



**Highways Department**

Contract No. HY/2007/13

**Environmental Team for Deep Bay Link  
(Operational Phase)**

**Operational Noise Monitoring Report**

3/2009

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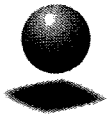
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The information contained in this report is, to the best of our knowledge, correct at the time of printing. The interpretation and recommendations in the report are based on our experience, using reasonable professional skill and judgment, and based upon the information that was available to us. These interpretations and recommendations are not necessarily relevant to any aspect outside the restricted requirements of our brief. This report has been prepared for the sole and specific use of our client and Maunsell Consultants Asia Ltd. accepts no responsibility for its use by others.

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Attention: Mr. Robert Chan / Mr. Stephen Chan

Dear Sirs,

**Re: Contract No. HY/2007/13  
Deep Bay Link (Operational Phase)  
Operational Noise Monitoring Report (Rev. 1)**

Reference is made to ET's e-mail correspondences enclosed with copy of the Operational Noise Monitoring Report (Rev. 1) and revised pages for the captioned report. We are pleased to inform that we have no further comment on the captioned Report.

We are pleased to inform you that the captioned Report, which had been certified by the ET Leader, is verified by IEC in compliance with Condition 1.9 of the Environmental Permit No. EP-163/2003/G of the Project.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned or our Mr. Damien Ku if you have any queries.

Yours sincerely,

K.S. Lee  
Independent Environmental Checker

c.c. Mr. Y T Tang  
Mr. Eric Chan

MCAL (ET Leader)  
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## 1. INTRODUCTION

### Background

- 1.1 This is the Operational Noise Monitoring Report prepared by Maunsell Consultants Asia Ltd. (ENSR), the designated Environmental Team (ET), for the Project “Deep Bay Link (Operational Phase)”. This report presents the results of operational traffic noise level at noise sensitive receivers (NSRs) identified in the EM&A Manual. The objective of this report is to assess whether the level of traffic noise measured at the designated NSRs are comparable to those predicted noise levels in the Environmental Impact Assessment (EIA) under the full provision of the mitigation measures recommended.
- 1.2 In accordance with the “Final Environmental Impact Assessment Report for Preliminary Design and Ground Investigation for Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange”<sup>[1]</sup>, the “Final EIA Report for Deep Bay Link” and “Supplementary Document of Technical Note No. 30 – DBL13M1 Noise Barrier Review Report (Final – Rev. 1)” in order to assess the effectiveness of the proposed noise mitigation measures, traffic noise monitoring is required to be carried out at the NSRs within one year of the road opening. The operational noise monitoring requirements are also stipulated in the Environmental Permit No.EP-163/2003/G Clause 6.3 and the EM&A Manuals.
- 1.3 Operational noise monitoring should be carried out at 7 locations as stated in the Deep Bay Link EM&A Manual and at 3 locations for the Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung project. The locations are shown in Figure 1.1. The objectives of the measurements were to obtain sound pressure levels (SPL), in  $L_{10}$  (1-hour), as measured at the sensitive receivers during the morning and evening peak traffic periods and compare with the EIA predictions in year 2021.
- 1.4 In addition to the SPL measurement, relevant information, including traffic counts, speed checks, weather conditions, activities which might generate extraneous noises were also recorded.
- 1.5 Since consent from one of the sensitive receivers, the Sherwood, could only obtained on 23 July 2008, the operational noise monitoring plan was approved by EPD on 11 September 2008. Operational noise monitoring was carried out on 29, 30 September and 6, 8 October 2008.
- 1.6 This report presents the operational noise results and observations of monitoring carried out during the operation of the expressway.

## 2. MEASUREMENT METHODOLOGY

### Measurement Time

- 2.1 Traffic noise measurements were conducted on 29 and 30 September 2008 (normal weekdays) during the AM peak traffic hour from 09:00 to 10:30 and during the PM peak traffic hour from 14:00 to 15:30, on 6 October 2008 (normal weekday) during AM peak traffic hour from 09:00 to 10:30 and during PM peak traffic hour from 13:30 to 15:00 and on 8 October 2008 (normal weekday) during AM peak traffic hour from 08:00 to 09:30 and during PM peak traffic hour from 17:00 to 18:30.

### Noise Monitoring Locations (Noise Sensitive Receivers)

- 2.2 Noise measurements were conducted at ten monitoring locations according to the approved Traffic Noise Monitoring Plan (rev. 2). The monitoring locations are shown in Figure 1.1. Table 2.1 describes these monitoring stations.

**Table 2.1 Noise Monitoring Locations (Sensitive Receivers)**

Monitoring Station	Location	Predicted Noise Level, L <sub>10</sub> dB(A) in Year 2021		Noise Standard L <sub>10</sub> (peak hour) (dB(A))
		Unmitigated	Mitigated	
OP1	2/F, Village house north to Tsing Chuen Wai	73.0	66.0	70
OP2	G/F, Village House near Tsing Chuen Wai	72.0	67.0	
OP3	11/F, Block 1, Botania Villa	71.0	69.0	
OP4	G/F, Village House at Ngau Hom Shek	67.0	67.0	
OP5A	G/F, Village House at San Sang San Tsuen	N/A	N/A	
OP6	G/F, Poultry Farm with residential house	70.0	66.0	
OP7A	19/F, Block 1, The Sherwood	68.7	69.0	
E1	2/F, Home of Elderly near To Yuen Wai	80.0	76.0	
E1A	2/F, Village House at To Yuen Wai	75.0	65.0	
E2A	1/F, Village House near Tan Kwai Tsuen	81.0	67.0	

### Noise Monitoring Equipment

- 2.3 The Sound Level Meters used for the monitoring comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1). Any other noise measuring and analysis instrument used will be of comparable professional quality. The instrumentation to be used for the noise monitoring is given Table 2.2.

**Table 2.2 Traffic Noise Monitoring Equipment**

Manufacturer	Description
Integrating Sound Level Meter	Bruel & Kjaer 2238
Calibrator	Bruel & Kjaer 4231

### Maintenance and Calibration

- 2.4 The sound level meters were calibrated using a Bruel and Kjaer Sound Level Calibrator Type 4231 for 94dB at 1kHz, prior to and after each set of measurements. The results of the calibration were recorded on the field data sheet. Measurement results will be discarded if the calibration before and after does not agree to within 1dB(A) and measurement will be taken until this condition is fulfilled.

- 2.5 Calibration certificates for the sound level meters and calibrator are provided in Appendix A.

### **Noise Measurement Methodology**

- 2.6 The noise measurements were conducted to obtain two sets of A-weighted  $L_{10}$  (1 hour) sound pressure level during the AM and PM peak traffic hours over 3 half hours periods at each designated sensitive receiver.
- 2.7 The noise measurement point was at a point 1m from the exterior of the sensitive receiver building facades and was at a position at least 1.2m above ground of the sensitive receiver level.
- 2.8 Noise measurements were made in accordance with Section III of the "Calculation of Road Traffic Noise (CRTN), 1998"<sup>[4]</sup>.
- 2.9 All monitoring were carried out at 1m from the façade of the building. No monitoring was carried out in a free-field condition.
- 2.10 Statistical results such as  $L_{max}$ ,  $L_{min}$ ,  $L_{eq}$  and  $L_{90}$  were also obtained for reference purpose.
- 2.11 Observations were recorded when intrusive noise was unavoidable.
- 2.12 The wind speed was frequently checked with a portable wind meter. Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

### **Traffic Survey**

- 2.13 Traffic survey was conducted concurrently with the noise measurement for the sections of Deep Bay Link (DBL) and Yuen Long Highways between Lam Tei and Tan Kwai Tsuen (YLH) near the representative sensitive receivers.
- 2.14 Background information, including weather conditions and noise sources other than traffic along DBL and YLH, was recorded for each sensitive receiver. The traffic survey included monitoring of traffic flow, percentage of heavy and light vehicles and average traffic speed.

### 3. MEASUREMENT RESULTS AND OBSERVATIONS

#### General

3.1 Noise data was continuously recorded by sound level meter at an interval of 1 second. Other sources included community noise, dog barking, sirens from emergency vehicles and etc. These activities were recorded during the monitoring events and these extraneous noises were not taken into calculation of the traffic noise level.

#### Traffic Noise Level Monitoring Results

3.2 Traffic noise measurements were conducted on normal weekdays during the AM and PM peak traffic hour from 09:00 – 10:30 and from 14:00 to 15:30 on 29 and 30 September 2008, from 09:00 – 10:30 and from 13:30 to 15:00 on 6 October 2008 and from 08:00 – 09:30 and from 17:00 – 18:30 on 8 October 2008. Random check of wind speed at the monitoring station showed that it was below 5 m/s.

3.3 There were some activities, which generated extraneous noises, and these activities were recorded during the monitoring events. The extraneous noise data was neglected based on the site records, in order to indicate the traffic noise level of DBL or YLH. The summaries of traffic noise levels recorded are provided in Table 3.1.

**Table 3.1 Traffic Noise Measurement Results**

Monitoring Date	Weather Condition	Monitoring Station	Monitoring Period	Noise Level, L <sub>10</sub> , 1-hour dB(A)
29 September 2008	Sunny	OP6	09:00 – 10:30	53.1
		OP6	14:00 – 15:30	51.5
		OP5A	09:00 – 10:30	62.7
		OP5A	14:00 – 15:30	61.4
		OP2	09:00 – 10:30	52.2
		OP2	14:00 – 15:30	49.2
30 September 2008	Sunny	OP1	09:00 – 10:30	58.7
		OP1	14:00 – 15:30	59.6
		OP3	09:00 – 10:30	64.2
		OP3	14:00 – 15:30	64.4
		OP7A	09:00 – 10:30	63.0
		OP7A	14:00 – 15:30	62.7
6 October 2008	Fine	OP4	09:00 – 10:30	63.1
		OP4	13:30 – 15:00	58.8
8 October 2008	Fine	E1	08:00 – 09:30	63.4
		E1	17:00 – 18:30	62.9
		E1A	08:00 – 09:30	68.0
		E1A	17:00 – 18:30	68.8
		E2A	08:00 – 09:30	59.7
		E2A	17:00 – 18:30	60.5

3.4 Comparison of the edited noise measurement results was made against the EIA predicted noise level and the noise standard of 70 dB(A). Tables 3.2 showed that measurement in L<sub>10</sub> at the monitoring stations, predicted noise level in the EIA and the noise standard.

**Table 3.2 Noise Level Comparison with the Noise Standard**

Monitoring Station	Monitoring Period	Measured Noise Level, L <sub>10</sub> dB(A)	Predicted Noise Level in EIA, L <sub>10</sub> dB(A)	Noise Standard L <sub>10</sub> (1 hour) dB(A)
OP1	09:00 – 10:30	58.7	66.0	70
OP1	14:00 – 15:30	59.6	66.0	
OP2	09:00 – 10:30	52.2	67.0	
OP2	14:00 – 15:30	49.2	67.0	
OP3	09:00 – 10:30	64.2	69.0	
OP3	14:00 – 15:30	64.4	69.0	
OP4	09:00 – 10:30	63.1	67.0	
OP4	13:30 – 15:00	58.8	67.0	
OP5A	09:00 – 10:30	62.7	N/A	
OP5A	14:00 – 15:30	61.4	N/A	
OP6	09:00 – 10:30	53.1	66.0	
OP6	14:00 – 15:30	51.5	66.0	
OP7A	09:00 – 10:30	63.0	69.0	
OP7A	14:00 – 15:30	62.7	69.0	
E1	08:00 – 09:30	63.4	76.0	
E1	17:00 – 18:30	62.9	76.0	
E1A	08:00 – 09:30	68.0	65.0	
E1A	17:00 – 18:30	68.8	65.0	
E2A	08:00 – 09:30	59.7	67.0	
E2A	17:00 – 18:30	60.5	67.0	

**Road Condition and Traffic Survey**

- 3.5 The road surfaces of Deep Bay Link and Yuen Long Highway is asphalt paved. No obstruction or damage was noted from the road surfaces during the monitoring.
- 3.6 The traffic conditions along DBL and YLH were normal and there was no traffic congestion during the monitoring periods.
- 3.7 The percentage of heavy vehicle (HV) was generally similar to that of light vehicle (LV). Details of the measured and EIA predicted traffic flow and the percentage of heavy vehicle are provided in Tables 3.3.

**Table 3.3 Traffic Flow**

Monitoring Location	Monitoring Period	Measured Value				EIA prediction	
		LV	HV	Total Flow	Percentage of HV	Traffic Flow	Percentage of HV
OP1 (DBL)	AM	267	213	480	44.4%	4,300	71.3%
	PM	294	267	561	47.6%		
OP2 (DBL)	AM	411	405	816	49.6%	5,700	76.5%
	PM	321	237	558	42.5%		
OP3 (DBL)	AM	399	354	753	47.0%	5,800	75.0%
	PM	411	339	750	45.2%		
OP4 (DBL)	AM	267	345	612	56.4%	7,600	66.0%
	PM	225	363	588	61.7%		
OP5A (DBL)	AM	411	405	816	49.6%	5,700	76.5%
	PM	321	237	558	42.5%		
OP6 (DBL)	AM	411	405	816	49.6%	5,700	76.5%
	PM	321	237	558	42.5%		
OP7A (DBL)	AM	399	354	753	47.0%	5,800	75%
	PM	411	339	750	45.2%		
CPR	AM	1035	696	1731	40.2%	2,700	5.0%
	PM	1209	720	1929	37.3%		
E1 (YLH)	AM	2574	2919	5493	53.1%	10,900	52.5%
	PM	2010	2736	4746	57.6%		
E1A (YLH)	AM	2574	2919	5493	53.1%	10,900	52.5%
	PM	2010	2736	4746	57.6%		
E2A (YLH)	AM	3183	1800	4983	36.1%	10,900	52.5%
	PM	1647	2538	4185	60.6%		

Notes: HV represents Heavy Vehicle  
 LV represents Light Vehicle

3.8 Low traffic flow in DBL was noted during the course of measurement.

3.9 The traffic speeds along HK-DBL were estimated concurrently with the noise measurement. Table 3.4 provides a summary of averaged traffic speed monitoring results and EIA prediction.

**Table 3.4 Traffic Speed Measurement**

Monitoring Date	Monitoring Period	Road	Measured Speed (km/hr)	EIA Predicted Speed (km/hr)
29 September 08	AM Peak	DBL (OP2, OP5A & OP6)	98.3	100.0
	PM Peak	DBL (OP2, OP5A & OP6)	94.3	100.0
30 September 08	AM Peak	DBL (OP1, OP3 & OP7A)	83.2	100.0
	PM Peak	DBL (OP1, OP3 & OP7A)	86.1	100.0
	AM Peak	CPR (OP7A)	53.2	70.0
	PM Peak	CPR (OP7A)	52.0	70.0
6 October 08	AM Peak	DBL (OP4)	93.8	100.0
	PM Peak	DBL (OP4)	94.1	100.0
8 October 08	AM Peak	YLH (E1&E1A)	81.4	70.0
	PM Peak	YLH (E1&E1A)	79.3	70.0
	AM Peak	YLH (E2A)	75.7	70.0
	PM Peak	YLH (E2A)	85.9	70.0

#### 4. DISCUSSION

- 4.1 At all monitoring stations operational noise monitoring were carried out at the AM and PM peak hours. All intrusive noise (e.g. nearby construction noise) affecting the measured noise level were edited out.

##### Predicted Noise Levels under the Traffic Flow Condition in 2021

- 4.2 According to the Environmental Impact Assessment Report for the Project, “Final Environmental Impact Assessment Report for Preliminary Design and Ground Investigation for Widening of Yuen Long Highway between Lam Tei and Shap Pat Heung Interchange”<sup>[1]</sup>, the “Final EIA Report for Deep Bay Link” and “Supplementary Document of Technical Note No. 30 – DBL13M1 Noise Barrier Review Report (Final – Rev. 1)”, for the worst case scenario, the traffic noise levels were predicted to occur in year 2021.
- 4.3 Based on the EM&A Manuals, noise monitoring should be carried out during the AM and PM peak hours within the first year of road opening. In conjunction with the noise monitoring, traffic information including traffic flow, speed and percentage heavy vehicles was also obtained.
- 4.4 Since consent from one of the sensitive receivers, the Sherwood, could only obtain on 23 July 2008, the operational noise monitoring plan was approved by EPD on 11 September 2008. Operational noise monitoring was carried out on 29, 30 September and 6, 8 October 2008.
- 4.5 The predicted noise level under the traffic flow condition in 2021 was in accordance with Section III of the “Calculation of Road Traffic Noise (CRTN), 1988”<sup>[4]</sup> for adjustment to the measured traffic noise level by adding a correction factor and for comparison with prediction from the CRTN. This will include the traffic flow, percentage of heavy vehicles, and an average vehicle speed. The following equation extracted from the CRTN was adopted to correct the measured noise level in consideration of the differences between the measured traffic flow and the predicted traffic flow in the EIA Report.

$$* \text{ Correction Factor} = 10\text{Log}\left(\frac{Q'}{Q}\right) + 33\text{Log}\left(\frac{V' + 40 + 500/V'}{V + 40 + 500/V}\right) + 10\text{Log}\left(\frac{1 + 5p'/V'}{1 + 5p/V}\right)$$

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

- 4.6 The predicted noise levels at the sensitive receivers are estimated based on the equation from CRTN.
- 4.7 Detailed traffic conditions in year 2021 are summarized in the Table 4.1.

**Table 4.1 EIA Predicted 2021 Peak Hour Traffic Data**

Noise Monitoring Location	Traffic Flow (Nr/hr)	% of HV	Traffic Speed (km/hr)
OP1	4,300	71.3%	100
OP2	5,700	76.5%	100
OP3	5,800	75.0%	100
OP4	7,600	66.0%	100
OP5A	5,700	76.5%	100
OP6	5,700	76.5%	100
OP7A	5,800	75%	100
E1	10,900	52.5%	70
E1A	10,900	52.5%	70
E2A	10,900	52.5%	70
CPR	2,700	5.0%	70

4.8 The correction factors for each monitoring period were evaluated and summarized in Table 4.2.

**Table 4.2 Correction Factor for Different Monitoring Period**

Monitoring Station	Monitoring Period	Correction Factor dB(A)
OP1	AM Peak	12.1
	PM Peak	11.0
OP2	AM Peak	10.0
	PM Peak	12.3
OP3	AM Peak	11.5
	PM Peak	11.4
OP4	AM Peak	11.8
	PM Peak	11.7
OP5A	AM Peak	10.0
	PM Peak	12.3
OP6	AM Peak	10.0
	PM Peak	12.3
OP7A	AM Peak	**
	PM Peak	**
E1	AM Peak	2.2
	PM Peak	2.7
E1A	AM Peak	2.2
	PM Peak	2.7
E2A	AM Peak	4.3
	PM Peak	2.7

\*\*calculation of correction factor for OP7A will be presented in Sections 4.10 – 4.11 and Table 4.3.

4.9 Due to the close proximity of monitoring station OP7A to the Castle Peak Road and the low traffic flow of Deep Bay Link during the monitoring, contribution from Castle Peak Road should be taken into account when calculating the correction factor. The predicted noise level for 2008 would be calculated by back-calculation from the predicted noise level for year 2021 using the measured traffic information. The difference between the predicted 2008 noise level and the predicted 2021 noise level as stated in the EIA report will be the normalized value. Detailed calculation is shown in Section 4.11 and Table 4.3.

4.10 For OP7A and Castle Peak Road,

$$* \text{ Correction Factor} = 10\text{Log}\left(\frac{Q'}{Q}\right) + 33\text{Log}\left(\frac{V' + 40 + 500/V'}{V + 40 + 500/V}\right) + 10\text{Log}\left(\frac{1 + 5p'/V'}{1 + 5p/V}\right)$$

Where Q' is measured traffic flow during the traffic noise monitoring event in 2008,  
 V' is measured traffic speed during the traffic noise monitoring event in 2008,  
 P' is measured percentage heavy vehicle during the traffic noise monitoring event in 2008,  
 Q is predicted traffic flow for 2021,  
 V is predicted traffic speed for 2021,  
 p is predicted percentage heavy vehicle for 2021.

**Table 4.3 Correction Factor for OP7A**

Monitoring Period	<sup>1)</sup> Predicted NL (CPR)	<sup>2)</sup> Correction Factor (CPR)	<sup>3)</sup> Predicted NL (DBL)	<sup>4)</sup> Correction Factor (DBL)	<sup>5)</sup> Predicted NL in 2021 (as in EIA)	Predicted NL in 2008	Correction factor for 2021
AM	57.4	1.6	67.1	-11.5	69.0	60.6	8.4
PM	57.4	1.8	67.1	-11.4	69.0	60.8	8.2

1) & 3) Obtained from Supplementary Document of Technical Note No. 30 – DBL13M1 Noise Barrier Review Report, Annex 1  
 2) & 4) Obtained from back-calculation from (5) the predicted noise level for year 2021, using the measured traffic information.

4.11 Under the designed traffic condition in Year 2021, the projected noise levels as received at the sensitive receivers are estimated and shown in Table 4.4.

**Table 4.4 Projected and EIA Predicted Noise Level**

Monitoring Station		Noise Level, L <sub>10</sub> (1 hour) dB(A)		
		Correction Factor*	Projected Noise Level	EIA Predicted Noise Level
OP1	AM Peak	12.1	70.8	66.0
	PM Peak	11.0	70.6	66.0
OP2	AM Peak	10.0	62.2	67.0
	PM Peak	12.3	61.5	67.0
OP3	AM Peak	11.5	75.7	69.0
	PM Peak	11.4	75.8	69.0
OP4	AM Peak	11.8	74.9	67.0
	PM Peak	11.7	70.5	67.0
OP5A	AM Peak	10.0	72.7	N/A
	PM Peak	12.3	73.7	N/A
OP6	AM Peak	10.0	63.1	66.0
	PM Peak	12.3	63.8	66.0
OP7A	AM Peak	8.4	71.4	69.0
	PM Peak	8.2	70.9	69.0
E1	AM Peak	2.2	65.6	76.0
	PM Peak	2.7	65.6	76.0
E1A	AM Peak	2.2	70.2	65.0
	PM Peak	2.7	71.5	65.0
E2A	AM Peak	4.3	64	67.0
	PM Peak	2.7	63.2	67.0

Note \* Corrected by traffic flow, speed and percentage of heavy vehicles.

- 4.12 Comparison of the projected noise level was made against the EIA prediction for year 2021. The projected noise level for the year 2021 at stations OP1, OP3, OP4, OP7A and E1A are higher than the predicted 2021 noise level in the EIA.
- 4.13 For monitoring stations OP1, OP3 and OP7A, the traffic flow in DBL was low during the course of measurement. Background noise may cause a rather significant contribution to the measured noise levels, and hence affect the projected values.
- 4.14 For OP4, Village House at Ngau Hom Shek, the measured noise level was expected to be higher than the actual due to the disturbance by insects on the nearby trees / plants during the measurement, and such disturbance was unable to be neglected during the measurement. Thus higher projected noise level for year 2021 was expected.
- 4.15 For OP3 and OP7A, Block 1 of Botania Villa and Block 1 of the Sherwood were facing the Deep Bay Link, excessive noise was recorded during the measurement. It was observed that the excessive noise was caused by the vehicles when they passed an uneven road joint, which lead to higher measured noise levels at the stations.

- 4.16 For E1A, Village House at To Yuen Wai, although the traffic flow approached the EIA prediction, the background noise was significant during the course of measurement. The predicted noise levels in 2021 interpolated from the measured noise levels ( $L_{10(1\text{-hour})}$  of 68.0 dB(A) and 68.8 dB(A) in AM and PM peak traffic hours respectively) are assumed to be solely contributed by traffic noise, which increase over time in a predicted pattern. However, as the measured noise levels were actually observed to be significantly contributed by background noise, the predicted noise level in 2021 may be over-estimated.

## 5. CONCLUSION

- 5.1 Traffic noise measurements were conducted on normal weekday during the AM and PM peak traffic hour from 09:00 – 10:30 and from 14:00 to 15:30 on 29 and 30 September 2008, from 09:00 – 10:30 and from 13:30 to 15:00 on 6 October 2008 and from 08:00 – 09:30 and from 17:00 – 18:30 on 8 October 2008. The weather conditions were sunny. The traffic conditions, including traffic flows, type of vehicles and average traffic speeds were also monitored during the monitoring events.
- 5.2 Activities which generated extraneous noise were recorded, and these irrelevant noise data were not taken into the evaluation of traffic noise levels. However, disturbance from insects, which could not be neglected in the measurement, near station OP4 and vehicles passing the uneven road joint of Deep Bay Link near stations OP3 and OP7A could increase the measured noise level.
- 5.3 Sound pressure levels, in  $L_{10(1\text{hr})}$ , were recorded at the 10 designated monitoring locations.
- 5.4 The traffic flow, speed and percentage of heavy vehicles were recorded during each monitoring period. The correction factors for all monitoring stations were evaluated based on the differences of traffic conditions between these noise measurement events and the predicted traffic condition in Year 2021. For monitoring station OP7A, due to its close proximity to Castle Peak road and low traffic flow at Deep Bay Link during the monitoring period, contribution from Castle Peak Road was also included in the calculation of the normalization for OP7A.
- 5.5 Comparison of the projected noise level was made against the EIA prediction for year 2021. The projected noise level for the year 2021 was compared with the predicted year 2021 noise level in the EIA.
- 5.6 For monitoring stations OP1, OP3 and OP7A, the traffic flow in DBL was low during the course of measurement. Background noise may cause a rather significant contribution to the measured noise levels, and hence the projected values.
- 5.7 For monitoring station E1A, attributed to the high background noise in the area, the measured noise level may not be able to reflect the contribution of traffic noise, and the predicted noise level in 2021 may be over-estimated.
- 5.8 The projected noise levels for the year 2021 at all stations are lower than the respective predicted 2021 noise levels in the EIA except stations OP1, OP3, OP4, OP7A and E1A.

## 6. REFERENCES

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- 6.2 Ove Arup & Partners (HK) Ltd., Agreement No. CE 109/98, "Deep Bay Link, Investigation and Preliminary Design, Environmental Impact Assessment Report", May 2002.
- 6.3 Ove Arup & Partners (HK) Ltd., Agreement no. CE 56/2000, Design and Construction Assignment for Deep Bay Link, "Supplementary Document of Technical Note No. 30 – DBL13M1 Noise Barrier Review Report (Final – Rev. 1) (Report Ref. 23506-REP-182-03), January 2006.
- 6.4 "Calculation of Road Traffic Noise", Department of Transport, UK, 1988.
- 6.5 Maunsell Environmental Management Consultants Limited, Contract No. HY/2002/23, "Deep Bay Link - Southern Section, Baseline Monitoring Report", November 2003.