

**ENGINEERING INFRASTRUCTURE ON HUNG HOM BAY RECLAMATION
TRAFFIC NOISE ASSESSMENT AND MITIGATION MEASURES AND
AIR QUALITY IMPACT ASSESSMENT ON UNDERPASS ALONG
HUNG HOM SOUTH ROAD**

SUMMARY

1 INTRODUCTION

The Hung Hom Bypass and Princess Margaret Road Link (HHBP & PMRL) Preliminary Report Stage Study was completed in late 1992. Included in the study were preliminary layouts of the local roads in the Hung Hom Bay Reclamation. An EIA under the chairmanship of EPD was carried out as part of the study. Effects of impacts from the local roads were considered to be small and were not affirmative at the time due to the SkyRail proposal in Hung Hom and Tsim Sha Tsui.

The detailed design of the local roads in the reclamation has now been completed, following the decision on land uses and ExCo's decision not to permit construction of the SkyRail. As requested by EPD, an additional traffic noise impact study of the local roads was undertaken. An assessment of air quality at the proposed underpass on Hung Hom South Road has also been carried out.

The Hung Hom Bay reclamation is planned for commercial, residential, educational, open space and government/institution/community uses. The engineering infrastructure on Hung Hom Bay includes local roads to serve the developments and improve traffic circulation in the Hung Hom area and involves the widening and extension of Hung Hom South Road.

2 TRAFFIC NOISE ASSESSMENT AND MITIGATION

Monitoring undertaken for the original HHBP & PMRL EIA indicated that existing noise levels may be up to 78 dB(A) at existing properties with facades facing Hung Hom South Road. Further monitoring was undertaken which confirmed that noise levels in this area exceed planning guidelines at some locations.

Prevailing noise levels were calculated at existing noise sensitive receivers (NSRs), and maximum levels are shown in Table 1.

Table 1 Maximum Calculated Prevailing Noise Levels at Lily Mansions, Palm Mansions, Willow Mansions and Hung Hom Bay Centre

NSR	Maximum calculated prevailing noise level dB(A)
Lily Mansions	73.1
Palm Mansions	73.2
Willow Mansions	74.7
Hung Hom Bay Centre	72.9
Hung Hom South Road/Fuk Chi Street	75.4

Future noise predictions for the year 2011 indicate that a large part of the new reclamation will be subject to noise levels in excess of planning guidelines. Noise levels over the whole site are typically in the range 74-80 dB(A) with no mitigation on the local roads. Future noise levels at existing blocks along Hung Hom South Road will increase, thus mitigation will be required. Maximum predicted noise levels at the potentially noise sensitive reclamation sites are shown in Table 2.

Table 2 Maximum Predicted Noise Levels at the Reclamation Sites

Reclamation site	Maximum predicted noise level dB(A)
Comprehensive Development Area (CDA)	78
Primary School Site (E)	78
Private Sector Participation Scheme Housing Area (PSPS)	76
Waterfront Commercial Area	78
Government Use (G)	80

A number of direct technical remedies were tested for reducing noise levels. The major benefit would arise from the use of noise reducing surface on the HHBP, PMRL, Hung Hom South Road, Road B, Hung Hom Road and Road F to the junction with Road G. Provision of a barrier on the Hung Hom South Road underpass retaining walls would give further noise reduction. These measures are therefore recommended. (See figure B)

Where direct technical remedies on new roads fail to adequately protect residential sensitive facades from traffic noise levels equal to or over the 70 dB(A) Hong Kong Planning Standards and Guidelines (HKPSG) limit, indirect technical remedies (in the form of adequate

glazing and provision of air conditioning) have been considered. To determine the eligibility for indirect technical remedies, the following criteria have been used:

- (a) the predicted overall noise level from the new roads, together with other traffic noise in the vicinity, must not be less than the HKPSG criteria (eg 70 dB(A) for residential premises);
- (b) the predicted noise level must be at least 1.0 dB(A) above the prevailing noise level (ie the total traffic noise level existing before the works to construct the road were commenced); and
- (c) the contribution to the increase in the noise level from the new road must be at least 1.0 dB(A).

Details of the dwellings potentially eligible for indirect technical remedies are provided in Tables 3-7. Facade locations are shown in the attached figures A.1 and A.2.

Table 3 Hung Hom Bay Centre: Dwellings Eligible for Indirect Technical Remedies

Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria
HHB1-1	none	HHB3-3	3-8	HHB5-5	none
HHB1-2	2-14	HHB4-1	none	HHB6-1	none
HHB1-3	none	HHB4-2	1-14	HHB6-2	none
HHB1-4	none	HHB4-3	1-14	HHB6-3	none
HHB2-1	none	HHB4-4	1-10	HHB6-4	none
HHB2-2	4-13	HHB5-1	none	HHB6-5	none
HHB2-3	none	HHB5-2	none	HHB7-1	none
HHB3-1	none	HHB5-3	none	HHB7-2	none
HHB3-2	5-14	HHB5-4	none	HHB7-3	none

Table 4 Palm Mansions: Dwellings Eligible for Indirect Technical Remedies

Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria
PM 1-1	none	PM 3-7	1-16	PM 5-3	1-9
PM 1-2	none	PM 3-8	1-16	PM 5-4	4-16
PM 1-3	4-16	PM 3-9	1-16	PM 5-5	5-16
PM 1-4	none	PM 3-10	1-16	PM 5-6	none
PM 1-5	none	PM 3-11	none	PM 5-7	none
PM 1-6	none	PM 3-12	none	PM 5-8	none
PM 1-7	none	PM 3-13	none	PM 6-1	none
PM 1-8	none	PM 4-1	none	PM 6-2	none
PM 2-1	none	PM 4-2	none	PM 6-3	none
PM 2-2	none	PM 4-3	none	PM 6-4	5-16
PM 2-3	none	PM 4-4	5-16	PM 6-5	9-16
PM 3-1	none	PM 4-5	5-16	PM 6-6	none
PM 3-2	none	PM 4-6	4-16	PM 6-7	none
PM 3-3	none	PM 4-7	7-16	PM 6-8	none
PM 3-4	2-16	PM 4-8	5-16	PM 6-9	none
PM 3-5	1-16	PM 5-1	2-16	PM 6-10	none
PM 3-6	1-16	PM 5-2	2-6		

Table 5 Willow Mansions: Dwellings Eligible for Indirect Technical Remedies

Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria
WM 1-All	none	WM 5-2	none	WM 7-5	5-16
WM 2-All	none	WM 5-3	none	WM 7-6	2
WM 3-1	none	WM 5-4	4-16	WM 7-7	none
WM 3-2	none	WM 5-5	3-16	WM 7-8	none
WM 3-3	3-16	WM 5-6	1-15	WM 8-1	none
WM 4-1	7-15	WM 5-7	2-7	WM 8-2	none
WM 4-2	none	WM 5-8	2-9	WM 8-3	3
WM 4-3	8-13	WM 6-1	none	WM 8-4	1-16
WM 4-4	1-16	WM 6-2	none	WM 8-5	1-16
WM 4-5	1-16	WM 6-3	6-16	WM 8-6	1-16
WM 4-6	1-16	WM 6-4	5-16	WM 8-7	1-16
WM 4-7	1-16	WM 6-5	5-16	WM 8-8	1-16
WM 4-8	1-16	WM 6-6	2-10	WM 8-9	1-16
WM 4-9	1-14	WM 6-7	none	WM 8-10	1-16
WM 4-10	3-8	WM 6-8	6-11	WM 8-11	none
WM 4-11	none	WM 7-1	8-16	WM 8-12	none
WM 4-12	none	WM 7-2	9-16	WM 8-13	none
WM 4-13	none	WM 7-3	2-16	WM 33	none
WM 5-1	9-10	WM 7-4	5-16		

Table 6 Lily Mansions: Dwellings Eligible for Indirect Technical Remedies

Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria	Block and facade	Levels Meeting Eligibility Criteria
LM 1-1	none	LM 5-5	5-16	LM 6-2	none
LM 1-2	none	LM 5-6	none	LM 6-3	none
LM 1-3	none	LM 5-7	12-16	LM 6-4	none
LM 5-1	none	LM 5-8	none	LM 6-5	none
LM 5-2	none	LM 5-9	none	LM 6-6	none
LM 5-3	none	LM 5-10	none	LM 6-7	none
LM 5-4	1-16	LM 6-1	none	LM 6-8	none

Table 7 Hung Hom South Road/Fuk Chi Street: Dwellings Eligible for Indirect Technical Remedies

Facade	Levels Meeting Eligibility Criteria	Facade	Levels Meeting Eligibility Criteria	Facade	Levels Meeting Eligibility Criteria
A0-1	none	A0-4	none	A0-7	none
A0-2	none	A0-5	none	A0-8	none
A0-3	none	A0-6	none		

On the basis of the noise assessment, the following conclusions and recommendations are made:

- The traffic flows on the local roads are higher than predicted by the original HHBP & PMRL EIA. Areas such as Whampoa Garden will be subject to noise in excess of the HKPSG criteria as a result of local traffic alone.
- At the planning and development stage of the sites on the reclamation, special requirements such as the adoption of non-sensitive building facades should be considered. The use of such measures can be controlled through land administration and planning application procedures. This would apply to the CDA, waterfront and PSPS sites. The primary school site will be subject to high noise levels, and could only be protected through a tall barrier around the site (which would have to be almost as high as the building). It is recommended that should this site be required for educational use, the school building is insulated against traffic noise.

- On the basis of the noise level predictions, the recommended direct technical remedies option for local roads is:
 - 1) Noise reducing surfacing covering Hung Hom Road from the Hung Hom South Road to Tak On Street, Hung Hom South Road, Road F to the junction with Road G and Road B.
 - 2) 3m high noise barriers along either side of the underpass ramp walls with absorptive linings to both the ramp walls and the barriers.
- The total number of dwellings that will be exposed to noise levels in exceedance of the HKPSG noise limit without any direct technical remedies is approximately 1200.
- The total number of dwellings that will still be exposed to noise levels in exceedance of the HKPSG noise limit with the incorporation of all recommended direct technical remedies is approximately 1000.
- In accordance with the ExCo directive on 'Equitable Redress for Persons Exposed to Increased Noise Resulting from the Use of New Roads' and subject to ExCo's approval, approximately 500 eligible dwellings in the Whampoa Garden and Hung Hom Bay Centre have been identified for indirect technical remedies in the form of window improvements and provision of air-conditioners.
- The estimated cost of the indirect technical remedies is approximately \$7.5M. This assumes that air-conditioner (AC) units will be required in all eligible flats (or financial compensation provided where flats already have adequate AC's). As the properties along Hung Hom South Road which are eligible for indirect technical remedies are modern, it is anticipated that window improvements and improvements to electricity supplies for the air conditioners would not generally be required.
- Further study is needed to establish the exact locations and addresses of the eligible flats, along with issues such as adequacy of electricity supply and services to accommodate additional A/C units in the affected blocks.

3 UNDERPASS AIR QUALITY ASSESSMENT

A 42m long underpass will be constructed to carry Hung Hom Road over Hung Hom South Road. The air quality impacts of the vehicle emissions in the underpass and around the portal area during the operation of the underpass were assessed.

The impact of vehicles around the portal areas is found to be within the Air Quality Objectives given in the Air Pollution Control Ordinance.

The assessment of in-tunnel air quality shows that during normal traffic operation the levels of major pollutants will be within the tunnel air quality criteria recommended by EPD. However, in order to avoid the possible build up of pollutants during stationary traffic conditions, mechanical ventilation will be provided.

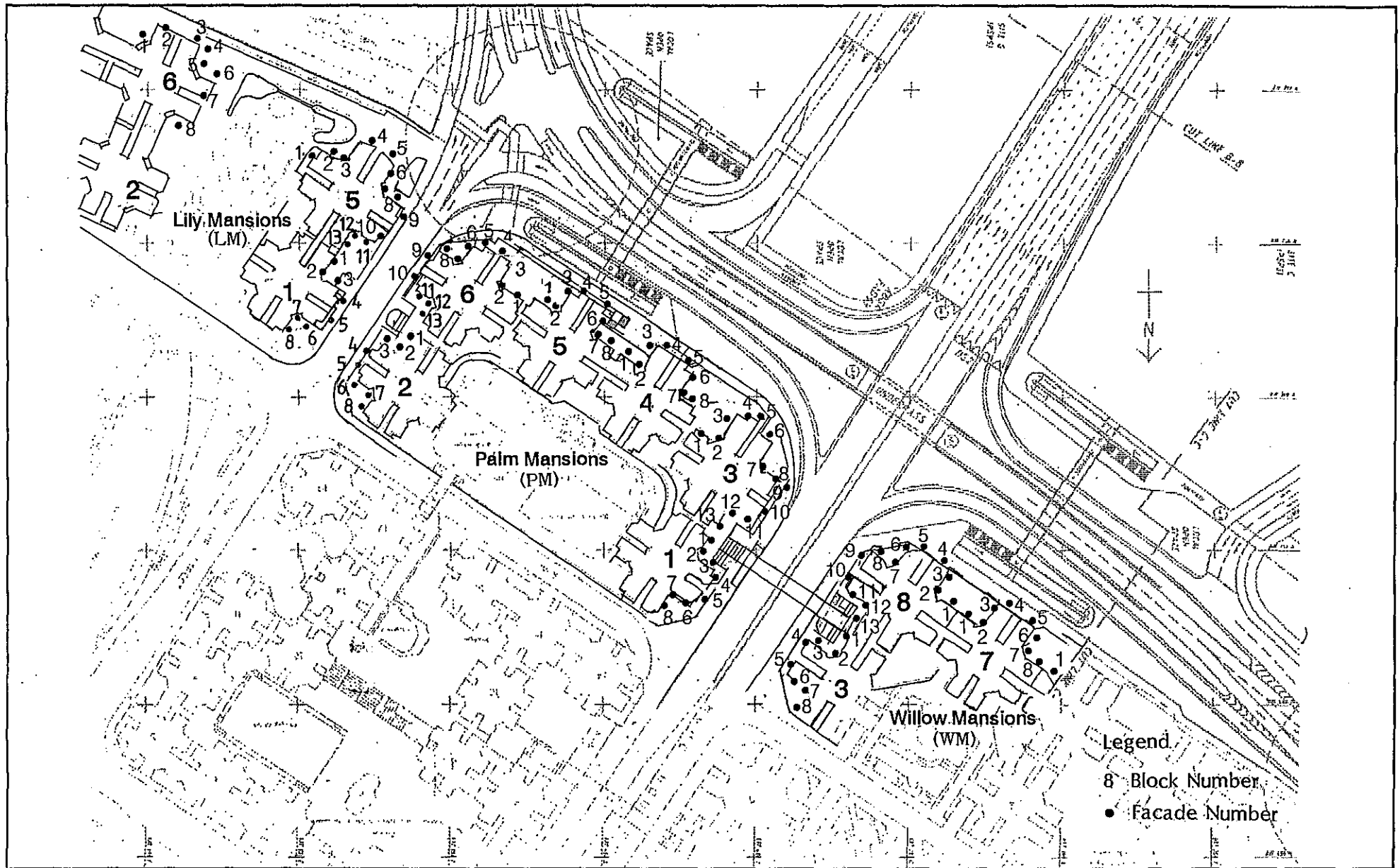


Figure A-1 Facade Numbers for Lily Mansions, Palm Mansions, & Willow Mansions

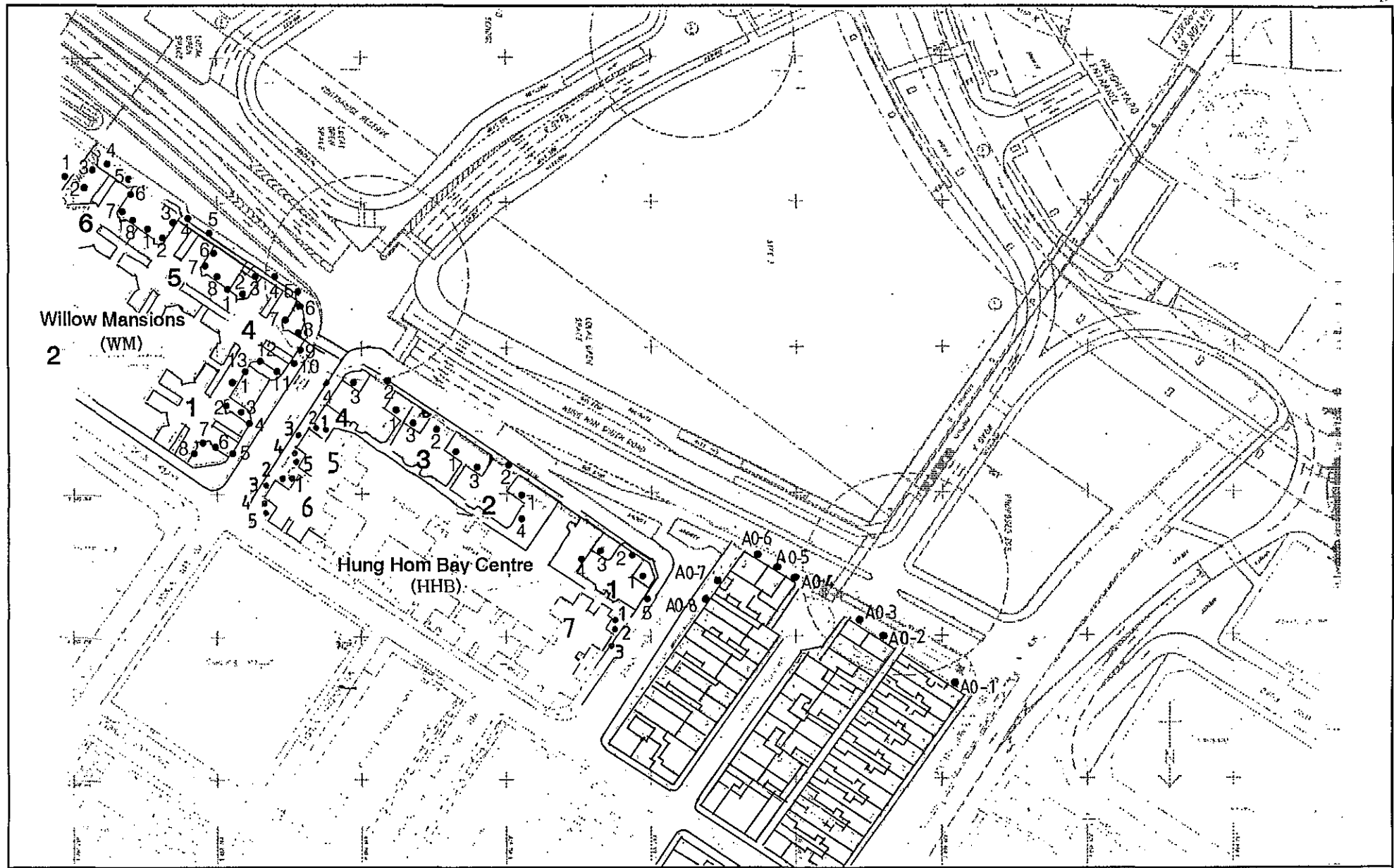


Figure A-2 Facade Numbers for Willow Mansions & Hung Hom Bay Centre

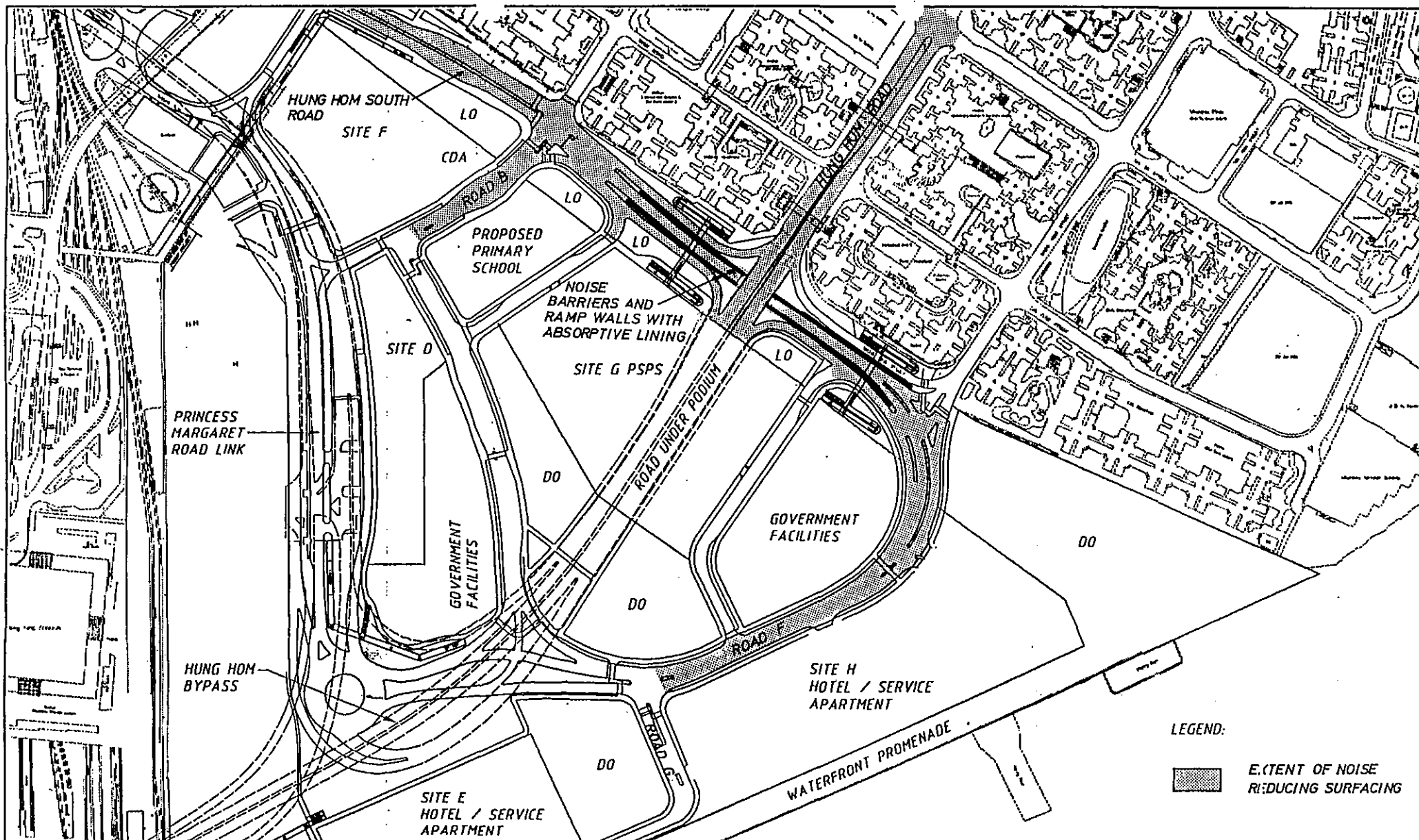


FIGURE B

ACCESS. ROADS IN HUNG HOM BAY RECLAMATION :
 RECOMMENDED DIRECT NOISE MITIGATION MEASURES

**ENGINEERING INFRASTRUCTURE ON HUNG HOM BAY RECLAMATION
TRAFFIC NOISE ASSESSMENT AND MITIGATION MEASURES AND
AIR QUALITY IMPACT ASSESSMENT ON UNDERPASS ALONG
HUNG HOM SOUTH ROAD**

ADDENDUM NO. 1 TO SUMMARY

Addendum 1a:

Page 7, first paragraph

- replace "either side" with "both sides"

Addendum 1b:

Page 7, fifth paragraph

- replace "The estimated cost of the indirect technical remedies is approximately \$7.5M." with "The estimated cost of the indirect technical remedies, including flat surveys and administration, is approximately \$10M."

Addendum 1c:

Page 7, fifth paragraph

- delete "(or financial compensation provided where flats already have adequate AC's)"