

Hong Kong Government
Highways Department
路政署



Route 5
Section Between
Shek Wai Kok and Chai Wan Kok
五號幹線 - 石圍角至柴灣角段

Environmental Impact Assessment

Executive Summary

環境影響評估摘要

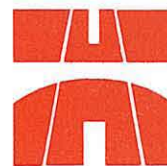
Mott MacDonald Hong Kong Ltd.

in association with

EBC Hassell Limited

February 1995

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Introduction

Route 5 comprises the section of the New Territories Circular Road between Shatin and Tsuen Wan. The connection from Shatin to Shek Wai Kok was completed and opened to traffic in April 1990 with the opening of the Route 5 tunnels project and the Territory Development Department now proposes to construct the section from Shek Wai Kok to Chai Wan Kok. Highways Department have been appointed as works agency for the project. This section of the road is urgently needed to reduce congestion and the environmental effect of heavy traffic through the central areas of Tsuen Wan, and has been included on the Outline Zoning Plan and Outline Development Plan for several years.

Traffic between Tuen Mun Road/Castle Peak Road (Sham Tseng) and Route 5 currently passes through the congested road network within Tsuen Wan. During peak hours, the four signalized junctions, viz., Castle Peak Road/Tsuen King Circuit, Castle Peak Road/Tai Chung Road, Sha Tsui Road/Tai Ho Road and Sha Tsui Road/Tai Chung Road are already loaded close to or beyond their capacities. Traffic queues are regularly observed at the approaches to signalised junctions along Castle Peak Road (Tsuen Wan) between Sha Tsui Road and Sai Lau Kok Road in the Kowloon bound direction during the morning peak hours and in the Tuen Mun bound direction in the evening peak.

By 2001, without the Route 5 Extension, major junctions along both Castle Peak Road (Tsuen Wan) and Sha Tsui Road are expected to be overloaded beyond their capacities by about 30%. This would result in long traffic queues on Castle Peak Road (Tsuen Wan) extending to Tuen Mun Road thereby blocking the Kowloon bound movements during the peak hours. Traffic movements along local roads in the vicinity would also be seriously impeded. Most important, any incident on Castle Peak Road (Tsuen Wan) and Sha Tsui Road causing a reduction in the road capacity would easily bring about a complete grid-lock to traffic circulation in the area.

The design of the project is being undertaken in-house by Highways Department who have commissioned Mott MacDonald Hong Kong Limited to carry out an environmental impact assessment (EIA). Full details of the EIA are presented in the Final Assessment Report. This Executive Summary presents the main findings, conclusions and the recommendations of the study. The location of the new road and its alignment are shown on Figure 1.

The EIA Study has been carried out to a Brief prepared by Government and agreed with Government Departments prior to the start of the work. The work has been managed by a Steering Group chaired by Highways Department with technical issues resolved in a Working Group chaired by Environmental Protection Department (EPD). The key issues that have been considered and evaluated include air, water and noise pollution during construction and operation of the project, together with visual impact and impacts on the ecology of the area.

Sensitive receivers were identified in accordance with the recommendations of the Hong Kong Planning Standards and Guidelines and the existing environmental framework was determined from data collected by EPD at their routine monitoring stations, supplemented by site inspections. A comprehensive noise monitoring survey was carried out to determine the background noise levels.

Project Description

The new road will be a high speed dual carriageway constructed partly on a new alignment and partly by improvement of the existing Castle Peak Road. The new road will start at its eastern end with improvement works to the Tsuen Kam Interchange where an underpass will be constructed. The road will then run in a westerly direction parallel to and to the north of the Mass Transit Railway (MTR) line and to the south of the slope leading up to Route Twisk before crossing the MTR on an overbridge close to the China Dyeing Works site. A new development is being constructed at the China Dyeing Works site over the new road which will pass through the podium of the development in tunnel. To the west of the China Dyeing Works redevelopment site the new road will be at-grade along the existing Castle Peak Road. The existing junction between Castle Peak Road and Tsuen King Circuit will be modified to accommodate the flyover for Route 5 and to improve traffic flow. The project limit at the western end will be at the intersection with Tuen Mun Road in Chai Wan Kok where new slip roads to the existing interchange will be constructed.

Environmental Framework

Land uses in the Study Area are mixed and range from recreational, residential, commercial and industrial in an urban environment to semi-rural and squatter type developments and established plantations and woodland. Residential and other land uses which will be sensitive to environmental impacts are shown on Figure 1 and will include the following (from east to west):

- o high rise residential blocks in the vicinity of Tsuen Kam Interchange. These include Shek Wai Kok Estate and Fairview Garden;
- o predominately low rise village houses in Hoi Pa Village South Terrace (due to be completed in 1995) and along Route Twisk (Pak Tin Pa Tsuen, Nam Tin Chuk, Muk Min Ha Tsuen, Pak Yin Pa and Pak Tin Pa San Tsuen). Nam Tin Chuk is further from the proposed new road than the other villages but includes the Tung Lam Home for the Aged and a sitting out area at the southern extremity of the village;
- o high rise residential blocks at Luk Yeung Sun Chuen above the MTR depot. Kwai Ming Wu Memorial School of the Precious Blood is located to the west of this development;
- o the proposed new development at the China Dyeing Works site will comprise high rise residential blocks on a podium; and
- o high rise buildings along Tsuen King Circuit and Castle Peak Road to the west of the China Dyeing Works site. These include a proposed development by Nam Fung Textiles.

The Study Area is already affected by noise and air pollution with impacts from industry and road traffic being key issues. Road traffic noise levels are particularly high with some residential blocks experiencing noise levels as high as 76 dB(A) according to measurements take during the EIA Study. Air pollution measured at the EPD monitoring station at Tai Ho Road, Tsuen Wan shows levels of about half the Air Quality Objectives. Water courses are relatively unpolluted in the upper parts of the catchment but pollution levels increase further downstream due to pollution from the urban and industrial developments. The nearest nature conservancy area to the Study Area is the Tai Mo Shan Country Park, about 0.7km to the north but there are no Sites of Special Scientific Interest or other Special Areas in the Study Area except for the Tang Clan Ancestral Grave, a Site of Archaeological and Historical Interest. This site has not been assessed in this Study.

Environmental Impacts during Construction

The analysis of potential air and water pollution during construction has shown that there are not likely to be any impacts which exceed the standards recommended by EPD, although strict dust control will be required throughout the works. The EIA Study has recommended environmental monitoring and audit to ensure that these impacts are kept under control by the contractor. Because there are no vegetation or fauna of conservation significance, the consequences of the works in terms of Hong Kong's overall botanical or ecological resources are minimal.

Noise from construction should be limited to Leq (30 min) 75 dB(A) during the daytime. It is possible that this level could be exceeded on occasions but the contractor will be required to implement mitigation measures to control the noise. Night working will only be required on a few occasions and noise during these periods will be controlled under the Noise Control Ordinance. Noise barriers and enclosures will need to be used during construction to reduce the noise to meet the recommended maximum levels. The largest impacts during night working will be in the vicinity of the China Dyeing Works site where night possessions for works above the MTR will be required. Noise Control clauses will be specified in the works contract to control the noise impact during construction. Options for mitigation of construction noise will include:

- o use of silenced equipment;
- o scheduling activities to avoid parallel operations of several sets of powered mechanical equipment;
- o siting of equipment as far as practicable from noise sensitive receivers; and
- o use of temporary enclosures and/or noise barriers placed close to the noise sources to screen specific receivers.

The EIA report has recommended monitoring and audit of noise throughout the construction. For construction during normal working (unrestricted) hours (0700-1900 hours) impact monitoring should comprise L_{eq} (30 minute) taken at least twice per week. Impact monitoring for construction outside normal working (restricted) hours (1900 - 0700 hours) should comprise L_{eq} (5 minute) taken twice per day, once in each of the restricted periods, unless complaints are received in which case more frequent measurements will be necessary. The precise programme for impact monitoring should be determined when details of the contractor's programme for construction are known.

Environmental Impacts during Operation

The key issue during operation will be impacts from traffic noise. The study has also considered air and water pollution but has concluded that these will meet current standards. Similarly, there will be no significant visual or ecological impacts. The air pollution within the tunnel through the China Dyeing Works redevelopment has been assessed and found to be within the standards recommended by EPD. Similarly air pollution from vehicles travelling along the road will not cause Air Quality Objectives to be exceeded at any of the sensitive receivers.

The traffic noise impact study identified the sensitive receivers and noise measurements were made to establish the baseline noise levels. Traffic predictions (shown in Table 1) for the proposed new road, provided by Transport Department, were used to predict noise levels for the year 2011. The traffic noise impact assessment followed the techniques given in the UK Department of Transport's "Calculation of Road Traffic Noise" as recommended in the Hong Kong Planning Standards and Guidelines.

The EIA has identified that about 4,300 dwellings and two schools will be affected by traffic noise which will exceed the noise standards once the road extension is in use. To ameliorate the future traffic noise problem, a package of direct technical remedies in the form of open-textured road surface on the full length of the road and road cover, partial enclosures and noise barriers along sections of the Route 5 extension and the existing roads within the project area have been incorporated, wherever practicable, into the project proposal. Noise barriers will be reflective or absorptive and will incorporate vision panels where necessary to avoid compromising sight lines. The recommended package of direct technical remedies is shown on Figure 1. The capital cost of the mitigation measures will be about HK\$266 million out of the estimated total capital project cost, including noise mitigation measures, of HK\$1000 million. The existing and predicted traffic noise levels and the effects of the mitigation measures on the identified noise sensitive receivers are shown on Figure 2. The EIA indicates that with the incorporation of the proposed mitigation measures, no existing dwellings will be eligible for indirect technical remedies in the form of window insulation and air-conditioners.

Conclusions

The section of Route 5 from Shek Wai Kok to Chai Wan Kok is a priority project to reduce traffic congestion and environmental impacts in the central parts of Tsuen Wan.

The EIA Study has considered the magnitude and acceptability of all environmental impacts from the project and has concluded that the key issues will be noise during construction and operation.

Mitigation measures have been considered to reduce noise from traffic and road enclosures and barriers have been recommended along parts of the road together with the application of a low noise road surfacing.

Table 1 2011 AM Peak Traffic in Veh/Hr

Road Link	Direction	Traffic Flow	
		Total Vehicles	% Heavy Vehicles
Route 5			
Cheung Pei Shen to	W/B	1500	50
Tsuen Kam Interchange	E/B	800	72
Route 5			
Tsuen Kam Interchange	W/B	2400	57
to Castle Peak Road	E/B	2400	53
Slip Road from Route 5	E/B	1600	43
to Tsuen Kam Interchange			
Slip Road from Tsuen Kam	W/B	900	69
Interchange to Route 5			
Castle Peak Road (at grade)			
Tai Chung Rd to Tai Ho Rd N	W/B	1000	94
	E/B	1600	39
Route 5 to Tai Chung Rd	W/B	1400	40
	E/B	1900	40
Sha Tsui Rd to Route 5	W/B	3800	52
	E/B	4200	49
Chai Wan Kok Interchange	W/B	2000	48
to Sha Tsui Rd	E/B	2600	40
Tuen Mun Rd	W/B	1300	59
	E/B	1500	63
Tai Chung Rd	W/B	600	38
	E/B	700	42
Tsuen King Circuit	W/B	200	4
	E/B	200	11
Route Twisk	W/B	1100	71
	E/B	900	37
Cheung Pei Shen Rd	W/B	900	37
	E/B	1200	59
Tai Ho Road North	W/B	1200	35
	E/B	700	49
Texaco Road North	W/B	2300	60
	E/B	2200	49
Wai Tsuen Rd	W/B	300	54
	E/B	500	34

CE 38/92號合約

第五號幹線—從石圍角至柴灣角的路段

環境影響評估研究

摘要報告

引言

第五號幹線是新界環迴公路的一段道路，位於沙田與荃灣之間。隨著第五號幹線隧道的通車，沙田至石圍角的連接道路於一九九零年四月竣工和通車。拓展署現在提議興建石圍角至柴灣角的一段道路，路政署已經受委擔任這項工程的工程代理人。這段道路對於舒緩荃灣中區交通繁忙引起的交通擠塞和環境影響，極為迫切需要，已經列入已往幾年分區計劃大綱圖和發展大綱圖則中。

屯門公路／青山公路(深井段)和第五號幹線之間的交通，目前流經荃灣區內交通擠塞的道路網絡。在繁忙時間，在四個燈號控制路口、即青山公路／荃景圍、青山公路／大涌道、沙咀道／大河道及沙咀道／大涌道交叉路口，交通流量已經接近或者超過它們的負載能力。在沙咀道與西樓角路之間的青山公路(荃灣段)各個燈號控制路口，往九龍方向道路在早上繁忙時間往往排列車輛長龍，往屯門方向道路在傍晚繁忙時間亦常見車龍。

到公元二零零一年，倘若沒有第五號幹線延伸道路，預計青山公路(荃灣段)以及沙咀道各個主要路口的交通負荷將超過它們的設計能力大約百分之三十，從而造成繁忙時間內青山公路(荃灣段)上的車輛長龍延長至屯門公路，以致阻塞前往九龍的車輛流動，並使鄰近的區內道路的交通情況亦大受影響。一旦青山公路(荃灣段)及沙咀道發生任何事故造成道路負載能力降低時，很容易引起區內交通癱瘓，這種後果最為嚴重。

此項道路工程的設計，正由路政署內部進行。路政署已經委託萬隆工程顧問香港有限公司(Mott MacDonald Hong Kong Limited) 進行一項環境影響評估研究。環境影響評估研究的詳細內容載於最終評估報告中。本文摘要列出該項研究的主要發現、結論和建議。新道路的位置及路線在圖1 中標示出來。

「環境影響評估研究」已經在政府編制的一份「簡報」中列出，並且在工程開展以前得到政府部門的同意。該項工程已經由路政署主持的一個指導小組管理，有關的技術問題則由環境保護署主持的一個工作小組解決。已經研究和評估的主要問題包括這條道路在施工和使用期間的空氣、水及噪音污染問題，以及這條道路對景觀和該區生態的影響問題。

環境評估人員依據「香港規劃標準與指引」的建議確定敏感的噪音接收地點，並按照環境保護署在日常監測站收集得到的數據加上現場考察所得的補充資料確定現有環境架構。他們曾進行一次全面的噪音監測測量，以便確定背景噪音水平。

工程描述

這條新道路將是一條高速雙向行車道，其中部份是新建路段，部份路段是由現有的青山公路改建而成。新道路東端自荃錦交匯處改良工程開始，該處將興建一個地下通道。新道路接著向西延伸，在地下鐵路北面與朝向荃錦公路的斜坡南面與地下鐵路平行，至中國染廠附近經過高架天橋跨越地下鐵路。中國染廠地盤上正在興建一個新物業，新道路將經過隧道穿越該物業的平台。在中國染廠重建物業地盤西面，新道路將在地面上沿著現有的青山公路伸展。青山公路與荃景園之間現有的交叉路口將予以改建，以便容納第五號幹線的行車天橋和改善交通流量。道路工程的西端，將在柴灣角與屯門公路交匯處並在此終止，這裏將興建新的連接支路與現有交匯點相接。

環境架構

本研究區內的土地用途多種多樣，包括市區環境中的遊憩用地、住宅用地、商業用地與工業用地，以至半鄉村用地、寮屋和現有種植園及林地。對此項工程的環境影響敏感的住宅及其它用途土地在圖 1 中標示出來，並將包括下列各部份（自東至西）：

- * 荃錦交匯處附近的高層住宅區，包括石圍角村和怡景園；
- * 在海霸村南台（將於1995年竣工）以及沿荃錦公路（白田霸村、南天竺、木棉下村、白田霸及白田霸新村）以低層村屋為主的住宅區。南天竺離擬建的新道路較遠，但是在該村南端有東林安老院以及休憩區；
- * 荃灣地鐵站上蓋綠楊新村高層住宅區。該村西部有寶血會伍季明紀念學校；
- * 中國染廠地盤擬建的新物業平台上將興建的高層住宅大廈；以及
- * 中國染廠地盤以西荃錦圍和青山公路一帶的高層樓宇，包括南豐紡織擬建的一項物業在內。

本研究區已經受到噪音和空氣污染的影響，工廠與道路交通造成的影響是主要問題。道路交通噪音水平特別高。根據環境影響評估研究過程中測量所得數據，某些住宅大廈經受的噪音水平達76分貝A。環境保護署設於荃灣大河道的空氣監測站測量得到的空氣污染記錄顯示，荃灣的空氣污染約為空氣質素指標

水平的一半。集水區上游的水道污染程度相對較輕，但是下游的污染程度因市區物業和工業樓宇的污水排放而加劇。大帽山郊野公園是最接近本研究區的自然保護區，大約位於研究區北面0.7公里，但是研究區內不存在任何具有特別科學價值的地域或者其它特種區域，只有鄧族祖墳是一個具有考古和歷史意義的地方，但是它沒有被劃入研究範圍內。

建築期間的環境影響

建築期間潛在的空氣及水質污染分析顯示，不大可能發生任何超出環境保護署推薦標準的影響，但在整個施工過程中必須嚴格控制塵埃。「環境影響評估研究」建議在建築期間進行環境監測和審查，確保這些影響受到承建商的控制。由于施工地區並無具有保護價值的植物和動物，此項工程對本港整體植物與生態資源的影響極微。

日間築路發出的噪音必須限制，不得超過等效連續聲級（30分鐘）75分貝A。雖然偶而可能超過這一噪音水平，但承建商需採取噪音減緩措施來控制噪音。夜間可能偶然需要施工，當時噪音將依據噪音管制條例予以控制。建築期間還需使用隔音圍牆和隔音蓋罩來降低噪音，使之符合建議的最高噪音水平。在中國染廠地盤附近需要在夜間進行地鐵上方之高架行車天橋施工，屆時將會產生最大的夜間施工噪音影響。工程合約將列出噪音控制條款，以控制建築期間的噪音影響。減緩建築噪音的措施將包括：

- * 使用消聲設備；
- * 編排施工時間，避免同一時間使用多台大功率機器設備施工；
- * 設備安放位置盡量遠離敏感噪音接受地點；以及
- * 在靠近噪音來源地點安裝臨時隔音蓋罩及／或隔音圍牆，把噪音來源與特定的噪音接受物體隔開。

「環境影響評估研究」建議，在整個建築期內實施噪音監測及審查。正常工作時間（不受限制時間）內（早上七時至晚上七時）施工的噪音影響監測應包括等效連續聲級（30分鐘）測定，每周至少進行二次。正常工作時間以外（限制時間）（晚上七時至早上七時）施工的噪音影響監測應包括等效連續聲級（5分鐘）測定，每天進行二次，每次在一段限制時間內進行，但如接到關於噪音影響的投訴需要進行更加頻密的監測。噪音影響監測的具體計劃應在獲悉承建商的詳細施工計劃後決定。

使用期間的環境影響

這條道路使用期間的主要問題是交通噪音的影響。本項研究亦考慮了空氣污染和水質污染問題，但是所得的結論是污染程度符合現行標準。工程對景觀或生態的影響亦甚微小。研究人員亦已評估穿越中國染廠重建物業隧道內的空氣污染，認為污染水平符合環境保護署建議的標準。同樣，沿著這條道路行駛的車輛引起的空氣污染，在任何敏感接收地點將不會超出「空氣質素目標」規定的範圍。

在交通噪音影響研究中，確定了敏感的噪音接收地點，並且進行了噪音測量，以建立基線噪音聲級，並且採用運輸署提供的擬建新道路的交通流量預測（見表 1），作出公元二零一一年的噪音水平預測。交通噪音影響評估按「香港規劃標準與準則」的建議，採用英國運輸部發出的「道路交通噪音計算」（Calculation of Road Traffic Noise）推薦使用的技術。

「環境影響評估研究」確定，這條延伸道路啓用後，大約4300個住戶和兩所學校受到交通噪音的影響而超出噪音標準。爲了緩和未來的交通噪音問題，已經擬定整套直接技術補救方案，包括在這條道路全部路段上敷設低噪音路面以及沿著工程區域內的第五號幹線延伸路段和現有道路建築隔音蓋罩、半開式隔音蓋罩和隔音圍牆。這些措施在切實可行情況下，均已列入工程建議方案中。隔音圍牆將反射或吸收噪音，並在必要的地方加設視線擋板，用來遮擋有礙觀瞻的景象。建議的直接技術補救方案見圖 1。整個工程包括減緩噪音措施的資本成本總額爲港幣拾億元，其中減緩噪音措施的資本成本約爲港幣貳億陸仟柒百萬元。現在和預計的交通噪音水平以及噪音減緩措施對已經查明的敏感噪音接受地點的影響見圖 2。「環境影響評估研究」顯示，採用建議的減緩噪音措施後，現有的住戶將不需要採用窗戶隔音以及空氣調節等間接技術補救措施。

結論

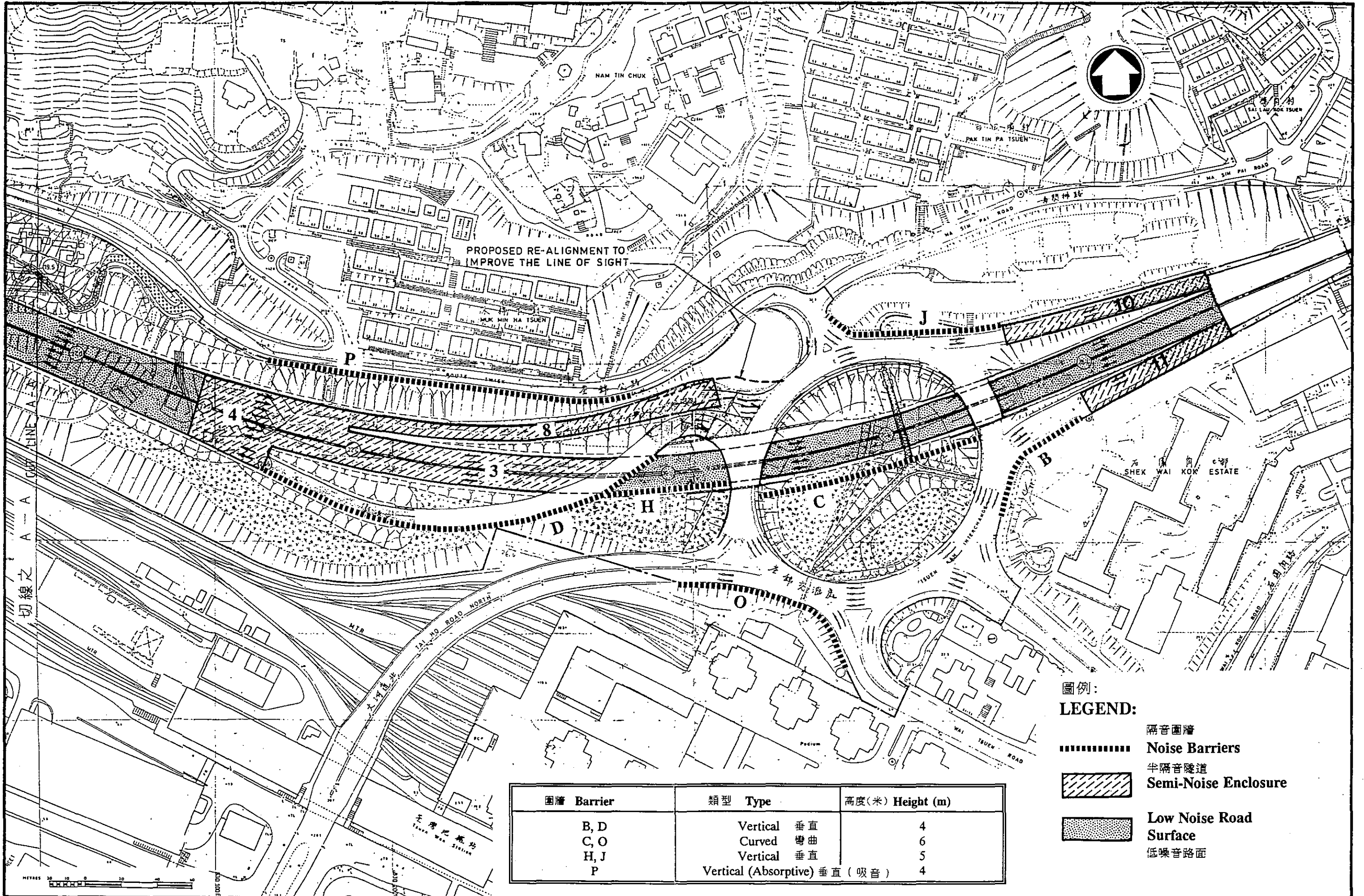
第五號幹線從石圍角至柴灣角的路段，是減少荃灣中區交通擠塞及環境影響的一項優先工程項目。

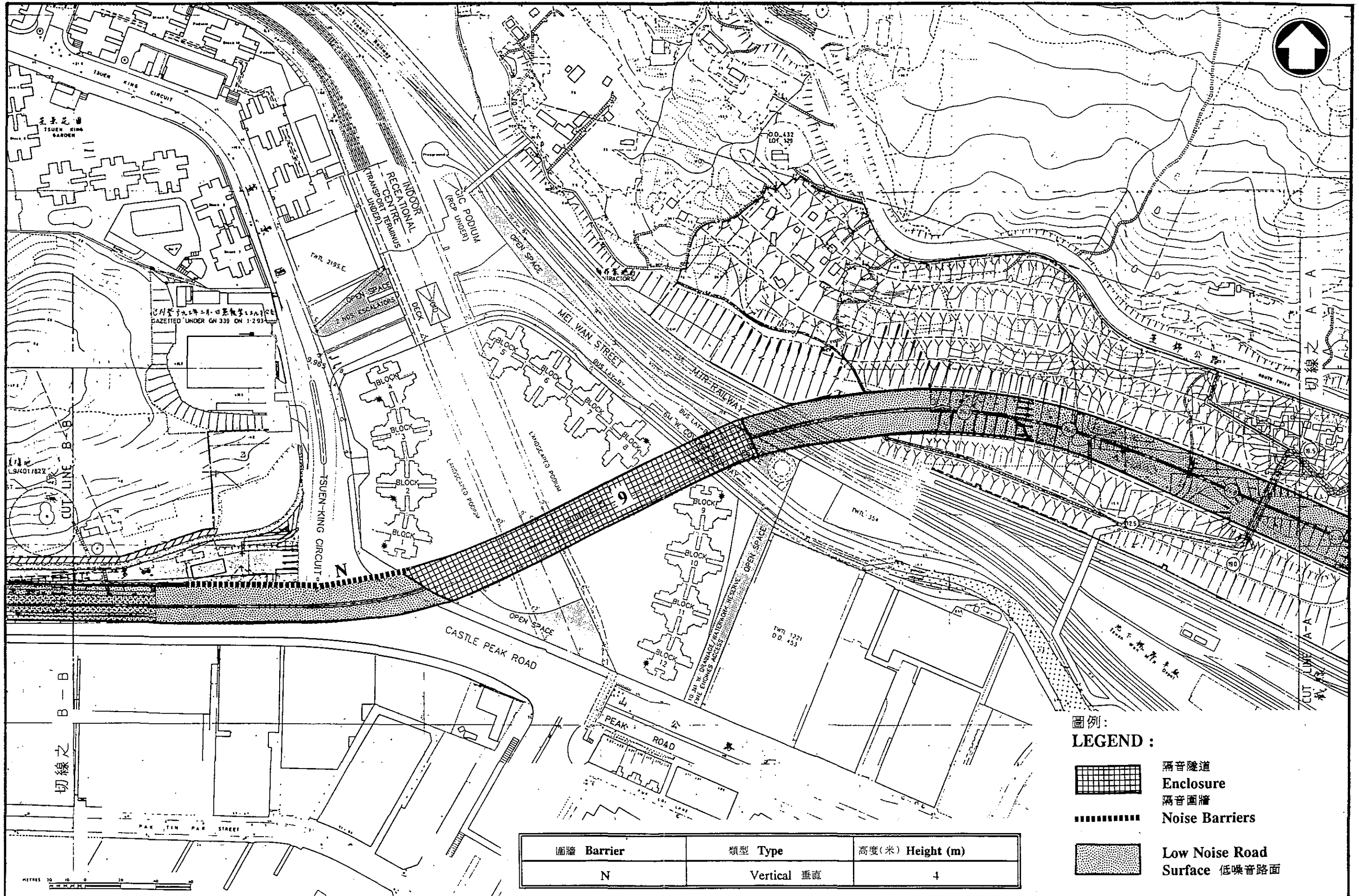
「環境影響評估研究」已經考慮這條道路所產生的所有各種環境影響的大小以及可接受程度，並且得出結論：關鍵的影響因素是道路建設及使用期間所產生的噪音。




研究人員已經考慮採用噪音減緩措施來降低交通噪音，並且建議在這條道路部份路段加設隔音圍牆和隔音蓋罩以及在路段敷設低噪音路面。

表 1: 2011年早上繁忙時間交通流量(車輛/每小時)

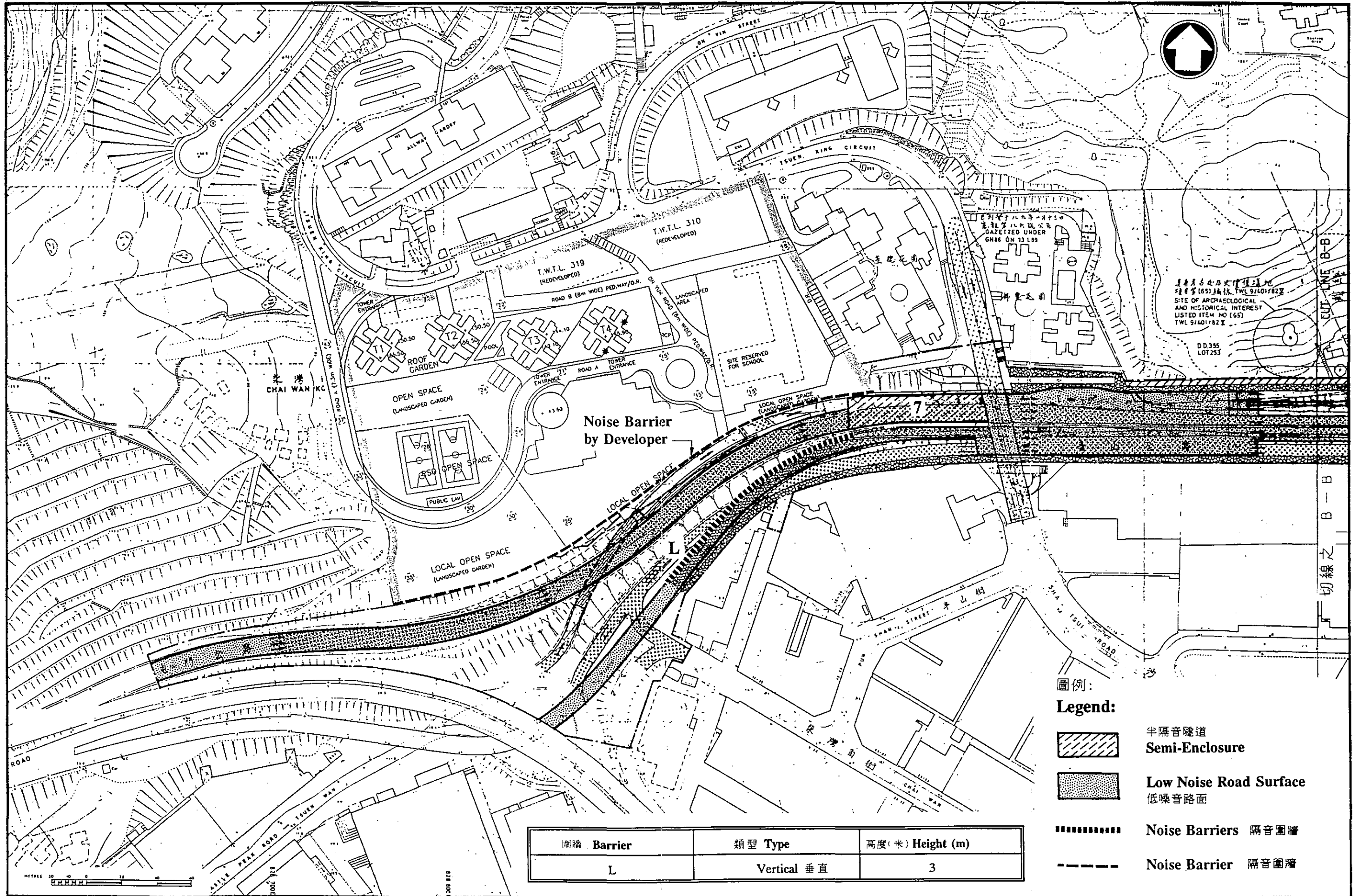
連接道路	交 通 流 量		
	車流方向	車輛總數	重型車輛(%)
第五號幹線			
象鼻山至荃錦交匯處	西行	1500	50
	東行	800	72
第五號幹線			
荃錦交匯處至青山公路	西行	2400	57
	東行	2400	53
從第五號幹線至 荃錦交匯處的連接支路	東行	1600	43
從荃錦交匯處至 第五號幹線的連接支路	西行	900	69
青山公路(地面)			
大涌道至大河道北	西行	1000	94
	東行	1600	39
第五號幹線至大涌道	西行	1400	40
	東行	1900	40
沙咀道至第五號幹線	西行	3800	52
	東行	4200	49
柴灣角交匯處至 沙咀道	西行	2000	48
	東行	2600	40
屯門公路	西行	1300	59
	東行	1500	63
大涌道	西行	600	38
	東行	700	42
荃景圍	西行	200	4
	東行	200	11
荃錦公路	西行	1100	71
	東行	900	37
象鼻山路	西行	900	37
	東行	1200	59
大河道北	西行	1200	35
	東行	700	49
德士古道北	西行	2300	60
	東行	2200	49
惠荃路	西行	300	54
	東行	500	34




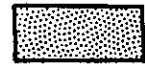

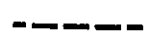


- 圖例:
LEGEND :
-  隔音隧道
Enclosure
 -  隔音圍牆
Noise Barriers
 -  Low Noise Road
Surface 低噪音路面

圍牆 Barrier	類型 Type	高度(米) Height (m)
N	Vertical 垂直	4



圖例:
Legend:

-  半隔音隧道
Semi-Enclosure
-  Low Noise Road Surface
低噪音路面
-  Noise Barriers 隔音圍牆
-  Noise Barrier 隔音圍牆

圍牆 Barrier	類型 Type	高度(米) Height (m)
L	Vertical 垂直	3

圖2 Figure 2
 Noise Sensitive Receivers
 敏感的噪音接收地點及噪音影響 and Noise Impact
 (共3頁第1頁) (Sheet 1 of 3)

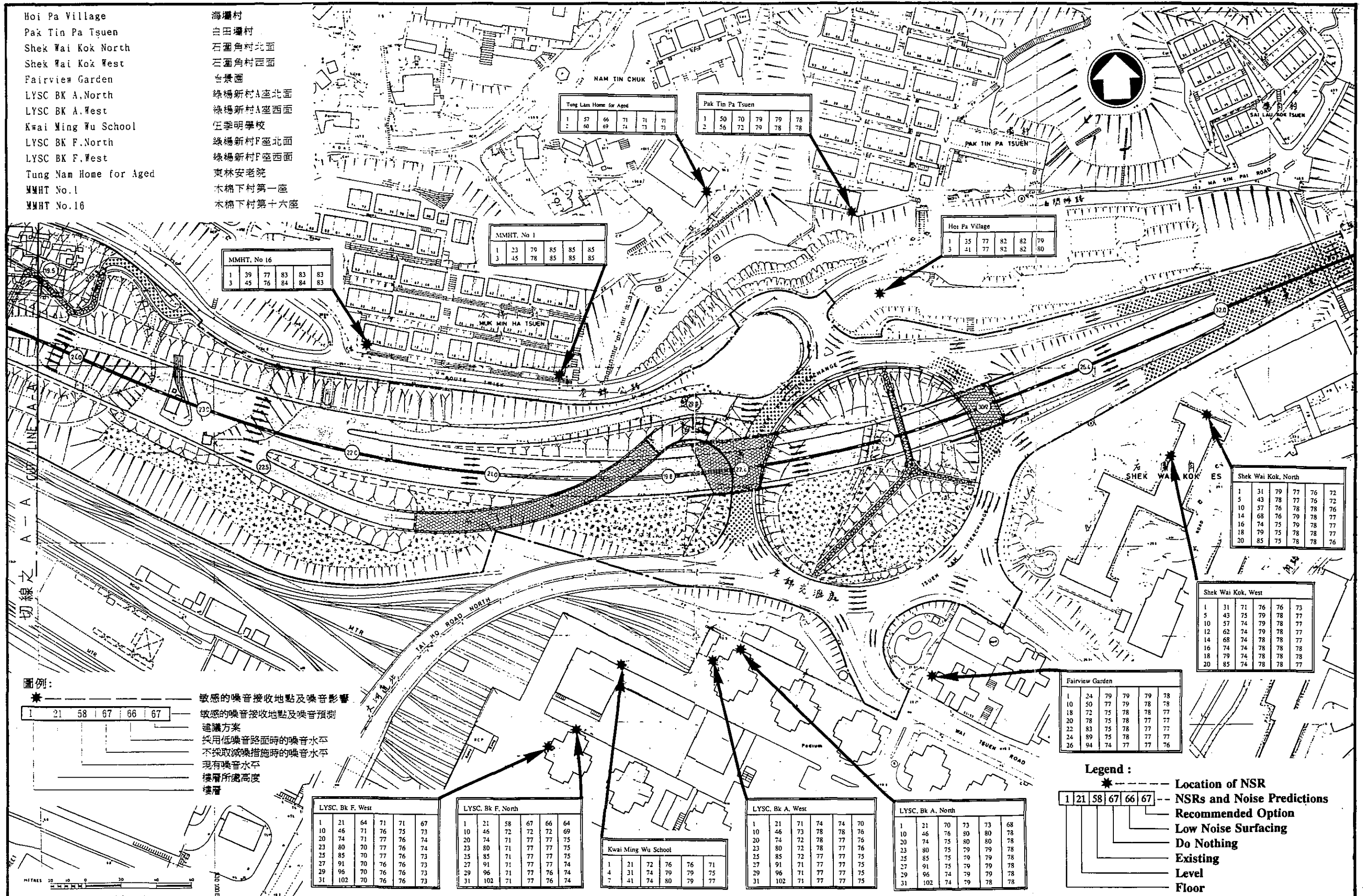


圖2 Figure 2
 Noise Sensitive Receivers
 敏感的噪音接收地點及噪音影響 and Noise Impact
 (共3頁第2頁) (Sheet 2 of 3)

