



Highways Department
Major Works Project Management Office

Agreement No. CE 82/96

Improvements to Island Eastern Corridor Section between North Point Interchange and Sai Wan Ho

Investigation Assignment

ENVIRONMENTAL IMPACT ASSESSMENT REPORT
EXECUTIVE SUMMARY

MAUNSELL CONSULTANTS ASIA LTD

In association with

MVA Asia Ltd
ENPAC Ltd
Hassell Ltd

EIA-141.4/BC
4/1/02

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Section between North Point Interchange and Sai Wan Ho
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1 INTRODUCTION

- 1.1 It has been recognized for some time that there is a capacity problem at the Hong Kong side of the Eastern Harbour Crossing (EHC). As a result of inadequate capacity, traffic queues are often found on the eastbound carriageway of the Island Eastern Corridor (IEC) and its approach roads during the traffic peak hours. The traffic queues have caused severe merging and weaving problems.
- 1.2 It is also anticipated that traffic flows on the IEC are likely to increase in the next decade when the Central-Wan Chai Bypass and the new housing developments in Shau Kei Wan and Chai Wan are completed. The existing traffic lanes on the IEC near the EHC would not be able to accommodate the predicted traffic flows and the weaving and merging movements if no road improvement works are implemented.
- 1.3 A traffic impact assessment was conducted under Agreement No. CE47/94, "Traffic Impact Assessment for Four Residential Developments Study". The assessment established the need for improvements to the IEC section between North Point Interchange and Sai Wan Ho whereby two additional traffic lanes in the eastbound direction and one additional traffic lane in the westbound direction of the IEC between Man Hong Street and Tai Cheong Street are provided in order to accommodate the anticipated additional traffic demand and resolve the existing merging and weaving problems.
- 1.4 In 1997, Highways Department commissioned Maunsell Consultants Asia Limited under Agreement No. CE82/96 to conduct an Investigation Assignment on the above proposed improvement works to the IEC. As part of the Assignment, a detailed Environmental Impact Assessment (EIA) has been carried out to assess the potential short and long term environmental impacts of the proposed road improvement works on both the existing and planned sensitive developments. The findings, conclusions and recommendations of the EIA are contained in the Final EIA Report, and briefly summarized in the following sections.

2 PROJECT DESCRIPTION

- 2.1 The section of the IEC under investigation in this study is approximately 2.5 km in length. For ease of reference, the Project is divided into three different sections as described below:

Section 1	Eastbound Flyover and realignment of Hoi Yu Street
Section 2	Westbound Flyover/Carriageway west of Tai Koo Shing Interchange
Section 3	Westbound Flyover and Carriageway from Tai Cheong Street to Tai Koo Shing Interchange

Figure 1 shows these three sections.

3. ENVIRONMENTAL SETTING - SENSITIVE RECEIVERS

- 3.1 In accordance with the Study Brief, noise sensitive receivers (NSRs) within 300 metres of the proposed road alignment have been identified for noise impact assessment. Site survey reveals that the existing NSRs in the Study Area are mainly high-rise residential developments and educational institutions. Representative NSRs are identified within the Study Area and the locations of representative NSRs are depicted in Figure 2.
- 3.2 A number of NSRs at further distances behind the above are not included in the assessment although they are located within the Study Area because of shielding by the above buildings. These NSRs mainly include Taikoo Shing and low-rise residential buildings along Shau Kei Wan Road. The 5-storey Korean International School and Caritas Lok Yi School at Lei King Wan are also excluded from the assessment because the sensitive facades of both schools are oriented away from the IEC. The residential building at the 'R (A)' site near Lei King Wan is also excluded from the noise impact assessment as it has already incorporated self-protective design and blank walls at the potentially affected facades. Furthermore, a noise-tolerant USD leisure centre is planned for at the adjacent site, acting as a noise screening structure for the 'R (A)' site.
- 3.3 Air Sensitive Receivers (ASRs) including domestic premises, industrial and commercial buildings, educational institutions, and recreational and leisure facilities, within 500 metres of the road improvement have been identified for air quality impact assessment. Representative ASRs identified within the Study Area are depicted in Figure 3.
- 3.4 According to the Outline Zoning Plans for Quarry Bay and North Point (S/H21/9 and S/H8/7), the vacant lot north of Cannosa College is zoned 'Open Space' (O). As advised by Urban Services Department, the 'O' site is planned for the proposed Quarry Bay Park Phase II which is scheduled to commence construction in December 1998 for completion by May 2000. As such, the site is not considered as noise sensitive use but as an ASR.

4 CONSTRUCTION NOISE

- 4.1 Construction of the proposed road improvement works is likely to produce high noise levels at the existing NSRs along the IEC, if unmitigated. However, the potential impacts are amendable and could be reduced to an acceptable level through the implementation of suitable noise control measures, including the use of silenced equipment, siting of equipment, use of noise mufflers and temporary noise barriers.

5 CONSTRUCTION DUST

- 5.1 Construction dust will arise from the roadworks, and the haulage of construction materials. Model calculations using the Fugitive Dust Model show that dust concentrations at the nearby existing receivers may exceed the hourly TSP concentration of 500 mg/m³. Dust suppression measures such as good housekeeping, frequent watering of the dust areas and covering of materials on truck with tarpaulin sheeting are necessary to reduce the impacts. It is anticipated that the non-exceedance of the hourly TSP concentration of 500 mg/m³ and Air Quality Objectives can be achieved by the implementation of these dust suppression measures.

6 WATER QUALITY

- 6.1 During the construction phase, site runoff, sewage effluent arising from the on-site construction workforce could impact on marine water quality of Victoria Harbour. However, with the implementation of appropriate mitigation measures such as the use of oil/grit separators and/or sediment basins/traps as detailed in *ProPECC PN1/94 - Construction Site Drainage*, the impacts are unlikely to be adverse.
- 6.2 Marine sediments will be extracted during the installation of marine bored piles for the elevated structures, but the quantity will be small. It is recommended that the quality of the sediments be assessed for their proper disposal.

7 CONSTRUCTION WASTES

- 7.1 During construction, three types of waste will be generated and they are construction waste, chemical waste and general refuse.
- 7.2 The contractor should be required to ensure that all construction wastes are properly collected, stored, sorted and re-used. If disposal of wastes is deemed necessary, the Contractor should arrange to transport and dispose of the waste at a designated disposal site.
- 7.3 When construction wastes are handled, transported and disposed of, good waste management practices should be followed to ensure no adverse environmental impacts.

8 ECOLOGY

- 8.1 The main ecological impact of the proposed road works will be the loss of plants. However, results of the preliminary ecological survey show that all the plant species recorded in the study area are common and widespread urban plantation. No mature trees are required to be felled because of the project works. Furthermore, no signs of large mammals were found during the survey period. Few signs of birds were found in the study area and all of them fall into the category of common urban bird species. Therefore, no adverse ecological impacts are anticipated.
- 8.2 The construction works for the elevated structure over the foreshore of the Victoria Harbour will not involve open dredging and therefore marine ecology near the shore will not be impacted by the project.

9 ROAD TRAFFIC NOISE

- 9.1 Road traffic noise is a key environmental concern during the operation phase. It has been predicted that the majority of the noise sensitive facades along the IEC will be exposed to noise levels exceeding the HKPSG noise criteria based on the highest traffic flows within 15 years after the improvement works. Taking into account engineering constraints, traffic sightline problem and acoustical effectiveness, two segments of noise barriers as described below are recommended for implementation :

- 110m of 5m high inverted L-shaped noise barrier adjoining 560m of 5m high plain barrier on the westbound lane between Hoi Yu Street and Tai Koo Shing Interchange; and
- 540m of 5m high inverted L-shaped noise barrier on the westbound lane between Tai Koo Shing Interchange and Kornhill flyover.

The recommended noise mitigation scheme is depicted in Figure 4.

- 9.2 After incorporation of the above recommended direct mitigation measures, the noise impacts at many of the NSRs along the IEC arise mainly from traffic on the existing IEC and other local roads. Therefore, further provision of measures on the new/improved roads would not be effective to reduce the overall traffic noise levels. Considerations have been given to indirect technical remedies in the form of acoustic insulation and air conditioning at the affected NSRs and an eligibility assessment has been made on all affected receivers. The results show that only the Fire Services Department Staff Quarters building (FSDSQ) (a total of 9 dwelling units) is eligible for consideration for indirect measures. As for all the other NSRs, since the new roads do not contribute more than 1.0 dB(A) to the overall noise levels at these receivers, they are not eligible for consideration for indirect technical remedies.

10 VEHICLE EMISSIONS

- 10.1 Model calculations using the worst traffic scenario in terms of vehicle emissions during the operation show that there would be marginal exceedance of the hourly criterion of $300 \mu\text{g}/\text{m}^3$ for NO_2 along the outer perimeter of Quarry Bay Park. A setback of 15m from the road edge of the IEC is required for active recreational uses along the road alignment whilst larger setback distance of 22m is required in the area between the Eastern Harbour Crossing Tunnel portal and Taikoo Shing Interchange. The predicted air pollutant concentrations at discrete air-sensitive receivers at first-floor receiver level would comply with the hourly criterion of NO_2 .
- 10.2 One of the worst affected areas is the tennis courts in Quarry Bay Park Sports Ground located between the Eastern Harbour Crossing Tunnel portal and Taikoo Shing Interchange. Various alternatives such as converting the tennis courts into an indoor squash court, relocating, eliminating or elevating the tennis courts have been explored. But none of these alternatives are considered feasible. With the modification of the 5m plain noise barrier forming a semi-enclosure along the 130 m stretch of the proposed westbound additional carriageway fronting the Quarry Bay Park Sports Ground, the air quality at all active recreational uses, including tennis courts, football field and basketball court, is predicted to comply with the AQO as shown in Figure 5. Within the predicted $300 \mu\text{g}/\text{m}^3$ contour lines, some sitting-out areas of the Quarry Bay Park are located at some 10-15m from the IEC. According to the HKPSG, sitting-out areas are classified as passive recreation which is tolerated within a setback of 3-20m from a trunk road.
- 10.3 As for the future Quarry Bay Park Phase II (QBP II) Development, a minimum buffer zone of 10m for active recreational uses should be reserved along the alignment of the IEC and near the Eastern Harbour Crossing Tunnel portal. The design of QBP II should be made such that no active recreational uses are planned within the $300 \mu\text{g}/\text{m}^3$ contour.

11 LANDSCAPE AND VISUAL IMPACTS

- 11.1 It is recognised that owing to existing site constraints the proposed road improvement roads will unavoidably require removal of the existing vegetation and encroachment onto part of the existing Quarry Bay Park, resulting in landscape and visual impacts to various degrees. Mitigation measures including careful consideration and design of the highway structures to blend in with the environment and minimise visual impacts, extensive planting not only to compensate for the loss of vegetation but also to additionally soften the impacts of the works should be considered.

12 RECOMMENDATIONS ON MITIGATION MEASURES

12.1 The following environmental impact mitigation measures are recommended to reduce the identified impacts:

(i) Construction Noise

- Incorporation of Environmental Pollution and Control Conditions in Contract Documentation for construction noise control;
- Implementation of EM&A programme to control construction noise.

(ii) Construction Dust

- Incorporation of Environmental Pollution and Control Conditions in Contract Documentation for construction dust control;
- Implementation of EM&A programme to control construction dust.

(iii) Water Quality

- Implementation of the mitigation measures such as the use of oil/grit separators and/or sediment basins/traps as detailed in *ProPECC PNI/94 - Construction Site Drainage* to minimize water quality impacts during construction;
- Installation of silt screen near the water pumping station .
- Disposing and treating all effluent generated by the on-site workforce and ensure all sewage discharges from the study area meet the TM standards.

(iv) Construction Waste

- Separation of wastes into various categories for re-use or proper disposal;
- Minimisation of on-site impacts through good site practice.

(v) Ecology

- Revegetation of plants in order to compensate for the loss of plants during the construction.

(vi) Road Traffic Noise

- Installation of the following barriers:-
 - (a) 110m of 5m inverted L-shaped noise barrier adjoining 560m of 5m high plain barrier on the westbound lane between the Hoi Yu Street exit and the Taikoo Shing Interchange; and

(b) 540m of 5m high inverted L-shaped noise barrier on the westbound lane between Tai Koo Shing Interchange and the Kornhill flyover.

- Provision of indirect technical remedies to the dwellings units at the Fire Services Department Staff Quarter.

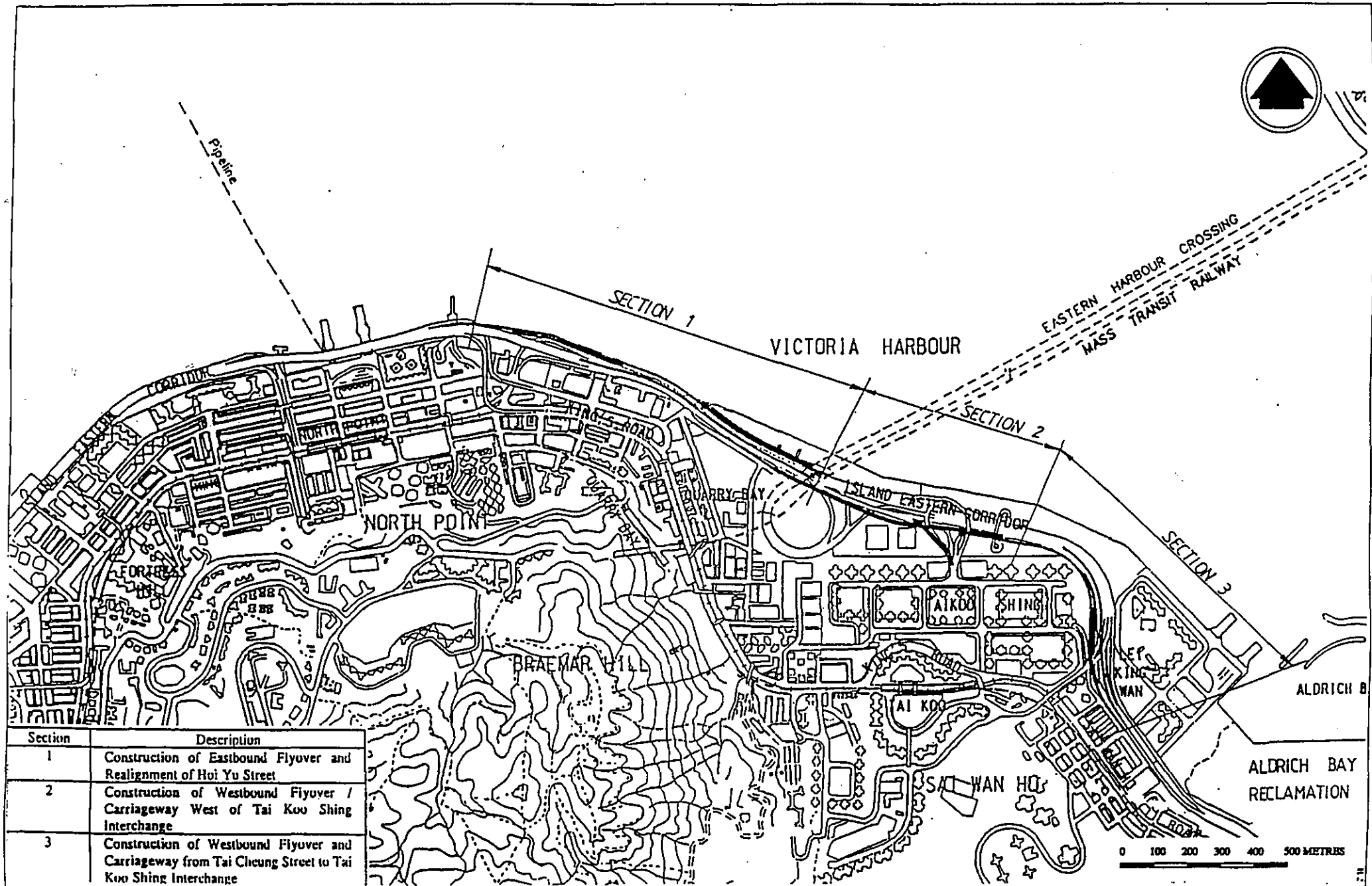
(vii) Vehicle Emissions

- Modification of the 5m plain barrier to form a semi-enclosure along the 130 m stretch of the proposed westbound additional carriageway fronting the Quarry Bay Park Sports Ground.
- Reservation of a buffer zone of 10 m for active recreational uses along the alignment of the IEC for the future Quarry Bay Park Phase II Development.

(viii) Landscape and Visual Impacts

- Consideration of the design of the elevated road sections to blend with the surrounding environment.
- Consideration of the design of the noise barriers to integrate them within the local landscape and visual context, while enhancing the benefit they provide for screening the traffic.
- Reprovisioning of the affected facilities and planting within Quarry Bay Park.
- Extensive planting to not just compensate for the loss of vegetation but also to provide additional softening effects to the visual impacts of the proposed works.

Figures



Section	Description
1	Construction of Eastbound Flyover and Realignment of Hoi Yu Street
2	Construction of Westbound Flyover / Carriageway West of Tai Koo Shing Interchange
3	Construction of Westbound Flyover and Carriageway from Tai Cheung Street to Tai Koo Shing Interchange

AGREEMENT NO. C82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

PROPOSED SECTIONS OF IEC IMPROVEMENTS

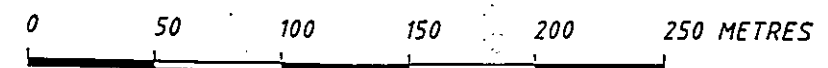
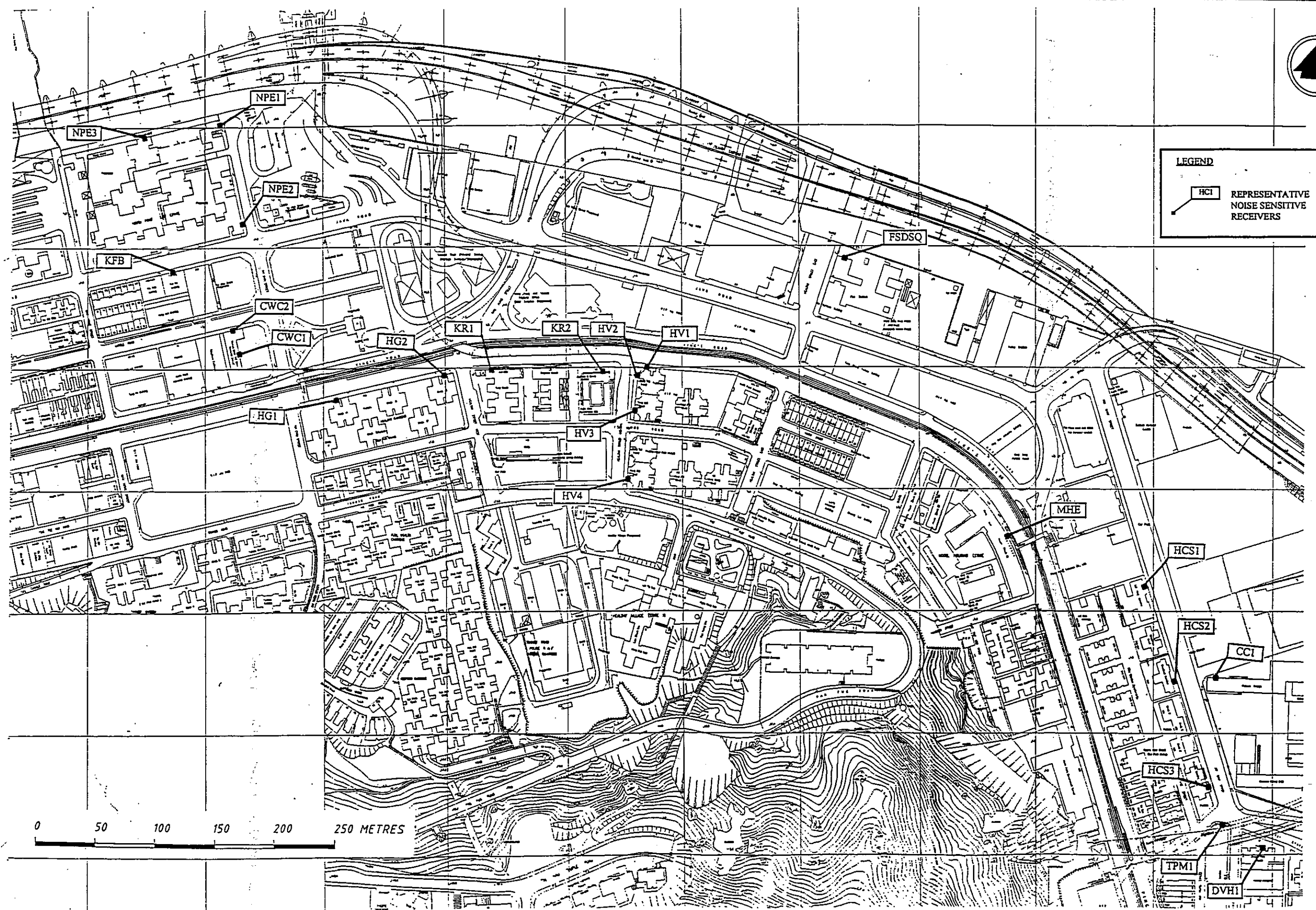
FIGURE NO.	1
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LEGEND

HCI REPRESENTATIVE NOISE SENSITIVE RECEIVERS

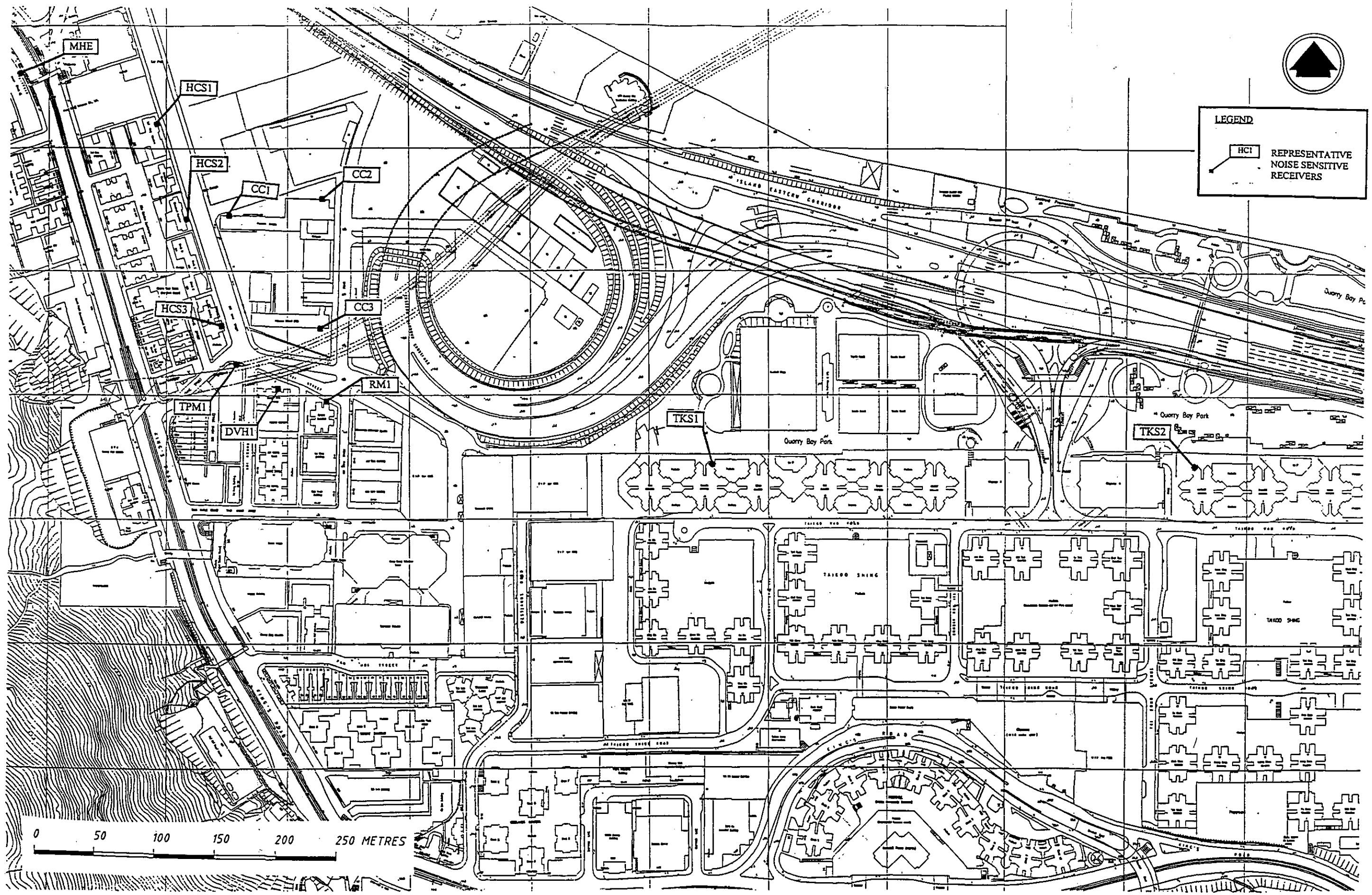


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LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS (SHEET 1 OF 3)

FIGURE NO.	2a
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AGREEMENT NO CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS (SHEET 2 OF 3)

FIGURE NO.

2b

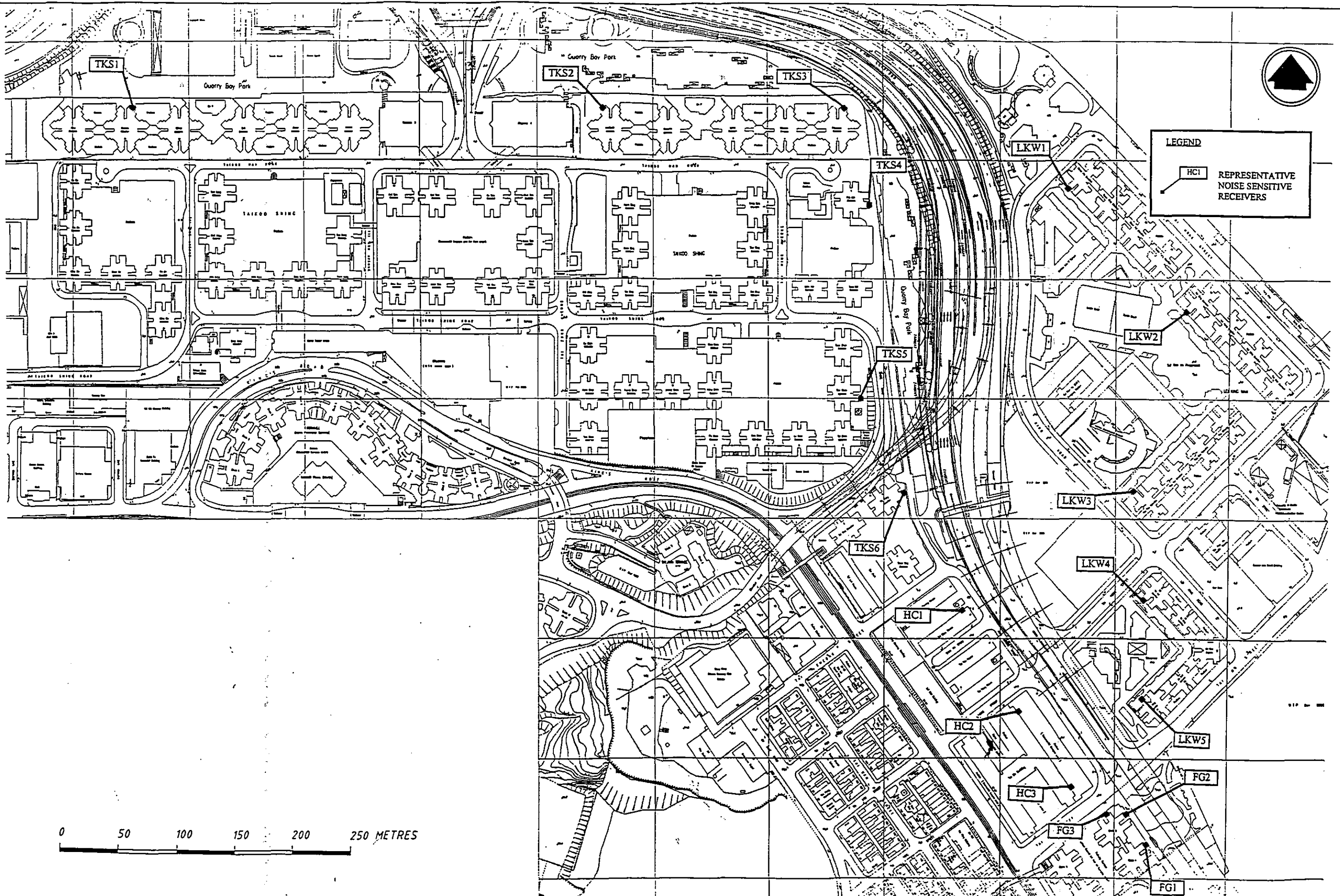
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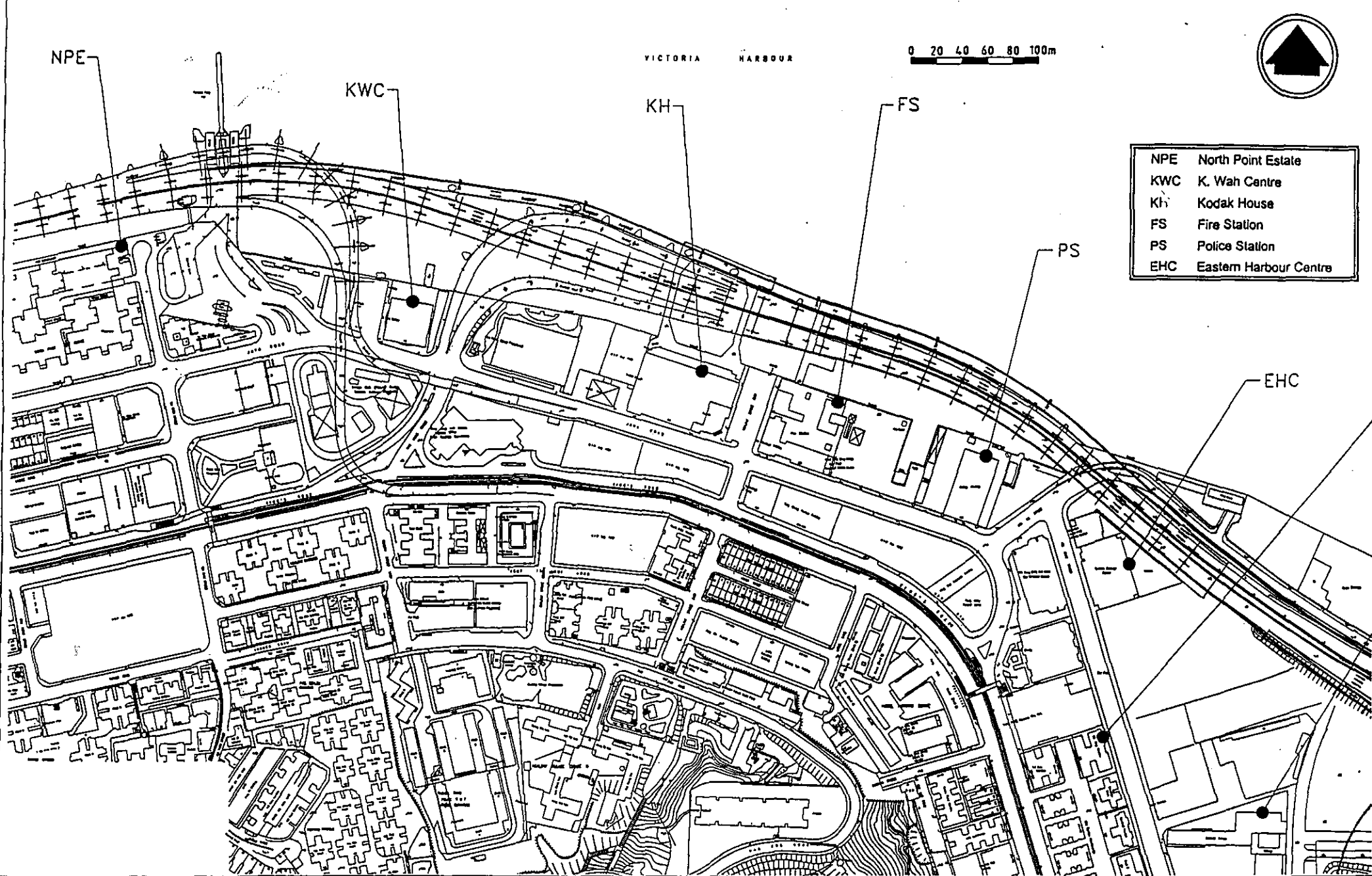


AGREEMENT NO CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

LOCATIONS OF REPRESENTATIVE NOISE SENSITIVE RECEIVERS (SHEET 3 OF 3)

FIGURE NO.	2c	
SCALE	AS SHOWN	DATE
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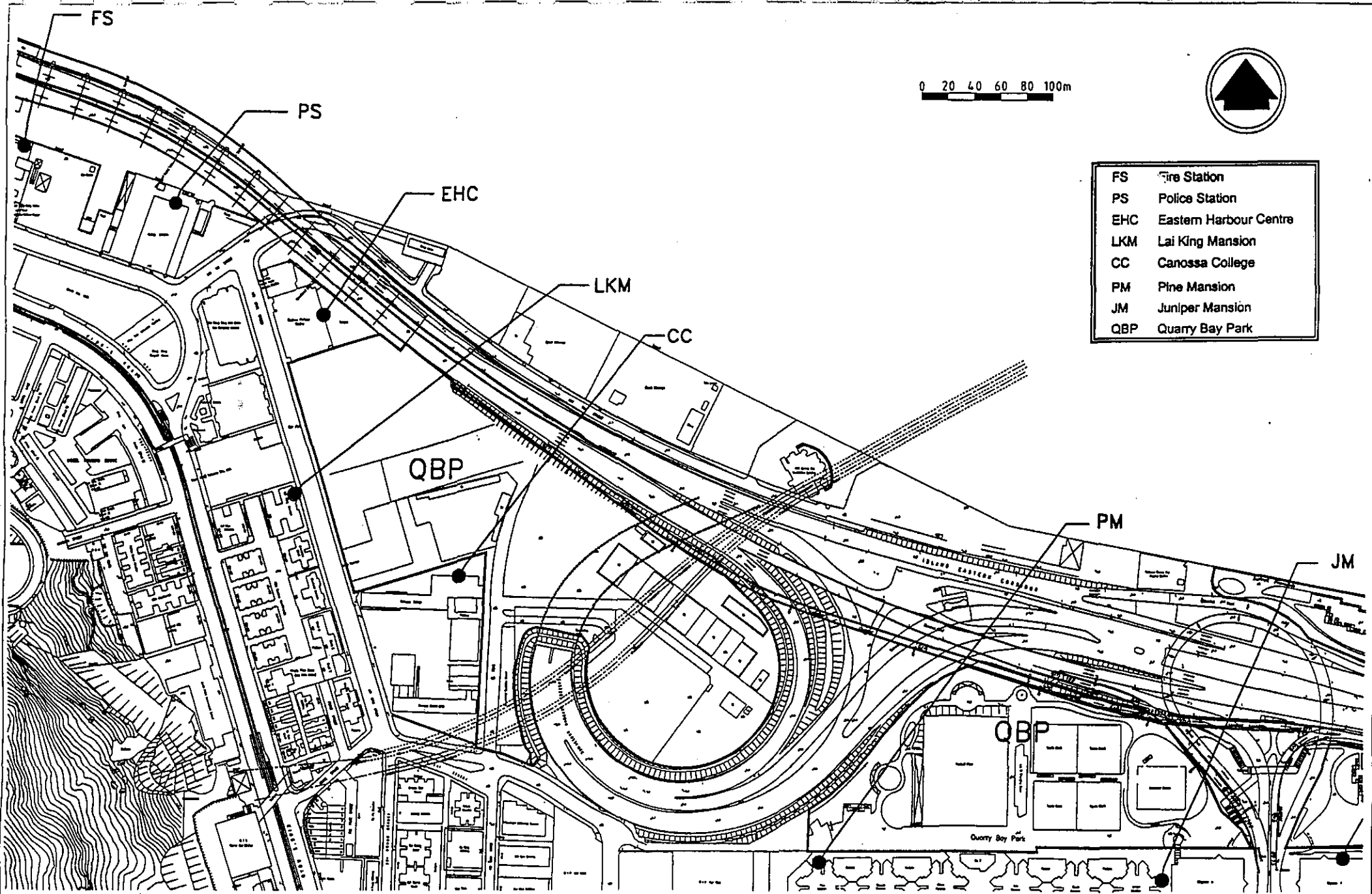


AGREEMENT NO CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

LOCATIONS OF REPRESENTATIVE AIR SENSITIVE RECEIVERS (SHEET 1 OF 3)

FIGURE NO.	3a
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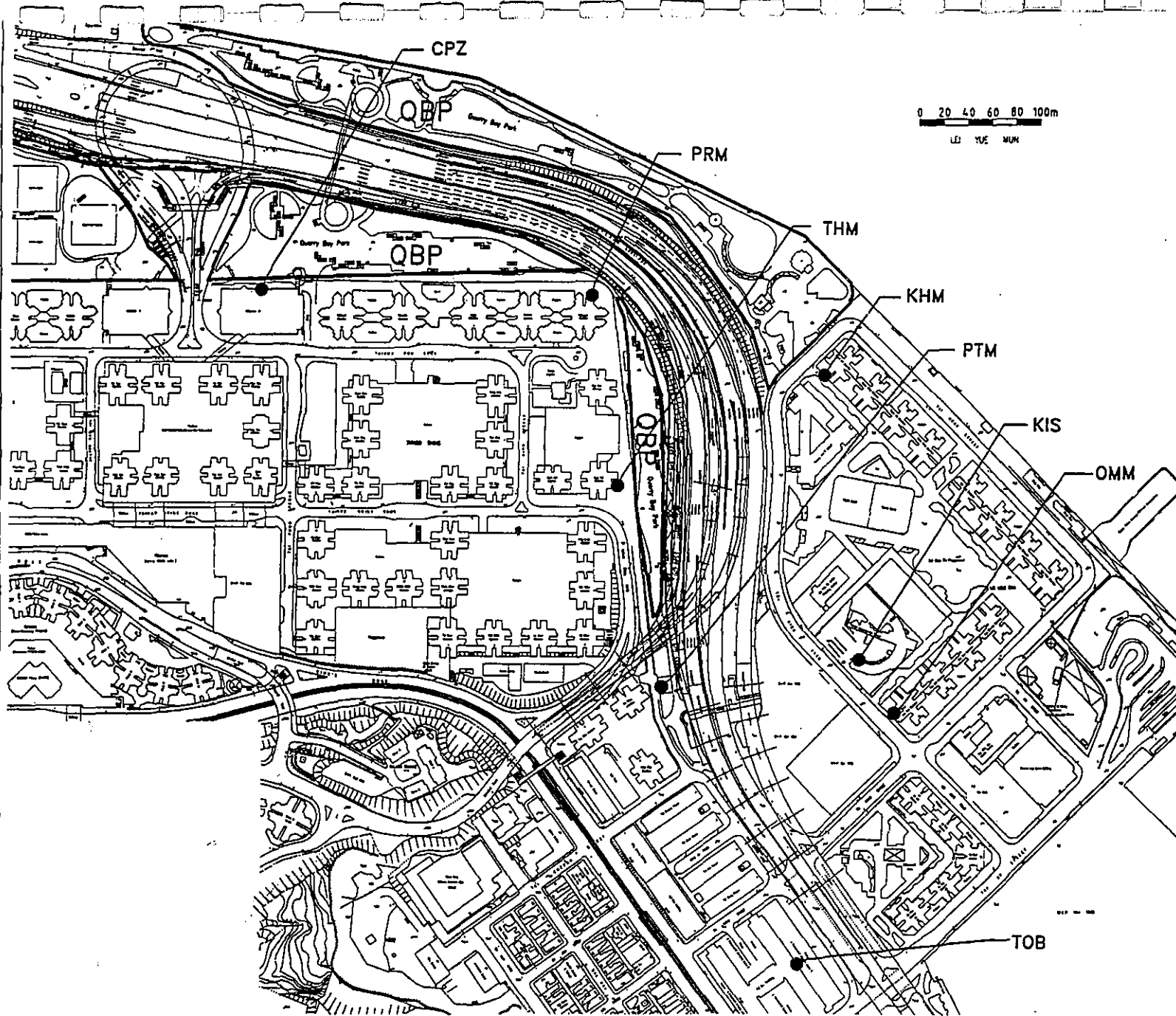
FS	Fire Station
PS	Police Station
EHC	Eastern Harbour Centre
LKM	Lai King Mansion
CC	Canossa College
PM	Pine Mansion
JM	Juniper Mansion
QBP	Quarry Bay Park

AGREEMENT NO CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

LOCATIONS OF REPRESENTATIVE AIR SENSITIVE RECEIVERS (SHEET 2 OF 3)

FIGURE NO.		3b
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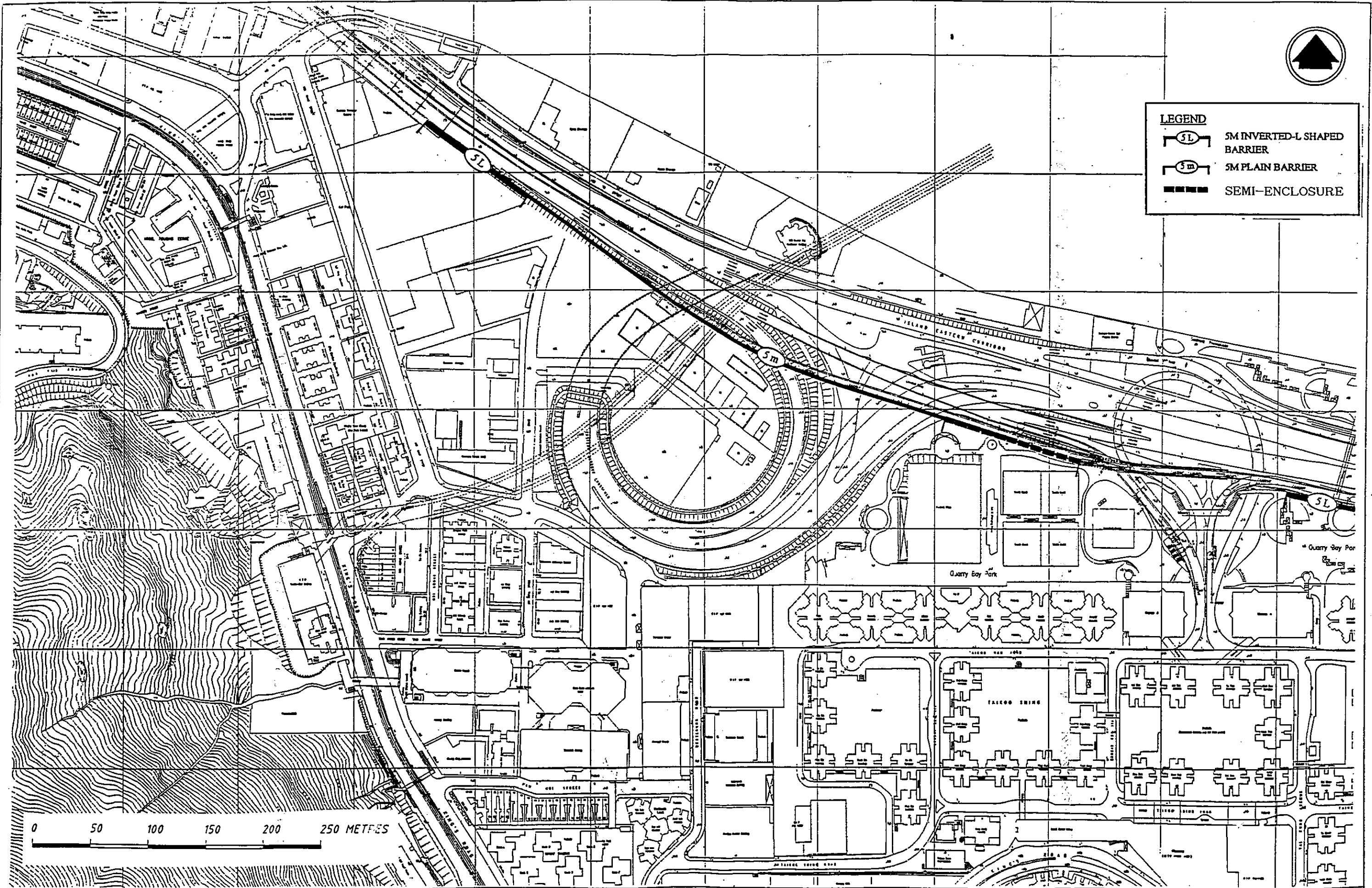
CPZ	Cityplaza 4
PRM	Primrose Mansion
THM	Tung Hoi Mansion
KHM	Kwun Hoi Mansion
PTM	Po Tong Mansion
KIS	Korean International School
OMM	On Ming Mansion
TOB	Tai On Building
QBP	Quarry Bay Park

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LOCATIONS OF REPRESENTATIVE AIR SENSITIVE RECEIVERS (SHEET 3 OF 3)

FIGURE NO.	3c	
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RECOMMENDED MITIGATION MEASURES (SHEET 1 OF 2)

FIGURE NO.

4a

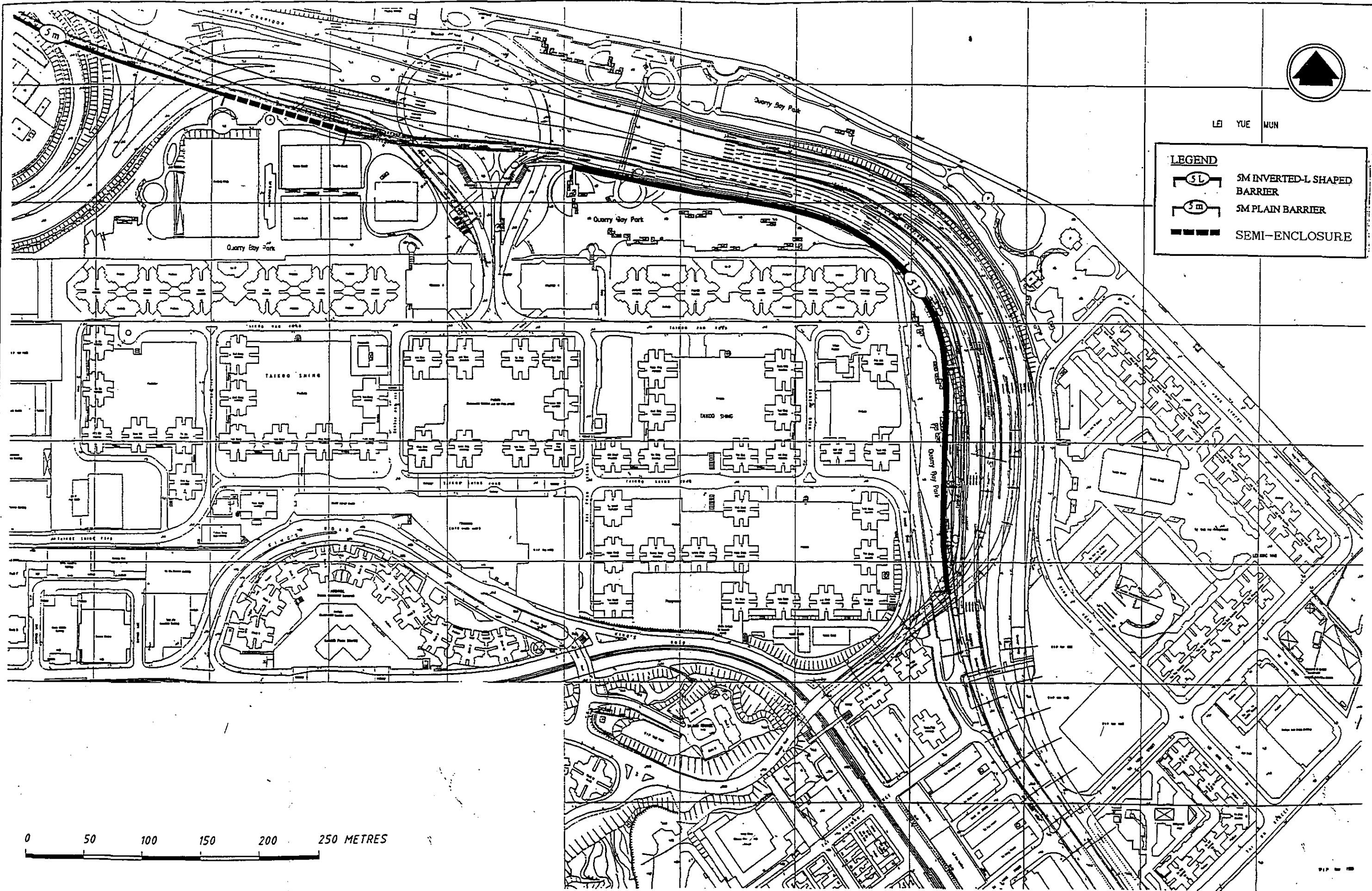
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AGREEMENT NO CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

RECOMMENDED MITIGATION MEASURES (SHEET 2 OF 2)

FIGURE NO.

4b

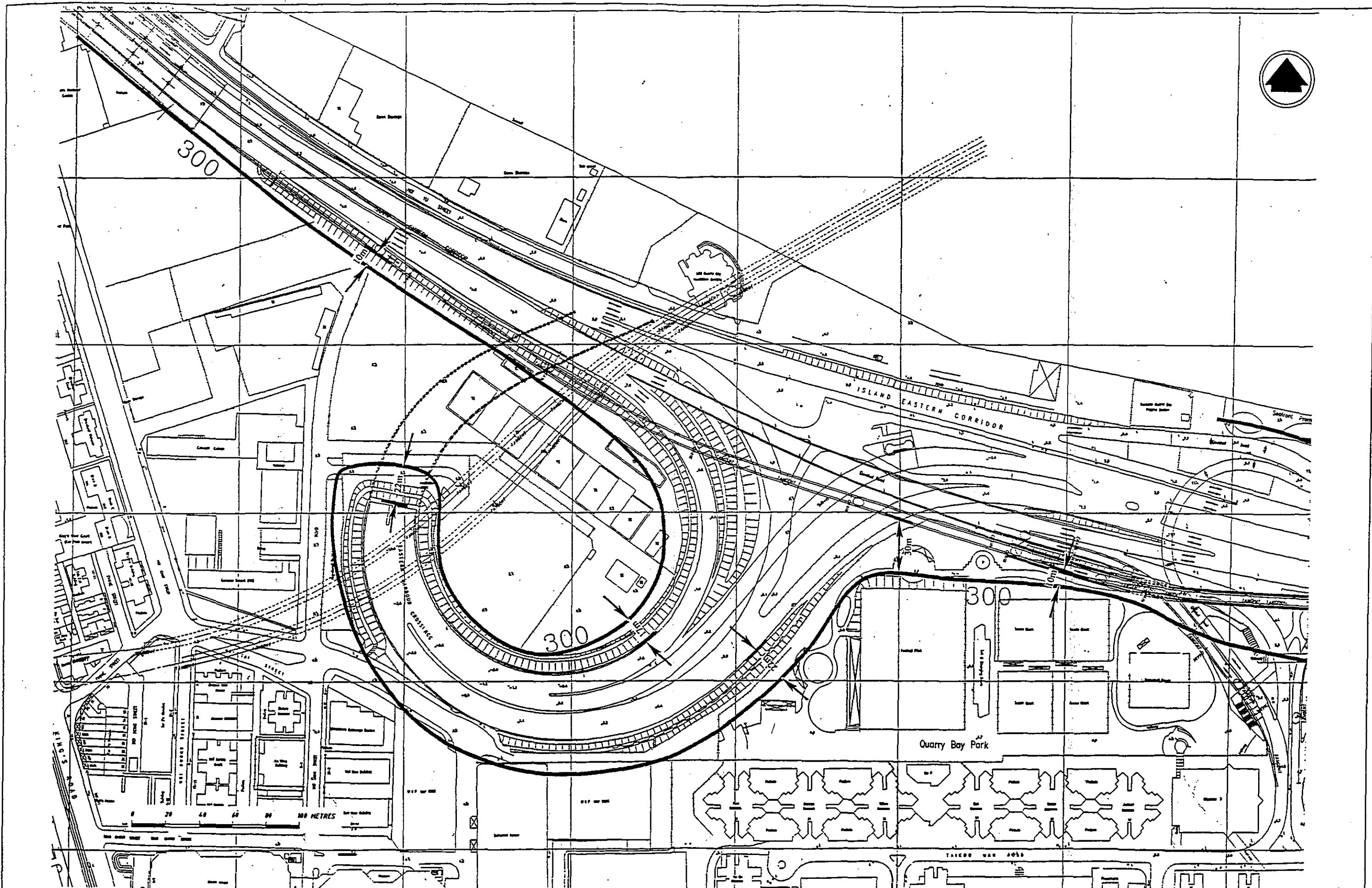
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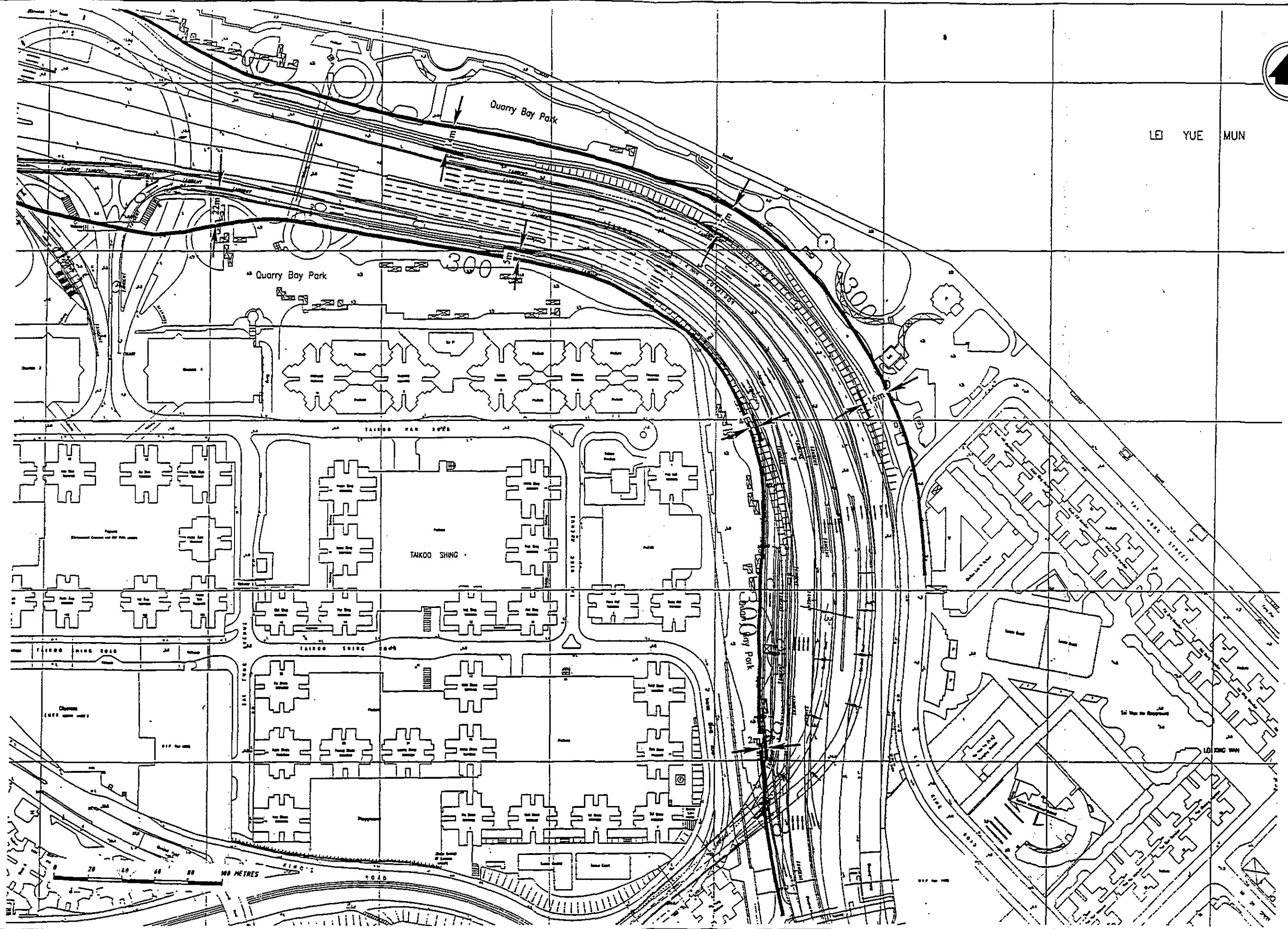


AGREEMENT NO. CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

PREDICTED 1-HOUR AVERAGE NO₂ CONCENTRATIONS (µg/m³) CONTOURS
 AT LOCAL GROUND LEVEL - MITIGATED (SHEET 1 OF 2)

FIGURE NO.	5a
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AGREEMENT NO CE82/96 - IMPROVEMENTS TO ISLAND EASTERN CORRIDOR SECTION BETWEEN NORTH POINT INTERCHANGE AND SAI WAN HO

PREDICTED 1-HOUR AVERAGE NO₂ CONCENTRATIONS (µg/m³) CONTOURS
 AT LOCAL GROUND LEVEL - MITIGATED (SHEET 2 OF 2)

FIGURE NO.

5b

SCALE:

AS SHOWN

DATE:

JANUARY 98

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