

ROCK HILL STREET EXTENSION
ENVIRONMENTAL IMPACT ASSESSMENT STUDY

Final Report

HIGHWAYS DEPARTMENT
HIGHWAYS (HONG KONG) REGION

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1 INTRODUCTION

Introduction

1. This Environmental Impact Assessment Study for the proposed Rock Hill Street Extension project has been undertaken by Highways (Hong Kong) Region of Highways Department following an earlier environmental review on the project in which the Environmental Protection Department conclude that the project is likely to cause significant noise impact. This Study is required to be carried out to identify the extent of the impact and recommend on the best practicable mitigation measures including consideration of indirect technical remedies for the residual impact when all practicable direct technical remedies have been considered and implemented. The extent of road subject to the Study includes the sections of Sands Street and North Street from Belcher's Street to and including the proposed Rock Hill Street Extension which links up Sands Street with Smithfield.

Project Background

2. The Western District Traffic Study carried out in 1988 recommended the construction of an additional link between Pokfulam Road and Connaught Road West to cater for future traffic demand. The link, scheduled for completion by 1996, comprises Belcher Bay link, Rock Hill Street Extension and Smithfield Extension. The proposed Rock Hill Street Extension involves constructing a ground level link between Sands Street and Smithfield so that future traffic travelling from Belcher Bay Link to Pokfulam Road via Smithfield Extension can avoid using the busy Belcher's Street. The proposed layout of Rock Hill Street Extension is shown on Figure 1.

3. The Transport Policy Coordinating Committee has endorsed the recommendation of Western District Traffic Study regarding the construction of Rock Hill Street Extension. The Central and Western District Board was informed of the proposed works at its Traffic and Transport Committee on 5 December 1991 and no adverse comment was made by the members. The proposed work was gazetted under the Roads (Works, Use and Compensation) Ordinance on 24 April 1992 and authorized by the Secretary for Transport on 4 December 1992.

4. Rock Hill Street Extension together with Kennedy Town Traffic Management Measures Stage 2 are included under Item 412TH of the Public Works Programme and scheduled for commencement in early 1994 and completion in 1996.

5. The Western District Traffic Study has conducted a preliminary EIA study for the proposed Rock Hill Street Extension. The study concluded that air pollution would be insignificant and only traffic noise impact might need further study. However, during the construction stage, dust will be emitted due to earthwork, slopework and roadwork. Suitable clauses will be included in the contract document requiring the Contractor to exercise care to minimise the generation of construction dust and carry out any necessary dust suppression measures such as wetting or covering any exposed earth surface. It is not expected that the water quality of the nearby area would be affected due to this project as both surface water and sewerage will be properly conveyed via underground drainage system to be constructed in conjunction with the works.

6. Environmental Protection Department carried out an environmental review for Rock Hill Street Extension in July 1992 and recommended to conduct a detailed study to determine the noise impact on the environment during both construction and operation stages.

Purpose of the Study

7. The Study is conducted to identify the extent of the noise impact arising from the proposed Rock Hill Street Extension project during the construction and operation stages and recommend on the best practicable noise mitigation measures to meet the requirements as stipulated under the Hong Kong Planning Standards & Guidelines.

2 THE SITE AND PROPOSED WORKS

Description of Site

8. Both Sands Street and Smithfield are perpendicular to Belcher's Street and are separated by about 250 m. Accessible from Sands Street, the existing Rock Hill Street is a 50 m long cul-de-sac behind and parallel to Belcher's Street. Along the existing Rock Hill Street and the proposed extension are a children playground, a rock/soil slope with mature vegetation on top, leased and unleased government lands, a Police store, a latrine and a refuse collection point. Alongside the proposed road are mixed industrial and residential developments, a proposed Urban Council Complex and a reserved government office site.

Proposed Works

9. It is proposed to construct a one-way two-lane westbound carriageway with footpath on both sides to link Sands Street/ North Street and Smithfield. To construct the proposed extension, it is necessary to resume and demolish 3 buildings at the junction of Sands Street and Rock Hill Street, to cut into the slope at the end of Rock Hill Street and to demolish all the temporary structures lying on Rock Hill Street and the proposed extension.

3 NOISE IMPACT ASSESSMENT

I OPERATION STAGE

Existing Noise Level

10. Residential buildings adjacent to Rock Hill Street Extension and the short sections of Sands Street and North Street beyond Belcher's Street will inevitably be affected by the traffic noise generated during the operation stage. Figure 2 shows locations of the Noise Sensitive Receivers (NSR) possibly affected by the proposed roadworks.

Traffic Projection for Noise Assessment

11. The following traffic scenarios are selected to establish the traffic noise level for comparison.

11.1 Design year 1993

Traffic flow figures as shown in Table 3.1 are obtained from the Western District Traffic Study. The flow figures are used to establish the existing traffic noise level.

11.2 Design year 2006 (without improvement schemes)

Traffic flow figures are obtained from the Western District Traffic Study. The flow figures as shown in Table 3.1 represent the growth of traffic flow without implementation of Western Harbour Crossing, Belcher Bay Link, Smithfield Extension, Rock Hill Street Extension and other traffic management schemes, and are thus the expected traffic noise level by 2006 in the existing road network.

11.3 Design year 2006 (with improvement schemes)

The year 2006 traffic flow forecast for Rock Hill Street Extension, Belcher's Street, North Street, Catchick Street and Smithfield as shown in Table 3.1 are derived from the traffic flow forecasts and road network capacity assessment study done in August 1993 for the Smithfield Extension Project and is taken as the design year for calculation of future noise levels noting that the traffic projections at year 2006 are higher than those in year 2011 due to an expected diversion of traffic from Smithfield Extension to Route 7 between Kennedy Town and Aberdeen which is assumed to be in place by year 2011.

TABLE 3.1
Year 1993 Traffic Flow

		Traffic Flow (veh/hr)		
		Flow at 1993	Flow at 2006 (without improvement scheme)	Flow at 2006 (with improvement scheme)
Belcher's Street	AM	989	1452	1207
	PM	1020	1498	1451
Catchick Street	AM	497	730	912
	PM	462	679	913
North Street (Catchick Street/ Belcher's Street)	AM	86	126	220
	PM	185	272	149
North Street (Belcher's Street/ Rock Hill Street Extension)	AM	*	*	96
	PM	*	*	37
Sands Street	AM	88	129	1195
	PM	88	129	1270
Rock Hill Street Extension	AM	*	*	1153
	PM	*	*	1149
Smithfield	AM	439	645	1259
	PM	390	573	1320

* Not Applicable

Assessment Methodology and Criteria

12. Future road traffic noise levels have been calculated using the methods described in the U.K. Department of Transport's publication "Calculation of Road Traffic Noise" (1988) published by H.M. Stationery Office.

13. Noise prediction has been based on the worst-case traffic scenario, taking into account the effects of traffic flow, traffic speed, percentage of heavy vehicle, gradient and surface type of the road, the distance, angle of view and facade reflection. Friction course shall be provided on road surfaces of Rock Hill Street Extension, the sections of Sands Street and North Street between Belcher's Street and Rock Hill Street Extension.

14. To determine the effects of traffic on the NSR, both traffic figures of morning and afternoon peaks have been used in the calculations. Since most Noise Sensitive Receivers are multi-storey buildings, the noise level at each floor level will be slightly different and only the highest noise levels are presented. Samples of traffic noise prediction are attached at Appendix I for reference.

15. Impact Assessment

The traffic noise study was carried out following the Hong Kong Planning Standards & Guidelines. Consideration of noise mitigation measures are required if all of the following criteria as set out by EPD are met with:-

- (a) the predicted overall noise level from the new or improved road together with other traffic noise in the vicinity will be more than the HKPSG criteria, i.e. 70 dB(A) L10(1 hour);
- (b) the predicted noise level will be at least 1.0 dB(A) more than the prevailing noise level, i.e. 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 or improved road will be at least 1.0 dB(A).

As a general principle for the provision of noise mitigation measures, equitable redress in the form of direct technical remedies should be considered wherever practicable. As recommended in the Hong Kong Planning Standards & Guidelines, direct technical remedies shall be barriers in the form of earth berms or solid fences to be built adjacent to the road or total enclosure to the road.

The predicted traffic noise levels at each of the noise sensitive receivers at years 1993 and 2006 are shown on Figures 3 and 4 respectively. Comparison of the noise levels with respect to the above three criteria are tabulated in Appendix II. Detailed assessment of each noise sensitive receiver are discussed as follows:-

15.1 **Sands Street (Section between Belcher's Street and Rock Hill Street)**

(a) **Man Fat Building (NSR 14), Sun's Building (NSR 13) and House No. 1G (NSR 11)**

The three criteria for consideration of noise mitigation measures are met. Direct technical remedies in the form of total enclosure was first considered but found to be impractical due to the following reasons:

- (i) Erection of the enclosure will reduce the footpath width to less than 1m which is not acceptable.
- (ii) The enclosure will obstruct kerbside access, street lighting, traffic signage and maintenance access to utilities services.
- (iii) The enclosure will obstruct emergency access to buildings. Provision of openings fronting building access will defeat the original intent of the enclosure.

(b) **Ying Ga Garden (NSR 12), House No. 3 Sands Street (NSR 9) and House No. 19 Tai Pak Terrace (NSR 18)**

The predicted traffic noise levels are 65.9 dB(A), 69.1 dB(A) and 64.8 dB(A) respectively and hence no noise mitigation measure is required.

15.2 **Rock Hill Street Extension (Section between House No. 1J Sands Street and Po Fat Building)**

After resumption and demolition of House No. 1K, 1L and 1M, the south eastern side of Po Fat Building facing Sands Street and the southern side of House No. 1J, Sands Street will be affected by the future traffic noise. The impact assessment is as follows:-

(a) **Po Fat Building (Position behind House No. 1M Sands Street) (NSR 10)**

The affected premises are in fact the same premises fronting Rock Hill Street Extension facing southward and will be discussed in para. 15.3(a) below.

- (b) Po Fat Building (Position behind No. 1K & 1L, Sands Street) (NSR 10a) and (premises at South Side of 1J Sands Street) (NSR 10b)

The predicted traffic noise levels are 69.5 dB(A) and 70 dB(A) respectively and hence no noise mitigation measure is required.

15.3 Rock Hill Street Extension

The predicted traffic noise levels along Rock Hill Street Extension range from 62.2 dB(A) to 75.4 dB(A). Compared to the existing traffic noise levels which lie between 47.7 dB(A) and 67.9 dB(A), future traffic noise levels are in general higher and exceed the HKPSG standard. Detailed impact assessment of the buildings along Rock Hill Street Extension are as follows:-

- (a) Po Fat Building (NSR 8)

The three criteria for consideration of noise mitigation measures are met. Direct technical remedies in the form of noise barrier was first considered but found to be impractical due to the following reasons:-

- (i) The footpath fronting this building will be reduced to a width of 0.5m upon erection of a barrier.
- (ii) Upper part of the barrier will encroach into the first floor of the building.
- (iii) Due to site constraint, the radius of the outside curve of the carriageway is already the minimum in terms of safety consideration. Realigning the road to widen the footpath fronting the building will tighten the outside curve of the carriageway and reduce the footpath width on the opposite side to 0.5m. Such arrangement will endanger the motorists and pedestrians and is considered unacceptable.
- (iv) The barrier will obstruct emergency access to buildings. Provision of openings fronting building access will defeat the original intent of the barrier.

- (b) Tin Shing Industrial Building, Tin Lung Factory Building and Kam Mow Industrial Building

As these are industrial buildings, noise mitigation measures are not required.

(c) House No. 40 Belcher's Street (NSR 7)

The predicted traffic noise level is 64.3 dB(A) and hence no noise mitigation measures is required.

(d) Kin Yu Mansion (NSR 6), Kam Po Mansion (NSR 4), Kin Liong Mansion (NSR 3) and Pit Fat Building (NSR 2)

The three criteria for consideration of noise mitigation measures are met. Direct technical remedies in the form of noise barrier was first considered but found to be impractical due to the following reasons:-

- (i) These buildings are located on either side of North Street and the erection of noise barriers will lead to sight line problem endangering the road users. To eliminate this problem, it has been suggested to retain North Street as a cul-de-sac upon completion of Rock Hill Street Extension. Transport Department did not agree to this proposal and advised that the connection of North Street to Rock Hill Street Extension formed an important part of the Kennedy Town Traffic Management Measures which would help to resolve the traffic congestion problem in the area. Upon commissioning of the Western Harbour Crossing, there would be a lot of traffic flow along Sands Street and Rock Hill Street Extension. North Street would also serve as an emergency route in case there was any problem arising from the major route along Sands Street/Rock Hill Street Extension.
- (ii) The barrier will obstruct emergency access to buildings. Provision of openings fronting building access will defeat the original intent of the barrier.

(e) Man Kwong Court (NSR 1) and Lungga Mansion (NSR 5)

Since there is a tall podium at Man Kwong Court and that Lungga Mansion having a podium up to second floor level is set back about 5.5m from its building line, the predicted traffic noise levels are found to be 66.7 dB(A) and 69.1 dB(A) respectively and hence no noise mitigation measure is required.

15.4

North Street (Section between Belcher's Street and Rock Hill Street Extension)

- (a) **House No. 54, Belcher's Street (NSR 17) and House No. 29-35, North Street (NSR 17a)**

With the provision of friction course, the predicted traffic noise level at House No. 54, Belcher's Street is 70.2 dB(A) which is less than the prevailing noise level of 70.6 dB(A) while the predicted noise level at House No. 29-35 is 69.1 dB(A) which is less than 70 dB(A). No noise mitigation is required.

- (b) **Kam Po Mansion (NSR 16)**

The three criteria for consideration of noise mitigation measures are met. Direct technical remedies in the form of total enclosure was first considered but found to be impractical due to the same reasons as stated in para. 15.1(a) above.

16. As discussed in para. 15 above, the provision of direct technical remedies in the form of noise barrier or total enclosure are not practicable due to various site constraints. Subject to further detailed investigation, consideration of indirect technical remedies comprising insulation and the provision of air conditioners will be required. Subject to final decision by the Executive Council, some of the dwellings within the following buildings may be eligible for the provision of indirect technical remedies:

- (i) **Sands Street**

Man Fat Building, Sun's Building, House Nos. 1E, 1F, 1G, 1H & 1J.

- (ii) **Rock Hill Street Extension**

Po Fat Building, Kin Yu Mansion, Kam Po Mansion, Kin Liong Mansion and Pit Fat Building

- (iii) **North Street**

Kam Po Mansion and Kin Liong Mansion.

17. The number of dwellings possibly affected by future traffic noise requiring consideration of indirect technical remedies is approximately in the order of 500 and the estimated order of cost involved is \$25 million. Subject to Executive Council's approval, a separate detailed investigation will be carried out to establish the exact extent of the affected premises requiring provision of such remedies.

II CONSTRUCTION STAGE

18. Construction noise will be generated by powered mechanical equipment used for the construction of a proposed road on Rock Hill Street. This could have significant noise impacts on the dwellings in the neighbourhood of the site, depending on the type of construction equipment as well as whether the work activities are close to the dwellings.

Assessment Methodology and Criteria

19. For the current study, the assessment of construction noise impact is achieved by examining the maximum noise level calculated in terms of L_{eq} arising from individual activity at the facade of the identified Noise Sensitive Receivers. The approach is similar to the procedure as laid down in the Technical Memorandum of the Noise Control Ordinance.

20. At present, there is no statutory control on construction noise during the day-time in the Noise Control Ordinance. However, in considering the environment of the area under study, the day time construction noise limit is taken as 75dB(A) L_{eq} (30 min) at 1m from the window facade of the nearby residential premises.

Impact of Daytime Activities

21. The detailed assessment on the maximum predicted noise level during the construction stage is shown in Appendix III.

22. As can be observed from Table 3 of Appendix III, the predicted construction noise level at all the NSR's under the worst conditions will exceed the criterion of 75 dB(A). The excessive noise level is mainly due to the extremely close proximity of the construction area to the dwellings. The results simply indicate a realistic worst case noise level at the closest noise sensitive receiver to the work area of each construction activity; noise levels at other residential areas adjacent to the work area are not likely to exceed those reported here. The approach adopted during the assessment is to predict impacts during a worst case operation, whereby all construction equipment has been assumed to be operating at a particular point in the construction area of each activity. In reality, this intensity of activities is unlikely to occur for eight hours per day, six days per week.

Impact of Night Works

23. The results presented in Appendix III refers to the impact on daywork activities. It is expected that night works will not be required so the noise levels for night works have not been considered.

Practical Mitigation Measures

24. In order to mitigate excessive construction noise, the following practical measures could be considered:

- (a) re-scheduling of construction of activities to avoid parallel operations of several sets of equipment;
- (b) adequate and appropriate maintenance of construction plants;
- (c) programming the noisy operations to be carried out during periods having high background noise;
- (d) reduction of operations items of powered mechanical equipment;
- (e) turning off powered mechanical equipment whenever possible;
- (f) re-arrangement of equipment such that the noisy construction equipment to be located at a reasonable distance from noise sensitive receivers;
- (g) application of silenced equipment; and
- (h) screening of specific receivers by the application of temporary noise barriers, acoustic sheds or earth bunds.

25. It is not a common practice to introduce stringent restrictions on the methods of construction to be employed by the Contractor. However, with an aim to mitigating excessive construction noise during construction, it is recommended that appropriate noise control measures be incorporated in the Contract; stipulating that the construction noise standards to be met by the Contractor as well as any monitoring procedure to be followed during construction. As recommended by EPD, the above measures shall be translated into the contract requirements. Suitable clauses for some of the measures as advised by EPD appended in Appendix IV shall be included in the contract.

26. With combination of the measures laid down in paragraph 24, in particular the use of acoustic sheds to screen noisy activities such as road/rock breaking and slope cutting, the corresponding construction noise levels at the facades of the Noise Sensitive Receivers can be reduced by 20 dB(A) to achieve the criterion of 75 dB(A). It should be also noted that the noise impact on the NSR due to the roadwork will be reduced gradually as the roadwork moves along, since the roadwork activities are not stationary. Moreover, the duration of having the high construction noise impact will not last long, since the noisy operations such as lorries and concreting will only operate for a rather short duration.

27. It is recommended that construction noise levels should be closely monitored during the construction stage so that appropriate mitigation measures could immediately be implemented if found necessary. The proposed monitoring system is described in para. 28 below. The primary purpose of the construction phase noise monitoring and auditing programme is to check compliance with any daytime noise criteria in the contract documents.

Compliance Monitoring

28. The monitoring schedule should be determined by the Engineer depending on the Contractor's method of construction. The procedure of noise monitoring should follow that contained in the Technical Memorandum on Noise from Construction Works other than Percussive Piling. Measurements should be carried out at least twice per day, or more frequently if noise levels become high. Under the above monitoring programme, noise at level 75dB(A) Leq(30 min) or below shall be always maintained. However, the action plans as illustrated in Table 3.2 are recommended to be added to the monitoring proposal.

TABLE 3.2

Immediate Actions to be Implemented

Event	Action	
	Engineer	Contractor
If noise level exceeds 75 dB(A)	<ul style="list-style-type: none"> - Notify Contractor. - Require Contractor to propose measures to reduce noise. - Increase monitoring frequency. 	<ul style="list-style-type: none"> - Submit noise mitigation proposals to the Engineer. - Implement noise mitigation measures.
When a complaint is received	<ul style="list-style-type: none"> - Notify Contractor - Conduct measurement - Investigate noisy operations 	
When more than one complaints are received within 2 weeks' time	<ul style="list-style-type: none"> - Notify Contractor - Investigate and analyze - Require Contractor to propose measures for the analyzed noise problem - Increase monitoring frequency to check mitigation effectiveness 	<ul style="list-style-type: none"> - Submit noise mitigation proposal to Engineer - Implement noise mitigation proposal

4 CONCLUSION AND RECOMMENDATION

Noise impact

I OPERATION STAGE

29. Following the construction and opening of the proposed Rock Hill Street Extension, some of the premises along Rock Hill Street Extension and sections of Sands Street and North Street to the south of Belcher's Street will be subject to traffic noise levels exceeding the criteria as set out under the Hong Kong Planning Standards & Guidelines. To ameliorate the noise impact, it is recommended that the roads be surfaced with friction course, which, because of its honeycomb like structural property, reduces noise from tyres on the road. Other possible measures to mitigate noise propagation include the erection of noise barriers or total enclosures but were considered impractical in view of site limitation. Subject to approval by Executive Council, provision of indirect technical remedies in the form of insulation and air-conditioners will need to be considered for the following premises as shown on Figure 5 :

(i) Sands Street

Man Fat Building, Sun's Building, House Nos. 1E, 1F, 1G, 1H & 1J.

(ii) Rock Hill Street Extension

Po Fat Building, Kin Yu Mansion, Kam Po Mansion, Kin Liong Mansion and Pit Fat Building

(iii) North Street

Kam Po Mansion and Kin Liong Mansion.

30. It is further recommended that the exact extent of premises eligible for the provision of indirect technical remedies should be subject to further detailed investigation.

II CONSTRUCTION STAGE

31. During the construction of the Rock Hill Street Extension project, excessive noise levels will be generated in the immediate vicinity of operations which are at close proximity to the nearby residential premises. Adopting the mitigation measures as recommended in para. 25 above will keep the noise impact to within the planning criterion. Moreover, regular monitoring of the construction noise level will be implemented to control the noise impact.

32. It is recommended that relevant clauses for the noise mitigation measures and monitoring procedure be included under the contract documents requiring the Contractor to ensure the noise levels arising from his site activities are minimised.

APPENDIX I

SAMPLES OF TRAFFIC NOISE PREDICTION

**ROCK HILL STREET EXTENSION
AND KENNEDY TOWN TRAFFIC MANAGEMENT MEASURES
ENVIRONMENTAL IMPACT ASSESSMENT**

Traffic Noise Prediction at Rock Hill Street Extension

Year 1993
No RHSE

Location : Pit Fat Building

Segment : 1 Smithfield

**STAGE 1
BASIC NOISE LEVEL**

	Above proposed carriageway (m)								Remark	Above proposed carriageway (m)								
	1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2		1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2	
Traffic flow Q (veh/h)	439.0	439.0	439.0	439.0	439.0	439.0	439.0	439.0	L (10)	c7	68.6	68.6	68.6	68.6	68.6	68.6	68.6	68.6
Traffic speed V (km/h)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	BNL corr.	c8	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Heavy vehicles p (%)	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6										
Gradient G (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		c6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Design speed Vd (km/h)	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6										
Road surface	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious		P16.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
											BNL	70.6	70.6	70.6	70.6	70.6	70.6	70.6

**STAGE 2
PROPAGATION**

Shortest horz. dist. d (m)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	Prop. corr.	c7	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1	
Relative height h (m)	0.7	5.7	10.7	15.7	20.7	25.7	30.7	35.7											
Average height H (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Ground cover l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
Noise barrier height h' (m) dist. from kerb d' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
Path difference p' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Log p'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
											Total corr.	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1

**STAGE 3
SITE LAYOUT**

Facade	yes	yes	yes	yes	yes	yes	yes	yes	SL corr.	P26.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Opp. facade angle (deg)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0		P26.2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Angle of view (deg)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0		c10	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	
											Total corr.	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1

**STAGE 4
COMBINING NOISE LEVELS**

BNL	70.6	70.6	70.6	70.6	70.6	70.6	70.6	70.6
Prop. corr.	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1
SL corr.	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1
Noise Level	62.5	62.4	62.3	62.2	62.0	61.8	61.6	61.3

Remark C1 - Chart 1
P16.1 : Paragraph 16.1
from "Calculation of Road Traffic Noise"

**ROCK HILL STREET EXTENSION
AND KENNEDY TOWN TRAFFIC MANAGEMENT MEASURES**

ENVIRONMENTAL IMPACT ASSESSMENT

Traffic Noise Prediction at Rock Hill Street Extension

Year 2006
No RHSE

Location : Pit Fat Building

Segment : 1 Smithfield

**STAGE 1.
BASIC NOISE LEVEL**

	Above proposed carriageway (m)								Remark	Above proposed carriageway (m)								
	1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2		1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2	
Traffic flow Q (veh/h)	645.0	645.0	645.0	645.0	645.0	645.0	645.0	645.0	L (10)	c7	70.3	70.3	70.3	70.3	70.3	70.3	70.3	70.3
Traffic speed V (km/h)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	BNL corr.	c4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.3
Heavy vehicles p (%)	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6										
Gradient G (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		c5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Design speed Vd (km/h)	47.6	47.6	47.6	47.6	47.6	47.6	47.6	47.6										
Road surface	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious		P1&I	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0
									BNL		72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2

**STAGE 2.
PROPAGATION**

Shortest horz. dist. d (m)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	Prop. corr.	c7	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1
Relative height h (m)	0.7	5.7	10.7	15.7	20.7	25.7	30.7	35.7										
Average height H (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ground cover l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Noise barrier height h' (m) dist. from kerb d' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0										
Path difference p' (m) Log p'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
									Total corr.		-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1

**STAGE 3.
SITE LAYOUT**

Facade	yes	yes	yes	yes	yes	yes	yes	yes	SL corr.	P2&I	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Opp. facade angle (deg)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0		P2&J	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Angle of view (deg)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0		c10	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1
									Total corr.		-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1

**STAGE 4.
COMBINING NOISE LEVELS**

BNL	72.2	72.2	72.2	72.2	72.2	72.2	72.2	72.2
Prop. corr.	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1
SL corr.	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1

Noise Level	64.1	64.1	64.0	63.9	63.7	63.5	63.2	63.0
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**ROCK HILL STREET EXTENSION
AND KENNEDY TOWN TRAFFIC MANAGEMENT MEASURES
ENVIRONMENTAL IMPACT ASSESSMENT**

Traffic Noise Prediction at Rock Hill Street Extension

Year 2008
With RHSE

Location : Pit Fat Building

Segment : 1 Smithfield

**STAGE 1
BASIC NOISE LEVEL**

	Above proposed carriageway (m)								Remark	Above proposed carriageway (m)								
	1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2		1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2	
Traffic flow Q (veh/h)	1320.5	1320.5	1320.5	1320.5	1320.5	1320.5	1320.5	1320.5	L (10)	c2	73.4	73.4	73.4	73.4	73.4	73.4	73.4	73.4
Traffic speed V (km/h)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	BNL corr.	c4	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
Heavy vehicles p (%)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0										
Gradient G (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		c5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Design speed Vd (km/h)	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3										
Road surface	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious	Impervious		F16.1	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0	-1.0

BNL 71.8 71.8 71.8 71.8 71.8 71.8 71.8 71.8

**STAGE 2
PROPAGATION**

Shortest horz. dist. d (m)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	Prop. corr.	c7	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1	
Relative height h (m)	0.7	5.7	10.7	15.7	20.7	25.7	30.7	35.7											
Average height H (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Ground cover l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
Noise barrier height h' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
dist. from kerb d' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
Path difference p' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
Log p'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0											
Total corr.																			

Total corr. -5.0 -5.0 -5.1 -5.3 -5.4 -5.7 -5.9 -6.1

**STAGE 3
SITE LAYOUT**

Facade	yes	yes	yes	yes	yes	yes	yes	yes	SL corr.	F16.1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Opp. facade angle (deg)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0		F16.2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	
Angle of view (deg)	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0		c10	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	-7.1	
Total corr.																			

Total corr. -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1 -3.1

**STAGE 4
COMBINING NOISE LEVELS**

BNL	71.8	71.8	71.8	71.8	71.8	71.8	71.8	71.8
Prop. corr.	-5.0	-5.0	-5.1	-5.3	-5.4	-5.7	-5.9	-6.1
SL corr.	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1	-3.1

Noise Level
63.7 63.7 63.6 63.5 63.3 63.1 62.8 62.6

Remark C1 - Class J
F16.1: Paragraph 16.1
from "Calculations of Road Traffic Noise"

**ROCK HILL STREET EXTENSION
AND KENNEDY TOWN TRAFFIC MANAGEMENT MEASURES**

ENVIRONMENTAL IMPACT ASSESSMENT

Traffic Noise Prediction at Rock Hill Street Extension

Year 2006
With RHSE

Location : Pit Fat Building

Segment : 7 Rock Hill Street Extension (Between North St. & Smithfield)

**STAGE 1
BASIC NOISE LEVEL**

	Above proposed carriageway (m)								Remark	dB(A)	Above proposed carriageway (m)								dB(A)	
	1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2			1.2	6.2	11.2	16.2	21.2	26.2	31.2	36.2		
Traffic flow Q (veh/h)	1153.1	1153.1	1153.1	1153.1	1153.1	1153.1	1153.1	1153.1	L (10)	c2	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8
Traffic speed V (km/h)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	BNL corr.	c4	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2	-1.2
Heavy vehicles p (%)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0												
Gradient G (%)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		c5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Design speed Vd (km/h)	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3												
Road surface	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious	Pervious		P1&1	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5	-3.5
									BNL		68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7

**STAGE 2
PROPAGATION**

Shortest horz. dist. d (m)	9.0	9.0	9.0	9.0	9.0	9.0	9.0	9.0	Prop. corr.	c7	0.3	-0.1	-0.9	-1.7	-2.5	-3.3	-3.9	-4.5		
Relative height h (m)	0.7	5.7	10.7	15.7	20.7	25.7	30.7	35.7												
Average height H (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Ground cover l	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0												
Noise barrier height h' (m) dist. from kerb d' (m)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0												
Path difference p' (m) Log p'	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		c9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
									Total corr.		0.3	-0.1	-0.9	-1.7	-2.5	-3.3	-3.9	-4.5		

**STAGE 3
SITE LAYOUT**

Facade	yes	yes	yes	yes	yes	yes	yes	yes	SL corr.	P1&1	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Opp. facade angle (deg)	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0		P1&2	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Angle of view (deg)	120.0	120.0	120.0	120.0	120.0	120.0	120.0	120.0		c10	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8	-1.8
									Total corr.		2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2

**STAGE 4
COMBINING NOISE LEVELS**

BNL	68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7			68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7	68.7
Prop. corr.											0.3	-0.1	-0.9	-1.7	-2.5	-3.3	-3.9	-4.5		
SL corr.											2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Noise Level	71.3	70.9	70.1	69.3	68.4	67.7	67.1	66.5												

Remark C1 : Chart 3
P1&1 : Paragraph 16.1
from " Calculation of Road Traffic Noise "

APPENDIX II

EPD CRITERIA APPLIED TO
ROCK HILL STREET EXTENSION

EPD Criteria applied to Rock Hill Street Extension

Open-textured Wearing Courses along Rock Hill Street Ext.,
Sands Street and North Street.

Noise reduction : -3.5dB

NSRs between Rock Hill Street Extension and Belcher's Street

NSR	Location	Height (mPD)	A	B	A'	B'	PNL	ONL	Criteria 1	Criteria 2	Criteria 3	Mitigation Required?
									(ONL >70)	(ONL -PNL>1)	(ONL -B'>1)	
1 Man Kwong Court	RHSE	23.5	0.0	47.7	65.9	49.3	47.7	66.0	No	Yes	Yes	No
		58.5	0.0	63.8	60.5	65.5	63.8	66.7	No	Yes	Yes	No
2 Pit Fat Building	RHSE	7.0	0.0	62.5	71.2	64.1	62.5	72.0	Yes	Yes	Yes	Yes
		42.0	0.0	61.3	66.3	63.0	61.3	68.0	No	Yes	Yes	No
3 Kin Liong Mansion	RHSE	7.0	0.0	62.7	75.0	64.4	62.7	75.4	Yes	Yes	Yes	Yes
		42.0	0.0	62.2	68.1	63.9	62.2	69.5	No	Yes	Yes	No
4 Kam Po Mansion	RHSE	7.0	0.0	59.5	74.7	61.2	59.5	74.9	Yes	Yes	Yes	Yes
		42.0	0.0	59.3	67.8	60.9	59.3	68.6	No	Yes	Yes	No
5 Lungga Mansion	RHSE	7.0	0.0	0.0	69.1	0.0	0.0	69.1	No	Yes	Yes	No
		42.0	0.0	0.0	64.6	0.0	0.0	64.6	No	Yes	Yes	No
6 Kin Yu Mansion	RHSE	7.0	0.0	58.7	73.1	60.4	58.7	73.3	Yes	Yes	Yes	Yes
		42.0	0.0	58.6	67.2	60.3	58.6	68.0	No	Yes	Yes	No
7 40 Belcher's Street	RHSE	13.7	0.0	0.0	58.7	0.0	0.0	58.7	No	Yes	Yes	No
		48.7	0.0	0.0	64.3	0.0	0.0	64.3	No	Yes	Yes	No
8 Po Fat Building	RHSE	7.0	0.0	0.0	74.7	0.0	0.0	74.7	Yes	Yes	Yes	Yes
		42.0	0.0	0.0	67.8	0.0	0.0	67.8	No	Yes	Yes	No
9 3 Sands Street	RHSE	22.8	0.0	0.0	69.1	0.0	0.0	69.1	No	Yes	Yes	No
		57.8	0.0	0.0	64.5	0.0	0.0	64.5	No	Yes	Yes	No
10 Po Fat Bldg. (Sands Street)	Sands Street	7.0	0.0	0.0	73.2	0.0	0.0	73.2	Yes	Yes	Yes	Yes
		42.0	0.0	0.0	66.8	0.0	0.0	66.8	No	Yes	Yes	No
10 a Po Fat Bldg. (Position behind 1K & 1L Sands Street)	Sands Street	7.0	0.0	0.0	69.5	0.0	0.0	69.5	No	Yes	Yes	No
		42.0	0.0	0.0	66.1	0.0	0.0	66.1	No	Yes	Yes	No
10 b 1J Sands Street (Premises at South Side of 1J Sands Street)	Sands Street	7.0	0.0	0.0	70.0	0.0	0.0	70.0	No	Yes	Yes	No
		42.0	0.0	0.0	66.6	0.0	0.0	66.6	No	Yes	Yes	No
11 1G Sands Street	Sands Street	7.0	0.0	64.8	73.9	66.5	64.8	74.6	Yes	Yes	Yes	Yes
		34.0	0.0	63.5	67.2	65.1	63.5	69.3	No	Yes	Yes	No
12 Ying Ga Garden	Sands Street	30.0	0.0	67.6	-	69.3	67.6	65.9	No	No	No	No
		97.0	0.0	65.4	-	97.1	65.4	64.6	No	No	No	No
13 Sun's Building	Sands Street	7.0	0.0	64.4	73.4	66.0	64.4	74.1	Yes	Yes	Yes	Yes
		42.0	0.0	62.7	65.3	64.4	62.7	67.9	No	Yes	Yes	No
14 Man Fat Building	Sands Street	7.0	0.0	69.1	72.8	70.8	69.1	74.9	Yes	Yes	Yes	Yes
		33.5	0.0	66.7	65.2	68.4	66.7	70.1	Yes	Yes	Yes	Yes
16 37-41 North Street	North Street	7.0	0.0	61.9	70.8	63.5	61.9	71.5	Yes	Yes	Yes	Yes
		27.0	0.0	61.1	67.0	62.8	61.1	68.4	No	Yes	Yes	No
17 54 Belcher's Street	North Street	6.1	0.0	70.6	-	72.3	70.6	70.2	Yes	No	No	No
		35.0	0.0	66.5	-	68.1	66.5	65.9	No	No	No	No
17 a 35 North Street	North Street	7.0	0.0	64.1	66.4	65.7	64.1	69.1	No	Yes	Yes	No
		27.0	0.0	63.3	62.4	65.0	63.3	66.9	No	Yes	Yes	No
18 19 Tai Pak Terrace	Sands Street	16.5	0.0	59.1	56.6	60.8	59.1	62.2	No	Yes	Yes	No
		51.5	0.0	58.0	63.2	59.7	58.0	64.8	No	Yes	Yes	No

Remarks

- A = Existing Noise Level from new highway or highway to be altered prior to commencement of Works
- B = Existing Noise Level from all other highways in the vicinity prior to commencement of Works
- A' = Predicted Noise Level from new highway or altered highway at completion of Works
- B' = Predicted Noise Level from all other highways in the vicinity at completion of Works
- PNL = Prevailing Noise Level
- ONL = Predicted Overall Noise Level

APPENDIX III

ASSESSMENT ON THE MAXIMUM PREDICTED
NOISE LEVEL DURING CONSTRUCTION STAGE

Construction Activities and Equipment

1. For the purposes of assessing noise impacts from the construction of the proposed road on Rock Hill Street, five different intensities of activity are identified. A summary of the construction activities, necessary mechanical equipment, and sound power levels (SPL) for the equipment is provided in Table 1.

TABLE 1

Construction Activities and Equipment

Construction Activity	Equipment/Quantity	Sound Power Level (SPL) dB(A)
Demolishing of buildings	Excavator-mounted hydraulic concrete crusher	1 102
	Lorry	1 112
Cutting of slope	Hand-held pneumatic breaker, silenced	1 110
	Air compressor, super silenced	1 95
	Backhoe	1 112
	Lorry	1 112
Construction of bored-pile retaining wall	Excavation:	
	Bored-piling machine	1 115
	Lorry	1 112
	Concreting:	
	Concrete lorry mixer	1 109
Hand-held vibratory poker	1 113	
Cutting of knoll	Hand-held pneumatic breaker, silenced	1 110
	Air compressor, super silenced	1 95
	Backhoe	1 112
	Lorry	1 112
Roadwork	Excavation:	
	Hand-held pneumatic breaker, silenced	1 110
	Air compressor, super silenced	1 95
	Lorry	1 112
	Compaction:	
	Paver	1 109
	Road Roller	1 108
	Concreting:	
	Concrete lorry mixer	1 109
Hand-held vibratory poker	1 113	

Sensitive Receivers

2. The closest sensitive receiver for the construction area of each activity is selected in order to determine the worst case situation. A summary for the identified Noise Sensitive Receivers (NSR's) and the Notional Noise Sources (NNS's), as well as their distance is shown in Table 2.

TABLE 2

Distance between NSR and NNS for each Construction Activity

Construction Activity	Noise Sensitive Receiver	Distance (m)
Demolishing of buildings	1J, Sands Street	8
Cutting of slope	Kin Yu Mansion	35
Construction of bored-pile retaining wall	Kin Yu Mansion	17
Cutting of knoll	Kin Yu Mansion	12
Roadwork	Kam Po Mansion	8

Construction Noise Impact Assessment

3. The total sound power level (SPL) produced by each on-site construction activity is as follows:

- (a) Demolishing of buildings = 112.5 dB(A)
- (b) Cutting of slope = 116.0 dB(A)
- (c) Construction of bored-pile retaining wall
 - excavation = 117.0 dB(A)
 - concreting = 114.5 dB(A)
- (d) Cutting of knoll = 116.0 dB(A)
- (e) Roadwork
 - excavation = 114.0 dB(A)
 - compaction = 111.5 dB(A)
 - concreting = 114.5 dB(A)

4. If an activity happens to be occurred coinciding with another activity at some distances away, the receiver at any one location is expected to have a perceived noise level negligibly higher than the calculated maximum noise level arising from either activity in isolation. This is not the case when two equally noisy activities operating in close distance effect at nearest receiver can be higher than the calculated maximum noise level arising from either activity in isolation by 3 dB(A).

Impact of Daytime Activities

5. The maximum construction noise levels at the facades of the identified Noise Sensitive Receivers (NSRs) for the daytime activities have been predicted based on the sound power levels of the equipment to be used. In order to determine the worst noise level at each receiver, all the equipment of each construction activity is assumed to operate in parallel at any one time. The distance corrected noise levels predicted for each NSR from each construction activity is given below in Table 3. A facade correction of +3 dB(A) has been added to the results.

TABLE 3

Maximum noise levels at NSR's

Construction Activity	Noise Sensitive Receiver (NSR)	Maximum Predicted Noise Level, dB(A)
Demolishing of buildings	1J, Sands Street	89.5
Cutting of slope	Kin Yu Mansion	80.0
Construction of bored-pile retaining wall	Kin Yu Mansion	89.0
Cutting of knoll	Kin Yu Mansion	89.0
Roadwork	Kam Po Mansion	95.5

APPENDIX IV

RECOMMENDED NOISE POLLUTION CONTROL CLAUSES

Recommended Noise Pollution Control Clauses

1. The Contractor shall comply with and observe the Noise Control Ordinance and its subsidiary regulations in force in Hong Kong.
2. The Contractor shall provide an approved integrating sound level meter to IEC 651 : 1979 (Type 1) and 804 : 1985 (Type 1) for the exclusive use of the Engineer at all times. The Contractor shall maintain the meter in proper working order and provide a substitute when the meter is out of order or otherwise not available.
3. In addition to the requirements imposed by the Noise Control Ordinance, to control noise generated from equipment and activities for the purpose of carrying out any construction work other than percussive piling during the time period from 0700 to 1900 hours on any day not being a general holiday, the following requirement shall also be complied with :
 - (i) The noise level measured at 1m from the most affected external facade of the nearby noise sensitive receivers during any 30 minute period shall not exceed an equivalent sound level (Leq) of 75 dB(A).
 - (ii) Should the limits stated in the above sub-clause (i) be exceeded, the construction shall stop and shall not recommence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented.

Any stoppage or reduction in output resulting from compliance with this clause shall not entitle the Contractor to any extension of time for completion or to any additional costs whatsoever.
4. The Contractor shall carry out the Works in such a manner as to minimise noise impacts on the surrounding environment during execution of the Works.
5. Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing measures intended to be used on the Site to be made available for inspection and approval to ensure that they are suitable for the project.
6.
 - (i) The Contractor shall ensure that all plant and equipment to be used on site shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means to avoid disturbance to any nearby noise sensitive receivers.
 - (ii) The Contractor shall provide acoustic sheds or screens whenever applicable to shelter noisy construction works including the cutting of slope/knoll and road/rock breaking unless acoustically equivalent noise reduction measures are proposed and implemented to the satisfaction of the Engineer.
7. The Contractor shall devise and arrange methods of working to minimise noise impacts, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.

8. Notwithstanding the requirements and limitations set out in clause 3 above and subject to compliance with clauses 4, 6 and 7 above, the Engineer may upon application in writing by the Contractor, allow the use of any equipment and the carrying out of any construction activities for any durations provided that he is satisfied with the application which, in his opinion, to be of absolute necessity and adequate noise insulation has been provided to the educational institutions to be affected, or of emergency nature, and not in contravention with the Noise Control Ordinance in any respect.
9. For the purposes of the above clauses, any domestic premises, hotels, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing arts centre or office building shall be considered a noise sensitive receiver.
10. For building demolition work the Contractor shall use hydraulic concrete crusher whenever applicable.

LIST OF FIGURES

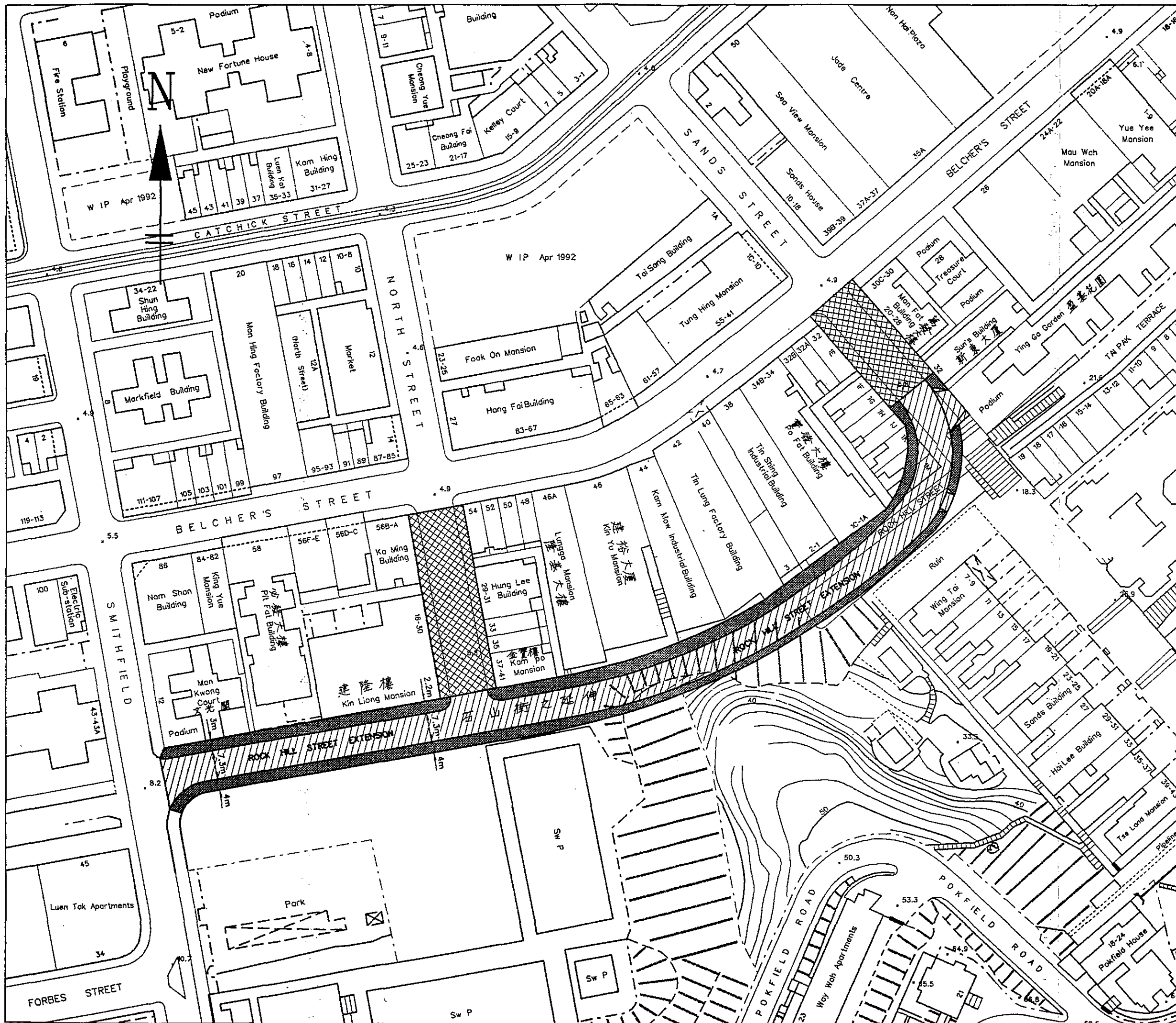
FIGURE 1 GENERAL LAYOUT

FIGURE 2 LOCATION OF NSRs

FIGURE 3 PREDICTED PEAK HOUR TRAFFIC NOISE LEVEL AT YEAR 1993





FIGURE 4 PREDICTED PEAK HOUR TRAFFIC NOISE LEVEL AT YEAR 2006

FIGURE 5 LOCATION PLAN FOR INDIRECT TECHNICAL REMEDIES



NOTES

LEGEND :

-  Existing footway and carriageway to be reconstructed
-  Proposed carriageway
-  Proposed footway
-  Proposed run-in

no.	date	description	Initial
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REVISION

drawn	W. F. LOOK	8-93	
checked	K. H. TONG		
approved	<i>C. H. TONG</i>	10-93	
	Senior Engineer/CW2	Date	

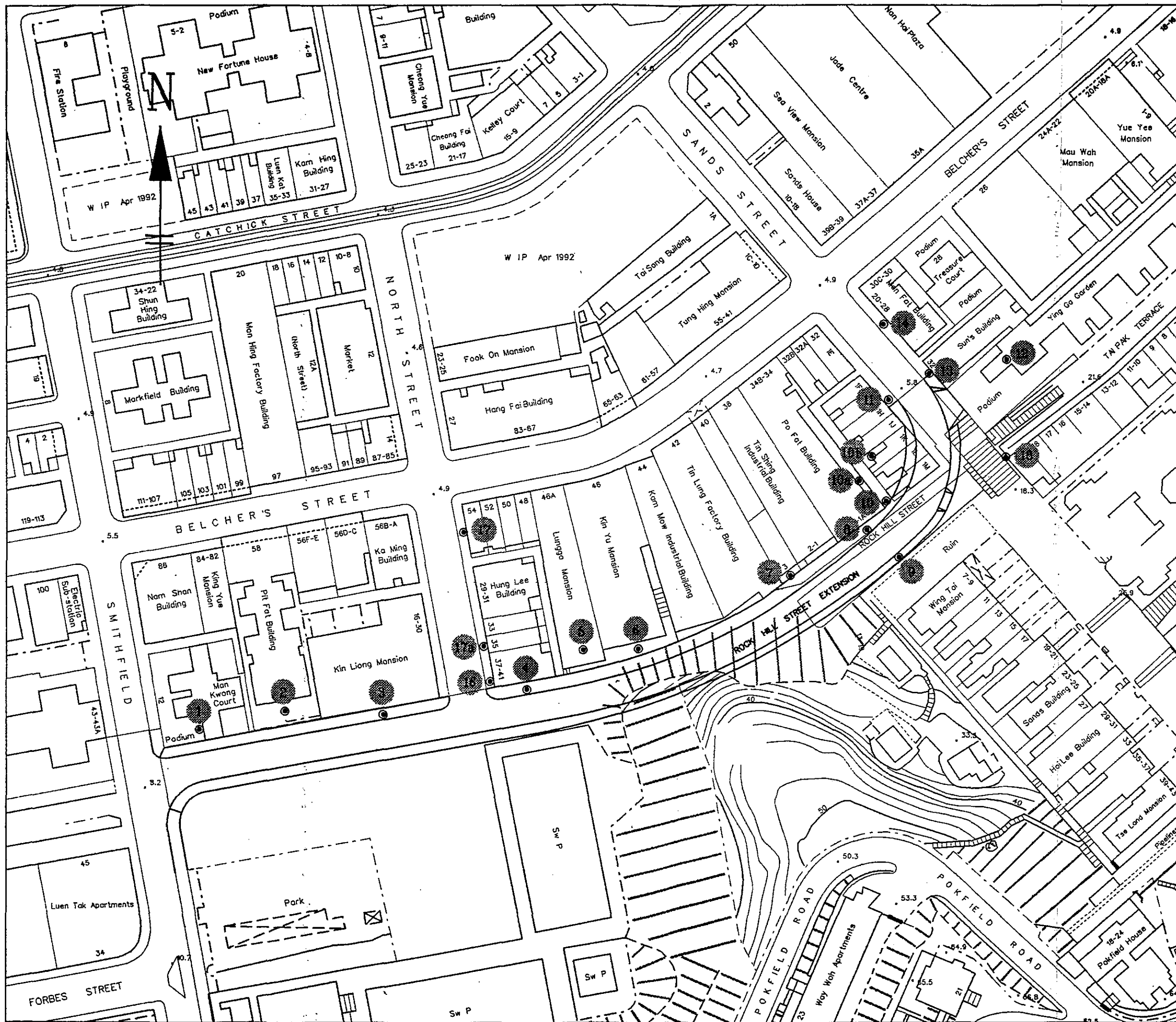
contract no.	
file no.	
project no.	
contract	ROCK HILL STREET EXTENSION

drawing title	GENERAL LAYOUT
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drawing no.	FIGURE 1	scale	1 : 1 000
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office	HIGHWAYS / HONG KONG REGION
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NOTES

LEGEND :

● NSR NO.

no.	date	description	initial
-----	------	-------------	---------

REVISION

drawn W. F. LOOK *WFL* 8-93

checked K. H. TONG *KHT* 10-93

approved *Cochrane* 10-93
Senior Engineer/CW2 Date

contract no.

file no.

project no.

contract
ROCK HILL STREET
EXTENSION

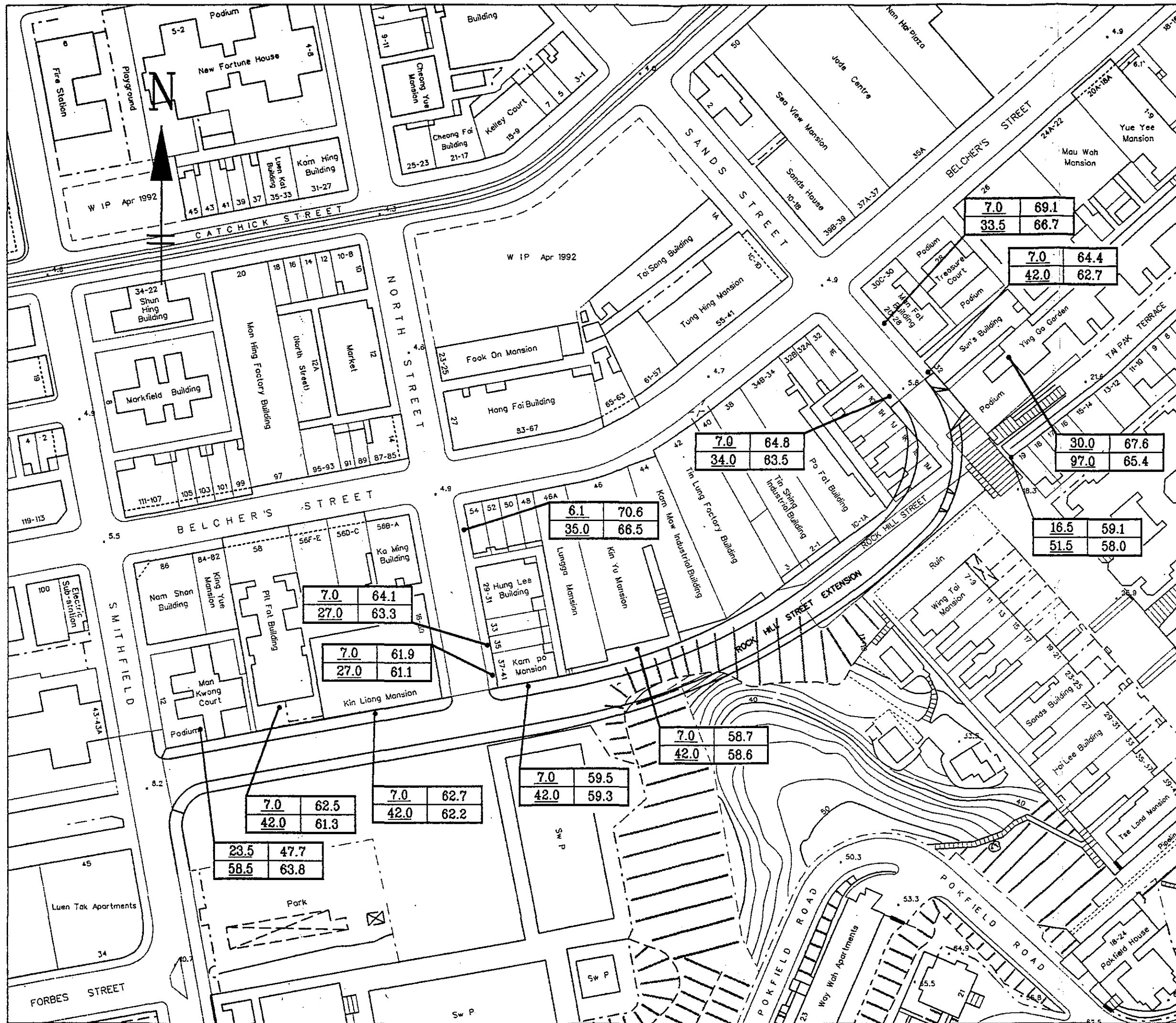
drawing title
LOCATION OF NSRs

drawing no. FIGURE 2	scale 1:1000
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HIGHWAYS / HONG KONG REGION



HIGHWAYS
DEPARTMENT
HONG KONG



NOTES

1. All predicted noise levels are L_{10} (1 hour)

LEGEND :

LEVEL (mPD)	Predicted Noise Level db (A)
5.0	72.6
35.0	68.2

no.	date	description	Initial
-----	------	-------------	---------

REVISION

drawn	W. F. LOOK	6-93
-------	------------	------

checked	K. H. TONG	
---------	------------	--

approved	<i>Collyer</i>	10-93
	Senior Engineer/CW2	Date

contract no.

file no.

project no.

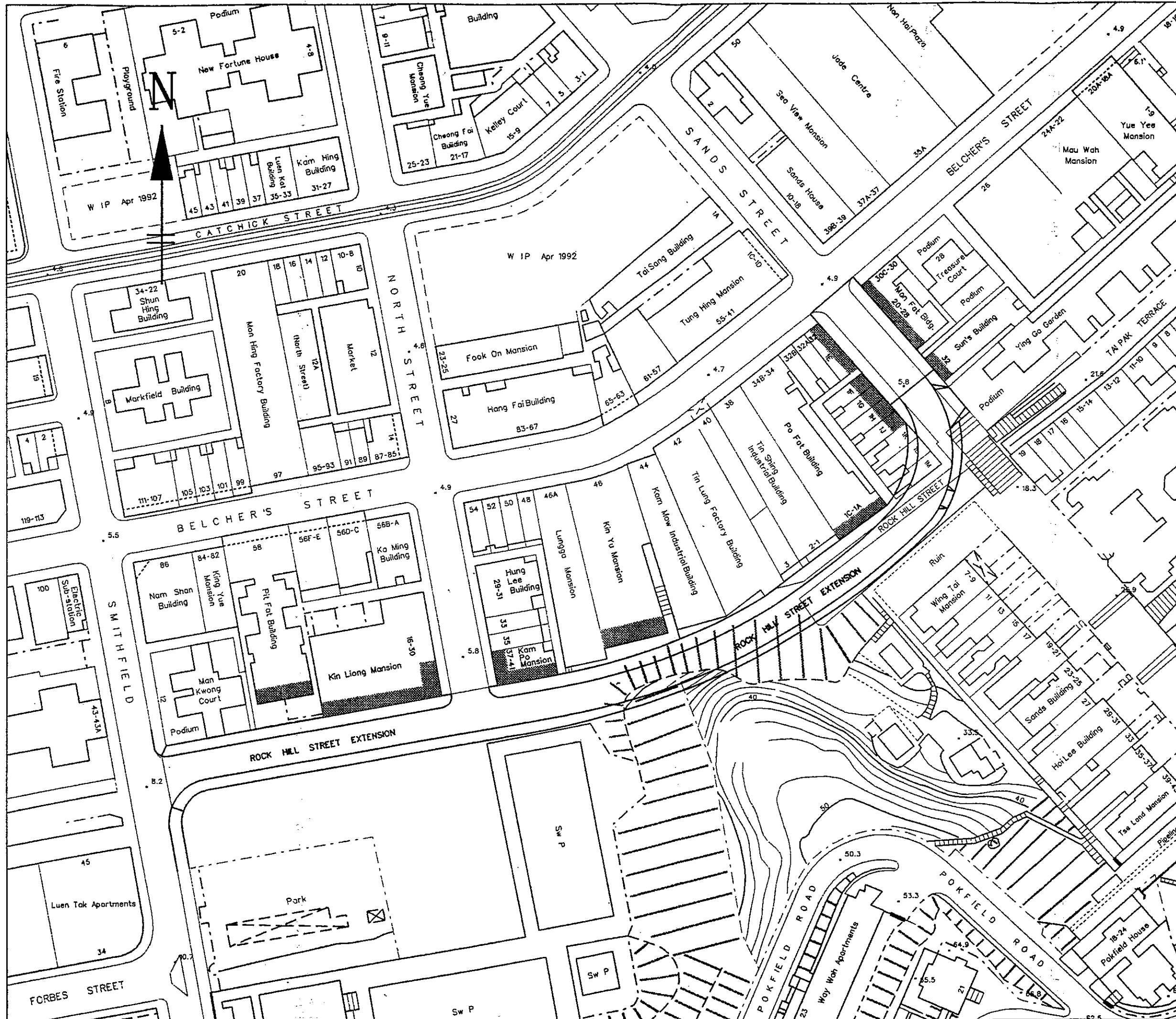
contract
ROCK HILL STREET EXTENSION

drawing title
PREDICTED PEAK HOUR TRAFFIC NOISE LEVEL AT YEAR 1993

drawing no.	scale
FIGURE 3	1 : 1 000


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NOTES

LEGEND :

 Premises to be considered for indirect technical remedies

no.	date	description	initial
REVISION			
drawn		W. F. LOOK	10-8-93
checked		K. H. TONG	10-10-93
approved		<i>C. Cheung</i>	10-10-93
Senior Engineer/CW2			Date

contract no.

file no.

project no.

contract

ROCK HILL STREET EXTENSION

drawing title

LOCATION PLAN FOR INDIRECT TECHNICAL REMEDIES

drawing no.	scale
FIGURE 5	1 : 1 000

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