

APPENDIX A2

Technical Paper No. 2 - Traffic Noise Impact Assessment (Supplementary Paper)

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Traffic Noise Impact Assessment
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1. INTRODUCTION

Following the former Technical Paper No. 2 on "Traffic Noise Impact Assessment" which addresses the traffic noise impacts solely on acoustical grounds, Working Paper No. 1 on "Mitigation Measures" was prepared to assess the practical and engineering constraints of the proposed mitigation measures and a practical form of measures were resolved. The purpose of this supplementary paper is to incorporate the findings of both Working Papers and re-assess the acoustical effectiveness of feasible mitigation measures.

2. AP LEI CHAU BRIDGE

Two sections of 5 m inverted L-shaped barriers about 45m and 50m in length along the eastbound carriageway are proposed to protect the NSRs located adjacent to the flyover. The layout of barriers is shown in Figure 1. A typical cross-section of the barrier on separate, independent structure is shown in Figure 2.

A summary of the predicted road traffic noise levels at representative NSRs after the implementation of the proposed barriers is presented in Table 1. As shown in Table 1, the noise levels at a few of the NSRs are predicted to be reduced by upto 7 dB(A). The high noise levels at the upper floors of the low-rises fronting Ap Lei Chau Bridge are attributed to the gaps between barriers due to site constraints. Other NSRs (i.e. TC-1 and NF-1) are not protected because they are also affected by road traffic noise contributions from the at-grade Ap Lei Chau Bridge Road.

Under the proposed mitigation scheme, a total number of 34 dwellings or 44 percent of the affected dwellings are protected, and the breakdown is presented in Table 2.

Table 1 Unmitigated and Mitigated Noise Levels for Ap Lei Chau Bridge

NSR	Floor	Overall Noise Levels at Various Levels,dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
TC-1	1	70	65	64
	5	70	70	68
	10	70	72	71
	15	70	74	72
	20	70	74	72
	22	70	73	72
RH-1	1	70	63	60
	5	70	71	66
	10	70	74	69
SM-1	1	70	62	58
	5	70	71	67
	7	70	77	70
SM-2	1	70	64	61
	5	70	75	70
	7	70	79	73
NT-1	1	70	66	64
	5	70	75	73
NF-1	1	70	68	67
	5	70	73	72
	10	70	75	74
	15	70	74	73
	20	70	74	74
	22	70	74	74

Table 2 Effectiveness of Proposed Mitigation Measure for Ap Lei Chau Bridge

NSRs	Number of Dwellings Exceeding the HKPSG criterion	
	Without Mitigation	With Mitigation
Toho Court	14	14
Rousseau Heights	18	0
Sun Ming Building	20	4
Nam Tack Mansion	6	6
Ning Fung Mansion	19	19

3. SECTION OF TSING TSUEN ROAD NEAR RIVIERA GARDENS

Considering the space and engineering constraints along Tsing Tsuen Road near Riviera Gardens, two segments of partial enclosures about 100m and 185m long along the eastbound carriageway are proposed to protect the NSRs at Riviera Gardens as described in Figure 3. Typical cross-sections of the partial enclosures are shown in Figure 4.

A summary of predicted road traffic noise levels at representative NSRs after the implementation of these proposed partial enclosures is shown in Table 3. As shown in Table 3, the noise levels at the NSRs are predicted to be reduced by upto 16 dB(A). Due to the limited extent of the partial enclosures, many of the dwellings cannot be fully protected.

As a result, a total number of 714 dwellings or 46 percent of the affected dwellings are protected, and the breakdown is presented in Table 4.

Table 3 Unmitigated and Mitigated Noise Levels for Tsing Tsuen Road near Riviera Gardens

NSRs	Floor	Overall Noise Levels at Various Level, dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
A-1	1	70	64	64
	5	70	67	67
	10	70	71	71
	15	70	71	71
	20	70	71	71
	25	70	71	71
	30	70	70	70
	35	70	70	70
	40	70	70	70
B-1	1	70	65	62
	5	70	71	68
	10	70	74	71
	15	70	74	71
	20	70	73	70
	25	70	73	70
	30	70	72	70
	35	70	72	69
	40	70	72	70
B-2	1	70	67	63
	5	70	75	72
	10	70	77	73
	15	70	77	73
	20	70	76	72
	25	70	76	72
	30	70	75	72
	35	70	74	72
	40	70	74	72
C-1	1	70	67	62
	5	70	76	72
	10	70	76	72
	15	70	76	71
	20	70	75	71
	25	70	74	71
	30	70	74	71
	35	70	73	71
	40	70	73	70
C-2	1	70	69	66
	5	70	81	78
	10	70	80	77
	15	70	79	76
	20	70	78	76
	25	70	77	75
	30	70	76	75
	35	70	76	74
	40	70	75	74

Table 3 (Cont.) Unmitigated and Mitigated Noise Levels for Tsing Tsuen Road near Riviera Gardens

NSRs	Floor	Overall Noise Levels at Various Level, dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
C-3	1	70	70	66
	5	70	80	77
	10	70	80	76
	15	70	79	75
	20	70	78	75
	25	70	77	75
	30	70	76	74
	35	70	76	73
	40	70	75	73
D-1	1	70	67	61
	5	70	75	68
	10	70	74	68
	15	70	74	68
	20	70	73	67
	25	70	73	67
	30	70	72	69
	35	70	72	68
	40	70	71	68
D-2	1	70	72	59
	5	70	80	68
	10	70	79	68
	15	70	78	67
	20	70	77	70
	25	70	77	71
	30	70	76	70
	35	70	75	70
	40	70	75	70
D-3	1	70	72	59
	5	70	80	64
	10	70	80	65
	15	70	79	67
	20	70	78	71
	25	70	77	71
	30	70	76	70
	35	70	76	70
	40	70	75	70
E-1	1	70	70	63
	5	70	74	64
	10	70	74	65
	15	70	74	65
	20	70	73	65
	25	70	73	64
	30	70	73	64
	35	70	72	64
	40	70	72	64

Table 3 (Cont.) Unmitigated and Mitigated Noise Levels for Tsing Tsuen Road near Riviera Gardens

NSRs	Floor	Overall Noise Levels at Various Level, dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
F-1	1	70	74	67
	5	70	76	67
	10	70	75	67
	15	70	75	67
	20	70	74	66
	25	70	74	66
	30	70	74	66
	35	70	73	66
	40	70	73	66
G-1	1	70	79	75
	5	70	78	75
	10	70	78	74
	15	70	77	73
	20	70	76	73
	25	70	75	72
	30	70	75	72
	35	70	74	71
	40	70	74	71
G-2	1	70	79	77
	5	70	79	77
	10	70	78	76
	15	70	77	75
	20	70	77	75
	25	70	76	75
	30	70	76	74
	35	70	75	74
	40	70	75	73
G-3	1	70	75	75
	5	70	75	75
	10	70	75	75
	15	70	74	74
	20	70	74	74
	25	70	73	73
	30	70	73	73
	35	70	73	73
	40	70	72	72
H-1	1	70	77	76
	5	70	77	76
	10	70	76	76
	15	70	76	76
	20	70	76	75
	25	70	75	75
	30	70	75	74
	35	70	75	74
	40	70	74	74

Table 3 (Cont.) Unmitigated and Mitigated Noise Levels for Tsing Tsuen Road near Riviera Gardens

NSRs	Floor	Overall Noise Levels at Various Level, dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
J-1	1	70	75	74
	5	70	75	75
	10	70	75	74
	15	70	74	74
	20	70	74	74
	25	70	74	74
	30	70	73	73
	35	70	73	73
	40	70	73	73
J-2	1	70	76	75
	5	70	76	76
	10	70	76	76
	15	70	76	76
	20	70	76	75
	25	70	75	75
	30	70	75	75
	35	70	75	75
	40	70	75	74

Table 4 Effectiveness of Proposed Mitigation Measure for Tsing Tsuen Road near Riviera Gardens

NSRs	Number of Dwellings Exceeding the HKPSG criterion	
	Without Mitigation	With Mitigation
Riviera Gardens		
Hoi Nga Mansion	142	95
Hoi Kwu Mansion	167	124
Hoi Sing Mansion	190	159
Hoi Fung Mansion	261	25
Hoi Wai Mansion	152	0
Hoi Yat Mansion	165	0
Hoi Kwai Mansion	258	218
Hoi Yin Mansion	148	148
Hoi Yue Mansion	62	62

4. SECTION OF TSING TSUEN ROAD NEAR CHEUNG ON ESTATE

As Housing Department generally supports the proposal to mitigate traffic noise from Tsing Tsuen Road, an independently supported partial enclosure within the boundary of Cheung On Estate has been further examined. A partial enclosure of 150m long is shown in Figure 5.

A summary of predicted road traffic noise levels at representative NSRs after the implementation of the proposed partial enclosures is shown in Table 5. As shown in Table 5, the noise levels at the NSRs are predicted to be reduced by 1-9 dB(A). Due to the limited extent of the partial enclosures, many of the dwellings cannot be fully protected. As a result, only 122 dwellings or 12 percent of the affected dwellings are protected, and the breakdown is presented in Table 6.

Table 5 Unmitigated and Mitigated Noise Levels for Tsing Tsuen Road near Cheung On Estate

NSRs	Floor	Overall Noise Levels at Various Level, dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
OM1	1	70	67	67
	5	70	69	69
	10	70	72	71
	15	70	71	71
	20	70	72	71
	25	70	72	72
	30	70	72	72
	34	70	71	71
OM2	1	70	69	69
	5	70	69	69
	10	70	71	71
	15	70	71	71
	20	70	71	71
	25	70	71	71
	30	70	71	71
	34	70	71	70
OP1	1	70	71	67
	5	70	78	71
	10	70	77	73
	15	70	77	74
	20	70	76	73
	25	70	76	73
	30	70	75	73
	34	70	75	72
OP2	1	70	72	71
	5	70	78	74
	10	70	78	75
	15	70	77	75
	20	70	76	74
	25	70	76	74
	30	70	75	73
	34	70	75	73

Table 5 (Cont.) Unmitigated and Mitigated Noise Levels for Tsing Tsuen Road near Cheung On Estate

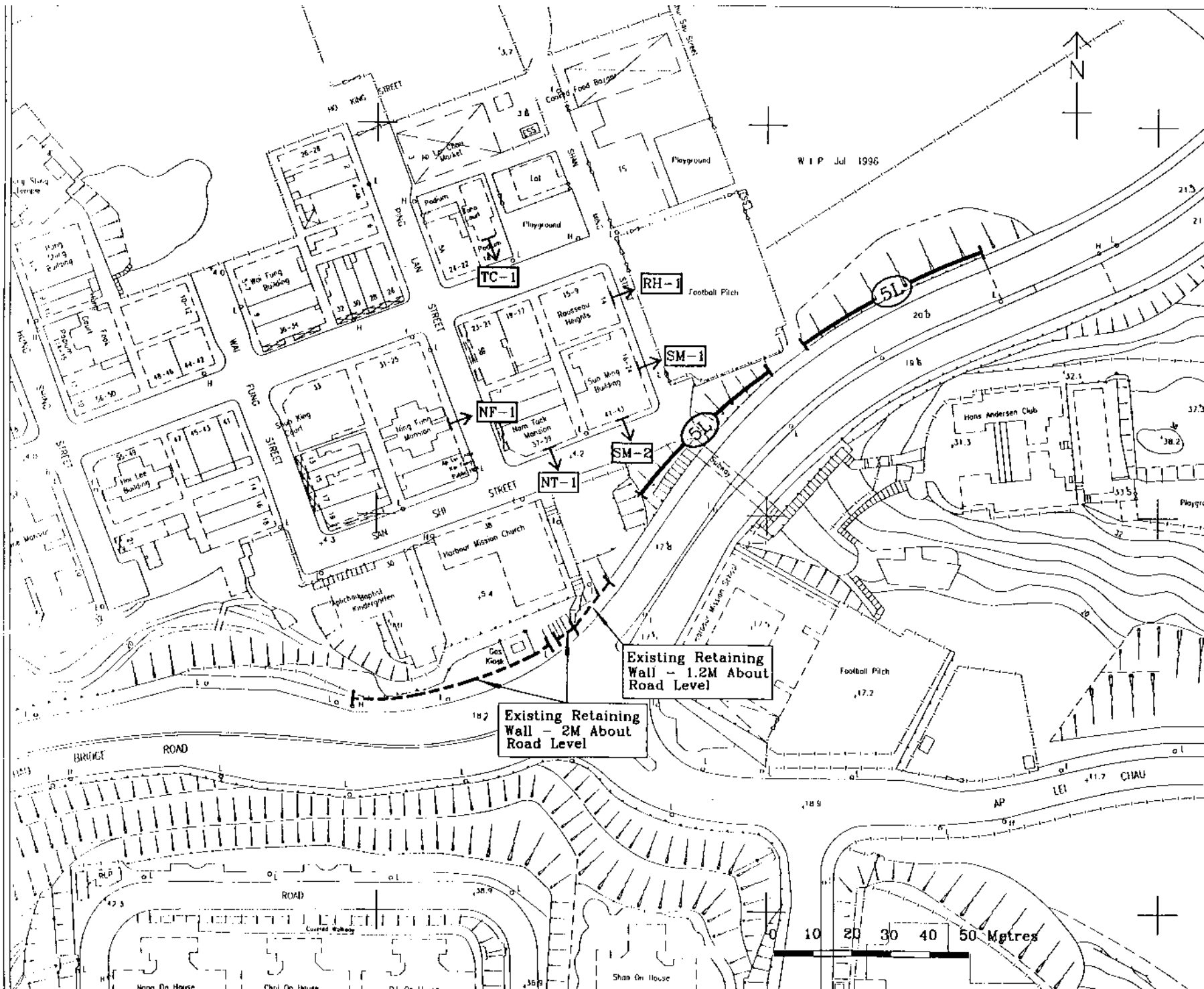
NSRs	Floor	Overall Noise Levels at Various Level, dB(A)		
		Assessment Criterion	Unmitigated	Mitigated
OP3	1	70	76	76
	5	70	79	79
	10	70	79	78
	15	70	78	77
	20	70	77	76
	25	70	76	75
	30	70	76	75
	34	70	75	74
OP4	1	70	73	73
	5	70	75	75
	10	70	75	75
	15	70	74	74
	20	70	73	73
	25	70	73	73
	30	70	72	72
	34	70	72	72
OP5	1	70	70	70
	5	70	72	72
	10	70	73	73
	15	70	72	72
	20	70	72	72
	25	70	72	72
	30	70	72	72
	34	70	71	71
OC1	1	70	77	72
	5	70	80	75
	10	70	79	78
	15	70	78	78
	20	70	77	77
	25	70	77	76
	30	70	76	76
	34	70	76	75
OC2	1	70	72	64
	5	70	79	71
	10	70	78	76
	15	70	77	75
	20	70	76	74
	25	70	76	74
	30	70	75	73
	34	70	75	73
OC3	1	70	70	65
	5	70	78	69
	10	70	77	73
	15	70	77	74
	20	70	76	73
	25	70	76	73
	30	70	75	72
	34	70	75	72

Table 6 Effectiveness of Proposed Mitigation Measure for Tsing Tsuen Road near Cheung On Estate

NSRs	Number of Dwellings Exceeding the HKPSG criterion	
	Without Mitigation	With Mitigation
Cheung On Estate		
On Mei House	201	200
On Pak House	556	489
On Chiu House	304	250

5. CONCLUSION & RECOMMENDATION

This paper has re-assessed the acoustical effectiveness of feasible noise mitigation measures as identified in the Final Report. Upon examining the practical forms of the 5m inverted L-shaped barriers for Ap Lei Chau Bridge and the 5.5m partial enclosures for both ends of Tsing Tsuen Road, it is found that these measures provide 44%, 46% and 12 % of protection for the affected dwellings.



LEGEND

⊖ 5L ⊕ PROPOSED 5M INVERTED L-SHAPED BARRIER

WIP Jul 1996

Existing Retaining Wall - 1.2M About Road Level

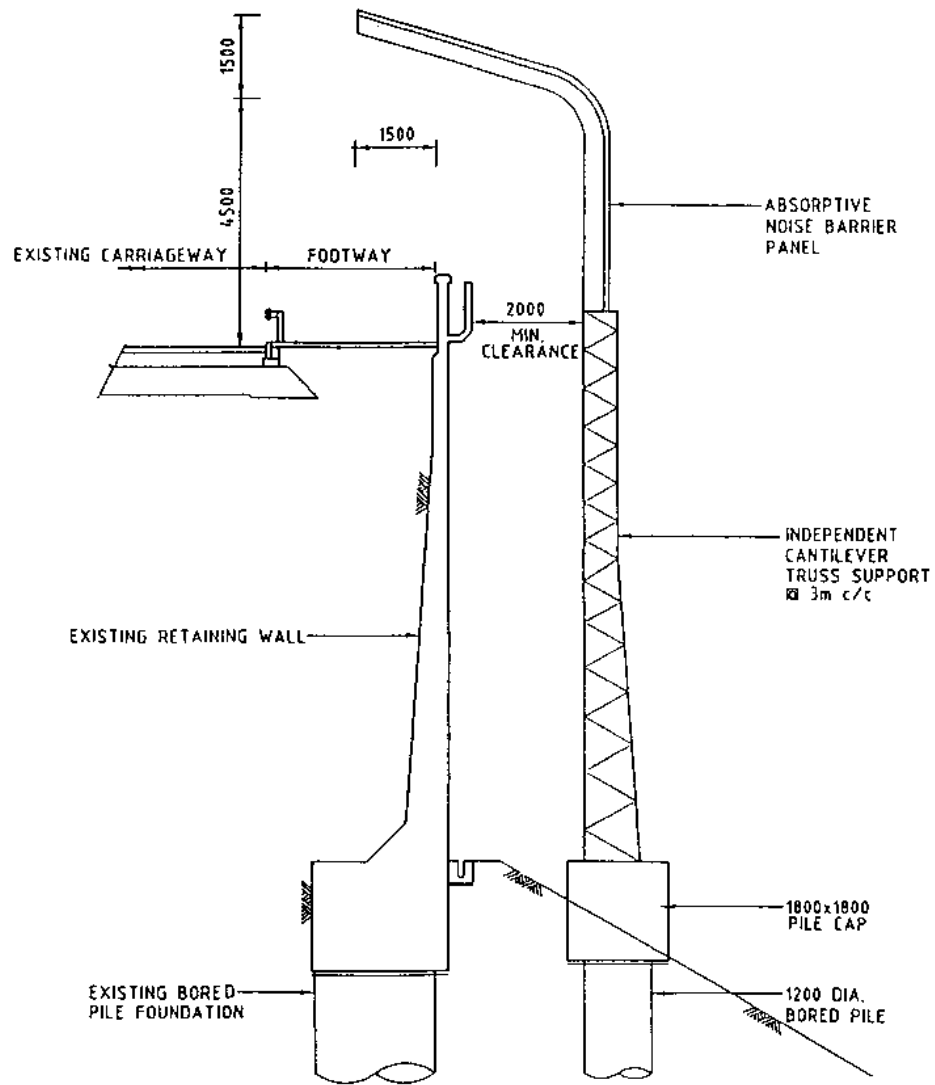
Existing Retaining Wall - 2M About Road Level


ENVIRONMENTAL PROTECTION DEPARTMENT
 FEASIBILITY STUDY FOR PROVIDING NOISE MITIGATION MEASURES ON EXISTING FLYOVERS

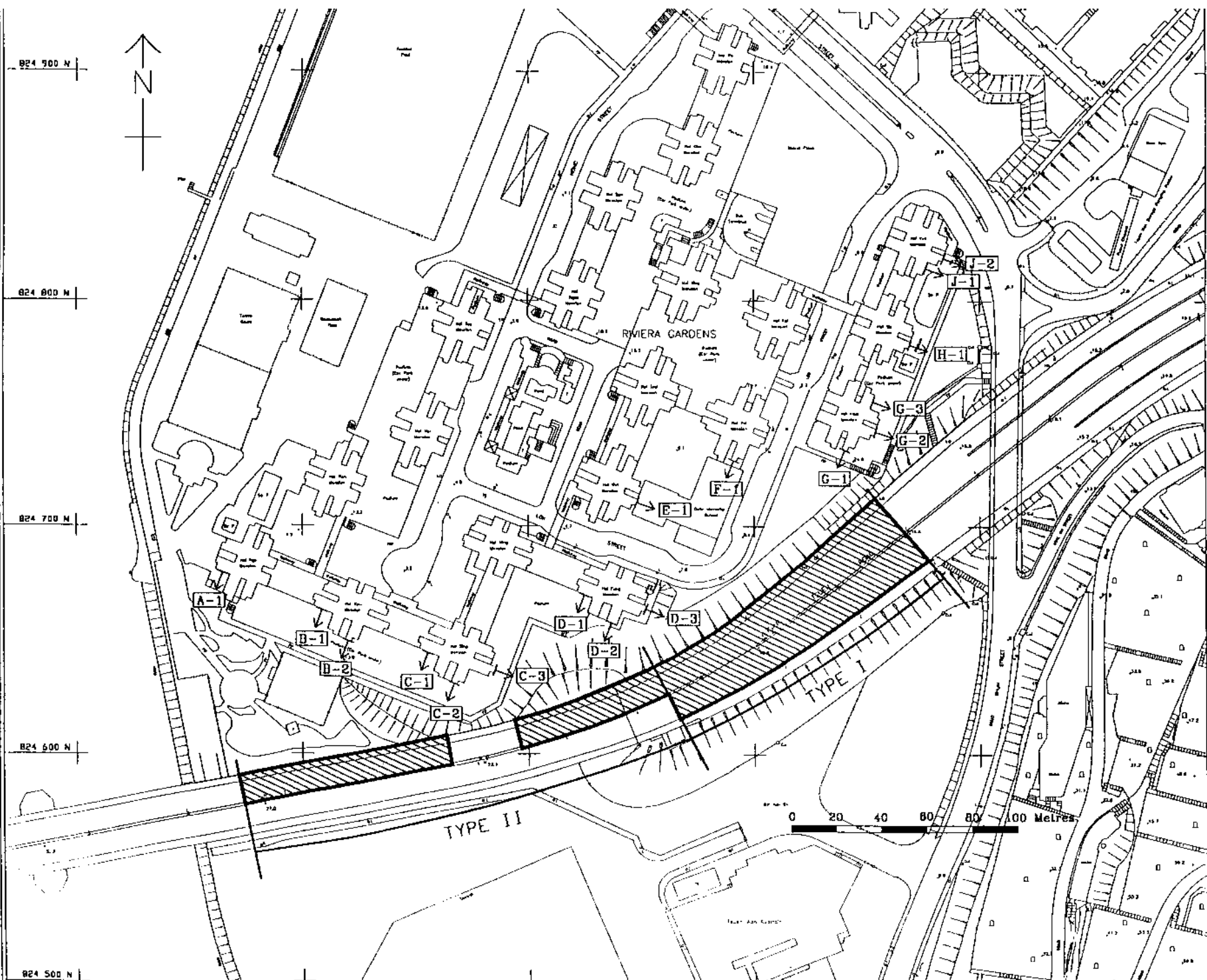
LOCATION OF PROPOSED NOISE BARRIER

MAUNSELL CONSULTANTS ASIA LTD
 茂華(亞洲)工程顧問有限公司

FIGURE NO. 圖號編號: FIGURE 1
 SCALE 比例: AS SHOWN




NO.	REV.	DATE	BY	CHECKED
 ENVIRONMENTAL PROTECTION DEPARTMENT FEASIBILITY STUDY FOR PROVIDING NOISE MITIGATION MEASURES ON EXISTING FLYOVERS				
CROSS-SECTION OF INVERTED-L SHAPED NOISE BARRIER				
HAINSELL CONSULTANTS ASIA LTD 海星諮詢工程師有限公司				
FIGURE NO. 圖紙編號		FIGURE 2		
SCALE 比例		N. T. S.		

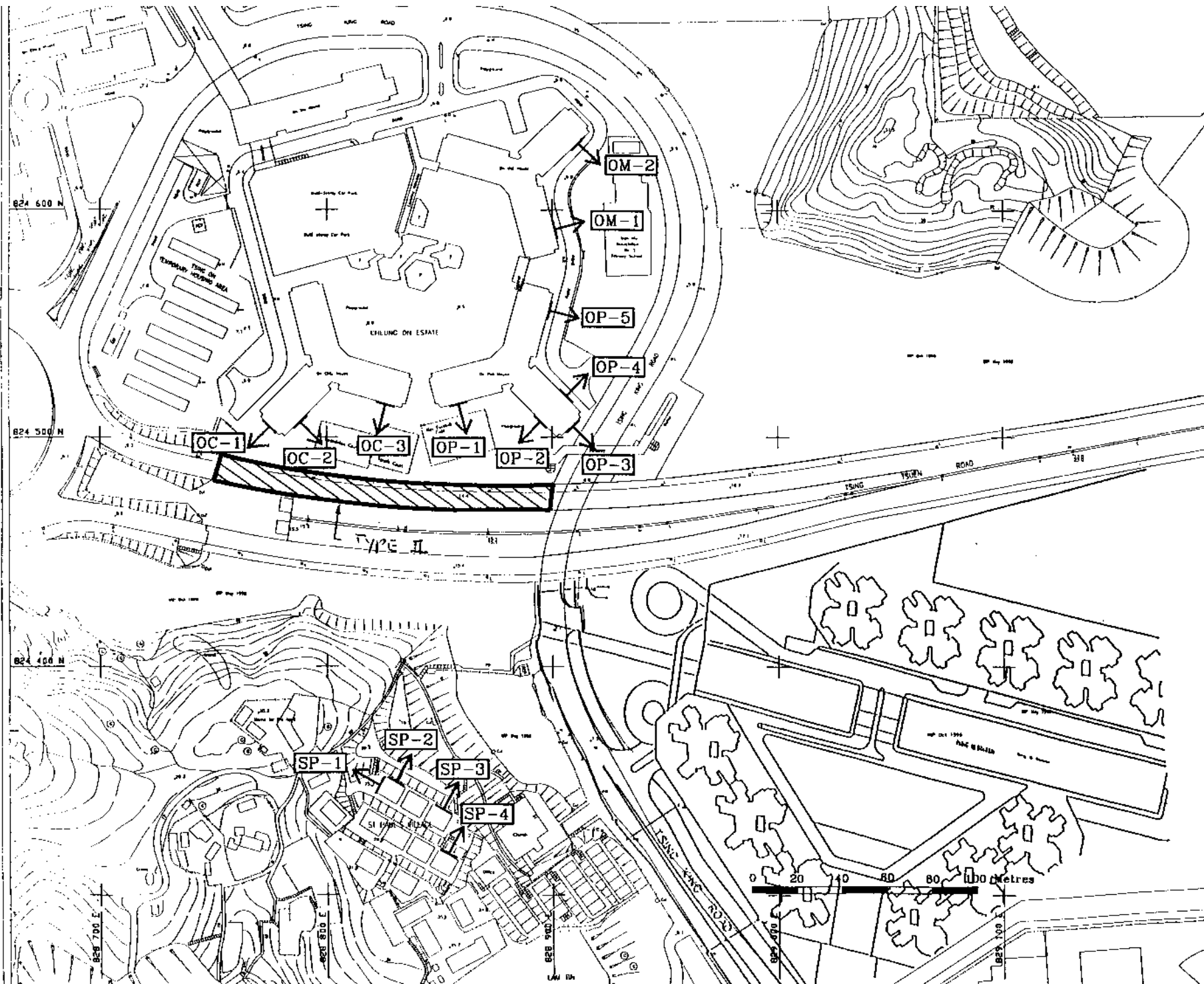


LEGEND



- J-2 LOCATION OF REPRESENTATIVE NSR
- TYPE I - PARTIAL ENCLOSURE COVERING THE ENTIRE WIDTH OF CARRIAGEWAY
- TYPE II - PARTIAL ENCLOSURE COVERING EASTBOUND CARRIAGEWAY


 ENVIRONMENTAL PROTECTION DEPARTMENT FEASIBILITY STUDY FOR PROVIDING NOISE MITIGATION MEASURES ON EXISTING FLYOVERS	
LOCATIONS OF PROPOSED PARTIAL ENCLOSURES	
MAINSELL CONSULTANTS ASIA PTE. LTD. 茂誠諮詢工程有限公司	
FIGURE NO.	FIGURE J
SCALE	AS SHOWN

maunsell



LEGEND

- 
OM-1 LOCATION OF REPRESENTATIVE NSR
- 
PARTIAL ENCLOSURE

	ENVIRONMENTAL PROTECTION DEPARTMENT
	FEASIBILITY STUDY FOR PROVIDING NOISE MITIGATION MEASURES ON EXISTING FLYOVERS
LOCATION OF PROPOSED PARTIAL ENCLOSURE	
MAUNSELL CONSULTANTS ASIA LTD 漢維臣工程顧問有限公司	
FIGURE NO. 圖號編號	FIGURE 5
SCALE 比例尺	AS SHOWN

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