

HIGHWAYS DEPARTMENT

**AGREEMENT NO. CE 31/95
ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR
PWP ITEM NO. 437CL:
"ALDRICH BAY RECLAMATION - ENGINEERING WORKS"**

EXECUTIVE SUMMARY

ENPAC Limited

in association with

**Maunsell Consultants Asia Limited
Peter Fraenkel BMT (Asia) Limited
Urbis Limited**

EIA/002.1/97

EIA/002.1/97

EXECUTIVE SUMMARY

1. INTRODUCTION

The reclamation of Aldrich Bay scheduled for completion by 1997 will provide a land area of 7.6 hectares(ha) for Special Residential development, 3.06 ha for Residential-Zone 1 development, 1.48 ha for Educational establishment, 0.04 ha for Institution and Community uses, 1.24 ha for Government Reservation, and 7.23 ha for Open Space use. Following the completion of the reclamation, engineering works included under PWP Item No. 437CL: "Aldrich Bay Reclamation - Engineering Works" (the Project) will be implemented to provide the supporting infrastructure for the above planned developments.

The Project site is bounded on the landward side by Tai On Street to the west, Tam Kung Temple Road to the east, and the Island Eastern Corridor (IEC) to the south. Figure 1 shows a location plan of the site. The Project is to construct local roads and the associated drainage works, pedestrian subway extensions, new pedestrian subways, footbridges and the associated landscaping works.

In view of the close proximity of the existing sensitive receivers to the Project site and the potential impacts of the proposed engineering works on the planned uses on the site, the Highways (Hong Kong) Region commissioned in June 1996 ENPAC Limited in association with Maunsell Consultants Asia Limited, Peter Fraenkel BMT (Asia) Limited and Urbis Limited to conduct an Environmental Impact Assessment Study to properly address all key environmental issues of the Project.

2. PROJECT CHARACTERISTICS

The proposed Engineering Works include the following :

- (a) construction of about 1,900 metres of roads with associated drainage works;
- (b) construction of two footbridges;
- (c) construction of two pedestrian subway extensions at Tung Hei Road near new Aldrich Bay Road and at junction of A Kung Ngam Village Road and Tung Hei Road;
- (d) construction of a new pedestrian subway connecting the reclamation area to Felicity Garden near Tai On Street; and
- (e) construction of associated landscaping works.

Figure 2 shows the layout of works on the site. The Project will be implemented in five sections of works as below :

- Sections I : Roadworks around the PSPS site.
Section II : Roadworks other than Sections I and III.
Section III: Roadworks for land affected by MTR Lot No. 1.
Section IV : Footbridges located at Road 9/1 and Road 9/4 and subway extensions at Tung Hei Road near new Aldrich Bay Road and at junction of A Kung Ngam Village Road and Tung Hei Road; and
Section V : Subway construction near Tai On Street connecting the reclamation area to Felicity Garden.

Figure 3 shows the different sections of the roadworks.

A preliminary construction programme for the proposed roads and the associated works within the Aldrich Bay Reclamation is given in Figure 4. According to the Highways Department, the construction works are scheduled for completion in 28 months, commencing from October 1998.

3. ENVIRONMENTAL SETTING

3.1 Existing Environment

The Aldrich Bay Reclamation is some 20 plus hectares of newly formed land. At present, the reclamation site has been formed and is used by Civil Engineering Department as a temporary public dumping barging point for construction waste. In the daytime, dump trucks carrying waste from off-site enter the reclamation site from Nam On Street through an entrance at junction of Aldrich Bay Road and Nam On Street and dispose of the waste. The trucks are wheel-washed before exiting the site through Aldrich Bay Road.

While the site itself is dusty and noisy due to dump trucks moving over unpaved road surface, the off-site environment is hardly affected because of the remoteness of the site from the sensitive buildings and the screening effect of a 2.5m high hoarding along the southern site boundary.

Apart from two new commercial buildings on Hing Man Street and Nam On Street, the Eastern Magistracy at Tai On Street, a church and a kindergarten on Hing Man Street, the Fish Wholesale Market, a sewage treatment plant, Tam Kung Temple and two schools on the east, the site is flanked on the landward side mainly by residential buildings of 6 to 25 storeys, including Felicity Gardens and Lei King Wan on the west, and the residential buildings along Hing Man Street, Nam On Street and Aldrich Bay Road. Figure 5 shows the locations of existing noise sensitive receivers. These receivers are potentially sensitive to both noise and construction dust. In addition, there are a few sitting out areas underneath the Island Eastern Corridor and a playground which are also considered to be air sensitive.

The noise environment at the mid and upper floors of the affected buildings is dominated by the traffic noise from the IEC while the lower floors are subject to noise from buses and public light buses on Tai On Street, Tung Hei Road, and to a lesser extent from the construction traffic on Nam On Street, Aldrich Bay Road, and other minor local roads.

Vehicle emissions from the nearby existing roads and the unpaved reclamation are the major sources of air pollution in the Project area; no major industrial emissions are identified in the vicinity to the site. As the surface winds in the area are easterly over about 70% of the time in a year, it is expected that the air quality to the west of the site is degraded because of the prevailing winds.

3.2 Future and Planned Development

The Aldrich Bay Reclamation site is zoned for residential, commercial, institutional and open-space uses. According to the development proposals presented in the Final Report "Aldrich Bay Reclamation Public Housing Development - Traffic Impact and Environmental Impact - II" issued by the Hong Kong Housing Authority (HKHA) in 1996, public rental, HOS and PSPS developments are planned. In addition, G/IC facilities, open space, and educational

establishments are also planned on the site. Figure 6 shows the future and planned development on the site. As advised by the Housing Department (HD), the layout of the proposed Public Rental/HOS and PSPS development is only tentative and is subject to future changes. However, HD has confirmed that the layout of the proposed PR/HOS and PSPS development used in this EIA Study is the latest available version. HD has agreed to address the residual impacts arising from any subsequent revision of the layout of the proposed PR/HOS development in their Environmental Assessment Study (EAS). Also, the future developer of the proposed PSPS is required to submit to the government for approval in writing proposals to mitigate the traffic noise impacts on the final layout.

4. CONSTRUCTION IMPACT ASSESSMENT AND MITIGATION MEASURES

4.1 Construction Noise

Construction of the Project will generate noise from the use of powered mechanical equipment on site and the construction traffic. As broadly illustrated by the preliminary construction programme in Figure 4, construction activities may, during a given period, be undertaken on an individual basis or concurrently. In addition, it is anticipated that piling will be required for the building construction on the site.

A construction noise impact assessment has been carried out to predict the maximum anticipated noise impacts from various individual and concurrent construction activities. The method of assessment follows the procedures described in *Technical Memorandum on Noise from Construction Works other than Percussive Piling* and *Technical Memorandum on Noise from Percussive Piling*.

For the purpose of this assessment, it has been assumed that diesel hammering driving pre-stressed concrete pipes would be employed for the building construction and based on this piling method piling noise levels at the representative noise sensitive receivers have been predicted.

The results show that the maximum noise levels due to the engineering works at many NSRs around the Project site exceed the noise limit of 75 dB(A) $L_{eq}(30\text{-min})$ recommended in the *EPD's Practice Note for Professional Persons ProPECC PN 2/93*, if unmitigated. On the other hand, the predicted piling noise at all the existing NSRs are within Acceptable Noise Level and therefore the Contractor should be permitted to carry out piling between 0700 and 1900 hours on normal weekdays.

In order to mitigate the potential construction noise impacts, mitigation measures have been proposed, including fitting more efficient exhaust to the equipment, keeping the machine enclosure panels closed, erecting inverted-L acoustic barriers, and enclosing the equipment in acoustic enclosures. It is anticipated by implementing these measures, all mitigated noise levels would comply with the construction noise guideline.

While it is not feasible to dictate the methods and exact schedule of construction to be employed by the Contractor, noise control requirements can be incorporated in the Contract Documents, specifying the noise standards to be met and requirements of noise monitoring on the site. A set of recommended pollution control clauses has been provided in the Final Report for incorporation into the Contract Documents. Also, details of the proposed environmental monitoring and audit (EM&A) requirements are contained in the EM&A Manual.

4.2 Construction Dust

Earthworks, excavation, and backfilling associated with the proposed road and subway construction in this Project and concurrent building construction on the site have the potential to contribute to the suspended dust in air.

The potential construction dust impact has been calculated using the Fugitive Dust Model and contours of the predicted highest hourly and daily average dust concentrations at ground level, including the background concentration, in the vicinity to various Sections of the roadworks have been prepared. In order to allow for the worst scenario in terms of dust concentrations in air, cumulative dust impacts arising from the roadworks and the building works have been examined.

The results show that the predicted concentrations at many of the nearby ASRs including all the identified ASRs along Hing Man Street, Nam On Street and the sitting-out areas underneath the IEC would exceed the Dust Guideline of $500 \mu\text{g}/\text{m}^3$ and the Air Quality Objectives (AQO), if unmitigated.

Dust suppression measures will be required to reduce the dust concentrations to acceptable levels. Various measures including watering the haul roads, use of dust barriers, paving of access roads, and good housekeeping have been examined. It is anticipated that by implementing these measures the hourly and daily average dust concentrations would comply with the Dust Guideline and the AQO at air sensitive locations.

4.3 Waste Disposal

As bored piles will be used for the construction of the foundation of the proposed footbridges and the pedestrian subways in this Project, contaminated mud underneath the reclamation site will be extracted during the bored piling operation. Any extracted mud from the bored piling operation should be analyzed for possible contamination. In the event that the mud is found to be contaminated, the relevant government departments should be consulted for disposal at designated disposal site.

5. OPERATIONAL IMPACT ASSESSMENT AND MITIGATION MEASURES

The existing and the future receivers in the Study Area will be exposed to road traffic noise from the operation of the new roads on the reclamation, the existing local roads and the IEC. The impact of road traffic noise in year 2015 has been assessed with reference to HKPSG which stipulates maximum L_{10} (1 hour) road traffic noise levels of 70 dB(A) for domestic premises and 65 dB(A) for schools and churches.

The results are summarized in the following table:

Table 1 Number of Sensitive Units Exceeding HKPSG Criteria

Noise Sensitive Development		Main Traffic Noise Contribution			
		Existing Roads		New Roads	Total
		IEC	Others		
Existing	Dwellings	1748	30	0	1778
	Classroom	2	0	0	2
	Church	1	0	0	1
New	HOS	617	0	0	617
	PSPS	510	0	28	538
	Private Residential	40	0	0	40
	Classroom	17	11	14	42

The above results have taken into consideration the noise mitigation measures recommended in the Final Report "Aldrich Bay Reclamation Public Housing Development - Traffic Impact and Environmental Impact II" issued by the Hong Kong Housing Authority in 1996 and "The Preliminary Environmental Review (PER) Report" issued by Architectural Services Department (ASD) in 1996, which include single aspect building (SAB) at the southernmost part of the PSPS site, self-protecting design of the proposed Housing for Senior Citizens, and a 3m high barrier for the Primary School north of the PSPS site.

Given that it is beyond the scope of this Study to mitigate noise from existing roads including the IEC, practical direct mitigation measures on the new roads such as a barrier up to 5m high for the proposed PSPS development, and a solid boundary wall up to 4m high for the proposed Secondary School adjacent to the Residential Zone 1 on the west have been examined for effectiveness.

However, none of the measures examined are effective. In the case of the PSPS, the ineffectiveness of the barrier is due to the insufficient height of the barrier, which can only protect up to the first-floor of the high-rise. As for the secondary school, since one of the major noise source contributors is the elevated IEC, thus no ground-level barrier is effective in mitigating the excessive noise. An effective means of mitigating the noise at this school is to insulate the affected classrooms.

As a means of redressing the residual impact at the existing sensitive receivers resulting from the use of the new roads on the site, Environmental Protection Department's (EPD's) eligibility criteria have been applied to assess the eligibility of the affected receivers for consideration of sound insulation. The result is that no existing receivers are eligible because the dominant source will be from the existing roads.

For future noise sensitive development on the site, the following constraints should be observed :

- Careful planning of the internal building layout to minimize noise exposure (i.e. orientation of the noise sensitive facades away from the IEC). Any significant setback in Residential Zone is not practical due to the size of the plot.

- Careful design of the building envelop to provide self protection against traffic noise, including the use of elevated podium to screen the lower floors from the local traffic.
- Provision of good quality windows and air-conditioners to those dwelling units where the facade noise levels exceed 70 dB(A)L₁₀(1-hr).
- Provision of sound insulation to the affected classrooms of the Secondary School near the Residential Zone 1 site on the west.
- Orientation of the Secondary School in the PR/HOS site should be retained with the noise-tolerant assembly hall facing the IEC as a noise-screening structure, and the minimum setback distance from the IEC should not be less than the currently adopted layout.

6. LANDSCAPING AND VISUAL IMPACT ASSESSMENT

An integral part of the EIA study has been the identification of the potential landscape and visual impacts of the proposed engineering works upon the reclamation site. This initially involved the identification of the existing landscape and visual character of the site and the surrounding areas.

The potential visual impacts were predicted to be low for people experiencing long distance views as well as people experiencing near distance views from the residential and commercial developments that surround the site. Landscape and visual impact mitigation measures were detailed for implementation during the construction stage of the project.

A series of landscape design guidelines were produced for consideration at the detailed design stage. Implementation of these guidelines would help achieve a landscape of high visual quality and high landscape value for what will be a visually prominent new development. These design guidelines covered the design of paving materials, railings, tree grilles, seating, rain/sun shelters, signage, lighting and planting design as well as the need for adequate provision of soil in tree pits.

7. ENVIRONMENTAL MONITORING AND AUDIT

In view of the close proximity of the Aldrich Bay Reclamation to the identified sensitive receivers, an EM&A programme monitoring air, noise and waste disposal is considered necessary during the construction period.

Air Quality

1-hour and 24-hour TSP levels should be monitored to assess the impacts of construction dust on air quality. The designated monitoring locations are shown in Figure 7.

Noise

The construction noise levels in terms of the A-weighted equivalent continuous sound pressure level (Leq) should be monitored to assess the noise impacts. The designated monitoring locations are the same as for air quality (see Figure 7).

Waste Management

The contractor is responsible for waste control within the construction site, removal of the waste material produced from the site and to implement any mitigation measures to minimise waste or redress problems arising from the on-site waste.

It is a further requirement of the EPD that the environmental monitoring programme should be subject to environmental audit. The aim is to determine whether satisfactory compliance with the legislative requirements has been met, and to ensure that no annoyance is caused to sensitive receivers or else the remedial action plan will be initiated, if required.

Detailed monitoring schedules and audit requirements should be incorporated into the construction contract for the proposed Engineering Works in the Aldrich Bay Reclamation site. The clauses containing these schedules and requirements should be formulated in consultation with EPD.

8. CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

Construction of the Project has been shown to cause significant noise impacts on the noise sensitive receivers in the Study Area. The predicted maximum anticipated construction noise levels are above 75 dB(A) $L_{eq}(30min)$ at most NSR locations. However, the impacts can be mitigated through proper implementation of appropriate noise control measures and environmental monitoring programme during the construction of the Project.

Construction dust is also a key environmental issue with many existing receivers being close to the construction site. Model prediction has shown that the 1-hr and 24-hr dust guideline or standard will be exceeded at many ASRs if unmitigated. Proposed mitigation measures such as watering the haul roads, paving temporary access roads, and installing wind barriers to reduce the impact have been evaluated and are found effective.

Road traffic noise from the IEC has been shown to be a key environmental issue during the operational phase. Based on the projected traffic figures for 2015, it has been predicted that the traffic noise levels at most existing and planned NSRs will exceed the HKPSG noise criteria. Specifically, most of the existing and planned dwellings fronting the IEC will be exposed to noise levels exceeding 70 dB(A) $L_{10}(1-hr.)$ and one planned school and one existing church will be exposed to noise levels exceeding 65 dB(A) $L_{10}(1-hr.)$. As the main noise source for both the existing and planned sensitive receivers is the IEC traffic, no direct mitigation measure for the new roads is considered effective, apart from a 3m barrier that can protect all of the sensitive classrooms at the primary school facing Road 9/2A. On the other hand, no direct technical remedies would be recommended for the existing IEC because it is beyond the scope of this Study.

In order to redress the residual impacts, EPD's eligibility criteria have been applied to the affected existing receivers for their eligibility for indirect technical remedies in the form of acoustic insulation. However, none is qualified mainly because the dominant noise source is the existing roads.

Development constraints such as orientation of sensitive facades, careful design of the internal layout, and provision of good quality windows and air-conditioners should be considered for

future development in the reclamation area. HD would take into consideration of the residual impacts arising from any subsequent revision of the layout of the proposed PR/HOS development in their Environmental Assessment Study (EAS). Also, the future developer of the proposed PSPS should submit to the government for approval in writing proposals to mitigate the traffic noise impacts on the final layout.

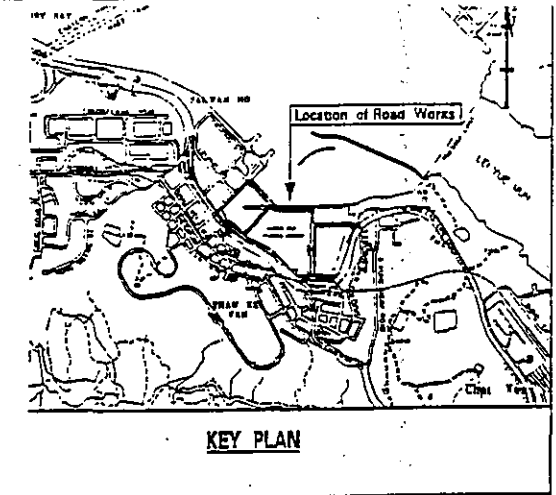
Appropriate mitigation measures for the proposed secondary school at the west of the reclamation is sound insulation which includes provision of good quality windows and air-conditioners. As this is outside the scope of the Project (PWP Item No. 437CL) and this Study, the project proponent of the school should consider the provision of this measure.

The potential visual impacts of the proposed engineering works have been predicted to be low for people experiencing long distance views as well as people experiencing near distance views from the residential and commercial developments that surround the site. Landscape and visual impact mitigation measures have been detailed for implementation during the construction stage of the project. A series of landscape design guidelines have been produced for consideration at the detailed design stage. Implementation of these guidelines would help achieve a landscape of high visual quality and high landscape value for what will be a visually prominent new development.

8.2 Recommendations

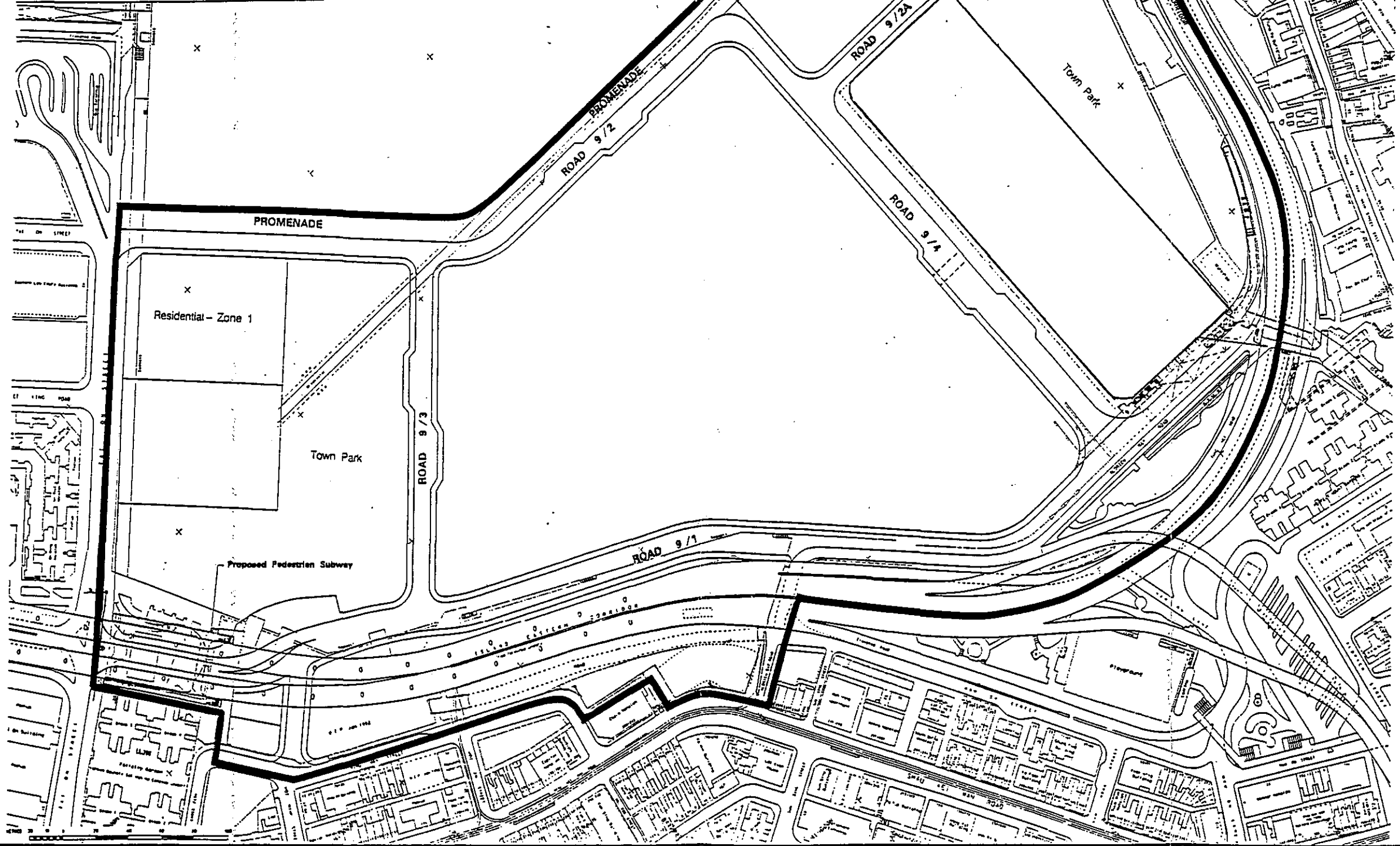
The following recommendations are made:

- Provision of good quality window and air-conditioners for classrooms where the predicted facade traffic noise levels exceeding $65 \text{ dB(A)}L_{10}(1\text{-hr})$ in the proposed secondary school on the west of the reclamation. As this is outside the scope of the Project (PWP Item No. 437CL) and this Study, the project proponent of the school should consider the provision of this measure.
- Provision of good quality windows and air conditioners to those planned dwelling units where the predicted facade noise levels exceed $70 \text{ dB(A)}L_{10}(1\text{-hr})$. As this is outside the scope of the Project (PWP Item No. 437CL) and this Study, the project proponent of the future residential developments should consider the provision of this measure.
- Inclusion of development constraints in the land use planning on the site.
- Inclusion of pollution control clauses as recommended in Appendix B of the Final Report to the Contract Documents to control construction noise, dust, and waste disposal from the Engineering Works.
- Implementation of the EM&A programme as detailed in the EM&A Manual during the construction stage of the project.
- Implementation of the landscape design guidelines to cover the design of paving materials, railings, tree grilles, seating, rain/sun shelters, signage, lighting and planting design as well as the need for adequate provision of soil in tree pits.



ALDRICH BAY
Aldrich Bay Typhoon Shelter

Legend
 Project Limit of Aldrich Bay Reclamation



Project AGREEMENT NO. CE 31/95
 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL:
 "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"

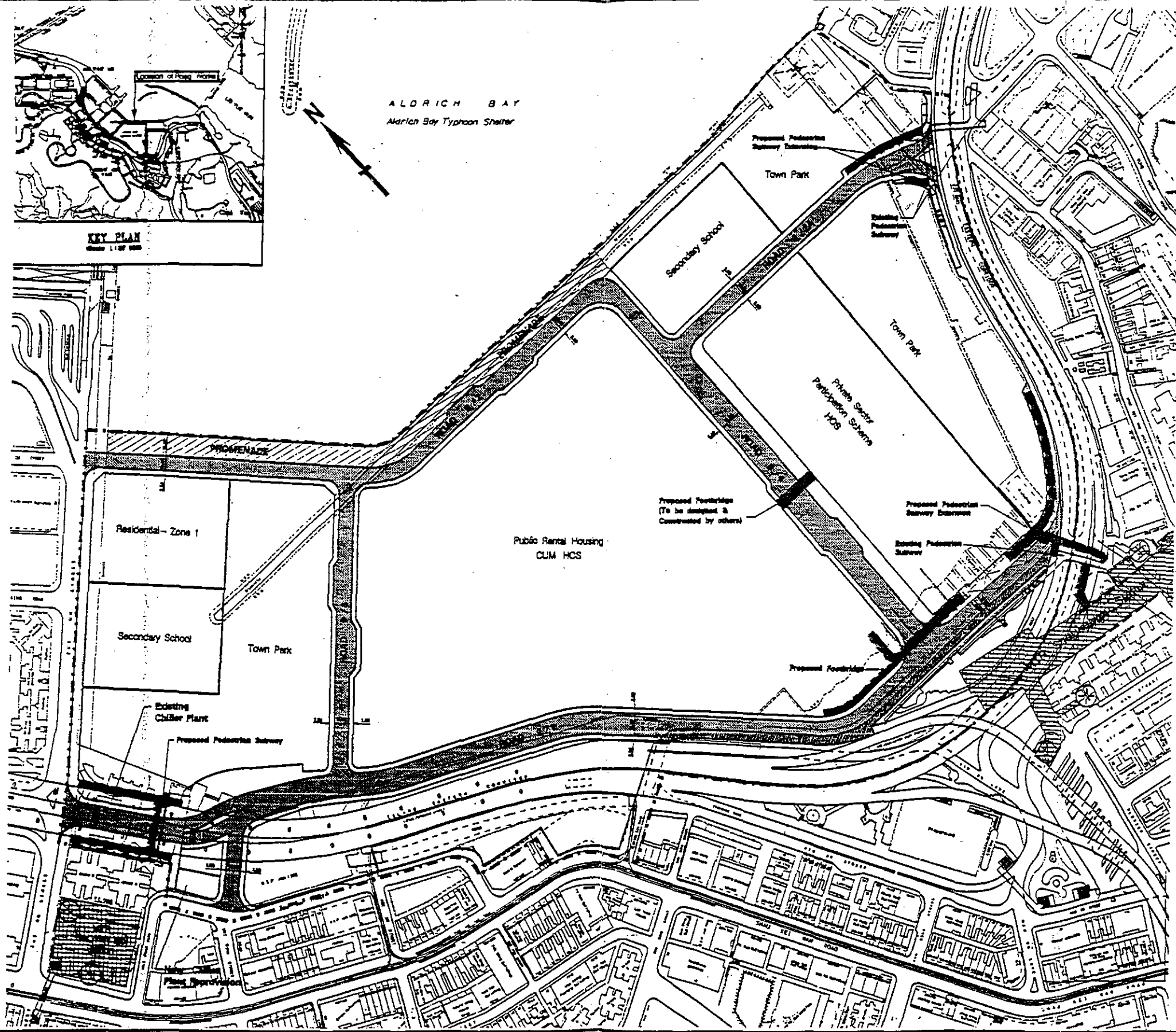
Title PROJECT LIMIT OF ALDRICH BAY RECLAMATION (ABR)







Figure 1

Scale As shown


Date JAN. 1997

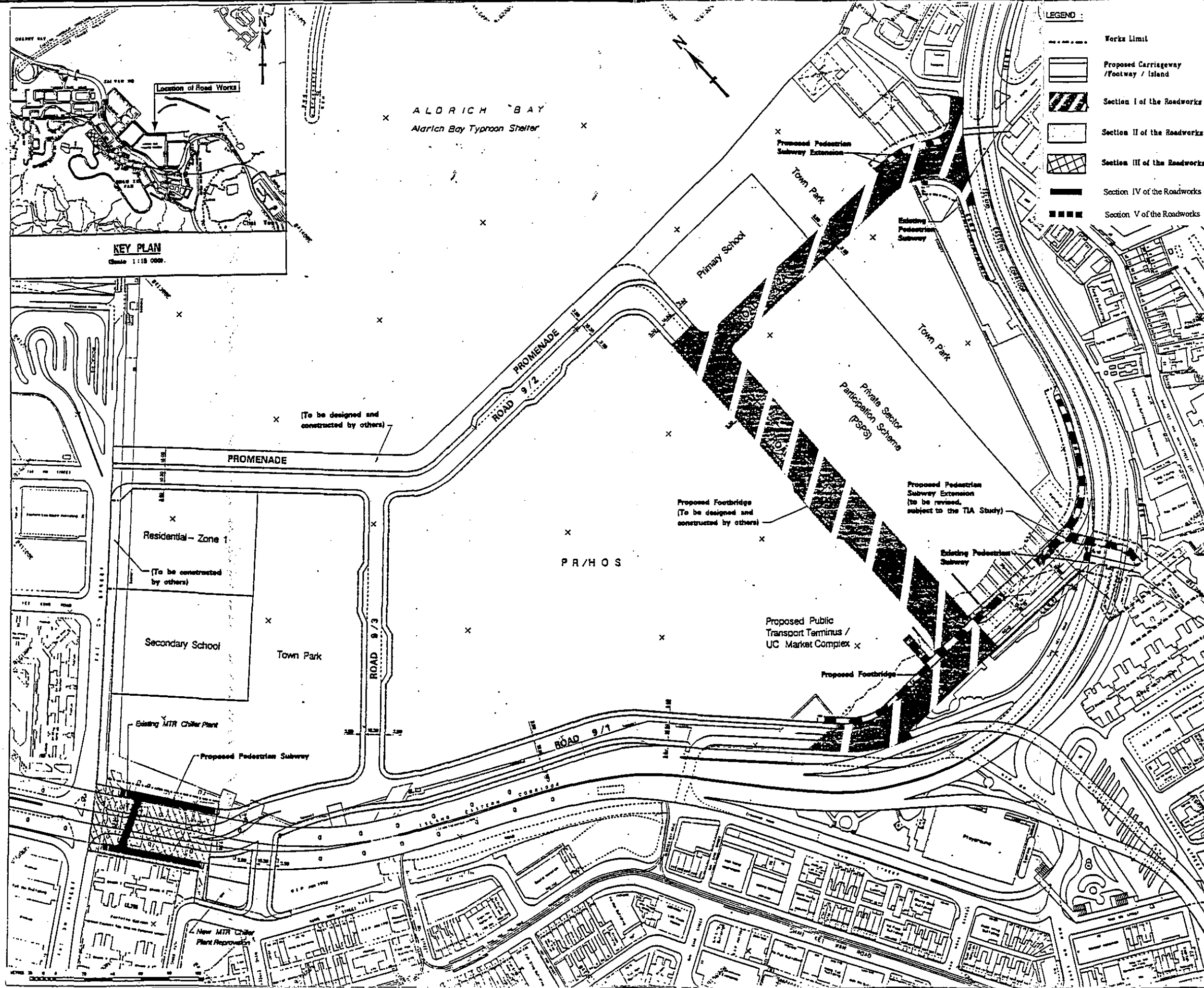




- LEGEND :**
-  Works Limit
 -  Existing Carriageway to be reconstructed
 -  Proposed Carriageway / Footway
 -  Proposed Promenade
 -  Extent of MTR Station
 -  Entrance for MTR Station

Project	AGREEMENT NO. CE 31/95	Figure	2
	ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"		Scale
Title	LAYOUT OF WORKS	Date	JAN. 1997


Environmental Assessment & Pollution control



Project AGREEMENT NO. CE 31/95
ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL:
"ALDRICH BAY RECLAMATION - ENGINEERING WORKS"

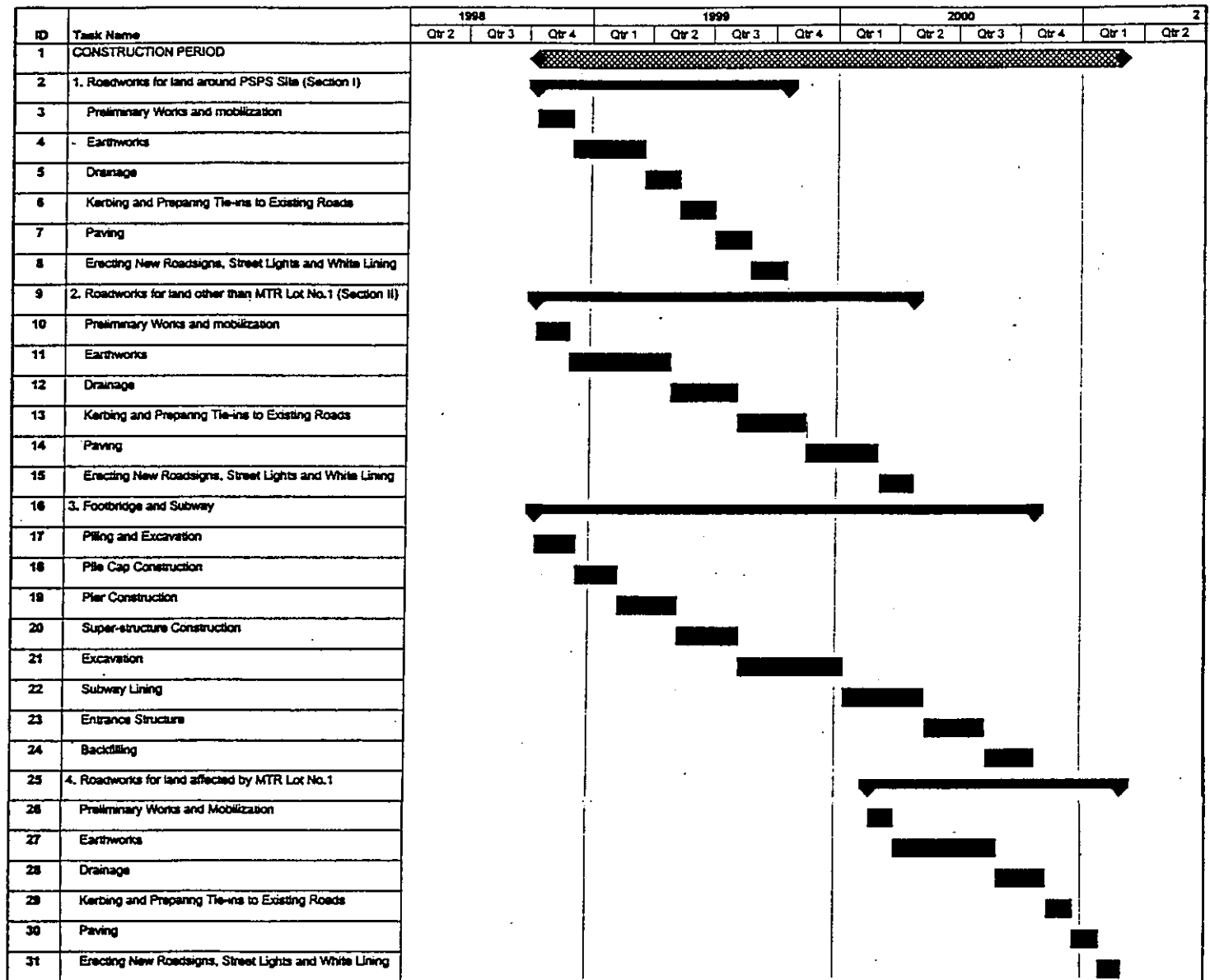
Title SECTIONS OF WORKS

Figure 3

Scale As shown

Date JAN. 1997


Environmental Assessment & Pollution Control



Project AGREEMENT NO. CE 31/95
 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PEP ITEM NO. 437CL:
 "ALDRICHBAY RECLAMATION - ENGINEERING WORKS"

Title PRELIMINARY CONSTRUCTION PROGRAMME

Figure 4

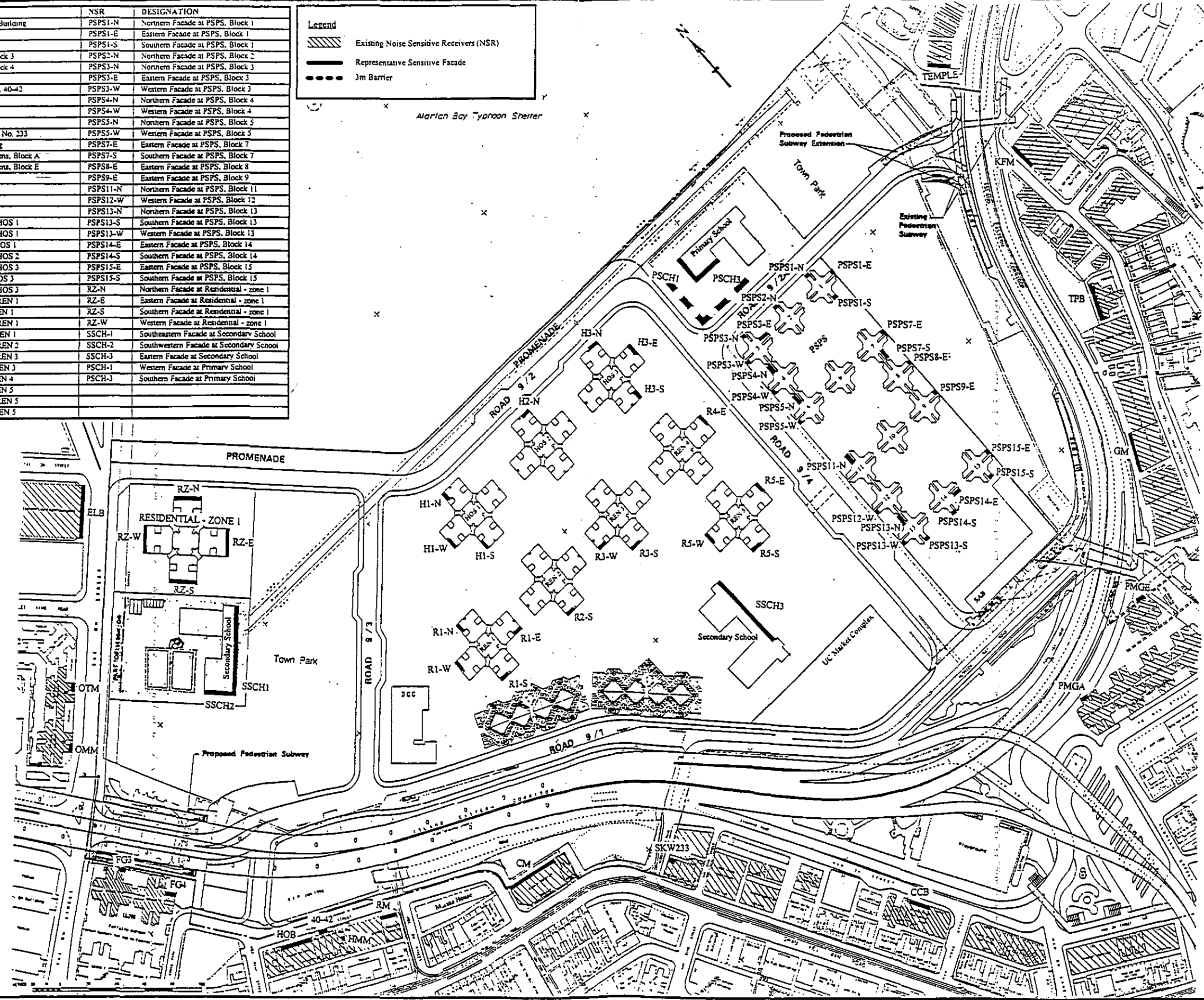
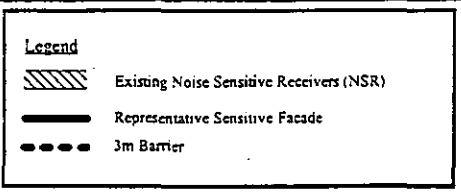
Scale N.T.S.

Date JAN. 1997



Environmental Assessment & Pollution Control

NSR	DESIGNATION	NSR	DESIGNATION
ELB	Eastern Low Court Building	PSPS1-N	Northern Facade at PSPS, Block 1
OTM	On Tsui Mansion	PSPS1-E	Eastern Facade at PSPS, Block 1
OMM	On Ming Mansion	PSPS1-S	Southern Facade at PSPS, Block 1
FG3	Felicity Garden, Block 3	PSPS2-N	Northern Facade at PSPS, Block 2
FG4	Felicity Garden, Block 4	PSPS3-N	Northern Facade at PSPS, Block 3
HOB	Hing On Building	PSPS3-E	Eastern Facade at PSPS, Block 3
40-42	Hing Man Street No. 40-42	PSPS3-W	Western Facade at PSPS, Block 3
HMM	Hing Man Mansion	PSPS4-N	Northern Facade at PSPS, Block 4
RM	Rockson Mansion	PSPS4-W	Western Facade at PSPS, Block 4
CM	Casio Mansion	PSPS5-N	Northern Facade at PSPS, Block 5
SKW 233	Shan Ken Wan Road No. 233	PSPS5-W	Western Facade at PSPS, Block 5
CCB	Chung Chau Building	PSPS7-E	Eastern Facade at PSPS, Block 7
PMGA	Perfect Mount Gardens, Block A	PSPS7-S	Southern Facade at PSPS, Block 7
PMGE	Perfect Mount Gardens, Block E	PSPS8-E	Eastern Facade at PSPS, Block 8
GM	Golden Mansion	PSPS9-E	Eastern Facade at PSPS, Block 9
TPB	Tung Po Building	PSPS11-N	Northern Facade at PSPS, Block 11
KFM	Kim Far Mansion	PSPS12-W	Western Facade at PSPS, Block 12
TEMPLE	Temple	PSPS13-N	Northern Facade at PSPS, Block 13
H1-N	Northern Facade at HOS 1	PSPS13-S	Southern Facade at PSPS, Block 13
H1-S	Southern Facade at HOS 1	PSPS13-W	Western Facade at PSPS, Block 13
H1-W	Western Facade at HOS 1	PSPS14-E	Eastern Facade at PSPS, Block 14
H2-N	Northern Facade at HOS 2	PSPS14-S	Southern Facade at PSPS, Block 14
H3-N	Northern Facade at HOS 3	PSPS15-E	Eastern Facade at PSPS, Block 15
H3-E	Eastern Facade at HOS 3	PSPS15-S	Southern Facade at PSPS, Block 15
H3-S	Southern Facade at HOS 3	RZ-N	Northern Facade at Residential - zone 1
R1-N	Northern Facade at REN 1	RZ-E	Eastern Facade at Residential - zone 1
R1-E	Eastern Facade at REN 1	RZ-S	Southern Facade at Residential - zone 1
R1-S	Southern Facade at REN 1	RZ-W	Western Facade at Residential - zone 1
R1-W	Western Facade at REN 1	SSCH-1	Southeastern Facade at Secondary School
R2-S	Southern Facade at REN 2	SSCH-2	Southwestern Facade at Secondary School
R3-S	Southern Facade at REN 3	SSCH-3	Eastern Facade at Secondary School
R3-W	Western Facade at REN 3	PSCH-1	Western Facade at Primary School
R4-E	Eastern Facade at REN 4	PSCH-3	Southern Facade at Primary School
R5-E	Eastern Facade at REN 5		
R5-S	Southern Facade at REN 5		
R5-W	Western Facade at REN 5		



Project AGREEMENT NO. CE 31/95
 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 457CL:
 "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"

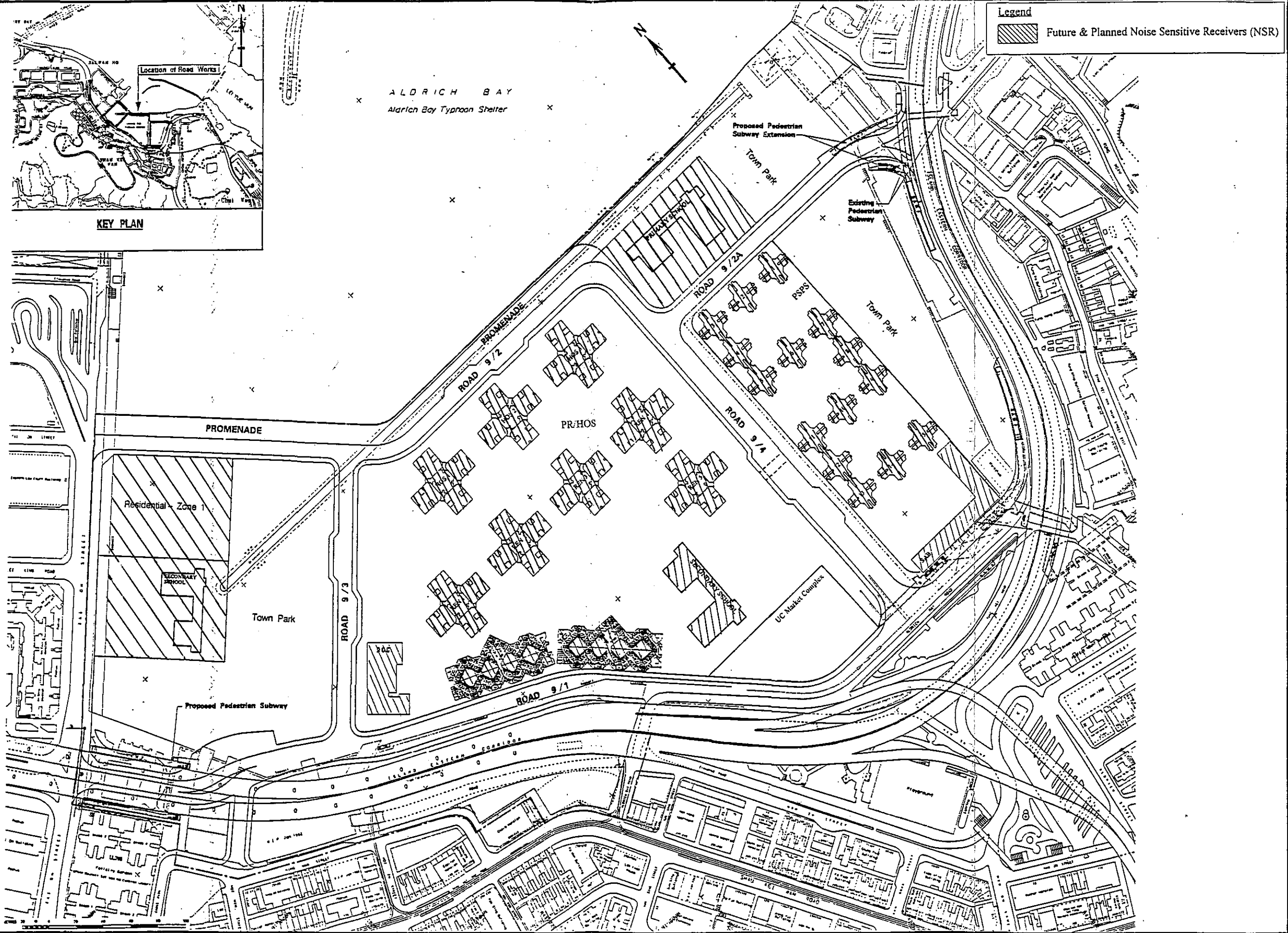
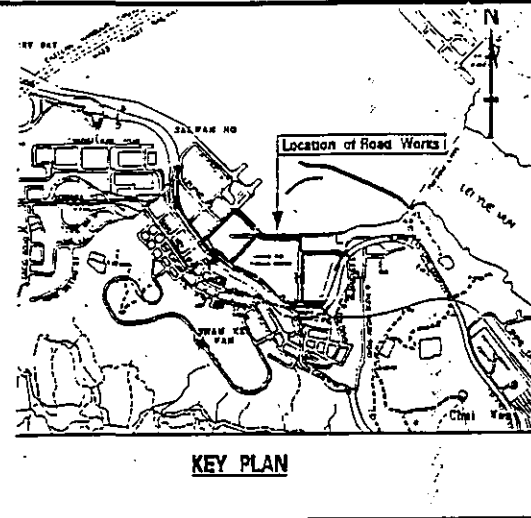
Title LOCATION OF EXISTING NOISE SENSITIVE RECEIVERS AND
 DESIGNATIONS OF REPRESENTATIVE NOISE SENSITIVE FACADES

Figure 5

Scale As shown

Date JAN. 1997





Project AGREEMENT NO. CE 31/95
ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL:
"ALDRICH BAY RECLAMATION - ENGINEERING WORKS"

Title LOCATIONS OF FUTURE AND PLANNED SENSITIVE USES

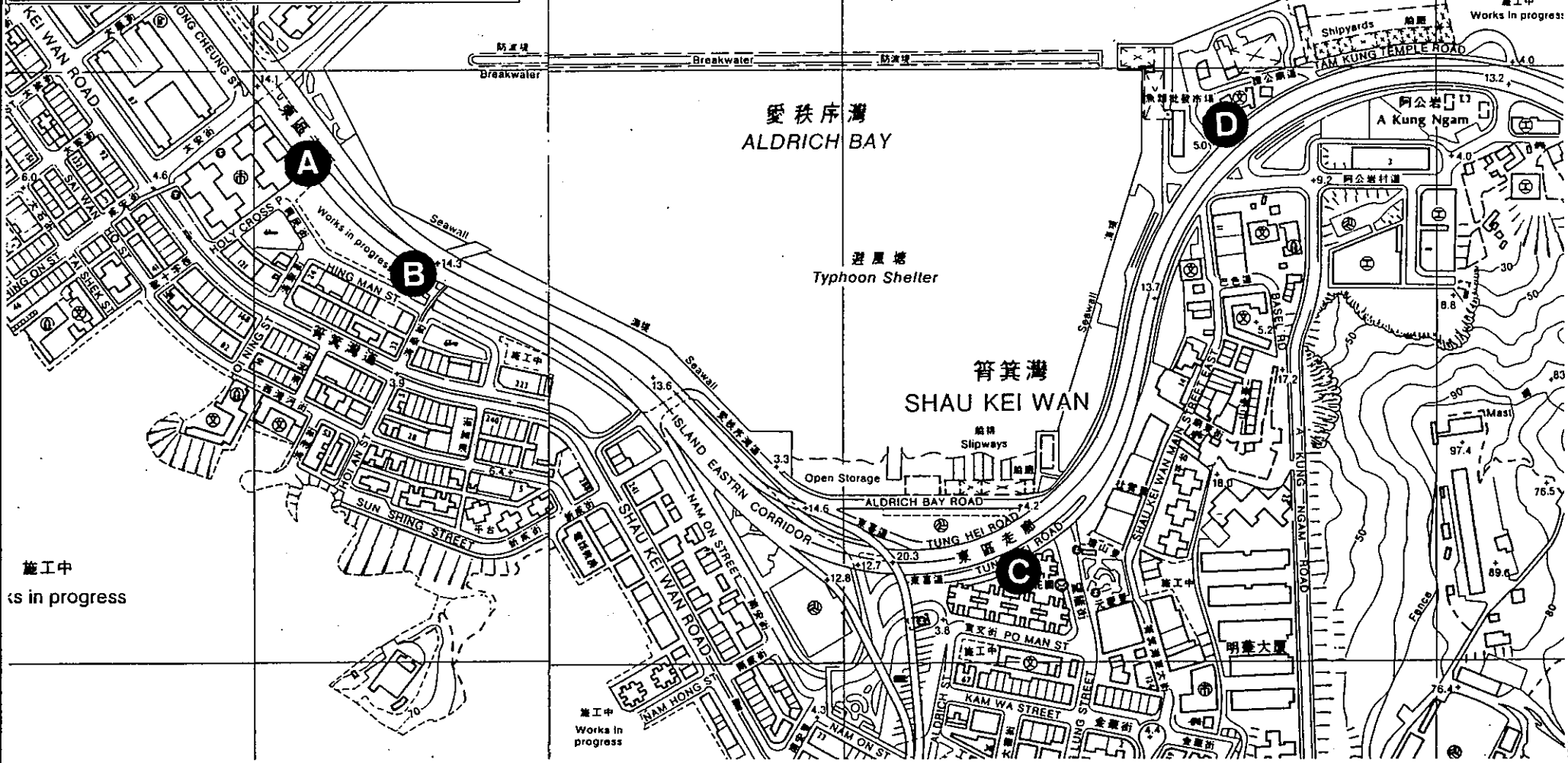
Figure 6

Scale As shown

Date JAN. 1997



Station No.	Designation
A	Felicity Garden (podium level)
B	Working site under Island Eastern Corridor (street level)
C	Perfect Mount Gardens (podium level)
D	Tam Kung Temple (street level)

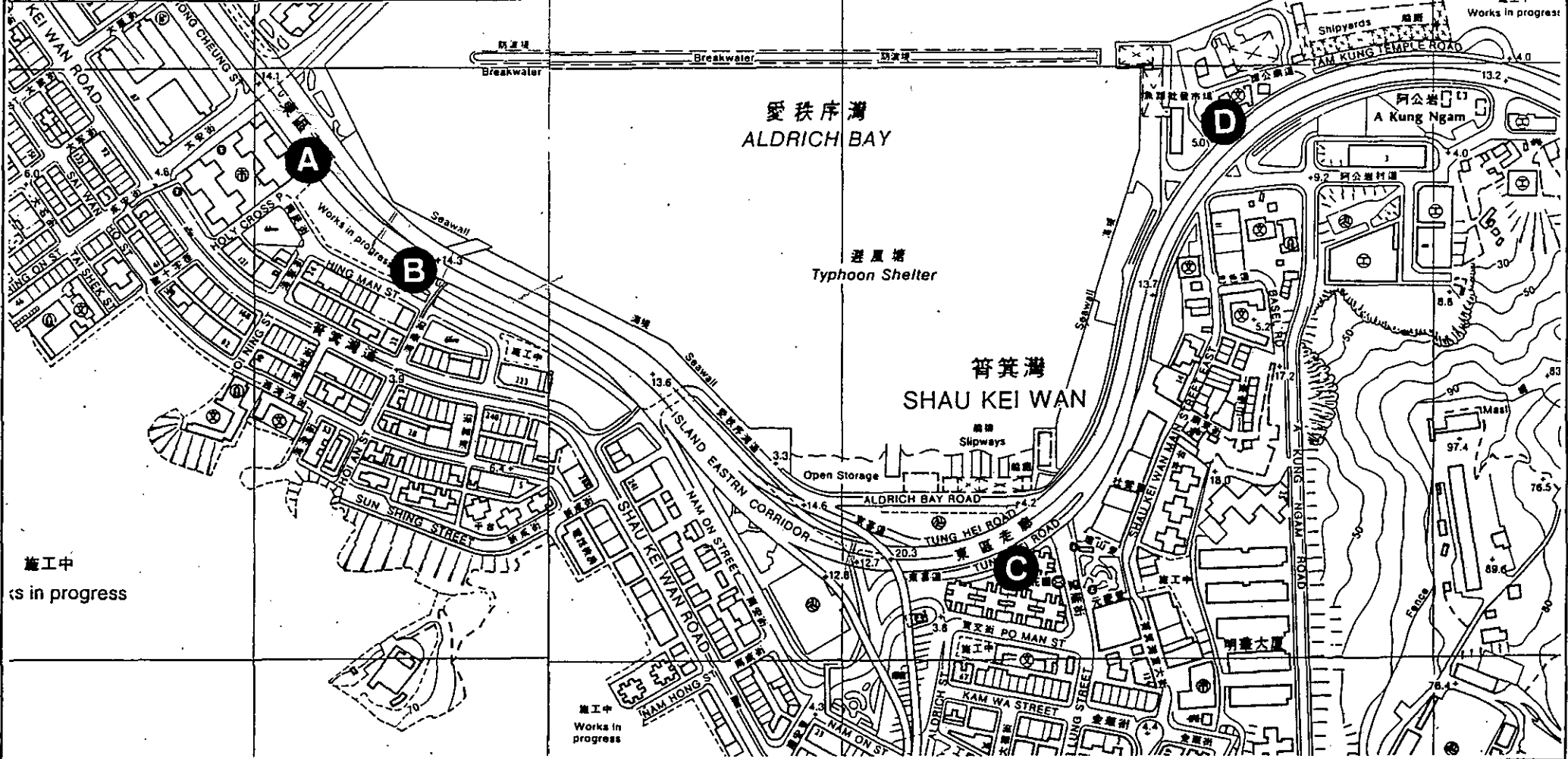


Project	AGREEMENT NO. CE31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
	Title LOCATION OF NOISE MONITORING STATIONS

Figure	7
Scale	1:5000
Date	JAN. 1997

Environmental Assessment & Pollution Control

Station No.	Designation
A	Felicity Garden (podium level)
B	Working site under Island Eastern Corridor (street level)
C	Perfect Mount Gardens (podium level)
D	Tam Kung Temple (street level)



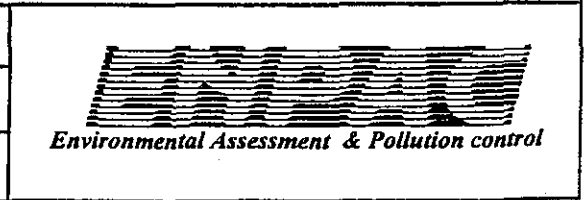
Project 合約編號 CE31/95 工務計劃項目 PWP 第 437CL: “愛秩序灣填海區--
基礎建設工程” 環境影響評估研究

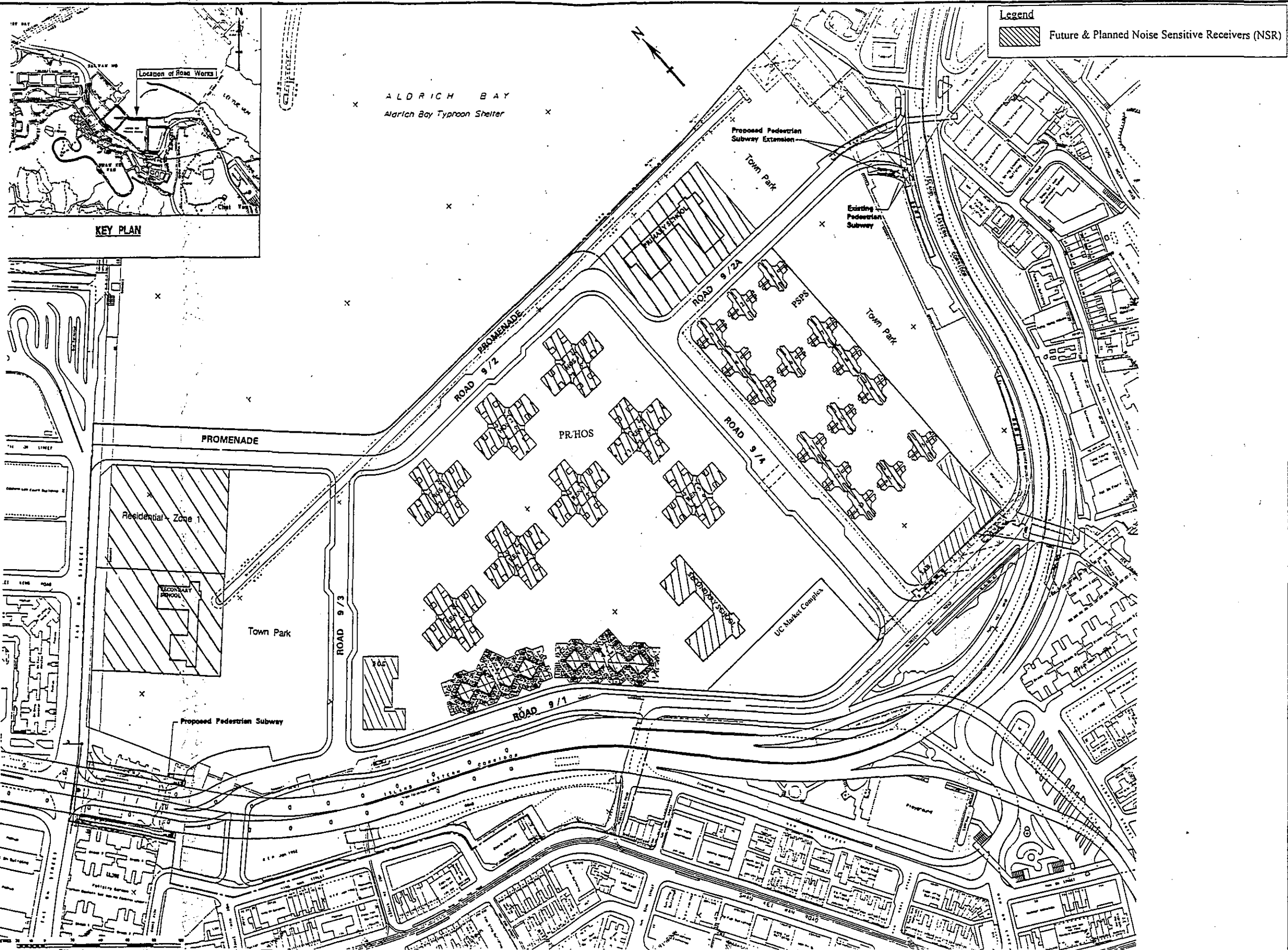
Title 空氣監察站及噪音監察站位置

Figure 七

Scale 1:5000

Date 一九九七年一月





Project 合約編號 CE31/95 工務計劃項目 PWP 第 437CL: “愛秩序灣填海區--
基礎建設工程” 環境影響評估研究

Title 未來感應強的發展地方

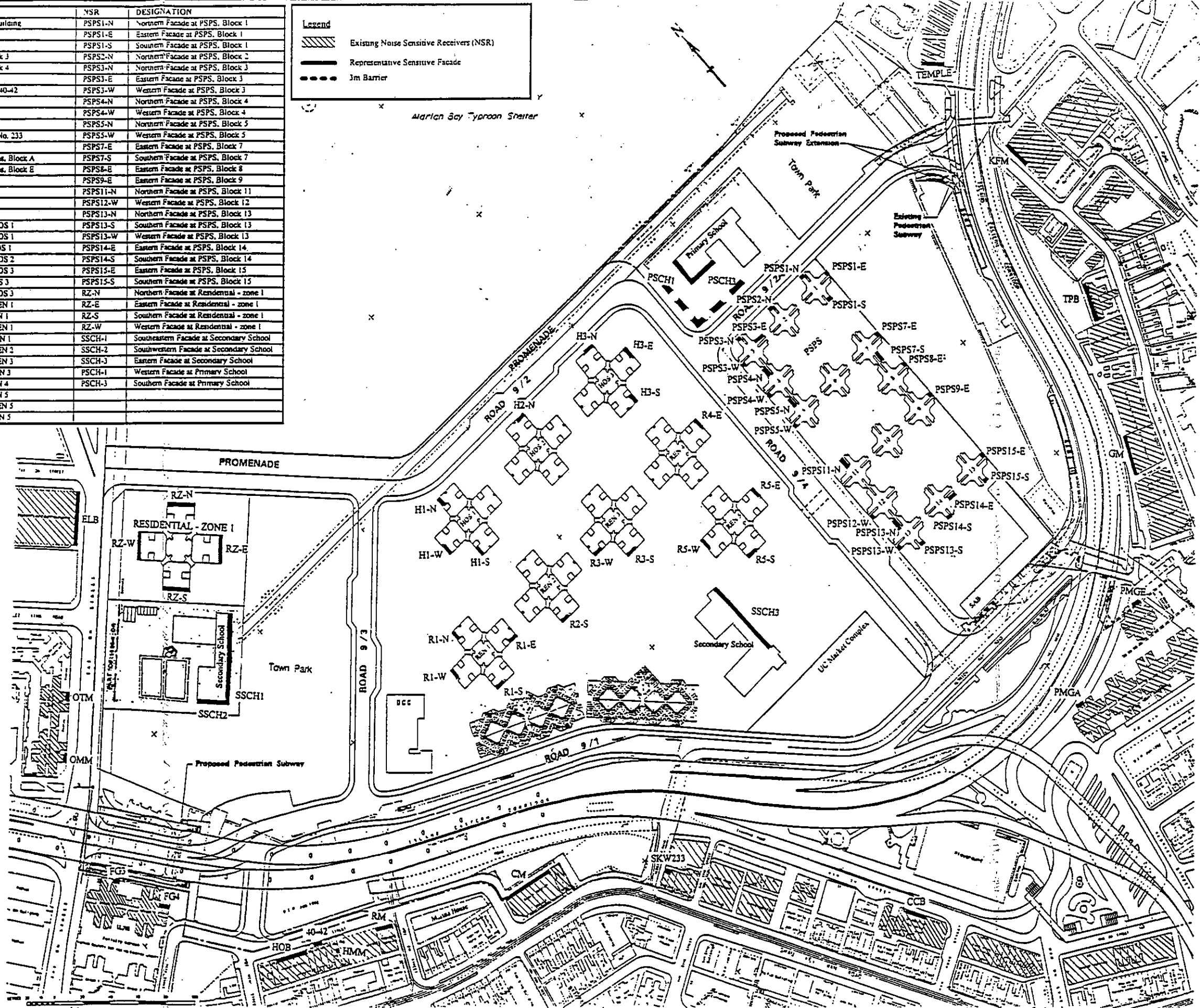
Figure 六
Scale
Date 一九九七年一月



NSR	DESIGNATION	NSR	DESIGNATION
ELB	Eastern Low Court Building	PSPS1-N	Northern Facade at PSPS, Block 1
OTM	On Tsui Mansion	PSPS1-E	Eastern Facade at PSPS, Block 1
JMM	On Ming Mansion	PSPS1-S	Southern Facade at PSPS, Block 1
FG3	Felicity Garden, Block 3	PSPS2-N	Northern Facade at PSPS, Block 2
FG4	Felicity Garden, Block 4	PSPS3-N	Northern Facade at PSPS, Block 3
HOB	Hing On Building	PSPS3-E	Eastern Facade at PSPS, Block 3
40-42	Hing Man Street No. 40-42	PSPS3-W	Western Facade at PSPS, Block 3
HMM	Hing Man Mansion	PSPS4-N	Northern Facade at PSPS, Block 4
RM	Rocison Mansion	PSPS4-W	Western Facade at PSPS, Block 4
CM	Casio Mansion	PSPS5-N	Northern Facade at PSPS, Block 5
SKW 233	Shan Kai Wan Road No. 233	PSPS5-W	Western Facade at PSPS, Block 5
CCB	Chung Cha Building	PSPS7-E	Eastern Facade at PSPS, Block 7
PMGA	Perfect Mount Gardens, Block A	PSPS7-S	Southern Facade at PSPS, Block 7
PMGE	Perfect Mount Gardens, Block E	PSPS8-E	Eastern Facade at PSPS, Block 8
GM	Golden Mansion	PSPS9-E	Eastern Facade at PSPS, Block 9
TPB	Tung Po Building	PSPS11-N	Northern Facade at PSPS, Block 11
KFM	Kim Fat Mansion	PSPS12-W	Western Facade at PSPS, Block 12
TEMPLE	Temple	PSPS13-N	Northern Facade at PSPS, Block 13
H1-N	Northern Facade at HOS 1	PSPS13-S	Southern Facade at PSPS, Block 13
H1-S	Southern Facade at HOS 1	PSPS13-W	Western Facade at PSPS, Block 13
H1-W	Western Facade at HOS 1	PSPS14-E	Eastern Facade at PSPS, Block 14
H2-N	Northern Facade at HOS 2	PSPS14-S	Southern Facade at PSPS, Block 14
H3-N	Northern Facade at HOS 3	PSPS15-E	Eastern Facade at PSPS, Block 15
H3-E	Eastern Facade at HOS 3	PSPS15-S	Southern Facade at PSPS, Block 15
H3-S	Southern Facade at HOS 3	RZ-N	Northern Facade at Residential - zone 1
R1-N	Northern Facade at REN 1	RZ-E	Eastern Facade at Residential - zone 1
R1-E	Eastern Facade at REN 1	RZ-S	Southern Facade at Residential - zone 1
R1-S	Southern Facade at REN 1	RZ-W	Western Facade at Residential - zone 1
R1-W	Western Facade at REN 1	SSCH-1	Southeastern Facade at Secondary School
R2-S	Southern Facade at REN 2	SSCH-2	Southwestern Facade at Secondary School
R3-S	Southern Facade at REN 3	SSCH-3	Eastern Facade at Secondary School
R3-W	Western Facade at REN 3	PSCH-1	Western Facade at Primary School
R4-E	Eastern Facade at REN 4	PSCH-3	Southern Facade at Primary School
R5-E	Eastern Facade at REN 5		
R5-S	Southern Facade at REN 5		
R5-W	Western Facade at REN 5		

Legend

- Existing Noise Sensitive Receivers (NSR)
- Representative Sensitive Facade
- 3m Barrier



Project 合約編號 CE31/95 工務計劃項目 PWP 第 437CL: “愛秩序灣填海區--
基礎建設工程” 環境影響評估研究

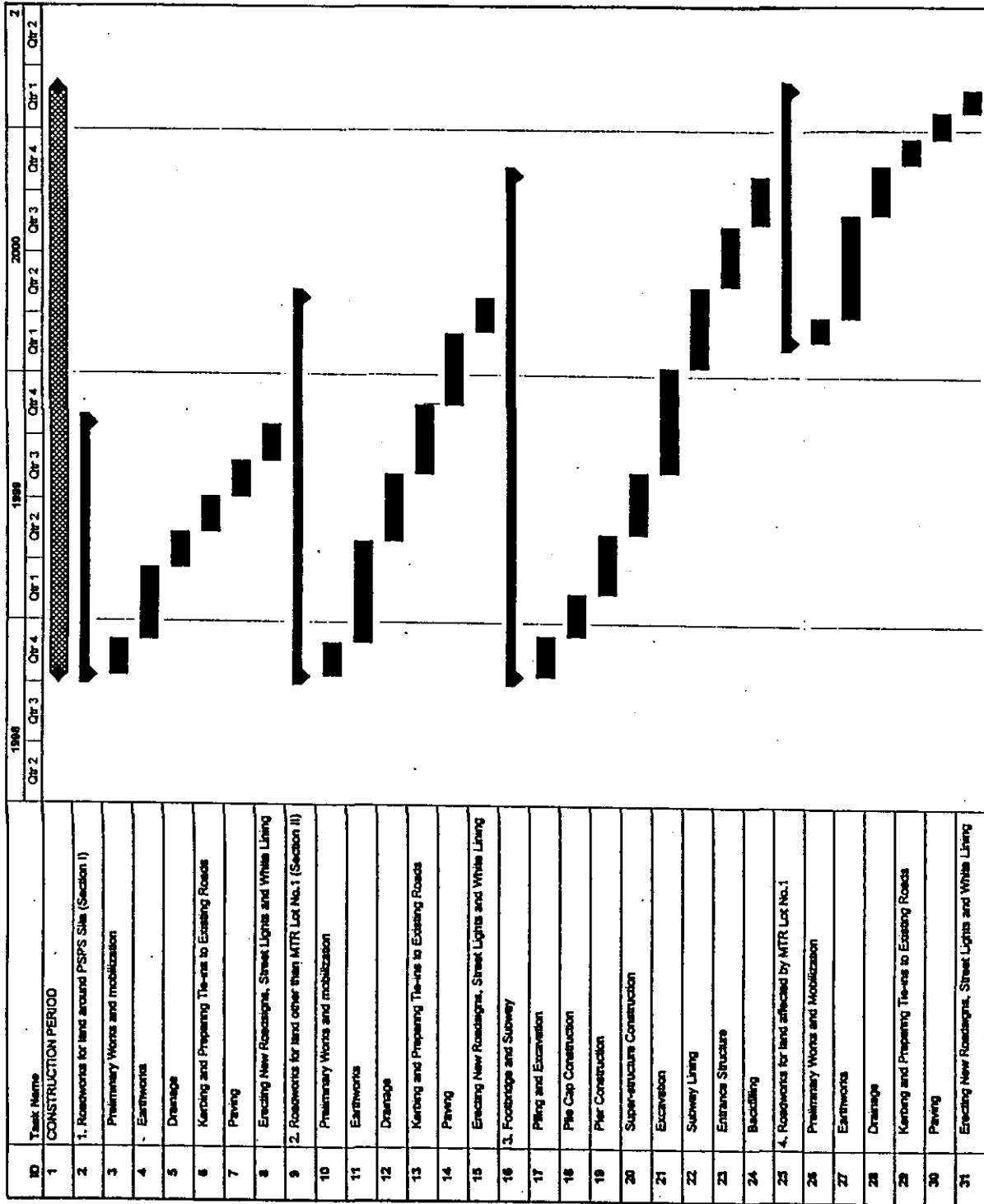
Title 現有噪音感應強的地方及具代表性噪音感應強的地方

Figure 五

Scale

Date 一九九七年一月





Project 合約編號 CE31/95 工務計劃項目 PWP 第 437CL: "愛秩序灣填海區 -- 基礎建設工程" 環境影響評估研究

Figure 四

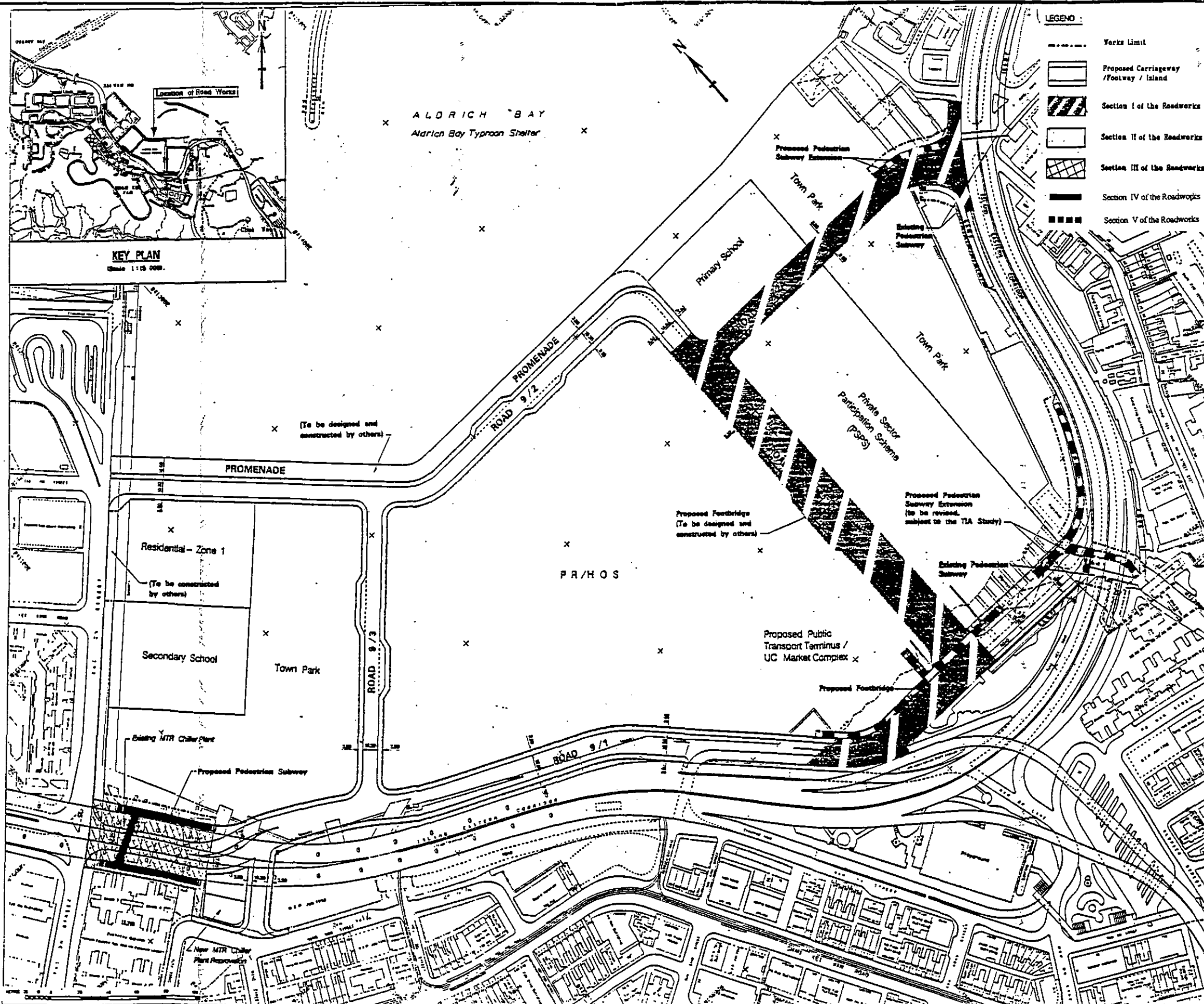
Scale N.T.S.

Date 一九九七年一月



Environmental Assessment & Pollution Control

Title 建議中愛秩序灣填海區及有關工程之初步建築計劃



Project 合約編號 CE31/95 工務計劃項目 PWP 第 437CL: “愛秩序灣填海區--
基礎建設工程” 環境影響評估研究

Title 各項道路工程部份

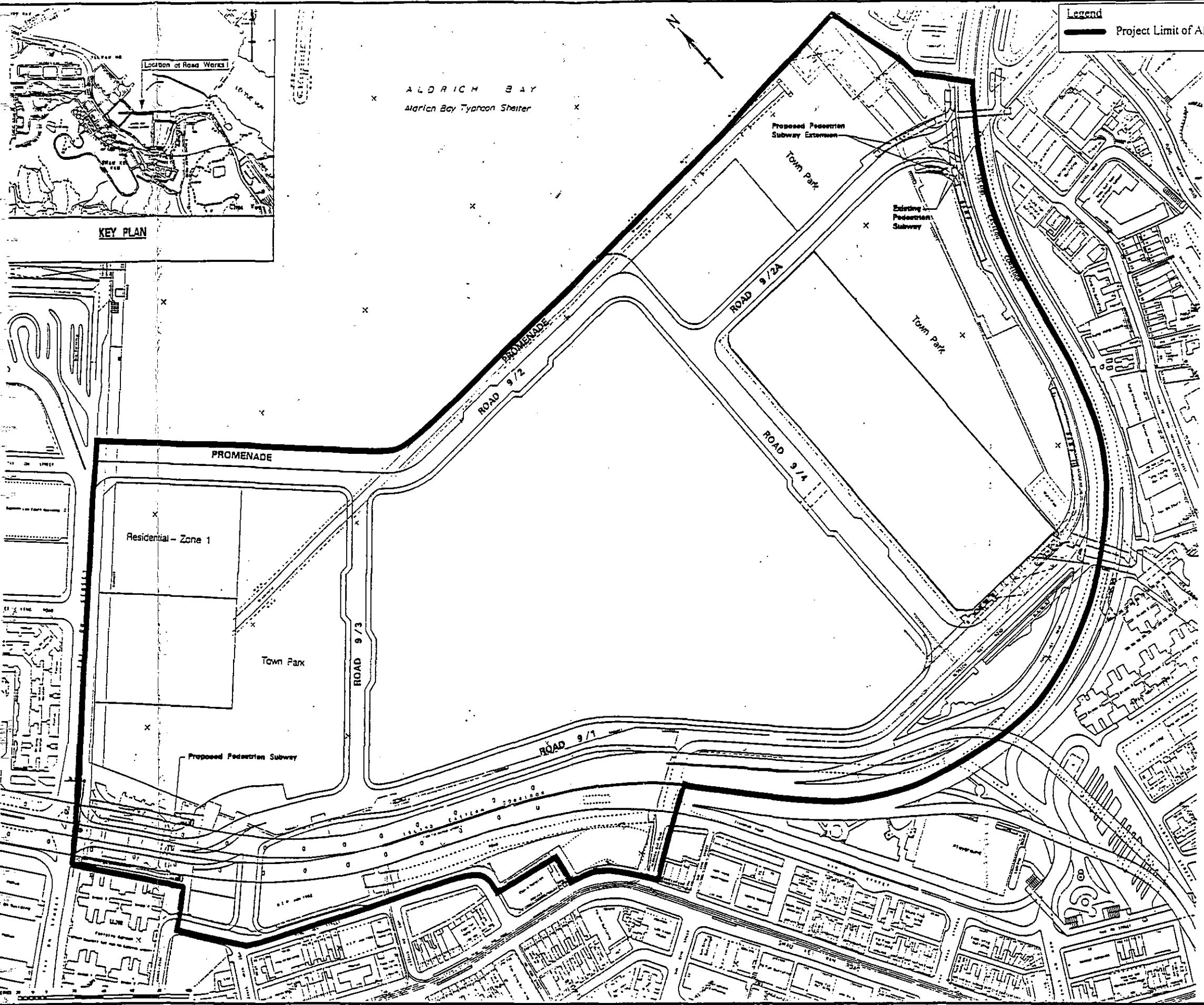
Figure 三

Scale

Date 一九九七年一月


Environmental Assessment & Pollution Control

Legend
 — Project Limit of Aldrich Bay Reclamation



Project 合約編號 CE31/95 工務計劃項目 PWP 第 437CL: “愛秩序灣填海區--
 基礎建設工程” 環境影響評估研究

Title 愛秩序灣填海區範圍

Figure —
 Scale
 Date 一九九七年一月



8.2 建議

建議如下：

- (一) 將填海區西面建議中的一所中學內所有受交通噪音超過 65 分貝的課室裝設高質素窗戶及冷氣機。由於隔音工程超出 PWP 第 437 CL 項工程及今次環境評估研究的範圍，故這所中學的計劃者應該考慮提供此項隔音工程。
- (二) 將填海區內所有受交通噪音超過 70 分貝的未來住宅單位裝設高質素窗戶及冷氣機。由於隔音工程超出 PWP 第 437 CL 項工程及今次環境評估研究的範圍，故未來住宅發展的計劃者應該考慮提供此項隔音工程。
- (三) 將發展規限事項列入填海區土地規劃。
- (四) 將減低噪音，塵埃和廢物處理的條款列入合約文件。
- (五) 建築期間執行環境監察及審查。
- (六) 執行景觀設計指引，包括路面用料設計，欄杆，座椅，燈光，避雨亭和園林設計等。

8. 結論及建議

8.1 結論

建築工程的噪音水平，在大部份噪音感應強的地方都會超過 75 分貝，不過透過徹實執行所建議的改善措施，噪音水平將會減至 75 分貝以下。

至於建築塵埃方面，如沒有舒緩措施，在大部份空氣感應強的地方都會超過一小時和二十四小時的指引和標準。改善措施如路面灑水，鋪設路面和加設擋風屏障都能有效地減低影響。

在道路運作期間，東區走廊是主要的交通噪音來源，根據 2015 年的交通流量，絕大部份現時及未來噪音感應強的地方均超過“香港規劃標準及準則”訂定的噪音標準。由於主要噪音來源是東區走廊，故此除了一道 3 米高的屏障能夠保護一所面向 9/2A 路的小學外，其餘建議在新建道路上興建的屏障都未能有效地紓減噪音水平。由於在東區走廊進行直接技術補救工程並不在環境影響評估研究的範圍內，因此本報告沒作出任何建議。

有見及此，當局曾以環境保護署訂定的三項準則來審查受影響樓宇是否合乎資格獲得考慮提供隔音裝置，結果顯示所有樓宇都不符合資格。

在填海區內的未來發展需考慮樓宇內部間格和隔音裝置設施。房屋署需考慮因為房協發展圖則改變而引致此評估結果有所差異的可能性。另外，私人參與居屋計劃的發展商應該書面呈交政府有關改善交通噪音影響的建議和圖則。

紓減填海區西面一所中學的噪音水平的方法是裝置隔音設施。由於這中學不屬於此工程和報告範疇內，故此這所中學的計劃者應該提供是項改善措施。

景觀及視覺影響並不算嚴重，在建築期間，將會執行景觀及視覺改善措施。報告亦提議一系列的景觀設計指引，這些指引能幫助改善景觀及提高視覺質素。

7. 環境監察及審查

鑑於愛秩序灣填海區與噪音感應強的地方非常接近，故此環境監察及審查有需要在建築期間執行，包括空氣，噪音和廢物處理三方面。

空氣

需要監察一小時的空氣中總懸浮粒子濃度，以評估建築塵埃對空氣質素的影響。圖七表示空氣監察站位置。

噪音

需要監察噪音聲級 (Leq)，以評估建築期間的噪音影響。噪音監察站位置與空氣監察站一樣 (圖七)。

廢物處理

承建商有責任控制及運送地盤內的廢物，並且執行所有改善措施來減低廢物影響。

環境監察計劃需與環境審查配合，旨於確保一切遵照法例規定，並且確保工程不影響居民，否則有關方面需作出補救行動。

有關詳細監察程序及審查要求應該列入建築合約文件，其條款內容亦應該向環境保護署諮詢。

因為直接舒緩措施未能有效地實行，故此當局曾根據環境保護署訂定的三項準則來評審受影響的現有樓宇是否合乎資格獲得考慮提供間接技術措施。結果顯示由於交通噪音主要來源是現有道路，未能符合第三項準則，故此所有樓宇都未能符合獲得考慮提供隔音裝置。

至於計劃中噪音感應強的地方，有關當局需注意以下各項：

- (一) 利用樓宇內部間隔來減低噪音。由於住宅用地(甲)地盤面積有限，未能增加噪音感應強的地方與道路之間的距離。
- (二) 利用樓宇外牆來擋隔交通噪音，包括利用樓宇的高架平台來遮擋低層住宅。
- (三) 為那些超過 70 分貝交通噪音水平影響的住宅提供高質素窗戶及冷氣機。
- (四) 為住宅用地(甲)旁邊的中學提供隔音裝置。
- (五) 在公屋/居屋地盤的中學，其集會禮堂可面對東區走廊來遮擋噪音，而學校與東區走廊之間的距離應不少於現行圖則。

6. 景觀及視覺影響評估

環境影響評估報告曾就此項工程所帶來的景觀及視覺影響作出研究。報告亦指出填海區及附近一帶現有的景觀及視覺特性。

對工程範圍一帶的住宅及商業大廈來說，此項工程所帶來的視覺影響不算嚴重。報告已詳細列出在建築期間應推行的景觀改善措施。

報告訂下一系列景觀設計指引，以便在詳細設計階段時可作參考。如能徹實執行此套指引，可幫助改善景觀及提高視覺效果。這套指引包括鋪路物料設計，欄杆，座椅，燈光，避雨亭及園林設計等。

5. 道路交通噪音評估及改善措施

愛秩序灣填海區上的新建道路，加上附近現有的道路和東區走廊，預料現有和未來的噪音感應強的地方都受到較大的行車噪音影響。2015 年的交通噪音是根據“香港規劃標準及準則”訂定的噪音標準來評估，此標準規定住宅的噪音不超過 70 分貝，而學校與教堂的噪音不超過 65 分貝。

評估結果概括如下：

表一. 超逾噪音標準的單位數目

噪音感應強的地方		受不同道路影響的單位數目			
		現有道路		新建道路	總數
		東區走廊	其它		
現有	住宅	1748	30	0	1778
	教室	2	0	0	2
	教堂	1	0	0	1
未來	房協	617	0	0	617
	私人參與居屋計劃	510	0	28	538
	私人發展	40	0	0	40
	教室	17	11	14	42

以上評估結果已考慮“愛秩序灣填海區公屋發展-交通影響及環境影響(二)”及“初部環境檢討報告”中所提議的噪音改善措施，其中包括在私人參與居屋計劃地盤最南端的地方採用單向樓宇設計，長者住所採用自行保護設計以及在私人參與居屋計劃地盤北面的小學加建 3 米高屏障。

爲了避免私人參與居屋計劃的居民和住宅用地(甲)附近的中學受到高交通噪音影響，當局曾分別就 5 米高及 4 米高的隔音屏障作出效用評估。

可惜，以上的措施都未能有效地紓減噪音。由於私人參與居屋計劃的樓宇屬高層建築物，5 米高的屏障只能保護到一樓住戶。至於那所中學最主要是受東區走廊的交通噪音影響，故此任何地面的屏障都不能有效地紓減噪音水平，當局建議爲那所中學受影響的教室提供高質素窗戶及冷氣機。

4.2 建築塵埃

道路及行人隧道工程中的挖土和傾瀉泥土活動引致空氣中懸浮塵埃增加。

透過電腦模擬可計算及評估建築塵埃的影響，並可繪製在地平面日均和時均的等線圖。

評估結果顯示，如沒有舒緩措施，則空氣中總懸浮粒子的濃度在興民街，南安街兩旁的住宅，以及位於東區走廊下休憩地方都超過指引所訂的 500 微克/立方米。

減低空氣塵埃懸浮量的措施包括將地盤車輛出入的通道灑水，使用擋風屏障，鋪設通道路面，以及完善地盤管理方法。透過這些措施，空氣中塵埃濃度應可以符合制訂的標準。

4.3 廢物處理

興建天橋的地基和行人隧道時所使用的鑽孔樁，會將填海區底下受污染的泥濘帶出地面。所有被帶出的泥濘需要經過污染程度分析，如發現泥濘已被嚴重污染，承建商應諮詢有關政府部門作出適當的處理。

3.2 未來發展計劃

愛秩序灣填海區將用作住宅，商業，公共機構及空地用途。房屋署於一九九六年發表的“愛秩序灣填海區公眾房屋發展-交通及環境影響- (二)”最後報告書提及公屋，居者有其屋及私人參與建居屋計劃樓宇等發展計劃。同時也包括政府/社區設施，空地及院校等設施。圖六展示未來發展計劃。房屋署亦提到建議書的發展計劃只是暫時性，需要時是會更改的。但同時亦指出可根據這份建議書的發展計劃來作環境影響評估研究。房屋署同意會根據環境評估研究結果對公屋/居者有其屋發展計劃提供舒緩措施。同時未來私人參與建居屋計劃樓宇的發展商需以書面向政府提交減低噪音的建議書。

4. 建築期影響評估及舒緩措施

4.1 建築噪音

建築期間使用的地盤機動設備必定產生噪音，根據圖四建築計劃表，建築工程活動會以個別進行或幾項同時進行。另外，地盤內會進行撞擊式打樁活動。建築噪音評估方法是依循“管制建築工程噪音(撞擊式打樁除外)技術備忘錄”。由撞擊式打樁活動所產生的噪音是假設以柴油錘打預應力混凝土樁的聲功率級來評估。

評估結果顯示，如沒有舒緩措施，則建築工程在大部份噪音感應強的地方所產生的噪音聲級超過 75 分貝。另一方面，打樁工程在所有噪音感應強的地方所產生的噪音聲級都符合標準，故此週日可在 0700 時至 1900 時作業。

改善建築噪音的方法包括安裝有效的滅聲器和加設隔音板；採用隔音屏障來遮隔某些噪音感應強的地方，以及放置機動設備於隔音罩內。如能徹實執行以上所提議的改善措施，建築噪音水平應可以有效地降至 75 分貝或以下。

雖然當局未能控制承建商所使用的建築方法，但仍能夠將噪音標準和所需的噪音監察規格，以及噪音消滅條款列入投標合約文件。關於環境監察及審查規格的詳細資料已包括在環境監察及審查手冊內。

3. 環境背景

3.1 現有環境

愛秩序灣填海工程帶來約二十多公頃之新用地。現在土木工程署暫將新填海區用作臨時廢料傾倒處，白天倒泥車從其他地方將廢料由南安街經愛秩序灣道與南安街交匯處的入口進入地盤及傾倒廢物。車輛經愛秩序灣道離開地盤之前需清洗輪胎。

雖然倒泥車在地盤沒鋪設的泥面上行走產生不少灰塵及噪音，但由於感應強的樓宇遠離地盤，加上地盤範圍南端有 2.5 米高的屏障，故此地盤以外的環境不受嚴重影響。

除位於興民街與南安街的兩座商業樓宇，太安街的東區裁判司署，興民街的教堂及幼稚園，魚類批發市場，污水處理廠，譚公廟及東面的兩所學校外，地盤的外圍主要是 6 至 25 層高的住宅樓宇，包括西面的欣景花園及鯉景灣，與及在興民街，南安街及愛秩序灣道的住宅樓宇。圖五展示現有噪音感應強的地方。這些地方可能亦對建築塵埃感應強。位於東區走廊天橋下的休憩地方及遊樂場也是空氣質素感應強的地方。

位於中高層的噪音主要來自東區走廊的車輛，而低層的噪音則來自太安街與東喜道的巴士及公共小型巴士；只有少部份噪音來自南安街，愛秩序灣道及區內道路的建築車輛。

在工程範圍內，空氣污染主要來自附近道路的交通廢氣與填海區內的塵埃。由於該區域全年有百份之七十以上吹東風，故地盤西面的空氣質素較差。

2. 工程項目特性

建議中的工程包括：

- (1) 建築約 1900 米的道路及有關的渠務工程；
- (2) 建築兩條行人天橋；
- (3) 在東喜道近新愛秩序灣道及阿公岩村道與東喜道之交界處，分別建築行人隧道延長段；
- (4) 建築一條新的行人隧道連接填海區與太安街附近的欣景花園；
- (5) 進行有關的環境美化工程。

圖二展示基建工程的分佈，工程計劃將分為五個部份進行：

- 第一部份：在私人參與建屋計劃(PSPS)位置的周圍進行道路工程；
- 第二部份：第一及第三部份以外的道路工程；
- 第三部份：地下鐵路第一地段所影響的道路工程；
- 第四部份：建築兩條行人天橋，位於 9/1 及 9/4 道路；兩條行人隧道延展其一位於近新愛秩序灣道之東喜道，及另一位於阿公岩村道與東喜道之交界處；
- 第五部份：由填海區近太安街連接欣景花園之隧道建設。

圖三展示各項道路工程部份。

圖四展示建議中愛秩序灣填海區-基礎建設工程。路政署預計道路工程需時約 28 個月，在一九九八年十月份動工。

1. 引言

愛秩序灣填海工程計劃在一九九七年完成，屆時可提供 7.6 公頃之土地可作為特別住宅發展用途，3.06 公頃作住宅用地(甲)發展，1.48 公頃作教育建設，0.04 公頃作公共機構及社區設施，1.24 公頃作為政府設施及 7.23 公頃作為空地用途。在填海工程完成後，PWP 第 437CL: “愛秩序灣填海區-基礎建設工程”項目將提供以上發展項目的基建部份。

工程地盤西自太安街，東及譚公廟道，南端為東區走廊。圖一展示工程的位置。工程項目是建設區內道路及有關的渠務工程，行人隧道的伸延，新行人隧道，新行人天橋以及有關的園林工程。

由於工程項目位置鄰近感應強地區，同時對將來計劃用地存在影響，故此港島路政署在一九九六年委託怡柏環境工程有限公司，聯同茂盛(亞洲)工程顧問有限公司，法蘭高寶萬通工程顧問有限公司(亞洲)及雅邦規劃設計有限公司進行工程項目中對環境影響評估研究。



路政署

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環境影響評估

摘要報告

怡柏環境工程有限公司

聯同

茂盛(亞洲)工程顧問有限公司

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雅邦規劃設計有限公司