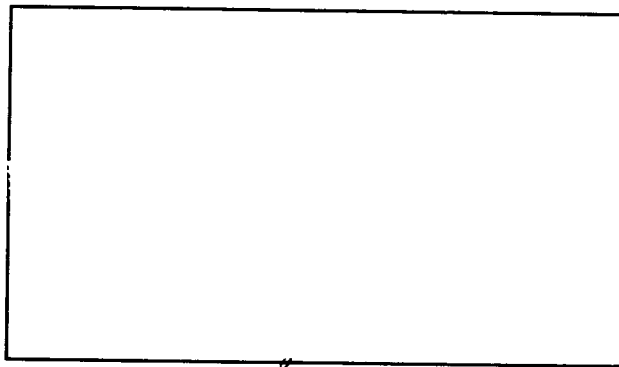


Agreement No. CE 46/96

Feasibility Study on Alternative  
Alignment for the Western Coast  
Road, TKO : *Environmental Impact  
Assessment-Executive Summary*

27 August 1999

Reference C1609



# **1 INTRODUCTION**

## **1.1 Background**

1.1.1 On 16 January 1997, the Territory Development Department of the Hong Kong Government commissioned Maunsell Consultants Asia Limited as the lead consultant for the Feasibility Study on the Alternative Alignment for the Western Coast Road, Tseung Kwan O under Agreement No. CE 46/96. The purpose of the Feasibility Study is to identify alternative alignment options for the Western Coast Road (WCR) and recommend the preferred alignment option for which Preliminary Design will be developed (hereafter referred to as the Project).

1.1.2 As part of this Feasibility Study, Environmental Resources Management (ERM) Hong Kong, Limited were commissioned to undertake the Environmental Impact Assessment (EIA) to provide environmental input during the alignment option selection and to assess the environmental feasibility of the preferred alignment in order to ensure compliance with Hong Kong Government standards and guidelines. Hassell were commissioned to undertake the cultural heritage and landscape/visual impact studies.

## **1.2 Project Description**

1.2.1 The primary objective of the Feasibility Study is to identify and evaluate the feasibility of alignment options in providing a new major trunk road connection between Tseung Kwan O (TKO) New Town and South East Kowloon (SEK). The current TKO population of around 220,000 is planned to increase to 445,000 with a possible further increase to 520,000. WCR would provide access from East Kowloon for the increased population at TKO and provide a safe route for Dangerous Goods Vehicles (DGV) to and from Area 137, TKO. WCR would also provide access between Eastern Kowloon and other port developments in TKO (such as that in Area 131).

1.2.2 Without the Project, it is expected that existing road infrastructure would not be able to accommodate future population demand in the area and alternative routing would be required for the transport of DGV. The planning of the Project has been undertaken so as to meet the required traffic carrying capacity with the potential for impacts to the local community, environment, road and marine transport activities minimised.

1.2.3 As part of the alignment option assessment, a number of alternative alignment schemes including coastal and inland options were developed and evaluated based on a number of considerations such as environmental, engineering, traffic, cost, marine and land use. A preferred alignment as shown in Figure 1 has subsequently been recommended for further preliminary engineering design, forming the basis of the EIA report.

### **1.3 Construction Phase**

- 1.3.1 The construction of the WCR has been divided into four sections as described below.

#### *TKO Section*

- 1.3.2 The TKO Section of WCR would be built on a narrow strip of reclamation along the TKO coastline towards the Lei Yue Mun Headland. The area of reclamation required for WCR in the TKO Section would be about 75,200 m<sup>2</sup> (7.5 ha), approximately 80 m wide and 940 m in length.

#### *Lei Yue Mun Headland Section*

- 1.3.3 This Section comprises cut and cover tunnel works for a short tunnel of approximately 175 m involving: site clearance, excavation, tunnel construction, slope works and drainage/utility works.

#### *Lei Yue Mun Slip Roads*

- 1.3.4 Construction for the slip road will involve site clearance, cut and fill works, piling work, roadworks and drainage utility works. It is expected that access to this Section of the alignment will be through the Yau Tong area. However, it is expected that the number of vehicles travelling along haul routes will be minimal, as most of the excavated material will be used on-site such as for slope works or reclamation.

#### *Yau Tong Coastal Section*

- 1.3.5 This Section will comprise the reclamation works and subsequent road infrastructure works. The works will involve the dredging and construction activities required for the seawall, reclamation and the proposed submerged rubble mount and protective pile at Yau Tong Bay; reprovisioning of the new pumping station, ferry pier, CED Maintenance Depot and FMO Fish Market; and construction of the roadway.

### **1.4 Operation Phase**

- 1.4.1 WCR is proposed to operate as a dual 4-lane roadway along the TKO Section to cope with the anticipated traffic generated from the future housing, commercial, port and industrial developments in TKO. WCR would then be reduced to a dual 3-lane roadway as it reaches the Lei Yue Mun Headland and traverses into the Yau Tong Area where it connects to the South East Kowloon area. The slip roads in the Yau Tong area will be 1 or 2-lane single carriageways. (See Figure 1)

## **2 NOISE**

### **2.1 Construction Phase**

- 2.1.1 The EIA Study results indicated that the Project would result in noise impacts at noise sensitive receivers in the Study Area. With the implementation of the recommended noise mitigation measures, such as use of quiet plant and construction techniques, movable noise barriers and by reducing the number of plant operating simultaneously, the predicted noise levels will meet the noise criteria during construction activities,
- 2.2 Operation Phase**
- 2.2.1 Computer noise modelling indicate that the operation of the Project is likely to result in exceedances of the traffic noise criteria for residential dwellings and schools in the Study Area. A package of direct noise control measures at the roadside has been recommended to mitigate the noise impact to within the noise criteria, including noise barriers, cantilever noise barriers, semi and full enclosure, as shown in Figure 2-5. With the implementation of these mitigation measures, 2,090 dwellings and 55 classrooms would meet the criteria stipulated in the EIA Ordinance-Technical Memorandum (EIAO-TM) criteria.
- 2.2.2 However even with all practical mitigation measures on the new roads exhausted taking into account site, engineering and traffic safety constraints, there are still a few planned noise sensitive receivers (NSRs) with noise exceedances. Therefore indirect technical remedies in the form of provision of Type I glazing (as specified in the EIAO-TM) and air-conditioning are recommended for the affected NSRs as a last resort to meet the noise criteria.
- 2.2.3 With the implementation of the recommended measures, no residual noise impact is anticipated during operation of the Project.
- 2.2.4 Noise emissions from the reprovisioned Fish Market and CED Depot are predicted to comply with the relevant EIAO-TM daytime and night-time criteria at neighbouring NSRs.

### **3 AIR QUALITY**

#### **3.1 Construction Phase**

- 3.1.1 Dust will be the main pollutant during the construction of the Project from activities associated with reclamation, site clearance, ground excavation, materials handling and vehicle movements on unpaved site roads. With the implementation of standard dust suppression measures as set out in the APC (Construction Dust Regulation), the EIAO-TM dust criteria will be met at all air sensitive receivers.

#### **3.2 Operation Phase**

- 3.2.1 Vehicle exhaust will be the major pollutant source during the operation of the Project. Air quality computer modelling results indicated that air quality

at air sensitive receivers will meet the statutory Air Quality Objectives. Ventilation design specifications of air exchange rates have been recommended for the short tunnel and noise enclosure, to comply with the Government tunnel air quality guidelines.

## **4 WATER QUALITY**

### **4.1 Construction Phase**

4.1.1 For the reclamation in the TKO Section, results of the comparative assessment of the suspended solids plume modelling used in the Area 131 Study show that the placement of fill is unlikely to lead to impacts due to the relatively small volumes of material used and long distances from water sensitive receivers.

4.1.2 For the WCR reclamation at Yau Tong, suspended solids plume modelling predicted potential exceedance of the Water Supply Department (WSD) upper limit criteria at the sea water intakes. Disturbance of contaminated marine sediments from dredging could also lead to potential impacts upon the surrounding water sensitive receivers. However, it is anticipated that the employment of the mitigation measures recommended such as use of silt curtain, closed dredger and strict dredging and handling techniques will reduce the suspended solids impacts to within the Water Pollution Control Ordinance criteria and the WSD water quality objectives.

### **4.2 Operation Phase**

4.2.1 Hydrodynamic modelling undertaken for the proposed WCR reclamation at Yau Tong and the submerged reef confirmed that there is not a reduction in the flushing of the Yau Tong Bay. The results showed that the reclamation has only a minor effect on the local hydrodynamics in terms of the local flow pattern as well as the water exchange of Yau Tong Bay.

## **5 WASTE**

### **5.1 Construction Phase**

5.1.1 The Project will generate significant quantities of waste including dredged materials, excavated materials, construction waste, demolition waste and general refuse during construction. Mitigation measures have been recommended, such as proper handling and disposal of construction waste, to ensure that adverse environmental impacts are prevented and that opportunities for waste minimisation and recycling are followed. No waste related regulatory non-compliance should therefore occur as a result of the storage, handling, collection, transport, and disposal of wastes arising from the construction and operation of the Project.

## 6 ECOLOGY

### 6.1 Terrestrial Ecology

6.1.1 The terrestrial ecological resources of the Study Area have been identified through field surveys. Given the poor ecological conditions of the Study Area, the potential for adverse ecological impacts arising from the WCR proposal is considered low and it is considered that there would be no adverse residual terrestrial ecology impacts, particularly with the implementation of planting as proposed as part of the landscape assessment which would provide more than 4 ha of dense tree and shrub woodland planting and more than 0.4 ha of ornamental planting. However, recommendations have been made to minimise disturbance to the surrounding habitats during construction, particularly the scrubland /grassland mosaic habitat near the northern end, the Black Kite nest and the patches of protected Chinese New Year Flower (*Enkianthus quinqueflorus*). No adverse impacts are expected on the protected orchid species *Arundina chinensis* and *Habenaria linguella* which are located outside the work site boundary.

### 6.2 Marine Ecology

6.2.1 Information from literature review and field surveys on baseline conditions indicated that intertidal and subtidal hard surface habitats are of medium ecological value. Soft bottom habitats identified in the review were regarded as of low ecological value. No sightings of marine mammals have been reported in the vicinity and therefore the area is not considered as an important habitat for Hong Kong's resident dolphin and porpoise populations. The only marine ecological sensitive receiver identified in the area is the Tung Lung Chau Fish Culture Zone. The impact assessment indicated that Project generated impacts to this location were predicted to be within the Water Quality Objectives and no adverse impacts would occur.

6.2.2 The impacts occurring as a result of construction and operation of the WCR are the direct loss of medium ecological value intertidal and subtidal hard bottom assemblages present within the reclamation site which can be mitigated through the provision of tetrapod seawalls on which soft and hard coral assemblages can colonise and grow. The ecological value soft bottom subtidal assemblages is not considered to be significant as these have been found to be of low value. The mitigation measure coupled with the finding that the habitat ranges from low to medium ecological value combine to reduce the residual impact to acceptable level.

## 7 LANDSCAPE AND VISUAL

7.1.1 The proposed WCR is expected to result in differing degrees of impact to the landscape character of the Study Area. The main landscape impact would be in the Yau Tong area through significant change to the harbour frontage and on Lei Yue Mun due to disturbance to patterns of settlement in the fishing village, loss of nature/coastline and loss of hillside vegetation. The main visual impacts would be related to an introduction of a highway

structure to existing views, such as from Lei Yue Mun fishing village settlements and housing developments at Ko Chiu Road and Lei Yue Mun.

7.1.2 These softworks mitigation proposals would consist of approximately 4 ha of dense tree and shrub woodland planting and 0.4 ha of ornamental planting. It should be noted that no off-site mitigation measures are proposed. In accordance with Annex 10 of the Technical Memorandum, the overall level of impact is considered acceptable with mitigation measures.

7.1.3 There is limited scope for mitigation measures for the elevated sections of road, particularly those across stretches of water. Mitigation measures have been recommended to minimise the potential landscape and visual impacts, such as co-ordinated design of road structures, including noise barriers and full enclosures, to create landscape and visual elements that are integrated with the surrounding environment; screen buffer tree and shrub planting on both sides of the road and newly formed slopes; and consideration of all new formed slopes to have natural looking contours.

## **8 CULTURAL HERITAGE**

8.1.1 The WCR will avoid physical encroachment/interference with the Tin Hau Temples, Devil's Peak Fort and Military Installations, Ming Chiu Tong and the Lei Yue Mun Village Burial Ground. Impacts will however result from conflict of the proposed road alignment with some of the cliff faces of the historic quarry landscape. The road alignment, where it impacts with the cliff faces, will be reviewed at the design stage in order to make every effort to retain a significant section of the quarry. The proposed WCR is considered to be acceptable with mitigation measures from the cultural heritage point of view.

## **9 ENVIRONMENTAL MONITORING & AUDIT**

9.1.1 An Environmental Monitoring and Audit (EM&A) programme has been recommended based on the findings and recommendations of the EIA, setting out details of the monitoring and audit requirements and procedures for the Project construction and operation, to ensure efficacy of mitigation measures and compliance with established environmental guidelines and standards.

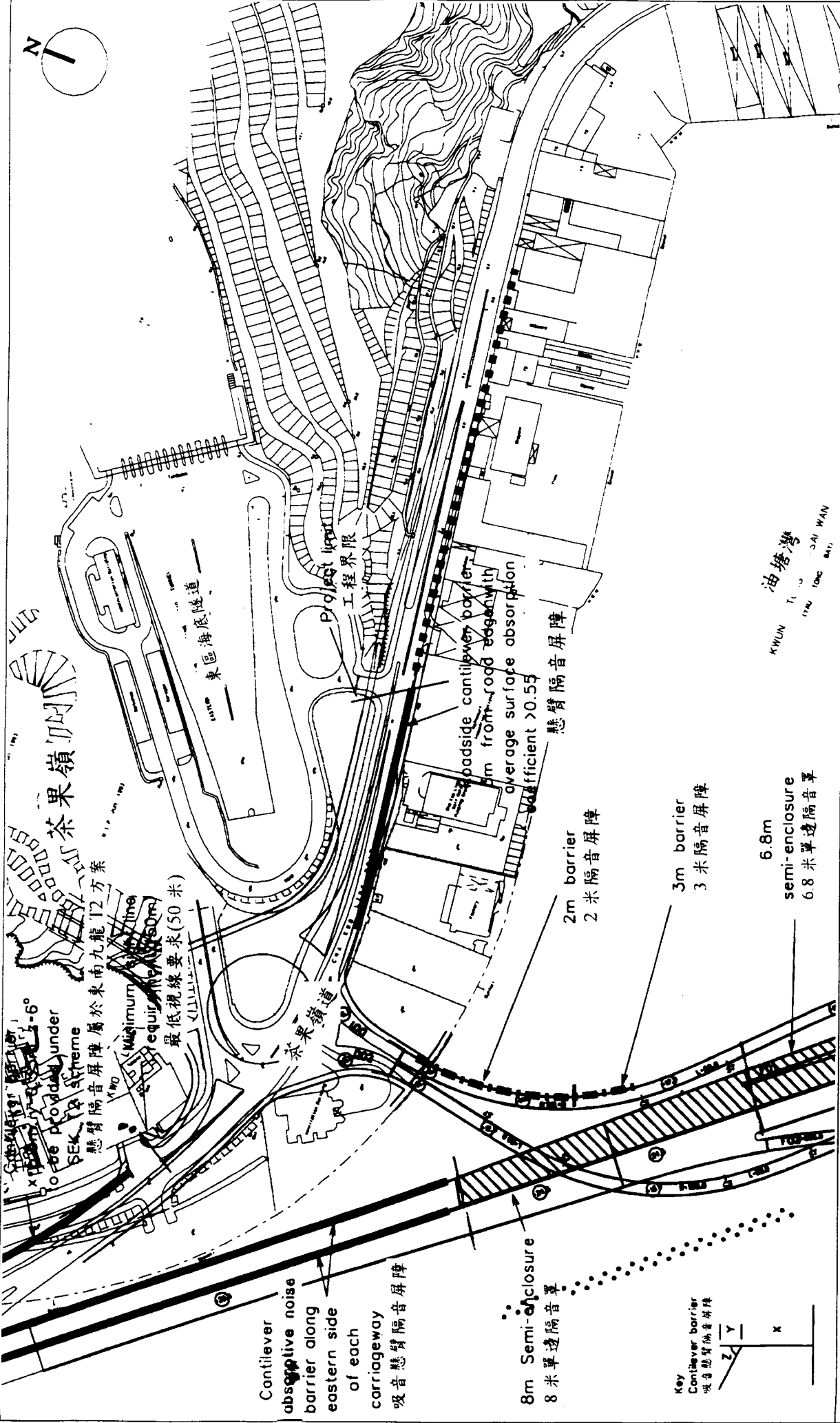
## **10 CONCLUSION**

10.1.1 The EIA Study presented a detailed assessment of the potential environmental impacts associated with the construction and operation phases of the WCR, based on the latest information available. Environmental mitigation measures and EM&A requirements have been recommended, which will form the basis of the Environmental Permit under the EIA Ordinance. The findings of the report indicate that with the implementation of the mitigation measures, checked by the EM&A programme, the proposed

Project will fulfill the requirements of the EIA Ordinance and comply with the established environmental guidelines and standards.

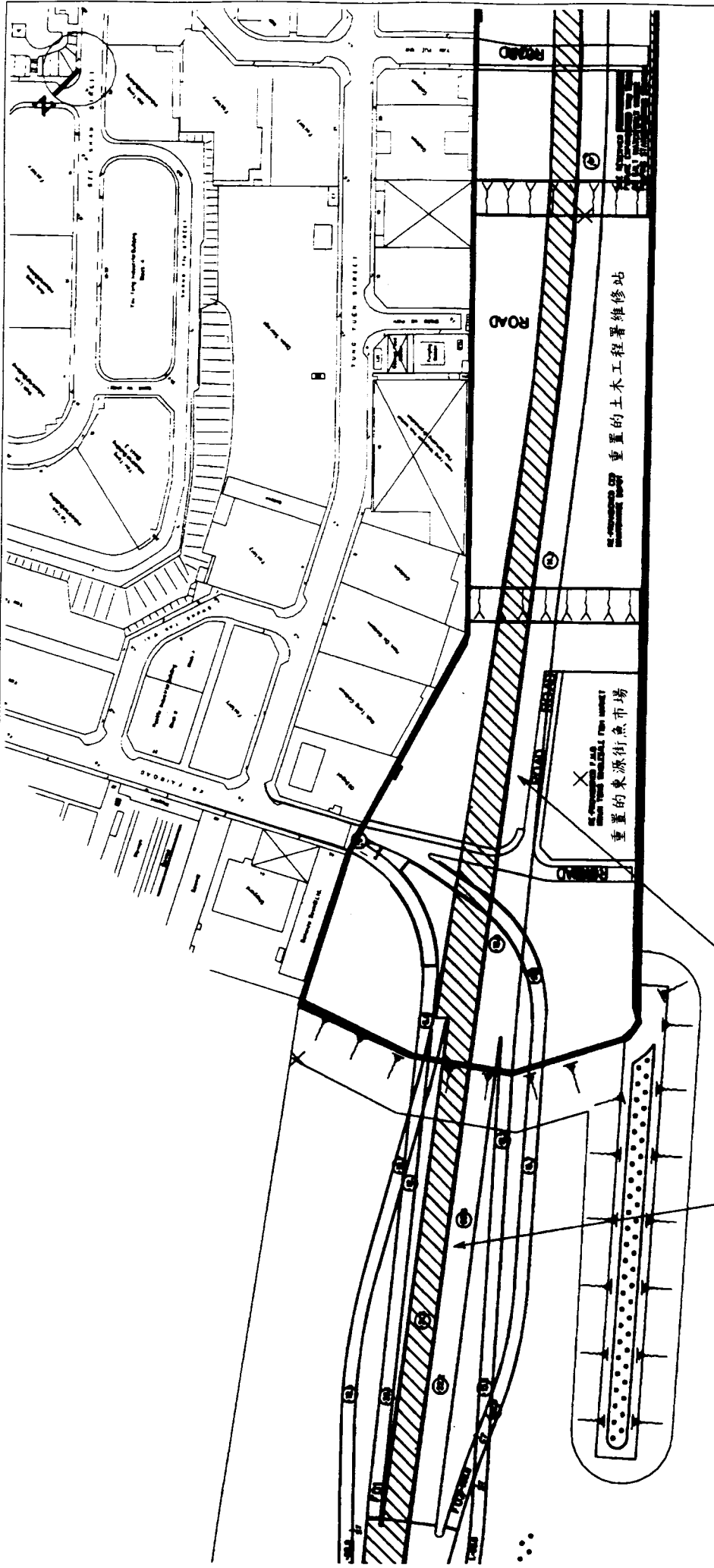






WESTERN COAST ROAD NOISE MITIGATION (SHEET 1 OF 4)

西岸公路噪音緩解措施



6.8m semi-enclosure with 2.5m overhang above western carriageway

6.8米單邊隔音罩在西面行車路頂伸出2.5米

WESTERN COAST ROAD NOISE MITIGATION (SHEET 2 OF 4)  
 西岸公路噪音緩解措施

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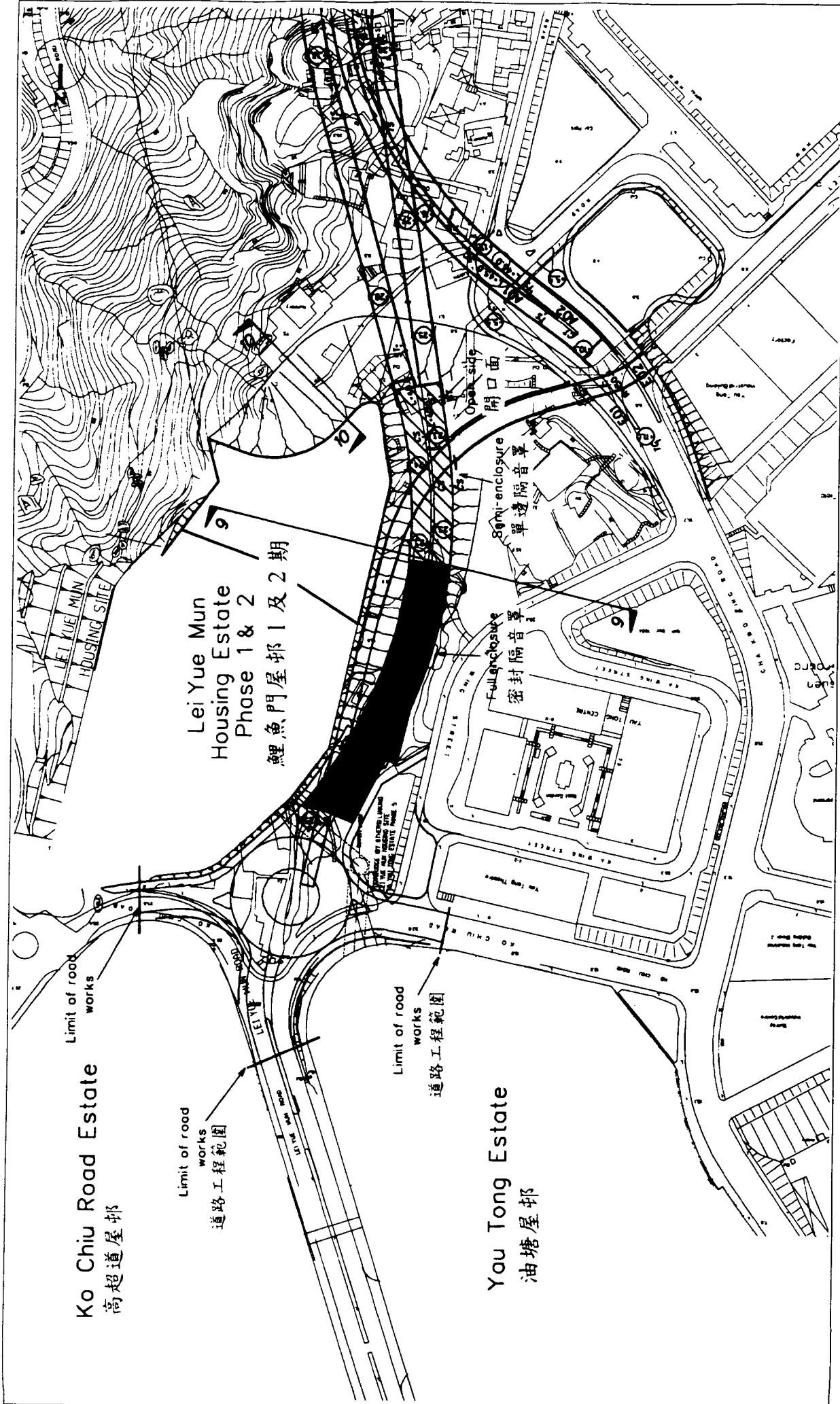
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6.8m semi-enclosure  
6.8米單邊隔音罩

WESTERN COAST ROAD NOISE MITIGATION (SHEET 3 OF 4)  
西岸公路噪音緩解措施

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Ko Chiu Road Estate  
高超道屋邨

Limit of road works  
道路工程範圍

Lei Yue Mun  
Housing Estate  
Phase 1 & 2  
鯉魚門屋邨 1 及 2 期

Limit of road works  
道路工程範圍

You Tong Estate  
油塘屋邨

Full enclosure  
密封隔音罩

Semi-enclosure  
半邊隔音罩

Open side  
開口面

WESTERN COAST ROAD NOISE MITIGATION (SHEET 4 OF 4)  
西岸公路噪音緩解措施

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