (1\ hour)}$ dB(A).

Concurrent traffic counts with percentage heavy vehicles and traffic speed were also carried out for the road segments which were selected based on the EIA/VEP prediction. The locations of road segments for traffic counts are shown in **Figures 2.1** and **2.2**. The measured traffic flow and average speed are summarised in **Appendix C**.

3.3 Comparison of Baseline and Second Operational Noise Monitoring Results

The measured noise levels ($L_{10\ (1\ hour)}$ dB(A)) at the three monitoring locations during the baseline and second operational noise measurement were in the range of 65 to 66 dB(A) and 65 to 68 dB(A) respectively as summarized in **Table 3.3** and they were found to be within the noise standard of 70 dB(A).

Table 3.3: Comparison of baseline and second operational noise measurement results

Monitoring Locations	Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A) [1]	
	Baseline Measurement	2nd Operational Measurement
M1	65	65
M2	66	68
M3	66	67

[1] Presented in integers.

The differences between the baseline noise levels and the second operational noise levels at M1, M2 and M3 were 0.3 dB(A), 1.6 dB(A) and 0.2 dB(A) respectively. This suggests that the traffic noise from the road is not a dominant source of the noise environment.

4 COMPARSION OF MEASURED AND PROJECTED NOISE LEVELS

4.1 Methodology

It can be seen from **Table 3.3** that the noise levels in terms of $L_{10\ (1\ hour)}$ measured during the baseline noise monitoring were very close to those measured in the second operational noise measurement at the respective sensitive receivers, it suggests that the noise contribution from the new roads (R8T) for current traffic condition is not a dominant source of the noise environment. In addition, based on the site observations during the noise monitoring, the background noise levels at M1 and M2 were found to be dominated by the operation of container terminals. Given the dominance of background noise from other sources, a more practical approach is therefore adopted for noise estimation and comparison of the monitoring and prediction results. The measured operational noise levels at the designated locations are compared with the projected noise levels (sum of the contribution of existing and new roads) based on the EIA/VEP Report for the current traffic condition. In case discrepancies are observed, the measured and projected noise levels are reviewed and explanation is given to justify the discrepancies. Details are given in Section 4.2 below.

4.2 Results Interpretation

The individual noise level contributions of major existing roads and new roads for Year 2021 are estimated based on the equations as shown in **Appendix B**. The individual noise levels for both existing and new roads are then corrected with the current traffic volume, percentage of heavy vehicles and traffic speed by applying the equations. The results of determination and prediction of individual noise levels are presented in **Appendix D**. The comparison of the projected traffic noise levels (sum of the contribution of existing and new roads) for the current traffic condition and the measured noise levels are summarized in **Table 4.1**.

Table 4.1: Comparison of the projected noise levels and measured noise levels

Monitoring Locations	EIA/VEP Predicted Noise Level in Year 2021[1], dB(A)	Projected Noise Level for Current Traffic Condition [2], dB(A)	Second Operational Measured Noise Level, dB(A) [3]
M1	68	63	65
M2	70	65	68
M3	73	67	67

[1] Predicted Noise Levels for Year 2021 for roads were based on the EIA Report (ref: .EIA-025/1999) and the Supplementary Information on Noise Barrier Review at Ramp C/D in November 2008 (ref: AEIAR-018/1999).

[2] Projected noise levels for current traffic condition are calculated in accordance with CRTN methods and the results are summarized in **Appendix D**.

[3] The second operational measured noise levels in **Table 3.3** were rounded off for comparison with the prediction.

The measured noise levels at Fok Ying Tung Hall of Residence (M1 and M2) were found higher than the projected noise levels which were calculated based on the traffic count results in the second operational noise monitoring. As the locations of M1 and M2 are close to the container terminals, the measured noise levels were mainly affected by the background noise from the operation of the container terminals. Site observation also indicated that the background noise level was dominated by the operation of container

terminals. Therefore, given the influence by the operation of container terminals, the projected noise levels at M1 and M2 were lower than the measured values.

For the monitoring station at Mei Foo Sun Chuen (M3), the projected noise level for current traffic condition was found to be the same as the measured result during the second operational noise measurement in 2010. This suggests that the traffic noise prediction in the approved EIA Report (ref: EIA-025/1999) should be reasonably close to the measured noise level.

5 CONCLUSION

The second operational noise monitoring at the selected sensitive receivers, Fok Ying Tung Hall of Residence (M1 and M2) and Mei Foo Sun Chuen (M3) was conducted on 26th August and 18th August 2010 respectively while the baseline noise measurement obtained from the baseline noise monitoring event was used. The traffic conditions, including traffic flow, percentage of heavy and light vehicles as well as traffic speeds were recorded.

All the measured $L_{10\ (1\ hour)}$ levels at the monitoring station were below the noise standard of 70 dB(A). The measured noise levels at Fok Ying Tung Hall of Residence (M1 and M2) were found higher than the projected noise levels for current traffic condition. The background noise level at Fok Ying Tung Hall of Residence was however dominated and affected by the operation of container terminals due to close proximity. At Mei Foo Sun Chuen (M3), the projected noise level for current traffic condition was found to be the same as the measured.

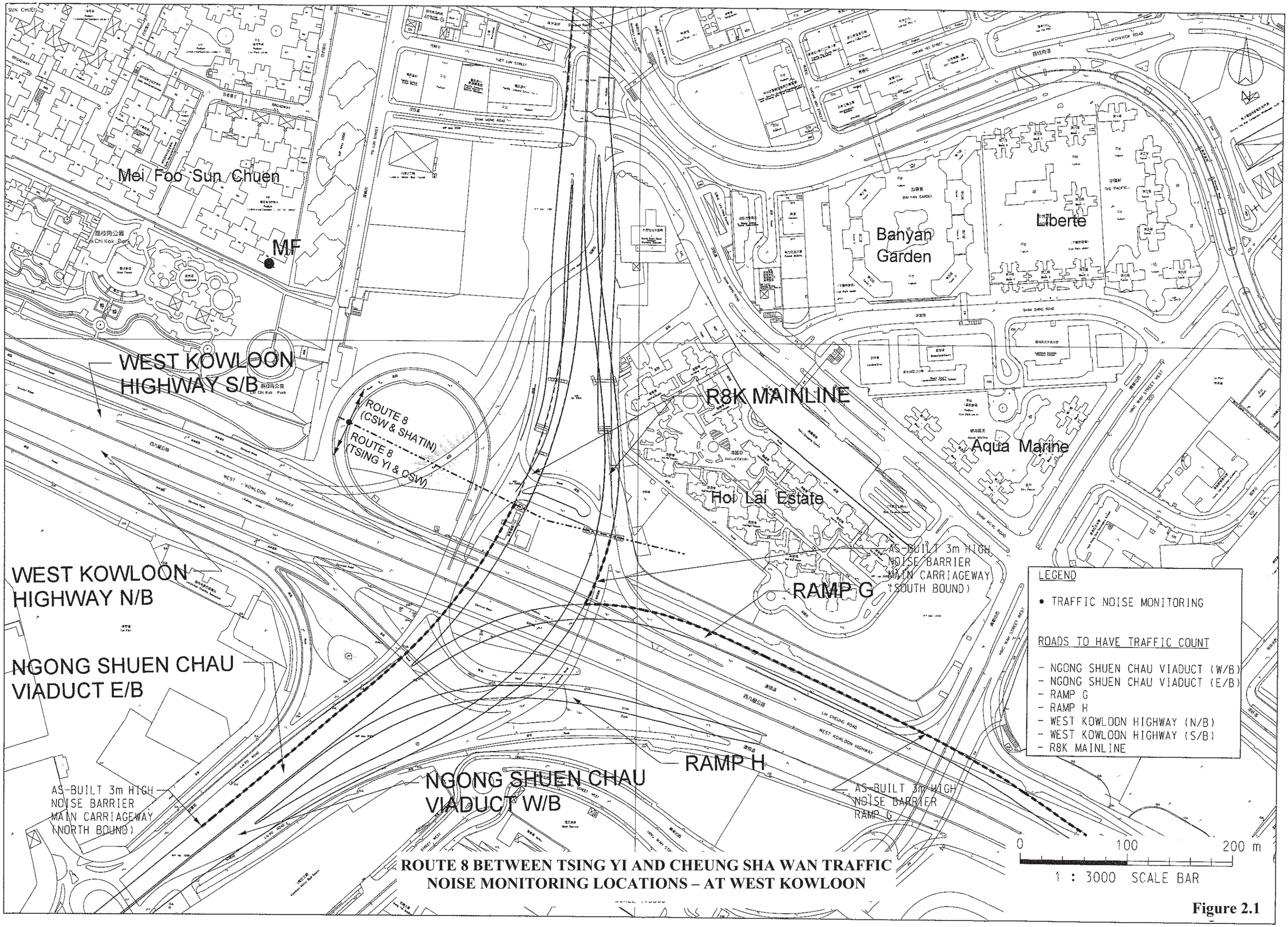
6 REFERENCE

[1] Route 9 between Tsing Yi and Cheung Sha Wan - Final Environmental Impact Assessment Report (EIA-025/1999), Atkins China Ltd., August 1999.

[2] Route 9 between Tsing Yi and Cheung Sha Wan – Supplementary EIA Information on the Modified Scheme, Ove Arup & Partners Hong Kong Limited, January 2000.

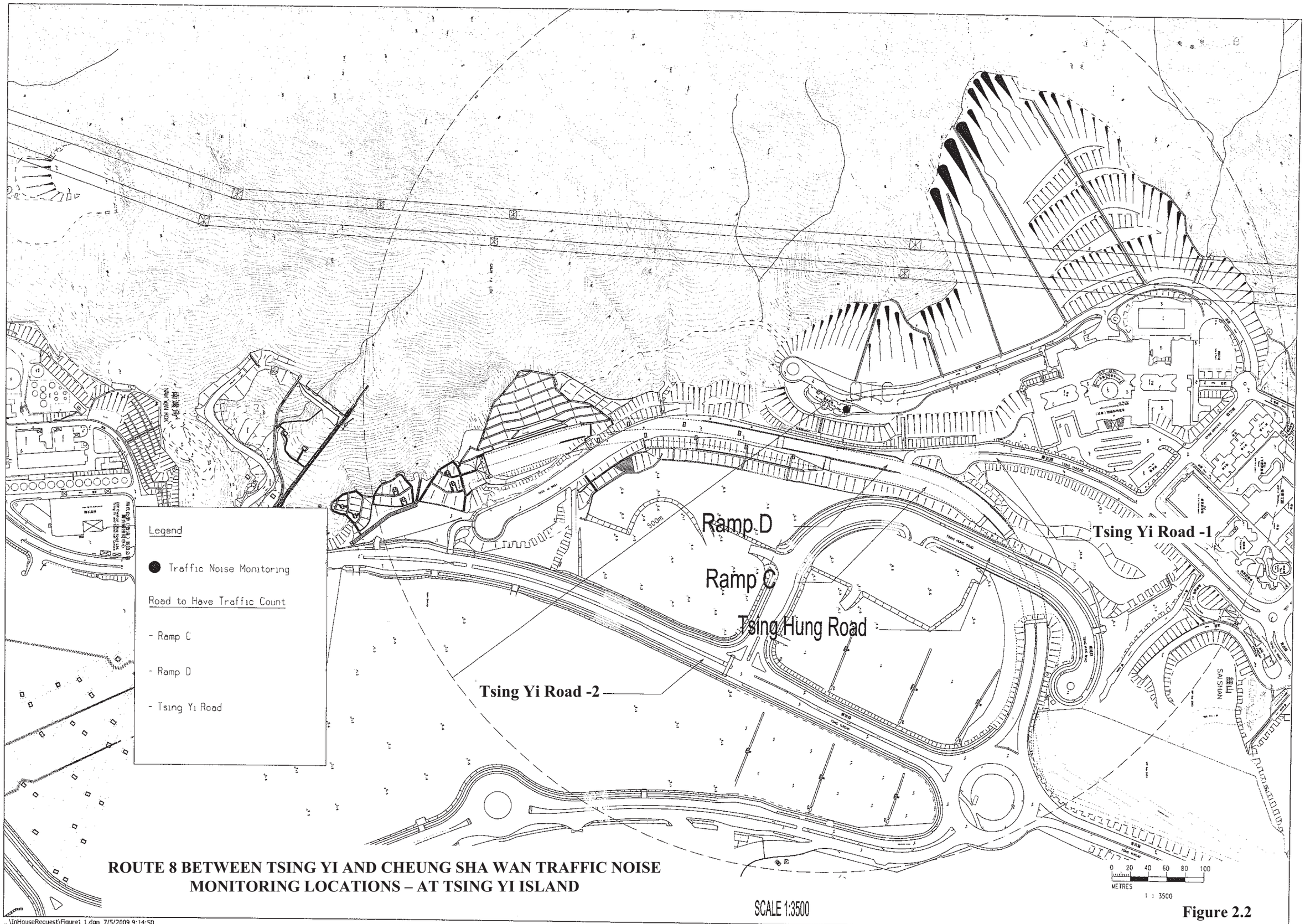
[3] Route 8 Tsing Yi and Cheung Sha Wan – Design and Construction – Supplementary Information on Noise Barrier Review at Ramp C/D, Ove Arup & Partners Hong Kong Limited, November 2008.

FIGURES



ROUTE 8 BETWEEN TSING YI AND CHEUNG SHA WAN TRAFFIC NOISE MONITORING LOCATIONS – AT WEST KOWLOON

Figure 2.1



ROUTE 8 BETWEEN TSING YI AND CHEUNG SHA WAN TRAFFIC NOISE MONITORING LOCATIONS – AT TSING YI ISLAND

SCALE 1:3500

Figure 2.2

..\InHouseRequest\Figure1 1.dgn 7/5/2009 9:14:50

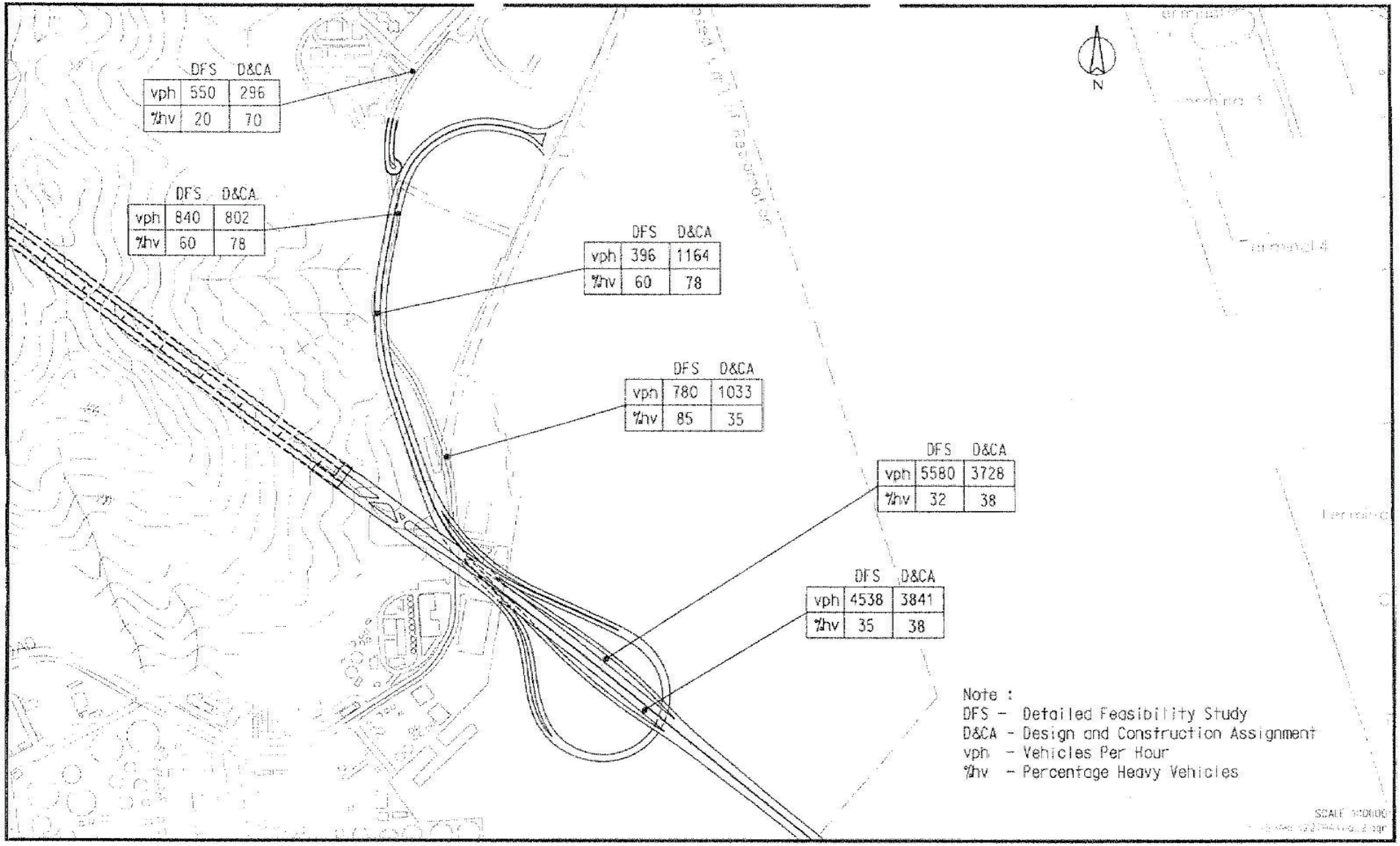
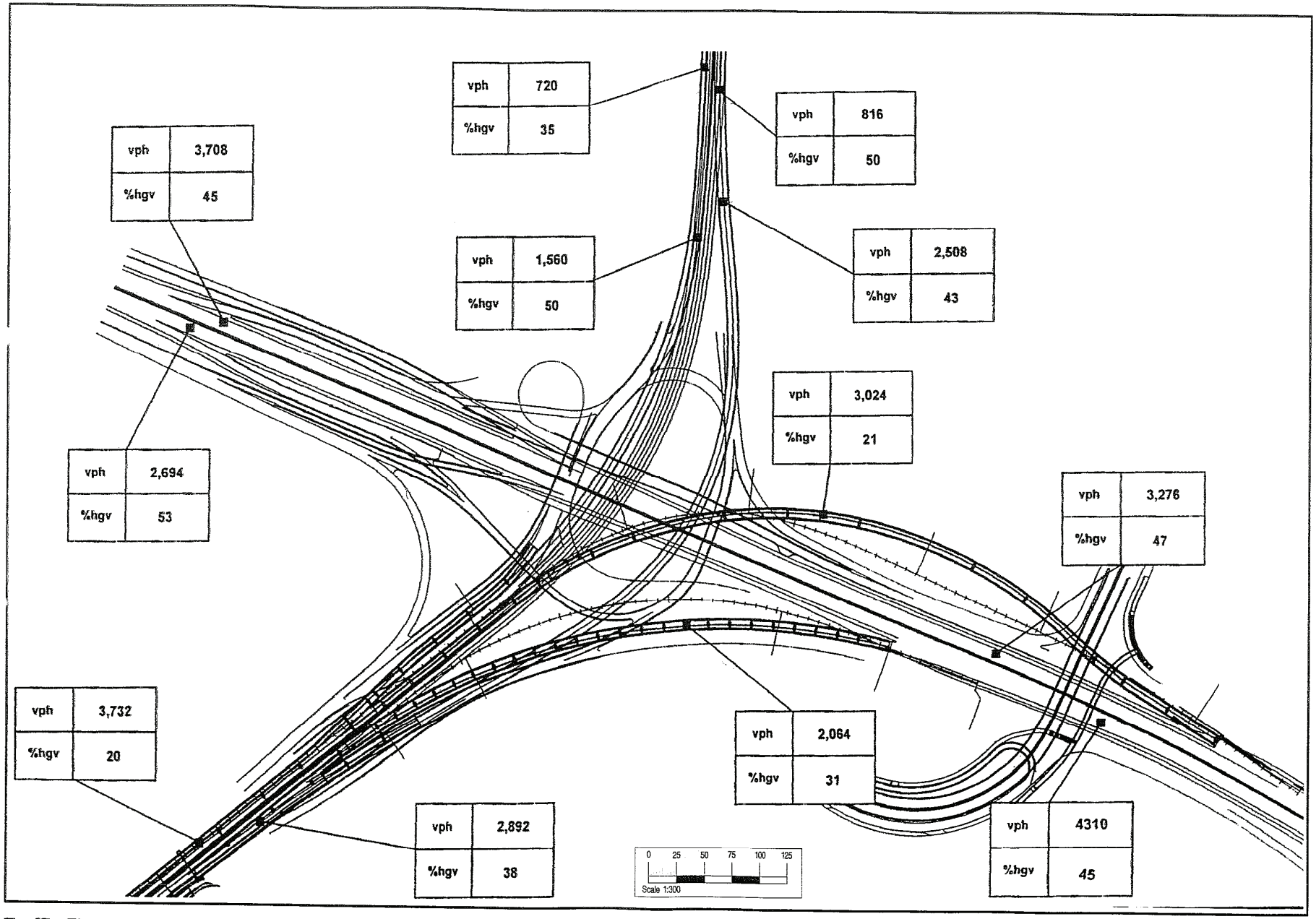


Figure 3.1 | Traffic Flows and % Heavy Vehicles for CT9 Links for Year 2021 AM Peak



Traffic Flows and % Heavy Goods Vehicles for Lai Wan Interchange

Figure 3.2

Appendix A

Calibration Certificates

Calibration Certificates
(Baseline Monitoring)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M S. Castle Peak Road
Tai Lam, Tuen Mun, N T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com hk
Website : www.materialab.com hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Maeda-Hitachi-Yokogawa-Hsin Chong JV
Address : PO Box No 80330, Cheung Sha Wan Post Office
Project : Calibration Services
Calibration Item -

Description	:	Sound level meter
Model No	:	Bruel & Kjaer (Type 2238)
Serial No.	:	2565848 (Microphone), 2562752 (Sound level meter)
Next Calibration Due Date	:	16/Dec/2009

Laboratory Information

Calibrating Equipment -

Description	:	B & K Acoustic Multifunction Calibrator 4226
Serial No	:	2546175
Date of Calibration	:	16/Dec/2008
Ambient Temperature	:	20±2 °C
Specification Limit	:	EN 60651: 1994 Type 1

Calibration Results :

(1) Frequency response
(Reference SPL: 94dB & Range setting: 50 - 130dB at traditional free field)

Table 1: Summary of frequency response (A - weighting)

Frequency (Hz)	Measured Value (dB)	Specification Limit (dB)		
31.5	-38.6	-40.9	to	-37.9
63	-25.8	-27.7	to	-24.7
125	-16.0	-17.1	to	-15.1
250	-8.6	-9.6	to	-7.6
500	-3.3	-4.2	to	-2.2
1000(ref.)	0.0	-1.0	to	1.0
2000	1.2	0.2	to	2.2
4000	0.9	-2.0	to	2.5
8000	-2.0	-4.1	to	0.4
12500	-6.3	-10.3	to	-1.3
16000	-9.8	$-\infty$	to	-3.6

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

(2) Level range control
(Reference SPL: 94dB, Reference frequency: 1kHz & Reference range setting : 50 - 130dB)

Table 2: Summary of level range control accuracy

Level range (dB)	Measured deviation (dB)	Specification limit (dB)
50-130 (Ref.)	NA	NA
20-100	0.0	± 0.5
30-110	0.0	± 0.5
40-120	0.0	± 0.5
60-140	0.0	± 0.5

(3) Differential level linearity
(Reference SPL: 94dB, Reference frequency: 1kHz & Primary indicator range: 50 - 130dB)

Table 3: Summary of differential level linearity

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
94	NA	NA
104	0.0	± 0.4
114	0.0	± 0.4

(4) Crest factor
(C.F : 3, Test frequency: 2kHz, Test range: 50 - 130dB & Test SPL: 106dB)

Table 4: Crest factor

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
106	0.3	± 0.5

Remarks :
1. The equipment used in this calibration is traceable to recognized National Standards.
2. The above calibration results does comply with the Type 1 specification requirement.

Checked by : _____ Date : 18-12-08 Certified by : _____ Date : 18 Dec, 2008
C K So (Engineer)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M S. Castle Peak Road
Tai Lam Tuen Mun N.T. Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Maeda-Hitachi-Yokogawa-Hsin Chong JV
Address : PO Box No 80330, Cheung Sha Wan Post Office
Project : Calibration Services
Calibration Item -
Description : Sound level meter
Model No. : Bruel & Kjaer (Type 2238)
Serial No. : 2565853 (Microphone), 2562757 (Sound level meter)
Next Calibration Due Date : 16/Dec/2009

Laboratory Information

Calibrating Equipment -
Description : B & K Acoustic Multifunction Calibrator 4226
Serial No : 2546175
Date of Calibration : 16/Dec/2008
Ambient Temperature : 20±2 °C
Specification Limit : EN 60651: 1994 Type 1

Calibration Results :

(1) Frequency response
(Reference SPL: 94dB & Range setting: 50 - 130dB at traditional free field)

Table 1: Summary of frequency response (A - weighting)

Frequency (Hz)	Measured Value (dB)	Specification Limit (dB)		
31.5	-38.8	-40.9	to	-37.9
63	-26.0	-27.7	to	-24.7
125	-16.1	-17.1	to	-15.1
250	-8.7	-9.6	to	-7.6
500	-3.4	-4.2	to	-2.2
1000(ref.)	-0.1	-1.0	to	1.0
2000	1.1	0.2	to	2.2
4000	0.7	-2.0	to	2.5
8000	-2.4	-4.1	to	0.4
12500	-6.3	-10.3	to	-1.3
16000	-9.2	$-\infty$	to	-3.6

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road
Tai Lam, Tuen Mun, N.T. Hong Kong
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

(2) Level range control

(Reference SPL: 94dB, Reference frequency: 1kHz & Reference range setting : 50 - 130dB)

Table 2: Summary of level range control accuracy

Level range (dB)	Measured deviation (dB)	Specification limit (dB)
50-130 (Ref.)	NA	NA
20-100	0.0	± 0.5
30-110	0.0	± 0.5
40-120	0.0	± 0.5
60-140	0.0	± 0.5

(3) Differential level linearity

(Reference SPL: 94dB, Reference frequency: 1kHz & Primary indicator range: 50 - 130dB)

Table 3: Summary of differential level linearity

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
94	NA	NA
104	0.0	± 0.4
114	0.0	± 0.4

(4) Crest factor

(C.F.: 3, Test frequency: 2kHz, Test range: 50 - 130dB & Test SPL: 106dB)

Table 4: Crest factor

Sound pressure level (dB)	Measured deviation (dB)	Specification limit (dB)
106	0.2	± 0.5

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards
2. The above calibration results does comply with the Type 1 specification requirement.

Checked by : _____ Date : 18-12-08 Certified by : _____ Date : 18 Dec. 2008

C K So (Engineer)

FUGRO TECHNICAL SERVICES LIMITED
MateriaLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M S. Castle Peak Road
Tai Lam, Tuen Mun. N T. Hong Kong.

Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk / www.fugro.com

MateriaLab

Report No : 041333CA82714(5)

CALIBRATION CERTIFICATE OF SOUND LEVEL CALIBRATOR

Client Supplied Information

Client : Maeda-Hitachi-Yokogawa-Hsin Chong JV
Address : PO Box No. 80330, Cheung Sha Wan Post Office
Project : Calibration Services
Calibration Item -

Description	:	Bruel & Kjaer Sound Level Calibrator
Model No.	:	Type 4231
Serial No	:	2605971
Next Calibration Due Date	:	16-Dec-2009

Laboratory Information

Calibrating Equipment -

Description	:	B & K Acoustic Multifunction Calibrator 4226
Serial No.	:	2546175
Date of Calibration	:	16-Dec-2008
Ambient Temperature	:	20±2 °C
Specification Limit	:	±0.5dB

Calibration Result :

(1) At 94dB reading
Correction of UUT (at 94dB & 1kHz) : +0.0dB

(2) At 114dB reading
Correction of UUT (at 114dB & 1kHz) : +0.0dB

Remarks :
1 The equipment used in this calibration is traceable to recognized National Standards
2. The above calibration results does comply with the specification requirement.
3. Serial number of sound level meter (microphone) used is 2562752 (2565848). Settings of SLM are 50-130dB range, A weighting and F response

Checked by : _____ Date : 18-12-08 Certified by : _____ Date : 18 Dec. 2008
C K So (Engineer)

Calibration Certificates (Second Operational Noise Monitoring)

FUGRO TECHNICAL SERVICES LIMITED
MaterialLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MaterialLab

Report no.: 061265CA100018

REPORT ON CALIBRATION OF SOUND LEVEL METER

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description : Sound Level Meter
Manufacturer : Bruel & Kjaer (Model no. 2238 (meter), 4188 (microphone))
Serial No. : 2562752 (meter), 2565848 (microphone)
Next Calibration Date : 07-Jan-2011
Specification Limit : EN 60651: 1994 Type 1

Laboratory Information

Description : B & K Acoustic Multifunction Calibrator 4226
Equipment ID. : R-108-1
Date of Calibration : 07-Jan-2010 Ambient Temperature : 22 °C
Calibration Location : Calibration Laboratory of MaterialLab
Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighing frequency response	16000Hz	-9.4	-3.6 to -∞
	12500Hz	-6.4	-1.3 to -10.3
	8000Hz	-2.0	0.4 to -4.1
	4000Hz	1.0	2.0 to 0.0
	2000Hz	1.2	2.2 to 0.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	-3.3	-2.2 to -4.2
	250Hz	-8.6	-7.6 to -9.6
	125Hz	-16.0	-15.1 to -17.1
	63Hz	-25.8	-24.7 to -27.7
	31.5Hz	-38.7	-37.9 to -40.9
C-weighing frequency response	16000Hz	-11.3	-5.5 to -∞
	12500Hz	-8.2	-3.2 to -12.2
	8000Hz	-4.0	-1.5 to -6.0
	4000Hz	-0.8	0.2 to -1.8
	2000Hz	-0.1	0.8 to -1.2
	1000Hz	0.0	1.0 to -1.0
	500Hz	0.0	1.0 to -1.0
	250Hz	0.1	1.0 to -1.0
	125Hz	0.0	0.8 to -1.2
	63Hz	-0.4	0.7 to -2.3
	31.5Hz	-2.2	-1.5 to -4.5
Level range control	20dB-100dB	0.0	± 0.5
	30dB-110dB	0.1	± 0.5
	50dB-130dB	0.1	± 0.5
	60dB-140dB	0.1	± 0.5
Differential level linearity	94dB-104dB	0.1	± 0.4
	104dB-114dB	-0.1	± 0.4

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For frequency response: Reference SPL is 94dB, range setting is 40-120dB & time weighing is fast
4. For differential level linearity: range setting is 40-120dB & time weighing is fast
5. The equipment does comply with EN 60651: 1994 Type 1 sound level meter for the above measurement.

Checked by : Sunny Date : 9 Jan 2010 Certified by : _____ Date : 09 Jan, 2010
So Chi Kuen (Engineer)

CA-R-297 (22/07/2009)

FUGRO TECHNICAL SERVICES LIMITED
MaterialLab Division,
Fugro Development Centre,
5 Lok Yi Street, 17 M.S. Castle Peak Road,
Tai Lam, Tuen Mun, N.T., Hong Kong.
Tel : +852-2450 8233
Fax : +852-2450 6138
E-mail : matlab@fugro.com.hk
Website : www.materialab.com.hk

MaterialLab

Report no.: 061265CA92364(1)

REPORT ON CALIBRATION OF SOUND CALIBRATOR

Client : Maeda-Hitachi-Yokogawa-Hsin Chong J.V.

Address : PO Box No. 80330, Cheung Sha Wan Post Office

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	:	Sound Calibrator
Manufacturer	:	Pulsar Instruments Inc. (Model no. 100B)
Serial No.	:	035213
Next Calibration Date	:	11-Nov-2010
Specification Limit	:	±0.5dB

Laboratory Information

Description	:	B & K Acoustic Multifunction Calibrator 4226
Equipment ID.	:	R-108-1
Date of Calibration :	11-Nov-2009	Ambient Temperature : 22 °C
Calibration Location :	Calibration Laboratory of MaterialLab	
Method Used	:	By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.1dB	±0.5dB
104dB	-0.1dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. Sound level meter used is client sound level meter (S/N: 110453 / T220553) with range setting, time weighing and frequency weighing at 30 - 130dB, fast & A respectively.
4. The equipment does comply with specification limit.

Checked by : Sunny Date : 13 Nov 2009 Certified by : So Chi Kuen (Engineer) Date : 13 Nov, 2009

CA-R-297 (22/07/2009)

輝創工程有限公司

Sun Creation Engineering Limited Calibration and Testing Laboratory

Certificate No. : C103994

Certificate of Calibration

This is to certify that the equipment

Description : Sound & Vibration Analyser

Manufacturer : Svantek

Model No. : SVAN957

Serial No. : 15369

has been calibrated for the specific items and ranges.
The results are shown in the Calibration Report No. C103994.

The equipment is supplied by

Co Name : Maeda-CREC-SELI Joint Venture

Address : 3B Hoi Kok Street, Tsuen Wan, N.T.

Date of Issue : 23 July 2010

Certified by :

K.C Lee

The test equipment used for calibration are traceable to the National Standards as specified in this report
This report shall not be reproduced except in full and with prior written approval from this laboratory

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

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

Report No : C103994

Calibration Report

ITEM TESTED

DESCRIPTION : Sound & Vibration Analyser
MANUFACTURER : Svantek
MODEL NO. : SVAN957
SERIAL NO : 15369

TEST CONDITIONS

AMBIENT TEMPERATURE : (23 ± 2)°C RELATIVE HUMIDITY : (55 ± 20)%
LINE VOLTAGE : ---

TEST SPECIFICATIONS

Calibration check

DATE OF TEST : 23 July 2010 ***JOB NO.*** : IC10-1835

TEST RESULTS

The results apply to the particular unit-under-test only
All results are within 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
- Agilent Technologies, USA
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany
- The Bruel & Kjaer Calibration Laboratory, Denmark

Tested by *L L Cheung* *Date* *23 July 2010*

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building 1 Hing On Lane, Tuen Mun, New Territories Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Report No. : C103994

Calibration Report

1 The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 24 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	C100067
CL179	Acoustic Calibrator	C095223

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 (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq (kHz)	
HIGH	SPL	A	Fast	114.00	1	113.8

6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
HIGH	SPL	A	Fast	114.00	1	114.0	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
HIGH	SPL	A	Fast	114.00	1	114.0 (Ref.)
				94.00		93.9

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

Report No : C103994

Calibration Report

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
HIGH	SPL	A	Fast	114.00	1	114.0	Ref.
			Slow			114.0	± 0.3

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
HIGH	SPL	A	Fast	114.00	63 Hz	87.8	-26.2 ± 1.5
					125 Hz	97.8	-16.1 ± 1.5
					250 Hz	105.3	-8.6 ± 1.4
					500 Hz	110.7	-3.2 ± 1.4
					1 kHz	114.0	Ref.
					2 kHz	115.2	+1.2 ± 1.6
					4 kHz	115.0	+1.0 ± 1.6
					8 kHz	113.0	-1.1 (+2.1 ; -3.1)
					12.5 kHz	109.7	-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	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
HIGH	SPL	C	Fast	114.00	63 Hz	113.2	-0.8 ± 1.5
					125 Hz	113.8	-0.2 ± 1.5
					250 Hz	114.0	0.0 ± 1.4
					500 Hz	114.0	0.0 ± 1.4
					1 kHz	114.0	Ref.
					2 kHz	113.8	-0.2 ± 1.6
					4 kHz	113.2	-0.8 ± 1.6
					8 kHz	111.1	-3.0 (+2.1 ; -3.1)
					12.5 kHz	107.8	-6.2 (+6.0 ; -∞)

Report No. : C103994

Calibration Report

Remarks : - Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

114 dB :	63 Hz - 125 Hz	:	± 0.45 dB
	250 Hz - 500 Hz	:	± 0.40 dB
	1 kHz	:	± 0.30 dB
	2 kHz	:	± 0.45 dB
	4 kHz	:	± 0.45 dB
	8 kHz	:	± 0.55 dB
	12.5 kHz	:	± 0.80 dB
	1 kHz	:	± 0.10 dB (Ref 94 dB)
94 dB :	1 kHz	:	± 0.30 dB

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

Note :
The values given in this Calibration Report 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

Calibration and Testing Laboratory of Sun Creation Engineering Limited
c/o 4/F, Tsing Shan Wan Exchange Building 1 Hing On Lane, Tuen Mun New Territories Hong Kong
Tel: 2927 2606 Fax: 2744 8986 E-mail: callab@suncreation.com Website: www.suncreation.com

Appendix B

Methodology for Noise Level Determination and Correction

'Existing Road' and 'New Road' Noise Level Determination

The contribution of major existing roads and new roads for each monitoring station has been identified and summarized in **Table 2.4**. It was noted that some of the monitoring stations are affected by more than one road noise source. As only one single value of 'existing road' and 'new road' was presented in the EIA report separately, the individual noise level contributions of major existing road and new road noise sources are estimated by solving the following equation (1) and (2) in accordance with CRTN method taking two road noise sources as an example. The same principles are applied for three or more road noise sources.

$$Exisitng\ Noise = 10\log\left(10^{\frac{L_{P1}}{10}} + 10^{\frac{L_{P2}}{10}}\right) \quad (1)$$

$$L_{P1} - L_{P2} = 10\log\left(\frac{Q_1}{Q_2}\right) + 33\log\left(\frac{V_1 + 40 + 500/V_1}{V_2 + 40 + 500/V_2}\right) + 10\log\left(\frac{1 + 5p_1/V_1}{1 + 5p_2/V_2}\right) - 10\log\left(\frac{d_1}{d_2}\right) + 10\log\left(\frac{\theta_1}{\theta_2}\right) \quad (2)$$

where

L_{P1} and L_{P2} are sound pressure levels of major road 1 and 2 respectively,

Q_1 and Q_2 are traffic flows of major road 1 and 2 respectively,

V_1 and V_2 are traffic speeds of major road 1 and 2 respectively,

p_1 and p_2 are heavy vehicle percentages of major road 1 and 2 respectively,

d_1 and d_2 are distances from noise monitoring locations to the major road 1 and 2 respectively, and

θ_1 and θ_2 are angles of view for major road 1 and 2 respectively.

Individual Noise Level Correction

The individual noise level contributions for both existing roads and new roads are then readjusted by applying the following correction factor to account for the measured traffic data at the roads mentioned in **Table 2.4.** The calculation of correction factor is shown below:

EIA Predicted Noise Level in Year 2021 – Current Projected Noise Level = Correction Factor (3)

$$CorrectionFactor = 10\log\left(\frac{Q'}{Q}\right) + 33\log\left(\frac{V'+40+500/V'}{V+40+500/V}\right) + 10\log\left(\frac{1+5p'/V'}{1+5p/V}\right)$$

where

Q' is predicted traffic flow by using the CRTN noise model,

V' is predicted traffic speed by using the CRTN noise model,

p' is predicted percentage heavy vehicle by using the CRTN noise model,

Q is measured traffic flow during the traffic noise monitoring event,

V is measured traffic speed during the traffic noise monitoring event, and

p is measured percentage heavy vehicle during the traffic noise monitoring event.

Appendix C

Noise Monitoring and Traffic Count Results

Appendix C
Noise Monitoring and Traffic Count Results

Baseline Traffic Noise Monitoring

M1 (1/F, Fok Ying Tung Hall of Residence)

25th November 2009	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	64.9
	L_{90} dB(A)	61.8
	L_{eq} dB(A)	63.8
	L_{max} dB(A)	78.4
	L_{min} dB(A)	58.3
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	65.1
	L_{90} dB(A)	62.2
	L_{eq} dB(A)	63.9
	L_{max} dB(A)	75.6
	L_{min} dB(A)	58.9
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	64.9
	L_{90} dB(A)	62.3
	L_{eq} dB(A)	64.1
	L_{max} dB(A)	77.7
	L_{min} dB(A)	59.2

M2 (3/F, Fok Ying Tung Hall of Residence)

25th November 2009	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	65.9
	L_{90} dB(A)	62.2
	L_{eq} dB(A)	64.6
	L_{max} dB(A)	79.3
	L_{min} dB(A)	59.2
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.3
	L_{90} dB(A)	62.2
	L_{eq} dB(A)	64.6
	L_{max} dB(A)	76.4
	L_{min} dB(A)	59.4
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	66.2
	L_{90} dB(A)	62.4
	L_{eq} dB(A)	64.7
	L_{max} dB(A)	79.3
	L_{min} dB(A)	59.9

Appendix C
Noise Monitoring and Traffic Count Results

Baseline Traffic Noise Monitoring

M3 (Mei Foo Sun Chuen, State 8, Block No. 112,, Rooftop)

11st December 2009	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	65.9
	L_{90} dB(A)	63.0
	L_{eq} dB(A)	64.8
	L_{max} dB(A)	70.2
	L_{min} dB(A)	60.0
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.9
	L_{90} dB(A)	64.3
	L_{eq} dB(A)	65.8
	L_{max} dB(A)	71.5
	L_{min} dB(A)	61.6
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	67.7
	L_{90} dB(A)	65.5
	L_{eq} dB(A)	66.8
	L_{max} dB(A)	72.6
	L_{min} dB(A)	63.7

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Noise Monitoring (Summary)

Traffic Flow

For Location M1 & M2: - Fok Ying Tung Hall of Residence				
	Measured Value [1]		EIA prediction [2]	
Traffic Count Location	Total Flow (vph)	% of HV	Total Flow (vph)	% of HV
Tsing Yi Road – 1 (next to Mei King Playground)	236	24.3	296	70
Tsing Yi Road - 2 (near Tai Tung Industrial Building)	238	81.5	1,033	35
Ramp C	312	83.3	802	78
Ramp D	245	71.4	1,164	78
For Location M3: - Mei Foo Sun Chuen				
	Measured Value [1]		EIA prediction [3]	
Traffic Count Location	Total Flow (vph)	% of HV	Total Flow (vph)	% of HV
WKH S/B	2,079	27.4	3,708	45
WKH N/B	840	20.1	2,694	53
NSCV Ramp G	1,330	23.1	3,024	21
NSCV Ramp H	523	17.9	2,064	31
NSCV W/B	697	21.0	2,892	38
NSCV E/B	1,439	25.5	3,732	20
R8K W/B	175	30.5	816	50
R8K E/B	109	54.6	720	35

[1] The total traffic flow and % of heavy vehicles refer to the averaged traffic flow and averaged % of heavy vehicles for the whole monitoring period (i.e. 1.5 hours).
[2] The traffic forecast for Year 2021 in the Supplementary EIA Information on the Modified Scheme dated 28 January 2000 and Supplementary Information on Noise Barriers Review ar Ramp C/D in November 2008 has been adopted.
[3] The traffic forecast for Year 2021 in the approved EIA report for Route 9 between Tsing Yi and Cheung Sha Wan (ref: EIA-025/1999) has been adopted.

Traffic Speed Measurement

For Location M1 & M2: - Fok Ying Tung Hall of Residence		
Traffic Count Location	Measured Speed (km/hr) [1]	Traffic Speed (km/hr) [2]
Tsing Yi Road – 1 (next to Mei King Playground)	37.7	50
Tsing Yi Road - 2 (near Tai Tung Industrial Building)	47.1	50
Ramp C	39.1	50
Ramp D	38.0	50
For Location M3: - Mei Foo Sun Chuen		
Traffic Count Location	Measured Speed (km/hr) [1]	Traffic Speed (km/hr) [2]
WKH S/B	87.9	100
WKH N/B	88.1	100
NSCV Ramp G	81.1	80
NSCV Ramp H	79.2	80
NSCV W/B	95.4	80
NSCV E/B	92.4	80
R8K W/B	85.9	80
R8K E/B	88.4	80

[1] The measured speed is shown as weighted average of traffic speed (taking into account of % of heavy vehicles).
[2] For existing roads (e.g. Tsing Yi Road and West Kowloon Highway), the traffic speeds are the existing speed limits imposed by the Transport Department. For new roads (i.e. Ramp C/D, Ngong Shuen Chau Viaduct), the traffic speeds refer to the design road speed limits of the concerned roads.

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M1
Monitoring location address	1/F, Fok Ying Tung Hall of Residence
Date of Monitoring	26-Aug-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^oC)	28
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562752	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): Tsing Yi Road – 1 (next to Mei King Playground)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	15	34	3.61	3.42	34.9	36.8	36.2
8:40 – 8:55	14	35	3.59	3.38	35.1	37.3	36.7
8:55 – 9:10	10	50	3.89	3.23	32.4	39.0	37.9
9:10 – 9:25	11	54	3.75	3.32	33.6	38.0	37.2
9:25 – 9:40	19	41	3.66	2.95	34.4	42.7	40.1
9:40 – 9:55	17	54	3.51	3.26	35.9	38.7	38.0

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 236
Heavy Vehicle % = 24.3
Measured speed (km/hr) = 37.7

Raw Data – Road (Name & Direction): Tsing Yi Road – 2 (near Tai Tung Industrial Building) .

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	45	9	2.57	2.67	49.0	47.2	48.7
8:40 – 8:55	48	10	2.77	2.45	45.5	51.4	46.5
8:55 – 9:10	61	9	2.96	2.86	42.6	44.1	42.8
9:10 – 9:25	56	11	2.68	2.38	47.0	52.9	48.0
9:25 – 9:40	39	17	2.75	2.47	45.8	51.0	47.4
9:40 – 9:55	42	10	2.65	2.30	47.5	54.8	48.9

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 238
Heavy Vehicle % = 81.5
Measured speed (km/hr) = 47.1

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ramp C

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	60	11	3.23	3.14	39.0	40.1	39.2
8:40 – 8:55	56	8	3.38	2.61	37.3	48.3	38.7
8:55 – 9:10	80	14	3.60	2.77	35.0	45.5	36.6
9:10 – 9:25	65	17	3.53	3.08	35.7	40.9	36.8
9:25 – 9:40	71	20	2.87	2.49	43.9	50.6	45.4
9:40 – 9:55	58	8	3.34	3.03	37.7	41.6	38.2

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 312
Heavy Vehicle % = 83.3
Measured speed (km/hr) = 39.1

Raw Data – Road (Name & Direction): Ramp D

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	54	15	3.50	3.28	36.0	38.4	36.5
8:40 – 8:55	47	23	3.57	3.37	35.3	37.4	36.0
8:55 – 9:10	39	24	3.47	3.26	36.3	38.7	37.2
9:10 – 9:25	37	14	3.62	3.02	34.8	41.7	36.7
9:25 – 9:40	45	17	3.17	2.68	39.7	47.0	41.7
9:40 – 9:55	40	12	3.30	2.78	38.2	45.3	39.8

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 245
Heavy Vehicle % = 71.4
Measured speed (km/hr) = 38.0

M1 (1/F, Fok Ying Tung Hall of Residence)

26th August 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:25	L_{10} dB(A)	64.7
	L_{90} dB(A)	61.8
	L_{eq} dB(A)	63.6
	L_{max} dB(A)	71.9
	L_{min} dB(A)	60.9
Measurement Results (2nd 30 mins) Start at 08:55	L_{10} dB(A)	64.7
	L_{90} dB(A)	60.7
	L_{eq} dB(A)	63.2
	L_{max} dB(A)	73.2
	L_{min} dB(A)	59.8
Measurement Results (3rd 30 mins) Start at 09:25	L_{10} dB(A)	64.3
	L_{90} dB(A)	60.4
	L_{eq} dB(A)	62.6
	L_{max} dB(A)	70.7
	L_{min} dB(A)	59.5

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M2
Monitoring location address	3/F, Fok Ying Tung Hall of Residence
Date of Monitoring	26-Aug-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^oC)	28
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	SVAN 957	15369	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): Tsing Yi Road – 1 (next to Mei King Playground)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	15	34	3.61	3.42	34.9	36.8	36.2
8:40 – 8:55	14	35	3.59	3.38	35.1	37.3	36.7
8:55 – 9:10	10	50	3.89	3.23	32.4	39.0	37.9
9:10 – 9:25	11	54	3.75	3.32	33.6	38.0	37.2
9:25 – 9:40	19	41	3.66	2.95	34.4	42.7	40.1
9:40 – 9:55	17	54	3.51	3.26	35.9	38.7	38.0

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 236
Heavy Vehicle % = 24.3
Measured speed (km/hr) = 37.7

Raw Data – Road (Name & Direction): Tsing Yi Road – 2 (near Tai Tung Industrial Building)

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:25 – 8:40	45	9	2.57	2.67	49.0	47.2	48.7
8:40 – 8:55	48	10	2.77	2.45	45.5	51.4	46.5
8:55 – 9:10	61	9	2.96	2.86	42.6	44.1	42.8
9:10 – 9:25	56	11	2.68	2.38	47.0	52.9	48.0
9:25 – 9:40	39	17	2.75	2.47	45.8	51.0	47.4
9:40 – 9:55	42	10	2.65	2.30	47.5	54.8	48.9

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 238
Heavy Vehicle % = 81.5
Measured speed (km/hr) = 47.1

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ramp C

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted
	HV	LV	HV	LV	HV	LV	Speed (km/h)
8:25 – 8:40	60	11	3.23	3.14	39.0	40.1	39.2
8:40 – 8:55	56	8	3.38	2.61	37.3	48.3	38.7
8:55 – 9:10	80	14	3.60	2.77	35.0	45.5	36.6
9:10 – 9:25	65	17	3.53	3.08	35.7	40.9	36.8
9:25 – 9:40	71	20	2.87	2.49	43.9	50.6	45.4
9:40 – 9:55	58	8	3.34	3.03	37.7	41.6	38.2

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 312
Heavy Vehicle % = 83.3
Measured speed (km/hr) = 39.1

Raw Data – Road (Name & Direction): Ramp D

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted
	HV	LV	HV	LV	HV	LV	Speed (km/h)
8:25 – 8:40	54	15	3.50	3.28	36.0	38.4	36.5
8:40 – 8:55	47	23	3.57	3.37	35.3	37.4	36.0
8:55 – 9:10	39	24	3.47	3.26	36.3	38.7	37.2
9:10 – 9:25	37	14	3.62	3.02	34.8	41.7	36.7
9:25 – 9:40	45	17	3.17	2.68	39.7	47.0	41.7
9:40 – 9:55	40	12	3.30	2.78	38.2	45.3	39.8

**Distance in between land marks (m) = 35
Total hourly vehicle (vph) = 245
Heavy Vehicle % = 71.4
Measured speed (km/hr) = 38.0

M2 (3/F, Fok Ying Tung Hall of Residence)

26th August 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:25	L_{10} dB(A)	67.8
	L_{90} dB(A)	64.5
	L_{eq} dB(A)	66.4
	L_{max} dB(A)	73.4
	L_{min} dB(A)	63.3
Measurement Results (2nd 30 mins) Start at 08:55	L_{10} dB(A)	67.5
	L_{90} dB(A)	63.4
	L_{eq} dB(A)	66.0
	L_{max} dB(A)	75.3
	L_{min} dB(A)	62.3
Measurement Results (3rd 30 mins) Start at 09:25	L_{10} dB(A)	67.5
	L_{90} dB(A)	63.1
	L_{eq} dB(A)	65.7
	L_{max} dB(A)	72.4
	L_{min} dB(A)	62.8

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

General

Location I.D.	M3
Monitoring location address	Mei Foo Sun Chuen, State 8, Block No. 112, Rooftop
Date of Monitoring	18-Aug-10
Measurement time	30 minutes/ duration (3 durations)
Weather conditions	Sunny
Temperature (^{o}C)	27
Wind speed (ms^{-1})	$<5ms^{-1}$

Equipment

Instrument	Type	Equipment No.	Setting
Sound level meter	B&K Type 2238	2562752	facade
Calibrator	Pulsar Model	035213	NA

Calibration

Before measurement: 94.0 dB(A)	After measurement: 93.9 dB(A)

Raw Data – Road (Name & Direction): West Kowloon Highway S/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	176	356	12.95	10.21	74.2	94.1	87.6
8:45 – 9:00	142	410	12.62	10.68	76.2	90.0	86.4
9:00 – 9:15	172	455	13.23	10.50	72.7	91.5	86.4
9:15 – 9:30	95	328	13.78	10.01	69.8	96.0	90.1
9:30 – 9:45	136	385	12.56	10.06	76.5	95.5	90.6
9:45 – 10:00	134	329	13.30	10.46	72.3	91.9	86.2

**Distance in between land marks (m) = 267
Total hourly vehicle (vph) = 2079
Heavy Vehicle % = 27.4
Measured speed (km/hr) = 87.9

Raw Data – Road (Name & Direction): West Kowloon Highway N/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	26	134	13.19	10.23	72.9	94.0	90.5
8:45 – 9:00	34	156	12.97	10.52	74.1	91.4	88.3
9:00 – 9:15	54	173	13.45	10.54	71.5	91.2	86.5
9:15 – 9:30	38	163	12.62	10.69	76.2	89.9	87.3
9:30 – 9:45	60	194	13.27	10.10	72.4	95.2	89.8
9:45 – 10:00	41	187	12.89	10.82	74.6	88.8	86.3

**Distance in between land marks (m) = 267
Total hourly vehicle (vph) = 840
Heavy Vehicle % = 20.1
Measured speed (km/hr) = 88.1

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Ramp G

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	100	295	4.16	3.81	77.9	85.0	83.2
8:45 – 9:00	122	284	4.41	4.08	73.5	79.4	77.6
9:00 – 9:15	72	281	4.30	3.78	75.3	85.7	83.6
9:15 – 9:30	72	263	4.27	4.00	75.9	81.0	79.9
9:30 – 9:45	47	235	4.24	3.85	76.4	84.2	82.9
9:45 – 10:00	48	176	4.26	4.04	76.1	80.2	79.3

**Distance in between land marks (m) = 90
Total hourly vehicle (vph) = 1330
Heavy Vehicle % = 23.1
Measured speed (km/hr) = 81.1

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Ramp H

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	25	135	4.95	4.66	72.7	77.3	76.5
8:45 – 9:00	26	105	4.94	4.35	72.9	82.8	80.8
9:00 – 9:15	14	115	5.24	4.36	68.7	82.6	81.1
9:15 – 9:30	28	95	5.11	4.29	70.5	83.9	80.9
9:30 – 9:45	21	93	4.98	4.44	72.3	81.1	79.5
9:45 – 10:00	26	101	5.04	4.61	71.4	78.1	76.7

**Distance in between land marks (m) = 100
Total hourly vehicle (vph) = 523
Heavy Vehicle % = 17.9
Measured speed (km/hr) = 79.2

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Mainline W/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	36	177	10.92	9.76	87.4	97.7	96.0
8:45 – 9:00	41	141	10.79	9.62	88.4	99.2	96.7
9:00 – 9:15	19	149	11.11	9.91	85.9	96.3	95.1
9:15 – 9:30	48	119	10.54	9.85	90.5	96.9	95.0
9:30 – 9:45	38	121	10.52	9.89	90.7	96.5	95.1
9:45 – 10:00	38	119	10.42	9.96	91.6	95.8	94.8

**Distance in between land marks (m) = 265
Total hourly vehicle (vph) = 697
Heavy Vehicle % = 21.0
Measured speed (km/hr) = 95.4

Raw Data – Road (Name & Direction): Ngong Shuen Chau Viaduct Mainline E/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	113	302	11.35	9.36	79.6	96.5	91.9
8:45 – 9:00	133	297	10.52	9.24	85.9	97.8	94.1
9:00 – 9:15	95	296	10.51	8.92	86.0	101.3	97.6
9:15 – 9:30	88	280	10.24	9.61	88.2	94.0	92.6
9:30 – 9:45	62	244	11.96	9.98	75.6	90.5	87.5
9:45 – 10:00	59	189	11.43	9.56	79.1	94.5	90.8

**Distance in between land marks (m) = 251
Total hourly vehicle (vph) = 1439
Heavy Vehicle % = 25.5
Measured speed (km/hr) = 92.4

Appendix C
Noise Monitoring and Traffic Count Results

Second Operational Traffic Noise Monitoring

Field Record Sheet

Raw Data – Road (Name & Direction): R8K Mainline W/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	11	42	11.18	9.78	80.8	92.4	90.0
8:45 – 9:00	15	36	11.30	9.87	80.0	91.6	88.1
9:00 – 9:15	5	34	12.10	10.38	74.7	87.1	85.5
9:15 – 9:30	20	24	11.43	10.17	79.1	88.8	84.4
9:30 – 9:45	17	28	11.30	10.13	80.0	89.2	85.7
9:45 – 10:00	12	18	11.52	10.76	78.4	84.0	81.8

**Distance in between land marks (m) = 265
Total hourly vehicle (vph) = 175
Heavy Vehicle % = 30.5
Measured speed (km/hr) = 85.9

Raw Data – Road (Name & Direction): R8K Mainline E/B

Time (15 min each)	Traffic data*		Average traveling time (s) **		Speed (km/h)		Weighted Speed (km/h)
	HV	LV	HV	LV	HV	LV	
8:30 – 8:45	13	7	10.90	9.29	82.9	97.3	87.9
8:45 – 9:00	11	13	10.83	9.44	83.4	95.7	90.1
9:00 – 9:15	23	15	10.65	9.45	84.8	95.6	89.1
9:15 – 9:30	16	17	10.50	9.60	86.1	94.1	90.2
9:30 – 9:45	15	9	11.07	9.56	81.6	94.5	86.5
9:45 – 10:00	11	13	11.13	9.88	81.2	91.5	86.7

**Distance in between land marks (m) = 251
Total hourly vehicle (vph) = 109
Heavy Vehicle % = 54.6
Measured speed (km/hr) = 88.4

M3 (Mei Foo Sun Chuen, State 8, Block No. 112, Rooftop)

18th August 2010	Parameter	Measured (dB(A))
Measurement Results (1st 30 mins) Start at 08:30	L_{10} dB(A)	66.7
	L_{90} dB(A)	64.6
	L_{eq} dB(A)	65.8
	L_{max} dB(A)	69.0
	L_{min} dB(A)	63.8
Measurement Results (2nd 30 mins) Start at 09:00	L_{10} dB(A)	66.4
	L_{90} dB(A)	64.4
	L_{eq} dB(A)	65.6
	L_{max} dB(A)	68.9
	L_{min} dB(A)	63.7
Measurement Results (3rd 30 mins) Start at 09:30	L_{10} dB(A)	66.6
	L_{90} dB(A)	64.6
	L_{eq} dB(A)	65.7
	L_{max} dB(A)	69.2
	L_{min} dB(A)	63.7

Remarks: Noise monitoring was cancelled in the presence of fog, rain, and wind with steady speed exceeding 5 m/s, or wind with gusts exceeding 10m/s.

Note: LV - light vehicle (i.e., private car, motorcycle and taxies)
HV - heavy vehicle (i.e., other than LV)
* - traffic count for a duration of 15 minutes

Appendix D

Summary of Noise Level Breakdown

Appendix D
Summary of Noise Level Breakdown

Correction Factor for Traffic Flow Projection and Comparison of Predicted Noise Level and Projected Noise Level

Monitoring Station	Traffic Count Location				Noise Level, L_{10} dB(A)						
			Distance (m)	Angle of View (Degree)	2nd Operational Measured Noise Level, $L_{10\ (1\ hour)}$ dB(A)	EIA Predicted Noise Level in Year 2021, dB(A)	EIA Predicted Noise Level (existing road / R8T) in Year 2021, dB(A)	Correction Factor	Current Traffic Condition Projected Noise Level (existing road / R8T), dB(A)	Current Traffic Condition Projected Noise Level (Total impact), dB(A)	EIA Predicted Noise Level (Total impact), dB(A)
M1	Existing Roads	Tsing Yi Road – 1 (next to Mei King Playground)	157	19	65	61	53.2	5.1	48.1	63	68
		Tsing Yi Road - 2 (near Tai Tung Industrial Building)	311	95			60.2	3.4	56.8		
	R8 (Tsing Yi)	Ramp C	55	148		67	62.6	4.1	58.5		
		Ramp D	45	148			65.1	7.4	57.7		
M2	Existing Roads	Tsing Yi Road – 1 (next to Mei King Playground)	157	30	68	62	55.7	5.1	50.6	65	70
		Tsing Yi Road - 2 (near Tai Tung Industrial Building)	311	98			60.8	3.4	57.4		
	R8 (Tsing Yi)	Ramp C	56	148		70	65.6	4.1	61.5		
		Ramp D	46	148			68.1	7.4	60.7		
M3	Existing Roads	WKH S/B	192	175	67	72	69.6	4.7	64.9	67	73
		WKH N/B	211	175			68.3	8.5	59.8		
	R8 (Tsing Yi)	NSCV Ramp G	397	34		61	50.8	3.2	47.6		
		NSCV Ramp H	429	31			49.4	7.4	42.0		
		NSCV W/B	392	40			53.0	6.7	46.3		
		NSCV E/B	366	62			54.6	2.6	52.0		
		R8K W/B	315	157			55.3	7.8	47.5		
		R8K E/B	268	136			53.7	6.3	47.4		