HIGHWAYS DEPARTMENT

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

ENVIRONMENTAL IMPACT ASSESSMENT
FINAL REPORT

ENPAC Limited

in association with

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

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Environmental Impact Assessment
Final Report
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1. INTRODUCTION

1.1 Background

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 1.1 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.

Apart from two new commercial buildings, the Eastern Magistracy, the Fish Wholesale Market and a sewage treatment plant, the site is flanked on the landward side by residential buildings of 6 to 25 storeys, including Felicity Gardens and Lei King Wan on the west. Given the close proximity of these receivers to the site boundary, it is anticipated that the proposed roadworks would cause noise and dust nuisances to these sensitive uses during the construction phase.

A further environmental issue is the traffic noise impact from the proposed roads and the cumulative effects from the nearby existing roads, especially the IEC. As the site is earmarked mainly for housing and educational uses which are highly sensitive to traffic noise, the development potential of the site can be much constrained by traffic noise if due consideration is not given at an early stage of the Project to the mitigation of noise at the site. A secondary issue is the traffic noise impact from the proposed roads on the existing receivers, though the nearby existing roads are expected to dominate the noise environment. The prevailing government policy provides redress for existing receivers subject to increased noise from the use of new roads.

In view of the need to properly address these key environmental issues, 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 for the Project which includes two separate studies:

(a) Environmental Impact Assessment (EIA) study, and
(b) Traffic Impact Study (TIS).

This report contains the EIA study and the TIS is contained in a separate volume.

1.2 Study Objectives

The purpose of the Study was to provide information on the nature and extent of the potential noise and air quality impacts on the environment arising from the construction and operation of the Project and all concurrent activities in the area. The following itemizes the key objectives :

- Assess the impact of construction noise, both net and cumulative, on the existing noise sensitive receivers (NSRs) during the construction phase of the Project.
- Assess the impact of traffic noise, both net and cumulative, on the existing and planned NSRs during the operational phase of the Project.
- Assess the dust impact, both net and cumulative, on the existing air sensitive receivers (ASRs) during the construction phase of the Project.
- Examine the need for incorporating direct/indirect technical remedies in the Project.
- Propose mitigation measures to alleviate the impacts during the construction and operation phases of the Project, where needed.
- Achieve a layout and detailed arrangement for the new roads, foot bridges and subways that will result in the least possible visual and landscape impact and create most opportunity for landscape mitigation to reduce impacts.

The noise and dust assessment results will be used as the basis for the evaluation of their respective impacts arising from the proposed Engineering Works on both existing and planned sensitive developments, as well as for the identification of locations where the acceptable criteria limits are exceeded and appropriate mitigation measures are required.

1.3 Report Structure

This EIA Report consists of 8 sections, as follows:

(1) Introduction
(2) Project Description
(3) Construction Impact Assessment
(4) Operational Impact Assessment
(5) Mitigation Measures
(6) Landscaping and Visual Impact Assessment
(7) Environmental Monitoring and Audit
(8) Conclusion and Recommendation

2. PROJECT DESCRIPTION

2.1 Proposed Engineering Works

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 2.1 shows the layout of works and the planned land uses on the site.

2.2 Construction Programme

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 2.2 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 2.3. According to the Highways Department, the construction works are scheduled for completion in 28 months, commencing from October 1998.

2.3 Construction Activities

The Engineering Works comprise the following main activities :

Road Works: construction of flexible pavement comprising subbase, roadbase, basecourse, and wearing course, road kerbs, and all associated drainage and landscaping works.

Footbridges : construction of bridge foundations, piers, bridge deck, retaining walls and associated earthworks, drainage and landscaping works.

Subway extensions : driving of bored piles and construction of caisson walls.

Equipment requirements for each activity are provided in Table 2.1 and Table 2.2, along with sound power levels (SWLs) for individual and groups of equipment. Equipment SWL's employed for this assessment are based on those contained in Table

3 of *Technical Memorandum on Noise from Construction Work other than Percussive Piling* and Table 11 of *BS 5228: Part 1: 1984.*

Table 2.1 Typical Equipment Requirements for Road Works

Activity	Equipment and Quantity		Assessment Input		Total
			Assumed on-time[ii]	SWL[i] per piece dB(A)	
Preliminary Works and Mobilization	Truck with crane Drilling rig (diesel)	1 1	100% 100%	98 114	114.1
Earthworks	Pneumatic breaker D8 Ripper/Dozer Dumptrucks Loader Vibrating roller D4 Dozer	1 1 4 1 1 1	70% 100% 20% 70% 100% 65%	110 115 109 110 104 115	118.8
Drainage	Dumptrucks Backhoes Truck with crane Concrete mixer truck Vibratory pokers	2 2 1 1 2	20% 90% 100% 80% 75%	110 109 98 107 112	117.0
Kerbing	Concrete mixer truck Vibratory pokers Dumptruck	1 1 1	80% 75% 20%	107 112 109	112.6
Paving (flexible)	Asphalt trucks Paver Rollers	4 1 2	100% 100% 100%	110 108 103	117.0
Erecting New Roadsigns, Street Lights and White Lining	Trucks	2	20%	109	105.0

Table 2.2 Typical Equipment Requirements for Footbridge and Subway

Activity Construction	Equipment and Quantity		Assessment Input		Total
			Assumed on-time[ii]	SWL[i] per piece dB(A)	
Piling	Bored piling rigs	2	100%	115	122.2
	Mobile cranes	1	100%	116	
	Pump trucks	1	50%	109	
	Concrete mixer trucks	2	80%	107	
	Vibratory pokers	4	75%	112	
Pile Cap Construction	Excavator (backhoe)	1	85%	109	115.8
	Dumptrucks	2	20%	109	
	Dewatering pump compressor	1	100%	100	
	Crane	1	100%	98	
	Concrete mixer trucks	2	80%	107	
	Vibratory pokers	4	75%	112	
Pier Construction	Compressor	1	100%	100	118.1
	Crane	1	100%	98	
	Concrete pump truck	1	100%	107	
	Concrete mixer trucks	2	80%	107	
	Vibratory pokers	4	75%	112	
Super-structure Construction	Compressor	1	100%	100	118.1
	Mobile cranes	2	100%	98	
	Concrete pump truck	1	100%	107	
	Concrete mixer trucks	2	80%	107	
	Vibratory pokers	4	75%	112	
Excavation	Backhoe	1	85%	109	117.0
	Trucks	2	20%	109	
	Vibratory pokers	3	75%	112	
	Compressor	1	100%	100	
Subway Lining	Backhoe	1	85%	109	117.0
	Trucks	2	20%	109	
	Vibratory pokers	3	75%	112	
	Compressor	1	100%	100	
Entrance Structure	Compressor	1	100%	100	117.1
	Concrete pump truck	1	100%	107	
	Concrete mixer trucks	2	80%	107	
	Vibratory pokers	3	75%	112	
Backfilling	Excavator	1	85%	109	113.8
	Trucks	2	20%	109	
	Concrete pump truck	1	100%	107	
	Concrete mixer trucks	2	80%	107	

Notes: i. SWL values are from *BS 5228: 1984*, using plant sound power methodology and results shown in Appendix C of that Standard. Exceptions are those SWL values for pneumatic breaker and air compressor, for they are derived from Table 3 of the *Technical Memorandum on Noise from Construction Work other than Percussive Piling*, assuming silenced equipment have been used.

ii. "On-time" estimates are generally obtained from *BS 5228: Part 1:1984*, using estimates shown in Appendix C of that Standard. Estimates for breakers, air compressors and dumptrucks have been assumed.

2.4 Existing Environment

The Aldrich Bay Reclamation is some 20 plus hectares of newly formed land bounded by Tai On Street to the west and the IEC to the south and east in Shaukeiwan. 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. A hoarding of about 2.5m high screens the on-site dumping activities from the street level receivers on Hing Man Street and 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 the hoarding.

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.

Hing Man Street carries very light traffic. Receivers on the lower floors of the buildings are subject to noise mainly from the mini-bus terminus across the Street, and the ground floor commercial activities.

A baseline monitoring of the traffic noise during the AM peak hours was undertaken on 15 August 1996. Four monitoring stations, designated as Stations A, B, C, and D in Figure 2.4 were set up for the noise monitoring and the monitoring results, summarized in Table 2.3, show that the background noise levels on the fringe of the Project site were in the order of L90(1-hr) 65-69 dB(A) (free-field).

Table 2.3 Baseline Noise Levels (Free-field)

Measurement Location	L_{10} dB(A)	L_{eq} dB(A)	L_{90} dB(A)
Felicity Garden (Podium Level)	78.6	74.6	68.7
Works Site under IEC	73.8	73.77	69.3
Perfect Mount Gardens (Podium Level)	75.8	72.9	68.8
Tam Kung Temple (Street Level)	73.6	71.9	65.6

Table 2.4 compares the measured noise levels with the calculated noise levels based on the concurrent traffic counts on site and indicates agreement of the prediction model with direct measurements.

Table 2.4 Modelled Noise Levels (Free-field) Based on Traffic Counts

Measurement Location	Traffic Count (veh/h)		Modelled Noise Level L_{10} dB(A)
	Light Vehicle	Heavy Vehicle	
Felicity Garden (Podium Level)	4987	1379	79.5
Works Site under IEC	65	245	73.5
Perfect Mount Gardens (Podium Level)	1920	1010	77.5
Tam Kung Temple (Street Level)	476	353	72.5

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.

Recent air quality data for the Project site, particularly Total Suspended Particulates (TSP) which is the air pollutant of main concern in this study, is not available; therefore, the annual average of TSP from the EPD's monitoring stations at Tai Po[1] and Central/Western[1] which is 87 $\mu g/m^3$ was quoted from the "*Air Quality in Hong Kong* 1994" and adopted as the prevailing measurement.

[1]Tai Po and Central share similar regional characteristics as Aldrich Bay Reclamation, hence the TSP concentration at Tai Po and Central can be used as representative of the Study area.

3. CONSTRUCTION IMPACT ASSESSMENT

3.1 Assessment Methodology

3.1.1 Construction Noise

The methodology outlined in the *Technical Memorandum on Noise from Construction Work other than Percussive Piling* has been used for the assessment of construction noise other than percussive piling noise. Adjustments for equipment on-time have been made according to Figure 4 of *BS 5228: Part 1: 1984.*

For the purpose of this EIA study, the construction noise impact has been assessed on the basis of the following assumptions :

- All items of powered mechanical equipment (PME) required for a particular construction activity are located at the notional source position of the segment where such activity is performed.
- A +3 dB(A) facade correction is added to the predicted noise levels in order to account for the facade effect at each NSR.
- The nearest sensitive facades of the residential buildings to the notional source positions (i.e. the lowest residential floors) are examined. Also, noise screening effect due to topographical barriers such as podium is ignored.
- Given the openness of the immediate locality of the construction site and NSRs under consideration, correction for acoustic reflection does not apply to this assessment.

No percussive piling is anticipated for the engineering works. However, there would be periods where construction of the proposed engineering works would be concurrent with building construction on the site. For this, percussive piling noise impact has been assessed using the method outlined in the *Technical Memorandum on Noise from Percussive Piling*. In the noise assessment, it has been assumed that the piling rig is located closest to the noise sensitive receivers.

3.1.2 Construction Dust

(a) *Air Dispersion Model*

The potential impact of construction dust has been assessed using the Fugitive Dust Model (FDM). Dust generating activities along the proposed road works e.g. excavation and backfilling, are represented as line sources in the model in order to simulate the impacts from the roadworks.

(b) *Emission Factor*

As no individual emission factors are available for the various activities, the emission factor appropriate for heavy construction in the "Compilation of Air Pollutant Emission Factors", AP-42, 5th edition, which is 1 x 10^{-7} kg/m^2/s has been used. Particulate emissions from vehicles which are mainly fine particles are excluded.

(c) *Meteorological Conditions*

In order to determine the highest 1-hr and 24-hr average concentrations of TSP in the vicinity to the construction site, one year of meteorological data has been obtained from the Royal Observatory. The data is for a wind station at Tseung Kwan O which better represents the topographical and geographical features of the site than other wind stations where data is available. The data has been used as input to the model and includes surface wind speed, wind direction, stability class and mixing height.

3.2 Environmental Standards and Guidelines

3.2.1 Construction Noise

(a) *Non-restricted Hours*

Under the existing provisions, there is no legal restriction on noise generated by construction activities (other than percussive piling) between the hours of 07:00 and 19:00 on normal weekdays. However, EPD's *Practice Note for Professional Persons ProPECC PN 2/93* recommends a non-statutory daytime construction noise limit of 75 dB(A) L_{eq}(30 min) at the facades of dwellings. This recommendation has been adopted for the assessment of construction noise during non-restricted hours.

(b) *Restricted Hours*

It is expected that night works will not be required and therefore the criteria stipulated in *Technical Memorandum on Noise from Construction Work other than Percussive Piling*, as well as in *Technical Memorandum on Noise from Construction Work in Designated Areas*, issued under the Noise Control Ordinance (NCO) are not applicable to this Project.

(c) *Percussive Piling*

As building construction may proceed concurrently with the proposed engineering works, the building Contractor must have obtained a valid Construction Noise Permit before percussive piling is carried out. According to the *Technical Memorandum on Noise from Percussive Piling* issued under the NCO, no restriction on time between 0700 and 1900 hours during normal weekdays will be applied to the works if the maximum predicted noise level at any dwelling using openable windows for ventilation does not exceed 85 dB(A). The standard for schools, clinics and courts of law is reduced by 10 dB(A) unless these premises are central air-conditioned. The "85 dB(A)" applies to the Eastern Magistracy in Lei King Wan because the sensitive rooms of the building are central air-conditioned.

3.2.2 Construction Dust

(a) *Hong Kong Planning Standards and Guidelines* (HKPSG)

The Hong Kong Planning Standards and Guidelines (HKPSG) identify construction and reclamation sites as major sources of dust and suspended particulates, and recommend that a buffer distance of at least 100 m be provided between the reclamation site and the nearest sensitive receivers (including residences, educational institutions, and active recreational facilities). In addition, the HKPSG state that

transportation routes to and from the reclamation site should be designed, and necessary protective measures taken, to minimise dust nuisance.

(b) *Air Pollution Control Ordinance*

Dust emissions from construction sites come under the control of the Air Pollution Control Ordinance, which calls for compliance with a set of health-related air quality objectives (AQOs) for seven pollutants, of which TSP is relevant to this study.

The AQOs contain no hourly criteria for concentrations of TSP. However, EPD has a Dust Suppression Guideline to indicate the maximum acceptable concentration of TSP during construction works. This Guideline, which is 500 $\mu g/m^3$ (hourly average), is used in the present assessment.

3.3 Existing Sensitive Receivers

The inland boundary of the Project site is flanked by low, medium and high-rise residential buildings, in addition to a temple and three schools (i.e. Tsung Tsin College, Shaukeiwan Government School, and a primary school) on the east (Figure 3.1), which are sensitive to both noise and construction dust. Several sitting-out areas underneath the IEC, a playground, and the Eastern Magistracy complex are also considered to be air sensitive.

Lei King Wan on the west is a private housing development comprising tower blocks of about 20 storeys, with shops on the ground floor. It is separated from the site by Tai On Street. Existing environment is much dominated by heavy traffic on IEC and Tai On Street.

Felicity Garden also on the west is another private housing development, comprising tower blocks of some 25 storeys with the Urban Council Sai Wan Ho Complex which is noise tolerant underneath. All dwellings of Blocks 3 and 4 on the seaward side are exposed to traffic noise from the IEC.

Two residential blocks, one of 5 storeys and another of 22 storeys with mezzanine floors underneath for commercial uses, are located between Holy Cross Path and Hoi Ning Street along Hing Man Street. Residential buildings between Hoi Ning Street and Hoi An Street are mainly 5 storeys, 7 storeys and 22 storeys high with commercial activities on the mezzanine floors. The street carries very light traffic. Main noise sources at the lower floors are the mini-bus terminus across the street, car-parking, and ground floor commercial activities. Construction traffic on the reclamation site hardly affects the receivers on the lower floors partly due to the screening of the hoarding. Receivers on the upper floors are exposed to high levels of traffic noise from the IEC.

A church is sited on the ground floor of Rockson Mansion at the junction of Hing Man Street and Hoi An Street. The three floors above the church are occupied by a kindergarten which is air-conditioned. Above the kindergarten are all residential units.

Casio Mansion to the east of Marina House, a commercial building with curtain walling at the front facade, is a 20 storey residential building overlooking the IEC with two mezzanine floors used for commercial uses.

A single-storey Kai Fong Welfare Centre is located at the junction of Aldrich Bay Road and Nam On Street. The centre is only mildly sensitive to noise because all sensitive rooms are setback from the road.

Residential and commercial buildings of 6-25 storeys high are located along Nam On Street which carries a lot of construction traffic in the daytime. Across the street is the UC playground and a sitting out area underneath the IEC.

Perfect Mount Gardens is a private housing development comprising five tower blocks with carparks underneath. All dwelling units are exposed to the IEC traffic.

To the east of Perfect Mount Gardens are residential buildings of 21-25 storeys high with the lower floors, including the mezzanine floors used for commercial uses.

Shaukeiwan Government School, Tsung Tsin College and a church next to it are sufficiently screened by other buildings from the IEC traffic. Also, Tam Kung Temple and the school behind it are screened from the IEC traffic by the road deck.

3.4 Noise Impact Assessment

3.4.1 Net Noise Impacts

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 2.3, construction activities may, during a given period, be undertaken on an individual basis or concurrently. For the purpose of this assessment, the noisiest activity in each section of the roadwork is adopted to assess the worst-case noise impact arising from each individual section on the designated NSRs in the Study Area. In addition, possible combinations of the roadworks have been considered in order to assess the cumulative noise impact from the proposed engineering works.

The results of construction noise calculation at the designated receivers (Figure 3.1) for the contributions from individual sections of the roadworks are shown in Table 3.1 and for combinations of roadworks are shown in Tables 3.2 - 3.4. The predicted construction noise levels at some of the affected dwellings (e.g. FG3, FG4, PMGE, OTM, OMM and TEMPLE) exceed the *EPD's Practice Note for Professional Persons ProPECC PN 2/93* noise limit of 75 dB(A) Leq(30 min) by as much as 13 dB(A) because of the close proximity of the sensitive receivers to the construction site. Hence, mitigation measures are required and the effectiveness of the mitigation measures is evaluated in Section 5. Sample calculation for construction noise is presented in Appendix A.

3.4.2 Cumulative Noise Impacts

Though no concurrent infrastructure projects such as roadworks are identified in the vicinity to the Study Area, the construction periods of the planned development and the proposed engineering works on the site are likely to overlap.

According to the schedule, the PSPS residential blocks, the primary school to the north of the PSPS site, and the secondary school to the west of the reclamation site are all to be completed by the end of 1999; the PR/HOS towers and the residential zone are to be completed by the end of 2000, and the UC Complex is expected to be

finished by April 2011. Due to the overlapping in construction period, cumulative noise impacts have been considered in this Study.

For building construction, the noisiest activity is likely to arise from percussive piling during the construction of the foundation. Assuming as a worst-case situation that the Contractor uses diesel hammering driving pre-stressed concrete piles, which produces a sound power level of 128 dB(A) according to the above Technical Memorandum, the potential noise impacts at the designated NSRs are presented in Table 3.5. As can be seen, the maximum noise levels at all the designated NSRs are within the Acceptable Noise Level of 85 dB(A) Leq(5-min.) and therefore there should be no restriction in time of the operation between 0700 and 1900 hours on normal weekdays.

Other general construction noise from building works is likely to be in the order of 110 dB(A). The noise contributions from the potential concurrent building works at the existing NSRs are presented in Table 3.6.

The cumulative noise impacts arising from the proposed engineering works and the concurrent building construction have also been examined. Table 3.7 shows the worst-case noise impacts from the construction of all sections of the roadworks and the building construction. The results indicate that the roadworks are likely to be the dominant noise sources and noise from the building works is unlikely to contribute significantly to the overall noise levels.

3.5 Dust Impact Assessment

3.5.1 Net Dust Impacts

In general, roadworks are much less dust generating than reclamation though earthworks, excavation, backfilling associated with the road and subway construction in this Project are potentially dusty. One of the concerns raised in the Environmental Review for the Aldrich Bay Reclamation undertaken by the EPD in January 1995 was the amount of dust that would be generated from the proposed engineering works and whether it would constitute an impact for the regional ambient air quality.

The potential dust impact has been calculated using the FDM and contours of the predicted highest hourly and daily average dust concentrations at ground level, including the background concentration, in the vicinity to Sections I and II of the roadworks are shown in Figures 3.2 to 3.5. As can be seen, 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 exceed the Guideline standards, if unmitigated. The concentrations are for the ground level receivers. Because of deposition, particularly for larger particles, dust concentrations at the upper floors are less. Typically, dust concentration decreases exponentially with height.

On the other hand, reconstruction of the existing Shaukeiwan MTRC subway entrance near Perfect Mount Gardens (Section III) and the proposed ramp outside Felicity Garden (Section IV) are predicted to have only mild dust impacts on the local air quality because of the scale of the works. The highest hourly and daily TSP concentrations at ground level are presented in Figures 3.6 to 3.9. No exceedance of the Dust Guideline or Standard is anticipated from the construction of these two sections.

Similarly the dust impact generated from Section V of the roadwork is unlikely to be adverse since the activities at this stage only involve backfilling and retrofitting the road segments affected by the MTR lot.

The cumulative dust impact arising from concurrent construction activities have also been investigated. The worst case scenario where Sections I, II, III and IV occur simultaneously has been considered and concentrations are presented in Figures 3.10 and 3.11. As shown, the cumulative TSP concentrations far exceed the Dust Guideline, and therefore mitigation measures for construction dust are necessary. The effectiveness of these measures is evaluated in Section 5.

3.5.2 Cumulative Dust Impacts

The operation of the CED public dumping point is expected to terminate before any engineering work is to proceed within the reclamation site. Thus no concurrent dust impact from the dumping operation is anticipated.

However, there will be concurrent building construction within the reclamation. In general, building construction involves foundation, steelwork, formwork, scaffolding and concreting which are relatively not dusty. Also, no concrete batching which is potentially dusty will be required on the reclamation for the building works. However, there will be haulage of construction material and ready-mixed concrete on paved haul roads which may contribute to the dust level in air. Assuming that on average there are three trucks, each of 24 Mg, per hour over an 8-hr working day moving on the haul roads, the dust contributions to the overall dust concentrations have been assessed. Figures 3.12 and 3.13 present the cumulative hourly and daily average TSP concentrations due to concurrent building construction. As shown in the figures, no significant cumulative dust impacts are anticipated.

Table 3.1 Unmitigated Construction Noise Levels Due to Individual Road Sections

NSR	Unmitigated Noise Levels, Leq(30-min.) dB(A)			
	Section I	Section II	Sections III & IV	Section V
ELB	-	78	68	66
OTM	-	85	76	71
OMM	-	85	80	74
FG3	-	75	87	81
FG4	-	76	86	79
RM	-	74	71	67
CM	64	74	67	62
SKW233	69	73	71	-
CCB	70	67	71	-
PMGA	72	73	78	-
PMGE	70	76	85	-
GM	66	80	81	-
TPB	70	78	81	-
KFM	78	77	80	-
TEMPLE	82	71	84	-

- Intervening distance is greater than 300m, thus its noise impact is negligible.

Table 3.2 Combinations of Construction Noise Scenarios (Sections I, II & V)

NSR	Unmitigated Noise Levels, Leq(30-min.) dB(A)			
	Section I	Section II	Section V	Overall
ELB	-	78	66	78
OTM	-	85	71	85
OMM	-	85	74	85
FG3	-	75	81	82
FG4	-	76	79	81
RM	-	74	67	75
CM	64	74	62	75
SKW233	69	73	-	74
CCB	70	67	-	72
PMGA	72	73	-	76
PMGE	70	76	-	77
GM	66	80	-	80
TPB	70	78	-	79
KFM	78	77	-	81
TEMPLE	82	71	-	82

- Intervening distance is greater than 300m, thus its noise impact is negligible.

Table 3.3 Combinations of Construction Noise Scenarios (Sections III, IV & V)

NSR	Unmitigated Noise Level, Leq(30-min.) dB(A)		
	Sections III & IV	Section V	Overall
ELB	68	66	70
OTM	76	71	77
OMM	80	74	81
FG3	87	81	88
FG4	86	79	87
RM	71	67	72
CM	67	62	68
SKW233	71	-	71
CCB	71	-	71
PMGA	78	-	78
PMGE	85	-	85
GM	81	-	81
TPB	81	-	81
KFM	80	-	80
TEMPLE	84	-	84

- Intervening distance is greater than 300m, thus its noise impact is negligible.

Table 3.4 Combinations of Construction Noise Scenarios (Sections I, II, III & IV)

NSR	Unmitigated Noise Levels, Leq(30-min.) dB(A)			
	Section I	Section II	Sections III & IV	Overall
ELB	-	78	68	78
OTM	-	85	76	86
OMM	-	85	80	86
FG3	-	75	87	87
FG4	-	76	86	86
RM	-	74	71	76
CM	64	74	67	75
SKW233	69	73	71	76
CCB	70	67	71	74
PMGA	72	73	78	80
PMGE	70	76	85	86
GM	66	80	81	84
TPB	70	78	81	83
KFM	78	77	80	83
TEMPLE	82	71	84	86

- Intervening distance is greater than 300m, thus its noise impact is negligible.

Table 3.5 Percussive Piling Noise for Potential Concurrent Building Projects

NSR	Unmitigated Noise Levels, Leq(5-min.) dB(A)						
	Residential Zone	Secondary School	PR/HOS site	UC Complex	Primary School	PSPS site	Overall
ELB	76	70	64	-	-	-	77
OTM	72	73	-	-	-	-	76
OMM	69	71	-	-	-	-	73
FG3	66	69	-	-	-	-	71
FG4	65	69	64	-	-	-	71
RM	63	67	67	-	-	-	71
CM	-	64	70	65	-	-	72
SKW233	-	-	67	68	-	-	71
CCB	-	-	63	69	-	64	71
PMGA	-	-	64	69	-	69	73
PMGE	-	-	64	67	-	71	73
GM	-	-	64	65	-	74	75
TPB	-	-	64	-	64	71	72
KFM	-	-	-	-	66	69	71
TEMPLE	-	-	-	-	68	69	72

\- Intervening distance is greater than 300m, thus its noise impact is negligible.

Table 3.6 General Construction Noise for Potential Concurrent Building Projects

NSR	Noise Levels, Leq(30-min.) dB(A)						
	Residential Zone	Secondary School	PR/HOS site	UC Complex	Primary School	PSPS site	Overall
ELB	67	62	53	-	-	-	68
OTM	61	67	-	-	-	-	68
OMM	59	64	-	-	-	-	65
FG3	56	59	-	-	-	-	61
FG4	55	59	-	-	-	-	60
RM	53	56	55	-	-	-	60
CM	-	53	57	55	-	-	60
SKW233	-	-	55	58	-	-	60
CCB	-	-	-	59	-	53	60
PMGA	-	-	53	58	-	56	61
PMGE	-	-	-	56	-	57	60
GM	-	-	53	55	-	58	61
TPB	-	-	53	53	54	58	61
KFM	-	-	-	-	56	57	60
TEMPLE	-	-	-	-	57	55	59

- Intervening distance is greater than 300m, thus its noise impact is negligible.

Table 3.7 Cumulative Construction Noise Impact (All Sections + Concurrent Building Construction)

NSR	Noise Level, Leq(30-min.) dB(A)		
	Concurrent Buildings	All Sections[1]	Overall
ELB	68	79	79
OTM	68	86	86
OMM	65	86	86
FG3	61	86	88
FG4	60	87	87
RM	60	76	76
CM	60	75	75
SKW233	60	76	76
CCB	60	74	74
PMGA	61	80	80
PMGE	60	86	86
GM	61	84	84
TPB	61	83	83
KFM	60	83	83
TEMPLE	59	86	86

1 Unmitigated noise levels

4. OPERATIONAL IMPACT ASSESSMENT

4.1 Noise Assessment Methodology

The impact of road traffic noise 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.

Road traffic noise levels have been predicted using ENPAC's in-house noise model which is based on the UK's Department of the Transport procedures described in "Calculation of Road Traffic Noise" published by the Welsh Office, HSMO 1988 (CRTN). In order to determine the worst impact within 15 years after the operation of the proposed roads in 2001, the projected traffic flows for the morning peak hours in 2015, being the year with the highest traffic flows, have been employed for the operational noise assessment.

In case where no practical direct technical remedies can be applied, reference has been made to the Exco' directive *Equitable Redress for Persons Exposed to Increased Noise Resulting from the Use of New Roads*. The EPD's eligibility criteria which are based on the UK's eligibility conditions stipulated in the CRTN have been adopted to test the eligibility of the existing NSRs for consideration of indirect technical remedies.

4.2 Existing Noise Sensitive Receivers

The existing noise sensitive receivers as described in section 3.3 are shown in Figure 3.1 encompass all of the residential dwellings along the IEC from Lei King Wan and Felicity Garden to Tam Kung Temple as the northernmost project limit. Building heights are in the range of 6 to 25 storeys high.

4.3 Future and Planned Sensitive Uses

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 planned on the site. Figure 4.1 shows the future and planned sensitive receivers. As advised by the Housing Department the layout of the proposed PR/HOS and PSPS development are only tentative and are subject to future change. However, HD has confirmed that the layout of the proposed PR/HOS and PSPS development used in this EIA study as 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.

As the proposed Housing for Senior Citizens (HSC) and the schools will be either self-protecting in design or sound insulated, it has been assumed in the subsequent noise assessment that these receivers are noise-tolerant, although the use is noise sensitive in nature.

4.4 Predicted Traffic Flows

According to the Transport Department (TD), 2015 will be the year when the traffic reaches the worst projection within a period of 15 years after operating the Project. Traffic growth after this year will presumably saturate on the assumption that the total population for the entire reclamation site is maintained at 31,800. Since local traffic data is available up through year 2011 from the Final Report of *Aldrich Bay Reclamation Public Housing Development : Traffic Impact and Environmental Assessment-II*, a growth factor of 2.0, agreeable to TD, has been adopted to project for the traffic beyond 2011. On the other hand, TD was able to provide the traffic flow data on the IEC for year 2015.

Projected 2015 AM peak hour traffic flows and vehicle composition for the roads under consideration are given in Table 4.1 below. A detailed breakdown of the traffic flows for 2015 is shown in Figure 4.2.

Table 4.1 Predicted Traffic Flows

Road Segment[1]	Status		1-way Traffic Flow (veh/hr)	2-way Traffic Flow (veh/hr)	% Heavy Vehicles	Road Speed (kph)
	New/Improved	Existing				
1-2	*			65	0	50
2-3	*			222	21	50
2-8	*			157	30	50
3-4	*			155	25	50
3-5	*			193	37	50
5-11	*			423	23	50
6-7	*			631	21	50
7-8	*			646	21	50
8-9	*			436	18	50
9-10	*			962	37	50
10-11	*			918	42	50
11-12	*			1020	35	50
12-13	*			1362	22	50
12-14	*			963	27	50
15-17		*	4140		58	70
16-17		*	4140		27	70
17-18		*		8280	38	70
18-19		*	608		49	50
18-20		*		8280	36	70
20-21		*	1046		31	50
20-22		*		8280	37	70
22-23		*	598		59	50
22-24		*		8280	34	70
24-25		*	508		28	50
24-26		*		5170	35	70
26-27		*		5170	42	70

Note: 1 Please refer to Figure 4.2 for identified road segments.

4.5 Noise Impact Assessment

According to the Environmental Impact Assessment conducted by the HKHA, three of the four housing types on the site will exceed the noise standard and thus require some form of mitigation in order to comply with the HKPSG noise criteria. These encompass the residential blocks (REN towers), the primary school and the PSPS. Mitigation measures proposed by the HKHA include blanking the windows for the facades facing the IEC, proper window insulation, and/or installing window-sized air conditioners.

As a base condition for further investigation in this EIA study, the traffic noise levels at various floor levels of the designated existing and planned noise sensitive facades have been calculated assuming :

- the latest available layout of the planned development agreed by HD as shown in Figure 4.1,
    - (1) the single aspect building (SAB) at the southernmost part of the PSPS site, and
    - (2) the proposed Housing for Senior Citizens with self-protecting and noise-tolerant design at Road 9/1;
- a 3m high barrier to protect the Primary School at Road 9/2A as recommended in "Preliminary Environmental Review (PER) Report" issued by Architectural Services Department (ASD) in 1996.

The results are shown in Table 4.2. As can be seen, the unmitigated noise levels are predicted to exceed 70 dB(A) by 1-14 dB(A) at the existing and 1-8 dB(A) at the planned NSRs.

In order to formulate mitigation schemes to protect the existing and planned receivers, a detailed analysis of the noise contribution from both the existing and new roads has been made for NSRs where the HKPSG noise criteria are exceeded. The results are summarized in Table 4.3 and discussed below. Mitigation measures are required to reduce the above impact and these are discussed in Section 5.

(a) Lei King Wan (represented by OTM, OMM)

Receivers at the middle and upper floors are likely to be exposed to high traffic noise from the IEC. The noise contribution from the new roads is insignificant in comparison.

(b) Felicity Garden (represented by FG3 and FG4)

Receivers on all floors are exposed to high traffic noise from the IEC. The noise contribution from the new roads is insignificant in comparison.
(c) Dwellings on Hing Man Street (represented by HOB, 40-42, HMM, and CM)

Receivers on the first and second floors are expected to be adversely affected by existing local roads, and those above the third floor levels are likely to be exposed to high traffic noise exceeding the HKPSG criterion from the IEC. The new roads contribute no more than 1 dB(A) to the overall noise levels.

On the other hand, receivers on Casio Mansion are all exposed to high traffic noise from the IEC.

(d) Church and School on Hing Man Street (represented by RM)

The church and kindergarten at Rockson Mansion are likely to be exposed to noise levels in excess of 65 dB(A), but largely due to contribution from existing roads.

(e) Dwellings on Nam On Street (represented by SKW233 and CCB)

Almost all of the receivers except those on the first or second floor of SKW233 are expected to be exposed to high noise levels from the IEC and to a lesser extent from Nam On Street. New roads are not expected to contribute significantly to the overall noise levels.

(f) Dwellings to the East of Bus Terminus (represented by PMGA, GM, TPB, and KFM)

The main noise impacts come from the existing roads, in particular, the IEC. New roads are not expected to contribute significantly to the overall noise levels.

(g) HOS on Reclamation (represented by R1-E, R1-S, R1-W, R2-S, R3-S, R3-W, R5-S, and R5-W)

The main noise impacts at the middle and upper floors come from the IEC. The new roads are not expected to contribute significantly.

(h) PSPS on Reclamation (represented by PSPS1-E, PSPS1-S, PSPS5-W, PSPS7-E, PSPS8-E, PSPS9-E, PSPS12-W, PSPS13-N, PSPS13-S)

Apart from PSPS12-W, PSPS5-W, IEC is the main contributor of traffic noise at the middle and upper floor receivers.

(i) Schools on Reclamation (represented by SSCH-1, SSCH-2, SSCH-3, PSCH-1 and PSCH-3)

SSCH-2 and SSCH-1 are expected to be exposed to noise levels higher than 65 dB(A). The noise is contributed almost equally from the IEC and the new roads.

(j) Private Residential Development (represented by RZ-1)

The main noise contributor at middle and upper floors is the IEC.

Table 4.2 Unmitigated Noise Levels at NSRs in 2015

(a) Existing Noise Sensitive Receivers

NSR	L10(1-hr.), dB(A)		
	1/F	10/F	20/F
ELB	63	69	/
OTM	65	73	/
OMM	67	77	/
FG3	78	79	77
FG4	84	81	79
HOB	75	79*	/
40-42	75	80*	/
HMM	74	77	76
RM	75	80	/
CM	73	81	80
SKW233	79	83*	/
CCB	75	80*	/
PMGA	80	79	/
PMGE	80	79	/
GM	63	80	/
TPB	65	78	76
KFM	75	79	77
TEMPLE	63	/	/

* Denotes noise level for 5th floor receivers; the building is less than 10-storey high.

(b) Home Ownership Scheme and Rental Housing

NSR	L10(1-hr.), dB(A)			
	1/F	14/F	27/F	40/F
H1-N	67	68	67	67
H1-S	61	67	67	67
H1-W	65	70	70	70
H2-N	70	65	63	62
H3-E	69	67	66	67
H3-N	70	65	63	62
H3-S	65	64	63	66
R1-E	57	71	74	74
R1-N	64	71	71	70
R1-S	58	76	78	77
R1-W	68	74	75	75
R2-S	60	71	76	76
R3-S	64	70	75	75
R3-W	63	69	74	74
R4-E	70	66	65	68
R5-E	70	68	69	69
R5-S	66	73	75	75
R5-W	61	71	74	74

(c) Private Sector Participation Scheme

NSR	L10(1-hr.), dB(A)		
	1/F	10/F	17/F
PSPS1-E	70	72	71
PSPS1-N	69	67	66
PSPS1-S	69	71	71
PSPS2-N	69	66	65
PSPS3-E	65	62	61
PSPS3-N	70	67	66
PSPS3-W	70	68	67
PSPS4-N	66	64	62
PSPS4-W	70	69	69
PSPS5-N	67	65	64
PSPS5-W	71	71	71
PSPS7-E	71	73	73
PSPS7-S	70	72	72
PSPS8-E	71	73	73
PSPS9-E	72	73	74
PSPS11-N	69	70	70
PSPS12-W	72	73	75
PSPS13-N	70	72	73
PSPS13-S	70	74	74
PSPS13-W	73	75	76
PSPS14-E	58	62	64
PSPS14-S	67	72	72
PSPS15-E	73	74	75
PSPS15-S	70	72	72

(d) Residential Zone and Secondary School

NSR	L10(1-hr.), dB(A)				
	1/F	5/F	10/F	20/F	30/F
RZ-W	55	55	53	50	49
RZ-N	61	61	60	60	60
RZ-E	65	66	69	70	70
RZ-S	66	67	72	73	73
SSCH-1	68	71	/	/	/
SSCH-2	69	73	/	/	/
SSCH-3	61	64	/	/	/
PSCH-1	61	65*	/	/	/
PSCH-3	61	65*	/	/	/

* The third floor, or highest floor of the particular sensitive facade is assessed.

Table 4.3 Unmitigated Noise Levels (2015) Contributed from New Roads and Existing Roads

(a) Existing Noise Sensitive Receivers

NSR	Floor	Existing Roads		New Roads	Overall
		IEC	Others		
OTM	10	73.3[1]	40.4	58.5	73
OMM	10	76.5	45.3	62.6	77
FG3	1	77.7	47.0	61.9	78
	10	78.3	53.5	67.9	79
	20	76.4	54.6	66.2	77
FG4	1	83.5	44.7	58.6	84
	10	80.5	53.6	68.2	81
	20	78.2	54.6	66.4	79
HOB	1	68.4	72.1	67.4	75
	5	77.5	71.8	65.3	79
40-42	1	69.1	72.6	66.8	75
	5	79.3	72.2	68.1	80
HMM	1	70.9	69.6	64.8	74
	10	76.4	67.2	62.6	77
	20	75.4	66.5	61.2	76
RM	1	70.2	72.5	66.0	75
	10	79.9	71.9	61.8	80
CM	1	72.9	43.5	52.3	73
	10	81.3	57.6	58.4	81
	20	80.0	57.0	65.4	80
SKW233	1	74.0	77.0	47.9	79
	5	82.0	75.7	52.8	83
CCB	1	74.8	50.9	41.7	75
	5	80.3	64.5	58.0	80
PMGA	1	78.7	74.9	54.8	80
	10	77.2	73.6	54.7	79
PGME	1	79.2	70.2	54.0	80
	10	78.0	70.3	56.1	79
GM	10	79.4	72.8	49.5	80
TPB	10	77.0	68.0	51.7	78
	20	75.5	66.8	52.5	76
KFM	1	74.9	56.0	47.1	75
	10	78.0	69.0	56.8	79
	20	75.8	69.1	57.2	77

(1) Noise levels are expressed in L10(1-hr.) dB(A).

(b) Home Ownership Scheme and Rental Housing

NSR	Floor	Existing Roads		New Roads	Overall
		IEC	Others		
R1-E	14	71.2	55.0	50.8	71
	27	74.0	62.3	52.1	74
	40	73.3	61.9	57.7	74
R1-N	14	70.8	0.0	62.0	71
	27	70.4	0.0	61.9	71
R1-S	14	76.2	57.8	54.7	76
	27	77.4	63.5	61.3	78
	40	76.4	62.6	61.7	77
R1-W	14	73.9	45.1	63.5	74
	27	75.2	49.8	62.3	75
	40	74.5	49.4	62.0	75
R2-S	14	70.7	56.8	51.1	71
	27	76.0	63.0	52.7	76
	40	75.3	62.7	55.7	76
R3-S	27	74.4	62.9	52.6	75
	40	74.2	63.7	52.5	75
R3-W	27	73.5	61.7	50.1	74
	40	73.3	62.6	50.2	74
R5-S	14	72.8	62.5	57.5	73
	27	74.7	65.9	55.8	75
	40	74.5	65.3	55.3	75
R5-W	14	70.8	58.7	36.7	71
	27	73.9	61.0	40.8	74
	40	73.7	62.5	44.8	74

(c) Private Sector Participation Scheme

NSR	Floor	Existing Roads		New Roads	Overall
		IEC	Others		
PSPS1-E	10	71.2	51.3	61	72
	17	71.0	54.6	59.5	71
PSPS1-S	10	70.9	48.9	53.3	71
	17	70.7	53.3	52.4	71
PSPS5-W	1	61.1	54.7	70.3	71
	10	67.6	55.7	67.3	71
	17	68.6	58.0	65.6	71
PSPS7-E	1	70.6	57.9	55.7	71
	10	72.4	58.9	55.4	73
	17	72.1	61.1	55.0	73
PSPS7-S	10	71.7	64.5	49.2	72
	17	71.6	64.2	48.9	72
PSPS8-E	1	71.1	56.6	53.7	71
	10	72.9	58.3	53.5	73
	17	72.6	64.2	53.3	73
PSPS9-E	1	71.4	57.2	52.1	72
	10	73.2	59.7	52.0	73
	17	72.9	65.0	51.8	74
PSPS12-W	1	65.1	56.0	71.1	72
	10	71.7	61.6	67.7	73
	17	73.4	64.9	65.9	75
PSPS13-N	10	70.2	55.2	65.8	72
	17	71.8	58.4	64.2	73
PSPS13-S	10	72.9	66.8	63.4	74
	17	73.2	66.7	62.1	74
PSPS13-W	1	66.9	62.2	71.0	73
	10	73.3	67.6	67.7	75
	17	74.4	67.5	65.9	76
PSPS14-S	10	70.8	65.0	61.4	72
	17	71.1	65.0	59.7	72
PSPS15-E	1	71.5	67.8	49.8	73
	10	73.2	68.1	49.8	74
	17	73.8	68.6	49.7	75
PSPS15-S	10	71.1	64.5	57.5	72
	17	71.4	64.5	57.2	72

(d) Residential Zone and Secondary School

NSR	Floor	Existing Roads		New Roads	Overall
		IEC	Others		
RZ-S	10	71.9	38.5	61.4	72
	20	72.4	45.6	61.7	73
	30	72.8	49.7	61.5	73
SSCH-1	1	64.4	38.3	64.9	68
	5	69.9	41.1	64.7	71
SSCH-2	1	66.2	38.6	66.1	69
	5	72.6	41.2	65.4	73

5 MITIGATION MEASURES

5.1 Construction Phase

5.1.1 Construction Noise

As discussed in Section 3.4, most of the existing NSRs are likely to be exposed to high construction noise if unmitigated. Suitable noise mitigation measures should be provided to protect the affected NSRs throughout the construction period.

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 is provided in Appendix B 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.

Potential noise control provisions to reduce noise levels from project activities include, but not be limited to, the following:

- Noisy equipment and activities shall be sited as far from sensitive receivers as is practical.
- Noisy plant or processes shall be replaced by quieter alternatives where possible. For example, pneumatic concrete breakers can be silenced with mufflers and bit dampers. Silenced diesel and gasoline generators and power units, as well as silenced and super-silenced air compressors, can be readily obtained. Manual operations are generally the most quiet, but they may require longer periods of time.
- Noisy activities can be scheduled to minimise exposure of nearby NSRs to high levels of construction noise. For example, noisy activities can be scheduled for midday, or at times coinciding with periods of high background noise (such as during peak traffic hours). Prolonged operation of noisy equipment close to dwellings should be avoided.
- Idle equipment shall be turned off or throttled down. Noisy equipment should be properly maintained and used no more often than is necessary.
- Construction activities shall be planned so that parallel operation of several sets of equipment close to a given receiver is avoided.
- If possible, the number of operating powered mechanical equipment(s) should be reduced.
- Construction plant should be properly maintained and operated. Construction equipment often has silencing measures built in or added on, e.g., bulldozer silencers, compressor panels, and mufflers. Silencing measures should be properly maintained and utilised.
- Temporary noise reduction measures such as curved or inverted-L acoustic barriers may be used to screen specific receivers. Enclosures for noisy

activities such as concrete breaking should be provided where the noise impact is potentially severe.

The most effective mitigation measure is to control the sound emissions from the powered mechanical equipment used on site. This involves either selecting silenced equipment, or reducing the transmission of noise using mufflers, silencers, or acoustic enclosures. In addition, construction noise along the noise path may be mitigated by erecting temporary noise screening structures. Given the high-rise nature of NSRs within the Study Area, the use of acoustic enclosures and curved/inverted-L noise barriers (located close to the noise source) are considered appropriate.

Appendix C presents one of many possible construction noise mitigation schemes to control noise at specific locations. Through proper implementation of the sample package of mitigation measures, the noise levels at the affected NSRs can be reduced as shown in Table 5.1. Furthermore, the cumulative noise levels including the concurrent building works construction are also found to be within acceptable limit, the results are presented in Table 5.2.

Though not effective in reducing noise impacts, the establishment of good community relations can be of great assistance to both the Contractor and local communities. Residents should be notified in advance of planned operations and informed of progress. If necessary, a liaison body can be established to bring together representatives of the affected communities, including the Government and the Contractor. In addition, residents should be provided with a telephone number for the Engineer's office, where they may register complaints concerning excessive noise. If justified, the Engineer may authorise noisy operations to cease or to be conducted at non-restricted hours.

5.1.2 Construction Dust

(a) *Operation at the site*

An effective dust suppression measure is to maintain good housekeeping on site and water the dusty area. According to US EPA AP-42, 5th publication, watering twice a day can reduce dust emissions by about 50 percent.

(b) *Pavement of Haul and Access Roads*

All haul roads and access roads which are frequently traversed by trucks should be paved to reduce entrainment of dust from the road surface. Furthermore, any travel on unpaved or untreated shoulders should be prevented by means of road kerbs or barriers, and effective wheel washing facilities should be provided on site.

While the CED public dumping point may not present itself as a major dust contributor, a paved haul road for access to the barging point on the shore is strongly recommended.

(c) *Use of Wind Barriers*

In light of the large exposed area and possibly high wind condition at the site, wind barriers are strongly recommended for dust suppression. A conceptual design of the wind barrier and proposed locations are shown in Figures 5.1 and 5.2 respectively. Ideally, wind barriers should be constructed in the vicinity to the construction

activities.

(d) *Handling of Dusty Materials*

Any vehicle with an open load carrying area used for moving materials which have the potential to create dust should have properly fitting side and tail boards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and should be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300 mm over the edges of the side and tail boards.

Further dust suppression measures are contained in Appendix B. It is anticipated that with the implementation of the above mitigation measures, overall dust suppression efficiency can be better than 80%. For the other concurrent building projects, an 80% dust suppression efficiency is also highly recommended. This can be achieved by combination of dust suppression measures such as watering the haul roads, wheel-washing of haul vehicles, covering the materials on trucks with tarpaulin sheeting, good housekeeping and the use of wind barriers.

An Environmental Monitoring & Audit programme as described in Section 7 of this Report should be implemented to ensure that the Dust Guideline and Standard are achieved or that additional dust suppression measures should be implemented, including stopping the operation. The mitigated results are shown in Figure 5.3 to Figure 5.10.

5.1.3 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 department should be consulted for disposal at designated disposal site. Specification for general waste disposal is contained in Appendix B.

Table 5.1 Mitigated Construction Noise Levels for the Worst Case Scenario

NSR	Earthworks			Piling			Total	
	Unmitigated Noise Level[1] dB(A)	Req'd Noise Red'tion dB(A)	Mitigated Noise Level dB(A)	Unmitigated Noise Level dB(A)	Req'd Noise Red'tion dB(A)	Mitigated Noise Level dB(A)	Unmitigated Noise Level dB(A)	Mitigated Noise Level dB(A)
ELB	78	-11[2]	67	68	-13[1]	55	79	67
OTM	85	-11	74	76	-13	63	86	74
OMM	85	-11	74	80	-13	67	86	75
FG3	82	-11	71	87	-13	74	88	75
FG4	81	-11	70	86	-13	73	87	74
RM	75	-11	64	71	-13	58	76	65
CM	75	-11	64	67	-13	54	75	64
SKW233	74	-11	63	71	-13	58	76	64
CCB	72	-11	61	71	-13	58	74	62
PMGA	76	-11	65	78	-13	65	80	67
PMGE	77	-11	66	85	-13	72	86	72
GM	80	-11	69	81	-13	68	84	71
TPB	79	-11	68	81	-13	68	83	70
KFM	81	-11	70	80	-13	67	83	71
TEMPLE	82	-11	71	84	-13	71	86	74

Notes: (1) All noise levels are in Leq(30-min.) dB(A).
(2) Please refer to Appendix C for details.

Table 5.2 Cumulative Construction Noise Impact (All Sections + Concurrent Building Construction)

NSR	Noise Level, Leq(30-min.) dB(A)		
	Concurrent Building Works	All Sections[1]	Overall
ELB	68	67	71
OTM	68	74	75
OMM	65	75	75
FG3	61	75	75
FG4	60	74	74
RM	60	65	66
CM	60	64	65
SKW233	60	64	65
CCB	60	62	64
PMGA	61	67	68
PMGE	60	72	72
GM	61	71	71
TPB	61	70	71
KFM	60	71	71
TEMPLE	59	74	74

1 Mitigated noise levels

5.2 Operational Phase

5.2.1 Potential Mitigation Options

Traffic noise may be controlled at source, along its path, or at NSR facades. According to the HKPSG, the acceptable noise level is 70 dB(A) L10(1-hr.) for residential dwellings and 65 dB(A) L10(1-hr.) for educational establishments. Options available for mitigating traffic noise have been reviewed, and their suitability for use in this Project is presented below.

5.2.1.1 Control at Source

Controlling traffic noise at its source involves traffic management and road surface treatments, both of which result in less noise being generated.

Traffic Management

Traffic management measures such as regulating traffic flow or vehicle speed, or limiting the use of the road by heavy vehicles may be introduced in the new development. However, traffic management measures have much wider implications to be adequately covered in this EIA study. As a result, this option has not been explored further in this study.

Road Surface Treatments

A pervious macadam paving surface (also known as friction course surfacing) has high acoustic absorption characteristics that can significantly reduce traffic noise levels. According to the CRTN, the presence of pervious macadam paving reduces traffic noise levels by up to 2.5 dB(A) as compared with impervious bituminous and concrete road surfaces at vehicle speeds higher than 75 kph.

While the application of friction course surfacing to some high speed roads has been found successful in reducing traffic noise in Hong Kong, the performance of existing noise reducing road surfacing on low speed roads such as the proposed roads at Aldrich Bay Reclamation (with speed limit of 50 kph) has not been considered satisfactory in respect of maintenance and cost implication due to the possible short service life of the material. A Highway/EPD joint study on the feasibility of developing a suitable specification for the use of the material on low speed roads is being conducted. The study will be completed in mid-1997.

Potential sources of additional traffic noise can be minimised by omitting manhole covers in the carriageway as far as possible during detailed design and by close supervision of finished pavement level tolerances during construction. Where possible, the existing utilities and drainage services should be diverted to the footpaths or to the central median space, to avoid placing manhole covers and valve chambers in the carriageway.

5.2.1.2 Control along Noise Path

Controlling traffic noise along its path includes the use of natural or man-made topographical barriers or purpose-built barriers of different types to intercept the noise path.

5.2.1.3 Control at NSRs

Control of traffic noise at the receiver includes insulation of sensitive facades, use of self-protecting buildings, orientation of building facades, building setback, and internal arrangement of rooms to screen sensitive areas.

Current practice in noise assessment and mitigation in Hong Kong is that all feasible direct technical measures should be implemented to reduce the potential noise impact. In the event that all these remedies prove to be impracticable and ineffective, consideration should be given to the redress of the existing NSRs affected by increased noise from the use of new roads. According to the Exco directive, existing receivers that will be affected by increased traffic noise levels following the operation of the Project may be provided with indirect technical remedies in the form of acoustic insulation and air conditioning subject to ExCo approval.

However, these noise sensitive receivers must meet the following three criteria before they are eligible for consideration of indirect technical remedies stipulated by Exco:

- The predicted overall noise level from the new road together with other traffic noise in the vicinity must be above the L_{10}(peak hour) 70 dB(A) for sensitive residential facades.
- The predicted overall noise level is at least 1.0 dB(A) more than the prevailing traffic noise level, i.e. the total traffic noise level existing before the commencement of the construction works.
- The contribution to the increase in the overall noise level from the new or improved road must be at least 1.0 dB(A).

5.2.2 Mitigation Scenarios

As is clear from the results presented in Section 4, the IEC traffic dominates the noise levels at the middle and upper floors of the new and existing NSRs with line of sight of the road. Given that the existing IEC is outside the scope of the Project (PWP Item No. 437CL) and this Study, no direct technical remedies would be recommended. As a result, the focus in this Study has been on the mitigation of noise impacts from the new roads on the future and planned noise sensitive receivers where the overall noise levels exceed the HKPSG noise criteria.

Mitigation scenarios where feasible solutions may be provided have been examined and are described below.

Scenario A: As shown by the results in section 4, the lower floor receivers on Blocks 5, 11, 12 and 13 of the PSPS are likely to be exposed to noise levels exceeding the HKPSG limit. A plain barrier of various heights has been considered at the road kerb of Road 9/4 in front of the housing blocks to screen the NSRs and this would involve relocating the bus bay to make way for the barrier. The location of the barrier is shown in Figure 5.11. However, due to various constraints including the lack of sufficient source-receiver separation, the high elevations of the receivers (i.e. all receivers are above 11m of the ground) and the dominant effect of the IEC, no barriers have been considered effective. A sectional drawing showing the ineffectiveness of a 5m barrier is shown in Figure 5.12. The results in Table 5.3 also

concur with the ineffectiveness of the barrier, showing only the first two floors may be protected by a 5 m barrier.

Alternatively, carparks or commercial complex may be provided underneath so that the tower blocks are more distant from the local roads. However, the effect is undesirable since this would expose more of the tower blocks to the IEC traffic.

It is therefore recommended that no barriers should be provided for these NSRs.

Scenario B: The noise levels at the proposed secondary school to the west of the reclamation site are predicted to exceed the HKPSG noise standard. Two segments of noise barriers of 4m and 5m high at segments of Road 9/1 and Road 9/3 (see Figure 5.13) have been tested for effectiveness and the results in Table 5.4 indicate even a 5m barrier is ineffective. The ineffectiveness of the barrier configuration arises from the need to allow for sightline at the corner.

As an alternative, a solid boundary wall of 3m or 4m has been tested for effectiveness (see Figure 5.14). The results, shown in Table 5.5, indicate that even a 4m high can hardly protect classrooms on the first floor level.

In view of this finding, no barriers are considered effective to protect the affected classrooms.

5.2.3 Residual Impact

The existing noise sensitive receivers which are expected to be exposed to overall noise levels exceeding the HKPSG criteria, but no practical direct technical remedies can be provided, have been assessed for their eligibility for indirect technical remedies. Table 5.6 presents a detailed assessment of eligibility according to the EPD's criteria as described above. The assessment results show that no existing NSRs are eligible because of the dominant effects of the existing roads. Basically, the new roads do not contribute more than 1.0 dB(A) to the overall noise levels at these receivers.

The total number of dwellings where the predicted noise levels exceed 70 dB(A) is estimated to be 2973, if no mitigation measures are provided. The total number of classrooms and church where the noise levels exceed 65 dB(A) is estimated to be 45. Out of these numbers, 2915 of the dwellings and 20 of the classrooms whose noise levels exceed the HKPSG noise criteria are due to the IEC dominance. Table 5.7 shows the detailed breakdown of the affected dwellings, classrooms and church.

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 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 predicted facade noise levels exceed 70 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.

Table 5.3 Effectiveness of a 4m and 5m Barrier at PSPS Site

NSR ID	Floor	L_{10}(1hr.), dB(A) Without Mitigation				L_{10}(1hr.), dB(A), With Mitigation			
		Existing Roads		New Roads	Overall Noise Levels	4m Barrier		5m Barrier	
		IEC	Others			New Roads	Overall	New Roads	Overall
PSPS5-W	1	61.1	54.8	70.3	71	70.3	71	66.8	68
	2	61.5	54.8	70	71	70	71	70	70
	3	62	54.9	69.6	70	69.6	70	69.6	70
	4	62.4	50	69.3	70	69.3	70	69.3	70
	5	64.9	55.1	68.9	71	68.9	71	68.9	71
PSPS12-W	1	65.1	56.0	71.1	72	71.1	72	67.2	70
	2	65.7	56.5	70.7	72	70.7	72	70.7	72
	3	66.4	56.9	70.3	72	70.3	72	70.3	72
	4	69.6	58.1	69.9	73	69.9	73	69.9	73
	5	69.8	55.7	69.5	73	69.5	73	69.5	73
PSPS13-N	1	63.7	55.7	68.4	70	62.6	67	58.7	65
	2	64.4	55.8	68.1	70	68.1	70	63.3	67
	3	65.5	55.9	67.8	70	67.8	70	67.8	70
	4	68.6	56	67.6	71	67.6	71	67.6	71
	5	68.9	56.3	67.3	71	67.3	71	67.3	71

Table 5.3 (Cont'd)

NSR ID	Floor	L_{10}(1hr.), dB(A), Without Mitigation				L_{10}(1hr.), dB(A), With Mitigation			
		Existing Roads		New Roads	Overall Noise Levels	4m Barrier		5m Barrier	
		IEC	Others			New Roads	Overall	New Roads	Overall
PSPS13-W	1	66.9	62.2	71.0	73	71.0	73	66.5	70
	2	67.6	62.5	70.6	73	70.6	73	70.6	73
	3	68.6	63.1	70.2	73	70.2	73	70.2	73
	4	71.1	63.6	69.8	74	69.8	74	69.8	74
	5	71.4	65	69.4	74	69.4	74	69.4	74
PSPS13-S	1	67.8	62.4	65.0	70	62.9	70	62.4	70
	2	68.4	62.9	64.9	71	63.0	70	62.8	70
	3	69.2	63.4	64.8	71	63.3	71	62.8	71
	4	70.7	64.6	64.6	72	64.6	72	62.9	72
	5	71.0	65	64.4	73	64.4	73	64.4	73

Table 5.4 Effectiveness of a 4m/5m Barrier along Road 9/1 and Road 9/3

NSR ID	Floor	L10(1-hr.), dB(A) Without Mitigation				L10(1-hr.), dB(A) With Mitigation			
		Existing Road		New Roads	Overall	4m Barrier		5m Barrier	
		IEC	Others			New Roads	Overall	New Roads	Overall
SSCH-1	1	64.4	38.3	64.9	68	58.8	65	58.7	65
	2	65.2	39.0	64.8	68	58.8	66	58.7	66
	3	66.2	39.7	64.8	69	58.8	67	58.6	67
	4	67.4	40.4	64.7	69	58.8	68	58.6	68
	5	69.9	41.1	64.7	71	58.7	70	58.5	70
SSCH-2	1	66.2	38.6	66.1	69	56.2	67	56.0	67
	2	67.1	39.4	66.0	70	56.3	67	56.1	67
	3	68.1	40.3	66.0	70	56.5	68	56.2	68
	4	69.5	41.2	65.4	71	56.6	70	56.3	70
	5	72.6	41.2	65.4	73	56.9	73	56.6	73

Table 5.5 Effectiveness of a 3m/4m Solid Wall Boundary at Secondary School

NSR ID	Floor	L10(1-hr.), dB(A) Without Mitigation				L10(1-hr.), dB(A) With Mitigation			
		Existing Road		New Roads	Overall	3m Barrier		4m Barrier	
		IEC	Others			New Roads	Overall	New Roads	Overall
SSCH-1	1	64.4	38.3	64.9	68	64.7	68	59.4	66
	2	65.2	39.0	64.8	68	64.7	68	64.7	68
	3	66.2	39.7	64.8	69	64.8	69	64.7	69
	4	67.4	40.4	64.7	69	64.7	69	64.7	69
	5	69.9	41.1	64.7	71	64.7	71	64.7	71
SSCH-2	1	66.2	38.6	66.1	69	65.9	69	61.0	67
	2	67.1	39.4	66.0	70	66.0	70	66.0	70
	3	68.1	40.3	66.0	70	66.0	70	66.0	70
	4	69.5	41.2	65.4	71	65.4	71	65.4	71
	5	72.6	41.2	65.4	73	65.4	73	65.4	73

Table 5.6 Eligibility Assessment for Indirect Technical Remedies

NSR	Floor	Assessment Criterion L_{10} dB(A)	Prevailing Noise Level L_{10} dB(A)	2015 L_{10} Noise Level, dB(A)					Criterion 1 (5) > (1)	Criterion 2 (5)-(2) ≥ 1.0	Criterion 3 (5)-(4) ≥ 1.0	Indirect Mitigation (Yes/No)
				New Roads	Other Roads			Overall				
					IEC	Others	Sum					
FG3	1	70	75.9	61.9	77.7	47.0	77.8	77.8	Yes	No	No	No
	10		76.3	67.9	78.3	53.5	78.3	78.7	Yes	Yes	No	No
	20		74.5	66.2	76.4	54.6	76.4	76.8	Yes	Yes	No	No
FG4	1	70	81.6	58.6	83.5	44.7	83.5	83.5	Yes	Yes	No	No
	10		78.4	68.2	80.5	53.6	80.5	80.8	Yes	Yes	No	No
	20		76.2	66.4	78.2	54.6	78.2	78.5	Yes	Yes	No	No
RM	G[1]	65	69.0	66.0	67.2	73.4	74.3	74.9	Yes	Yes	No	No
	3[2]		76.0	65.9	78.2	71.0	71.0	79.2	Yes	Yes	No	No
	10	70	78.0	61.8	79.9	71.9	80.5	80.6	Yes	Yes	No	No
CM	1	70	71.0	52.3	72.9	43.5	72.9	72.9	Yes	Yes	No	No
	10		79.4	58.4	81.3	57.6	81.3	81.3	Yes	Yes	No	No
	20		78.0	65.4	80.0	57.0	80.0	80.2	Yes	Yes	No	No
SKW233	1	70	77.4	47.9	74.0	77.0	78.8	78.8	Yes	Yes	No	No
	5		81.3	52.8	82.0	75.7	82.9	82.9	Yes	Yes	No	No
Column		**(1)**	**(2)**	**(3)**			**(4)**	**(5)**				

(1) Denotes the eligibility assessment for the church.
(2) Denotes the eligibility assessment for the kindergarten.

Table 5.6 (Cont'd)

NSR	Floor	Assessment Criterion L_{10} dB(A)	Prevailing Noise Level L_{10} dB(A)	2015 L_{10} Noise Level, dB(A)					Criterion 1 (5) > (1)	Criterion 2 (5)-(2) ≥ 1.0	Criterion 3 (5)-(4) ≥ 1.0	Indirect Mitigation (Yes/No)
				New Roads	Other Roads			Overall				
					IEC	Others	Sum					
HOB	1	70	65.9	67.4	68.4	72.1	73.6	74.5	Yes	Yes	No	No
	5		75.7	65.3	77.5	71.8	78.5	78.7	Yes	Yes	No	No
40-42	1	70	66.9	66.8	69.1	72.6	74.2	74.9	Yes	Yes	No	No
	5		77.4	68.1	79.3	72.2	80.0	80.3	Yes	Yes	No	No
HMM	1	70	64.1	64.8	70.9	69.6	73.3	73.9	Yes	Yes	No	No
	10		74.5	62.6	76.4	67.2	76.9	77.1	Yes	Yes	No	No
	20		73.4	61.2	75.4	66.5	75.9	76.0	Yes	Yes	No	No
CCB	1	70	73.9	41.7	74.8	50.9	74.8	74.8	Yes	No	No	No
	5		79.2	58.0	80.3	64.5	80.4	80.4	Yes	Yes	No	No
PMGA	1	70	79.4	54.8	78.7	74.9	80.2	80.2	Yes	No	No	No
	10		77.8	54.7	77.2	73.6	78.8	78.8	Yes	Yes	No	No
PMGE	1	70	78.8	54.0	79.2	70.2	79.7	79.7	Yes	No	No	No
	10		78.0	56.1	78.0	70.3	78.7	78.7	Yes	No	No	No
GM	10	70	79.4	49.5	79.4	72.8	80.3	80.3	Yes	No	No	No
Column		**(1)**	**(2)**	**(3)**			**(4)**	**(5)**				

Table 5.6 (Con't)

NSR	Floor	Assessment Criterion L_{10} dB(A)	Prevailing Noise Level L_{10} dB(A)	2015 L_{10} Noise Level, dB(A)					Criterion 1 (5) > (1)	Criterion 2 (5)-(2) ≥ 1.0	Criterion 3 (5)-(4) ≥ 1.0	Indirect Mitigation (Yes/No)
				New Roads	Other Roads			Overall				
					IEC	Others	Sum					
TPB	10	70	77.0	51.7	77.0	68.0	77.5	77.5	Yes	No	No	No
	20		75.7	52.5	75.5	66.8	76.0	76.1	Yes	No	No	No
KFM	1	70	74.0	47.1	74.9	56.0	75.0	75.0	Yes	Yes	No	No
	10		77.6	56.8	78.0	69.0	78.5	78.5	Yes	No	No	No
	20		76.0	57.2	75.8	69.1	76.6	76.7	Yes	No	No	No
OMM	10	70	74.7	62.6	76.5	45.3	76.5	76.7	Yes	Yes	No	No
OTM	10	70	71.8	58.5	73.3	40.4	73.3	73.4	Yes	Yes	No	No
Column		**(1)**	**(2)**	**(3)**			**(4)**	**(5)**				

Table 5.7 Number of Sensitive Units Exceeding HKPSG Criteria

Noise Sensitive Development		Main 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

6. ASSESSMENT OF POTENTIAL LANDSCAPE AND VISUAL IMPACTS

6.1 Introduction

This section of the report identifies the potential landscape and visual impacts of the proposed engineering works upon the reclamation site itself and upon the urban landscape of the surrounding area.

This is achieved by :

a) investigation of the landscape context of the development site in terms of the surrounding topography, vegetation, and landscape character;

b) identification of the major zones of visual influence of the site;

c) identification of the landscape features of the site

d) identification of the potential visual receivers who will be affected by the proposals;

e) identification of the elements of the development that would potentially generate landscape and visual impacts

f) synthesis of the above information leading to a comparative evaluation of the landscape and visual impacts.

g) identification of potential mitigation measures.

Landscape impacts are changes in the fabric, character and quality of a landscape as a result of development. Landscape impact assessment is concerned with impacts on two particular aspects of a landscape: impacts upon the *landscape resource* of a site (e.g. the rocks, soils, vegetation, and man-made features) and impacts upon the *landscape character* of a site (that is, the precise effect created by the combination of landscape features that makes that landscape distinctive or unique).

The *significance* of a landscape impact is judged to be a function of the magnitude of the impact and the sensitivity of a landscape resource or the character of a landscape.

Visual impacts relate solely to changes in the appearance of the landscape and the effects of those changes on people. Hence, visual impact assessment is concerned with the impacts of development upon the character or quality of key views as well as with the reactions of viewers who may be effected.

The *significance* of a visual impact is judged to be a function of the magnitude of the impact and the sensitivity of key views or viewers. In this context, viewers are referred to as *receptors* of visual impacts.

Impacts that are judged to be significant, are assessed as *severe, moderate* or *low*.

6.2 Study Approach

Landscape and visual impacts arising from proposed development are assessed against the condition of the landscape as it currently exists, termed the *baseline* condition. This allows the full significance of impacts to be registered.

In Sections 6.3 and 6.4 of this report, the baseline landscape and visual character around the Aldrich Bay reclamation site is outlined. Section 6.5 describes the landscape features and character of the reclamation site itself. Section 6.6 goes on to assess the significance of impacts upon the landscape of the site and its surroundings. Section 6.7 then assesses the impacts of the proposed development upon key views and key receptors. Finally, Section 6.8 describes the mitigation measures and the landscape design guidelines developed to reduce the identified impacts to a minimum.

6.3 Landscape Context and Character of the Surrounding Area.

Aldrich Bay Reclamation is situated on the northern side of Hong Kong Island, immediately to the east of Sai Wan Ho, at the far eastern end of Victoria Harbour. An elevated section of the Island Eastern Corridor (IEC) is located immediately to the east and south of the reclamation area whilst dense urban development, comprising high-rise commercial and residential development, surrounds the southern, western and eastern sides of the site. Intermittent roadside vegetation is located around the southern tip of the site next to Aldrich Bay Road. The vegetated hillslopes of Mount Parker provide a vegetated backdrop to this urban development at the rear of the site. However, whilst the upper slopes of Mount Parker are well-vegetated, disused quarry workings on the lower slopes have left areas of bare rock face.

A typhoon shelter is located on the northern edge of the reclamation and beyond this lies the open water of Victoria Harbour. Approximately a kilometre to the north-east, on the northern side of the harbour entrance, lies the village of Lei Mun Tsui. This village is small-scale in character and lies at the base of the low-lying peak of 1 Pau Toi Shan (Devil's Peak). The Kowloon urban area dominates the landscape further to the north-west of Lei Mun Tsui and the high-rise buildings in this area may be seen against a backdrop of the rugged peaks of the Kowloon hills.

In terms of *landscape character*, the area surrounding Aldrich Bay is both rugged and impressive in character with a strong relationship between land and sea. It is a landscape that is large in scale and which is dominated by the vertical elements both of rugged peaks in the background and of high-rise buildings along the narrow coastal strip. Whilst the uplands offer a simple and grandiose backdrop to Aldrich Bay, the urban areas of Shaukeiwan and Sai Wan Ho provide a complex and intricate foreground, providing a sharp contrast in landscape character. One important visual element is the elevated section of the IEC which visually separates Aldrich Bay from the surrounding landscape. This elevated road is a rather incoherent but visually dominant element in the local landscape.

The busy activity of the crowded typhoon harbour to the north of the Bay, and the IEC to the south, add still further to the complexity of the surrounding landscape.

6.4 Visual Character and Key Views

The *visual character* of the landscape around the Bay reflects the complexity of its landscape character. Walkers on Mount Parker and on other areas of high ground

have views that are extensive and visually complex and which are characterised by a variety of visual elements. Typically, such views have a backdrop of vegetated hillsides with an interplay of water and landforms in the middle-distance, of which Aldrich Bay forms a part. A set of panoramic photographs is shown at Figures 6.1 and 6.2 to illustrate the visual character of the site and the surrounding areas. The interface of land and sea, a visually sensitive zone, is typically characterised by urban development. At a distance the complexity of these urban forms is lost so that it becomes difficult to locate precise details. The low-lying promontories on either side of the harbour mouth, provide a more rural character with their village settlements and tall vegetation. The development site is located within a 'Visually Prominent New Development / Redevelopment Area'.

Those living and working in the middle and upper floors of high-rise buildings in Shaukeiwan and Sai Wan Ho have views in which the Aldrich Bay reclamation site forms a significant part of the foreground and middle ground. These views contain a diversity of visual elements which are generally complex in nature. Such views are, at present, dominated by the reclamation area and to a lesser extent by the vertical accents of peaks and buildings at Sam Ka Tsuen to the north. In particular, residents in buildings on Tai On Street have views in which the Aldrich Bay reclamation site plays a dominant role in the middle-distance. The site is visually dominant by virtue of its open aspect to the north and its large flat expanse of bare earth that contrasts with the complex patterns of the surrounding urban development. Visually, the interface between land and sea is again a particularly sensitive zone in middle-distance views as the eye is attracted to it as it spans the expanse of water beyond.

Views from the lower floors of buildings located to the south and east of the site (e.g. along Nam On Street and Tang Hei Road) are generally obstructed or restricted by the elevated section of the IEC. The reclamation site plays a less important role in views from a large number of other buildings around the Bay as it is seen at a more oblique angle.

Good views of the reclamation site are available to motorists using the IEC on its elevated section. The site is located in the foreground and middle-distance of these views. However, due to the speed of traffic movement, such views tend to be fleeting or transient. Motorists and pedestrians on Aldrich Bay Road receive only glimpsed views of the reclamation site due to the presence of road-side vegetation.

6.5 The Landscape Character and Features of the Site.

The majority of the reclamation site currently consists of levelled or almost levelled construction waste / fill material. A new sea wall has been put in place along the northern edge of the development. However, the eastern end of the site is currently still undergoing infill. Across the site are scattered piles of building materials, machinery and hoardings. A network of nullahs or drainage channels associated with the reclamation cross the site. There is little vegetation except for self-seeded weeds that are scattered across the site and intermittent scrub vegetation that is located along the southern and eastern parts of the site boundary. Areas of the southern and south-western part of the site are currently in use as make-shift car-parks, storage depots and yards. The slightly ramshackle appearance of these areas gives the urban landscape around them a rather incoherent character.

The reclamation site currently possesses the deserted and rather incoherent character typical of a construction site. It is also strongly influenced by the presence of the IEC

and associated sliproads, much of which are above grade. Though the site is large, it possesses a moderate sense of containment provided by the IEC itself and by the surrounding high-rise buildings.

6.6 Assessment of Landscape Impacts

6.6.1 Impacts on Landscape Resources

The potential impacts on landscape resources during construction of the proposed engineering infrastructure will involve the removal of substrate to facilitate creation of pedestrian underpasses as well as the creation of hard surfaces for footpaths and roads. These represent minor impacts on a landscape resources which are of very low sensitivity and impacts will not be significant at construction stage. No further impacts on the physical landscape are predicted at operational stage of the project.

In order to connect the new road network to the existing road at Sai Wan Ho, a small public garden will need to be removed. Urban Services Department should be fully considered on this matter if this proposal is to be implemented. This however is not considered to be a sensitive resource and impacts are not expected to be significant. The erection of pedestrian bridges and construction of subways will have only a negligible impact on landscape resources.

6.6.2 Impacts on Landscape Character

Construction of the proposed works will involve the presence of large excavation, haulage and lifting machinery around the site, particularly at its edges. The area of landscape around the site is currently so urbanised and so typical of a construction site, that it is not considered that the presence of this construction machinery on site will be wholly incongruous with its current character nor will it therefore represent a significant impact.

Once the proposed works are in place, the site will take on a slightly more ordered and urban character and will to all intents and purposes resemble an ongoing development site. In a landscape that is already so complex and so locally characterised by urban influences and highways infrastructure (both above and at grade), this development will not appear incongruous and impacts from all its aspects are expected to be negligible. Moreover, removal of the ramshackle sprawl of car parks and storage yards along the southern boundary of the site is likely to create a more orderly and coherent urban landscape. The impacts on landscape character are likely only to be positive as a result of the proposed development.

6.7 Assessment of Potential Visual Impacts

In order to assess the visual impact that the proposed development would have on the landscape and its surrounding population, it is necessary to establish not only what can be seen and where it can be seen from, but also by whom it can be seen and in what context is it viewed.

Visual impacts that would be generated by this project included the presence of a new road network (1,900m of road and associated footpaths) on the reclamation site, a 15m wide waterfront promenade, the presence of two new footbridges, new pedestrian subway entrances at various locations along the edge of the site and landscape works. Other visual elements of the proposed development will also include, at the

construction stage of the project, the presence of construction machinery, stockpiles of construction materials and structures in a partial state of completion.

The areas of potential visibility of the proposed works have been established by site investigations, together with 'line of site' studies using 10m contours from 1:5000 scale Ordinance Survey maps. These theoretical areas constitute the 'Zone of Visual Influence' and this is shown at Figure 6.3. In support of this, a series of panoramic photographs taken from the site are shown at Figures 6.1 and 6.2. It may be seen that the proposed engineering works would be potentially visible from large areas of the existing landscape. However, it should be noted that the actual extent of views is determined by numerous factors including the precise location and level of the viewing position, the orientation of individual buildings, as well as the degree of screening afforded by existing buildings and structures such as the IEC. This presents an infinitely variable set of conditions in which the views of the proposed development vary throughout the zone. To rationalise this situation, all the major potential viewing points within the zone have been identified below and then potential visual impacts on viewers at those points have been assessed.

In long distance views from Mount Parker, both construction work (machinery and vehicles) as well as the proposed development will be clearly visible. In long distance views from the northern side of the harbour, construction work (machinery and vehicles) at the front of the site as well as the waterfront promenade will be visible. The visual complexity of the landscape as it currently stands, means that it will tend to absorb further development of a similar scale and pattern without generating significant visual impacts on the surrounding areas. These long distance views will therefore be scarcely noticeable even to recreational receptors (eg walkers) who are deemed to be amongst the most sensitive. Impacts on these views both during and after construction are not therefore likely to be significant.

In views from commercial and residential properties around Aldrich Bay (i.e. along Nam On Street, Shaukeiwan Main Street East, Hing Man Street and Shaukeiwan Road) the open simplicity of the reclamation site will be altered during construction by the presence of equipment and machinery on site. These will tend to create slightly more incoherent visual patterns. Potential visual impacts from construction work are assessed as being low in significance. After construction, these views would be altered by the presence of roads, underpass entrances and footbridges. This will give some pattern to what is currently largely a visually homogenous site and will render it characteristic of the surrounding visual experience. The presence of above ground structures (such as footbridges) in such views is not inconsistent with the vertical accents currently present in these views (high-rise blocks, peaks and the IEC). Impacts on such views will therefore be negligible.

In views from the lower floors of properties around Aldrich Bay, both construction work and the proposed development will tend to get lost amongst views of the existing urban and highways infrastructure. Impacts on these views will therefore be negligible.

There will be close views of the proposed underpasses, roads, and footbridges for pedestrians around the edge of the site, particularly around Sai Wan Ho.

Development of the engineering works on the reclamation site will have the effect of making motorists' views from the IEC more visually complex. This is not inconsistent with the existing visual character of these views and the potential visual

impacts will be negligible.

The proposed engineering layout will also have secondary visual impacts in that it will partially dictate the future development proposed for the whole reclamation area.

6.8 Proposed Measures to Mitigate Potential Landscape and Visual Impacts

The following measures are proposed to mitigate the potential landscape and visual impacts of the proposed development.

6.8.1 The General Layout of the Engineering works and the Site Zonings

The arrangement of the landscape elements of the development is of prime importance in achieving a landscape of high visual quality and high landscape value for what is a designated a 'Visually Prominent New Development/Redevelopment Zone' in the Metroplan Urban Design Statement. Consideration of both these measures and the following more detailed landscape design proposals will ensure that the residual impact of the proposed project is a high quality development that enhances the urban area.

The following sections examine in more detail the component parts of the hard landscape structure and provide a series of guidelines that should be implemented at Detailed Design stage.

6.8.2 Hard Landscape Design

The hard landscape design provides the opportunity to achieve a visually coherent pedestrian circulation system throughout the various open space components of the reclamation. At the pedestrian level, the design and quality of hard surfaces, external furnishings, lighting, signage etc play an important role in determining the attractiveness and quality of external spaces and their success in terms of use. The design and specification of materials should take into account their ease of maintenance. All landscape design proposals should be considered by the relevant Government department in accordance with Works Branch Technical Circular No.18/94.

6.8.2.1 *Paving Materials*

Paving surfaces play an important role in the design of external spaces, determining quality, directing movement, defining areas of use and establishing style or character.

Within the waterfront promenade, roadside footpaths and open spaces, continuous paving surfaces should be provided along the pedestrian circulation system to reinforce the continuity of routes. Patterns within such areas should be used to express rhythm along the route, to relate the pedestrian areas to adjacent buildings, to express changes in direction and to emphasise the form of spaces along the route.

Variety within paving designs should be achieved with a limited range of materials by variations in slab/pavior sizes, colour combinations or changes in coursing patterns.

The following general guidelines apply to paving for this project:

- Paving materials should be of high quality and capable of withstanding continuous intensive use without undue degradation of surface finish. Consideration should be given to the need to avoid potential weed growth in between paving units.

- Consideration should be given to removal, replacement and reinstatement of paved surfaces as well as the possible settlement of ground across the reclamation area. Slabs and unit paviours laid on 'dry' flexible bases are more suitable in this respect than 'rigid' construction involving concrete bases.

- Paving surfaces should be designed in conjunction with surface drainage systems.

- The scale of paving units and patterns within an area should in general reflect the scale of the space.

- Paving design should be coordinated with other townscape elements such as tree grilles, manhole covers, gullies, lamp poles and other street furniture. Consideration should be given to paving patterns in the location for such elements and the detailing of appropriate paving trims, edgings etc.

- Paving surfaces in external areas should provide a textured finish with good non-slip characteristics whilst providing a comfortable surface for foot traffic and wheelchairs.

- Steps, ramps or other areas of potential hazard should be identified or highlighted by contrasting colours or textures.

- Clear unrestricted areas should be provided to all pedestrian crossings.

6.8.2.2 *Tree grilles, Railings, Gullies, Manhole Covers etc*

The design and co-ordination of ancillary pavement fixtures is an important factor in the ultimate quality of paved areas. The following simple guidelines should be considered:

- Within any given area of the reclamation, a consistent type or design of fixture should be adopted.

- The alignment of tree grilles, gullies, manhole covers etc should be coordinated with paving designs.

- Manhole covers should be recessed to receive paving materials to minimise their visual impact.

- Tree grilles provide the opportunity, in conjunction with tree guards, tree supports etc, to create distinctive townscape elements.

- Tree grilles should be designed in such a way as not to trap small particles such as cigarette ends and litter and should take into account future increase in girth of the tree as it grows.

- Railings will be required adjacent to the harbour wall and these should have a bold appearance to provide a sense of visual unity to the development when viewed from the harbour.

6.8.2.3 *Seating*

The provision of seating is an important factor in encouraging the use of the proposed promenade and open spaces. Seating can be provided in a wide variety of forms to suit various conditions.

The principal areas of use are:

- To provide resting points along routes.
- To provide viewing points of significant features such as views of the harbour, water features and sculptures and at points of activity (eg recreational facilities in the Town Park) and movement.
- To provide meeting places at nodes within the overall development eg such as the junction of the Town Park and the promenade.

Sitting areas form an essential part of most incidental spaces, particularly walkways such as the proposed promenade. They should generally be incorporated in appropriate positions along the route but suitably protected from areas of noise such as the existing bus station and should be provided with adequate climatic protection. Both scale and size should relate to the degree of comfort that can be achieved. The arrangement of seating units should also facilitate a clear outlook over adjoining activity spaces such as Aldrich Bay Typhoon Shelter and the proposed Town Park. Provision of seating on unallocated government land should be subject to agreement with the Urban Services Department.

The design requirements for seating vary depending on location and anticipated use. A proportion of the seating should be designed specifically to provide resting areas for pedestrians and should, as such, be designed for comfort.

By contrast, incidental seating should be provided in a wide variety of forms including planter walls, steps, sculptures, railings etc. The secondary use of such features as seating widens the possible range of materials and forms which are possible and allows for greater integration within the overall design.

Formal sitting areas should in general enjoy some form of enclosure, protection from wind and should be in areas of shade from buildings or trees.

6.8.2.4 *Shelters*

Consideration should be given to the provision of 'shelters' to give protection from sun, wind and rain. These may be located along the pedestrian routes, or next to landscape features, play areas or other centres of activity. The design of shelters may follow traditional or contemporary forms offering design opportunities for co-ordination with the overall design theme. Shelters may be integrated with sculptural elements, contribute to a design style, (a maritime theme is recommended for this development to reflect the history and location of this site) or be used to structure and define external spaces. Provision of shelters on unallocated government land should

be subject to agreement with the Urban Services Department.

6.8.2.5 *Signage*

A carefully co-ordinate signage system will serve to provide:

- Directions.
- Information.
- and to reinforce urban character and sense of place.

Signs should be categorised with district graphics to achieve these goals including:

- Street signs (at street junctions).
- Directional signs (located at circulation nodes for general directional guidance).
- Public information (directional signage in conjunction with maps etc).
- Highway related signages (pedestrian safety signs and public transport signage including taxi ranks, bus stops, etc).
- Regulatory signs (identifying hazards, byelaws, legal notices etc).

Each category of signage should have a consistent design style and method of application.

6.8.2.6 *Litter Bins*

Litter bins as independent elements seldom contribute to the quality of the external environment and should, wherever possible, be integrated within other hard landscape elements such as seating and planter walls. These should be located at a minimum distance of 50m with increased provision near centres of activity such as near the proposed schools and in the proposed parks. Bins should be designed with removable liners for ease of emptying and with provision for drainage.

6.8.2.7 *Lighting*

(A) Waterfront Promenade Lighting

The waterfront promenade should be designed in a consistent manner, emphasising the continuity of the route and presenting a uniform edge treatment to the reclamation. A high level of pedestrian circulation is expected along the promenade and lighting therefore plays an important role in emphasising the continuity of the route at night.

Tree planting is recommended along the promenade. Uplighting is recommended under these trees and a second row of column lights is proposed along the seawall, possibly constructed as a part of the seawall railing. This may be achieved in an economical and low-maintenance manner by incorporating standard lighting poles within the waterfront railing design.

These will provide a clearly visible chain of lights along the waterfront.

Recessed brick lights, or other low level lighting, are proposed as a part of any step construction along the promenade, both to provide safety for pedestrians and to create a continuous illuminated feature along the seafront. These should however, be vandal-resistant and subject to approval from the Urban Services Department.

A comprehensive lighting system must also be developed for all open space areas and footpaths. Provision of lighting should be subject to agreement with the Urban Services Department.

(B) Street Lighting

Rows of trees and shrubs are proposed along the outer edge of the roadside footpaths and these will tend to shade out street lighting. A secondary line of column lighting is proposed along the outer edge of the footpath to compensate for the shading effect of the trees. Light columns would be centred between trees to minimise conflict with roots and obstruction by branches. Consideration must be given to the need to avoid potential tree maintenance problems in the provision of lighting next to planting areas.

The lighting treatment would be consistent along the length of the street, reinforcing at night the avenue affect of the trees, and the continuity of the route.

Low level lighting is also proposed along the planting strip to illuminate sitting areas or signage, and emphasise the planting. Illumination of the planting strip would express the enclosure of the pedestrian space as distinct from the road beyond.

6.8.3 Layout of the Design Elements

The following measures are recommended for development of the landscape layout for the promenade to help achieve an identifiable sense of place within the urban structure. These should be developed in consultation with USD.

- Changes in paving levels may be used to create spatial and visual variety, to create sub-spaces and to define entrances to adjacent buildings and pedestrian crossings. It is recommended that the proposed 15 m wide promenade be divided into two separate levels and a line of steps be introduced both between the split levels of the promenade and the between the promenade and the Road 9/2.
- Distinct paving treatments should be used to reinforce a sense of place.
- Opportunities for informal pavement activities should be considered such as kiosk sales, displays, sitting spaces etc.
- Designated advertising elements/historical interpretation boards/information sign-boards should be used as integral design elements.

- Creative and attractive architectural designs will be required for both subway and footbridge structures.

- The proposed footbridge adjacent to Road 9/1 should be set back further into the site (15m min.) to allow more room for footpath tree planting to be carried out along Road 9/1 and for a belt of shrub planting (or climbers on mesh) to be established adjacent to the lower sections of the bridge.

- A 1.5m minimum zone of planting should be allowed adjacent to the subway entrances and the footbridge to visually soften the appearance of these structures where located adjacent to the edge of the site.

- The layout of the promenade most take into account view corridors along Roads 9/3 and 9/4, the location of the three existing landing steps along the harbour wall (Marine Department advise that no more landing steps are required for this development), the location of any structures that may be required on the promenade (eg refreshment kiosks), pedestrian circulation to adjacent areas etc.

- In addition to tree and shrub planting in footpaths, vegetation should also be established in the traffic islands on the east of the site. Safe access must be provided for horticultural maintenance staff on these traffic islands. Planting should be considered in association with all highway superstructures (e.g. growing climbers up supporting columns for bridges).

6.8.4 Soft Landscape Framework

Trees provide the key component of the street planting structure and offer the potential of forming a mass of greenery capable of competing with the scale of the surrounding building forms as well as adding coherence to the pedestrian circulation structure. Trees offer the potential to make real improvements to the pedestrian environment in micro-climatic terms, and improve the 'friendliness' of the city. The main objectives of the proposed street tree planting are:

- To create a major physical and visual structure of natural forms, introducing movement, colours and textures as a foil to the architectural and engineering forms which would otherwise dominate the street scene.

- To ameliorate microclimate conditions for pedestrians, providing shade, reducing glare and reflective heat from pavements, absorbing dust pollution and dissipating winds and turbulence.

- By selection of contrasting species, defining the continuity and extent of the various elements of the circulation and open space structure.

- Provision of tree guards should be used to support and stabilise roadside trees, particularly in exposed areas.

Shrubs would be used in conjunction with raised planters as a secondary layer in the planting framework, performing a variety of functions at ground level. The main functions are to :

- Control and define spaces.
- Screen and channel views.
- Create visual variety.
- Enhance architectural forms at ground level.

The shrub planting would provide a screen, at pedestrian eye level, visually separating pedestrians and traffic and defining the pedestrian space at ground level. In addition, shrub planting would provide the opportunity to introduce a wider variety of natural colours and textures which would be used to emphasise adjacent building entrances and reflect a variety of events along the street.

6.8.4.1 *Soft Landscape Design*

This section provides a general guide to plant selection and discusses various technical aspects of the planting structure. A wider selection of plant species should be provided at detailed design stage. These aspects will require further consideration in the development of engineering, architectural and landscape proposals.

(A) Plant Selection

Plant species will need to be carefully selected in order to satisfy the stated design objectives whilst withstanding the anticipated environmental conditions. The following lists of species should be used as a guide to plant selection in the detailed design stage.

i) Street trees should be regular in habit, non-suckering, non-surface-rooting, pollution tolerant and have well-defined trunks. A variety of tree forms may used throughout the reclamation to provide areas with different landscape characters. The following tree forms may be used:

Compact spreading habit, height 15m (plus).

Species include:

- Aleurites moluccana
- Cinnamonum camphora
- Pongamia pinnata

Columnar habit height 15m (plus).

Species include:

- Bischofia trifoliata
- Melia azedarach
- Peltophorum pterocarpus

Columnar habit, height 20-25m.

Species include:

- Eucalyptus citriodora
- Grevillea robusta
- Melaleuca leucadendron
- Melia azedarach

Road-Side shrubs

Species include:

- Barleria cristata
- Duranta repens
- Hibiscus rosa-sinensis
- Rhododendron spp
- Spiraea cantoniensis
- Thunbergia erecta

ii) Waterfront Promenade : trees to be 15-20m height with a broad-spreading compact forms, clearly defined trunks, evergreen, and tolerant of coastal conditions, salt spray and winds.

Species include:

- Artocarpus altilis
- Casuarina equisetifolia
- Hibiscus tiliaceus
- Roystonia regia

Tree planting is recommended in the pavements adjoining all roads. The species of trees used for the promenade area and Road 9/2 should be different from those used for the other proposed roads. This will help accentuate the difference in character between the promenade and the other areas of the site.

(B) Soil Volumes

The ability of the proposed planting framework to establish and achieve maturity is largely dependant on the provision and continued protection of adequate soil volumes to enable unrestricted growth. The minimum depth or volume of the soil mass required may be summarised as follows:

Planting Type	**Soil Depth/Vol**
Trees	1000 mm Layer/2.0m^3
Large Shrubs	600 mm Layer
Shrubs	450 mm Layer
Ground Cover	300 mm Layer
Grass	250 mm Layer

NB. Soil volumes/depths are a general guide and require re-examination for each specific area. Soil depths are quoted exclusive of the necessary drainage layer although it should be noted that the reclamation area will be freely draining. Topsoil should be provided in accordance with the General

Specification for Civil Engineering Works - Hong Kong Government (1993 Edition). The subsoil in planters should be clean, friable decomposed granite, free from grass or weed growth, construction debris or other foreign materials and stones over 25mm diameter. The proportion of stones under 25mm diameter should not exceed 10% volume.

(C) Technical Considerations for Trees in Pavements

The ability of the proposed street tree planting to establish and achieve maturity is largely dependant on the provision, and continued protection of adequate space, above and below ground, to enable future growth.

Trees at pavement level should be planted within continuous 'services free' tree planting zones. The width of the zone should be as large as possible given the constraints of underground services, but should not be less than 2.0m. See Figure 6.4 for conceptual sketch of planting zones. Improved soil should be provided in a continuous trench linking individual tree pits in order to maximise the volume of soil and moisture available for future root growth.

In predominantly 'hard paved' areas, drought is a potential hazard to the trees' survival and therefore an artificial watering system is recommended. This may take the form of perforated pipework, hosepipes, or subterranean reservoirs each being fed by watering inlets at the soil surface of each tree.

Above ground level, trees require protection form accidental or intentional vandalism, particularly in early years in the form of tree supports or protective grilles. The location of trees and other vegetation must not only take account of building entrances, pedestrian crossings but also traffic sight-lines.

(D) Water Supply

All plants rely to varying degrees on water for proper growth. Plants in urban situations are particularly dependant on artificial water sources due to:

- Reduced soil volumes.
- Lack of natural subterranean water sources.
- Increased evapo-transpiration due to the heating affect of urban areas, higher light levels due to reflective light and increased air movement due to building related turbulence.

In response to these factors a comprehensive irrigation system will be required throughout the main landscaped areas to ensure full development of the planting. An automatic irrigation system (with pump house) should be provided to any planting areas with an access problem. The Urban Services Department should be consulted on the details of any proposed irrigation systems. Lockable water points should be provided with a sweep of a 20m-long hose. Individual water points should be provided to any planters that are separated by footpaths to avoid possible tripping-up of pedestrians by hosepipes.

The precise method of watering and degree of automation would be dependant on the final form of the design. In general, it is anticipated that planted areas would require approximately 10L/m^2 per day on average.

6.8.4.2 *Landscape Maintenance*

To minimise long-term maintenance inputs, adequate provision for future maintenance operations should be made as follows:

- Detailed management plans and maintenance specifications should be prepared by a qualified landscape architect.
- Watering points should be provided at 30m centres, or partially automated irrigation systems should be installed for areas with restricted access.
- Drainage points should be provided in all raised planters.
- Stakes, guys of other means of support should be provided for trees and specimen shrubs.
- All raised planters should be free from underground utilities.
- Climbing supports should be provided where appropriate for climbers.
- Storage facilities should be provided for large scale spaces.

6.8.5 Landscape and visual impact mitigation measures that should be implemented during the construction phase of the project should include the following:

- retaining the existing fences on the boundary of the construction site to reduce the potential visual impacts of the proposed works (movement of vehicles as well as unsightly excavations and construction elements) and to prevent tipping, vehicle movements and encroachment of personnel into the site.
- checking regularly to ensure that the work site boundaries are not exceeded and that no damage is being caused to the surrounding areas;
- preventing the flow of pollutants and sediment into water bodies;
- employing high standards of dust control to protect vegetation adjacent to work sites.
- Structures should be carefully located to ensure that pedestrian movements around the station are not restricted and ample space should be provided for the turning of vehicles at the end of any roads that are severed by the development.

7. ENVIRONMENTAL MONITORING AND AUDIT

An environmental monitoring and audit (EM&A) programme performs three functions. It ensures that noise from the construction of the project is kept within acceptable levels; it establishes procedures for checking the application and effectiveness of mitigation measures; and it provides the means by which compliance can be checked, exceedances documented, and corrective action recorded.

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 measured to indicate the impacts of construction dust on air quality. The designated monitoring locations are shown in Figure 7.1.

Noise

The construction noise level should be measured in terms of the A-weighted equivalent continuous sound pressure level (Leq). The designated monitoring locations are the same as for air quality (see Figure 7.1).

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) Leq(30 min) 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 in 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)L10(1-hr) and one planned school and one existing church will be exposed to noise levels exceeding 65 dB(A)L10(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 protect 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 of 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 residential 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 measure 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 windows and air-conditioners for classrooms where the predicted traffic noise levels exceeding 65 dB(A)L10(1-hr) in the proposed secondary school on 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.

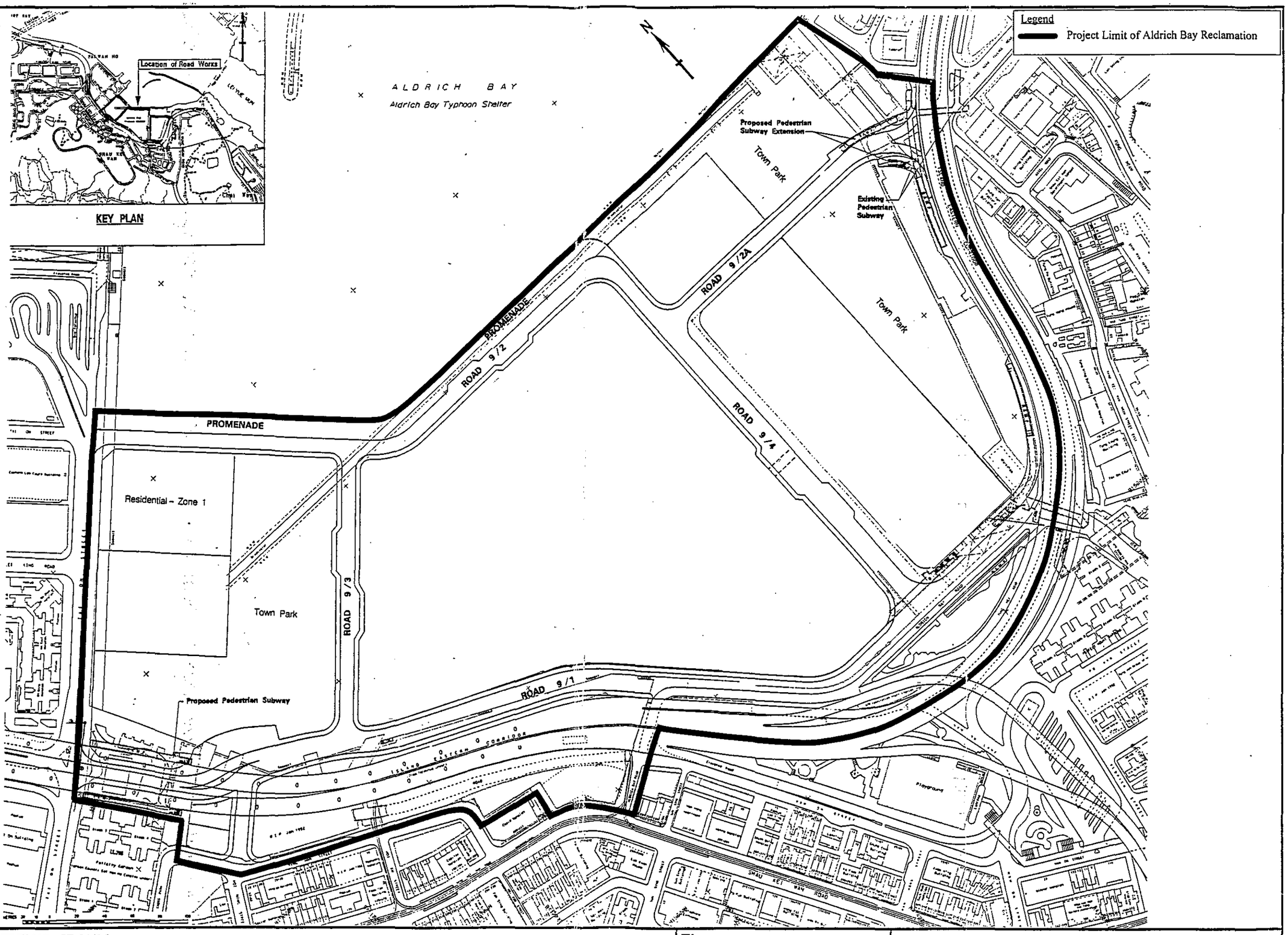
- Provision of good quality windows and air-conditioners to those planned dwelling units where the predicted facade traffic noise levels exceed 70 dB(A)L10(1-hr). As this is outside the scope of the Project (PWP Item No. 437CL) and this Study, the project proponent of the future residential developments 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 to the Contract Documents to control construction noise, dust, and waste disposal from the Engineering Works.

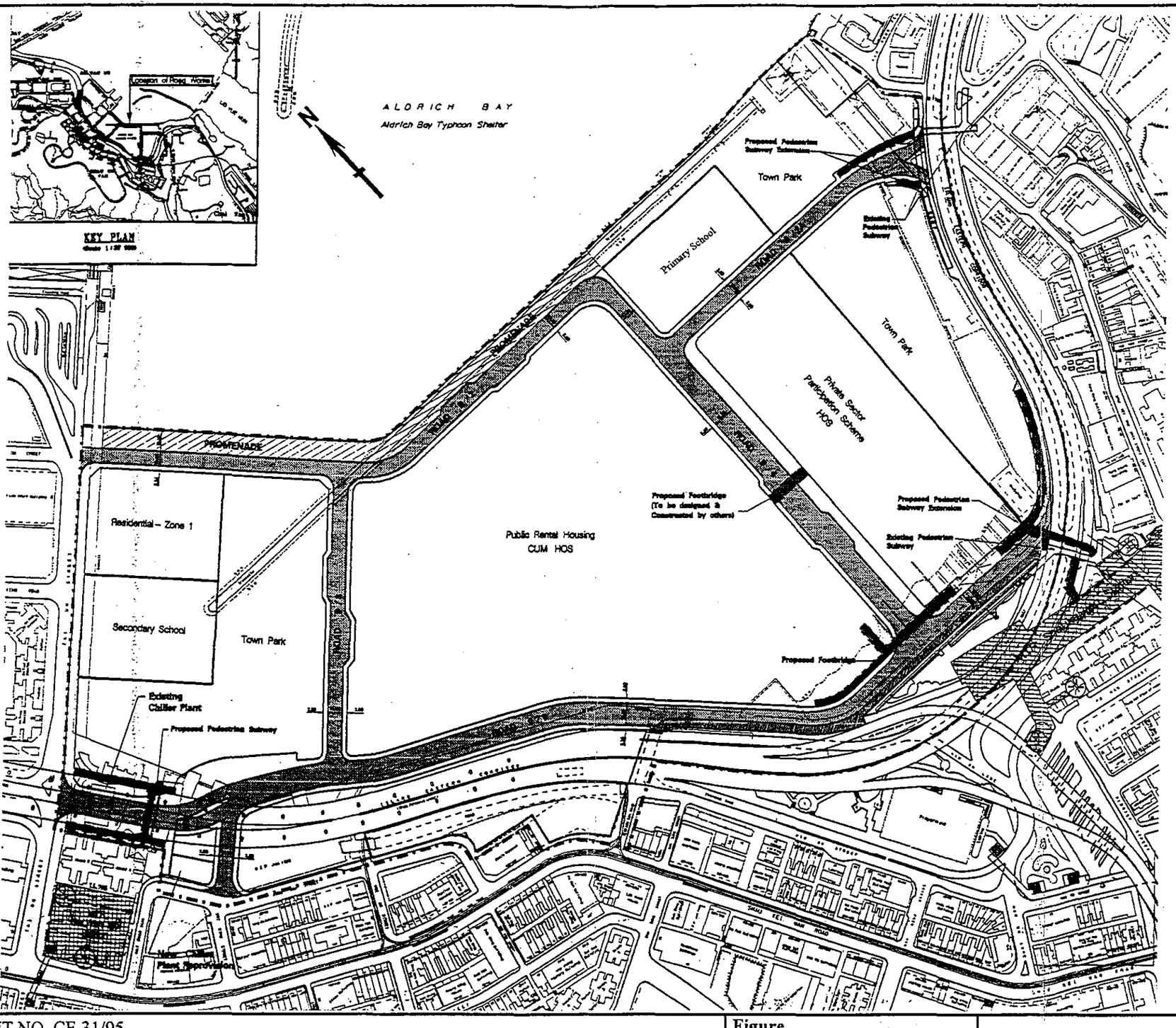
- Implementation of the EM&A programme as detailed in the EM&A Manual during the construction stage of the project.

- 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.



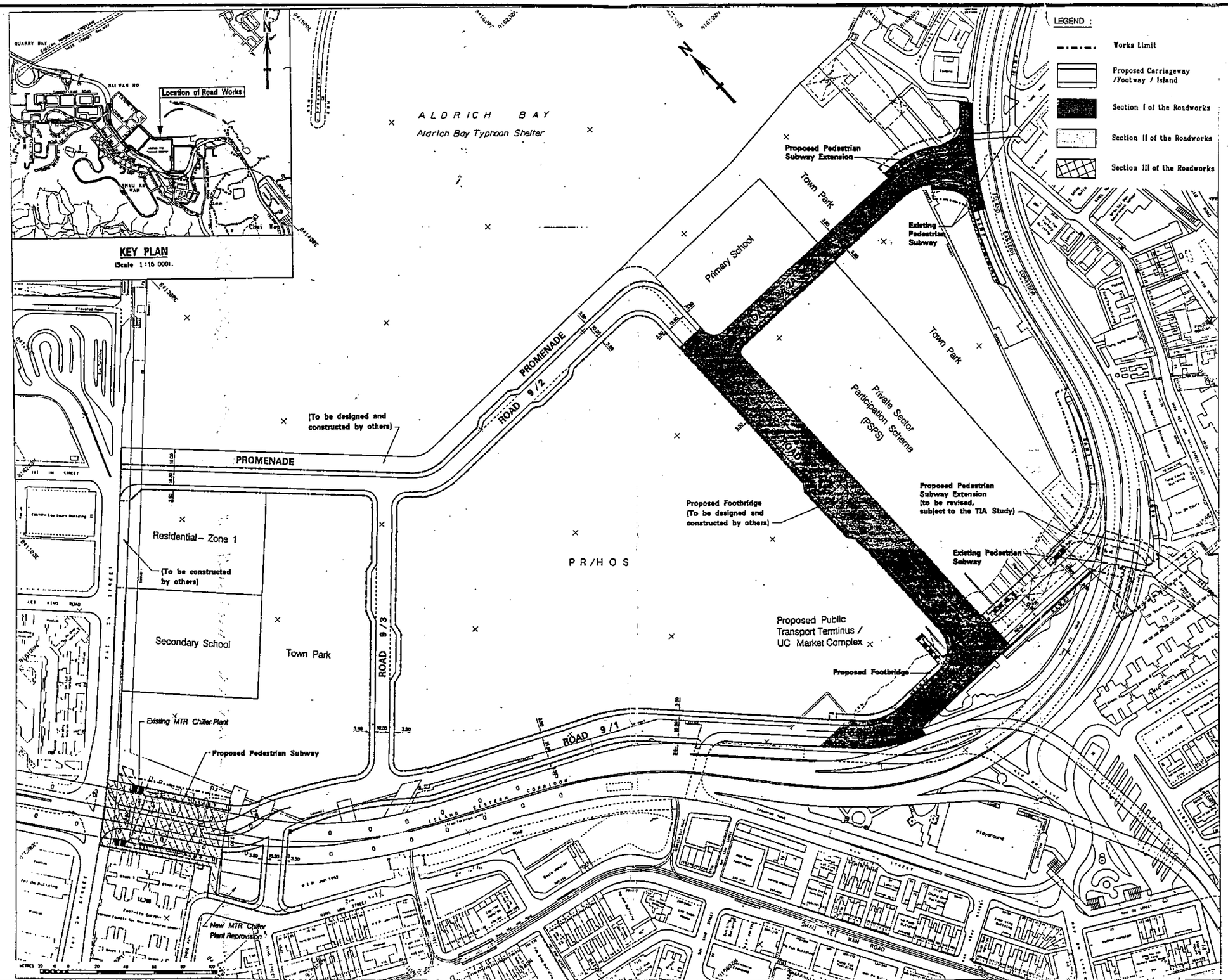
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	1.1
Title	PROJECT LIMIT OF ALDRICH BAY RECLAMATION (ABR)	**Scale**	As shown
		Date	JAN. 1997

Environmental Assessment & Pollution control



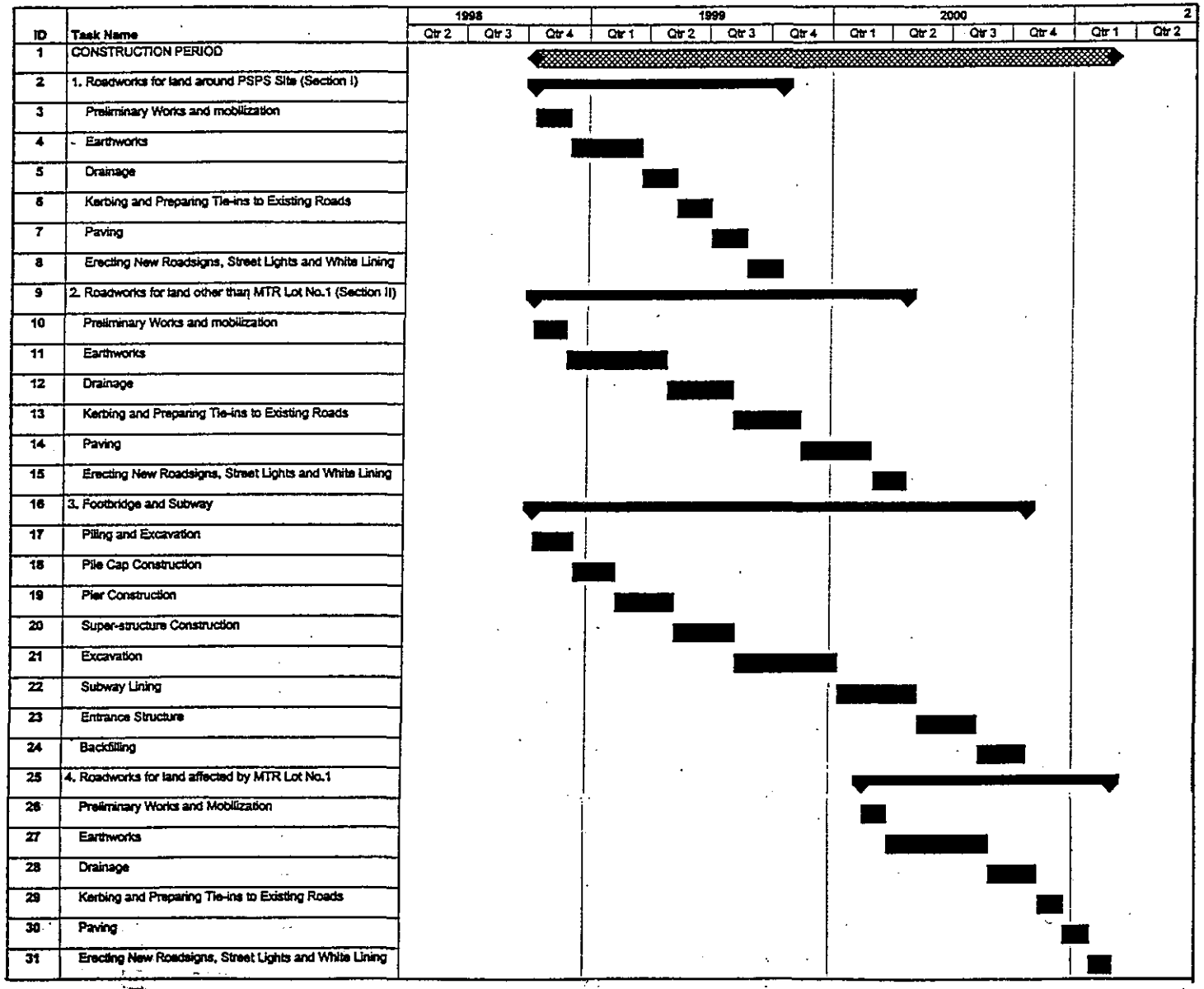
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	2.1
		Scale	N.T.S
Title	LAYOUT OF WORKS	**Date**	JAN. 1997

Environmental Assessment & Pollution control



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	2.2
Title	SECTIONS OF WORKS	**Scale**	As shown
		Date	JAN. 1997

Environmental Assessment & Pollution control



ID	Task Name
1	CONSTRUCTION PERIOD
2	1. Roadworks for land around PSPS Site (Section I)
3	Preliminary Works and mobilization
4	Earthworks
5	Drainage
6	Kerbing and Preparing Tie-ins to Existing Roads
7	Paving
8	Erecting New Roadsigns, Street Lights and White Lining
9	2. Roadworks for land other than MTR Lot No.1 (Section II)
10	Preliminary Works and mobilization
11	Earthworks
12	Drainage
13	Kerbing and Preparing Tie-ins to Existing Roads
14	Paving
15	Erecting New Roadsigns, Street Lights and White Lining
16	3. Footbridge and Subway
17	Piling and Excavation
18	Pile Cap Construction
19	Pier Construction
20	Super-structure Construction
21	Excavation
22	Subway Lining
23	Entrance Structure
24	Backfilling
25	4. Roadworks for land affected by MTR Lot No.1
26	Preliminary Works and Mobilization
27	Earthworks
28	Drainage
29	Kerbing and Preparing Tie-ins to Existing Roads
30	Paving
31	Erecting New Roadsigns, Street Lights and White Lining

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

Title PRELIMINARY CONSTRUCTION PROGRAMME

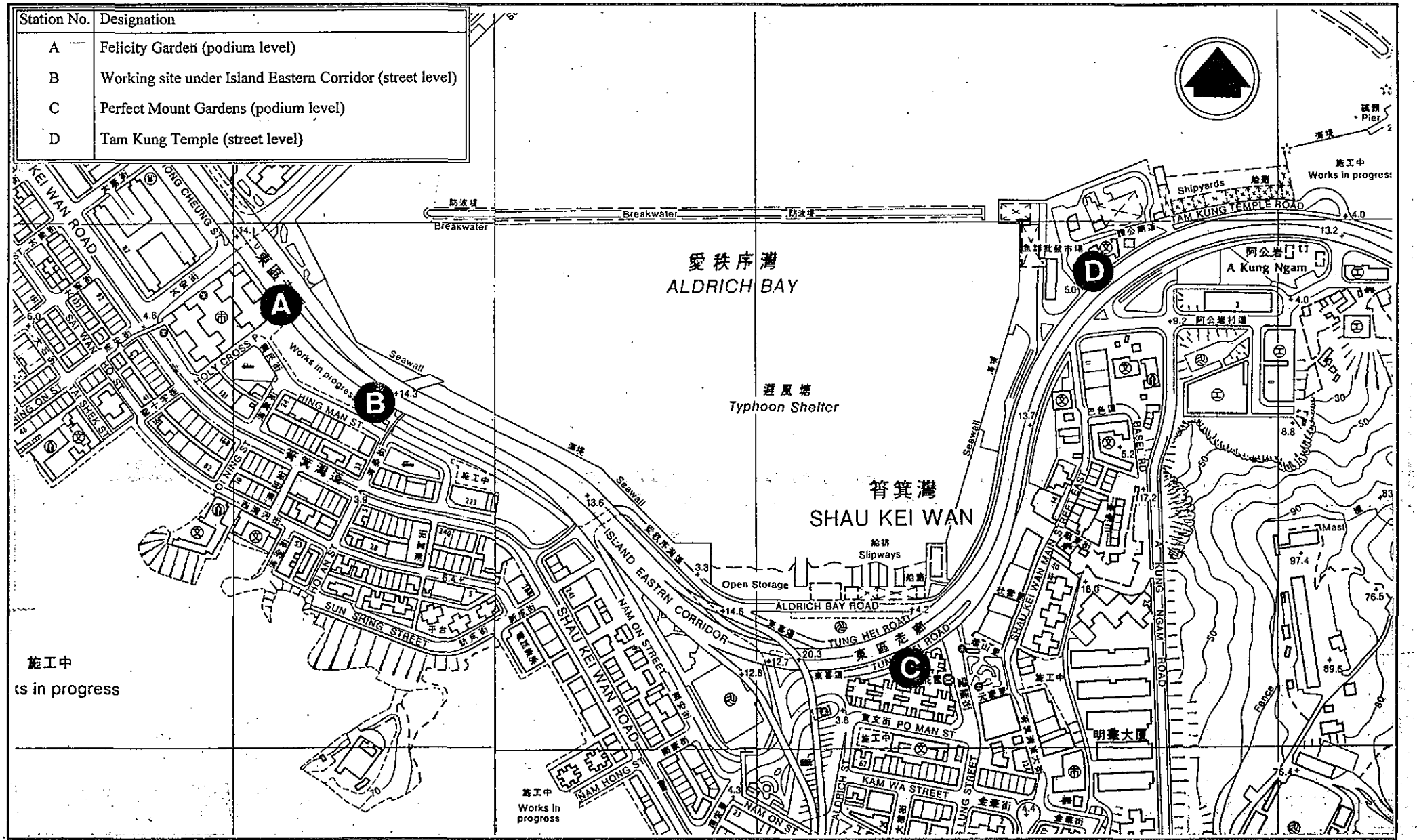
Figure 2.3

Scale N.T.S.

Date JAN. 1997

Environmental Assessment & Pollution control

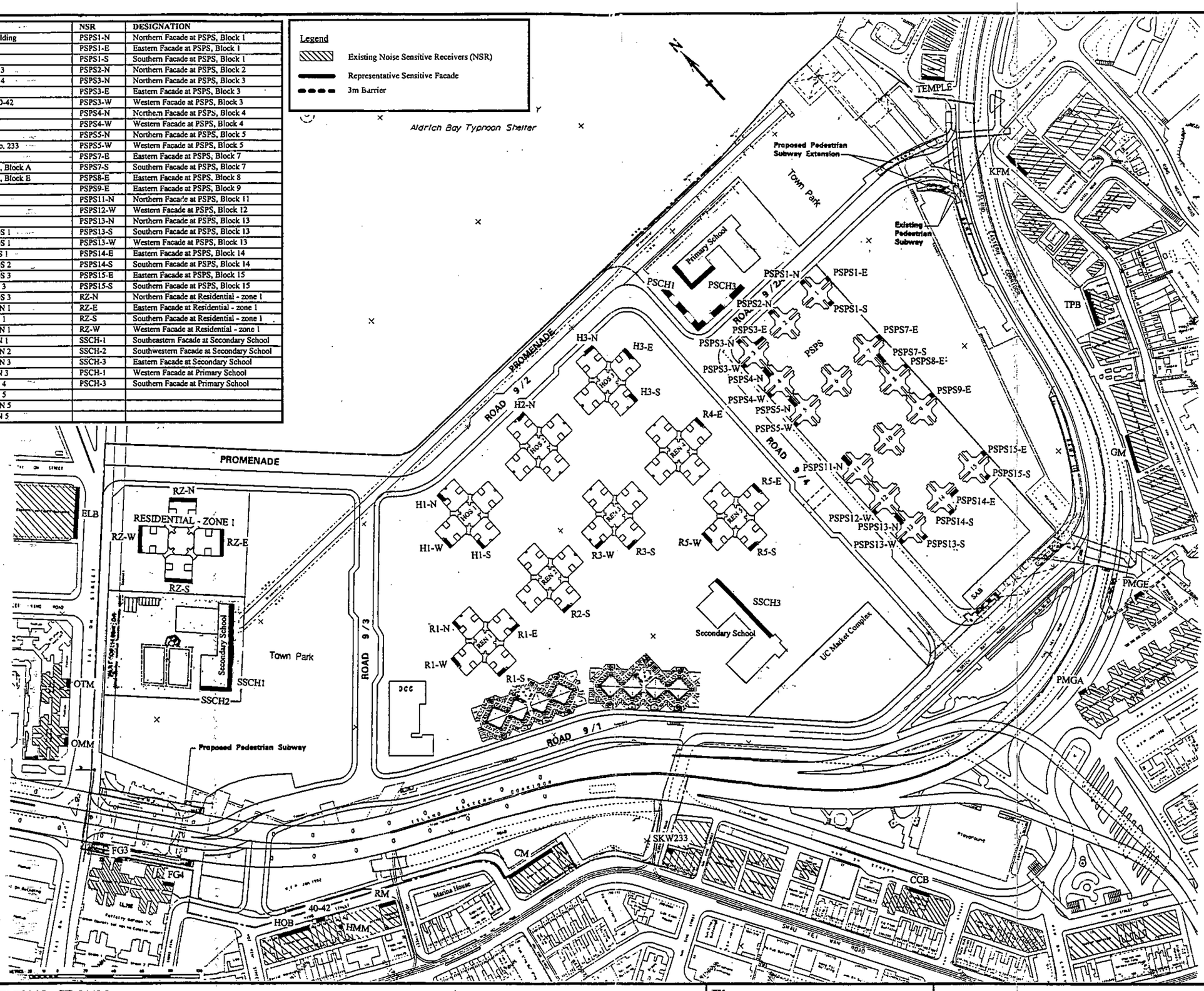
Station No.	Designation
A	Felicity Garden (podium level)
B	Working site under Island Eastern Corridor (street level)
C	Perfect Mount Gardens (podium level)
D	Tam Kung Temple (street level)



Project	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	2.4
Scale	1:5000
Date	JAN. 1997

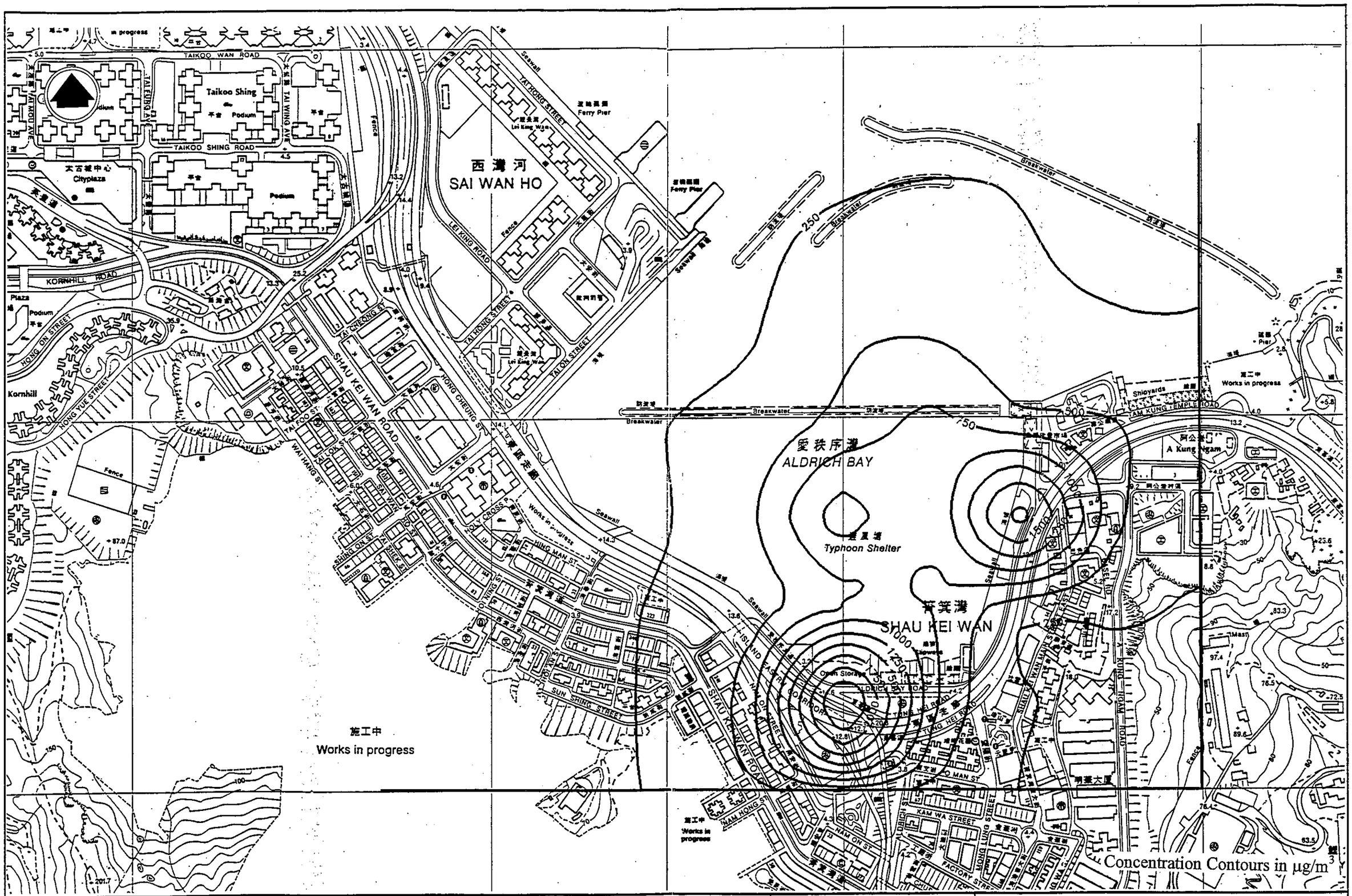
Environmental Assessment & Pollution control

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 Kei Wan Road No. 233	PSPS5-W	Western Facade at PSPS, Block 5
CCB	Chung Chai 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		



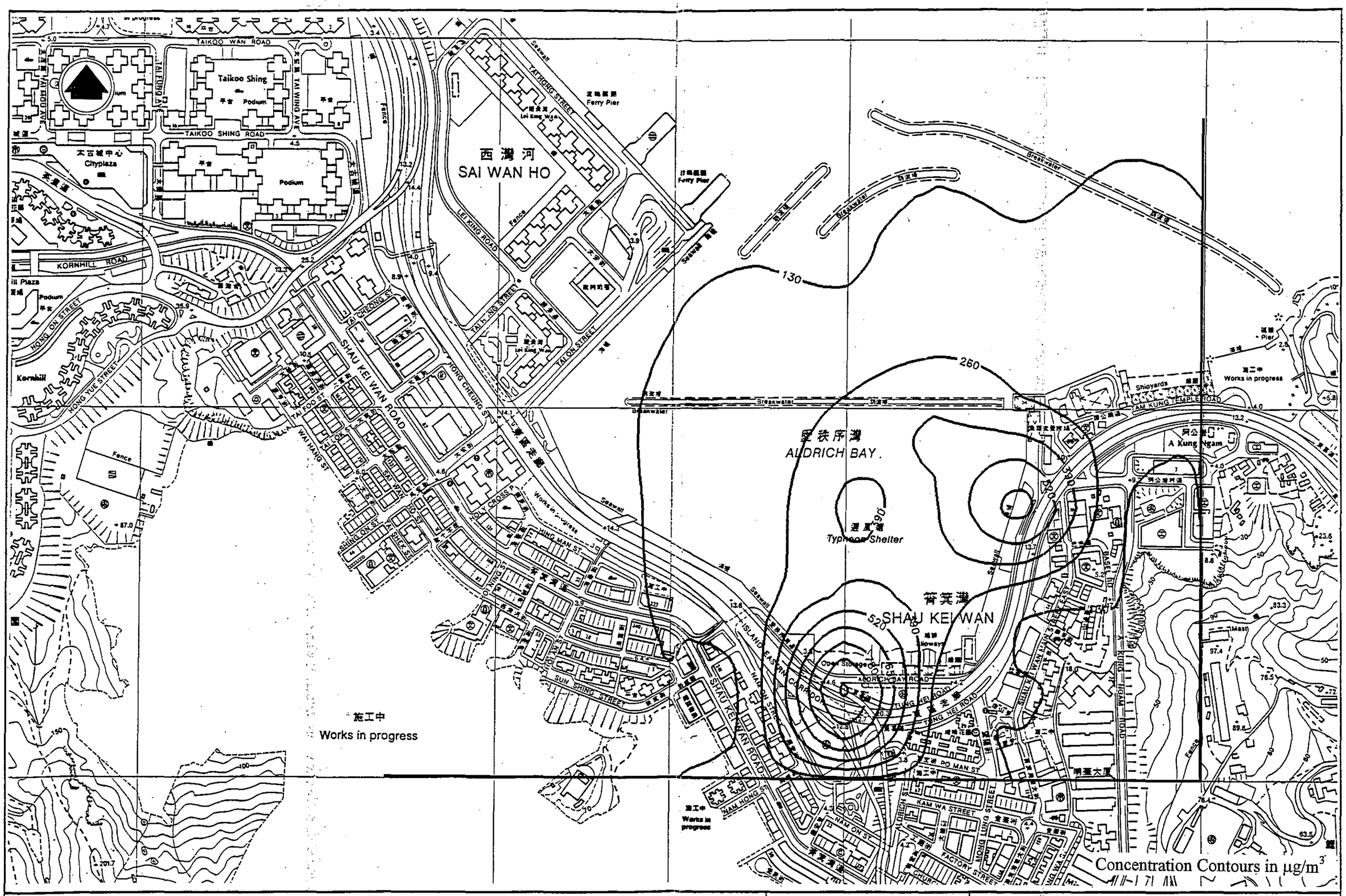
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
Title	LOCATION OF EXISTING NOISE SENSITIVE RECEIVERS AND DESIGNATIONS OF REPRESENTATIVE NOISE SENSITIVE FACADES
Figure	3.1
Scale	As shown
Date	JAN. 1997

Environmental Assessment & Pollution control



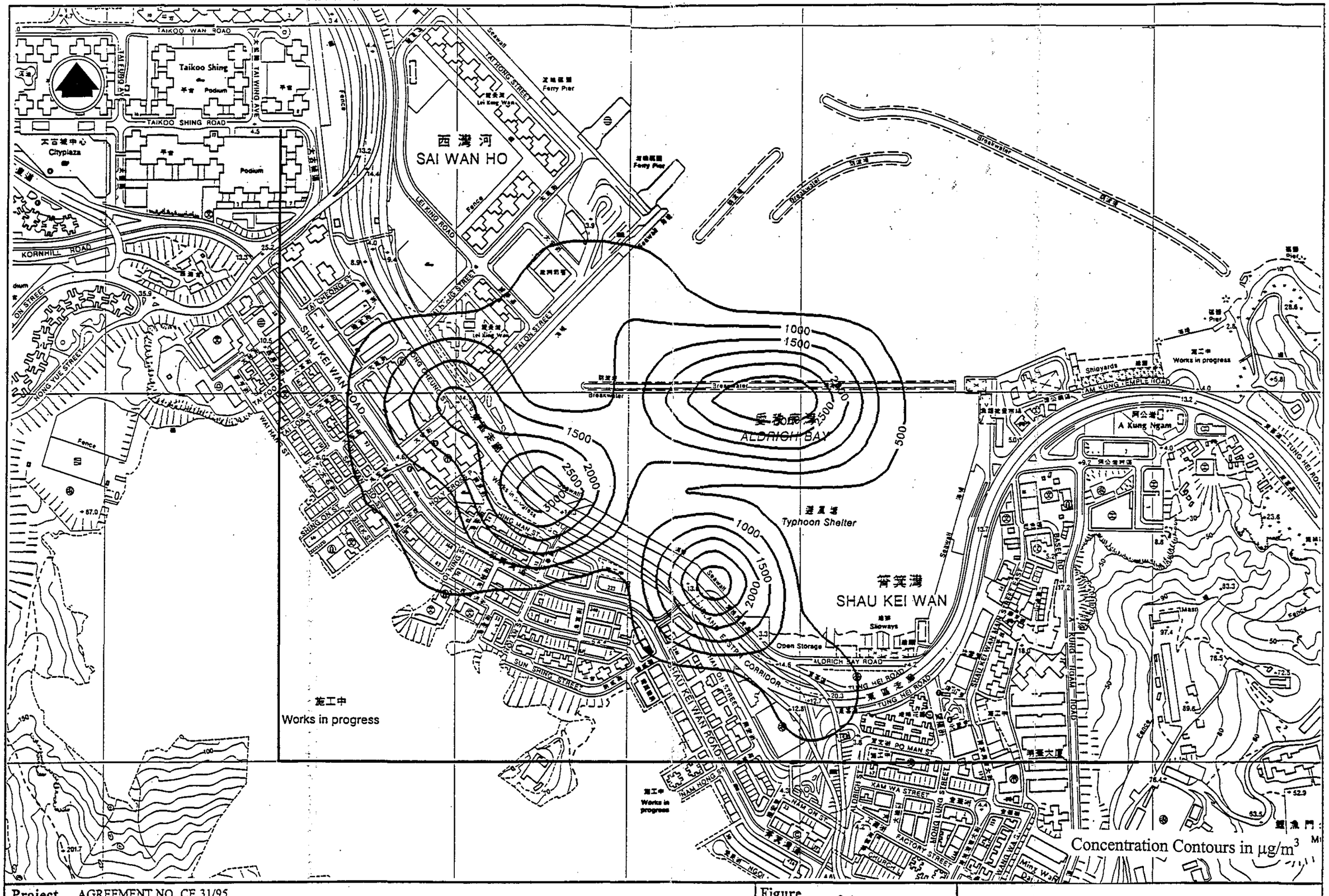
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - SECTION I (UNMITIGATED)
Figure	3.2
Scale	1:5000
Date	JAN. 1997

Environmental Assessment & Pollution control



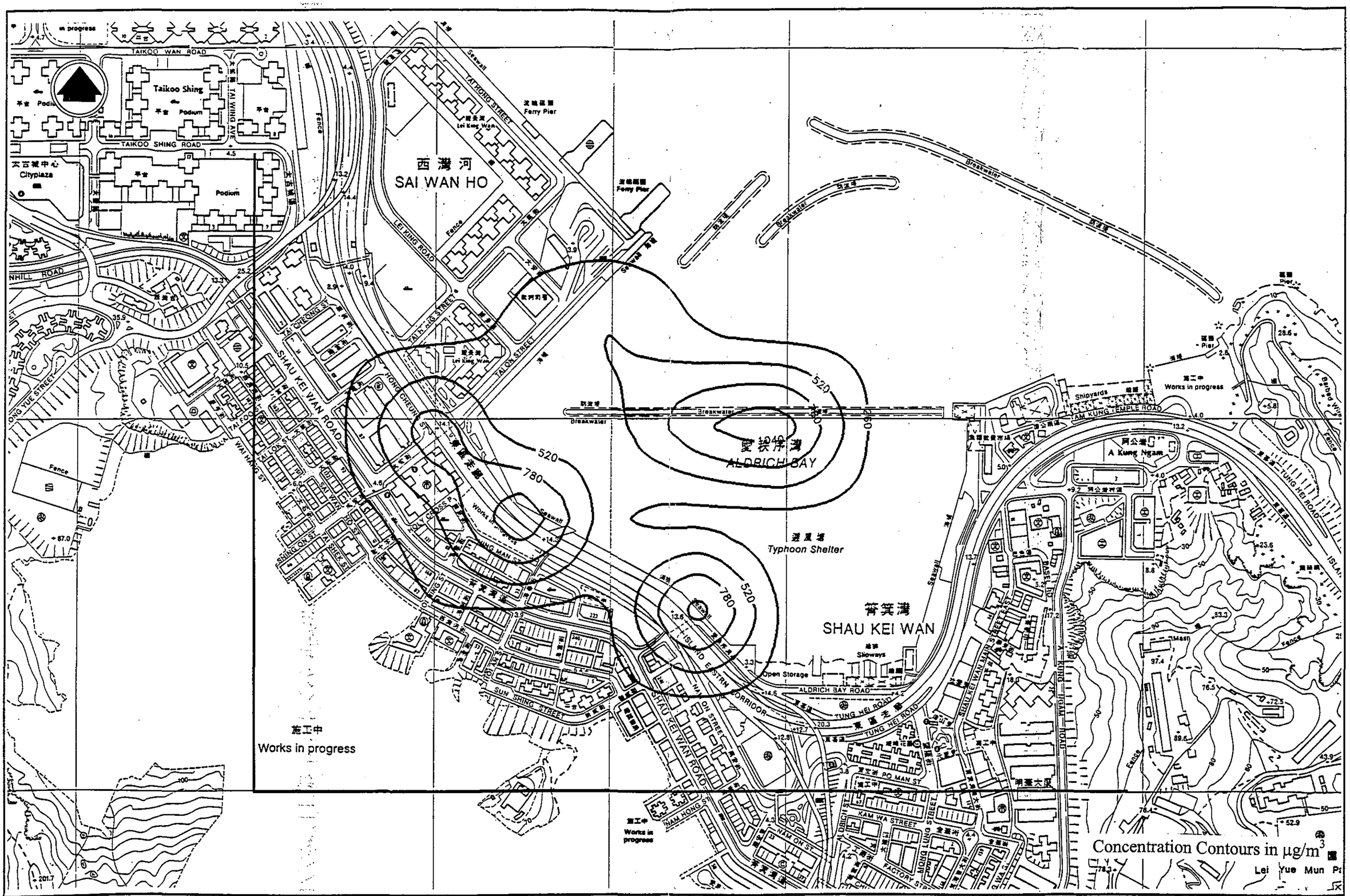
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
Title	DAILY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - SECTION I (UNMITIGATED)
Figure	3.3
Scale	1:5000
Date	JAN. 1997

Environmental Assessment & Pollution control



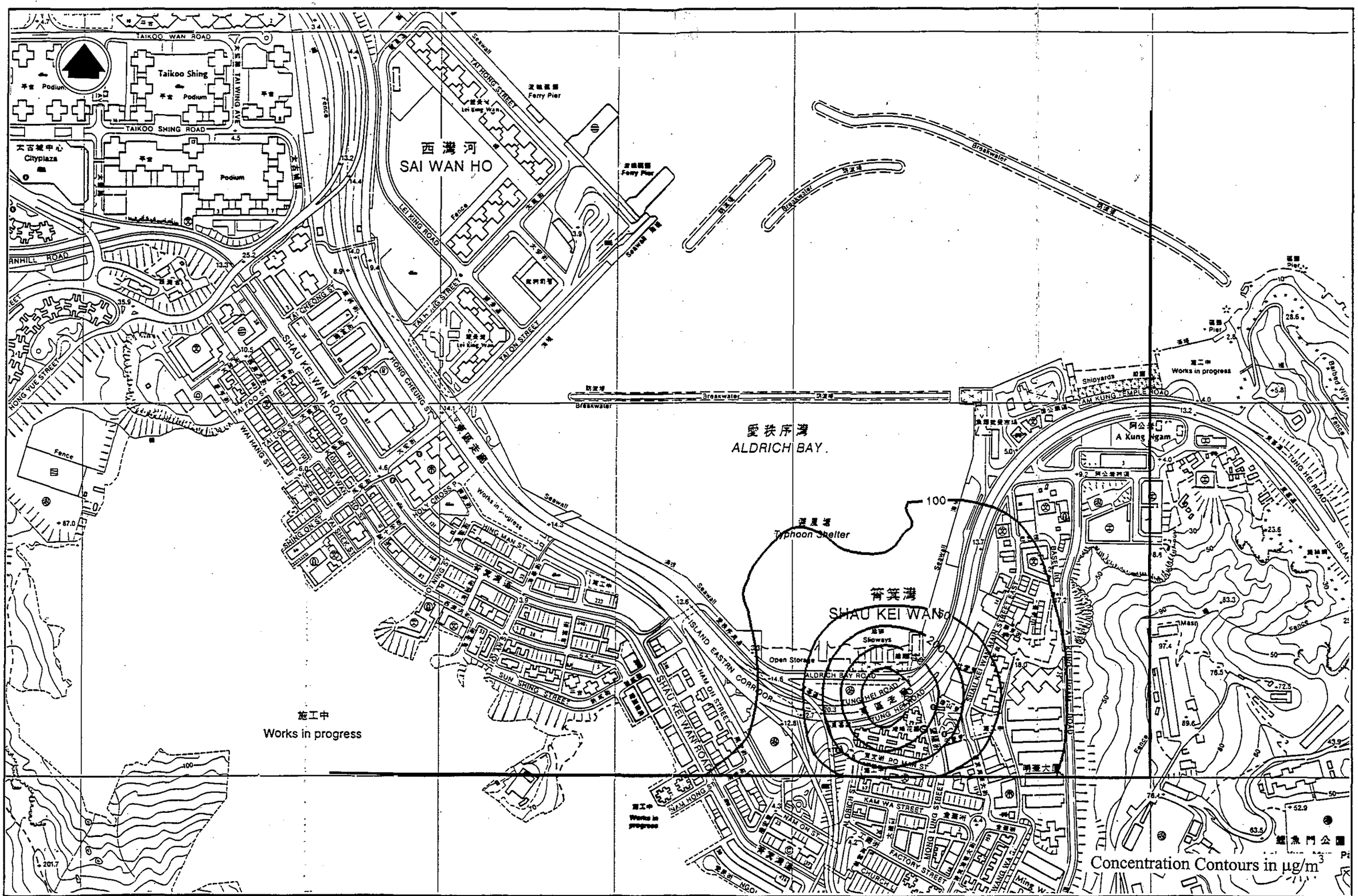
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.4
Title	HOURLY AVERAGE TSP CONCENTRATIONS (µg/m^3) DURING CONSTRUCTION - SECTION II (UNMITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



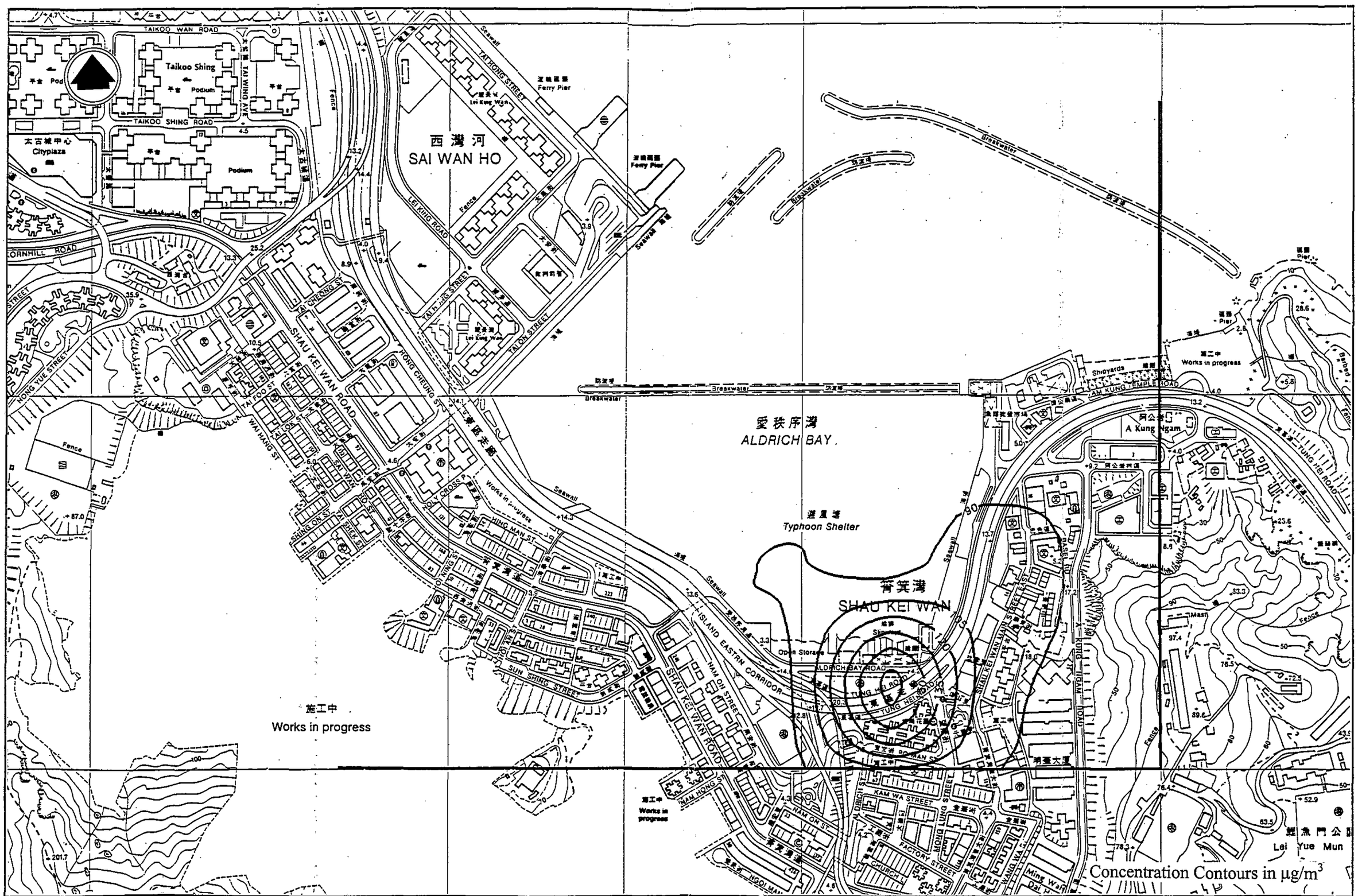
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.5
Title	DAILY AVERAGE TSP CONCENTRATIONS (µg/m^3) DURING CONSTRUCTION - SECTION II (UNMITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



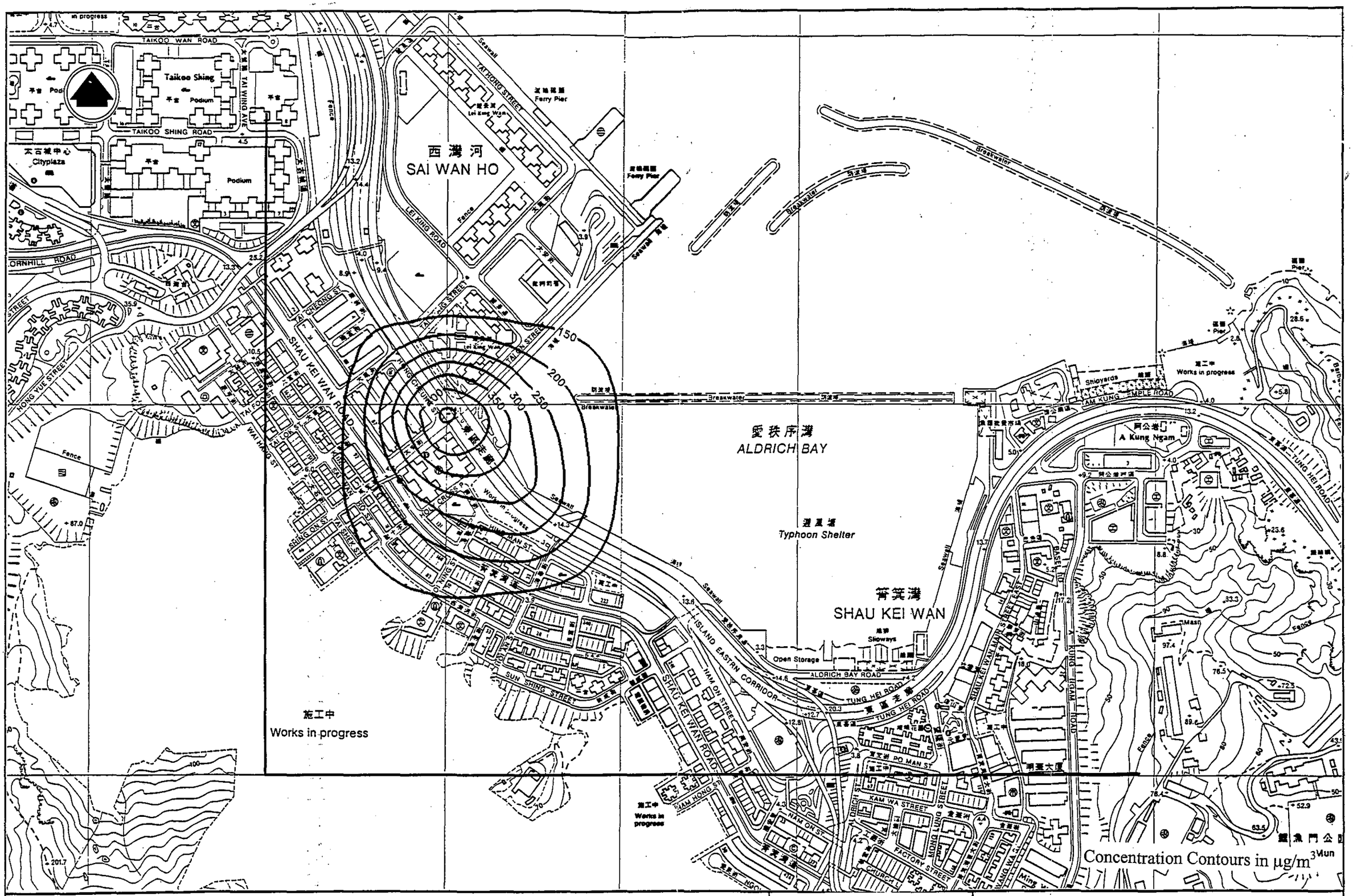
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.6
Title	HOURLY AVERAGE TSP CONCENTRATIONS (µg/m^3) DURING CONSTRUCTION - SECTION III (UNMITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.7
Title	DAILY AVERAGE TSP CONCENTRATIONS (µg/m³) DURING CONSTRUCTION - SECTION III (UNMITIGATED)	**Scale**	1:5000
		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	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - SECTION IV (UNMITIGATED)
Figure	3.8
Scale	1:5000
Date	JAN. 1997

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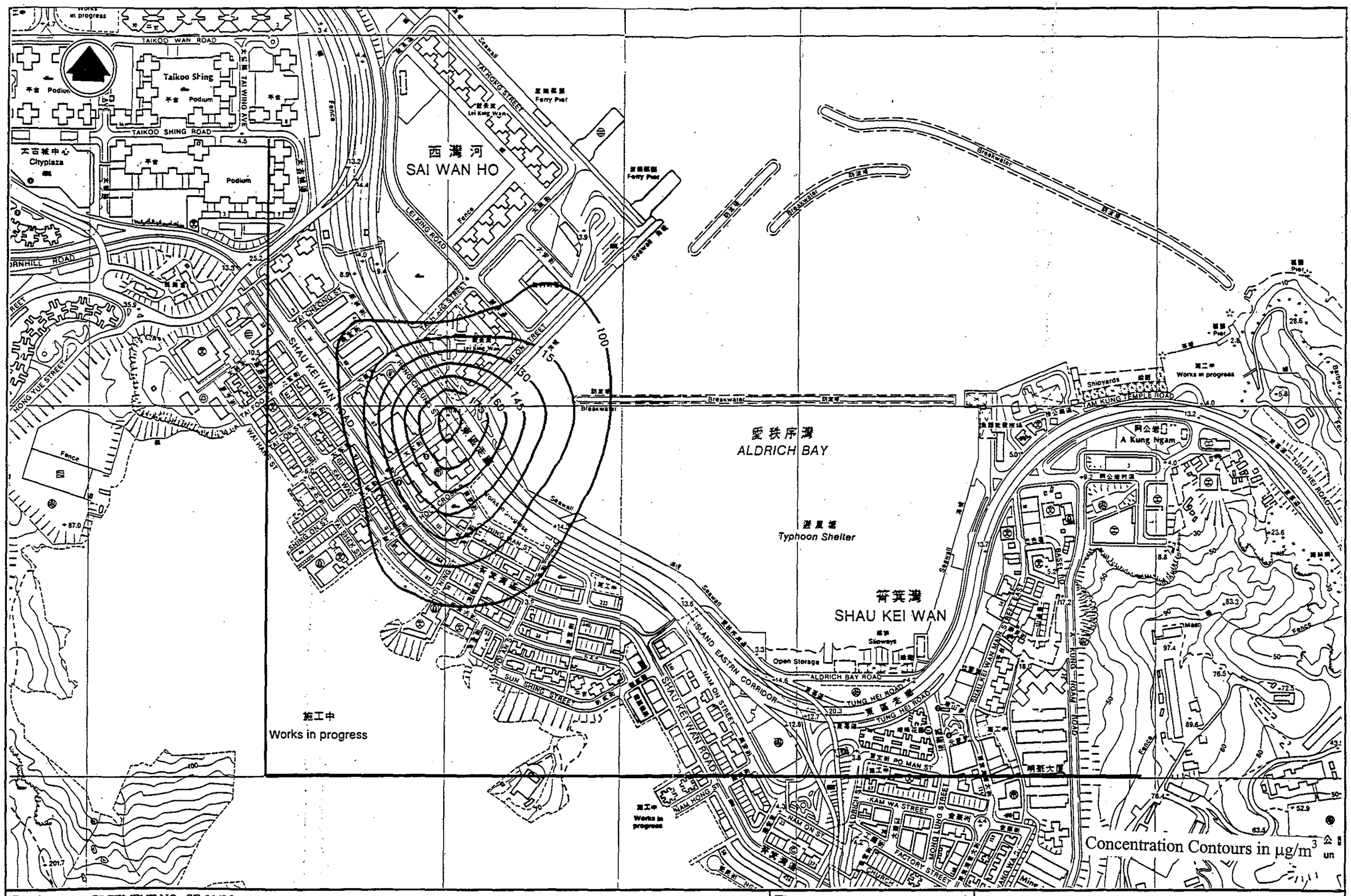
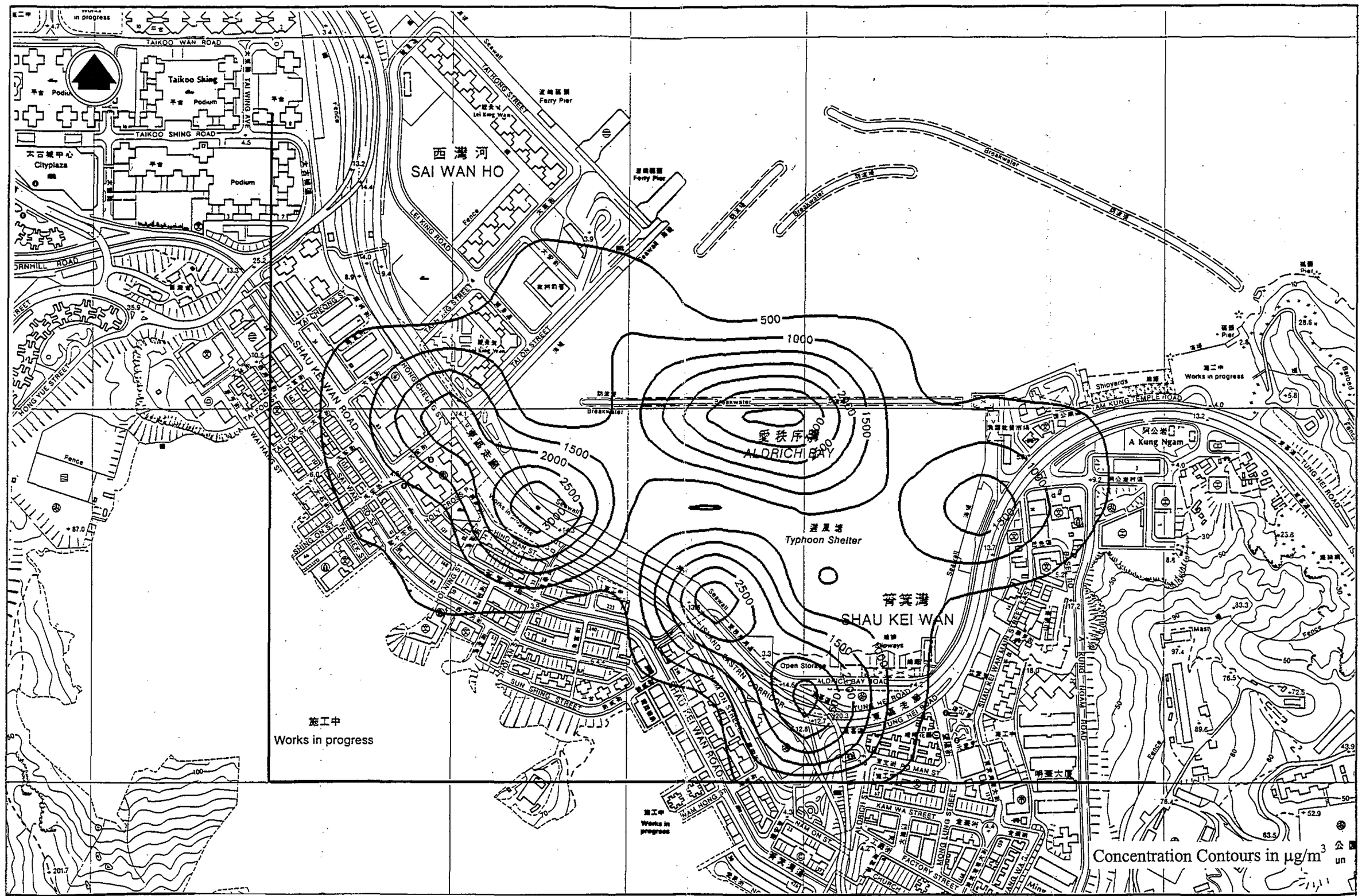


Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.9
Title	DAILY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - SECTION IV (UNMITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.10
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - ALL SECTIONS OF WORKS (UNMITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

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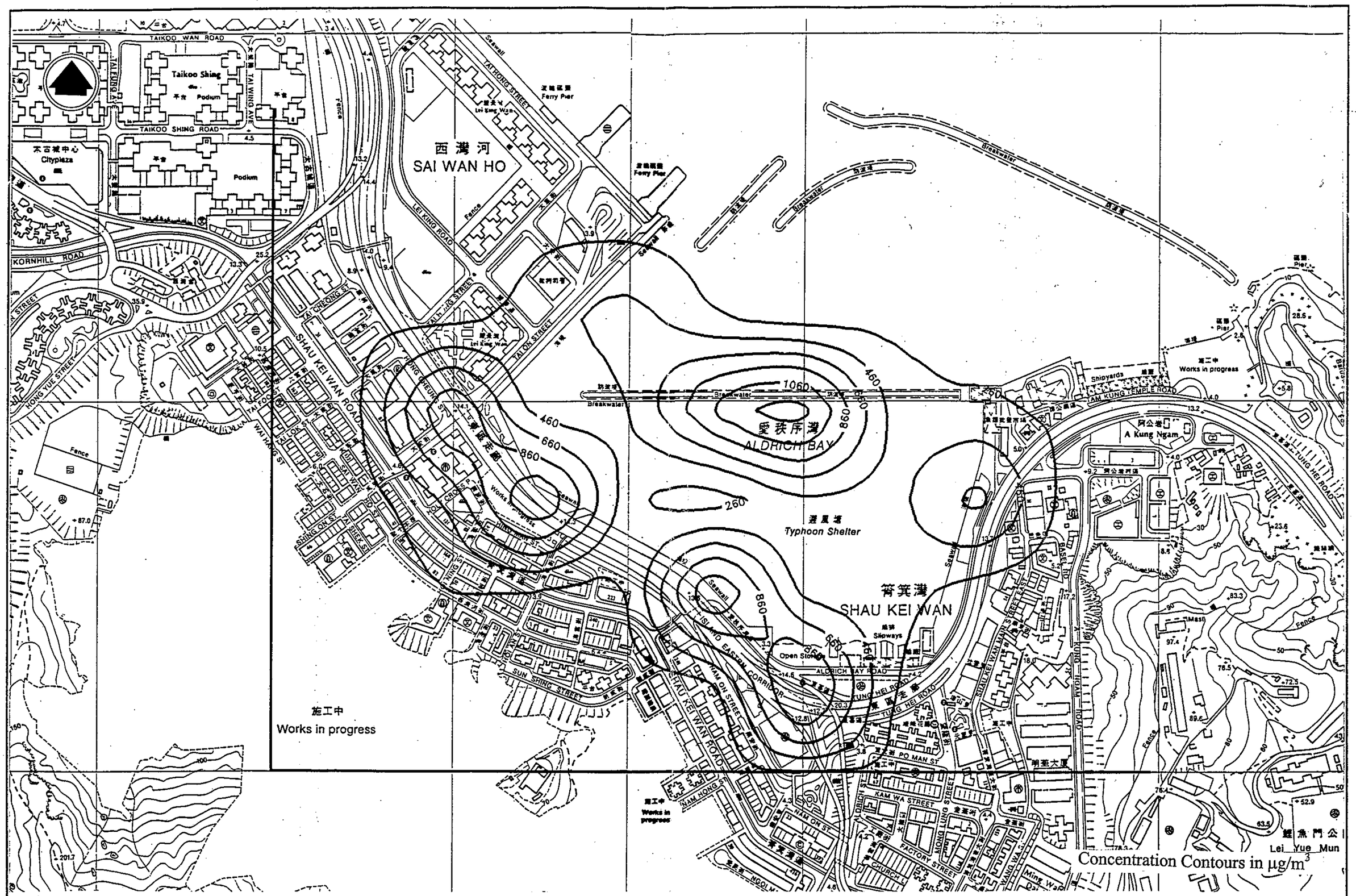
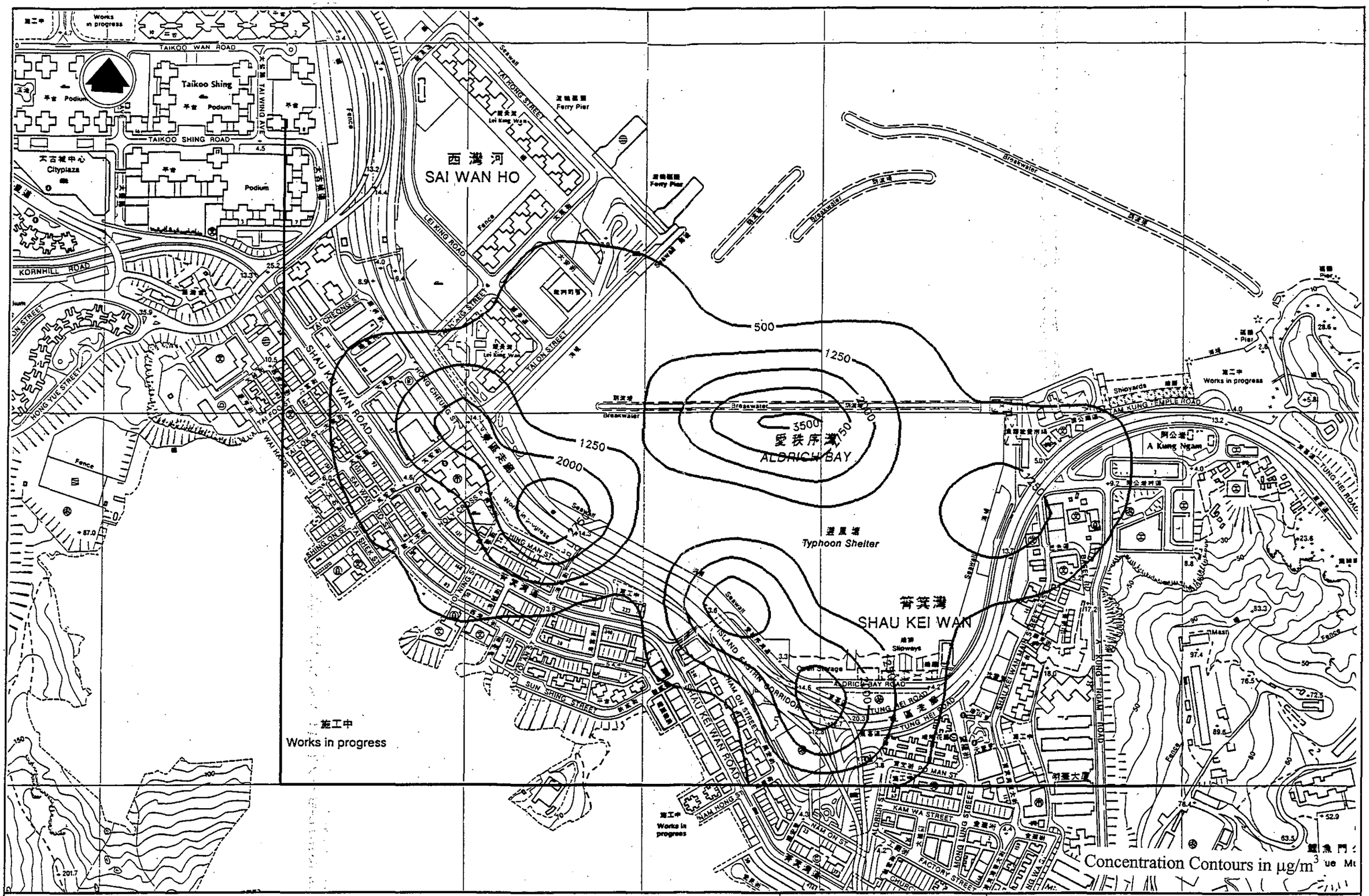


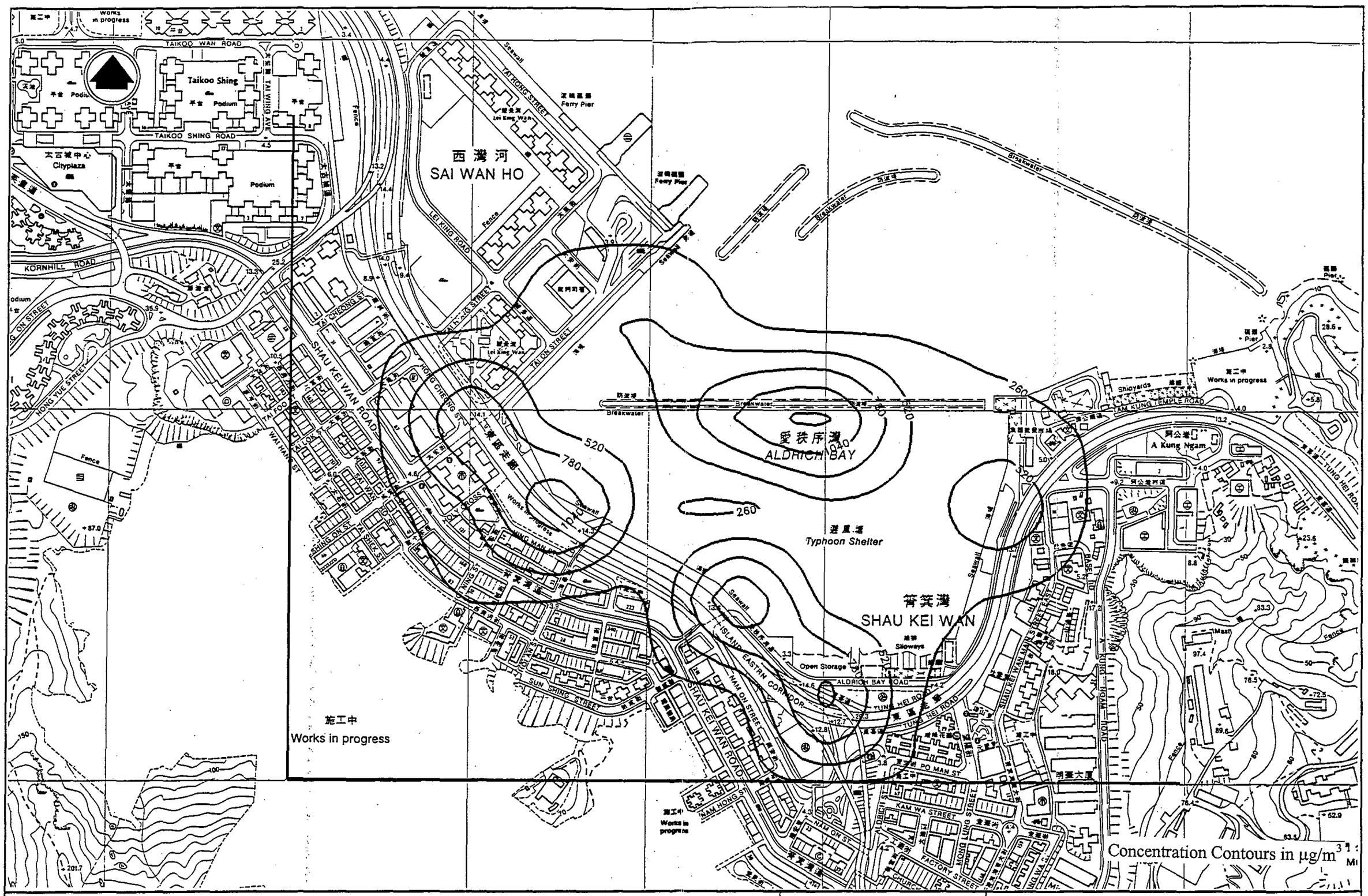
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	Figure	3.11
Title	DAILY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - ALL SECTIONS OF WORKS (UNMITIGATED)	Scale	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



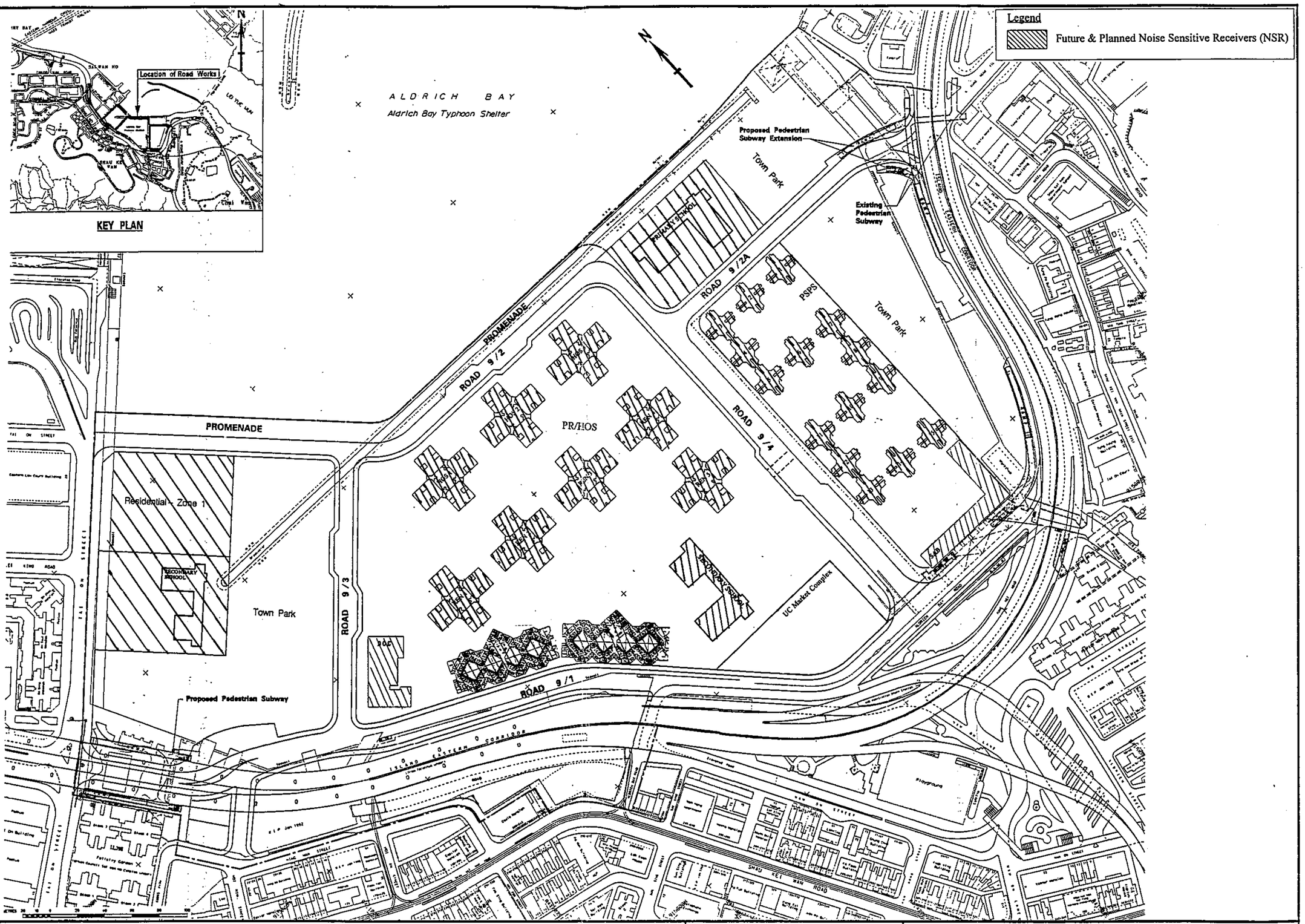
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	3.12
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - ALL SECTIONS OF WORKS AND CONCURRENT PROJECT (UNMITIGATED)	**Scale**	1:5000
		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"	**Figure**	3.13
		Scale	1:5000
Title	DAILY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - ALL SECTIONS OF WORKS AND CONCURRENT PROJECT (UNMITIGATED)	**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"	**Figure**	4.1
		Scale	As shown
Title	LOCATIONS OF FUTURE AND PLANNED SENSITIVE USES	**Date**	JAN. 1997

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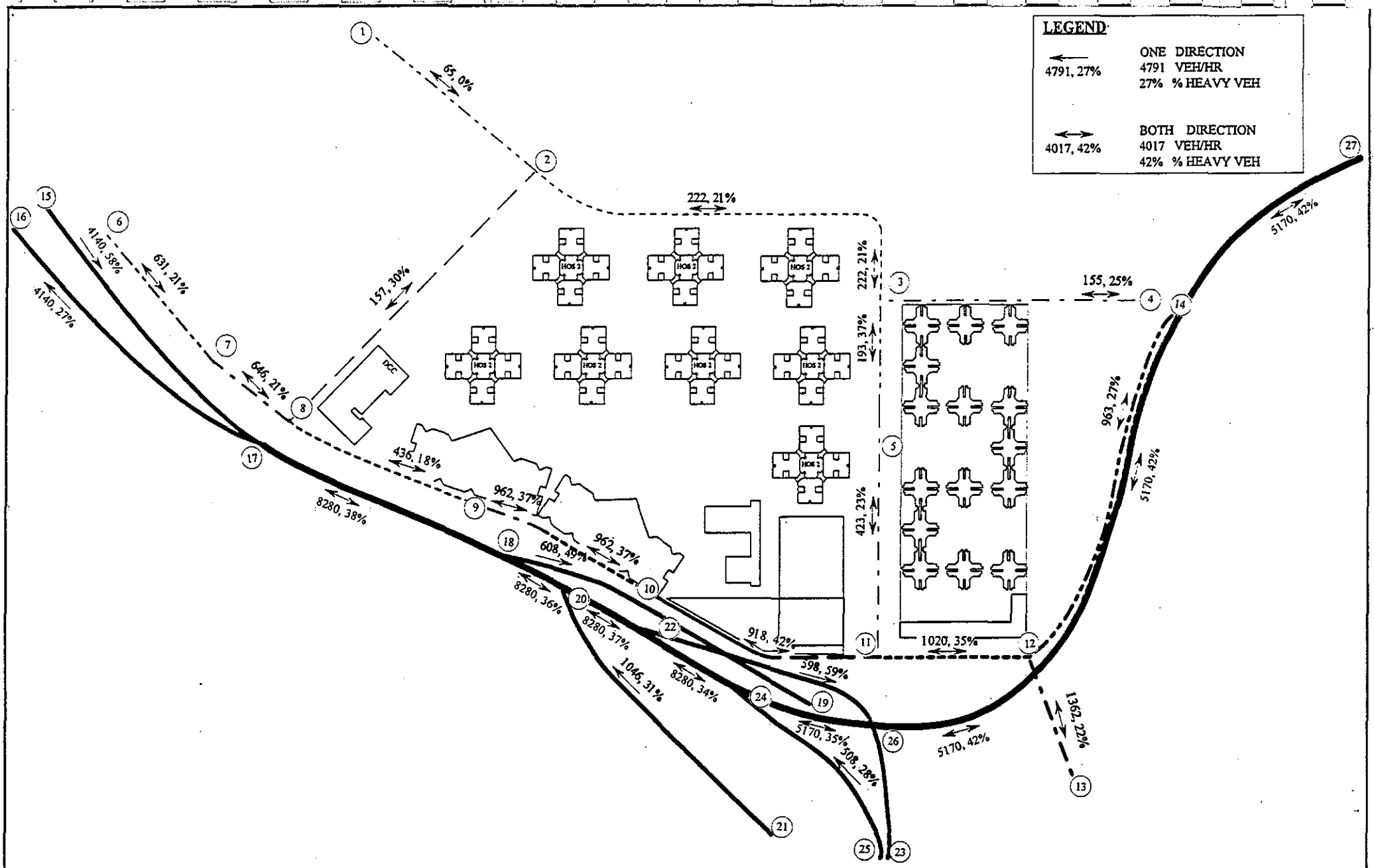
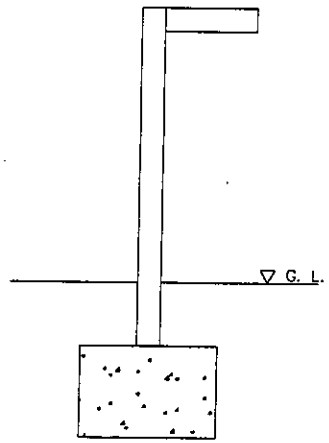
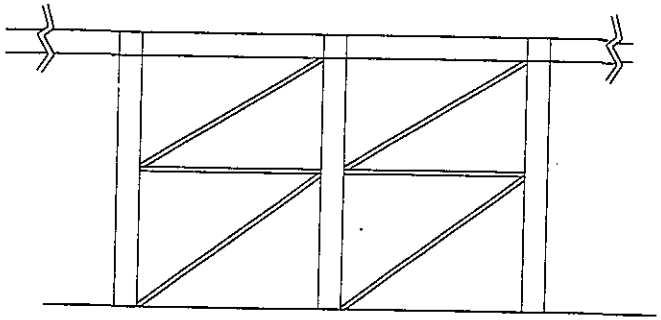


Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	4.2
		Scale	N.T.S
Title	TRAFFIC FLOW DIAGRAM - 2015	**Date**	JAN. 1997

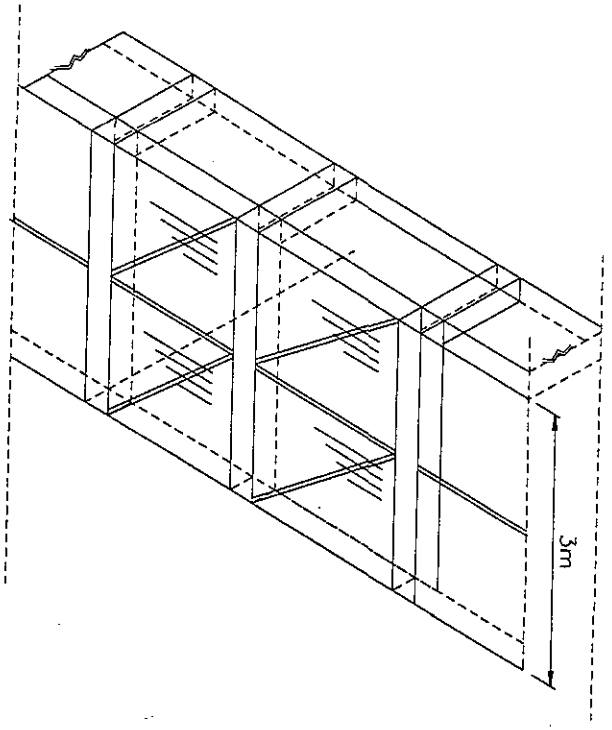
Environmental Assessment & Pollution control



SECTION



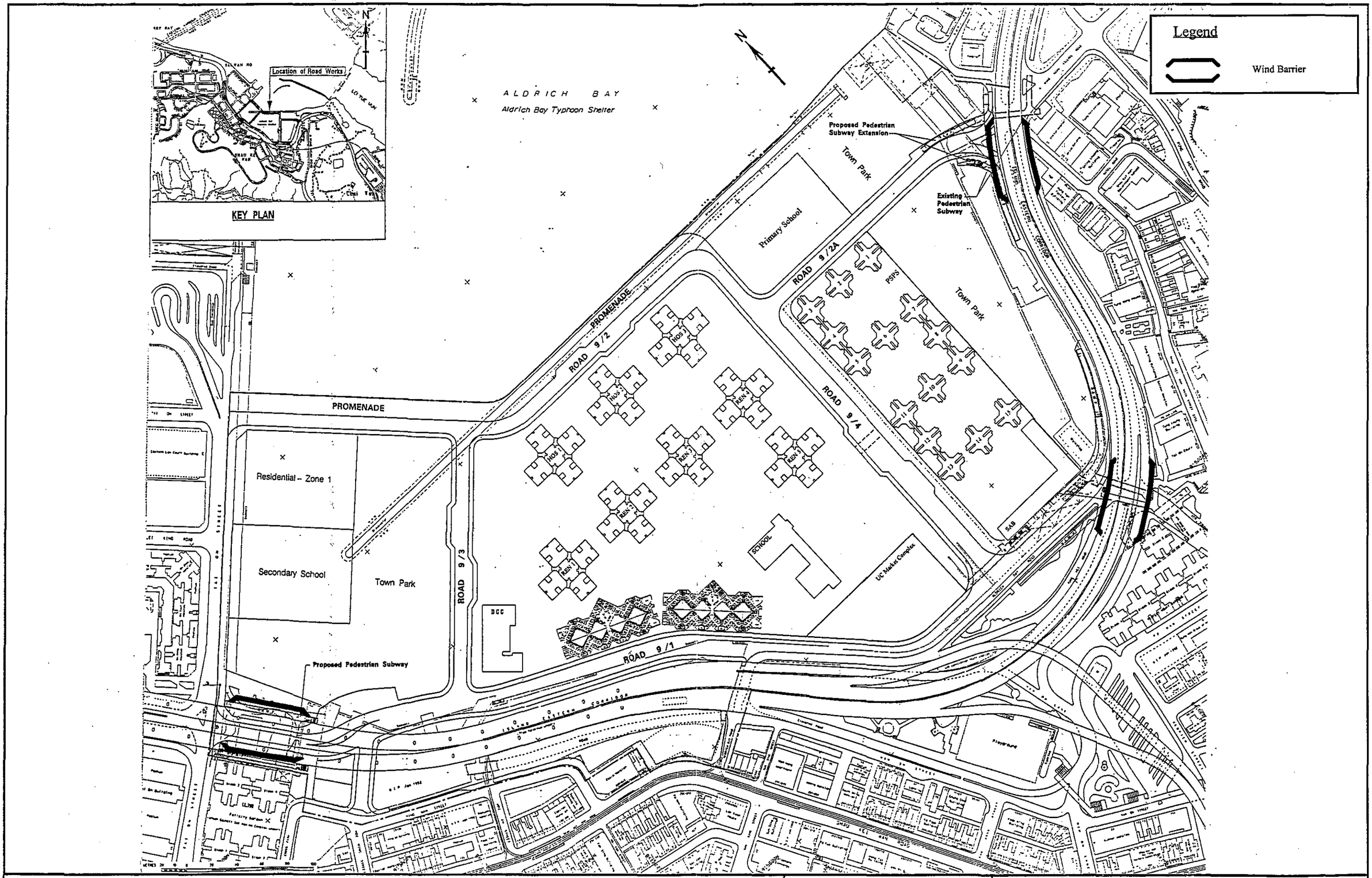
FRONT ELEVATION



ISOMETRIC VIEW

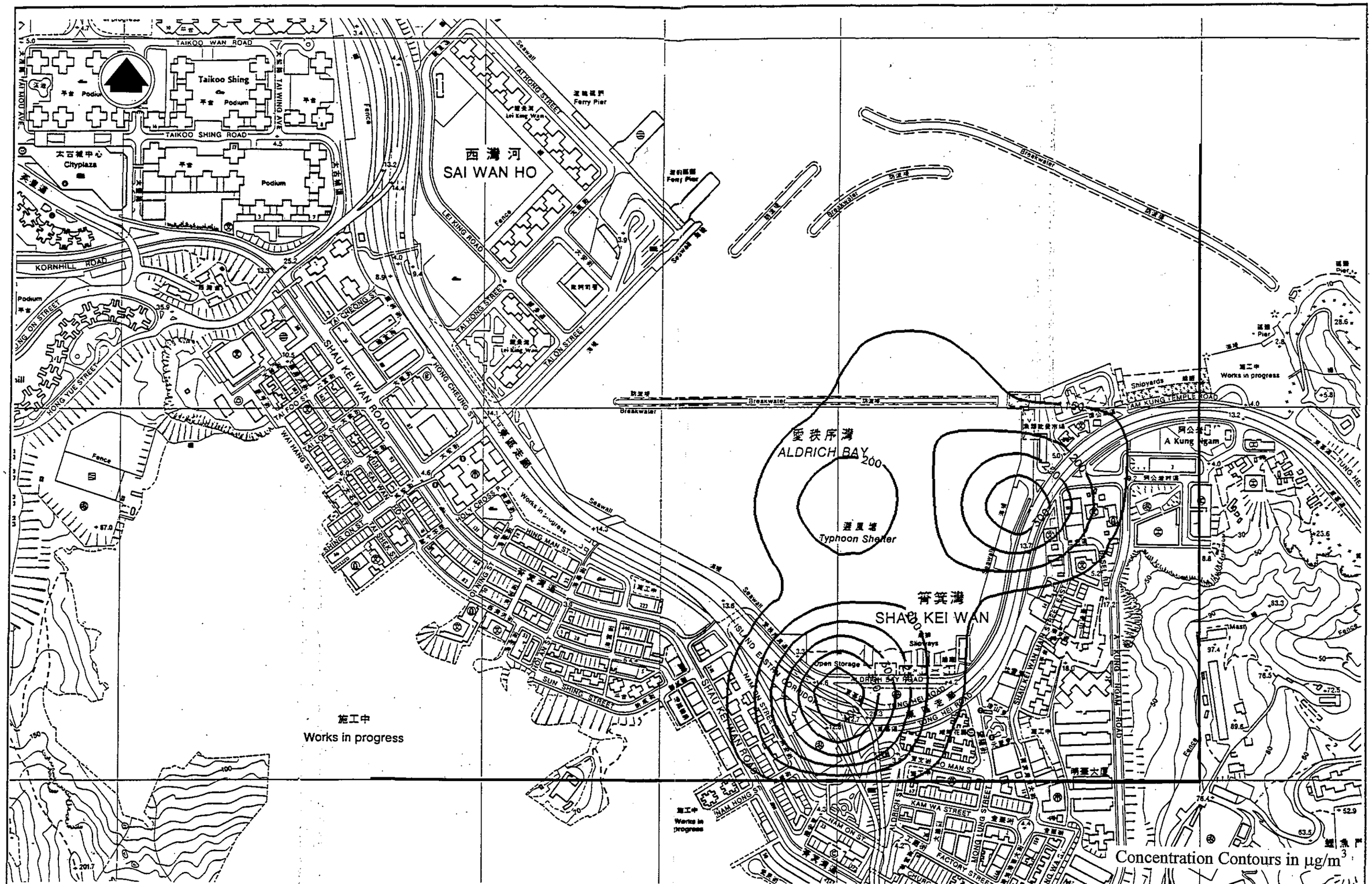
Project	AGREEMENT NO. CE31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY REGLAMATION - ENGINEERING WORKS"	**Figure**	5.1
		Scale	N.T.S
Title	Conceptual Design of Wind Barrier	**Date**	JAN. 1997

Environmental Assessment & Pollution control



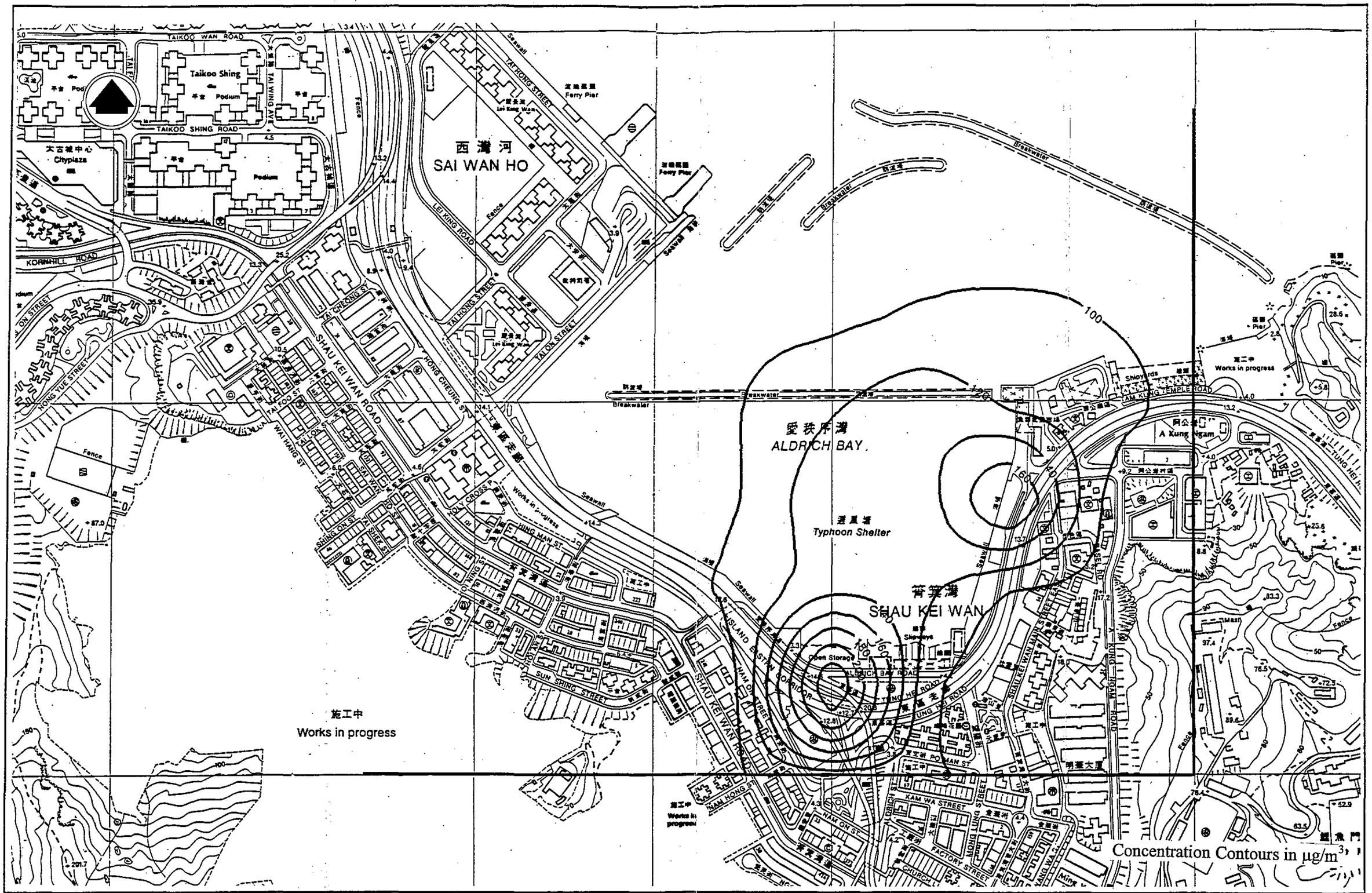
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.2
		Scale	As shown
Title	PROPOSED LOCATIONS OF WIND BARRIERS	**Date**	JAN. 1997

Environmental Assessment & Pollution control



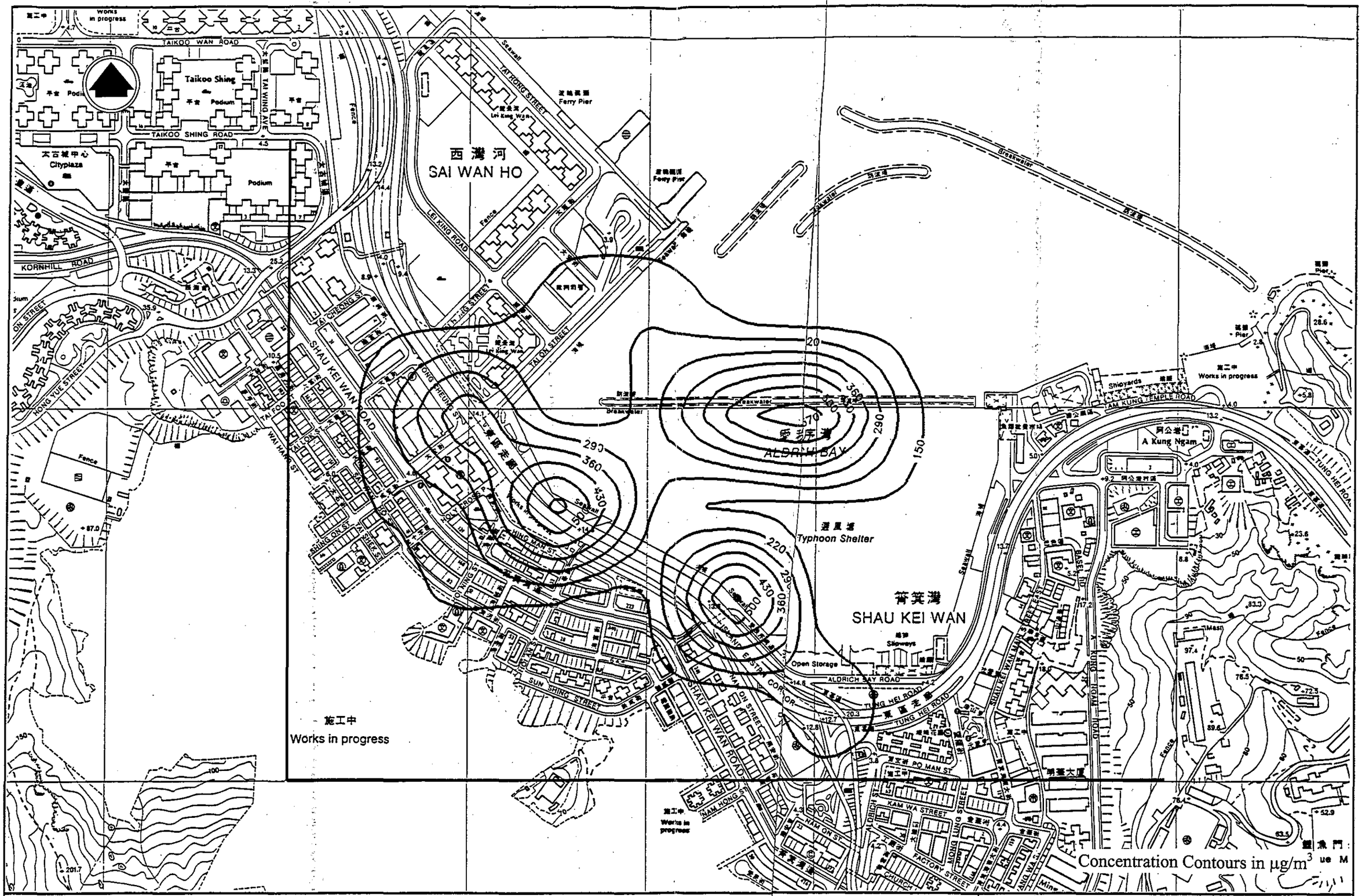
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	Figure	5.3
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m^3) DURING CONSTRUCTION - SECTION I (MITIGATED)	Scale	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



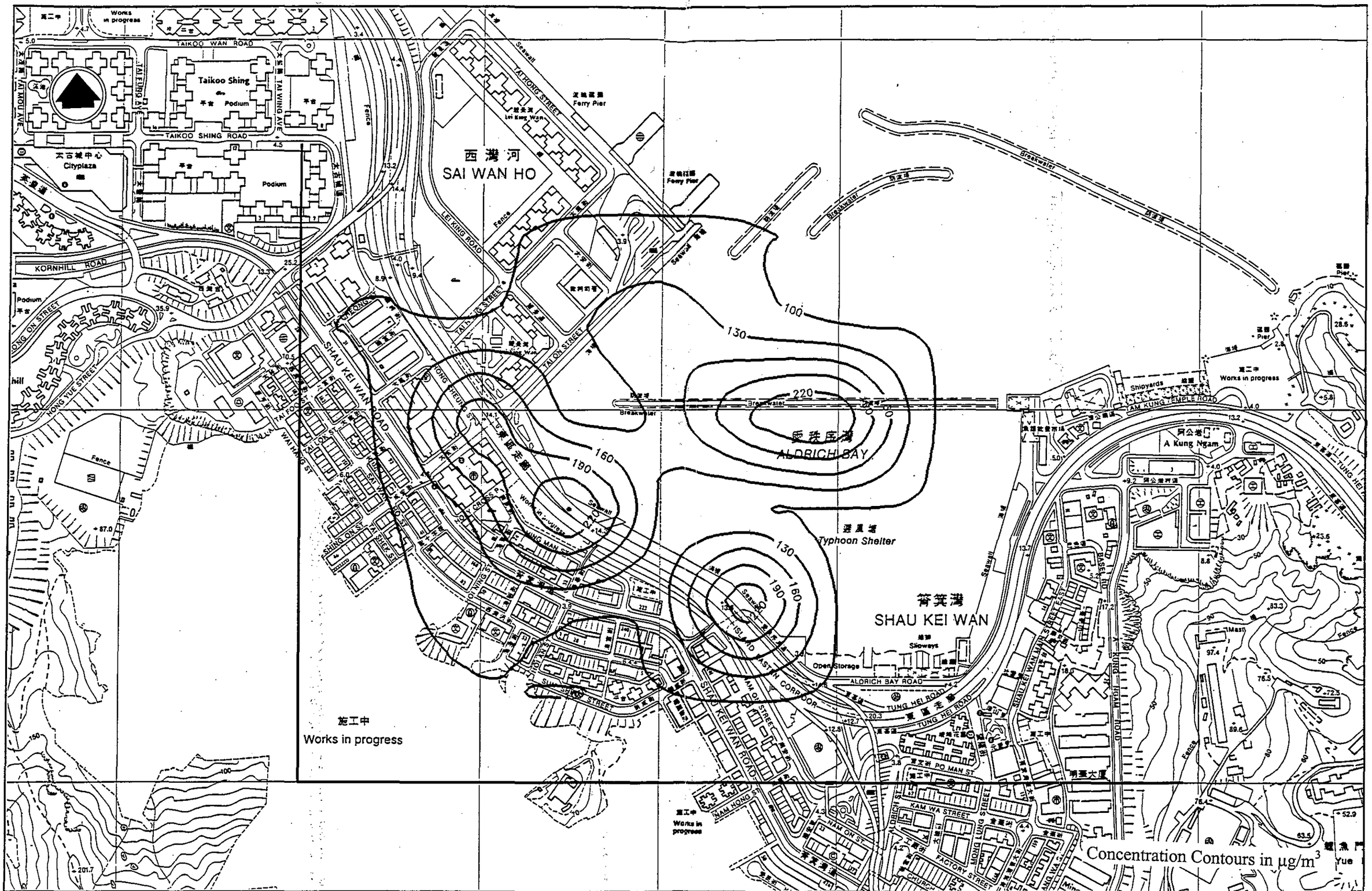
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.4
		Scale	1:5000
Title	DAILY AVERAGE TSP CONCENTRATIONS (µg/m³) DURING CONSTRUCTION - SECTION I (MITIGATED)	**Date**	JAN. 1997

Environmental Assessment & Pollution control



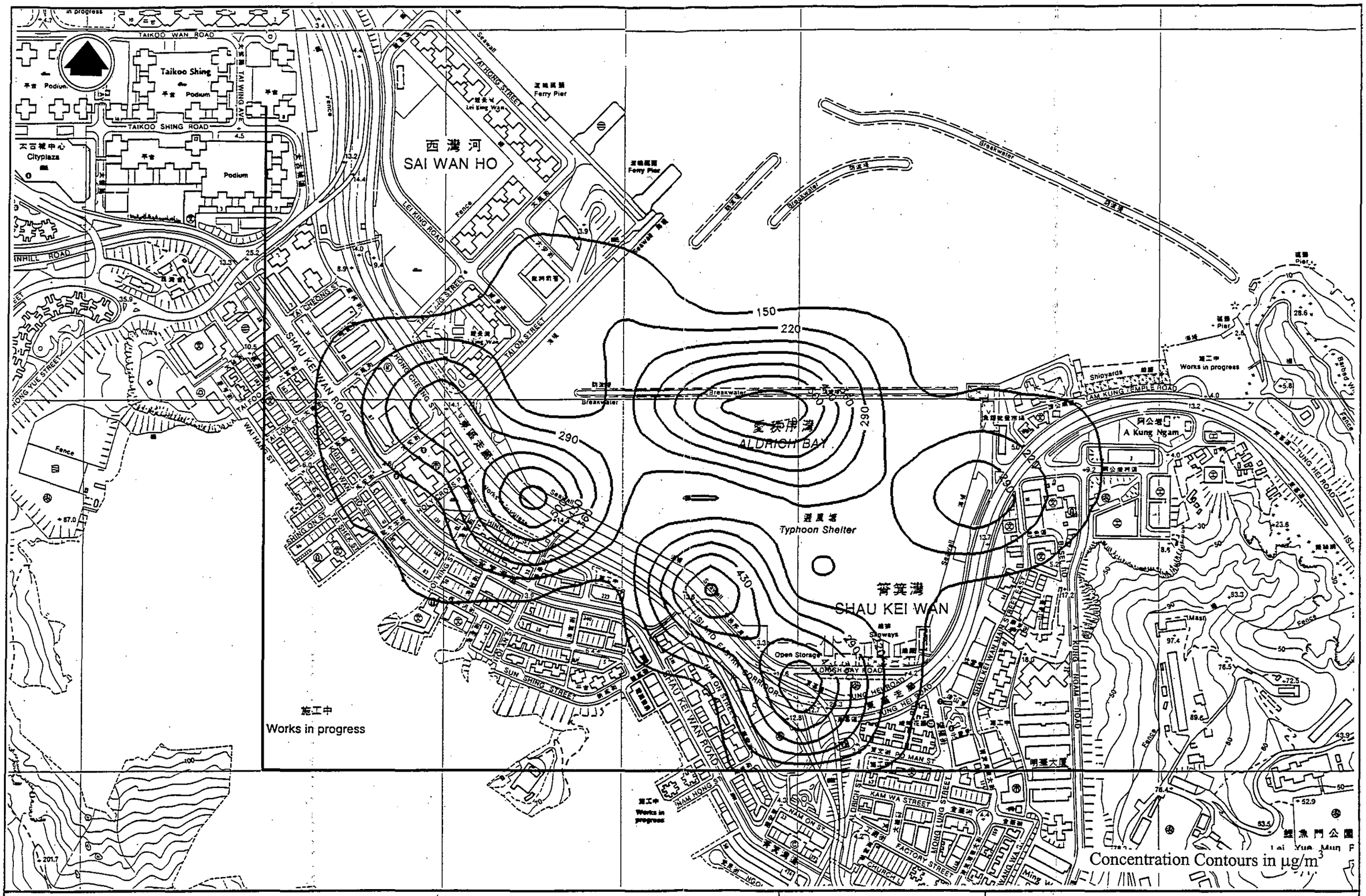
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m^3) DURING CONSTRUCTION - SECTION II (MITIGATED)
Figure	5.5
Scale	1:5000
Date	JAN. 1997

Environmental Assessment & Pollution control



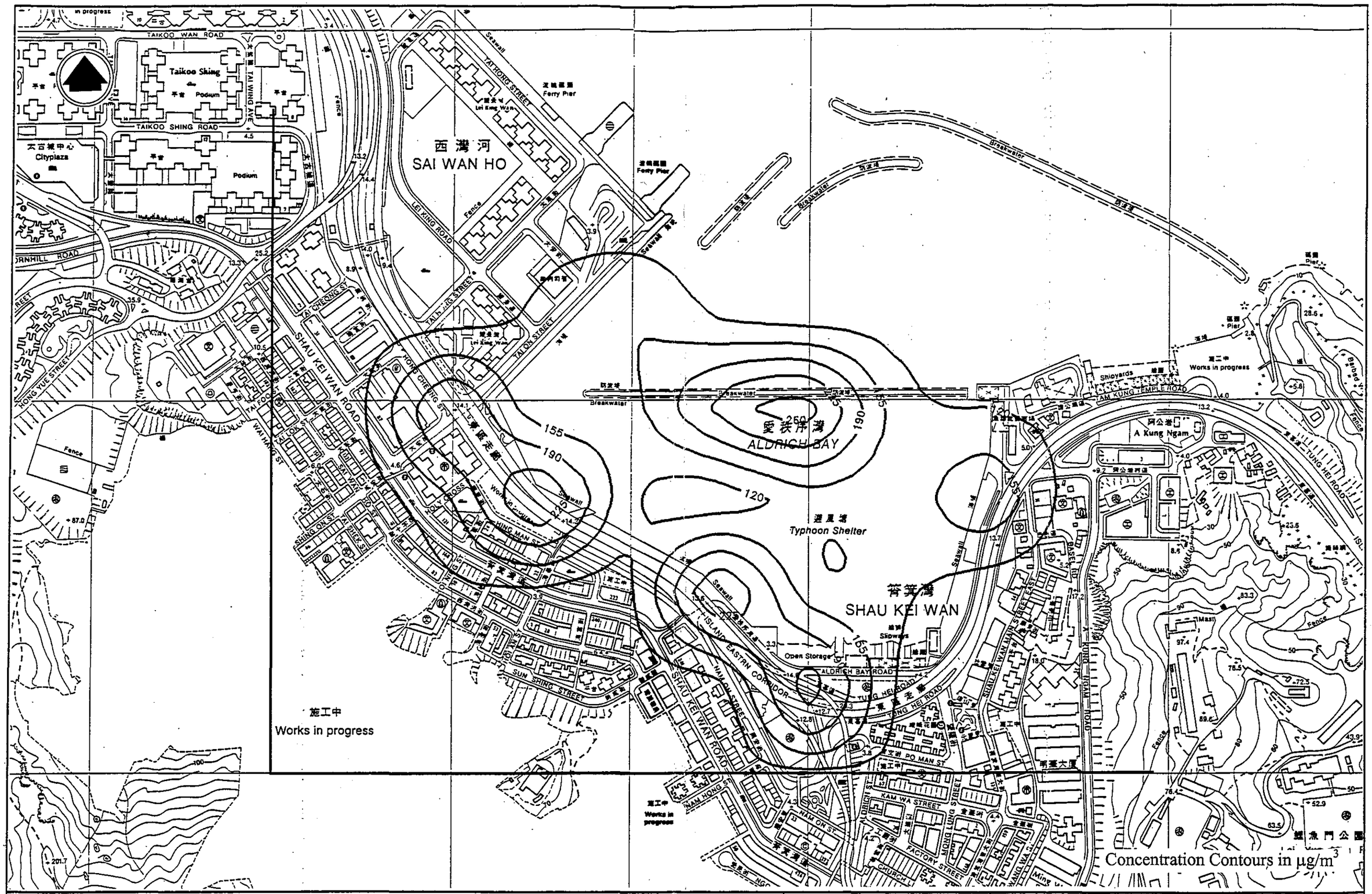
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.6
Title	DAILY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - SECTION II (MITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



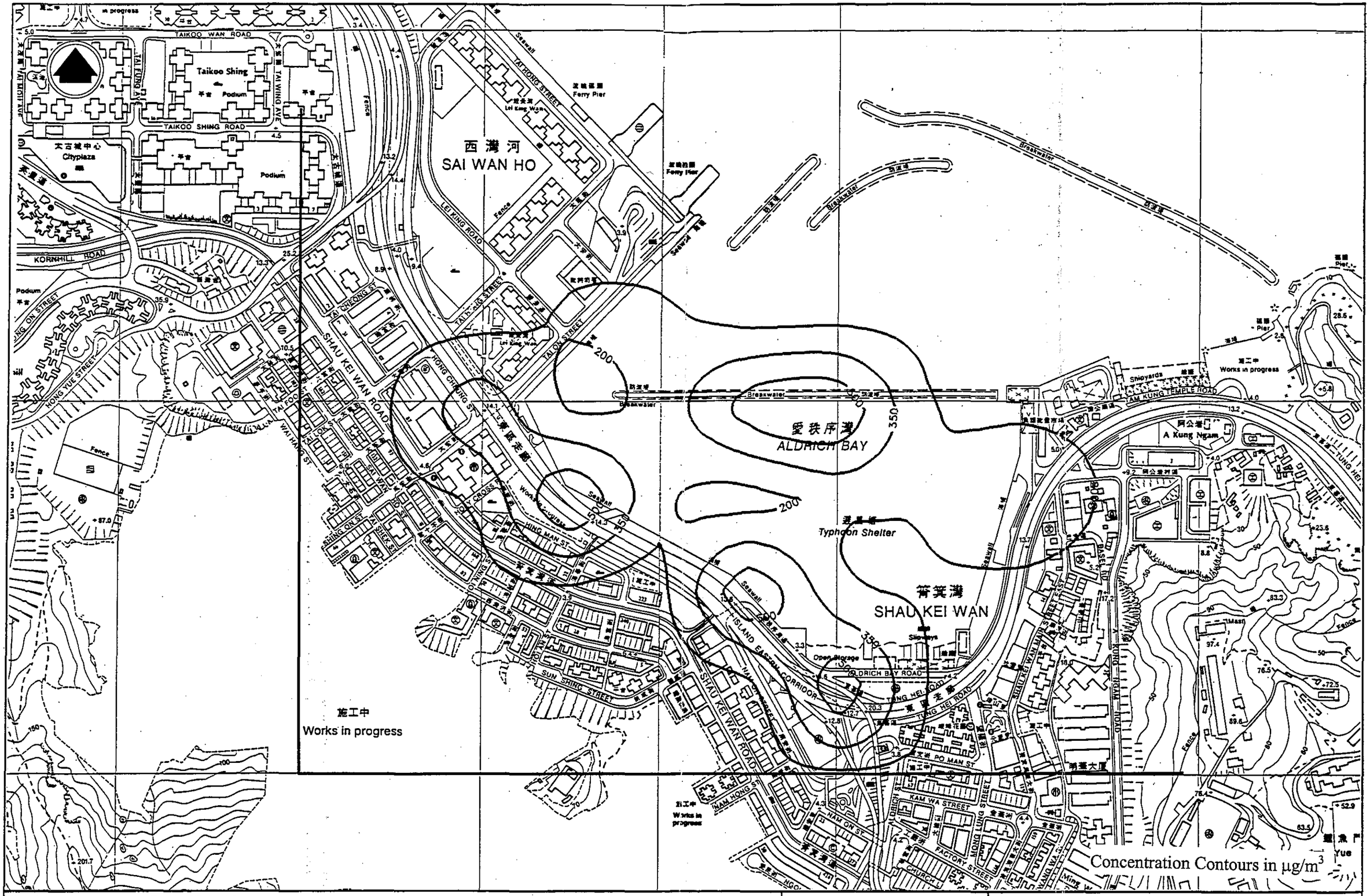
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.7
		Scale	1:5000
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - ALL SECTIONS OF WORKS (MITIGATED)	**Date**	JAN. 1997

Environmental Assessment & Pollution control



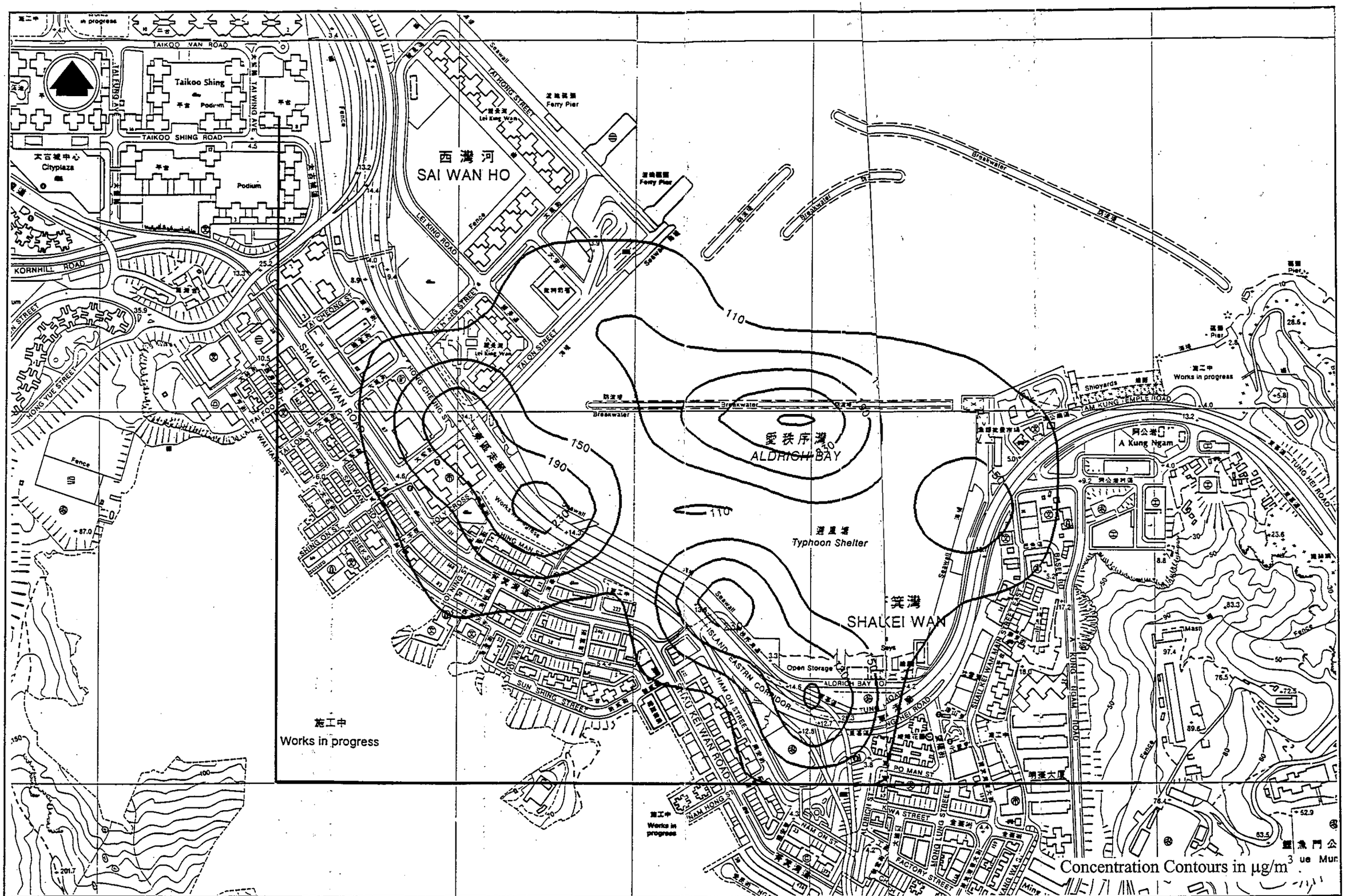
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.8
Title	DAILY AVERAGE TSP CONCENTRATIONS (μg/m^3) DURING CONSTRUCTION - ALL SECTIONS OF WORKS (MITIGATED)	**Scale**	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



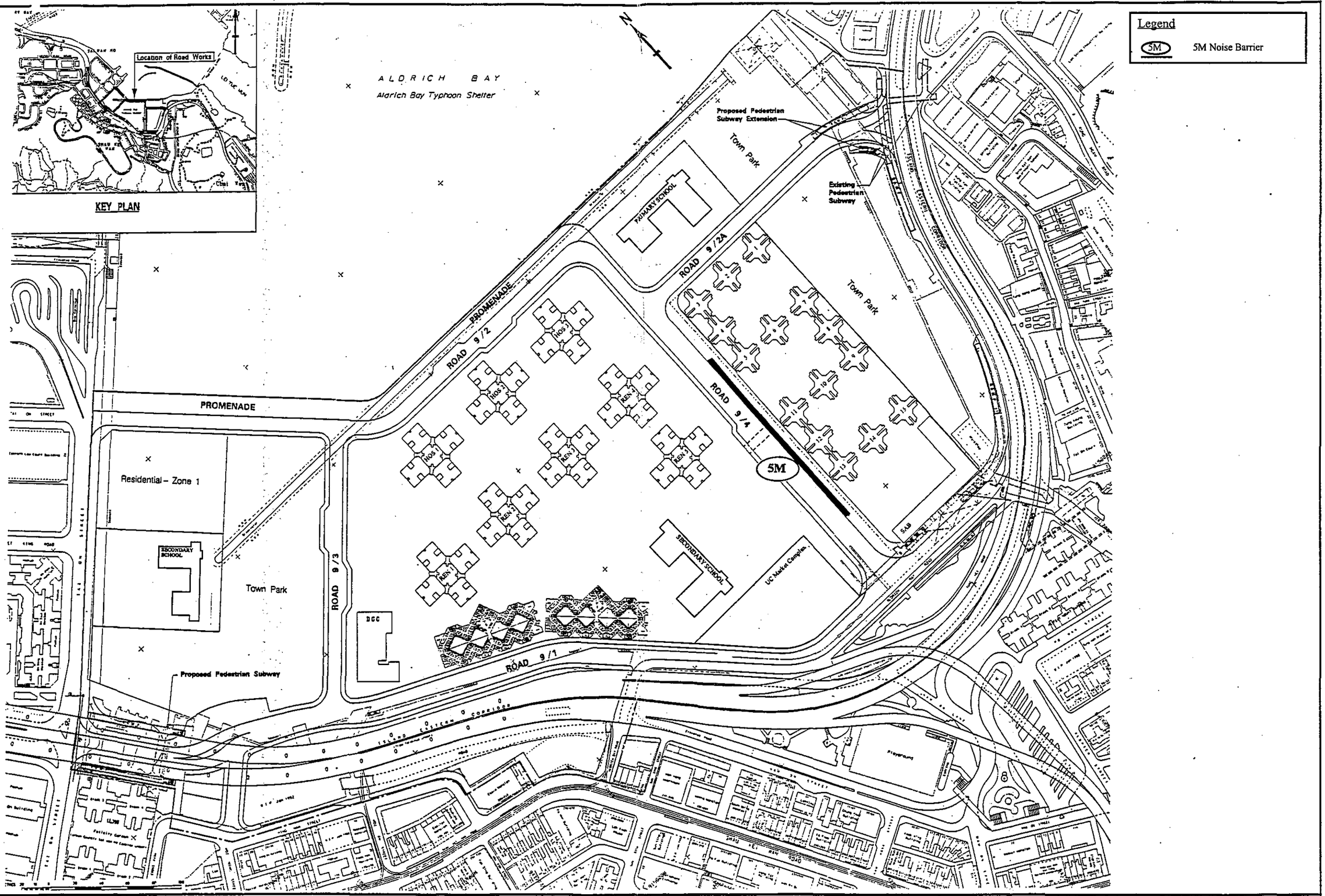
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	Figure	5.9
Title	HOURLY AVERAGE TSP CONCENTRATIONS (μg/m³) DURING CONSTRUCTION - ALL SECTIONS OF WORKS AND CONCURRENT PROJECT (MITIGATED)	Scale	1:5000
		Date	JAN. 1997

Environmental Assessment & Pollution control



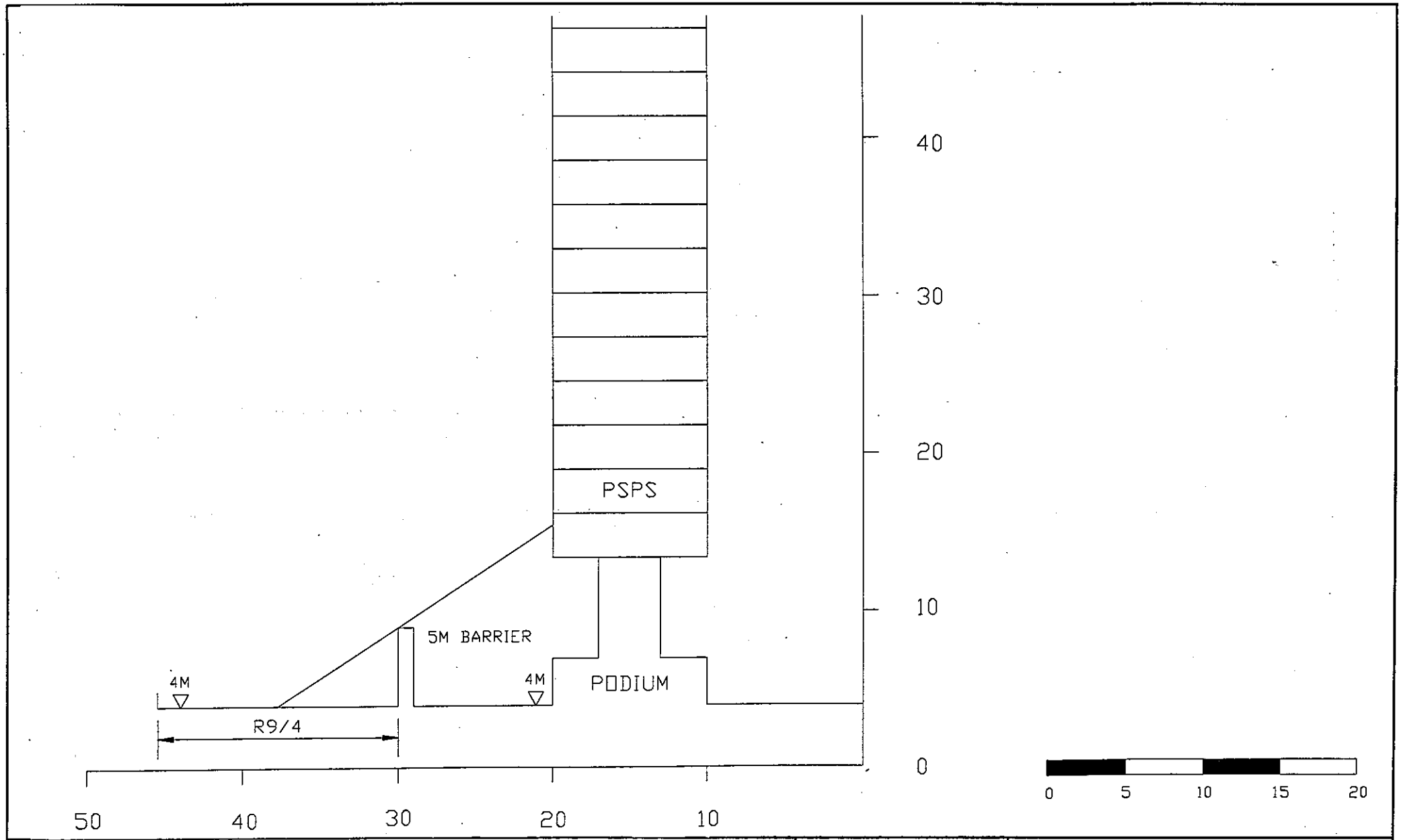
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.10
Title	DAILY AVERAGE TSP CONCENTRATIONS ($\mu g/m^3$) DURING CONSTRUCTION - ALL SECTIONS OF WORKS AND CONCURRENT PROJECT (MITIGATED)	**Scale**	1:5000
		Date	JAN. 97

Environmental Assessment & Pollution control



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.11
		Scale	As shown
Title	LOCATION OF 5M BARRIER - SCENARIO A	**Date**	JAN. 1997

Environmental Assessment & Pollution control



Project	AGREEMENT NO. CE31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
Title	SECTIONAL DRAWING
Figure	5.12
Scale	AS SHOWN
Date	JAN. 1997

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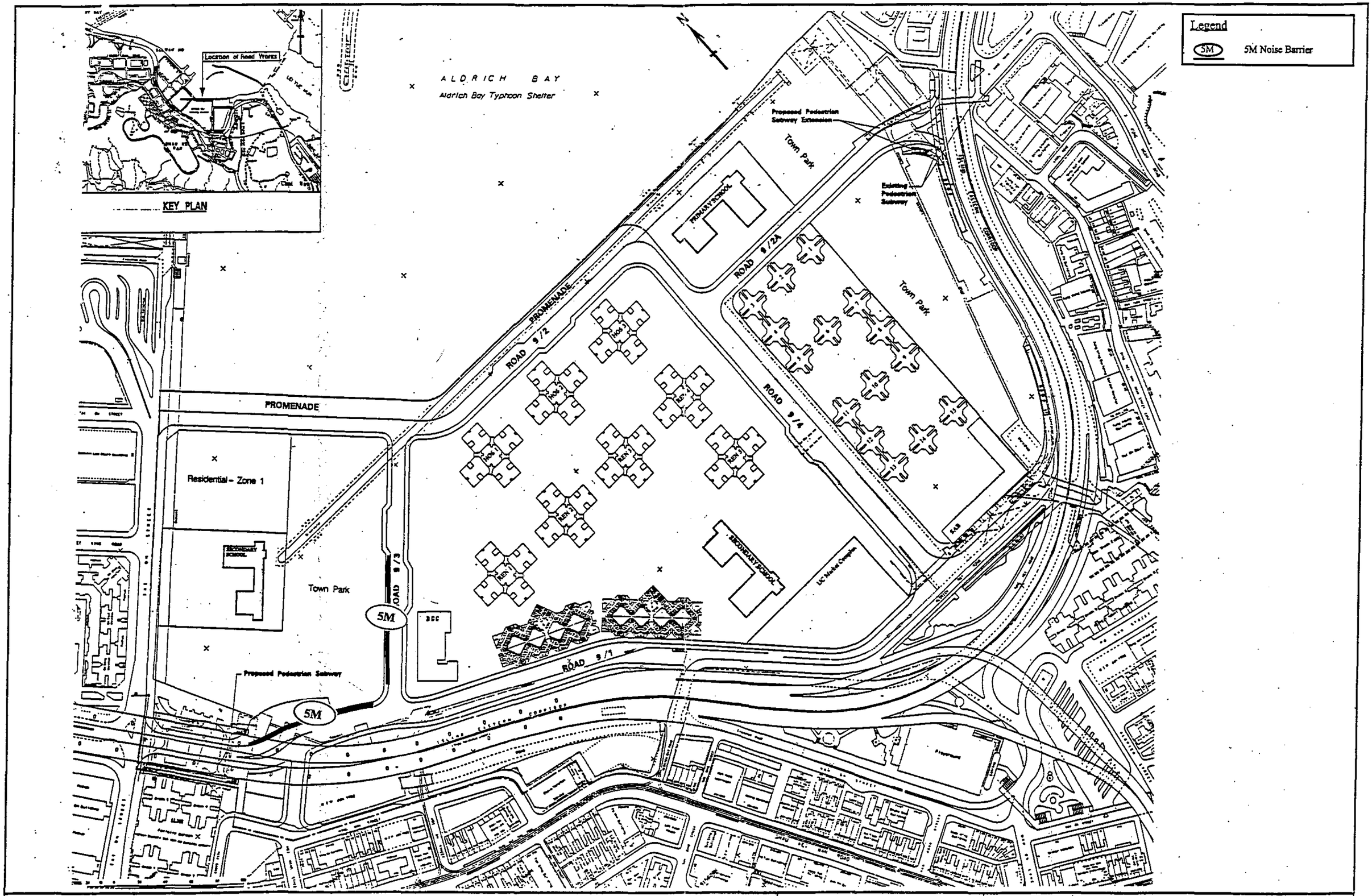
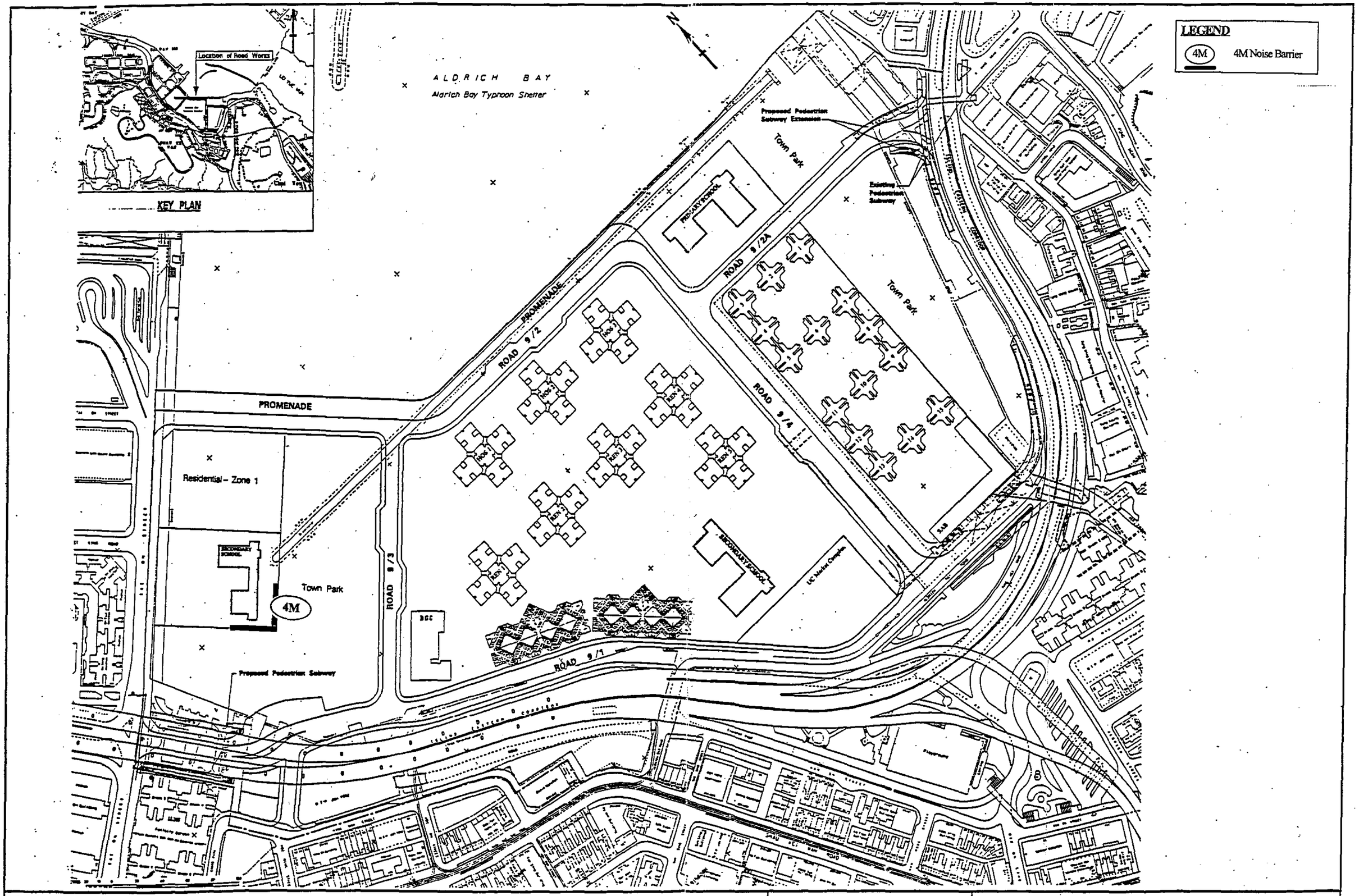


Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.13
Title	LOCATION OF 5M BARRIER - SCENARIO B(1)	**Scale**	As shown
		Date	JAN. 1997

Environmental Assessment & Pollution control

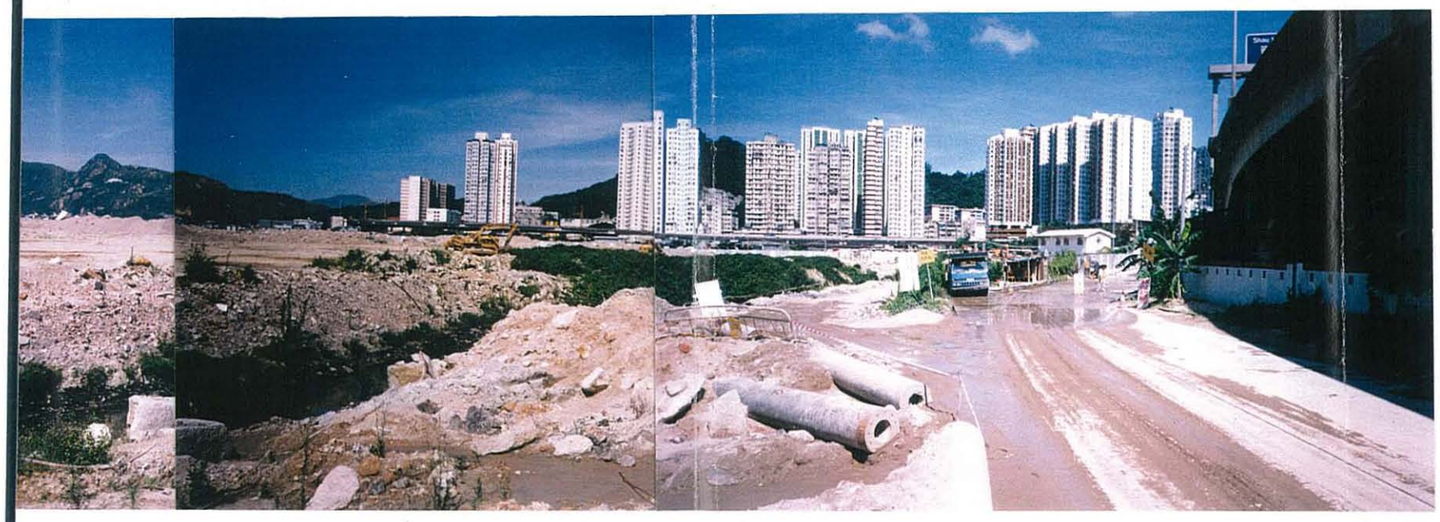


Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	5.14
		Scale	As shown
Title	LOCATION OF 5M BARRIER - SCENARIO B(2)	**Date**	JAN. 1997

Environmental Assessment & Pollution control

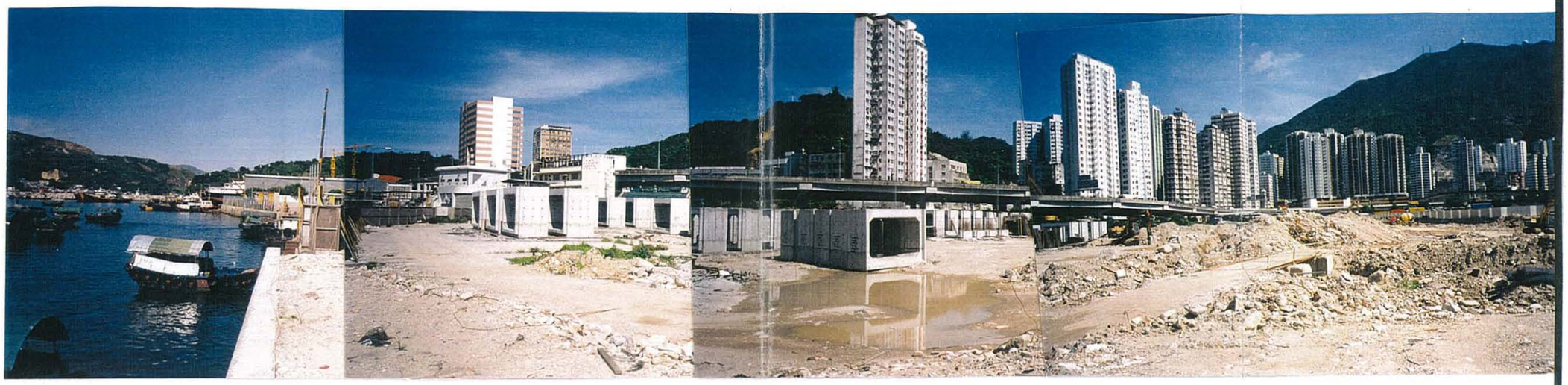
CUT LINE

CUT LINE



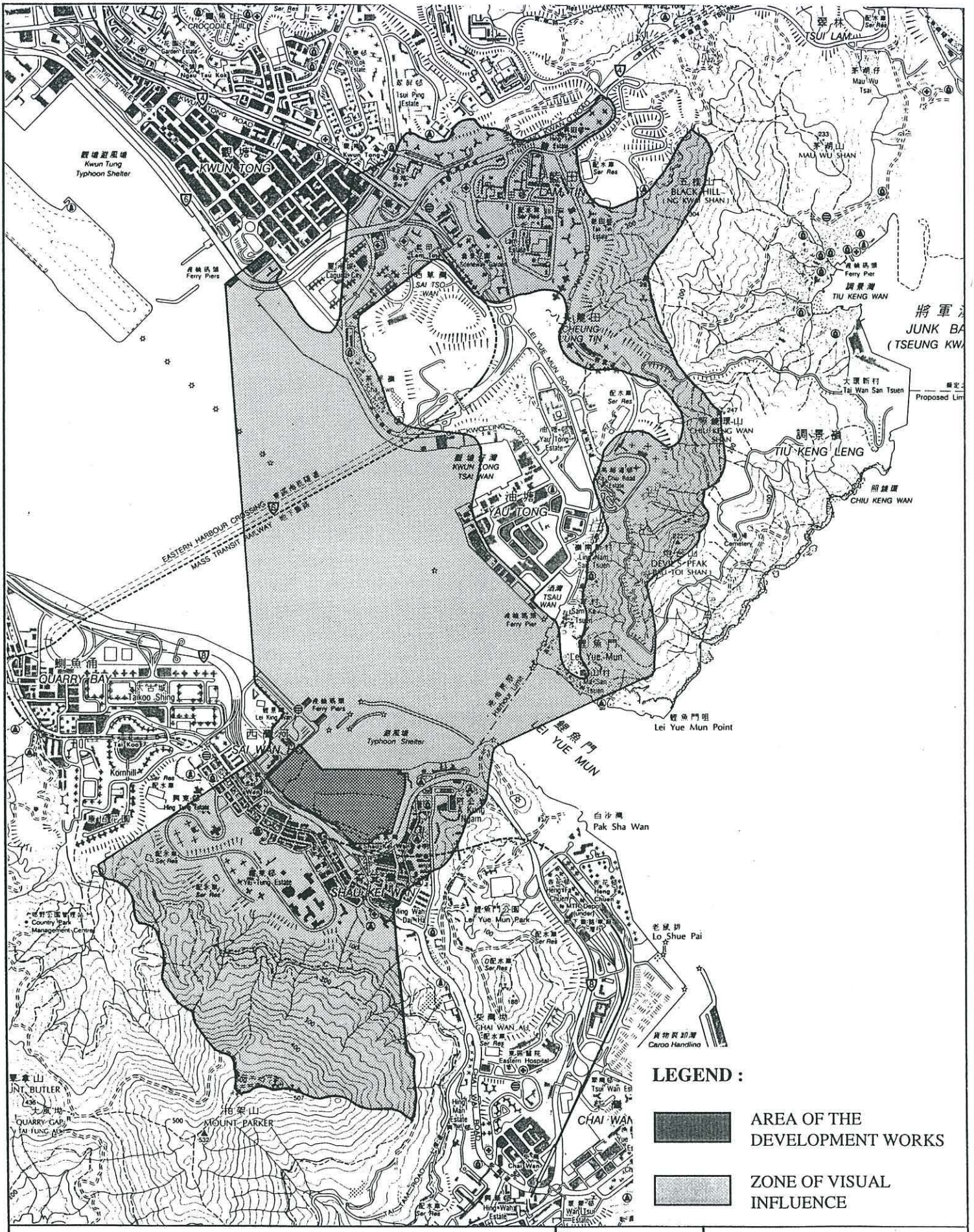
Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure** 6.1	
Title	PANORAMIC PHOTOGRAPH OF SITE	**Scale**	
		Date DEC. 1996	*Environmental Assessment & Pollution control*

CUT LINE



CUT LINE

Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure** 6.2	*Environmental Assessment & Pollution control*
Title	PANORAMIC PHOTOGRAPH OF SITE	**Scale**	
		Date DEC. 1996	



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	6.3
		Scale	NTS
Title	ZONE OF VISUAL INFLUENCE	**Date**	JAN. 1997

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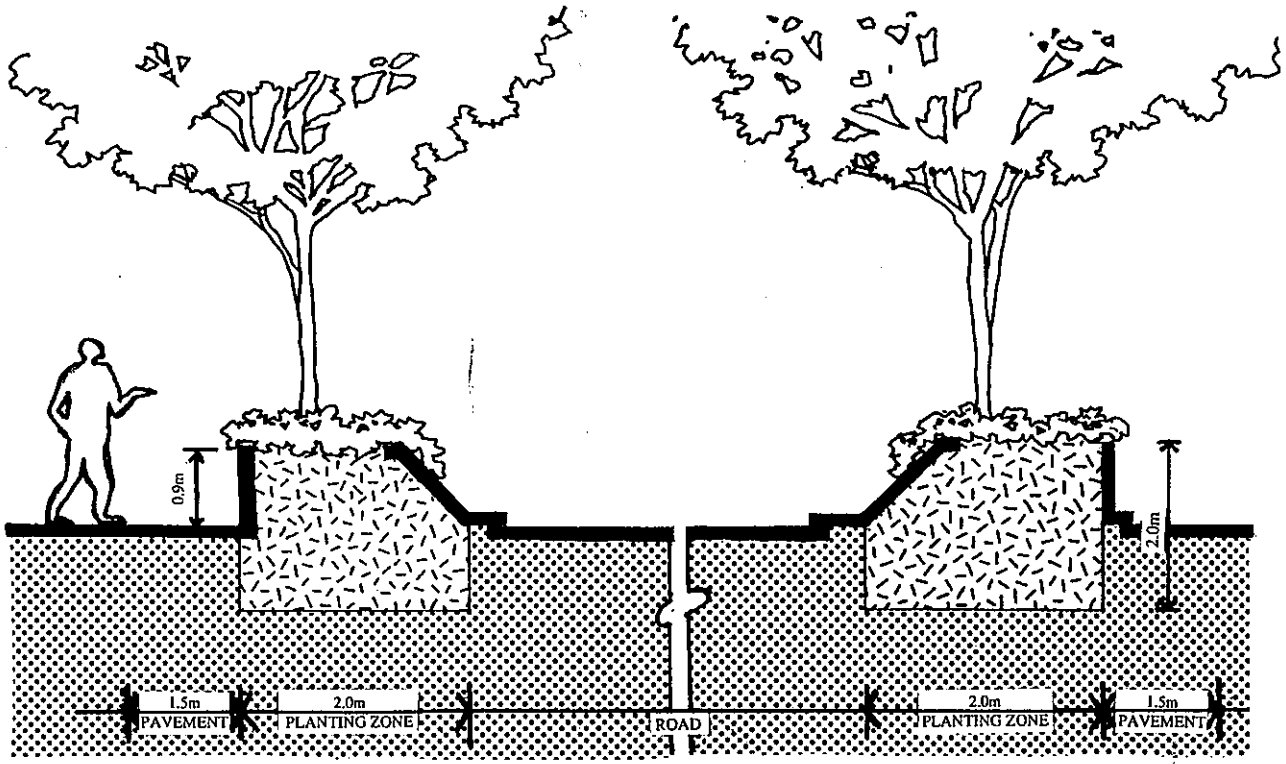
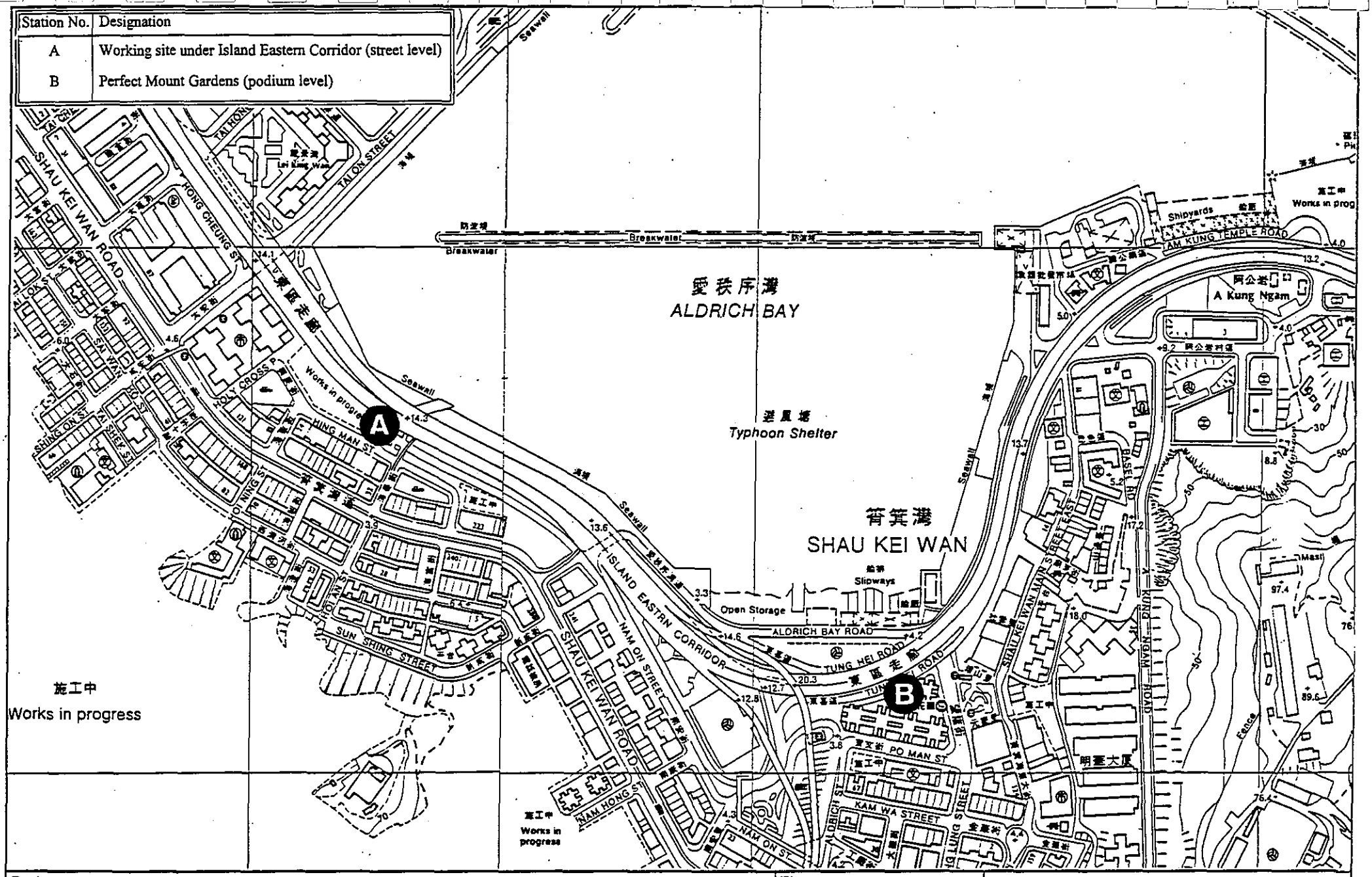
Environmental Assessment & Pollution Control



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"	**Figure**	6.4
Title	TYPICAL LANDSCAPE TREATMENT FOR LOCAL ROADS WITHIN RECLAMATION AREA	**Scale**	1:100
		Date	JAN. 1997

Environmental Assessment & Pollution Control

Station No.	Designation
A	Working site under Island Eastern Corridor (street level)
B	Perfect Mount Gardens (podium level)



Project	AGREEMENT NO. CE 31/95 ENVIRONMENTAL IMPACT ASSESSMENT STUDY FOR PWP ITEM NO. 437CL: "ALDRICH BAY RECLAMATION - ENGINEERING WORKS"
Title	LOCATIONS OF AIR AND NOISE MONITORING STATIONS
Figure	7.1
Scale	1 : 5000
Date	JAN. 1997

Environmental Assessment & Pollution control

APPENDIX A

APPENDIX A SAMPLE CALCULATION FOR CONSTRUCTION NOISE

$$SPL_{NSR} = SWL_t - 20\log r - 11 + D + C_f$$

where SPL_{NSR} = Sound Power Level at noise sensitive facade, dB(A)
SWL_t = Total Sound Power Level of Powered Mechanical Equipment at Notional position, dB(A)
r = Intervening Distance, m
D = Directivity factor, 3 dB(A)
C_f = Facade Correction, 3 dB(A)

For the worst scenario,

At NSR PMGA, r = 76 m

SWL of Earthworks = 119 dB(A)

Construction Noise Level at PMGA due to Earthworks = 76 dB(A)

SWL of Piling = 122 dB(A)

Construction Noise Level at PMGA due to Piling = 82 dB(A)

Total Construction Noise Level = 83 dB(A)

APPENDIX B RECOMMENDED POLLUTION CONTROL CONDITIONS FOR CONSTRUCTION CONTRACTS

1. AVOIDANCE OF NUISANCE

(a) All works are to be carried out in such a manner as to cause as little inconvenience as possible to nearby residents, property and to the public in general, and the Contractor shall be held responsible for any claims which may arise from such inconvenience.

(b) The Contractor shall be responsible for the adequate maintenance and clearance of channels, gullies, etc., and shall also provide and maintain such pedestrian and vehicular access as shall be directed within the works site.

(c) Water shall be used to prevent dust rising and the Contractor shall take every precaution to prevent the excavated materials from entering into the public drainage system. The Contractor shall be responsible for any claims and demands arising out of any nuisance caused by such washing down of spoils.

(d) The Contractor shall carry out the Works in such a manner as to minimize adverse impacts on the environment during execution of the Works.

2. NOISE POLLUTION CONTROL

(a) The Contractor shall comply with and observe the Noise Control Ordinance and its subsidiary regulations in force in Hong Kong.

(b) The Contractor shall provide an approved integrating sound level meter to IEC 651:1979 (Type 1) and 804:1985 (Type 1) and THE manufacturer's recommended sound level calibrator for the exclusive use of the Engineer at all times. The Contractor shall maintain the equipment in proper working order and provide a substitute when the equipment are out of order or otherwise not available.

The sound level meter including the sound level calibrator shall be verified by the manufactures every two years to ensure they perform the same levels of accuracies as stated in the manufacturer's specifications. That is to say at the times of measurements, the equipment shall have been verified within the last two years.

(c) 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 07:00 to 19:00 hours on any day not being a general holiday (including Sundays), the following requirements shall also be complied with:

(i) The noise level measured at 1 m from the most affected external facade of the nearby noise sensitive receivers from the construction work alone during any 30 minute period shall not exceed an equivalent sound level (L_{eq}) of 75 dB(A).

(ii) The noise level measured at 1 m from the most affected external

facade of the nearby schools from the construction work alone during any 30 minute period shall not exceed an equivalent sound level (L_{eq}) of 70 dB(A) [65 dB(A) during school examination periods].

The Contractor shall liaise with the schools and the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.

(iii) Should the limits stated in the above sub-clauses (i) and (ii) 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.

(d) Before the commencement of any work, the Engineer may require the methods of working, equipment and sound-reducing intended to be used on the Site to be made available for inspection and approval to ensure that they are suitable for the project.

(e) The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.

The noise reduction methods shall include, but not be limited to, scheduling of works; Siting of facilities; selection of quiet equipment; and use of purpose-built acoustic panels and enclosures.

(f) The Contractor shall ensure that all plant and equipment to be used on site are properly maintained in good operating condition and noisy construction activities 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.

(g) Notwithstanding the requirements and limitations set out in clause (c) above and subject to compliance with clauses (e) and (f) 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 duration 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.

(h) No excavator mounted breaker shall be used within 125 m from any nearby noise sensitive receivers. The Contractor shall use hydraulic concrete crusher wherever applicable.

(i) The only equipment that shall be allowed on the Site for rock drilling works will be quiet drilling rigs with a sound power level not exceeding 110 dB(A). Conventional pneumatically driven drilling rigs are specifically prohibited.

APPENDIX B

(j) For the purposes of the above clauses, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, or performing arts centre or office building shall be considered a noise sensitive receiver.

(k) The Contractor shall, when necessary, apply as soon as possible for a construction noise permit in accordance with the Noise Control (General) Regulations, display the permit as required and copy to the Engineer.

3. DUST SUPPRESSION MEASURES

(a) The Contractor shall undertake at all times to prevent dust nuisance as a result of his activities. The air pollution control system installed shall be operated whenever the plant is in operation.

(b) The Contractor shall at his own cost, and to the satisfaction of the Engineer, install effective dust suppression equipment and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver the concentration of air-borne dust shall not exceed 0.5 milligrams per cubic meter, at standard temperature (25°C) and pressure (1.0 bar) averaged over one hour, and 0.26 milligrams per cubic metre, at standard temperature (25°C) and pressure (1.0 bar) averaged over 24 hours.

(c) In the process of material handling other than cement and the like, any material which has the potential to create dust shall be treated with water or spraying with wetting agent.

(d) Where dusty materials are being discharged to a vehicle from a conveying system at a fixed transfer point, a three-sided roofed enclosure with a flexible curtain across the entry shall be provided. Exhaust should be provided for this enclosure and vented to a fabric filter system.

(e) Any vehicle with an open load carrying area used for moving materials which have the potential to create dust shall have properly fitting side and tail boards. Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300 mm over the edges of the side and tail boards.

(f) Stockpiles of sand and aggregate greater than 20 m^3 shall be enclosed on three sides, with walls extending above the pile and 2 metres beyond the front of the pile. In addition, water sprays shall be provided and used, both to dampen stored materials and when receiving raw material.

(g) The Contractor shall frequently clean and water the site to minimize the fugitive dust emissions.

(h) The Contractor shall restrict all motorized vehicles to a maximum speed of 8 km per hour and confine haulage and delivery vehicles to designated roadways inside the site. Areas of roadway longer than 100 m where movement of motorized vehicles exceeds 100 vehicular movements per day, or as directed by the Engineer, shall be furnished with a flexible pavement surfacing.

(i) Wheel washing facilities shall be installed and used by all vehicles leaving the site. No earth, mud, debris, dust and the like shall be deposited on public roads. Water in the wheel cleaning facility shall be changed at frequent intervals and sediments shall be removed regularly. The Contractor shall submit details of proposals for the wheel cleaning facilities to the Engineer prior to construction of the facility. Such wheel washing facility shall be usable prior to the commencement of any earthworks excavation activity on the Site. The Contractor shall also provide a hard-surfaced road between the washing facility and the public road.

(j) Conveyor belts shall be fitted with windboards, and conveyor transfer points and hopper discharge areas shall be enclosed to minimize emission of dust. All conveyors carrying materials which have the potential to create dust shall be totally enclosed and fitted with belt cleaners.

4. CONSENT TO EQUIPMENT AND PROCESSES

(a) The Contractor shall not install any furnace, boiler or other plant or equipment or use any fuel that might in any circumstance produce smoke or any other air pollution without the prior consent of the Engineer. Unless specifically instructed by the Engineer, the Contractor shall not light fires on site for the burning of debris or any other matter.

(b) The Contractor's attention is drawn to the Air Pollution Control Ordinance and its subsidiary legislation, particulary the Air Pollution (Furnaces, Ovens and Chimneys) (Installation and Alteration) Regulations and the Air Pollution Control (Smoke) Regulations.

5. REMOVAL OF WASTE MATERIAL

(a) The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the site onto any adjoining land or allow any waste matter or refuse to be deposited anywhere within the Site or onto any adjoining land and shall have all such matter removed from the Site.

(b) The Contractor shall be liable for any damages caused to adjoining land through his failure to comply with clause 5(a).

(c) The Contractor shall be responsible for temporary training, diverting or conducting of open streams or drains intercepted by any works and for reinstating these to their original courses on completion of the Works.

(d) The Contractor shall be responsible for adequately maintaining any existing site drainage system at all times, including removal of solids in sand traps, manholes and stream beds.

(e) Any proposed stream course and nullah temporary diversions shall be submitted to the Engineer for agreement one month prior to such diversion works being commenced. Diversions shall be constructed to allow the water flow to discharge without overflow, erosion or washout. The area through which the temporary diversion runs is to be reinstated to its original condition

or as agreed by the Engineer after the permanent drainage system has been completed.

(f) The Contractor shall furnish, for the Engineer's information, particulars of the Contractor's arrangements for ensuring that material from any earthworks does not wash into the drainage system. If at any time such arrangements prove to be ineffective the Contractor shall take such additional measures as the Engineer shall deem necessary and shall remove all silt which may have accumulated in the drainage system whether within the Site or not.

(g) The Contractor shall segregate all inert construction waste material suitable for reclamation or land formation and shall dispose of such material at such public dumping area(s) as may be specified from time to time by the Director of Civil Engineering Services.

(h) All non-inert construction waste material deemed unsuitable for reclamation or land formation and all other waste material shall be disposed of at a public landfill.

(i) The Contractor's attention is drawn to the Waste Disposal Ordinance, the Public Health and Municipal Services Ordinance, and the Water Pollution Control Ordinance.

6. DISCHARGE INTO SEWERS AND DRAINS

(a) The Contractor shall not discharge directly or indirectly (by runoff) or cause or permit or suffer to be discharged into any public sewer, storm-water drain, channel, stream-course or sea any effluent or foul or contaminated water or cooling or hot water without the prior consent of the Engineer who may require the Contractor to provide, operate and maintain at the Contractor's own expense, within the premises or otherwise, suitable works for the treatment and disposal of such effluent or foul or contaminated or cooling or hot water. The design of such treatment works shall be submitted to the Engineer for approval not less than one month prior to the commencement of construction or as agreed by the Engineer.

(b) If any office, site canteen or toilet facilities are erected, foul water effluent shall be directed to a foul sewer or to a sewage treatment facility either directly or indirectly by means of pumping or other means approved by the Engineer.

(c) The Contractor's attention is drawn to the Buildings Ordinance and to the Water Pollution Control Ordinance.

7. GENERAL PROCEDURES FOR THE AVOIDANCE OF POLLUTION DURING DREDGING TRANSPORTING AND DUMPING

(a) All Contractor's equipment shall be designed and maintained to minimise the risk of silt and other contaminants being released into the water column or deposited in other than designated locations.

(b) Pollution avoidance measures shall include but not be limited to the following:

(i) Mechanical grabs shall be designed and maintained to avoid spillage and seal tightly while being lifted;

(ii) Cutterheads of suction dredgers shall be suitable for the material being excavated and designed to minimise overbreak and sedimentation around the cutter;

(iii) Where trailing suction hopper dredgers for dredging of marine mud are in use, overflow from the dredger and the operation of lean mixture overboard systems shall not be permitted, unless expressly approved by the Engineer in consultation with Environmental Protection Department;

(iv) All vessels shall be sized such that adequate clearance is maintained between vessels and the seabed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash;

(v) All pipe leakages are to be repaired promptly and plant is not to be operated with leaking pipes;

(vi) Marine works shall cause no visible foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site or dumping grounds;

(vii) Barges and hopper dredgers shall be fitted with tight-fitting seals to their bottom openings to prevent leakage of material;

(viii) Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved;

(ix) Loading of barges and hoppers shall be controlled to prevent splashing of dredged material into the surrounding water, and barges or hoppers shall not be filled to a level that will cause overflowing of material or polluted water during loading or transportation; and

(x) Adequate freeboard shall be maintained on barges to ensure that decks are not washed by wave action.

(8) SPECIAL PROCEDURES FOR THE AVOIDANCE OF POLLUTION DURING DREDGING, TRANSPORTATION AND DISPOSAL OF DESIGNATED CONTAMINATED MARINE MUD

(a) Uncontaminated mud shall not be dumped other than in dumping grounds as may be approved for the purpose by the Director of Environmental Protection and in accordance with the Dumping at Sea Act (Overseas Territories) Order 1975. Contaminated mud shall not be dumped in gazetted dumping grounds. If it cannot be left in situ, it should be disposed of by specific methods as directed by the Director off Environmental Protection. The Contractor shall be responsible for obtaining all necessary licences for these operations.

Notes: The Engineer shall ensure that the Contractor has access to Works Branch Technical Circular No. 22/92 "Marine Disposal of Dredged Mud"; EPD Technical Circular No. 1.1.92 "Classification of Dredged Sediments for

Marine Disposal "; and Fill Management Committee Paper FMC/58 (6. 10. 92) "General Allocation Conditions for Marine Borrow Areas and Mud Disposal Sites".

(b) When dredging, transporting and disposing of designated contaminated marine mud, the Contractor shall implement additional special procedures for the avoidance of pollution which shall include but not be limited to be following:

(i) Dredging of designated contaminated marine mud shall only be undertaken by a suitable grab dredger using a closed watertight grab; and

(ii) Transport of designated contaminated marine mud shall be by split barge of not less than 750 m^2 capacity well maintained and capable of rapid opening and discharge at the disposal site.

(iii) Discharge from split barges shall be placed in the designated special dumping pit by bottom dumping, at a location within the pit to be specified, from time to time, by the Secretary of the Fill Management Committee (FMC) and Geotechnical Engineering Office of Civil Engineering Department;

(iv) The dumping vessel shall be stationary throughout the dumping operation, discharges shall be undertaken rapidly, and the hoppers shall then immediately be closed; any material adhering to the sides of the hopper shall not be washed out of the hopper and the hopper shall remain closed until the barge next returns to the disposal site;

(v) Any substance which is found dumped by the Contractor outside the designated dumping ground shall be removed; and

(vi) Providing and maintaining functional marker buoys at the corners of the pit.

(c) <u>Silt Curtains</u>

(i) The Contractor will be responsible for designing, agreeing with the Engineer, and installing silt curtains where required to achieve the water quality requirements and the protection of water quality at any water intakes;

(ii) Silt curtains shall be formed from tough, abrasion-resistant permeable membranes suitable for the purpose, supported on floating booms in such a way as to ensure that the ingress of turbid waters to the enclosed water shall be restricted;

(iii) The boom of the curtain shall be formed and installed in such a way that tidal rise and fall are accommodated and that the ingress of turbid waters is limited. The removal and reinstallation of such curtains during typhoon conditions shall be as agreed with the Director of Marine; and

(iv) The Contractor shall regularly inspect the silt curtains and shall ensure that they are adequately moored and marked to avoid danger to marine traffic.

9. PREVENTION OF EROSION

Sections of permanent cut slope excavation at final cut face grade larger than 100 sq.m. shall be hydroseeded within one week of completion or as agreed by the Engineer.

APPENDIX C

APPENDIX C SAMPLE CALCULATION FOR MITIGATION OF CONSTRUCTION NOISE

In order to reduce the maximum anticipated construction noise to an acceptable level, the following package of noise control measures could be used:

	Mitigation Measures	*Anticipated Noise Reduction*
A.	Fit more efficient exhaust or sound reduction equipment, and keep closed the machine's enclosure panels	10 dB(A)
B.	Erect inverted-L acoustic barrier between the equipment and NSRs, and locate the barrier right adjacent to the equipment	15 dB(A)
C.	Enclose the equipment in acoustic enclosure	20 dB(A)

The above measures are then applied to the construction equipment requirements for the noisiest construction activities, as indicated in Table C.1.

Table C.1 Mitigated Construction Activities

Noisiest Activity	Equipment	Mitigation	Mitigated SWL, dB(A) (Per piece)
Earthworks	Pneumatic breaker	C	90
	D8 Ripper/Dozer	A	105
	Dumptrucks	B	94
	Loader	B	95
	Vibrating Roller	A	94
	D4 Dozer	B	105
Piling	Bored piling rigs	A	105
	Mobile cranes	B	101
	Pump trucks	B	94
	Concrete mixer trucks	B	92
	Vibratory pokers	C	92

APPENDIX D

APPENDIX D RESPONSES TO COMMENTS

COMMENTS	RESPONSES
Water Supplies Department Ref. (2) in WSD (HK) 1743/595/96 Pt(2) No comments.	 Noted.
Territory Development Department, HK Ref. ( ) i HKI 2/1/88 No specific comment on the draft EIA Report and Draft EM&A Manual.	 Noted.
Highways Department Ref. (65) in STR 5/12/26 As regards the paragraph 5.2.5 of the draft EIA Report - mitigation scenarios C, we can say that we are not aware of any feasibility study of installing noise mitigation measure on the existing IEC. Besides, we have no other comments on the reports as far as structural viewpoint is concerned.	 Noted. Mitigation scenario C has been deleted.
Drainage Services Department Ref. (20) in DSD HK 8/CE 3195 (a) Section 5.1, P22, para.(3) - 'Appendix D'is missing; (b) Appendix C, Condition 1(c) - please add the last sentence 'The Contractor shall be held responsible for any claims and demands arising out of any nuisance caused by such washing down of spoils'; (c) As regards the EM&A Manual, I have no comment to offer.	 Appendix D has been added. The text has been appended. Noted.

COMMENTS	RESPONSES
Highways Department Ref. ( ) in HYD T 12/6/97 To make the coverage of the Project Description more complete, I suggest to revise para. 2.1 Proposed Engineering Works as follows: (a) ...drainage works and associated roadside landscape works. (b) ...two bridges and associated landscape works.	Text has been amended.
Fire Services Department Ref. (26) in FSD 1/792/94 III (i) The construction of a canopy to enclose a section of the road will create a tunnel-like situation. Depending on the length and design of such canopy, if the tunnel-like structure is longer than 230m, this Department will impose detailed fire safety requirements; (ii) Having seen that the selection of materials used for construction has direct bearing on the safety of the public and fire fighters when barrier is on fire, the semi-enclosure and canopy should be constructed of non-combustible material. The relevant information should be provided to this Dept. for comment; (iii) The noise barrier/enclosure shall not encapsulate the existing fire hydrants and the ground valves at Eastern Corridor and those at new Road 9/4 in order to avoid hampering our fire fighting operation.	Noted. For your information, none of the proposed barrier exceeds 230m in length. If the barrier is to be constructed, FSD will be consulted during the detailed design stage. Noted.

COMMENTS	RESPONSES
Chief Arch/CMB Ref. ASD10/92051/TEC/EPD/1	
(1) In Section 5.2.2, the design of quieter vehicles may help in the control of noise at source however it will not occur in a short period of time.	Noted and the phrase "the design of quieter vehicles" has been deleted.
(2) Also in Section 5.2.2, limiting the use of road by heavy vehicles to control the noise at source may not be a good solution as it may create discriminating treatments.	Noted.
(3) Last para. of Section 5.2.5 refers. If the noise from IEC is dominant and conclusion and recommendation for IEC noise mitigation measures are still premature, will it be too early to finalise this EIA Report?	The partial enclosure option on the IEC has been deleted because it is beyond the proponent of this project to propose any partial enclosure on the IEC.
(4) No comment on the EM&A Report.	Noted.

COMMENTS	RESPONSES
Urban Services Department Ref. (10) in USDP 851/53 XXV (A) Draft EIA Report	
(a) Para. 2.1 - The proposed engineering works include the construction of a promenade and landscaping works. You may wish to know that my department is considering to develop the said promenade and the adjacent open space. I would therefore reserve my comment on the part of the draft report pertaining to the promenade area. You will be advised of our development proposal if it is to be materialised.	Noted.
(b) Para. 6.6.1 - It is mentioned that a small public garden will need to be removed in order to connect the new road network to the existing road at Sai Wan Ho. We would like to be further consulted in this respect.	USD will be fully consulted on this matter.
(c) Para. 6.8	
(i) We have encountered difficulties in maintaining some street plantings. Hence, in designing the streetscape, please take into consideration the unique constraints of individual sites and look into measures which could facilitate future maintenance.	We agree fully with the comment that the unique characteristics of each individual site should determine the plant species that are used in that location. Ease of maintenance is recognised as another important issue. Production of detailed planting plans is not, however, part of this study.
(ii) Ample time should be given to consult departments concerned on the streetscape proposals during the planning and design stages.	Noted.
(iii) The management and maintenance responsibilities of the streetscape should be in accordance with the Works Branch Technical Circular No. 18/94. A copy is attached for ease of reference.	Noted.

COMMENTS	RESPONSES
(d) Para. 6.8.1	
(i) The idea of providing a traffic-free pedestrian link between the promenade and open space site at Road 9/3 is welcome.	Support for this idea is welcome and we agree that the area of open space should not be reduced.
(ii) The proposal of relocating the open space sites away from the noisy IEC is supported. Nevertheless, the area of open space should not be subsequently reduced.	Refer to the above response.
(e) Para. 6.8.2.1 - The floor surface should be designed in such a way that no weeds and other undesirable vegetation can grow in between the gaps of the paving slabs.	Noted.
(f) Para. 6.8.2.2 - The design of tree grills should take into account of tree growth and girth increase.	Noted.
(g) Para. 6.8.2.3 and 6.8.2.4 - The provision of seatings and shelters on agreement by this department in accordance with WBTC No. 18/94.	Noted.
(h) Para. 6.8.2.7	
(i) Similarly, the provision of amenity lightings are also subject to this department's agreement as stated in WBTC No. 18/94. On the understanding that electricity departments / sections, individual electricity meters are required.	Noted.
(ii) The provision of lighting should avoid causing tree maintenance problems. e.g. trench work for the repair of cables should not cause damage to tree roots.	Noted.

COMMENTS	RESPONSES
(iii) Lighting constructed as a part of the seawall railing should preferably be replaced by lamp posts for easy maintenance.	Lighting fixed on isloated lamp posts surely involves the same maintenance issues as lighting fixed to posts that are in turn fixed to railings. The incorporation of standard lighting poles within the waterfront railing design would help avoid visual clutter and reduce the number of obstructions to pedestrian movements.
(iv) Low level lighting is not recommended as it would be subject to vandalism.	Noted.
(i) Para. 6.8.3	
(i) Access should be provided for horticultural maintenance staff to carry out their work at the traffic islands on the east of the site.	Noted.
(ii) Soft landscape treatment to all highway superstructures, such as footbridges should be considered to soften their appearance.	Noted.
(iii) The provision of visual amenity areas on unallocated government land shall also be subject to agreement by this department according to WBTC no. 18/94.	Noted.
(j) Para. 6.8.4.1	
(i) More species should be selected to enhance plant variation in detailed design stage.	Noted.
(ii) The provision of tall trees is supported. However, 'Tecoma stans' can seldom reach the height of 20-25m. You may like to provide other choices in the detailed design.	Noted. Production of detailed planting plans is not, however, part of this study.
(iii) Road-side shrubs species 'Lantana sellowiana' should be deleted from the list because of its invasive character.	Noted.

(iv) pavement tree planting to all new roads must be explored and designed in an early stage. All underground utilities lines/services required now or in future should avoid encroaching into tree root regime.	Noted. This will be emphasised in the Final EIA Report.
(v) The proposed width of planter and soil depth as shown in Fig. 6.4 is acceptable.	Noted.
(vi) The subsoil in planter shall be clean, friable decomposed granite, free from grass or weed growth, other foreign materials and stones over 25mm diameter. The proportion of stones under 25mm diameter shall not exceed 10% in volume. It should also be free from construction debris.	Noted. This will be emphasised in the Final EIA Report.
(vii) Automated irrigation system (with pump house) should be provided to planting areas with access problem. We would like to be consulted on the details / choice of irrigation system when available.	Noted. This will be emphasised in the Final EIA Report.
(viii) Lockable watering points should be provide within the sweep of 20-meter long hose.	Noted. This will be emphasised in the Final EIA Report.
(ix) Individual water points should be provided to planters which are separated by footpath to avoid trip over of pedestrians by hosepipe.	Noted. This will be emphasised in the Final EIA Report.
(k) Para. 6.8.4.2 - All raised planters should be free from utilities facilities underneath.	Noted.
(B) Draft EM&A Manual	
(a) Para. 3.1.1 - As shown in Figure 3.2, our Miu Tung Street Sitting-out Area (SOA-1) and Aldrich Bay Playground (SOA-2) are identified as air sensitive receivers (ASRs). We would like to have more information on this aspect when available.	Noted.

COMMENTS	RESPONSES
TE/HK Ref. in HR 182/50-2 Referring to the captioned Draft EIA Report, it is not clear whether the growth factor of 2.0 that was adopted beyond year in para.4.4 of the captioned Draft EIA Report actually meant an annual growth factor of 2.0 from 2011 to 2015. If this is the case, then I have no objection to the growth rate adopted for EIA purpose.	We confirm that an annual growth factor of 2.0 has been adopted to project the traffic from years 2011 to 2015.
Highways Department Ref. (12) in HH CW 437CL/EIA VII (i) It should be noted that the updated programme may need to be further reviewed when necessary in view of various uncertainties such as possible unforeseen delay by others etc.	Noted.
(ii) As suggested in Section 5 "Mitigation Measures" of the Draft EIA Report, a noise mitigation scenario in operational phase involves the installation of noise barriers/partial enclosures/enclosures on the Island Eastern Corridor. This Region does not support this idea as it appears that the so-called "retroactive mitigation measure" are meant for the developments already in existence and not future developments which could be arranged and/or oriented to mitigate noise impact.	Noted. The partial enclosure option on the IEC has been deleted.
(iii) You also recommend in Section 5 of the Report to install wind barriers for dust suppression during construction and claim that the efficiency for wind barriers can be up to 80 percent if properly constructed. Please show the details and the proposed locations of such wind barriers to achieve such efficiency.	Conceptual design of the wind barrier has been included in the Appendix.

COMMENTS	RESPONSES
Electrical & Mechanical Services Department Ref. CFC/49 I In both EIA and EM&A, it recognise that the Eastern Magistracy adjacent to the site boundary and anticipate the proposed engineering works would cause noise and dust nuisance to these sensitive uses during the construction phase. However, both proposed monitoring stations are located under the IEC which are too far away from the Eastern Magistracy. As the Magistracy is an important Government building and deterioration of the environment, in particular noise and dust may affect the proper functioning of the building. Consideration of environmental impact on the Magistracy should be given.	The Eastern Court of Law building has been considered as a possible monitoring location, but because there is not sufficient space for monitoring equipment to be set up within the premise of the building, thus the possibility has been relinquished.
Civil Engineering Department Ref. (75) in PWO 267CL pt 16 Referring to Table 2.2 of the Draft EIA Report, it appears to me that bored piles will be used for the foundation of the proposed footbridges and pedestrian subways under the project. Since contaminated mud underneath the reclamation site will be extracted during the bored piling operation, your study should address the method of disposal of contaminated mud and its associated impacts.	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 Fill Management Committee should be consulted for disposal at designated disposal site.
Eastern District Office Ref. (34) in EDO 3/630 XVII I have no specific comment on the report and manual, which are technical in nature.	Noted.

COMMENTS	RESPONSES
Planning Department Hong Kong Ref. (28) in HK9-55VI	
(A) According to the adopted Aldrich Bay Reclamation Layout Plan No. L/H9A/3, a land area of 7.6 ha will be provided for "Special Residential," 3.06 ha for "Residential-Zone 1," 1.48 ha for "Educational," 0.04 ha for "Institution and Community," 1.24 ha for "Government Reservation" and 7.23 ha for "Open Space." The claim of "19 hectares of land for public and private housing developments, as well as commercial, government, institutional and community facilities open spaces and other uses" in para. 1.1 should be amended accordingly.	Noted. Para. 1.1 has been amended accordingly.
(B) Figure 1.1, 3.1-3.3, 4.1, 4.2, 5.5	
(i) Not until the population level for Aldrich Bay Reclamation can be increased to a higher scenario, say 35,000 persons, the housing boundary for the public rental /HOS (PR/HOS) site can then be extended to cover the whole "RS' zone excluding the area reserved for "UC Market/Public Transport Terminus" development. The present population level set at 23,000 persons for Aldrich Bay Reclamation renders the PR/HOS site occupies only part of the "RS" zone as shown edged black on the enclosed plan. No doubt, D of H should be consulted on the aspect of detailed housing layout for the subject PR/HOS site.	D of H confirmed on 7/11/96 the population for the PR/HOS site is set for 31,800.
(ii) The reserved school site fronting the promenade at the north of PSPS site should be read as a primary school.	Noted. The text and relevant drawings have been amended accordingly.
(iii) The detailed layout for the proposed pedestrian subway near Tai On Street is yet to be finalised.	Noted.

COMMENTS		RESPONSES
Environmental Protection Department Ref. (29) in EP2/H9/07 V		
2.1	It is noted in page 3, section 2.2 that there are six sections of works. You have assessed dust impact arising from construction works in Section I - Section V in the report. However, no assessment of dust impact arising from construction works in Section VI. Please explain. In view of the proximity of air sensitive receivers, we consider an assessment of the dust impact arising from construction works in Section VI is necessary.	Noted. The dust impact assessment for Section VI has been included.
2.2	Based on Figure 2.3, the construction periods for works in Section I, Section II & III overlap with the construction of footbridge and subway (Section IV and V). You should predict the cumulative TSP impact on air receptors due to different sections of works.	The cumulative TSP impact from different sections of works have been considered.
2.3	Based on Figures 5.1-5.4, the mitigated 1-hour average and 24-hour average TSP levels for Section I, II & III still exceed the acceptable level at some air receptors. However, you did not propose any further dust suppression measures to reduce the TSP to an acceptable level. Please propose further mitigation measures and verify their effectiveness by quantitatively.	Further mitigation measures have been included in the report.
2.4	You have only predicted TSP levels arising from construction works in Section IV and V at discrete air receptors. In order to have a clear picture on the impacts, please produce TSP contours for both mitigated and unmitigated conditions.	TSP contours for Section IV and V have been included.
2.5	Please justify the use of meteorological data from the Tseung Kwan O Meteorological Station for the air quality impact assessment (re: page 9, section 3.1.2 (c)), given the fact that the Hong Kong International Airport Meteorological Station is closer to the study area.	Surface winds vary from place to place in Hong Kong. As the topographical and geographical characteristics of Tseung Kwan O are more similar to those of Aldrich Bay Reclamation than the H.K. International Airport, the meteorological data from Tseung Kwan O was used.

2.6	As agreed in the response to comments on the Inception Report, sample input and output files for air quality modelling would be submitted with the assessment report. However, no models files were submitted. Therefore, please submit the model files for our reference and comments. Without these files, we are not in a position to accept the modelling methodology and the modelling results.	Sample input and output files for air quality modelling will be submitted.
2.7	Some residential blocks of Lei King Wan are located in the vicinity of the work site and they are much closer to the site than the Felicity Garden. Therefore, please include them as air sensitive receivers and predict the dust impact at them.	Lei King Wan has already been included as an sensitive receiver and the dust impact on this receiver has been presented in Tables 3.3 and 3.4.
2.8	Please confirm whether the recommendation to pave the haul road for access to the barging point has been accepted by CED. Please also confirm whether the assumption of the haul road be paved has been taken into account in the air quality assessment.	CED confirms that a paved access road will be considered if needs arise. The air quality assessment has already taken into account the paved haul road.
2.9	Please confirm whether the proposed mitigation measures are acceptable to the HyD and ensure these measures be stipulated in the work contract specifications.	Noted.
3.1	The wording "A minor issue" in the 3rd sentence should be revised. It is premature to state in the Background section that the traffic noise impact from the proposed roads in a minor issue.	The phrase "A minor issue" has been revised.
3.2	We can see that there are still some differences between Table 2.3 and 2.4. Please clarify whether the modelled noise levels in Table 2.4 are free field values or including facade effects. You should state clearly the reasons of differences. In addition, full noise descriptors should be provided for all noise levels in this report.	The measured noise levels in Table 2.3 are free-field levels. If facade effect is included, the difference between these and the corresponding levels in Table 2.4 which are facade levels varies between 0.3-1.7 dB(A). Such differences are considered acceptable.

COMMENTS		RESPONSES
3.3a)	We cannot locate the temple and two schools in Figure 3.1 A table should be provided to list out all concerned NSRs with identification number, and Figure 3.1 and 3.3 should be aggregated into a figure. In addition to the existing NSRs in Figure 3.1, two existing schools located at A Kung Ngam Road and Tam Kung Mui Road should be included. Please ensure that the affected existing NSRs have been included in the assessment. Please ensure that the affected existing NSRs have been included in the assessment. Furthermore, we believe additional representative NSRs should be included as the proposed NSRs in Figure 3.3 cannot represent all existing NSRs in Figure 3.1.	The temple and the existing schools at Ah Kung Ngam and Tam Kung Mui Road have been included in Figure 3.1. Furthermore, Figures 3.1 and 3.3 have been combined. Additional representative NSRs have been included in the noise impact assessment.
b)	In addition to the marked NSRs in Figure 3.1, NSRs abutting Tai On Street should be taken into account in this assessment.	Lei King Wan has been included in the noise impact assessment.
3.4a)	The main purpose of the construction noise assessment in this report is to avoid late focus on this issue. The onus is on the consultants to ensure the accuracy of the noise calculation. We would not check the noise calculation for construction phase, nor do we have any obligation to go through details of the assessment.	Noted.
b)	It is the responsibility of the contractor to comply with the NCO and the relevant TMs if for any construction work during the restricted hours.	Noted.
3.5	The mitigated noise criteria should be presented in chapter 5.	Mitigated noise criteria have been presented in chapter 5.
3.6a)	Other traffic noise criteria, such as 65dB(A)L10 for school, should be included.	Noted. Please refer to the above comment.
b)	Since para 3 has mentioned the noise insulation eligibility criteria, we suggest that the 3 ExCo criteria should be incorporated in this paragraph. The 3 criteria are :-	Noted. The three criteria have been included in this paragraph.

	- the predicted overall noise level from the new road together with other traffic noise in the vicinity must be above 70dB(A)L10(1 hour) - the predicted overall noise level is at least 1.0dB(A) more than the prevailing traffic noise level, i.e. the total traffic noise level existing before the works to construct the road were commenced; and - the contribution to the increase in the overall noise level from the new road must be at least 1.0dB(A)	
3.7	Please see our comments in 3.3(b).	
3.8a)	The layout of the HOS/PR is out dated. You should obtain the latest layout from the Housing Department (HD).	Since the layout for the PR/HOS site has not been finalised, agreement was reached to adopt the latest available layout, which is the one presented in the EIA Report.
b)	Although the proposed Housing for Senior Citizens and the schools will be either self-protecting in design or provided with acoustic insulation, they should not be classified as non-noise sensitive. The wording should be revised.	The wording has been revised.
3.9a)	We understand that the predicted noise levels at the existing and planned noise sensitive facades have not taken into account the shielding effect of self-protecting and noise-tolerant buildings. We do not concur with this approach. Since the layouts of HOS has already been agreed with HD in the previous study, the proposed self-protecting and noise-tolerant buildings should be taken into account in the assessment of the traffic noise impacts. As such, the noise levels prediction without direct mitigation measures on the road works should include the self-protective and noise tolerant buildings.	The report has been revised to include the shielding effect of self-protecting and noise-tolerant buildings in the unmitigated scenario.

	b) According to ArchSD's Preliminary Environmental Review for the secondary school abutting Road 9/2A, a solid boundary wall is recommended as a noise mitigation measures. This should be incorporated into this assessment.	Noted. The recommendation has been incorporated in the modelling calculation.
	c) You should check with ArchSD & HD on the latest layout of the proposed schools in the study area as the orientation of the school buildings may affect the noise impacts.	Noted. The latest layout of the proposed schools has been considered and the noise calculations have been revised to take this into account.
	d) The total number of dwellings, classrooms and other noise sensitive elements that will be exposed to noise levels above the HKPSG criteria shall be quantified.	Noted. The total number of noise sensitive elements that will be exposed to noise levels above the HKPSG criteria has been quantified.
	e) You should make reference to the endorsed EIA reports for the layouts of HOS and PSPS.	Reference to the endorsed EIA was made.
3.10	The traffic flow of segment 2-8 should be included in the Table 4.1.	Segment 2-8 has been included in Table 4.1.
3.11	We suggest that you revise the wording in 1st sentence of section 5.1 to point out that without mitigation measures, the predicted construction noise levels will exceed the criteria.	Text has been revised.
3.12	There is no Appendix D included in this report.	Appendix D has been added.
3.13	a) The presentation of para. 6 and 7 of section 5.2.4 should be revised. Please explain clearly that all the direct technical remedies have been explored and exhausted before the ExCo directive is mentioned. In addition, it should be noted that only existing NSRs will be eligible for insulation. Therefore, the wording in 2nd sentence of para. 7 should be amended as "Only those existing noise sensitive receivers which meet..."	Text has been amended accordingly.
	b) Regarding the wording of the 3 criteria, please see our above comment 3.6 (b).	Noted.

COMMENTS		RESPONSES
3.14	Page 26, section 5.2.5: Mitigation Scenarios a) As per the above comment 3.9(a), we suggest that the discussion of the use of self-protective and noise tolerant building (i.e. Scenario A) be presented in chapter 4.	Noted. See our response to comment 3.9 (a).
	b) A quantitative assessment should be provided to sustain that the proposed noise barrier is ineffective. We understand that 5m barriers have been considered in this assessment. You should further elaborate the constraints, if any, rendering the use of noise barriers of other heights impractical.	Quantitative assessment of the effectiveness of the barriers has been included.
	c) We believe the proposed mitigation measures in Figure 5.5 are top bended barriers instead of partial enclosures. Please clarify. Nevertheless, if the proposed partial enclosures of IEC are engineering impracticable, the noise levels prediction (i.e. Table 5.3) are not necessary to be incorporated in the report. This EIA study should examine the best practicable package of noise mitigation measures within their scope of work based on the committed layouts of planned NSRs and the locations of existing sensitive uses. Any attempt to proposed mitigation measures on IEC, which is beyond the control of the client department, is unrealistic.	The partial enclosure option on the IEC has been deleted.
	d) You should further evaluate the feasibility to implement traffic management or to install noise enclosures within the Aldrich Bay reclamation area for noise mitigation measures.	Noted.
	e) The total number of dwellings, classrooms and other noise sensitive elements that will still be exposed to noise above the HKPSG criteria after the implementation of all recommended direct technical remedies shall be quantified.	Noted. See our response to comment 3.9 (d).

COMMENTS		RESPONSES
3.15	Page 27 Table 5.2 The titles of column "IEC" and "Existing Road" should be revised to indicate that IEC is also an existing road.	The titles for the column headings have been revised.
3.16	Page 33, section 5.2.6: Indirect Mitigation a) We do not concur with your view that the roads within the reclamation site are not classified as "New" roads. You should note that the planned NSRs are not eligible for insulation as per the directive from ExCo. However, the environmental constraints posed by the roads after all practical direct mitigation measures are applied and the environmental requirements for redressing any residual impacts on the planned NSRs should be addressed in this report.	Noted. To clarify, the proposed roads within the reclamation site are classifed as "New" roads to the existing receivers, but they are not considered as "New" roads to the planned receivers. Thus only the existing receivers are eligible for indirect technical mitigation.
	b) In case the direct mitigation measures are exhausted, the residual noise impacts on existing NSRs should be evaluated against the insulation eligibility criteria as per the understanding in 5.2.4. Therefore, a quantitative evaluation should be provided for consideration of the existing NSRs.	The eligibility criteria have been applied to the existing NSRs, and the results are presented in section 5.2.6.
3.17	a) Sample calculation of NSRs should be provided for our reference. The submission should include the basic noise levels, related correction factors and drawings in 1:1000 scale. We reserve our comment on the noise model until the above information is ready.	Noted. Sample calculations will be submitted.
	b) The cumulative noise impact arising from the construction of the proposed engineering works and the proposed housing & schools development nearby should be included.	The proposed engineering works will be largely completed before the housing development work begins. Cumulative noise impact should be minimal.

	COMMENTS	RESPONSES
	c) To our understanding, there is another Traffic Impact Study (TIS) being carried out by TD's consultants for the increasing of population at Aldrich Bay reclamation area. You should therefore liaise with TD (TTSD) to confirm if the traffic data used for the traffic noise calculation in the captioned EIA is on the same basis as that TIS.	Noted. The TD has been consulted.
	d) If the planned sensitive uses are to be developed at a later date, you should, where practicable, propose the noise mitigation measures for the planned sensitive uses.	Noted. Development constraints have been stated.
	e) The feasibility of the measures at planned noise sensitive uses, e.g. setback and/or building disposition, should be evaluated during the EIA process and the constrains/requirements on the planned noise sensitive uses should be identified.	Noted. Please see the above comment.
	f) The agreed environmental requirements on the future adjacent uses and any development constraints identified by the EIA should be explicitly stated in the report, such that the potential developers aware of such constraints/requirements when developing the sites in the future.	Noted. Please see our response to comment 3.17(d).
4.	<u>Draft EM&A Manual</u> Please make necessary changes to your draft manual to make it in line with this Generic EM&A Manual.	Noted.

COMMENTS	RESPONSES
Hong Kong Housing Authority Ref. HD(P) 7/3/HK9 VIII	
(i) Please make sure the traffic noise level is assessed based on a total population of 31,800 persons for the whole reclamation area.	Noted.
(ii) Please note that the layout of the proposed PR/HOS development contained in the Draft Final Report and Audit Manual will be subject to further changes pending the outcome of TD's traffic impact study. Any revision to HD's PR/HOS layout would be supported by a revised EIA. Since no direct noise mitigation measures at sources are considered practicable in the Draft Report, any subsequent change to the PR/HOS layout would not have any implications on the current EIA.	Noted.
(iii) In para 4.5, please consider the option of providing low noise surface for Road 9/4.	The recent findings of a joint study between the EPD and HyD show that low noise surfacing is not practical for vehicle speeds less than 70kph.
(iv) Para. 6.8.1 - The proposed deletion of the section of the road between the promenade and the proposed Town Park at Road 9/3 should be supported by a TIA.	Noted. However, it is beyond the scope of this Study to assess the traffic impact of the proposed deletion.
(v) Para 6.8.1 - The proposed measures recommended in this paragraph should be shown on a plan.	Noted. The proposed measure has been shown on a plan.
(vi) Para 8.1 - Screening the IEC is considered to be an effective mitigation option and should be further considered.	Noted. However, it is beyond the scope of this Study to propose any mitigation measures for the IEC.
(vii) I have no other comments on the EM&A.	Noted.

COMMENTS	RESPONSES
Environmental Protection Department Ref. (14) in EP2/H9/07 VI	
2.1a) It is noted in Figures 5.3, 5.4 that mitigated 1-hour TSP level at some air receptors still exceed 1-hour TSP guideline level. However, no further mitigation measures are proposed though it was stated in the responses to comments that further mitigation measures have been included. The Consultant must propose further mitigation measures and verify their effectiveness by modelling.	Further mitigation measures will be proposed and be shown to be effective in the Final Report.
b) Figure 5.7 presented the cumulative 1-hour TSP level arising from Sections I, IV, V (mitigated), which shows that there is no exceedance of 1-hour TSP level. However, the mitigated 1-hour TSP level due to construction work in Section I alone (Figure 5.3) shows the 1-hour TSP level exceeds the 1-hour TSP guideline level at some air receptors. It seems that the cumulative dust impact due to Sections I, IV, V should also exceed 1-hour TSP guideline level if the impact due to Section I already exceeds the guideline level. Would the Consultants clarify?	Different dust suppression factors have been employed in the two calculations. Mitigation measures will be revised.

c)	Figure 5.8 presented the cumulative 1-hour TSP level arising from Sections II, III, IV, V (mitigated), which shows that there is no exceedance of 1-hour TSP level. However, the mitigated 1-hour TSP level due to construction work in Section II & III alone (Figure 5.4) shows the 1-hour TSP level exceeds the 1-hour TSP guideline level at some air receptors. It seems that the cumulative dust impact due toSection II, III, IV, V should also exceed 1-hour TSP guideline level if the impact due to Section II & III already exceeds the guideline level. Would the Consultants clarify?	Same as 2.1(b)
d)	In previous submissions, contours of 24-hour TSP levels for both mitigated and unmitigated conditions are given. However, in this submission, contours of 24-hour TSP levels for both mitigated and unmitigated conditions are not given. In any case, 24-hour TSP level contours should also be plotted.	24-hour TSP concentration contours will be included in the Final Report.
e)	The Consultants should justify why the meterological data from Tseung Kwan O meteorological station are better than from the Hong Kong International Airport for the study area.	The meteorological station of Hong Kong International Airport is located in an open field where wind blows over a relatively uniform surface (i.e. harbour and runway) over a long fetch. As a result the wind exhibits relatively smaller variation in the wind speed and direction. The wind data therefore represents more of the general wind conditions in the Lei Yue Mun channel and the runway than an urban area. However, as EPD is probably aware, surface wind varies considerably over the man-made topography. The bulk of the Aldrich Bay Reclamation and, in particular, the locations of the existing receivers are sheltered from the harbour. It is highly unlikely that the historical wind condition at the runway has any resemblance to that on the reclamation and at the ASR locations because of the presence of man-made topography at the time when the proposed engineering works and the housing development are in progress. In comparison, the wind data from Tseung Kwan O is more representative of the wind condition on the reclamation because of similar isolated low- and high- rise man-made topography than the runway.

2.2 ai)	The Consultants have not yet confirmed whether the recommendation to pave the haul road for access to the barging point has been accepted by CED.	CED has agreed to consider paving the haul road if the need arises.
ii)	The Consultants have not yet given any response to my previous comment which required the Consultants to confirm whether the proposed mitigation measures are acceptable to HyD and ensure the measures be stipulated in work contract specification.	Mitigation measures are acceptble to HyD.
2.3	Please note that in any case, it is not acceptable for the TSP concentrations at any air receptor exceed established standards.	Noted. However, the calculated TSP concentration were based on worst scenarios which are not probable. furthermore, it should be noted that the FDM tends to over-predict.
3.1	Page 7 Table 2.4 I suggest the modelled noise levels should be based on free-field for easy of comparison.	Noted. The modelled noise levels will be revised.
3.2	Page 10 para 9 Kai Fong Welfare Centre should be indicated in the Figure 3.1	Kai Fong Welfare Centre will be indicated in Fig. 3.1.
3.4	Page 19 para 2 I believe the noise levels at existing NSRs will exceed in the range of 1 - 14 dB(A) as the noise levels at FG4 is up to 84 dB(A) whilst the noise levels at planned NSRs will exceed in the range of 1 - 12 dB(A), Please revise.	Text will be revised.
3.5	Page 19 para 8 The noise levels contribution from new and existing roads should be indicated in this para.	Text will be added.
3.6	Page 20 bullet (e) "PSPS" should be amended as "HOS".	Text will be amended.
3.7	Page 20 bullet (f) "HOS" should be amended as "PSPS".	Text will be amended.
3.8 a)	Page 20 bullet (g) The consultants should note that PSCH-2 and SSCH- are located at the school halls which are not considered as noise sensitive. Therefore, the assessment points should be deleted.	PSCH-2 and SSCH-4 will be deleted from assessment.

b)	As per our previous comment 3.9 (b), the solid boundary wall should be incorporated as noise mitigation measures for the primary school. Please confirm whether the solid boundary wall has been included in the noise model. I suggest the boundary wall should be also indicated in Figure 3.1.	The solid wall boundary has been included in the modelling assessment, and it will be further indicated in Fig. 3.1.
3.9	Page 21 Table 4.2 I suggest the higher floors of NSRs HOB, 40-42 and HMM should be indicated in this table.	Higher floors of HOB, 40-42, and HMM will be included in the relevant tables.
3.10	Page 25 Table 4.3 As per the above comment 3.9, NSRs HOB, 40-42 and HMM should be incorporated in Table 4.3.	Refer to the above comment.
3.11	Page 28 As per above comment 3.8 (a), PSCH-2 is considered non noise sensitive. I suggest deleting it from this table.	Refer to response 3.8(a).
3.12 a)	Page 30 para 2 I believe the 1st sentence should be amended as "Appendix D....". However, there is no Appendix C in this report.	The original 'Appendix D' has been changed to "Appendix C".
b)	As the construction noise levels of FG3, FG4, PMGE and TEMPLE will exceed the criteria, the consultants should further propose any noise mitigation measures to alleviate the construction noise impacts.	Further noise mitigation measures will be proposed to ensure that no exceedance of the noise criteria will occur.
3.13	Page 35 para 4 The 2nd sentence should be amended as "...traffic noise levels by up to 2.5 dB(A) as compared..."	Text will be amended.
3.14	Page 36 para 2 The para should be amended as "..., the performance of existing noise reducing road surfacing on low speed roads ... has not been considered satisfactory in respect of	Text will be amended.

3.14	The para should be amended as "...performance of existing noise reducing road surfacing on low speed roads...has not been considered satisfactory in respect of maintenance and cost implication due to the possible short service life of the material. A Highway/EPD joint study on the feasibility of developing a suitable specification for the use of the material on low speed roads is being conducted. The study will be completed in mid 1997."	Text will be amended.
3.15	Page 36 para 2 The details regarding noise reduction level of insulation should be investigated in NIW study. Therefore, I suggest deleting the last sentence.	The last sentence will be deleted.
3.16 a)	Page 36 para 2 According to Table 4.3 (c), lower floors on Block 5 are also affected by noise impacts from new roads. Therefore, the scenario A should also consider noise mitigation measures for Block 5 and its represented NSRs.	Noise mitigation measures will be considered for Block 5.
b)	I believe the "unacceptable noise levels" means the noise contribution from new roads exceeding HKPSG limits. Please revise the text.	Text will be revised.

3.17	Page 37 para 4 Scenario B As the church and the kindergarten are mainly affected by the existing IEC, I recommend the consultants should assess the eligibility of noise insulation against the 3 criteria as below:-	Both the church and kindergarten will be assessed using the 3 ExCo criteria.
a)	the predicted overall noise level from the new road together with other traffic noise in the vicinity must be above 65 dB(A) L10 (1 hour).	
b)	the predicted overall noise level is at least 1.0 dB(A) more than the prevailing trafficnoise 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 overall noise level from the new road must be at least 1.0 dB(A).	
3.18	Page 37 para 7 Numbers are missing.	Numbers have been added.
3.19	Page 38 Table 5.3 There are no noise levels differences at lower floors of PSPS12-W and PSPS13-W from new roads between mitigated and unmitigated scenarios. The consultants should recheck their calculation.	As the 1st floor is 6.3m above podium level, a 4m barrier provides no screening for the lower floor receivers at PSPS12-W and PSPS13-W.
3.20	Page 40 Table 5.4 The assessment of criterion 2 for NSR FG3 floor 1 is incorrect. Please amend.	Table 5.4 has been amended.
a)	Our previous comment 3.2 is still outstanding. Noise descriptors should be provided for all noise levels in this report.	Noise descriptors will be incorporated.
d)	If the planned sensitive uses are to be developed at a later date, you should, where practicable, propose the noise mitigation measures for planned sensitive uses.	Development constraints will be considered.
e)	The feasibility of the measures at planned noise sensitive uses, e.g. setback and/or building disposition, should be evaluated during the EIA process and the constraints/ requirements on the planned noise sensitive uses should be identified.	See above comment.