

**HIGHWAYS DEPARTMENT
MAJOR WORKS PROJECT MANAGEMENT OFFICE**

**AGREEMENT NO. CE 73/98
INVESTIGATION ASSIGNMENT FOR
WIDENING OF TOLO HIGHWAY/FANLING HIGHWAY
BETWEEN ISLAND HOUSE INTERCHANGE AND FANLING**

**ENVIRONMENTAL IMPACT ASSESSMENT
EXECUTIVE SUMMARY**

MARCH 2000



in association with

MVA Hong Kong Ltd
Enviros Hong Kong Ltd
ACL Asia Ltd
ERM Hong Kong Ltd

**HIGHWAYS DEPARTMENT
MAJOR WORKS PROJECT MANAGEMENT OFFICE**

**AGREEMENT NO. CE 73/98
INVESTIGATION ASSIGNMENT FOR
WIDENING OF TOLO HIGHWAY/FANLING HIGHWAY
BETWEEN ISLAND HOUSE INTERCHANGE AND FANLING**

**ENVIRONMENTAL IMPACT ASSESSMENT
EXECUTIVE SUMMARY**

MARCH 2000

Issue and Revision Record

Rev	Date	Originator	Checked By	Approved By	Description
A	Mar 2000	MCL/Enviros/ACLA	H T Cheng	K W Lee	First Issue

EIA EXECUTIVE SUMMARY

Contents

	Page
1. INTRODUCTION	1
2. PROJECT DESCRIPTION	1
3. ENVIRONMENTAL IMPACT ASSESSMENT	2
4. AIR QUALITY	2
5. NOISE	3
6. WATER QUALITY	3
7. WASTE DISPOSAL AND MANAGEMENT	4
8. ECOLOGY	4
9. LANDSCAPE AND VISUAL	5
10. ARCHAEOLOGICAL AND HISTORICAL MONUMENTS	6
11. ENVIRONMENTAL MONITORING AND AUDIT	6
12. CONCLUSIONS	6

LIST OF FIGURES

Figure 1.1 – 1.3	Location Plan
Figure 2	Typical Elevation and Details of Noise Barriers

1. INTRODUCTION

- 1.1 Tolo Highway and Fanling Highway form a vital part of the strategic Route 1, which links Hong Kong Island to Shenzhen. At present, the section between Sha Tin and Fanling is of dual 3-lane standard with the interchanges of dual-2 lane standard. Severe congestion is a frequent occurrence during peak periods, particularly in the Kowloon bound direction with traffic queues often stretching from Island House Interchange to Fanling.
- 1.2 The North East New Territories Development Strategy Review indicated that by 2006: the forecast traffic demand in the southbound direction of Tolo Highway and Fanling Highway between Island House Interchange and Fanling would exceed their design capacities; and that the vehicle/capacity ratios of several major interchanges along the Highways would also significantly exceed 1.2.
- 1.3 In order to ease the current traffic congestion problems and to cope with the increasing transport demands to and from the urban areas and also cross border traffic, the Tolo Highway and Fanling Highway are to be widened in phases, to dual 4-lane carriageway. Widening of a 5.4 km section of Tolo Highway between Sha Tin and Tai Po commenced in March 1999 for completion by the end of 2001.
- 1.4 This Project involves the Widening of a 8.7 km section of Tolo Highway and Fanling Highway between Island House Interchange and Fanling. Figures 1.1 to 1.3 show the extent of the widening works. The current developed implementation programme is for construction to commence in mid 2003 and for completion by the end of 2006.
- 1.5 The project is a designated project under the Environmental Impact Assessment (EIA) Ordinance (Cap.499) under Section A.1 of Schedule 2 and will require an environmental permit. The purpose of this Environmental Impact Assessment (EIA) is to provide information on the nature and extent of environmental impacts arising from this Project during the construction and operation phase. This will provide information for public consultation and provide a basis for project acceptance assessment by the Environmental Protection Department (EPD) and relevant authorities.
- 1.6 The EIA has been carried out in accordance with the requirements of the EIA Study Brief (no. ESB-004/1998 issued on 30.6.98). The Study Brief was prepared by the Government based on the Technical Memorandum of the EIA Ordinance (EIAO).

2. PROJECT DESCRIPTION

Introduction

- 2.1 The scope of works for the proposed widening of Tolo Highway/Fanling Highway project includes the following: -
 - (i) Widening a 4.7 km section of the Tolo Highway and a 4.0 km section of the Fanling Highway between Island House Interchange and Wo Hop Shek Interchange from the existing dual 3-lane to dual 4-lane;
 - (ii) Widening of the interchange sections at Island House Interchange, Tai Po North Interchange and Lam Kam Road Interchange from existing dual 2-lane to dual 3-lane including realigning the various slip roads;
 - (iii) Improving the existing sub-standard merging arrangement at the southbound carriageway of the Wo Hop Shek Interchange;

- (iv) Modifying and reconstructing the highway bridges, underpasses and footbridges intersecting the highways; and
- (v) Associated civil, geotechnical, landscaping, drainage electrical and mechanical installations, traffic control and surveillance systems, and environmental mitigation measures.

Alignment

- 2.2 The preferred alignment is the result of a detailed and complex selection process involving many aspects of engineering, traffic, environmental, land, programme and costs being taken into consideration. A further constraint on the design is that, as a road-widening scheme, the alignment must essentially follow the existing road.
- 2.3 The preferred alignment (see Figures 1.1 to 1.3) essentially follows the existing route, with widening on one side throughout. Widening on both sides was also considered but discounted owing to one side of the route being very heavily constrained relative to the other side.

3. ENVIRONMENTAL IMPACT ASSESSMENT

- 3.1 The EIA has identified Sensitive Receivers (SRs) within the Study Area, defined environmental parameters and features likely to be affected by the proposed project, and sets out the criteria and methodology on which impact assessments were based. Mitigation measures have been recommended for the environmental impacts arising from the proposed improvements exceeding the Hong Kong Planning Standards & Guidelines (HKPSG) and Technical Memorandum on Environmental Impact Assessment Process (TMEIA).
- 3.2 The environmental impact assessment has considered the impacts of the following aspects during construction and operation:
 - air quality;
 - noise;
 - water quality;
 - waste disposal and management;
 - ecology;
 - landscape and visual; and
 - archaeology and cultural heritage.
- 3.3 The findings of the impact assessments concerning the above are summarised in the following sections.

4. AIR QUALITY

- 4.1 A qualitative assessment on the construction dust impacts has identified that fugitive dust is the primary potential air pollutant during the road widening works. Established dust suppression techniques such as regular watering of haul roads, covering / dampening any stockpiles and dampening dusty materials before transportation, have been proposed. Through the proper implementation of the recommended mitigation measures, dust generation will be controlled and will not exceed the acceptable criteria. This, however, will be further verified through the EM&A program which will be undertaken as part of the construction works.
- 4.2 All roads within 500 m from the boundary of the project have been included in the CALINE4 model for assessing the traffic related air quality impacts. The CALINE4 modelling results indicate that neither the hourly NO₂ AQO or 24-hour RSP AQO will be exceeded during the operation phase of this project. Because these results are based upon both the worst case

traffic flows (Year 2020) and wind directions, it is concluded that the traffic related air quality impacts will be insignificant.

5. NOISE

- 5.1 The noise impact assessment has predicted that the unmitigated construction noise levels associated with the road widening works will likely cause adverse noise impacts at NSRs. Mitigation measures evaluated include the use of silenced PME, reduction in equipment number and its percentage on-time, as well as installation of noise barriers at appropriate locations. This approach was successful for all NSRs although the noise standard ($L_{eq(30\ min)}$ 65 dB(A) for school during examination period) cannot be fully attained at 2 locations. However, because the two schools, Wong Shiu Chi Middle School and HK Teacher's Association Secondary School, are on the list of EPD's "Noise Abatement Program in Schools", they are fully equipped with air conditioners and suitable window glazing. Therefore the construction noise impacts can be adequately mitigated and no residual noise impacts are anticipated.
- 5.2 Traffic noise impacts have been evaluated for the identified NSRs for the assessment year 2020 and Year 2002. All roads within 300 m from the boundary of the project limit have been included in the "roadNoise" model. The Year 2002 scenario has been assessed in order to determine the prevailing background noise levels prior to the commencement of the project. The traffic noise mitigation measures recommended in the final report on the "Noise Impact Assessment for 24 Hour Opening of Border Crossings" (Highways Department, 1996) for the road sections near Tai Hang Village have been included as part of the evaluation of the year 2002 prevailing noise climate of the surroundings. As the implementation program for other mitigation measures are yet to be determined, they are not included. The prediction results show that the Year 2002 traffic noise level will exceed the relevant EIA-TM noise standard at most NSRs.
- 5.3 It has been predicted that the unmitigated road traffic noise levels at most NSRs will exceed the relevant noise standards for the year 2020. As such, direct mitigation measures such as friction course road surfacing and noise barriers (see Figures 1.1 to 1.3) have been proposed. Following provision of vertical roadside and central reserve barriers (of height varying from 2 to 8 metres), as well as canopy type barriers (combination of a vertical barrier and a cantilever), the traffic noise levels due to the contribution from the project "new" roads are adequately mitigated to comply with the assessment criteria at all NSRs. Figure 2 shows the typical elevation and details of proposed noise barriers. The performance of the proposed mitigation measures for the Project also meets the criterion set out in the 24 Hour Opening of the Border Crossing study. Therefore, there are no significant traffic noise impacts caused by the Project.

6. WATER QUALITY

- 6.1 Water Quality sensitive receivers identified within the study area include Tai Po River, Lam Tsuen River, Ma Wat River, Wo Hop Shek Tributary and Tolo Harbour.
- 6.2 Water quality impacts arising during the construction phase pertain generally to demolition and reconstruction works and river training works. River training works will be carried out at three locations along the Ma Wat River at Tai Hang and Kiu Tau.
- 6.3 The assessments have shown the impacts to be locally confined and acceptable with the inclusion of standard mitigation measures. Recommendations have been made for monitoring of the works during the construction phase to ensure the impacts are acceptable. No residual impacts are expected following completion of the road widening works.

7. WASTE DISPOSAL AND MANAGEMENT

Waste Disposal

7.1 The potential environmental impacts from solid and construction waste streams generated by the proposed works has been assessed and an appropriate disposal strategy formulated. Wastes which will be generated during the construction phase include:

- vegetation and demolition waste from site clearance;
- excavated materials from earthworks (e.g. cuttings, pile foundations, regrading works);
- general construction waste (e.g. wood, scrap metal, concrete);
- bentonite slurries from pile construction;
- chemical wastes generated by general site practices (e.g. vehicle and plant maintenance/ servicing); and
- municipal wastes generated by site workers.

7.2 Based on a review of available information, no asbestos containing materials will be encountered during the construction.

Waste Management

7.3 Overall, the aim would be to implement waste management procedures to minimise potential impacts to the environment. This would be achieved by consideration and application of the following protocols :

- avoiding and/or minimising waste generation where practical by improvements or changes in the project design or site procedures;
- reusing/recycling/recovering materials where possible and thereby negating/ minimising disposal requirements (e.g. by waste segregation according to type, separation of recyclable materials such as metal, reuse of wood from site hoarding/concrete formwork, utilisation of excavated materials for filling or landscaping)
- ensuring that all treatment and disposal options comply with best practice and any relevant guidelines and legislation.

7.4 Normal construction waste management measures are proposed, including full consideration on the potential for re-use of excess spoil, segregation of recyclable and non-recyclable wastes (where practicable) and good housekeeping practice to minimise nuisances.

7.5 Waste generated from the operational phase of the road widening project is likely to be restricted to small volumes associated with intermittent maintenance works (e.g. tarmacadam from resurfacing works) and landscape upkeep (vegetation).

7.6 Provided that the mitigation measures outlined above are in place, potential impacts to the environment associated with waste generated by the construction and operational phases of the project will be controlled. Overall, waste disposal should not lead to significant adverse environmental impacts.

8. ECOLOGY

8.1 The 500 m study boundary either side of the highway encompasses a total of 207.37 ha, with the dominant ecological habitat comprising of agricultural land and woodland. Ecological survey was undertaken to establish the baseline ecological conditions. Key ecological sensitive receivers identified within the study area include the Tai Po egretty a designated Site of Special Scientific Interest (SSSI); natural woodland located at Yuen Chau Tsai, Ha Wun

Yui and Pun Chun Yuen; *Fung Shui* woodland at Shek Kwu Lung; agricultural land in the region of Tai Hang and Tai Wo; and several natural water courses.

- 8.2 Other minor impacts could include temporary disturbance of sensitive animal species within the area, fugitive dust emissions and water pollution. No adverse ecological impacts are anticipated following completion of the road widening.
- 8.3 Several mitigation measures can be implemented to minimise ecological impacts during the construction phase. A survey should be undertaken to identify the location and species of mature specimens of trees that warrant preservation. Boundaries of works areas should be fenced off to minimise encroachment of habitats. Vehicles and works areas should be frequently washed down with fresh water to minimise the spread of dust. In addition, waste interceptors should be implemented in works areas to protect water courses from spillages and dumping solid and liquid waste. Following completion of the road widening impacted areas should be landscaped and replanted with a variety of species of trees and shrubs that support native fauna.
- 8.4 Overall, no adverse ecological impacts are anticipated following completion of the highway.

9. LANDSCAPE AND VISUAL IMPACT

- 9.1 The construction phase of the proposed scheme would result in sources of visual impact arising from the loss of existing vegetation, the scale of the proposed earthworks and the nature of the construction activities to be undertaken. Although a higher adverse visual impact is predicted for the construction phase, these effects would be temporary in nature.
- 9.2 Overall during the opening year the sources of landscape and visual impacts would arise from the loss of the roadside vegetation, the disturbance caused by the new areas of cut and fill and construction of the proposed noise barriers.
- 9.3 The loss of roadside planting would initially have a large adverse visual impact on Visually Sensitive Receivers and on the existing landscape character of the local area particularly within the road corridor. This would expose views of the highway, and lead to a loss of the visual integration between the road corridor and the surrounding landscape.
- 9.4 The proposed areas of cut and fill would be visually prominent both within the road corridor and within the wider landscape context of the schemes visual envelope. However the existing level of visual disturbance caused by the highway structures would do much to lessen the perceived level of impact caused by the proposed works.
- 9.5 The proposed noise barriers and highway structures would, even with the design approach described above, form large and visually prominent structures both within the highway corridor and the wider landscape context. The proposed highway structures are generally replacing existing ones and so the level of adverse visual impact would remain largely unchanged. However, in the context of the wider landscape the combination of the proposed noise barriers and the roadside planting would successfully mitigate many of the adverse visual impacts caused by the operation of the widened highway.
- 9.6 During the design year, generally described as between ten and fifteen years after opening, the compensatory planting would have reached a level of maturity whereby it would perform the design role for which it was planted. This planting would reduce the adverse visual impacts caused by the proposed highway structures including the vertical barriers and ease the schemes perceived visual integration into the existing landscape.

9.7 The level of residual adverse impacts would be relatively low due to the existing disturbance caused by the existing highway and adjacent development, and the combined effect of the proposed mitigation measures. For the majority of the landscape and visual impacts predicted to occur as a result of the operational phase of the proposed widening scheme the residual impact would be 'acceptable with mitigation'.

9.8 The predicted impacts to the Planning and Development Control Framework would be negligible in that the proposed development has been designed where possible to stay within the existing landtake or widened within limited landtake and thus would not affect the viability of the existing planning designations within the highway corridor.

10. ARCHAEOLOGICAL AND HISTORICAL MONUMENTS

10.1 On the basis of the recommendation by the Antiquities and Monuments Office (AMO), a clause will be included in the contract document to require construction works to be carried out as unobtrusively as possible to avoid damage to and discourage visitors to Wun Yiu kiln and Yuen Chau Tsai.

10.2 A qualified archaeologist will also be employed during construction to carry out monitoring work at areas defined by the Antiquities and Monuments Office.

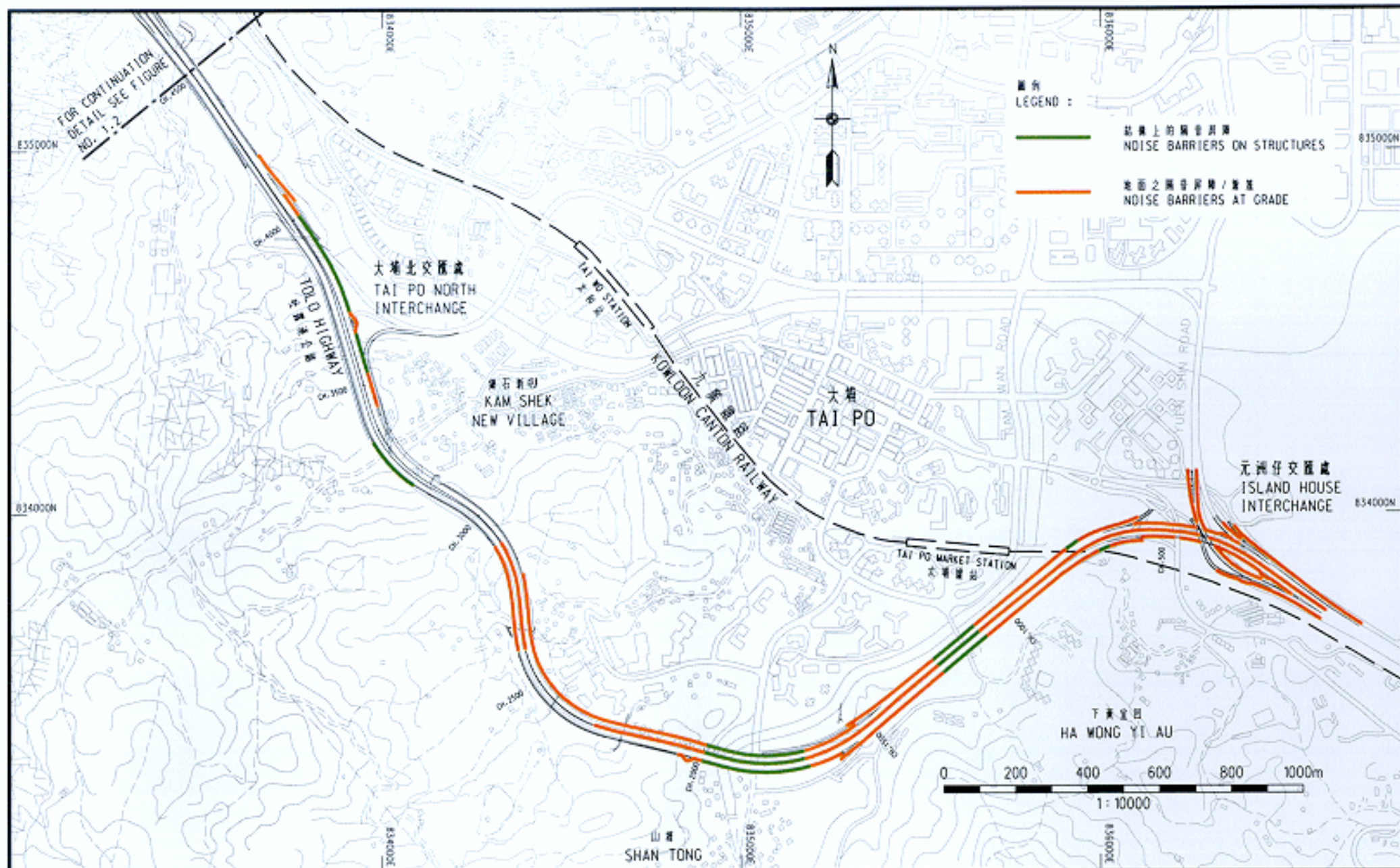
11. ENVIRONMENTAL MONITORING AND AUDIT

11.1 A comprehensive Environmental Monitoring and Audit (EM&A) programme has been recommended during construction and operation of the widened highways. The EM&A requirements cover air quality, noise, water quality, waste management, ecology, landscape and visual issues and cultural heritage and are a full reflection of the recommendations made within the EIA Report. With the inclusion of the recommended EM&A requirements into the works programme it is anticipated that the works can be carried out with full compliance of the standards set by the EIA Technical Memorandum.

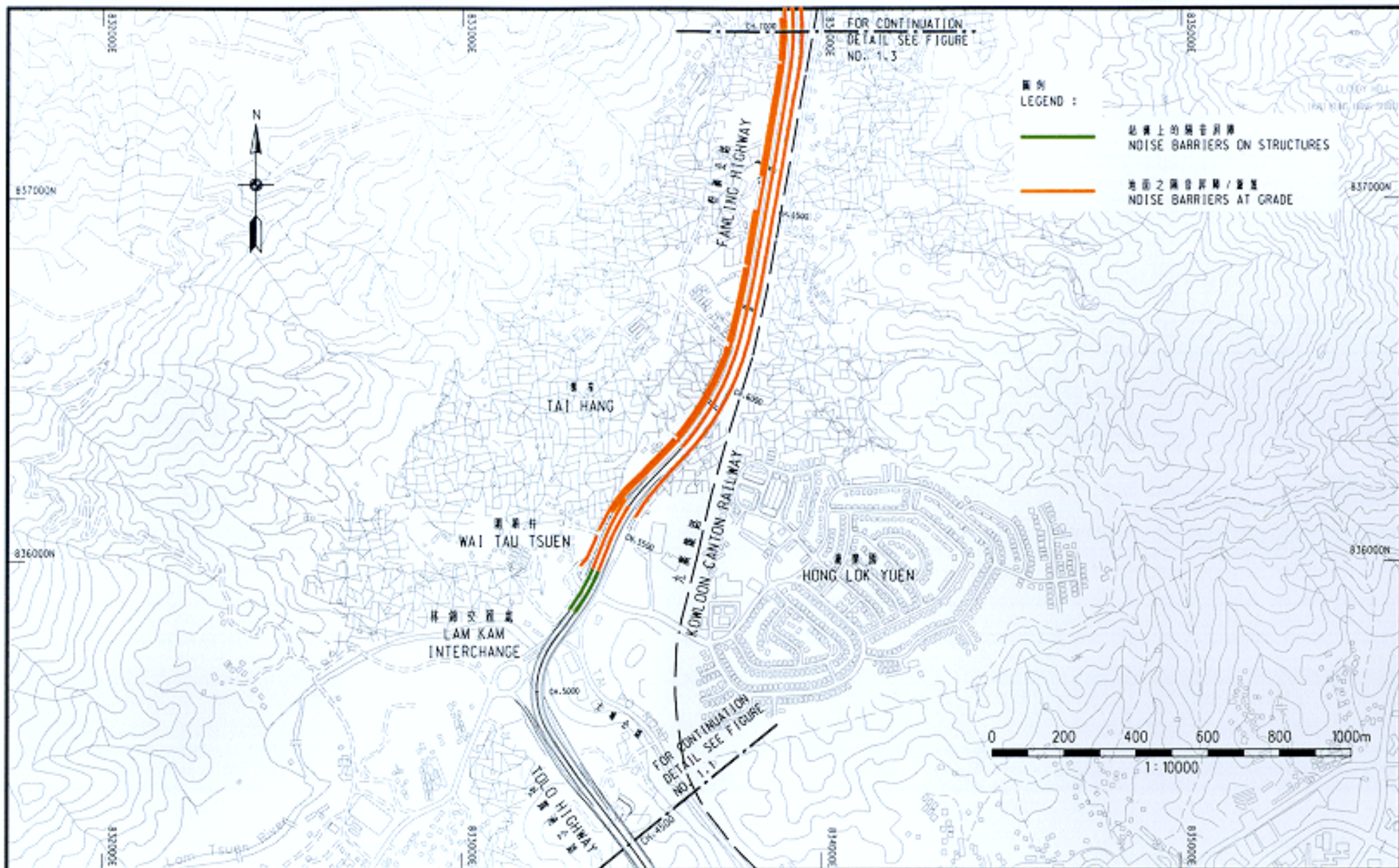
12. CONCLUSIONS

12.1 The Final EIA Report for Widening of Tolo Highway/Fanling Highway provides an assessment of the potential impacts associated with the construction and operation phase of the Project, based on the latest information available. From the assessments undertaken it is predicted that the Widening of Tolo Highway/Fanling Highway would comply with all environmental standards and legislation, provided that the recommended environmental control measures are implemented.

FIGURES



<p>Project 善政務司官邸附近道路交匯處與粉嶺之間的吐露港公路/粉嶺公路擴闊工程之研究諮詢 Investigation Assignment for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling</p>	<p>Title 位置圖 LOCATION PLAN</p>	<p>Figure No. 圖號 Figure 1.1</p> <table border="1"> <tr> <td>Date 03/2000 WAR. 2000</td> <td>Drawn</td> <td>Checked</td> <td>Approved</td> <td>Scale 圖樣顯示 AS SHOWN</td> </tr> </table> <p>CAD File: F:/PRDJ/551/SKETCH/FE1_1P2C</p>	Date 03/2000 WAR. 2000	Drawn	Checked	Approved	Scale 圖樣顯示 AS SHOWN	<p>Rev. P2</p>	<p>Mott 莫特 Connell 康尼爾 Mott Connell Limited 40/F Hopewell Centre 183 Queen's Road East, Hong Kong</p> <p>Tel No. 2828 5157 Fax No. 2827 1823</p>
Date 03/2000 WAR. 2000	Drawn	Checked	Approved	Scale 圖樣顯示 AS SHOWN					



Project 善政務司官邸附近道路交匯處與粉嶺之間的吐露港公路/粉嶺公路擴闊工程之研究諮詢
Investigation Assignment for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

Title 位置圖
LOCATION PLAN

Figure No.

圖號 Figure 1.2

Rev.

P2

Date
03/2000
MAR. 2000

Drawn

Checked

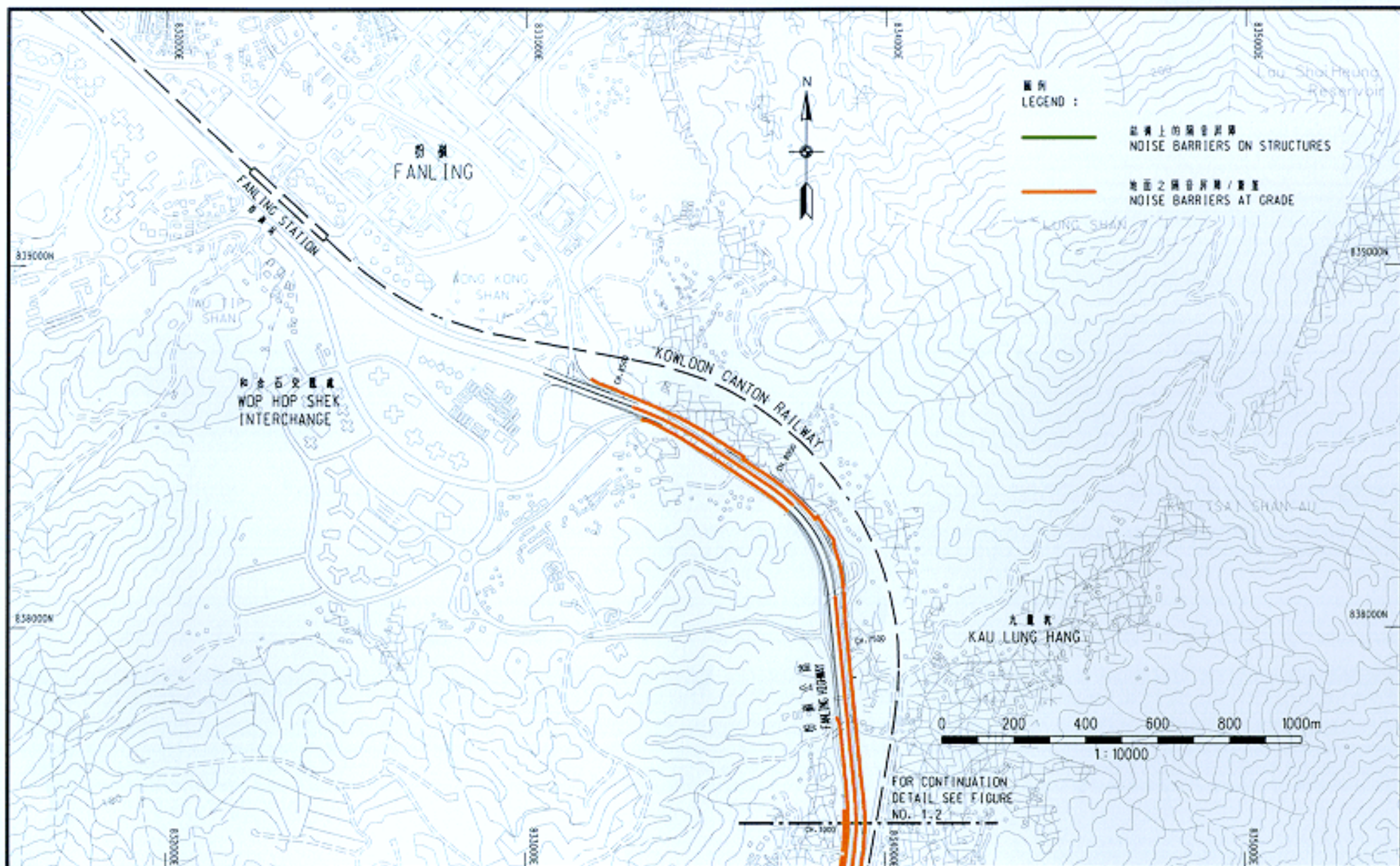
Approved

Scale
圖樣顯示
AS 5:00W

CAD File: F:\PROJ\551\SKE1CH\FE1_2P2C

Mott 美
Connell 茂
Mott Connell Limited
40/F Hopewell Centre
183 Queen's Road East, Hong Kong

Tel No. 2828 5757
Fax No. 2827 1823

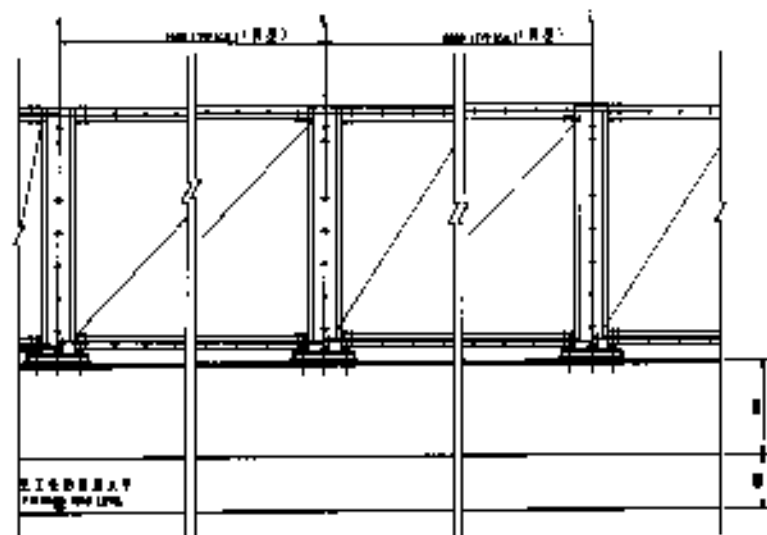


Project 善政務司官邸附近道路交匯處與粉嶺之間的吐露港公路/粉嶺公路擴闊工程之研究諮詢
Investigation Assignment for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

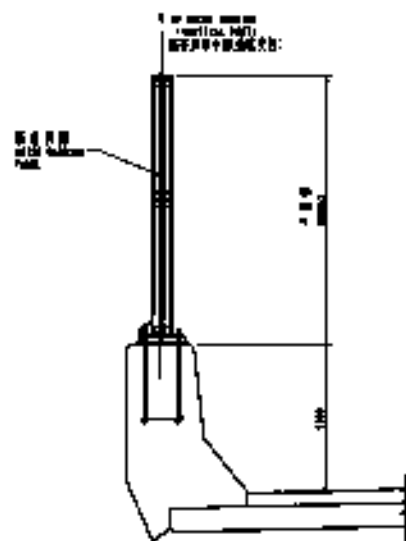
Title 位置圖
LOCATION PLAN

Figure No. 圖號 Figure 1.3
Rev. P2
Date 03/2000
03/2000
Drawn
Checked
Approved
Scale 1:10000
AS SHOWN
CAD File: F:\PROJ\551\SKE\ICH\FE1_3P2C

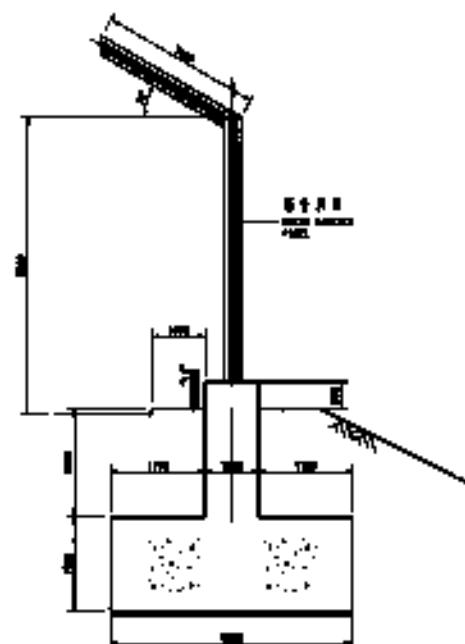
Mott
Connell
Mott Connell Limited
40/F Hopewell Centre
183 Queen's Road East, Hong Kong
Tel No. 2828 5757
Fax No. 2827 1823



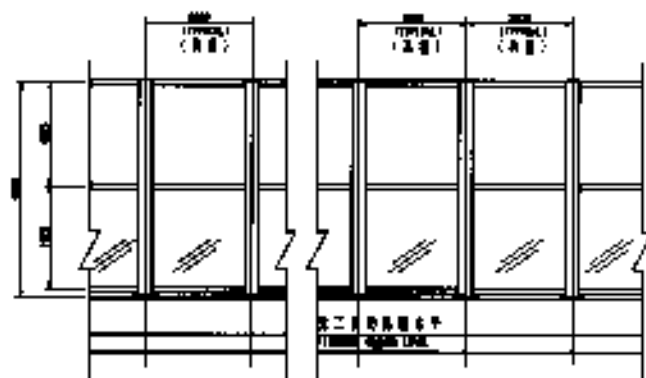
隔音屏障在橋面上的典型立面圖
TYPICAL ELEVATION OF NOISE BARRIER PANEL ON STRUCTURE
A1.1 參考圖則



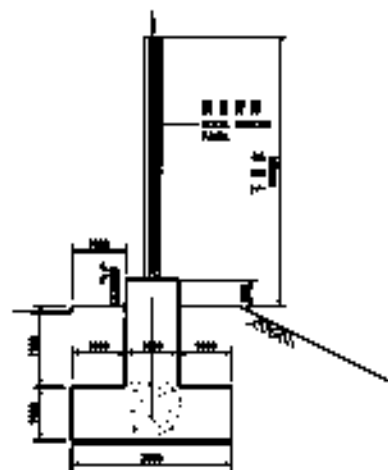
隔音屏障在橋面上的典型細節圖
TYPICAL DETAIL ON STRUCTURE
A1.2 參考圖則



帶篷式的隔音屏障在橋面上的典型細節圖
TYPICAL CANOPY NOISE BARRIER DETAIL AT GRADE
A1.3 參考圖則



隔音屏障在地面上的典型立面圖
TYPICAL ELEVATION OF NOISE BARRIER PANEL AT GRADE
A1.4 參考圖則



垂直式隔音屏障在地面上的典型細節圖
TYPICAL VERTICAL NOISE BARRIER DETAIL AT GRADE
A1.5 參考圖則

Project 新政府可甘屏附近道路交匯處與粉嶺之間的吐露港公路/粉嶺公路擴闊工程之研究諮詢
Investigation Assignment for Widening of Tolo Highway/Fanling Highway between Island House Interchange and Fanling

Title 隔音屏障的典型立面及細節圖
TYPICAL ELEVATION & DETAIL OF NOISE BARRIER

Figure No.

圖集 Figure 2

Rev.

P2

Date

03/2000
08. 2000

Drawn

Checked

Approved

Scale

1:50
AS SHOWN

CAD File: F:/PROJ/551/SKETCH/FE2P2C

Mott MacDonald
Mott
Corpsell
181 Queen's Road East, Hong Kong

Tel No: 2529 7722
Fax No: 2529 7723